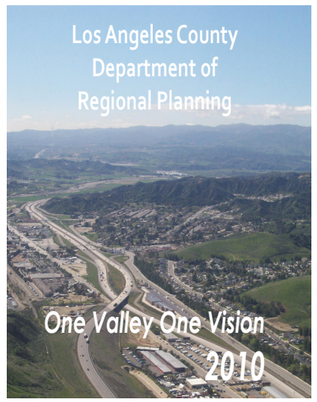

Revised Draft Program EIR
for the
County of Los Angeles'
Proposed
Santa Clarita Valley
Area Plan

Volume III
Appendix 3.13 (continued)

November 2010

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Los Angeles County Department of Regional Planning

Revised Draft Program EIR for the County of Los Angeles' Proposed Santa Clarita Valley Area Plan

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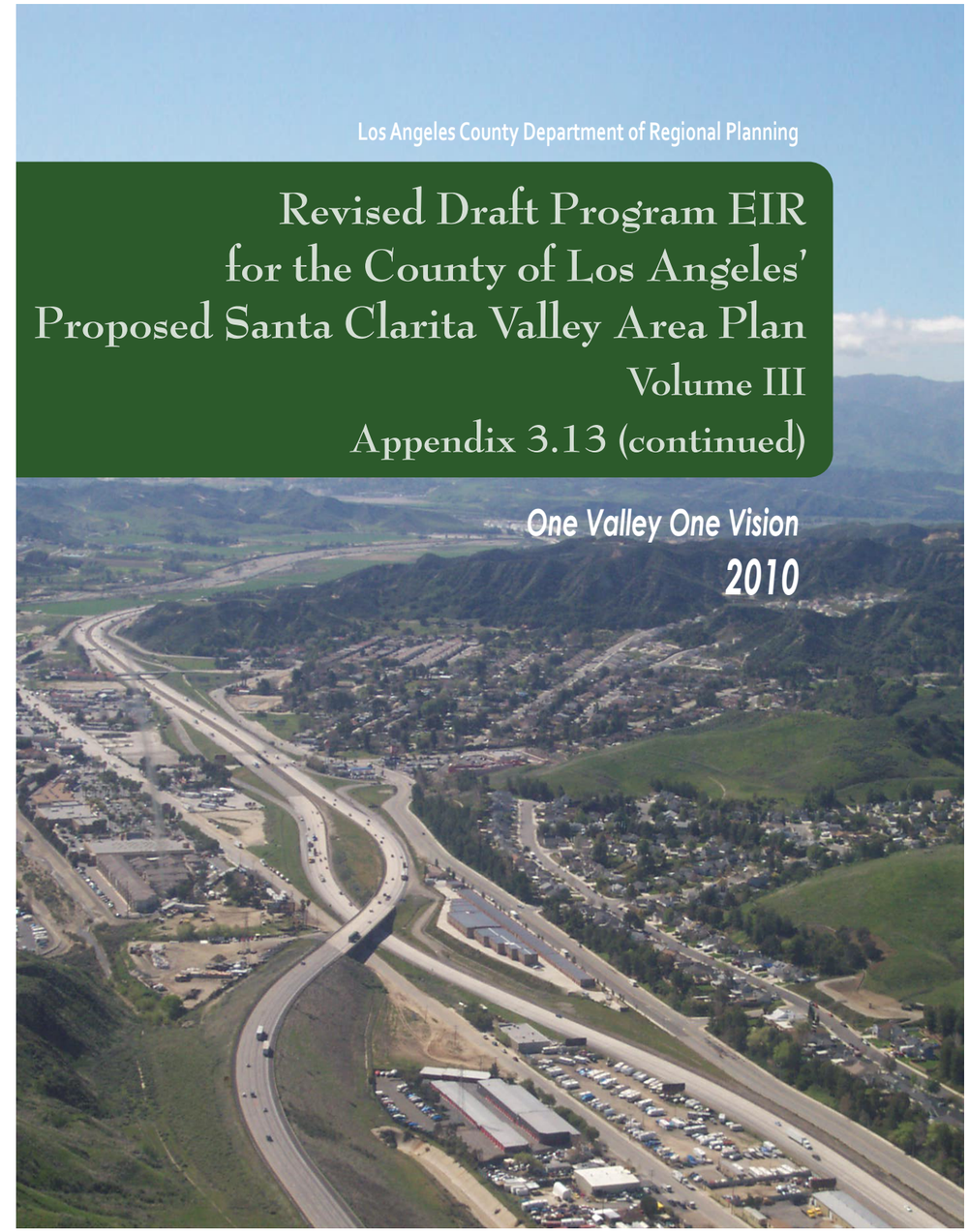
One Valley One Vision
2010



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Revised Draft Program EIR for the County of Los Angeles' Proposed Santa Clarita Valley Area Plan

Volume III

Appendix 3.13 (continued)

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November 2010

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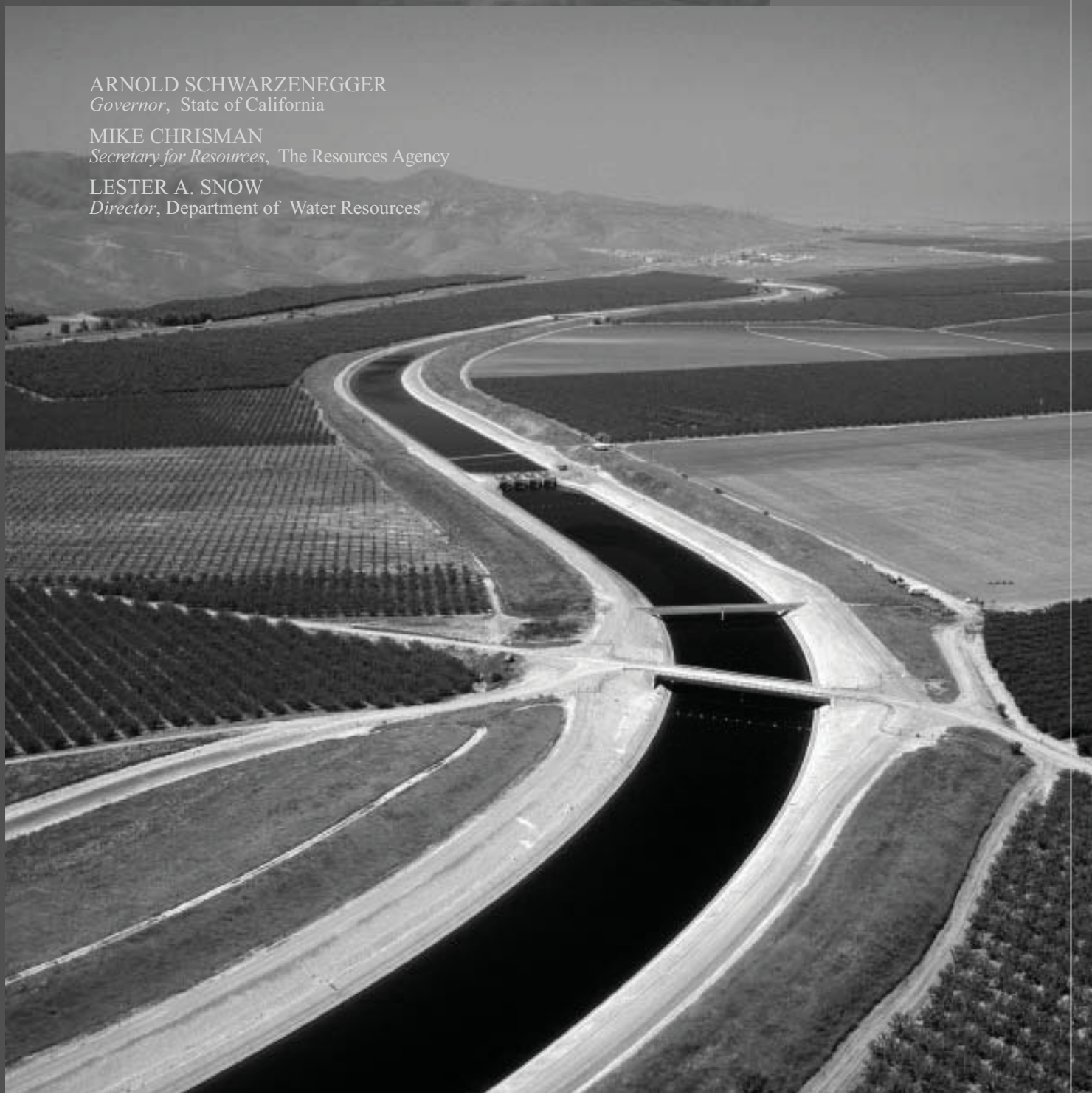

ARNOLD SCHWARZENEGGER
Governor, State of California

MIKE CHRISMAN
Secretary for Resources, The Resources Agency

LESTER A. SNOW
Director, Department of Water Resources

Chapter 9
Water Contracts and Deliveries

San Luis Reservoir

Significant Events in 2003

- On May 5, 2003, the Monterey Settlement Agreement was formally executed and was approved by the court on May 20, 2003. This settlement agreement offered an alternative to further litigation and, with certain conditions, allows the State Water Project to continue to operate pursuant to the Monterey Agreement while the new EIR is being prepared.
- The Department executed 39 long-term water supply contract amendments, 18 water conveyance/exchange agreements, 1 turn-in agreement, 10 turnout agreements, 34 Turnback Water Pool Program agreements, and 16 Article 21 Water Program agreements, with State Water Project contractors.
- The SWP approved delivery of 90 percent of SWP contractors' Table A requests, and conveyed 4,223,255 acre-feet to 27 long-term contractors and 26 other agencies.
- In 2003, 29,770 acre-feet of water were sold and purchased under the Turnback Water Pool Program.
- Implementation of the 2003 Colorado River Quantification Settlement Agreement resulted in a 2003 Exchange Agreement, pending execution, among Coachella Valley Water District, Metropolitan Water District of Southern California, and Desert Water District, which provides for the transfer of 88,100 acre-feet of Metropolitan's Table A amounts to Coachella, and 11,900 acre-feet of Metropolitan's Table A amounts to Desert.

The long-term water supply contracts for water service from the State Water Project between the Department and 29 local agencies are basic to the project's construction and operation. In return for State financing, constructing, operating, and maintaining facilities needed to provide water service, the agencies contractually agreed to repay all associated SWP capital and operating costs.

The Department delivers water to SWP contractors in accordance with their long-term water supply contracts.

These contracts set forth Table A amounts, which determine how much water a contractor may request each year from the Department.

Annual Table A represents the total amount of project water that an SWP contractor may request each year, according to that contractor's long-term water supply contract.

Approved Table A represents the amount of annual Table A requested by the contractors and approved for delivery by the Department, based on hydrologic conditions, current reservoir storage, and total requests by the SWP water contractors. The Department is not always able to deliver the quantity of water requested by the contractors; under certain

Long-Term SWP Water Supply Contracts

The first water supply contract was signed with the Metropolitan Water District of Southern California on November 4, 1960. The contract was negotiated by the Department and Metropolitan according to terms of the contracting principles for water service contracts announced by Governor Edmund G. Brown on January 20, 1960.

The Metropolitan contract became the prototype for all water contracts; by the end of 1967, 31 agencies had contracted for water. In addition, a water supply contract was executed with the City of West Covina in December 1963, but was terminated in August 1965; the city's Table A amount was transferred to Metropolitan through an amendment to the district's long-term contract with the Department. Long-term contracts with Hacienda Water District and Devil's Den Water District were also terminated when those districts transferred their Table A amounts, through contract amendments, to Tulare Lake Basin Water Storage District (1981) and Castaic Lake Water Agency (1992), respectively. Today the SWP has long-term water supply contracts with 29 agencies. Those contracts have been amended periodically to incorporate mutually desired modifications.

All water contracts signed in the 1960s included an estimate of the date water would first be delivered and a schedule of the amount of water the agency could expect to be delivered annually (annual Table A amounts). That amount was designed to increase gradually until the maximum amount of annual Table A was reached. The total combined maximum annual Table A amount for all water contracting agencies was initially 4,230,000 acre-feet, assuming full development of the SWP.

The contracts were initially designed to be valid for 75 years or until all bonds sold as part of the California Water Resources Development Bond Act were repaid, whichever period was longer. As a result of amendments to contracts in the 1990s, the current combined maximum annual Table A amount totals 4,172,786 acre-feet, and the contracts are in effect for the longest of the following periods: (1) the project repayment period, which extends to the year 2035; (2) 75 years from the date of the contract; or (3) the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

conditions, a lesser amount, allocated according to the long-term water supply contracts and the process noted above, is made available for delivery.

Approved Table A amounts may also be referred to in this chapter as *approved amounts* or *approved water.*

The long-term water supply contracts are amended as needed. During 2003, 39 amendments were executed, 27 of which were related to the Monterey Settlement Agreement. A number of long-term consolidated contracts, with the amendments integrated into the contract, are available online at www.swpao.water.ca.gov/wsc/index.cfm.

The Department also enters into miscellaneous agreements with SWP contractors and other agencies—which may be amended periodically—to convey SWP and non-SWP water through the California Aqueduct and to approve the construction, operation, and maintenance of turnouts along SWP facilities. During 2003, the Department executed 18 water conveyance/exchange agreements, 1 turn-in agreement, 10 turnout agreements, 34 Turnback Water Pool Program agreements, and 16 Article 21 Water Program agreements with SWP contractors. The Department also delivered water pursuant to 11 miscellaneous agreements executed prior to 2003 with the SWP contractors. Pending execution are 3 water conveyance/exchange agreements (including one unscheduled water program agreement) and 8 storage agreements.

The State Water Project Analysis Office has developed a numbering system for contracts, amendments, and agreements executed by the Department. These numbers, designated as SWPAO #XXXXX, are located in parentheses after each contract, amendment, or agreement.

Detailed information about amendments and agreements follows.

Amendments to Long-Term SWP Water Supply Contracts

All the original contracts signed by the Department and local agencies have been previously amended to incorporate mutually desired changes. Most amendments fall under the following five general categories:

(1) revision of annual Table A amounts in the water supply contracts;
(2) allocation of costs and benefits for the enlargement or extension of the East Branch and extension of the Coastal Branch of the California Aqueduct;
(3) purchase of excess capacity in the California Aqueduct;
(4) provisions to allow contractors, under certain conditions, to carry over undelivered SWP approved Table A water from one year for delivery in the next year; and
(5) implementation of Monterey Agreement principles.

The following long-term SWP Water Supply Contracts were amended during 2003.

Alameda County Flood Control and Water Conservation District-Zone 7. The Department executed Amendment No. 23 to the Water Supply Contract between Alameda-Zone 7 and the Department on August 1, 2003. The Amendment provided for the permanent transfer of 400 acre-feet of SWP Table A amounts from Tulare Lake Basin Water Storage District to Alameda-Zone 7, and set forth conditions for the transfer. The transfer is effective January 1, 2003. (SWPAO #03001)

Alameda County Flood Control and Water Conservation District-Zone 7. The Department executed Amendment No. 24 to the Water Supply Contract between Alameda-Zone 7 and the Department on November 7, 2003. This Amendment set forth the terms and conditions for the financing and repayment of costs attributable to the South Bay Aqueduct Enlargement. (SWPAO #03013)

Alameda County Flood Control and Water Conservation District-Zone 7. The Department executed Amendment No. 25 to the Water Supply Contract between Alameda-Zone 7 and the Department on October 31, 2003. The Amendment provided for the permanent transfer of 2,219 acre-feet of SWP Table A amounts from Kern County Water Agency to Alameda-Zone 7, and set forth conditions for the transfer. The transfer becomes effective January 1, 2004. (SWPAO #04002)

Coachella Valley Water District. The Department executed Amendment No. 18 to the Water Supply Contract between Coachella and the Department on October 10, 2003. The amendment provided for the permanent transfer of 88,100 acre-feet of SWP Table A amounts from Metropolitan Water District of Southern California to Coachella, and set forth conditions for the transfer. This amendment is a result of the 2003 Exchange Agreement pending execution, among Coachella, Metropolitan, and Desert Water Agency, which will provide for the transfer of 88,100 acre-feet of Metropolitan's Table A amounts to Coachella, and 11,900 acre-feet of Metropolitan's Table A amounts to Desert. The transfer is consistent with the implementation of the 2003 Colorado River Quantification Settlement Agreement. The amendment will become effective the later of January 1, 2004, or January 1 of the subsequent year that the 2003 Exchange Agreement becomes effective. The 2003 Exchange Agreement was not executed at the end of 2003. (SWPAO #04009)

County of Kings. The Department executed Amendment No. 16 to the Water Supply Contract between County of Kings and the Department on December 5, 2003. The amendment provided for the permanent transfer of 5,000 acre-feet of SWP Table A amounts from Tulare to County of Kings, and set forth conditions for the transfer. The transfer is effective January 1, 2004. (SWPAO #04004)

Desert Water Agency. The Department executed Amendment No. 18 to the Water Supply Contract between Desert and the Department on November 3, 2003. The amendment provided for the permanent transfer of 11,900 acre-feet of SWP Table A amounts from Metropolitan to Desert, and set forth conditions for the transfer. This amendment is a result of the 2003 Exchange Agreement pending execution, among Coachella, Metropolitan, and Desert Water Agency, which will provide for the transfer of 88,100 acre-feet of Metropolitan's Table A amounts to Coachella, and 11,900 acre-feet of Metropolitan's Table A amounts to Desert. The transfer is consistent with the implementation of the 2003 Colorado River Quantification Settlement Agreement. The amendment will become effective the later of January 1, 2004, or January 1 of the subsequent year that the 2003 Exchange Agreement becomes effective. The 2003 Exchange Agreement was not executed at the end of 2003. (SWPAO #04011)

Kern County Water Agency. The Department executed Amendment No. 36 to the Water Supply Contract between Kern and the Department on October 31, 2003. The amendment provided for the permanent transfer of 2,219 acre-feet of SWP Table A amounts from Kern to Alameda-Zone 7, and set forth conditions for the transfer. The transfer becomes effective January 1, 2004. (SWPAO #04001)

Metropolitan Water District of Southern California. The Department executed Amendment No. 27 to the Water Supply Contract between Metropolitan and the Department on October 24, 2003. The amendment provided for the permanent transfer of 88,100 acre-feet of SWP Table A amounts from Metropolitan to Coachella, and set forth conditions for the transfer. This amendment is a result of the 2003 Exchange Agreement pending execution, among Coachella, Metropolitan, and Desert, which will provide for the transfer of 88,100 acre-feet of Metropolitan's Table A amounts to Coachella, and 11,900 acre-feet of Metropolitan's Table A amounts to Desert. The transfer is consistent with the implementation of the 2003 Colorado River Quantification Settlement Agreement. The amendment will become effective the later of January 1, 2004, or January 1 of the subsequent year that the 2003 Exchange Agreement becomes effective. The

2003 Exchange Agreement was not executed at the end of 2003. (SWPAO #04008)

Metropolitan Water District of Southern California. The Department executed Amendment No. 28 to the Water Supply Contract between Metropolitan and the Department on October 24, 2003. The amendment provided for the permanent transfer of 11,900 acre-feet of SWP Table A amounts from Metropolitan to Desert, and set forth conditions for the transfer. This amendment is a result of the 2003 Exchange Agreement pending execution, among Coachella, Metropolitan, and Desert, which will provide for the transfer of 88,100 acre-feet of Metropolitan's Table A amounts to Coachella, and 11,900 acre-feet of Metropolitan's Table A amounts to Desert. The transfer is consistent with the implementation of the 2003 Colorado River Quantification Settlement Agreement. The amendment will become effective the later of January 1, 2004, or January 1 of the subsequent year that the 2003 Exchange Agreement becomes effective. The 2003 Exchange Agreement was not executed at the end of 2003. (SWPAO #04010)

Solano County Water Agency. The Department executed Amendment No. 19 to the Water Supply Contract between Solano and the Department on November 12, 2003. The amendment provided for the approval for Solano to pay only the prospective charge for the North Bay Aqueduct costs attributable to the 5,756 acre-feet annual Table A increase made effective in Amendment No. 17 to Solano's long term Water Supply Contract. The amendment becomes effective January 1, 2004. (SWPAO #03005)

Tulare Lake Basin Water Storage District. The Department executed Amendment No. 29 to the Water Supply Contract between Tulare and the Department on June 2, 2003. The amendment provided for the permanent transfer of 400 acre-feet of SWP Table A amounts from Tulare to Alameda-Zone 7, and set forth conditions for the transfer. The transfer is effective January 1, 2003. (SWPAO #03002)

Tulare Lake Basin Water Storage District. The Department executed Amendment No. 30 to the Water Supply Contract between Tulare and the Department on December 5, 2003. The amendment provided for the permanent transfer of 5,000 acre-feet of SWP Table A amounts from Tulare to Kings County, and set forth conditions for the transfer. The transfer becomes effective January 1, 2004. (SWPAO #04003)

Monterey Amendments

The Monterey Amendments increase the reliability of existing water supplies; provide stronger financial management for the SWP; and increase water management flexibility, providing more tools for local water agencies to maximize use of existing facilities.

The Monterey Amendments incorporated changes in determination of approved Table A water, the transfer of Table A amounts and land, financial restructuring, and increased operational flexibility. The Monterey Amendments are discussed in detail in Chapter 1, *Summary of Significant Events*, of Bulletin 132-95.

Plumas County Flood Control and Water Conservation District and Empire West Side Irrigation District, the only long-term SWP contractors who have not signed the Monterey Amendment, await completion of the EIR to decide whether to sign.

The Planning and Conservation League filed a lawsuit on December 27, 1995, challenging the California Environmental Quality Act compliance for the Monterey Amendment. A Sacramento County Superior Court judge later dismissed the lawsuit. PCL appealed the decision and on September 15, 2000, the Third District Court of Appeal reversed the Superior Court ruling. On December 13, 2000, the California Supreme Court denied review. The parties commenced mediation on March 26, 2002, and proceedings in Superior Court were stayed pending completion of mediation. On July 18, 2002, the parties reached agreement on principles for settling the lawsuit.

Monterey Settlement Agreement

On May 5, 2003, the Monterey Settlement Agreement was formally executed and was approved by the court on May 20, 2003. This settlement agreement offered an alternative to further litigation and, with certain conditions, allows the State Water Project to continue to operate pursuant to the Monterey Agreement while the new EIR is being prepared. The Department and the contractors agree not to approve any new projects or activity in reliance on the 1995 EIR, which was not approved, initiated or implemented prior to March 26, 2001, and the approval, initiation, or implementation of which would require a separate environmental document under CEQA. Information on the litigation can be found in *Chapter 6, Legislation and Litigation.*

The settlement agreement is a complex agreement with multiple components that balance the interests of the Department, the SWP contractors, Central Coast Water Authority, and Kern Water Bank Authority, with the disparate interests of the three plaintiffs.

All litigation costs will be paid by all SWP contractors, apportioned according to each agency's portion of the total maximum Table A Amounts as of January 1, 2003. Most of the contractors executed an agreement with the Department providing that the litigation costs will be allocated as incurred.

In addition to procedural items including attorney fees, mediation, and disposition of the lawsuit, items concerning the operation and management of the SWP are described below.

New Amendments to the SWP Contracts

The Department and 28 SWP contractors executed new amendments to the SWP long-term water supply contracts to improve and clarify disclosure of information about the delivery capability of the SWP. The amendments deleted the term "entitlement" and replaced that term with "Table A Amount." This does not change the Department's water delivery obligations or any other rights under the SWP contracts.

Language is also added to the bottom of each contractor's Table A to clarify that Table A is not to be interpreted to mean that the Department is able to deliver those amounts in all years. Empire, which has never signed the Monterey Amendment, did not execute the Monterey Settlement Amendment.

The amendment also requires the Department to distribute a biennial report to SWP contractors and all city, county, and regional planning agencies within the SWP project area, providing information as to SWP delivery capabilities, historic deliveries, and estimated deliveries under a range of hydrologic conditions. This report is intended to assist the SWP contractors in the assessment of the adequacy of the SWP component of their overall water supplies. The first edition of this report was issued in 2003 for SWP deliveries through 2002. More information on this report can be found in *Chapter 7, Water Supply Development and Reliability.*

SWP Availability

In addition to the biennial report mentioned above, the settlement agreement requires the Department to develop guidelines to assist the SWP urban contractors in providing information to land use planning agencies regarding local and regional programs to manage or supplement SWP supplies. The Department is also required to assist these contractors in providing complete and accurate information to land use agencies to assure that local land use decisions reflect accurate information on the availability of water from State, local, and other sources. Preparation of this document is underway.

New EIR

Agreement was reached on the content, scope, and process for the new EIR. The project to be analyzed in the new EIR is the Monterey Amendment and certain components of the settlement agreement. The Department will act as lead agency in preparing the new EIR. A Notice of Preparation was issued in January 2003 and scoping meetings were held throughout the State.

Under the agreement, a committee of plaintiffs and SWP contractors advises the Department on developing the EIR. The Department's Director serves as chair of this committee. Preparation of the new EIR is underway. The committee met nine times during 2003.

Public Participation in SWP Contract Negotiations

Future negotiations for SWP-wide contract amendments and for contract amendments to transfer Table A Amounts between SWP contractors will be conducted in public. The Department agrees that public review of significant changes to the water supply contracts is beneficial and in the public interest. The Department notified the contractors of this new process through Notice to State Water Project Contractors No. 03-10, on July 3, 2003, which is available online at swpao.water.ca.gov/notices/index.cfm).

Guidelines for Review and Approval of Permanent Water Transfers

The Department is required to issue guidelines to describe the process for the Department's review of proposed permanent transfers of Table A Amounts. These guidelines are to assist contractors in developing their transfer proposals and obtaining Department review expeditiously, and to assist the public in participating in that review. The Department issued these guidelines on July 3, 2003, through Notice to State Water Project Contractors No. 03-09 and published them in Bulletin 132-02, Chapter 9 (available online at swpao.water.ca.gov/publications/bulletin/02/Bulletin132-02.pdf).

Kern Water Bank

The Kern Water Bank will remain in local ownership and will operate as it has, but will be subject to additional restrictions on use. The Department agrees to prepare an independent study of KWB regarding impacts related to the transfer, development, and operation of KWB in light of the Kern environmental permits, as part of the new EIR.

Permanent Table A Transfers

The following permanent Table A transfers from Kern already completed under the Monterey Amendment are final:

- Kern to Mojave, Table A Amount of 25,000 acre-feet, effective 1998;
- Kern to Palmdale, Table A Amount of 4,000 acre-feet, effective 2000;
- Kern to Alameda-Zone 7, Table A Amount of 7,000 acre-feet, effective 2000;
- Kern to Alameda-Zone 7, Table A Amount of 15,000 acre-feet, effective 2000;
- Kern to Alameda-Zone-7, Table A Amount of 10,000 acre-feet, effective 2001;
- Kern to Solano, Table A Amount of 5,756 acre-feet, effective 2001; and
- Kern to Napa, Table Amount of 4,025 acre-feet, effective 2001.

The parties recognize that the Kern-Castaic Lake Water Agency 41,000 acre-feet Table A transfer is subject to pending litigation and agree that jurisdiction with respect to that litigation remain in the Los Angeles County Superior Court and that nothing in the agreement is intended to predispose the remedies or other actions that may occur in the pending litigation.

The potential environmental effects of these transfers are required to be analyzed in the new EIR.

Plumas County Flood Control and Water Conservation District

Plumas will resume payments pursuant to its SWP water supply contract beginning in 2003. The Department will not collect any Plumas arrearages. Plumas agreed to support the Monterey Amendments and, along with the other contractors, executed the amendment discussed above which deleted the term "entitlement" and replaced that term with "Table A Amounts."

Up to $8 million will be paid over 8 years to Plumas beginning in 2003, primarily for watershed

improvements for the mutual benefit of Plumas and the SWP in the Feather River watershed, and for other district-related purposes, to be disbursed with input from a watershed forum composed of representatives of Plumas, the Department, and SWP contractors. A technical committee composed of the Department, Plumas, SWP contractors, and local resource management groups was formed to assist the forum. To help the forum set priorities for watershed management and restoration action, a consultant was hired during 2003 to help prepare the Feather River Watershed Management Strategy.

In addition, the Department will offer Plumas an amendment to its water supply contract which will include the Department's agreement that water supplied to Plumas be determined based on availability of Lake Davis' water supply and that water deliveries to Plumas will not be reduced during SWP shortages so long as sufficient water is available from Lake Davis.

Miscellaneous Agreements with Long-Term SWP Contractors

2003 Water Conveyance/Exchange Agreements

During 2003, water conveyance/exchange agreements were executed or pending execution with long-term SWP contractors as described below.

Dudley Ridge Water District. A long-term agreement executed June 30, 2003, among the Department, Dudley Ridge, and Tulare, approved a change in point of delivery of a portion of Dudley Ridge's annual approved SWP water and other water supplies to Tulare's turnout at Reach 8D of the California Aqueduct. Two long-term water supply contract amendments with Tulare (Amendment No. 26) and Dudley Ridge (Amendment No. 24), were executed in December 2001 for the permanent transfer of 3,973 acre-feet of Tulare's Table A amounts to Dudley Ridge to accommodate the needs of Sandridge Partners, a landowner who farms in both Tulare and Dudley Ridge service areas. This is a subsequent agreement to provide delivery of water to Sandridge Partners in Dudley Ridge's service area through Tulare's turnout at Reach 8D. No water was delivered in 2003. (SWPAO #02005)

Dudley Ridge Water District. A letter agreement dated October 8, 2003, and executed November 18, 2003, among the Department, Dudley Ridge, and Tulare, approved the delivery of up to 4,000 acre-feet of Dudley Ridge's 2003 Table A amounts to Tulare at Tulare's turnout B in Reach 8D of the California Aqueduct. The agreement facilitated the water transfer from Dudley Ridge to Tulare on behalf of Sandridge Partners, who farms in both Dudley Ridge and Tulare service areas. During 2003, a total of 1,100 acre-feet was delivered to Tulare. (SWPAO #03052)

Dudley Ridge Water District. A letter agreement dated November 19, 2003, and executed November 20, 2003, among the Department, Dudley Ridge, and San Gabriel Valley Municipal Water District, approved the delivery of up to 11,458 acre-feet of Dudley Ridge's 2003 Table A amounts to San Gabriel at Reach 26A of the California Aqueduct. In exchange, San Gabriel will return a like amount of its future Table A amounts to Dudley Ridge by December 31, 2013. During 2003, a total of 8,700 acre-feet of Dudley Ridge's 2003 Table A amounts was delivered to San Gabriel. (SWPAO #03055)

Empire West Side Irrigation District. An agreement, pending execution between the Department and Empire, will provide for the delivery of unscheduled water to Empire in 2003 at times when project water is not needed for fulfilling approved Table A deliveries or for meeting project operational commitments. A total of 175 acre-feet of unscheduled water was delivered to Empire in 2003. (SWPAO #03012)

Kern County Water Agency. A letter agreement dated June 6, 2003, and executed July 3, 2003, between the Department and Kern, approved the delivery of up to 20,000 acre-feet of 2002 CVP water from three CVP contractors

to Kern. In exchange, Kern would return a like amount of its 2003 approved Table A amounts to the CVP contractors by December 31, 2003. The Department petitioned the State Water Resources Control Board on July 25, 2003, and received approval on August 26, 2003, for a temporary change of place of use for delivery of the return water. A total of 18,428 acre-feet was delivered to Kern from O'Neill Forebay and 18,428 acre-feet of water was returned to the CVP contractors at O'Neill Forebay in 2003. (SWPAO #03009)

Kern County Water Agency. A letter agreement dated June 12, 2003, and executed July 3, 2003, between the Department and Kern, approved the delivery of up to 13,000 acre-feet of 2001 CVP water from two CVP contractors to Kern. In exchange, Kern would return a like amount of its 2002 approved Table A amounts to the CVP contractors by December 31, 2002. The Department petitioned SWRCB on June 21, 2002, and received approval on August 16, 2002, for a temporary change of place of use for delivery of the return water. A total of 7,400 acre-feet was delivered to Kern from O'Neill Forebay and a total of 7,400 acre-feet of water was returned to the CVP contractors at O'Neill Forebay in 2002. (SWPAO #02014)

Kern County Water Agency. A letter agreement dated October 2, 2003, and executed December 15, 2003, among the Department, Kern, and Dudley Ridge, approved the delivery of up to 8,000 acre-feet of Kern's 2003 approved Table A amounts to Dudley Ridge at Reach 8D of the California Aqueduct. The agreement facilitated the water transfer from Kern to Dudley Ridge on behalf of the landowner Sandridge Partners who farms in both Kern and Dudley Ridge service areas. During 2003, a total of 8,000 acre-feet was delivered to Dudley Ridge. (SWPAO #03054)

Santa Clara Valley Water District. A letter agreement, pending execution between the Department and Santa Clara, provides for the delivery of up to 3,100 acre-feet of Brown's Valley Irrigation District's water (nonproject) to Santa Clara. This water, which is under Brown's Valley pre-1914 water rights, will be made available at Banks Pumping Plant and conveyed to Santa Clara at Reach 9 of the South Bay Aqueduct. Santa Clara requested this water be delivered pursuant to Article 55 of its long-term Water Supply Contract. During 2003, a total of 2,480 acre-feet of Brown's Valley water (nonproject) was delivered to Santa Clara. (SWPAO #03058)

Solano County Water Agency. A settlement agreement executed May 19, 2003, among the Department, Solano, and the Cities of Fairfield, Vacaville, and Benicia, and a conveyance agreement, executed concurrently between the Department and Solano, approved the delivery of up to 31,260 acre-feet annually of settlement water to Solano for delivery to the Cities of Fairfield, Vacaville, and Benicia. The agreements resulted from negotiations following the cities' petitions to SWRCB to appropriate water from the Sacramento River. The purpose of the agreements was to avoid disputing issues of appropriation before SWRCB. The agreement provides a supplemental water supply to the cities to assist in meeting current and future water demands through the North Bay Aqueduct. Water will be made available during excess conditions in the Delta as defined in the Coordinated Operations Agreement, or during balanced conditions when Water Rights Standard Permit term 91, which relates to availability of water for appropriation, is not in effect. The cities pay a fee per acre-foot of settlement water delivered during balanced conditions at NBA. The agreement remains in effect until December 31, 2035. During 2003, a total of 860 acre-feet of the settlement water was delivered to the Cities of Fairfield, Vacaville, and Benicia through Reaches 1 and 3A of the North Bay Aqueduct. (SWPAO #03017)

Tulare Lake Basin Water Storage District. A letter agreement dated April 14, 2003, and executed April 22, 2003, between the Department and Tulare, approved the transfer of up to 5,000 acre-feet of Tulare's 2003 approved Table A amounts to Westlands Water District at Reaches 5, 6, and 7 of the California Aqueduct on behalf of two landowners, Hansen Ranches

and Newton Farms, who farm in both the Tulare and Westlands service areas. The Department petitioned SWRCB on April 1, 2003, and received approval on May 23, 2003, for a temporary change of place of use. During 2003, a total of 3,900 acre-feet was delivered to Westlands at Reach 5. (SWPAO #03006)

Tulare Lake Basin Water Storage District. A letter agreement dated August 6, 2003, and executed August 25, 2003, between the Department and Tulare, approved the delivery of up to 25,000 acre-feet of Lower Tule River Irrigation District's water (nonproject) to Tulare at Reaches 8C and 8D of the California Aqueduct. Tulare requested this water be delivered pursuant to Article 55 of its long-term water supply contract. No water was delivered in 2003. (SWPAO #03007)

Tulare Lake Basin Water Storage District. A letter agreement dated April 4, 2003, and executed April 10, 2003, between the Department and Tulare, approved the transfer of up to 1,000 acre-feet of Tulare's 2003 Table A amounts to Westlands at Reach 7 of the California Aqueduct on behalf of Westlake Farms Inc., who farms in both Tulare and Westlands service areas. The water was delivered to Westlands for use on lands within the Kings County portion of Westland's service area. During 2003, a total of 1,000 acre-feet was delivered to Westlands at Reach 7. (SWPAO #03011)

Tulare Lake Basin Water Storage District. A letter agreement dated June 5, 2003, and executed August 25, 2003, between the Department and Tulare, approved the delivery of up to 10,000 acre-feet of nonproject water to Tulare at Reaches 8C and 8D (SWPAO #02025). Lower Tule River Irrigation District requested this water be delivered to Tulare and, in exchange, will receive a like amount of Tulare's Tule River water. Tulare requested the water be delivered pursuant to Article 55 of its long-term water supply contract. The water was made available at Banks Pumping Plant and delivered to Tulare in 2002. A subsequent Amendment pending execution between the Department and Tulare, will amend the delivery amounts to 10,596 acre-feet. (SWPAO #04022)

Water Conveyance/Exchange Agreements Prior to 2003

During 2003, water delivered pursuant to agreements with SWP contractors that were executed prior to 2003, is described below.

Alameda County Flood Control and Water Conservation District-Zone 7. A conveyance agreement dated July 28, 1995, between Alameda-Zone 7 and the Department, provides for the transfer of up to 5,000 acre-feet of Byron-Bethany Irrigation District's local water annually to Alameda-Zone 7 through SWP facilities. An amendment to extend the agreement to December 31, 2001, was executed April 26, 2002. Byron-Bethany may only transfer water that has been made available by conservation and crop idling. In 2003, 1,000 acre-feet of Byron Bethany's local water was pumped at Banks Pumping Plant and delivered to Alameda-Zone 7's turnouts in the South Bay Aqueduct. (SWPAO #02325)

Castaic Lake Water Agency. An agreement executed on December 27, 2001, among the Department, Castaic Lake, United Water Conservation District, Newhall Land and Farming Company, Newhall County Water District, and Los Angeles County, provided for the temporary extension through December 31, 2001, to store and release up to 8,786 acre-feet of local flood flows in Castaic Reservoir to Castaic Lake. United, a member unit of Ventura, transferred 4,512 acre-feet of stored local water to Castaic Lake in 2001. In 2003, Castaic Lake released 6,768 acre-feet of its 2003 Table A allocation to the Department (1.5 times the amount transferred by United). The Department in turn released 6,768 acre-feet of local water from Piru Creek to United. (SWPAO #01036)

Kern County Water Agency. An agreement executed on June 8, 2000, among the Department, Kern, and Western Hills Water District, approved delivery of 8,000 acre-feet of pre-1914 Lower Kern River Rights water banked in

Kern's share of the Pioneer Groundwater Banking Project. A portion of Kern's annual Table A amounts will be delivered annually to Western Hills from Reach 2A of the California Aqueduct; in exchange, Kern will take a like amount of banked local water from the Pioneer Groundwater Bank. The Department petitioned SWRCB and by SWRCB Order dated April 21, 2000, Western Hills' service area was included within the authorized SWP place of use. During 2003, a total of 917 acre-feet of Kern's Table A amounts was delivered to Western Hills at Reach 2A. (SWPAO #01001)

Kern County Water Agency. A letter agreement executed October 11, 2002, between the Department and Kern, approved the delivery of up to 30,000 acre-feet of nonproject water from four CVP contractors, members of the San Luis and Delta Mendota Water Authority, to Kern in 2000. In exchange, Kern would return a like amount of its approved Table A amounts to CVP contractors by December 31, 2003. During 2000, a total of 23,941 acre-feet of CVP water was delivered to Kern. During 2003, a total of 1,787 acre-feet was returned to CVP contractors. A balance of 22,154 acre-feet remained to be returned to the CVP contractors at the end of the contract term. (SWPAO #00032)

In a letter dated August 1, 2003, Kern requested an extension on the return period of the CVP water since Kern was unable to return all the water by December 31, 2003. Extension of the return period and other possible alternatives for Kern to return the remaining water to CVP contractors are being discussed among the Department, Kern, and San Luis and Delta Mendota Water Authority.

Mojave Water Agency. An agreement executed November 13, 1997, among AVEK, Mojave, and the Department, approved a change in point of delivery through 2019 of up to 2,250 acre-feet annually of Mojave's approved Table A amount to AVEK's Fairmont Turnout in Reach 19 of the California Aqueduct. Mojave does not have conveyance facilities to provide service to a solar energy generating station located within its service area. AVEK has conveyance capability and has agreed to provide service. During 2003, the Department delivered 816 acre-feet of Mojave's 2003 approved Table A amounts through AVEK's turnout at Reach 19. (SWPAO #97003)

San Bernardino Valley Municipal Water District. San Bernardino and Metropolitan entered into an agreement, Attachment 2, Coordinated Use Agreement for Conveyance Facilities and State Water Project Water Supplies, on May 14, 2001. The Department responded on February 27, 2002, concurring with the agreement and acknowledging the coordinated use of local facilities currently existing within San Bernardino's jurisdictional boundaries. This coordinated use involves delivery of San Bernardino's SWP water to Metropolitan's facilities within San Bernardino's service area. This action is permitted under Article 10 of the long-term water supply contract. During 2003, a total of 5,000 acre-feet of San Bernardino's approved Table A amounts was delivered to Metropolitan at Reach 26A. (SWPAO #02035)

Tulare Lake Basin Water Storage District. A letter agreement, dated June 15, 2001, and executed July 26, 2001, between the Department and Tulare, approved the delivery of up to 50,000 acre-feet of nonproject water from Westlands to Tulare between December 2000 and April 15, 2001, in exchange for a like amount of Tulare's Table A amounts during 2001 through 2003. The delivery of SWP exchange water to Westlands will be from the Delta to Reach 7 of the California Aqueduct, for use within the Kings County portion of Westlands' service area. A combined total of 28,145 acre-feet was delivered to Tulare during 2000 and 2001. During 2001, 1,975 acre-feet were returned to Westlands. During 2002, a total of 12,067 acre-feet was delivered to Westlands, leaving a balance of 14,103 acre-feet to be returned to Westlands. During 2003, a total of 14,103 acre-feet was returned to Westlands, completing this agreement. (SWPAO #01009)

EWA 2:1 Exchange Agreements

During 2002, six SWP contractors had agreements with the Department for the in lieu exchange of a portion of their 2002 Table A amounts for stored Environmental Water Account water. A portion of the EWA water subject to "spilling" in San Luis Reservoir was made available for exchange as of midnight March 29, 2002. For every two units of EWA water delivered to each contractor noted below, the contractor returned one unit of its 2002 approved Table A amounts to EWA by August 31, 2002. The following agreements include provisions concerning the exchanges.

Alameda County Flood Control and Water Conservation District, Zone 7. A letter agreement, dated March 27, 2003, and executed April 4, 2003, between the Department and Alameda-Zone 7, approved an in lieu exchange of a portion of Alameda-Zone 7's 2002 approved Table A amounts for up to 2,000 acre-feet of stored EWA water. During 2002, a total of 803 acre-feet of EWA water was delivered to Semitropic in April in accordance with the *Alameda County Flood Control and Water Conservation District, Zone 7 and Semitropoic Water Storage District Banking Program Agreement*, pursuant to a change in point of delivery agreement among the Department, Alameda-Zone 7, and Kern (SWPAO #02010); a total of 402 acre-feet of Alameda-Zone 7's 2002 Table A amounts was returned to EWA in July and August. (SWPAO #02017)

Alameda County Water District. A letter agreement, dated March 28, 2003, and executed April 8, 2003, between the Department and Alameda County, approved an in lieu exchange of a portion of Alameda County's 2002 approved Table A amounts for up to 2,000 acre-feet of stored EWA water. During 2002, a total of 571 acre-feet of EWA water was delivered to Alameda County in March and April, and a total of 286 acre-feet of Alameda County's 2002 Table A amount was returned to EWA in July and August. (SWPAO #02018)

Dudley Ridge Water District. A letter agreement, dated March 27, 2003, and executed April 9, 2003, between the Department and Dudley Ridge, approved an in lieu exchange of a portion of Dudley Ridge's 2002 approved Table A amount for up to 4,000 acre-feet of stored EWA water. During 2002, the Department delivered a total of 2,140 acre-feet of EWA water to Dudley Ridge, of which 1,597 acre-feet were delivered to Dudley Ridge's turnout and 543 acre-feet were delivered to Tulare's turnout in March and April pursuant to a long-term change in point of delivery agreement among the Department, Dudley Ridge, and Tulare (SWPAO #02005). A total of 1,070 acre-feet of Dudley Ridge's 2002 Table A amounts was returned to EWA in July and August. (SWPAO #02020)

Kern County Water Agency. A letter agreement, dated March 28, 2003, and executed April 15, 2003, between the Department and Kern, approved an in lieu exchange of a portion of Kern's 2002 approved Table A amounts for stored EWA water. During 2002, a total of 6,744 acre-feet of EWA water was delivered to Kern in March and April, and a total of 3,372 acre-feet of Kern's 2002 Table A amounts was returned to EWA in July and August. (SWPAO #02021)

Santa Clara Valley Water District. A letter agreement, dated March 27, 2003, and executed April 15, 2003, between the Department and Santa Clara, approved an in lieu exchange of a portion of Santa Clara's 2002 approved Table A amounts for up to 2,176 acre-feet of stored EWA water. During 2002, a total of 1,448 acre-feet of EWA water was delivered to Santa Clara in March and April, and a total of 724 acre-feet of Santa Clara's 2002 Table A amounts was returned to EWA in July and August. (SWPAO #02019)

Tulare Lake Basin Water Storage District. A letter agreement, dated March 28, 2003, and executed August 25, 2003, between the Department and Tulare, approved an in lieu exchange of a portion of Tulare's 2002 approved Table A amounts for up to 800 acre-feet of stored EWA

water. During 2002, a total of 675 acre-feet of EWA water was delivered to Tulare in March and April, and a total of 337 acre-feet of Tulare's 2002 Table A amounts was returned to EWA in July and August. (SWPAO #02023)

Turn-in Agreements

Antelope Valley-East Kern Water Agency. A turn-in agreement executed April 1, 2003, between the Department and AVEK, approved the introduction of local water into the California Aqueduct during 2001. The local water was introduced from a temporary turn-in structure located at Reach 22B, and AVEK took delivery of local water by exchange with project water delivered upstream in Reach 22A. During 2001, a total of 152 acre-feet of local water was introduced at Reach 22B and 152 acre-feet of SWP water was delivered to AVEK at Reach 22A. (SWPAO #01029)

Kern County Water Agency. During 2003, a total of 20,486 acre-feet of local water was introduced into California Aqueduct through Kern's existing turnouts in Reaches 12E and 13B. Letter agreements to allow the introduction of local water are pending.

Turnout Agreements

Alameda County Flood Control and Water Conservation District, Zone 7. An agreement dated January 23, 2002, between the Department and Alameda-Zone 7, allowed the construction, operation, and maintenance of the Corbett-Ising Turnout at Milepost 14.2, Reach 4 of the South Bay Aqueduct. The turnout has a design capacity of 6.7 cfs. Construction was essentially completed in 2002, but not formally accepted in 2003.

Antelope Valley-East Kern Water Agency. An agreement dated March 28, 2000, between the Department and AVEK, allowed the construction, operation, and maintenance of the Rancho Vista Turnout at Milepost 339.68, Reach 20B of the California Aqueduct. The turnout has a design capacity of 5 cfs. Construction was completed in March 2000, but was not formally accepted in 2003.

Kern County Water Agency and Belridge Water Storage District. An agreement dated October 29, 2001, among the Department, Kern, and Belridge Water Storage District, allowed the modification, operation, and maintenance of the existing Belridge Turnout No. 1A at Milepost 209.71, Reach 10A of the California Aqueduct. The turnout has a design capacity of 100 cfs. Modification work was completed in 2002, and formally accepted on March 27, 2003.

Agreements and Activities Related to the Monterey Amendments

Turnback Water Pool Program. Pursuant to Article 56(d) of the Monterey Amendments, the eighth year of the Turnback Water Pool Program was initiated through Notice to State Water Project Contractors No. 03-02, dated February 3, 2003. All SWP contractors who signed Monterey Amendments were permitted to participate in the program. The program allowed SWP contractors to offer a portion of their approved 2003 Table A water for sale in a turnback pool for use by interested SWP contractors. Based on Table A supply and demand, the turnback water was allocated among the selling and purchasing contractors. In 2003, 29,770 acre-feet of water were purchased under the Turnback Water Pool Program.

Transactions for Pool A and Pool B of the Turnback Water Pool Program occurred in February and March 2003, respectively. Turnback water sold for $11.90 per acre-foot—50 percent of the Delta Water Rate—through Pool A, and for $5.95 per acre-foot—25 percent of the Delta Water Rate—through Pool B. All money collected through the Turnback Water Pool Program was paid to the selling contractors. The 2003 Turnback Water Pool Program closed April 1, 2003. Notices to State Water Project Contractors describing the Turnback Water Pool Program are available online at www.swpao.water.ca.gov/notices/index.cfm.

Table 9-1 lists contractors who participated in Pool A and Pool B of the Turnback Water Pool Program.

Storage of Water Outside Service Area. Pursuant to Article 56 of the Monterey Amendments, six SWP contractors have agreements with the Department to deliver and store SWP water outside their service area for later use within their service area. The following agreements include provisions concerning the points of delivery and method for transporting such water.

Table 9-1. 2003 Turnback Water Pool Program (Acre-feet)

Contractor	Sold	Purchased
	Pool A	
Butte	375	
Mojave	16,900	
Ventura County	6,750	
Yuba City	2,320	
Alameda County		314
Alameda-Zone 7		583
AVEK		250
Coachella		172
Desert		285
Dudley Ridge		428
Kern		7,476
Kings		30
Metropolitan		15,024
Napa		160
Oak Flat		43
Santa Clara		747
Tulare		833
Total	*26,345*	*26,345*
	Pool B	
Butte	175	
Mojave	2,500	
Ventura	750	
Alameda County		40
Alameda-Zone 7		73
Castaic Lake		90
Coachella		22
Desert		36
Dudley Ridge		54
Kern		943
Kings		4
Metropolitan		1,896
Napa		20
Oak Flat		5
Santa Barbara		43
Santa Clara		94
Tulare		105
Total	*3,425*	*3,425*

Alameda County Flood Control and Water Conservation District, Zone 7. A change in point of delivery agreement pending execution, among the Department, Alameda-Zone 7, and Kern, will provide for the delivery of Alameda-Zone 7's approved 2002 carryover water and a portion of Alameda-Zone 7's approved 2003 SWP water supplies for storage in and later recovery from Semitropic, in accordance with the Alameda County Flood Control and Water Conservation District, Zone 7 and Semitropic Water Storage District Banking Program Agreement. Alameda-Zone 7 signed similar delivery agreements annually since 1998. All return water is to be delivered to Alameda-Zone 7 by December 31, 2013. During 2003, the Department delivered a total of 6,500 acre-feet of Alameda-Zone 7's 2002 extended carryover to Reach 10A for storage in Semitropic. (SWPAO #03008)

Alameda County Water District. A change in point of delivery agreement pending execution, among the Department, Alameda County, and Kern, will provide for the delivery of a portion of Alameda County's approved 2003 SWP water supplies for storage and later recovery from Semitropic, in accordance with the Alameda County and Semitropic Banking Program Agreement. Alameda County has signed similar delivery agreements annually since 1996. All return water is to be delivered to Alameda County by December 31, 2013. During 2003, the Department delivered a total of 18,800 acre-feet of Alameda County's approved SWP water to Reach 10A for storage in Semitropic, of which 16,100 acre-feet were 2003 Table A amounts and 2,700 acre-feet were 2002 extended carryover water. (SWPAO #03014)

Castaic Lake Water Agency. A change in point of delivery agreement pending execution, among the Department, Castaic Lake, and Kern, will provide for the delivery of up to 35,000 acre-feet of Castaic Lake's 2003 approved SWP water supplies for storage in and later recovery from Semitropic, in accordance with the Castaic Lake and Semitropic Banking Program Agreement. All return water is to be delivered to Castaic

Lake by March 31, 2014. No water was delivered in 2003. (SWPAO #03060)

Dudley Ridge Water District. A change in point of delivery agreement pending execution, among the Department, Dudley Ridge, and Kern, will provide for the delivery of up to 1,000 acre-feet of Dudley Ridge's approved 2003 Table A amounts for storage in and later recovery from Kern Water Bank. Dudley Ridge has signed similar delivery agreements annually since 1996. All return water is to be delivered to Dudley Ridge by December 31, 2013. During 2003, the Department delivered 350 acre-feet of Dudley Ridge's approved 2003 Table A amounts for storage in KWB. (SWPAO #03018)

Dudley Ridge Water District. A long-term change in point of delivery agreement pending execution, among the Department, Dudley Ridge, and Kern, will approve the delivery of a portion of Dudley Ridge's approved annual SWP water supplies to Kern to be used within Cawelo Water District, a member unit of Kern, the return of a like amount of such water, and the delivery of local Cawelo water supplies to Dudley Ridge by in lieu exchange for a portion of Cawelo's future allocation of Kern's SWP water supplies. This agreement is effective July 1, 2003, and remains in force until December 31, 2035. No water was delivered in 2003. (SWPAO #03053)

Dudley Ridge Water District. A letter agreement, executed November 10, 1997, among the Department, Dudley Ridge, and Kern, approved the delivery of up to 5,000 acre-feet of Dudley Ridge's 1997 Article 21 water and up to 2,000 acre-feet of Dudley Ridge's Table A amounts to KWB for storage and later recovery. A like amount of water is to be returned to Dudley Ridge by December 31, 2007. During 1997, a total of 5,342 acre-feet was delivered to Kern. During 2002, a total of 721 acre-feet was recovered and delivered to Dudley Ridge at Reach 8D. During 2003, a total of 350 acre-feet was recovered and delivered to Dudley Ridge at Reach 8D. (SWPAO #97021)

Metropolitan Water District of Southern California. A long-term change in point of delivery agreement pending execution, among the Department, Metropolitan, and Kern, will provide the delivery of a portion of Metropolitan's approved SWP supplies for storage in and later recovery from the groundwater basin underlying Kern Delta Water District, a member unit of Kern, in accordance with the Metropolitan and Kern Delta Water Management Program Agreement. During 2003, a total of 20,134 acre-feet of Metropolitan's Table A amounts was delivered to Kern Delta at Reaches 12E and 13B. (SWPAO #03019)

Metropolitan Water District of Southern California. A change in point of delivery agreement pending execution, among the Department, Metropolitan, and Mojave Water Agency, will provide for the delivery of up to 75,000 acre-feet of Metropolitan's 2003 and 2004 approved SWP water supplies for storage in and later recovery from Mojave River Basin within Mojave, in accordance with the Metropolitan and Mojave Water Banking Demonstration Program Agreement. The water is to be returned to Metropolitan by January 15, 2010. During 2003, the Department delivered a total of 24,874 acre-feet of Metropolitan's approved SWP water to Mojave at Reaches 22B and 24. (SWPAO #03057)

Metropolitan Water District of Southern California. A long-term agreement (SWPAO #01013), pending execution among the Department, Metropolitan, and Kern, will approve the delivery of a portion of Metropolitan's annual Table A and other water supplies for storage and later recovery from groundwater basins within Arvin-Edison Water Storage District, in accordance with the Metropolitan and Arvin-Edison Water Management Program Agreement. The return water is to be delivered to Metropolitan from Arvin-Edison and /or by exchange of Metropolitan's water for a like amount of Kern's SWP approved Table A amounts or other water delivered from the California Aqueduct. The water is to be returned to Metropolitan by December 31, 2035.

Before this long-term agreement was prepared, three interim agreements dated December 29, 1997 (SWPAO #97025), September 17, 1998 (SWPAO #98018, first amendment to SWPAO #97025), and April 13, 1999 (SWPAO #99009, second amendment to SWPAO #97025), among the Department, Metropolitan, and Kern, provided temporary authorization for Metropolitan to store water in Arvin-Edison. Water was delivered to Arvin-Edison for storage each year from 1997 to 2000 under these agreements. During 2001, water previously stored under SWPAO #97025 was returned to Metropolitan, completing the agreement. During 2003, a total of 7,297 acre-feet previously stored under SWPAO #98018 was recovered and delivered to Metropolitan at Reach 26A, completing this agreement. During 2003, a total of 5,083 acre-feet previously stored under SWPAO #99009 was recovered and delivered to Metropolitan at Reach 26A. During 2003, a total of 40,631 acre-feet of Metropolitan's Table A amounts was delivered to Arvin-Edison for storage at Reaches 12C and 14E. (SWPAO #01013)

Metropolitan Water District of Southern California. A letter agreement executed April 21, 1993, among the Department, Metropolitan, and Kern, approved the delivery of Metropolitan's 1992 carryover water for storage in and later recovery from Semitropic. Water is to be returned by December 31, 2010. A subsequent long-term agreement, executed August 21, 1995, among the Department, Metropolitan, and Kern, approved the annual delivery of a portion of Metropolitan's annual Table A and other water supplies for storage in and later recovery from Semitropic, in accordance with the Metropolitan and Semitropic's Water Banking Program Agreement. This agreement remains in effect until November 4, 2035. Water was delivered to Semitropic for storage in 1993, and each year from 1995 to 1999. During 2001, a total of 31,500 acre-feet was recovered and delivered to Metropolitan at Reach 30. During 2003, a total of 10,000 acre-feet was recovered and delivered to Metropolitan at Reach 26A, and a total of 70,940 acre-feet of Metropolitan's Table A amounts was delivered to Reach 10A for storage in Semitropic. (SWPAO #95010)

Santa Clara Valley Water District. A change in point of delivery agreement pending execution, among the Department, Santa Clara, and Kern, will provide for the delivery of a portion of Santa Clara's approved 2003 SWP water supplies for storage in and later recovery from Semitropic, in accordance with the Santa Clara and Semitropic Banking Program Agreement. Santa Clara has signed similar delivery agreements annually since 1996. All return water is to be delivered to Santa Clara by December 31, 2013. During 2003, the Department delivered 33,000 acre-feet of Santa Clara's 2003 Table A amounts to Reach 10A for storage in Semitropic. (SWPAO #03051)

Article 21 Water Program

Pursuant to Article 21 of the Monterey Amendments, Article 21 water replaces surplus, wet weather, and Article 12(d) water. The Article 21 water program allows a contractor to take delivery of water over the approved and scheduled Table A amounts for the current year. Article 21 water is available for delivery on a short-term basis as determined by the Department when water is still available after operational requirements for project water deliveries, water quality, and other requirements are being met.

The conditions for the Article 21 Water Program for 2003 were described in the March 14, 2003, Notice to State Water Project Contractors No. 03-03, available online at www.swpao.water.ca.gov/notices/index.cfm. Sixteen participants signed the notice, which indicated acceptance of the criteria, procedures, and charges for the program, and collectively received a total of 59,653 acre-feet of Article 21 water (Table 9-2).

During the Article 21 water program period, unscheduled water was also made available to Empire pursuant to its long-term water supply contract. Empire received 175 acre-feet of unscheduled water in 2003 for agricultural purposes.

Table 9-2. 2003 Article 21 Water Deliveries (Acre-feet)

Contractor	Amount
Castaic Lake	991
Coachella	204
Kings	58
Desert	330
Dudley Ridge	1,928
Empire[a]	175
Kern	27,891
Metropolitan	17,622
Napa	376
Oak Flat	19
San Bernardino	200
San Gabriel	200
San Luis Obispo	36
Santa Barbara	339
Santa Clara	936
Solano	2,280
Tulare	6,243
Total	*59,828*

[a]Unscheduled agricultural water

Flexible Storage Program

Pursuant to Article 54 of the Monterey Amendments, the Flexible Storage Program provides SWP contractors participating in the repayment of the capital costs of Castaic Lake and Lake Perris the option to withdraw water in excess of approved deliveries. The objective of this program is to provide additional flexibility and water management benefits to local participating agencies.

Available "flexible storage" is approximately 50 percent of active storage, providing for 160,000 acre-feet at Castaic Lake and 65,000 acre-feet at Lake Perris. Participating contractors of the Castaic Lake program include Metropolitan, Ventura, and Castaic Lake. Each can withdraw a maximum amount of 153,940 acre-feet, 1,377 acre-feet, and 4,683 acre-feet, respectively. At Lake Perris, Metropolitan can withdraw a maximum amount of 65,000 acre-feet. Any participating contractor is given 5 years to replace the water with Table A amounts, purchased water, exchange water, or local water.

One SWP contractor participated in the Flexible Storage Program in 2003. At the end of 2002, Metropolitan had a zero balance in Castaic Lake and Lake Perris. Metropolitan withdrew 77,804 acre-feet from Castaic Lake in 2003, and replaced 77,804 acre-feet in 2003, resulting in a zero water balance at the end of 2003. Metropolitan withdrew 17,993 acre-feet from Lake Perris, and replaced 17,993 acre-feet of Article 21, carryover, and Table A water in 2003, resulting in a zero water balance at the end of 2003. At the end of 2002, Castaic Lake Water Agency had a negative balance of 395 acre-feet from Castaic Lake. There was no action in 2003. Therefore, at the end of 2003, a negative balance of 395 acre-feet remains in Castaic Lake.

Carryover Programs

Pursuant to Article 56 of the Monterey Amendments, contractors can elect to store project water outside of their service area for later use within their service area. Qualified contractors can request carryover Table A amounts for delivery in the following year to the extent that such deliveries do not adversely affect current or future project operations. Factors that influence how much extended carryover water can be delivered include operational constraints of project facilities, filling of SWP conservation storage facilities, flood control releases, and water quality restrictions. If storage requests exceed the available storage capacity, the amount available is allocated among the contractors requesting storage in proportion to their annual Table A amounts for that year. Six SWP contractors took direct delivery of 75,584 acre-feet of 2002 approved Table A amounts carried over into 2003 as extended carryover. One SWP contractor used 45,600 acre-feet of this extended carryover for flexible storage payback. Two SWP contractors had a combined total of 9,200 acre-feet of their extended carryover delivered to storage outside their service areas.

Pursuant to Article 12(e) of the Water Supply Contract, contractors can carry over approved Table A water previously scheduled during October, November, and December that was not delivered due to local outages of wet conditions. One SWP contractor took delivery of 140 acre-feet of 2002 approved Table A amounts carried over into 2003 as Article 12(e) carryover. Addi-

tionally, another SWP contractor took delivery of 187 acre-feet of 2002 approved Table A amounts carried over into 2003 as Article 45(f) carryover.

2002 Summer Allocation Carryover Program

To help contractors prepare for potentially limited water supplies in 2003, the Department provided a 2002 Summer Allocation Carryover Program on October 11, 2002. Under this program, long-term SWP contractors were allowed to carry over up to 5 percent of their 2003 Table A amounts for temporary storage in San Luis Reservoir during 2003. This program is separate from, and in addition to, other carryover programs afforded by Articles 12(e) and 56 of the long-term water supply contracts. Twelve SWP contractors took a total delivery of 89,204 acre-feet of 2002 approved Table A amounts carried over into 2003 (Table 9-3).

Dry Year Water Purchase Program

In 2003, the Department initiated a Dry Year Water Purchase Program to reduce the possibility of adverse economic impacts and hardship associated with water shortages. Two SWP contractors and two Delta farmers participated in the program by signing a Memorandum of Understanding with the Department. The program participants requested a total of 11,355 acre-feet of dry year water. To meet participant demands, the Department obtained water from Butte Water District who made it available through crop idling.

Table 9-3. 2002 Summer Allocation Carryover Program Deliveries (Acre-feet)

Contractor	Amount
AVEK	7,049
Castaic Lake	4,760
Dudley Ridge	1,452
Metropolitan	54,975
Mojave	3,528
Napa	1,055
Palmdale	1,065
San Bernardino	1,844
Santa Barbara	2,274
Santa Clara	5,000
Solano	1,918
Tulare	4,284
Total	*89,204*

The four participants and the amount of water purchased from the 2003 Dry Year Program is detailed below:

- Kern County Water Agency - 8,741 acre-feet
- Dudley Ridge Water District - 2,220 acre-feet
- Phelps Brothers - 300 acre-feet
- Ronald Conn - 94 acre-feet

The participants entered into separate conveyance agreements with the Department to convey the dry year water across the Delta and through SWP facilities. Actual dry year water received by these participants was less than the amount purchased due to the Delta being in excess conditions during all of May and most of June 2003 which prevented the transfer and conveyance of the dry year water. The cumulative amount of dry year water made available to all participants was 7,653 acre-feet.

Environmental Water Account

EWA is a cooperatively managed program intended to provide protection to the fish of the Bay-Delta Estuary through environmentally beneficial changes and increased flexibility in the operations of the SWP and CVP, at no uncompensated water cost to the projects' water users. Responsibility for implementing EWA rests with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Department of Fish and Game (management agencies), as well as with the Bureau of Reclamation and the Department (project agencies).

Under EWA, fish protection is achieved by periodically curtailing project water delivery from the Bay-Delta to project water users south of the Delta and replacing it at a later date within the same calendar year. This necessitates the acquisition of alternative sources of project water, called EWA assets, which are used to replace the project water supply (i.e., the undelivered water). EWA assets consist of *purchase assets*,

which are acquired through purchases from willing water sellers; *variable assets*, which are acquired through changes in operations; and *source shifting*, which involves deferral of scheduled delivery of water allocations by willing participants. EWA is considered operational for any year when these assets are in place and Endangered Species Act commitments are provided by the management agencies.

In 2003, EWA's third operational year, a total of 316,216 acre-feet of curtailments for fish protection was requested by the management agencies between January and May. These exports occurred at Clifton Court Forebay (290,213 acre-feet) and Tracy Pumping Plants (25,799 acre-feet) in the Delta. All purchase asset acquisitions in 2003 were made by the Department as single-year transactions and environmental studies were carried out to ensure that the transactions complied with CEQA.

In fall 2002, the SWP backed approximately 20,000 acre-feet of EWA assets into Lake Oroville, transferring the debt from San Luis Reservoir to Lake Oroville. In spring 2003, heavy rains forced Oroville Reservoir into flood control status which led to the spill of 20,000 acre-feet of stored EWA water. In July, the SWP released 8,474 acre-feet of SWP water from Lake Oroville, using EWA's 500 cfs capacity at Clifton Court Forebay and creating a debt in Lake Oroville, as the likelihood of spilling EWA's debt to the SWP from Oroville Reservoir was deemed to be greater than that in San Luis Reservoir. The SWP also backed 18,922 acre-feet of EWA water (Yuba transfer) into Lake Oroville in July.

The Department and the Bureau acquired 90,591 acre-feet in variable assets and 214,914 acre-feet of purchase assets through contract agreements. A source shift was not implemented because there was no risk of low-point problems at San Luis Reservoir. The initial year of EWA operation ended with an 83,437 acre-foot credit of water for use during 2002 EWA actions. The second year of EWA operation ended with a 31,273 acre-foot credit for use during 2003 EWA actions. The third year of EWA ended with a 252 acre-foot credit for use during 2004 EWA actions.

The following section lists the SWP contractors and non-SWP contractors that participated in the EWA Program in 2003.

Purchase Assets

The purchase asset water amounts below represent the total amounts of water acquired for EWA from various sources. These amounts have not been adjusted to reflect conveyance losses.

Kern County Water Agency. An agreement executed on August 27, 2003, between the Department and Kern approved the purchase of up to 198,240 acre-feet of water stored in Kern Water Bank through the exchange of approved Table A water for support of EWA under the CALFED Program. A total of 125,000 acre-feet of Kern's water was purchased and used to repay SWP debt. (SWPAO #03704)

Yuba County Water Agency. An agreement executed on April 22, 2003, between the Department and Yuba approved the transfer of up to 185,000 acre-feet of water from storage in New Bullards Bar Reservoir and groundwater substitution for support of EWA under the CALFED Program. A total of 65,000 acre-feet of Yuba's water was purchased. Of the total, 6,000 acre-feet was used to repay CVP debt and 59,000 was used to repay SWP debt incurred through Delta fish actions (pumping curtailments at Tracy and Banks pumping plants) (SWPAO #03702).

Santa Clara Valley Water District and Kern County Water Agency. An agreement executed on December 1, 2003, between the Department, Santa Clara, and Kern approved the purchase of up to 30,000 acre-feet of water stored in Santa Clara's portion of Semitropic Groundwater Bank through the exchange of approved Table A water for support of EWA under the CALFED Program. A total of 20,000 acre-feet of Santa Clara's water was purchased and used to repay CVP debt. No water was delivered in 2003. (SWPAO #03703)

Metropolitan Water District of Southern California and Kern County Water Agency. An agreement executed on June 4, 2003, between the Department, Metropolitan, and Kern approved the exchange of up to 36,776 acre-feet of water for support of EWA under the CALFED program. The water was delivered by Kern to the Department, conveyed through the California Aqueduct, and delivered to Metropolitan in exchange for Metropolitan's approved Table A water. A total of 29,596 acre-feet of water was exchanged and Kern provided the remaining 7,180 acre-feet directly to the Department. (SWPAO #03700)

South Feather Water and Power Agency. An agreement executed on February 21, 2003, between the Department and South Feather Water and Power Agency, formerly Oroville-Wyandotte Irrigation District, approved the transfer of up to 10,000 acre-feet of water that would otherwise remain in storage from Little Grass Valley Reservoir and Sly Creek Reservoir for support of EWA under the CALFED Program. A total of 4,914 acre-feet of South Feather's water was transferred. (SWPAO #03701)

Operational Assets

Relaxation of the Export/Import Ratio. The Department has the opportunity to gain water credits if the EWA management agencies decide that the E/I ratio can be relaxed, thus allowing the SWP and CVP to pump any extra water that the fisheries do not need. In 2003, relaxation of the E/I ratio resulted in a total of 65,780 acre-feet of water being credited to EWA. (SWPAO #03730)

EWA Share of State Gain. The Department has the opportunity to pump half the CVPIA (b)(2) releases that reach the Delta on behalf of EWA. A total of 19,208 acre-feet of water was pumped at Banks Pumping Plant in 2003, and credited to EWA. (SWPAO #03740).

For additional information on EWA, see Chapter 7, *Water Supply Development and Reliability.*

Miscellaneous Agreements with Other Agencies

In addition to negotiating agreements with SWP contractors to provide for specified water deliveries, the Department also entered into several agreements with other agencies for water conveyance, or exchange, between January 1, 2003, and December 31, 2003.

Water Conveyance Agreements-CVP Water

The Department regularly enters into agreements to convey CVP water such as agreements with contractors receiving water from the Bureau through the Cross Valley Canal, a water conveyance facility that connects with the Aqueduct near Tupman in Kern County. Other agencies or corporations receive CVP water through agreements between the Department and the Bureau, including the U.S. Department of Veterans Affairs, USFWS, and Musco Family Olive Company. Occasionally, the Department also enters into agreements with the Bureau to convey CVP or SWP water from the Delta to O'Neill Forebay through CVP or SWP facilities. Some of these agreements allow the Bureau to make up for curtailed water exports from Tracy Pumping Plant associated with improving conditions for fish in the Delta. Other agreements allow replacing water exports foregone during maintenance and repair of Tracy and Banks Pumping Plants and CVP and SWP conveyance facilities between the Delta and O'Neill Forebay.

Byron-Bethany Irrigation District. An agreement executed May 28, 2003, between the Department and Byron-Bethany Irrigation District, approved the annual diversion of up to 50,000 acre-feet of Byron-Bethany's water from the Delta for agricultural, municipal and industrial uses. Historically, Byron-Bethany diverted water from the Delta under a pre-1914 water right and the diversions were primarily for agricultural purposes during the irrigation season. Land use within the District is changing from strictly agricultural uses to a mixture of agriculture, urban, and industrial which resulted in a change in the pattern of demand within the District from sea-

sonal to year-round use. This agreement describes the nature and extent of the District's diversion rights between the District and the Department, and is effective until December 31, 2035. No water was delivered in 2003. (SWPAO #02027)

Cross Valley Canal. Eight CVP water contractors use CVC to obtain water from the California Aqueduct either by exchange with other agencies or by direct delivery. The eight water contractors are: County of Fresno, County of Tulare, Hills Valley Irrigation District, Kern-Tulare Water District, Lower Tule River Irrigation District, Pixley Irrigation District, Rag Gulch Water District, and Tri-Valley Water District. These agencies have had water conveyance service by the Department since 1976 through

- long-term 3-party contracts with the Department and the Bureau, executed in 1976, and amendments extending the contracts through February 29, 1996; and
- interim renewal contracts: (1) March 1, 1996, through February 28, 1998; (2) March 1, 1998, through February 28, 2000; (3) March 1, 2000, through November 30, 2000; (4) December 1, 2000, through February 28, 2001; (5) March 1, 2001, through February 28, 2002; (6) March 1, 2002 through February 28, 2003; and (7) April 24, 2003 through February 29, 2004.

Between January 1, 2003, and December 31, 2003, the Department delivered CVP water to the CVC contractors as follows:

In May 2003, the following six CVC contractors received part of their 2003-04 approved CVP water: Kern-Tulare Water District (1,076 acre-feet), Rag Gulch Water District (357 acre-feet), Tri-Valley Water District (82 acre-feet), Hills Valley Irrigation District (242 acre-feet), Fresno County Public Works (216 acre-feet), and County of Tulare (383 acre-feet). The water delivered to the CVC contractors totaled 2,356 acre-feet. (SWPAO #s 03300, 03301, 03304, 03305, 03306, and 03307)

Department of Parks and Recreation. Water is provided for recreation facilities at several SWP lakes and reservoirs under an agreement between the Department and the Department of Parks and Recreation, dated October 28, 1971. The agreement implements the provisions of the Davis-Dolwig Act, and specifies maximum quantities of water that can be allocated to each lake per year. The lakes included in the agreement are Del Valle Reservoir, Lake Perris, Castaic Lake and Lagoon, Bethany Reservoir, and the San Luis Division facilities. Allocations to each lake are based on the percentages of Table A water allocated to SWP contractors in a given year.

Madera Irrigation District. On July 22, 2003, Madera Irrigation District requested that the Department convey 1,237 acre-feet of CVP water from the San Joaquin River Exchange Contractor Authority to Madera through SWP facilities. Under an agreement executed on March 22, 2004, the Department delivered 1,200 (1,237 minus 3 percent conveyance loss) acre-feet of water in October 2003. (SWPAO #03318)

Musco Family Olive Company. An agreement dated September 22, 2003, and executed November 21, 2003, among Musco Family Olive Company, Plain View Water District, the Department, and the Bureau, provides for the conveyance of up to 800 acre-feet of Plain View's CVP water to Reach 2A of the California Aqueduct for use by Musco Family Olive Company. A total of 719 acre-feet—95 acre-feet (SWPAO #02320) and 62 acre-feet (SWPAO #03311)—was delivered in 2003 under this agreement. Construction of a permanent turnout is currently being pursued.

U.S. Department of Veterans Affairs. A letter agreement dated November 6, 2002 and executed January 1, 2003, among the U.S. Department of Veterans Affairs, the Department, and the Bureau, provides for the conveyance of up to 450 acre-feet of CVP-approved water to Reach 2B of the California Aqueduct to the U.S. Department of Veterans Affairs' San

Joaquin Valley National Cemetery. A total of 5 acre-feet was delivered to the National Cemetery in Reach 2B of the California Aqueduct in 2003 under this 2002 agreement (SWPAO #02321), and a total of 80 acre-feet was delivered to the National Cemetery in Reach 2B of the California Aqueduct in 2003 under a pending letter agreement. (SWPAO #03312)

U.S. Fish and Wildlife Service Cooperative Agreement. The Bureau initiated a cooperative agreement with the Department to deliver CVP water to the Kern National Wildlife Refuge for USFWS. Under the terms of this cooperative agreement, dated September 9, 1994, up to 26,530 acre-feet of CVP water would be delivered from Check 21 to the Buena Vista Water Storage District Turnout BV-1B, on Reach 10A of the California Aqueduct, from October 1, 1993, through April 10, 1995. Since the cooperative agreement was signed, 13 modifications to the agreement have been executed. Under Modification No. 001, dated October 31, 1994, additional funding was provided. Similar funding adjustments through modifications were made each year to the agreement. Modification No. 013, executed February 3, 2002, extended the agreement through April 30, 2002, and defined the water delivery rates for 2001 and 2002. A new 5-year agreement with the Bureau for Kern National Wildlife Refuge is currently pending. The Department conveyed 14,936 acre-feet of CVP water to Kern National Wildlife Refuge in 2003.

Other Turnout Agreements. In 2003, there was one new turnout agreement with a non-SWP contractor agency.

Plain View Water District. An agreement executed October 1, 2003, between the Department and Plain View Water District, allowed the construction, operation, and maintenance of a permanent Musco Family Olive Turnout at Milepost 12.47, Reach 2A of the California Aqueduct. Construction is currently unscheduled. The agreement contains provisions for submitting plans and specifications within 1 year of executing the agreement.

Water Deliveries

Approved Table A Deliveries

Each year, by October 1, the SWP long-term water contractors submit initial requests for approved Table A deliveries allocated to contractors for use in the subsequent calendar year. Initial approved Table A amounts for the coming year are made by the Department in December and are based on operations studies that assume 90 percent exceedence of historic water supply (where exceedence refers to the possibility that water supply in the coming year will be exceeded by the historic water supply), current reservoir storage, and total requests by the SWP water contractors. Forecasts for the year are updated as hydrological conditions change. Approved Table A amounts are increased or decreased depending on both actual and projected hydrologic conditions.

On October 1, 2002, SWP long-term contractors submitted initial requests for 2003.

The Department approved deliveries of 825,375 acre-feet on December 3, 2002, resulting in initial approved Table A amounts of 20 percent of most SWP contractor requests. The Department increased the 2003 approved Table A amounts to 1.86 million acre-feet, or 45 percent on January 16, 2003. As water conditions improved, approved Table A amounts were increased to 2.06 million acre-feet (50 percent) on March 28; 2.89 million acre-feet (70 percent) on April 24; and finally to 3.71 million acre-feet (90 percent) on May 16.

Notices to State Water Project Contractors informing them of increases or decreases in approved Table A amounts are online at www.swpao.water.ca.gov/notices/index.cfm.

SWP Deliveries

The SWP delivers water for a variety of beneficial uses. In addition to delivering approved Table A water to long-term water supply contractors, the SWP

- conveys water to, and stores water for, other public agencies through special contracts and agreements;
- provides water for wildlife and recreational uses; and
- stores, releases, and delivers local runoff water from SWP facilities to agencies that hold local water rights.

In 2003, 4,223,255 acre-feet of water were conveyed to 27 long-term contractors and 26 other agencies. That amount includes

- 2,901,041 acre-feet of approved Table A water;
- 59,653 acre-feet of Article 21 water and 175 acre-feet of unscheduled water;
- 2,846 acre-feet of SWP water for recreation, fish and wildlife; and
- 1,037,324 acre-feet of water delivered to satisfy water rights settlement agreements and agreements with SWP contractors for local water supplies.

Figure 9-1, located before the tables at the end of the chapter, shows amounts of water delivered to various locations during 2003.

Specific information about water deliveries made to long-term contractors and other agencies during 2003 and historical deliveries from 1962 through 2003 are presented in the following three sections, each with a corresponding table, located at the end of the chapter:

- Water Delivered to Long-term Water Supply Contractors in 2003, by Service Area (Table 9-4);
- Water Delivered in 2003, by Month (Table 9-5); and
- Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962-03 (Table 9-6).

Water Deliveries and Credits to Long-Term SWP Contractors

Table 9-4 shows amounts of water delivered in 2003. The following information is arranged by column number.

2003 Approved Table A Water Delivered. Columns 1 through 6 show a detailed breakdown of approved Table A water delivered to long-term water supply contractors in 2003.

Turnback Pool Water. Column 5 shows 29,770 acre-feet of turnback pool water was delivered to long-term water supply contractors in 2003.

2002 Carryover Approved Table A Water Delivered During 2003. For several years, the Department has offered contractors the opportunity to carry over a portion of their approved Table A water for delivery in the current year to be delivered during the next year.

The carryover program was designed to encourage the most effective and beneficial use of water and to avoid obligating the contractors to use or lose the water by December 31 of each year. The SWP contractors' long-term contracts and amendments state the criteria for carrying over approved Table A water from one year to the next. Column 7 shows 219,915 acre-feet of water was carried over from 2002 for delivery in 2003.

Total Table A Water Delivered. Column 8 shows all approved Table A water delivered in 2003—a total of 2,898,144 acre-feet.

2003 Water Bank Recoveries. Column 9 shows 72,812 acre-feet of water bank recoveries in 2003.

2003 Article 21 Water. Column 10 shows 59,828 acre-feet of 2003 Article 21 water delivered to long-term water supply contractors in 2003 (includes 59,653 acre-feet of Article 21 water and 175 acre-feet of unscheduled water). Long-term water supply contractors who have

not signed the Monterey Amendment receive unscheduled water.

Dry Year Water Purchase Program. Column 11 shows 7,388 acre-feet of Dry Year Water Purchase Program water delivered in 2003.

2003 Article 54 Flexible Storage Withdrawal Recoveries. Column 12 shows 95,797 acre-feet of Article 54, Flexible Storage Withdrawal in 2003.

Total SWP Water Delivered. Column 13 shows 3,134,769 acre-feet of total SWP water delivered in 2003. This includes total approved Table A water, water bank recoveries, Dry Year Water Purchase Program, Flexible Storage Withdrawal, and Article 21 and unscheduled water.

Non-SWP Water Deliveries. Column 14 includes deliveries of nonproject water to long-term water contractors. Nonproject water is generally local and permit water that a SWP contractor has a water right to, or water purchased from, exchanged with, or transferred from non-SWP agencies. In 2003, nonproject water deliveries totaled 51,769 acre-feet.

Total Deliveries. Column 15 shows total amounts of water delivered to long-term contractors. In 2003, the SWP delivered 3,186,528 acre-feet to 27 long-term contractors. This amount included 2,901,041 acre-feet of approved Table A water, 59,828 acre-feet of Article 21 and unscheduled water, and 51,139 acre-feet of nonproject water.

Water Delivered in 2003 by Month

During 2003, the SWP provided water service to 53 agencies, including 27 long-term water contractors. Those agencies and the amounts of water delivered to them by month are listed in Table 9-5, and are summarized below as SWP water and nonproject water.

SWP Water. SWP water as defined in the *long-term water supply contracts,* includes Article 21 water; carryover approved Table A water; current year approved Table A amounts; flexible storage water; transfer and exchange of approved Table A water; and turnback pools A and B.

Related water includes operational flood release and recreation and fish and wildlife. There was no operational flood water released in 2003.

Article 21 Water. The Article 21 water program allows a contractor to take delivery of water over the approved and scheduled Table A amounts for the current year. In 2003, 16 contractors participated in the program. A total of 59,828 acre-feet of Article 21 water was delivered to Napa, Solano, Santa Clara, County of Kings, Dudley Ridge, Castaic Lake, Metropolitan, Kern, Oak Flat, Tulare, San Luis Obispo, Santa Barbara, Coachella, Desert, San Bernardino, and San Gabriel. Empire took delivery of 175 acre-feet of unscheduled water.

2002 Carryover Approved Table A Water. In 2003, 174,315 acre-feet of 2002 approved Table A water were delivered that had been stored in SWP storage facilities in 2002.

Approved Table A Water. A total of 2,735,926 acre-feet of 2003 approved Table A water was delivered to 27 long-term contractors. Also, 174,315 acre-feet of carryover water, and 95,797 acre-feet of flexible storage withdrawal water were delivered in 2003.

Exchanges and Transfers of Approved Table A Water. During 2003, a total of 66,677 acre-feet of approved Table A water was exchanged or transferred to SWP long-term contractors and non-SWP water agencies as follows:

- Kern transferred 8,000 acre-feet to Dudley Ridge;
- Tulare transferred 4,900 acre-feet of water to Westlands and exchanged 14,103 acre-feet with Westlands;
- Metropolitan exchanged 24,874 acre-feet with Mojave;
- Dudley Ridge exchanged 8,700 acre-feet with San Gabriel and transferred 1,100 acre-feet to Tulare; and

- San Bernardino transferred 5,000 acre-feet to Metropolitan.

Turnback Pool Water. A total of 29,770 acre-feet of turnback pool water was delivered to long-term water supply contractors.

Water for Recreation and Fish and Wildlife. A total of 2,846 acre-feet of SWP water was conveyed for recreational use and enhancement of fish and wildlife.

Recreational Use. The SWP delivered 563 acre-feet of water for facilities at Lake Oroville, Lake del Valle, O'Neill Forebay, Silverwood Lake, and Lake Perris. In addition, 1,776 acre-feet were delivered to Castaic Lake and Castaic Lagoon, an impoundment downstream from Castaic Lake devoted entirely to recreation.

Wildlife Management. The SWP delivered 507 acre-feet of water to use in managing wildlife in the Pilibos Wildlife Area, located on about 770 acres of land near O'Neill Forebay, 40 miles south of Los Banos.

Water for North Bay Aqueduct Flow Test. A total of 27 acre-feet was conveyed through the North Bay Aqueduct to test the flow capacity downstream of Barker Slough Pumping Plant, following a clean out of a portion of the pipeline.

Non-SWP Water

In 2003, the Department used SWP facilities to convey non-SWP water for various agencies according to the terms of water rights and water transfer and exchange agreements. Detailed information concerning those conveyances is found under the *Miscellaneous Agreements with Other Agencies* section in this chapter.

Floodwater. Occasionally, during wet years, the Department accepts floodwater from the Kern River into the California Aqueduct through the Kern River-California Aqueduct Intertie under an agreement entitled *Agreement among the State of California, Kern County Water Agency, and the Kern River Interests for Diversions of Floodwaters through the Kern River-California Aqueduct Intertie*, dated November 18, 1975. In 2003, the Department did not accept any floodwater into the California Aqueduct.

Water Rights Water. Water in this category is transported through SWP facilities to long-term SWP contractors and other agencies according to terms of various local water rights agreements. Some water simply passes through SWP transportation facilities; a portion is stored in SWP reservoirs for release at a later time. In 2003, 1,037,324 acre-feet of water in this category were delivered to the Feather River, South Bay, North Bay, and Southern California.

Feather River Area. Ten nonproject agencies in the Feather River area received 1,008,093 acre-feet. Those agencies are

- Last Chance Creek Water District, 6,598 acre-feet
- Thermalito Irrigation District, 2,398 acre-feet
- South Feather Water and Power Agency, formerly Oroville-Wyandotte Irrigation District, 4,879 acre-feet
- Western Canal Water District, 282,251 acre-feet
- Joint Water Districts Board, 682,403 acre-feet
- Oswald Water District, 445 acre-feet
- Tudor Mutual Water Company, 3,220 acre-feet
- Garden Highway Mutual Water Company, 16,303 acre-feet
- Plumas Mutual Water Company, 8,498 acre-feet
- Dana Brothers, 1,098 acre-feet

North Bay Area. In the North Bay Area, 4,600 acre-feet of Solano permit and settlement water were delivered.

South Bay Area. In the South Bay area, a total of 17,290 acre-feet of local water was delivered to Alameda-Zone 7 (9,378 acre-feet) and Alameda County (7,912 acre-feet). These two South Bay Aqueduct contractors hold water rights to runoff from Lake Del Valle watershed.

Southern California. In Southern California, 573 acre-feet of local runoff from the Houston Creek watershed were stored and delivered to Crestline under water rights held by the Department on Houston Creek. The authorized place of use is limited to Crestline.

The Department also released 6,768 acre-feet of local water from Piru Creek to United Water Conservation District, a member unit of Ventura.

Annual Table A Water and Water Delivered Since 1962

Information about annual Table A water and water conveyed for the past 40 years is contained in Table 9-6. The following discussion of conveyed Table A water is arranged according to column numbers.

Annual Table A. Columns 1 through 7 of Table 9-6 show the amount of long-term contractor's annual Table A water by area for years 1962 through 2003 as specified in the Table A schedules of the long-term water supply contracts.

In some instances Table A schedules—projections of each contractor's need for water to 2035—have been amended to meet the needs of individual contractors. The amounts of annual Table A water each contractor may request for years 1962 through 2035 can be found in Table B-4 in Appendix B.

Water Delivered. Columns 8 through 16 show water delivered or conveyed, including initial fill water and operational losses and storage changes.

Approved Table A Water. Column 8 shows amounts of approved Table A water delivered each year from 1962 through 2003.

Article 21 and Unscheduled Water. Article 21 and unscheduled water is water in excess of that required to meet all demands for the year's approved Table A water and water to be stored in SWP reservoirs.

Column 9 shows amounts of Article 21 water, as defined under *SWP Deliveries*, and unscheduled water delivered from 1962 through 2003.

Other Water. Column 10 includes amounts of water classified as other water delivered in 2003, including nonproject water conveyed through SWP facilities and regulated delivery of local supply.

In 2003, a total of 251,447 acre-feet of other water was delivered.

Feather River Diversions. Column 11 includes amounts of water from the Feather River delivered according to agreements for water rights water. In 2003, a total of 1,008,093 acre-feet in this category was delivered to agencies in the Feather River area.

Recreation Water. Column 12 shows water conveyed for recreational use or to provide water to improve water quality for fish and wildlife. In 2003, a total of 2,846 acre-feet of SWP water was conveyed for this purpose.

Initial Fill Water. The quantities listed in Column 14 represent the amounts used to initially fill the aqueducts and reservoirs south of the Delta to maximum operating capacities. Initial filling began in 1962 with the filling of the South Bay Aqueduct and was completed in 1979 when Lake Perris reached its maximum operating capacity of 127,000 acre-feet. In 1996 and 1997, the Coastal Aqueduct was initially filled.

Operational Losses. Column 15 includes the total amounts of water lost through evaporation and seepage, net storage changes in reservoirs south of the Delta, and amounts of inflow from local drainage areas, including inflows into San Luis Canal and from the Kern River Intertie.

Negative values are indicated for years when withdrawals and evaporation from reservoirs south of the Delta exceed the amounts of water added to the reservoirs.

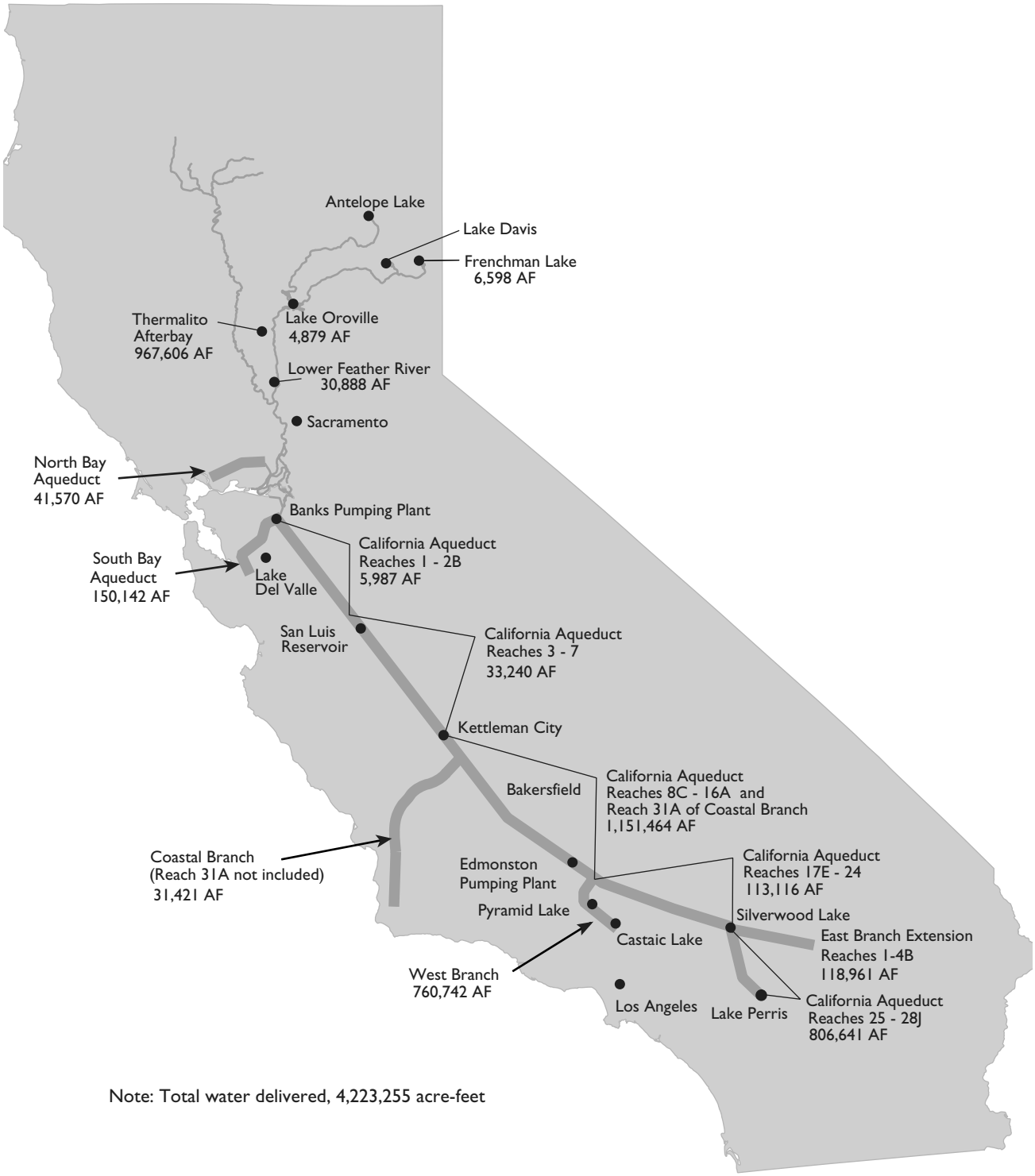

Figure 9-1. Water Delivered in 2003 and Delivery Locations of Long-Term Water Supply Contractors and Feather River Area Districts with Water Right Agreements with the Department

Table 9-4. Water Delivered to Long-Term Contractors through 2003, by Service Area (Acre-Feet)

Water Contractor or Agency	Approved Table A Water Deliveries														
	2003 Table A without Transfers, Exchanges, and Storage (1)	2003 Table A Supplied (Not a Delivery) (2)	2003 Table A Delivered through Transfers and Exchanges (3)	2003 Table A Delivered to Storage (4)	Pool Water (5)	Total 2003 Table A Delivered (6)	2002 Carryover Table A Delivered during 2003 (7)	Total Table A Deliveries (8)	Water Bank Recoveries (9)	2003 Article 21 Water (10)	2003 Dry Year Water Purchase (11)	2003 Article 54 Flexible Withdrawal (12)	Total SWP Water Delivered (13)	Non-SWP Water Deliveries (14)	Total Deliveries
Feather River Area															
County of Butte	551	0	0	0	0	551	0	551	0	0	0	0	551	0	551
Plumas County Flood Control and Water Conservation District	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
City of Yuba City	1,324	0	0	0	0	1,324	0	1,324	0	0	0	0	1,324	0	1,324
North Bay Area															
Napa County Flood Control and Water Conservation District	6,026	0	0	0	180	6,206	1,055	7,261	0	376	0	0	7,637	0	7,637
Solano County Water Agency	25,135	0	0	0	0	25,135	1,918	27,053	0	2,280	0	0	29,333	4,600[p]	33,933
South Bay Area															
Alameda County Flood Control and Water Conservation District-Zone 7	30,695	0	0	6,500[h]	656	31,351	13,099[h]	44,450	0	0	0	0	44,450	10,378[q]	54,828
Alameda County Water District	14,986	0	0	18,800[i]	354	31,440	5,150[i]	36,590	0	0	0	0	36,590	7,912[r]	44,502
Santa Clara Valley Water District	57,000	0	0	33,000[j]	841	90,841	14,104	104,945	0	936	0	0	105,881	3,100[s]	108,981
San Joaquin Valley Area															
Castaic Lake Water Agency	3,506	0	0	0	0	3,506	0	3,506	0	495	0	0	4,001	0	4,001
County of Kings	3,600	0	0	0	34	3,634	0	3,634	0	58	0	0	3,692	0	3,692
Dudley Ridge Water District	39,274	0	9,800[c]	350[k]	482	49,906	1,452	51,358	350	1,928	1,496	0	55,132	0	55,132
Empire West Side Irrigation District	1,074	0	0	0	0	1,074	187	1,261	0	175[m]	0	0	1,436	0	1,436
Kern County Water Agency	697,169	155,565[a]	8,000[d]	0	8,419	713,588	22,380	735,968	0	27,891[n]	5,892	0	790,237	18,428[t]	808,665
Oak Flat Water District	4,059	0	0	0	48	4,107	140	4,247	0	19	0	0	4,266	0	4,266
Tulare Lake Basin Water Storage District	75,373	0	19,003[e]	0	938	95,314	4,284	99,598	0	6,243	0	0	105,841	0	105,841
Central Coastal Area															
San Luis Obispo County Flood Control and Water Conservation District	4,417	0	0	0	0	4,417	0	4,417	0	36	0	0	4,453	0	4,453
Santa Barbara County Flood Control and Water Conservation District	24,312	0	0	0	43	24,355	2,274	26,629	0	339	0	0	26,968	0	26,968
Southern California															
Antelope Valley-East Kern Water Agency	52,730	0	0	0	250	52,980	7,049	60,029	0	0	0	0	60,029	0	60,029
Castaic Lake Water Agency	46,389	0	0	0	90	46,479	4,760	51,239	0	496	0	0	51,735	0	51,735
Coachella Valley Water District	14,045	0	0	0	194	14,239	0	14,239	0	204	0	0	14,443	0	14,443
Crestline-Lake Arrowhead Water Agency	1,563	0	0	0	0	1,563	0	1,563	0	0	0	0	1,563	573[u]	2,136
Desert Water Agency	23,168	0	0	0	321	23,489	0	23,489	0	330	0	0	23,819	0	23,819
Littlerock Creek Irrigation District	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Metropolitan Water District of Southern California	1,261,502	107,771[b]	24,874[f]	131,705[l]	16,920	1,435,001	134,845[w]	1,524,246	51,976	17,622[o]		95,797	1,689,641	0	1,689,641
Mojave Water Agency	10,907	0	0	0	0	10,907	3,528	14,435	0	0	0	0	14,435	0	14,435
Palmdale Water District	9,701	0	0	0	0	9,701	1,846	11,547	0	0	0	0	11,547	0	11,547
San Bernardino Valley Municipal Water District	20,371	0	5,000[g]	0	0	25,371	1,844	27,215	0	200	0	0	27,415	0	27,415
San Gabriel Valley Municipal Water District	13,034	0	0	0	0	13,034	0	13,034	0	200	0	0	13,234	0	13,234
San Gorgonio Pass Water Agency	116	0	0	0	0	116	0	116	0	0	0	0	116	0	116
Ventura County Watershed Protection District	5,000	0	0	0	0	5,000	0	5,000	0	0	0	0	5,000	6,768[v]	11,768
Total	2,447,027	263,336	66,677	190,355	29,770	2,724,629	219,915	2,898,944	72,812	59,828	7,388	95,797	3,134,769	51,769	3,186,528

[a]Kern supplied 125,000 af to EWA; exchanged 350 af of Dudley Ridge for Kern Water Bank water exchanged 10,000 af to Metropolitan for Semitropic Water Bank water; exchanged 6,436 af with Del Puerto Water District; exchanged 4,284 af with Panoche Water District; exchanged 9,495 af to San Luis Water District.

[b]Metropolitan supplied 29,596 af to EWA; used 45,600 af of carryover for flexible storage payback; used 32,575 af for flexible storage payback.

[c]Dudley Ridge exchanged 8,700 af with San Gorgonio; transferred 1,100 af to Tulare.

[d]Kern transferred 8,000 af to Dudley Ridge.

[e]Tulare exchanged 14,103 af with Westlands; transferred 4,900 af to Westlands.

[f]Metropolitan exchanged 24,874 af with Mojave.

[g]San Bernardino transferred 5,000 af to Metropolitan.

[h]6,500 af of 2002 carryover water delivered to Semitropic Water Bank (not shown in Column 6).

[i] 2,700 af of 2002 carryover water delivered to Semitropic Water Bank(not shown in Column 6).

[j]Delivered to Semitropic Water Bank.

[k]350 af delivered to Kern Water Bank.

[l]40,631 af to Arvin-Edison Water Bank, 20,134 af to Kern Delta Water Bank, and 70,940 af to Semitropic Water Bank..

[m]Empire's unscheduled water.

[n]Kern's Article 21 includes 7,180 af delivered to EWA.

[o]Metropolitan's Article 21 was used for flexible storage payback

[p]Santa Clara's permit and settlement water.

[q]Alameda Zone-7's 9,378 af of local water and 1,000 af of Byron-Bethany water.

[r]Alameda County's 7,912 af of local water.

[s]6,000 af of transferred water from Del Puerto WD, transferred 4,000 af from Panoche WD, and transferred 8,418 af from San Luis Water District.

[t]Transferred water from Browns Valley Irrigation District.

[u]Crestline's local water.

[v]Ventura's local water.

[w]Metropolitan used 45,600 af of carryover for flexible storage payback (not a delivery and not shown in Column 8).

Table 9-5. Water Delivered in 2003, by Month (Acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	2003 Total Deliveries	2003 Contract Table A
Feather River Area														
City of Yuba City														
Approved Table A water	0	0	0	0	0	0	741	583	0	0	0	0	1,324	9,600
Pool A water sale[a]	2,320	0	0	0	0	0	0	0	0	0	0	0	2,320	
Agency total	0	0	0	0	0	0	741	583	0	0	0	0	1,324	
County of Butte														
Approved Table A water	34	18	107	62	3	95	54	24	71	5	1	77	551	3,500
Pool A water sale[a]	375	0	0	0	0	0	0	0	0	0	0	0	375	
Pool B water sale[a]	175	0	0	0	0	0	0	0	0	0	0	0	175	
Agency total	34	18	107	62	3	95	54	24	71	5	1	77	551	
Plumas County Flood Control and Water Conservation District														
Approved Table A water	0	0	0	0	0	0	0	0	0	0	0	0	0	1,690
Recreation/Fish and Wildlife														
Recreation/fish and wildlife water	0	0	0	0	0	1	1	0	1	0	0	0	3	
Last Chance Creek Water District														
Regulated delivery of local supply	0	0	0	0	1,127	2,493	1,210	990	611	167	0	0	6,598	
Thermalito Irrigation District														
Regulated delivery of local supply	31	50	123	112	193	367	402	336	301	269	112	102	2,398	
South Feather Water and Power Agency														
Regulated delivery of local supply	0	0	0	0	200	893	922	922	893	678	199	172	4,879	
Western Canal Water District														
Regulated delivery of local supply	3,130	0	0	1,110	30,937	49,316	58,530	47,044	15,467	27,994	33,700	15,023	282,251	
Joint Water Districts Board														
Regulated delivery of local supply	31,850	0	0	2,027	62,250	110,610	123,760	106,821	66,885	46,240	71,130	60,830	682,403	
Oswald Water District														
Regulated delivery of local supply	0	0	0	0	13	130	156	93	53	0	0	0	445	
Tudor Mutual Water Company														
Regulated delivery of local supply	0	0	0	0	97	961	1,025	426	553	158	0	0	3,220	
Garden Highway Mutual Water Company														
Regulated delivery of local supply	0	0	0	696	2,205	3,050	3,906	2,801	1,567	2,017	61	0	16,303	
Plumas Mutual Water Company														
Regulated delivery of local supply	0	0	0	0	645	2,123	2,432	929	1,748	621	0	0	8,498	
Dana Brothers														
Regulated delivery of local supply	0	0	0	32	189	439	285	51	25	77	0	0	1,098	
SWP	34	18	107	62	3	96	796	607	72	5	1	77	1,878	
Non-SWP	35,011	50	123	3,977	97,856	170,382	192,628	160,413	88,103	78,221	105,202	76,127	1,008,093	
Feather River Area Total	35,045	68	230	4,039	97,859	170,478	193,424	161,020	88,175	78,226	105,203	76,204	1,009,971	14,790
North Bay Area														
Napa County Flood Control and Water Conservation District														
Approved Table A water	0	42	554	690	286	578	731	681	673	473	438	880	6,026	21,475
Article 21 water	0	0	376	0	0	0	0	0	0	0	0	0	376	
2002 summer allocation carryover	335	720	0	0	0	0	0	0	0	0	0	0	1,055	
Pool A water	0	0	0	0	0	160	0	0	0	0	0	0	160	
Pool B water	0	0	0	0	0	20	0	0	0	0	0	0	20	
Flow capacity test[a]	9	0	0	0	0	0	0	0	0	0	0	0	9	
Agency Total	335	762	930	690	286	758	731	681	673	473	438	880	7,637	
Solano County Water Agency														
Approved Table A water	0	0	100	925	2,365	3,464	5,320	4,126	3,531	1,660	1,546	2,098	25,135	46,756
Article 21 water	0	0	0	0	1,210	1,070	0	0	0	0	0	0	2,280	
2002 summer allocation carryover	279	782	857	0	0	0	0	0	0	0	0	0	1,918	
Solano settlement water	0	0	0	0	0	0	0	0	0	860	0	0	860	
Vallejo permit water	0	0	0	0	0	0	0	0	26	1,338	941	1,435	3,740	
Flow capacity test[a]	18	0	0	0	0	0	0	0	0	0	0	0	18	
Agency Total	279	782	957	925	3,575	4,534	5,320	4,126	3,557	3,858	2,487	3,533	33,933	
Delivery of Dry Year Purchase Water to Non-SWP Agencies														
Dry year purchase water to Ronald Conn	0	0	0	0	0	0	0	0	0	0	63	0	63	
Dry year purchase water to the Phelps Brothers	0	0	0	0	0	0	0	0	0	0	202	0	202	
SWP	614	1,544	1,887	1,615	3,861	5,292	6,051	4,807	4,204	2,133	1,984	2,978	36,970	
Non-SWP	0	0	0	0	0	0	0	0	26	2,198	941	1,435	4,600	
North Bay Area Total	614	1,544	1,887	1,615	3,861	5,292	6,051	4,807	4,230	4,331	2,925	4,413	41,570	68,231
South Bay Area														
Alameda County Flood Control and Water Conservation District, Zone 7														
Approved Table A water	0	0	286	1,136	231	3,778	6,369	5,820	4,629	5,041	1,945	1,460	30,695	78,400
Article 56 extended carryover stored in Semitropic[a]	3,800	2,700	0	0	0	0	0	0	0	0	0	0	6,500	
Article 56(c) extended carryover	1,513	2,304	2,782	0	0	0	0	0	0	0	0	0	6,599	
Local water	283	338	292	2,255	3,904	1,185	65	39	637	34	20	326	9,378	

[a]Excluded water from Agency Total

Table 9-5. Water Delivered in 2003, by Month (Acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	2003 Total Deliveries	2003 Contract Table A
Pool A water	0	0	0	0	0	583	0	0	0	0	0	0	583	
Pool B water	0	0	0	0	0	73	0	0	0	0	0	0	73	
Transfer water from Byron-Bethany	0	0	0	0	0	0	0	0	500	500	0	0	1,000	
Agency Total	1,796	2,642	3,360	3,391	4,135	5,619	6,434	5,859	5,766	5,575	1,965	1,786	48,328	
Alameda County Water District														
Approved Table A water	0	0	0	0	0	566	3,116	2,733	3,471	3,608	722	770	14,986	42,000
Approved Table A water stored in Semitropic[a]	0	0	0	0	10,000	6,100	0	0	0	0	0	0	16,100	
Article 56 extended carryover water stored in Semitropic[a]	2,000	700	0	0	0	0	0	0	0	0	0	0	2,700	
Article 56C extended carryover	918	1,169	363	0	0	0	0	0	0	0	0	0	2,450	
Local water	203	0	1,207	1,491	1,841	2,053	65	599	84	34	19	316	7,912	
Pool A water	0	0	0	0	0	314	0	0	0	0	0	0	314	
Pool B water	0	0	0	0	0	40	0	0	0	0	0	0	40	
Agency Total	1,121	1,169	1,570	1,491	1,841	2,973	3,181	3,332	3,555	3,642	741	1,086	25,702	
Santa Clara Valley Water District														
Advanced approved Table A water	0	0	0	0	0	0	0	0	0	0	0	620	620	100,000
Approved Table A water	0	0	3,675	4,842	6,131	6,923	7,295	6,250	9,656	4,187	3,407	4,014	56,380	
Approved Table A water stored in Semitropic[a]	0	0	0	0	0	20,000	0	0	9,500	3,500	0	0	33,000	
Article 21 water	0	0	714	222	0	0	0	0	0	0	0	0	936	
Article 56C extended carryover	24	6,871	2,209	0	0	0	0	0	0	0	0	0	9,104	
2002 Summer Allocation Carryover	5,000	0	0	0	0	0	0	0	0	0	0	0	5,000	
Pool A water	0	0	0	0	0	747	0	0	0	0	0	0	747	
Pool B water	0	0	0	0	0	94	0	0	0	0	0	0	94	
Transfer water from Browns Valley Irrigation District	0	0	0	0	0	0	0	0	0	3,100	0	0	3,100	
Agency Total	5,024	6,871	6,598	5,064	6,131	7,764	7,295	6,250	9,656	7,287	3,407	4,634	75,981	
Recreation/Fish and Wildlife														
Recreation/fish and wildlife water, Lake Del Valle	2	2	4	4	11	19	26	21	20	15	5	2	131	
SWP	7,457	10,346	10,033	6,204	6,373	13,137	16,806	14,824	17,776	12,851	6,079	6,866	128,752	
Non-SWP	486	338	1,499	3,746	5,745	3,238	130	638	1,221	3,668	39	642	21,390	
South Bay Area Total	7,943	10,684	11,532	9,950	12,118	16,375	16,936	15,462	18,997	16,519	6,118	7,508	150,142	220,400
San Joaquin Valley Area														
Castaic Lake Water Agency	0	105	2,197	538	0	0	0	0	0	0	0	666	3,506	12,700
Approved Table A water	0	0	396	99	0	0	0	0	0	0	0	0	495	
Article 21 water	0	105	2,593	637	0	0	0	0	0	0	0	666	4,001	
Agency total														
County of Kings														
Approved Table A water	0	0	0	0	0	500	500	500	500	500	550	550	3,600	4,000
Article 21 water	0	0	50	8	0	0	0	0	0	0	0	0	58	
Pool A water	0	0	0	0	0	0	0	30	0	0	0	0	30	
Pool B water	0	0	0	0	0	0	0	4	0	0	0	0	4	
Agency Total	0	0	50	8	0	500	500	534	500	500	550	550	3,692	
Dudley Ridge Water District														
Approved Table A water	0	2,312	2,540	2,288	5,189	8,296	9,745	8,267	61	399	0	177	39,274	57,343
Approved Table A water in Kern Water Bank[a]	0	0	0	0	0	0	0	0	0	0	0	350	350	
Article 21 water	0	0	1,801	127	0	0	0	0	0	0	0	0	1,928	
Bank water recovery, Kern Water Bank	0	0	350	0	0	0	0	0	0	0	0	0	350	
2002 Summer Allocation Carryover	1,359	93	0	0	0	0	0	0	0	0	0	0	1,452	
Dry Year Water Purchase Program	0	0	0	0	0	0	0	0	0	1,249	247	0	1,496	
Exchange approved Table A water to San Gabriel[a]	0	0	0	0	0	0	0	754	2,555	2,889	2,502	0	8,700	
Pool A water	0	0	0	428	0	0	0	0	0	0	0	0	428	
Pool B water	0	0	0	54	0	0	0	0	0	0	0	0	54	
Transfer of approved water to Tulare[a]	0	0	0	0	0	0	0	0	0	1,100	0	0	1,100	
Transfer of approved from Kern	0	0	0	0	0	0	0	0	5,300	2,700	0	0	8,000	
Agency Total	1,359	2,405	4,691	2,897	5,189	8,296	9,745	8,267	5,361	4,348	247	177	52,982	
Empire West Side Irrigation District														
Approved Table A water	11	395	90	0	200	105	0	0	0	0	0	273	1,074	3,000
Carryover wet	187	0	0	0	0	0	0	0	0	0	0	0	187	
Unscheduled water	0	0	171	4	0	0	0	0	0	0	0	0	175	
Agency Total	198	395	261	4	200	105	0	0	0	0	0	273	1,436	
Kern County Water Agency														
Approved Table A water	1,630	3,446	20,468	12,373	50,130	114,180	190,415	107,059	55,209	49,607	47,967	45,768	696,252	1,000,949
Approved Table A water to EWA[a]	0	0	0	0	0	36,000	36,000	36,000	17,000	0	0	0	125,000	
Approved Table A water to Western Hills	0	0	28	110	114	155	181	104	107	81	29	8	917	
Article 21 water	0	0	18,478	2,233	0	0	0	0	0	0	0	0	20,711	
Article 21 water to EWA	0	0	7,180	0	0	0	0	0	0	0	0	0	7,180	
Article 56C extended carryover	7,031	15,177	172	0	0	0	0	0	0	0	0	0	22,380	

[a]Excluded water from Agency Total

Table 9-5. Water Delivered in 2003, by Month (Acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	2003 Total Deliveries	2003 Contract Table A
Dry Year Water Purchase Program	0	0	0	0	0	0	0	0	0	0	5,892	0	5,892	
Exchange approved Table A water for water bank water[a]	0	0	350	0	0	0	0	0	0	0	0	0	350	
Exchange approved Table A water for water bank water[a]	0	0	0	8,867	1,133	0	0	0	0	0	0	0	10,000	
Exchange approved Table A water to Del Puerto[a]	0	0	0	0	0	0	0	0	436	0	0	0	436	
Exchange approved Table A water to Panoche[a]	0	0	0	0	0	0	0	0	284	0	0	0	284	
Exchange approved Table A water to San Luis[a]	0	0	0	0	0	0	0	0	1,067	0	0	0	1,067	
Exchange approved Table A water to Del Puerto[a]	0	0	0	0	0	0	0	0	6,000	0	0	0	6,000	
Exchange approved Table A water to Panoche[a]	0	0	0	0	0	0	0	0	1,129	750	1,168	953	4,000	
Exchange approved Table A water to San Luis[a]	0	0	0	0	0	0	0	0	2,922	4,533	973	0	8,428	
Exchange water from Del Puerto	0	4,942	979	79	0	0	0	0	0	0	0	0	6,000	
Exchange water from Panoche	0	3,070	858	72	0	0	0	0	0	0	0	0	4,000	
Exchange water from San Luis	0	5,000	3,428	0	0	0	0	0	0	0	0	0	8,428	
Pool A water	0	0	0	0	0	0	7,476	0	0	0	0	0	7,476	
Pool B water	0	0	0	0	0	0	943	0	0	0	0	0	943	
Turn-in water recovered by Kern	0	0	678	19,808	0	0	0	0	0	0	0	0	20,486	
Transfer of approved Table A water to Dudley Ridge[a]	0	0	0	0	0	0	0	0	5,300	2,700	0	0	8,000	
Deliveries to water banks in Kern														
Approved Table A water from Alameda County stored in Semitropic	3,800	2,700	0	0	0	0	0	0	0	0	0	0	6,500	
Article 56 extended carryover from Alameda-Zone 7 stored in Semitropic	0	0	0	0	10,000	6,100	0	0	0	0	0	0	16,100	
Article 56 extended carryover from Alameda County stored in Semitropic	2,000	700	0	0	0	0	0	0	0	0	0	0	2,700	
Approved Table A water from Santa Clara stored in Semitropic	0	0	0	0	0	20,000	0	0	9,500	3,500	0	0	33,000	
Approved Table A water from Dudley Ridge stored in Kern Water Bank	0	0	0	0	0	0	0	0	0	0	0	350	350	
Approved Table A water from Metropolitan stored in Semitropic	0	0	0	0	0	16,000	14,940	40,000	0	0	0	0	70,940	
Approved Table A water from Metropolitan stored in Arvin-Edison	0	0	0	0	5,477	13,990	11,799	1,900	1,400	1,520	675	3,870	40,631	
Approved Table A water from Metropolitan stored in Kern Delta	0	0	0	0	0	837	1,491	17,806	0	0	0	0	20,134	
Subtotal (Water Bank Deliveries)	5,800	3,400	0	0	15,477	56,927	28,230	59,706	10,900	5,020	675	4,220	190,355	
Agency Total[a]	14,461	35,035	45,089	34,675	65,721	171,262	227,245	166,869	66,216	54,708	52,563	49,996	983,840	
Oak Flat Water District														
Approved Table A water	0	0	0	194	635	704	926	776	416	400	7	1	4,059	5,700
Article 21 water	0	0	7	12	0	0	0	0	0	0	0	0	19	
Carryover 12(e)	0	18	122	0	0	0	0	0	0	0	0	0	140	
Pool A water	0	0	0	0	0	43	0	0	0	0	0	0	43	
Pool B water	0	0	0	0	0	5	0	0	0	0	0	0	5	
Agency Total	0	18	129	206	635	752	926	776	416	400	7	1	4,266	
Tulare Lake Basin Water Storage District														
Approved Table A water	0	1,288	1,241	2,883	1,077	14,373	12,363	20,616	1,428	3,441	12,275	4,388	75,373	111,127
Article 21 water	0	0	5,993	250	0	0	0	0	0	0	0	0	6,243	
2002 Summer Allocation Carryover	2,413	1,871	0	0	0	0	0	0	0	0	0	0	4,284	
Exchange approved Table A water to Westlands	0	0	0	0	11,103	3,000	0	0	0	0	0	0	14,103	
Pool A water	0	0	0	0	0	0	818	15	0	0	0	0	833	
Pool B water	0	0	0	0	0	0	102	3	0	0	0	0	105	
Transfer approved Table A water to Westlands	0	0	0	0	0	3,200	0	0	0	0	0	700	3,900	
Transfer approved Table A water to Westlands	0	0	0	0	250	250	250	0	0	0	250	0	1,000	
Transfer approved Table A water from Dudley	0	0	0	0	0	0	0	0	0	1,100	0	0	1,100	
Agency Total	2,413	3,159	7,234	3,133	1,077	14,373	13,283	20,634	1,428	4,541	12,275	4,388	87,938	
Westlands Water District														
Exchange approved Table A water from Tulare	0	0	0	0	11,103	3,000	0	0	0	0	0	0	14,103	
Transfer approved Table A water from Tulare	0	0	0	0	0	3,200	0	0	0	0	0	700	3,900	
Transfer approved Table A water from Tulare	0	0	0	0	250	250	250	0	0	0	250	0	1,000	
Agency Total	0	0	0	0	11,353	6,450	250	0	0	0	250	700	19,003	
Recreation/Fish and Wildlife														
Department of Fish and Game, O'Neill Forebay/Lateral 4	23	14	37	3	55	63	93	30	37	37	62	53	507	
Department of Parks and Recreation, O'Neill Forebay/San Luis/Cattle	3	0	2	5	9	10	17	11	9	6	1	1	74	
Total	26	14	39	8	64	73	110	41	46	43	63	54	581	
SWP	18,457	28,119	62,001	41,447	84,239	201,811	252,059	197,121	73,967	63,291	59,816	56,805	1,139,103	
Non-SWP	0	13,012	5,265	151	0	0	0	0	0	1,249	6,139	0	25,816	
San Joaquin Valley Area subtotal	18,457	41,131	67,266	41,568	84,239	201,811	252,059	197,121	73,967	64,540	65,955	56,805	1,164,919	
Other non-SWP Water Conveyed														
Tracy Golf and Country Club	0	0	0	0	0	0	0	0	0	0	0	0	0	
CVP Water Conveyed–Annual Contracts														
Plain View Water District/ Musco Family Olive Company	44	51	0	0	0	0	0	0	0	0	0	0	95	
Plain View Water District/ Musco Family Olive Company	0	0	62	64	63	71	72	72	74	87	56	3	624	
U.S. Department of Veteran Affairs, S.J.V. National Cemetery	1	4	0	0	0	0	0	0	0	0	0	0	5	
U.S. Department of Veteran Affairs, S.J.V. National Cemetery	0	0	3	4	7	9	14	16	15	7	3	2	80	
Subtotal	45	55	65	68	70	80	86	88	89	94	59	5	804	

[a]Excluded water from Agency Total

Table 9-5. Water Delivered in 2003, by Month (Acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	2003 Total Deliveries	2003 Contract Table A
Cross Valley Canal Contracts														
CVP water to Tulare	0	0	0	383	0	0	0	0	0	0	0	0	383	
CVP water to Fresno County Public Works	0	0	0	216	0	0	0	0	0	0	0	0	216	
CVP water to Hills Valley Irrigation District	0	0	242	0	0	0	0	0	0	0	0	0	242	
CVP water to Kern-Tulare	0	0	0	1,076	0	0	0	0	0	0	0	0	1,076	
CVP water to Rag Gulch	0	0	0	357	0	0	0	0	0	0	0	0	357	
CVP water to Tri-Valley Irrigation District	0	0	0	82	0	0	0	0	0	0	0	0	82	
Agency Total	0	0	242	2,114	0	0	0	0	0	0	0	0	2,356	
Bureau of Reclamation														
Conveyance of nonproject water to O'Neill Forebay	0	0	0	0	0	0	0	0	6,000	0	0	0	6,000	
Kern National Wildlife Refuge	1,136	2,139	1,291	220	236	145	0	1,008	3,497	0	1,255	4,009	14,936	
Recreation/fish and wildlife water	18	13	34	5	53	60	88	35	38	37	52	43	476	
Transfer of water to Madera Water District	0	0	0	0	0	0	0	0	0	1,200	0	0	1,200	
Agency Total	0	0	0	0	0	0	0	0	6,000	1,200	0	0	7,200	
SWP	0	0	0	0	0	0	0	0	0	0	0	0	0	
Non-SWP	45	55	307	2,182	70	80	86	88	6,089	1,294	59	5	25,772	
San Joaquin Valley Area subtotal	45	55	307	2,182	70	80	86	88	6,089	1,294	59	5	25,772	
SWP (Total)	18,457	28,119	62,001	41,417	84,239	201,811	252,059	197,121	73,967	63,291	59,816	56,805	1,139,103	
Non-SWP (Total)	45	13,067	5,572	2,333	70	80	86	88	6,089	2,543	6,198	5	51,588	
San Joaquin Valley Area Total	18,502	41,186	67,573	43,750	84,309	201,891	252,145	197,209	80,056	65,834	66,014	56,810	1,190,691	1,194,819
Central Coastal Area														
San Luis Obispo County Flood Control and Water Conservation District														
Approved Table A water	180	352	330	325	398	452	476	493	441	423	266	281	4,417	25,000
Article 21 water	0	0	24	12	0	0	0	0	0	0	0	0	36	
Agency Total	180	352	354	337	398	452	476	493	441	423	266	281	4,453	
Santa Barbara County Flood Control and Water Conservation District														
Approved Table A water	0	665	1,887	2,761	3,322	3,193	3,089	2,942	2,686	1,799	717	1,251	24,312	45,486
Article 21 water	0	0	236	103	0	0	0	0	0	0	0	0	339	
Carryover special (2002)	1,414	860	0	0	0	0	0	0	0	0	0	0	2,274	
Pool B water	0	0	0	43	0	0	0	0	0	0	0	0	43	
Agency Total	1,414	1,525	2,123	2,907	3,322	3,193	3,089	2,942	2,686	1,799	717	1,251	26,968	
SWP	1,594	1,877	2,477	3,244	3,720	3,645	3,565	3,435	3,127	2,222	983	1,532	31,421	
Non-SWP	0	0	0	0	0	0	0	0	0	0	0	0	0	
Central Coastal Area Total	1,594	1,877	2,477	3,244	3,720	3,645	3,565	3,435	3,127	2,222	983	1,532	31,421	70,486
Southern California Area														
Antelope Valley-East Kern Water Agency														
Approved Table A water	0	0	187	3,253	5,074	6,972	8,946	8,224	6,797	5,846	3,984	3,447	52,730	141,400
2002 Summer Allocation Carryover	2,274	2,143	2,632	0	0	0	0	0	0	0	0	0	7,049	
Pool A water	0	0	0	0	0	250	0	0	0	0	0	0	250	
Mojave's Approved Table A water delivered through AVEK	0	0	0	84	0	0	162	202	155	108	81	24	816	
Agency Total	2,274	2,143	2,819	3,337	5,074	7,222	9,108	8,426	6,952	5,954	4,065	3,471	60,845	
Castaic Lake Water Agency														
Approved Table A water	0	0	1,964	3,262	3,481	4,122	5,578	5,659	5,216	4,856	3,088	2,395	39,621	82,500
Approved Table A water to the Department	0	0	0	0	768	2,000	2,737	1,263	0	0	0	0	6,768	
Article 21 water	0	0	397	99	0	0	0	0	0	0	0	0	496	
2002 Summer Allocation Carryover	2,609	1,931	220	0	0	0	0	0	0	0	0	0	4,760	
Pool B water	0	0	0	0	0	90	0	0	0	0	0	0	90	
Agency Total	2,609	1,931	2,581	3,361	3,481	4,212	5,578	5,659	5,216	4,856	3,088	2,395	44,967	23,100
Coachella Valley Water District														
Approved Table A water	0	0	0	2,310	2,310	2,310	2,310	3,557	1,248	0	0	0	14,045	(1,748)
Article 21 water	0	0	152	52	0	0	0	0	0	0	0	0	204	
Pool A water	0	0	0	172	0	0	0	0	0	0	0	0	172	
Pool B water	0	0	0	0	0	22	0	0	0	0	0	0	22	
Agency Total	0	0	152	2,534	2,310	2,332	2,310	3,557	1,248	0	0	0	14,443	
Crestline-Lake Arrowhead Water Agency														
Approved Table A water	146	24	0	0	0	166	263	269	250	229	180	36	1,563	5,800
Local water	0	98	122	110	113	28	0	0	0	0	0	102	573	
Agency Total	146	122	122	110	113	194	263	269	250	229	180	36	2,136	
Desert Water Agency														
Approved Table A water	0	0	0	3,810	3,810	3,810	3,810	5,869	2,059	0	0	0	23,168	38,100
Article 21 water	0	0	246	84	0	0	0	0	0	0	0	0	330	
Pool A water	0	0	0	285	0	0	0	0	0	0	0	0	285	
Pool B water	0	0	0	0	0	36	0	0	0	0	0	0	36	
Agency Total	0	0	246	4,179	3,810	3,846	3,810	5,869	2,059	0	0	0	23,819	
Littlerock Creek Irrigation District														
Approved Table A water	0	0	0	0	0	0	0	0	0	0	0	0	0	2,300
Agency Total	0	0	0	0	0	0	0	0	0	0	0	0	0	
Metropolitan Water District of Southern California														
Approved Table A water	0	0	77,525	101,953	134,116	121,735	152,455	154,742	145,886	150,859	115,721	106,510	1,261,502	2,011,500

[a]Excluded water from Agency Total

Table 9-5. Water Delivered in 2003, by Month (Acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	2003 Total Deliveries	2003 Contract Table A
Approved Table A water to EWA[a]	0	0	0	0	29,596	0	0	0	0	0	0	0	29,596	
Approved Table A water stored in Semitropic[a]	0	0	0	0	0	16,000	14,940	40,000	0	0	0	0	70,940	
Approved Table A water stored in Arvin-Edison[a]	0	0	0	0	5,477	13,990	11,799	1,900	1,400	1,520	675	3,870	40,631	
Approved Table A water stored in Kern Delta[a]	0	0	0	0	0	837	1,491	17,806	0	0	0	0	20,134	
Article 56(c) extended carryover	0	0	34,270	0	0	0	0	0	0	0	0	0	34,270	
Bank water recovery, Arvin-Edison	5,795	1,502	0	0	0	0	0	0	0	0	0	0	7,297	
Bank water recovery, Arvin-Edison	0	4,186	897	0	0	0	0	0	0	0	0	0	5,083	
Bank water recovery, Semitropic	0	0	0	8,867	1,133	0	0	0	0	0	0	0	10,000	
2002 Summer Allocation Carryover	27,803	23,018	4,154	0	0	0	0	0	0	0	0	0	54,975	
Exchange approved water in behalf of EWA	12,287	15,309	2,000	0	0	0	0	0	0	0	0	0	29,596	
Exchange approved water to Mojave[a]	0	0	0	0	0	0	0	0	0	0	4,683	20,191	24,874	
Flexible storage replacement with Article 21 water (Lake Perris)	0	0	1,139	0	0	0	0	0	0	0	0	0	1,139	
Flexible storage replacement with Article 21 water (Castaic Lake)	0	0	12,000	4,483	0	0	0	0	0	0	0	0	16,483	
Flexible storage replacement with carryover special water (Lake Perris)[a]	0	1,100	0	0	0	0	0	0	0	0	0	0	1,100	
Flexible storage replacement with carryover special water (Castaic Lake)[a]	0	6,000	38,500	0	0	0	0	0	0	0	0	0	44,500	
Flexible storage replacement with Table A water (Lake Perris)[a]	0	0	0	15,754	0	0	0	0	0	0	0	0	15,754	
Flexible storage replacement with Table A water (Castaic Lake)[a]	0	0	0	16,821	0	0	0	0	0	0	0	0	16,821	
Flexible storage withdrawal (Lake Perris)	9,712	8,281	0	0	0	0	0	0	0	0	0	0	17,993	
Flexible storage withdrawal (Castaic Lake)	36,059	41,745	0	0	0	0	0	0	0	0	0	0	77,804	
Pool A water	0	0	0	15,024	0	0	0	0	0	0	0	0	15,024	
Pool B water	0	0	0	0	0	1,896	0	0	0	0	0	0	1,896	
Transfer approved Table A water from Santa Barbara	0	0	0	0	0	0	0	0	0	0	0	5,000	5,000	
Agency Total	91,656	94,041	131,985	130,327	135,249	123,631	152,455	154,742	145,886	150,859	115,721	111,510	1,538,062	
Mojave Water Agency														
Approved Table A water	0	0	395	2,211	1,025	678	1,024	908	1,288	1,871	433	258	10,091	75,800
Mojave's approved Table A water delivered through AVEK	0	0	0	84	0	0	162	202	155	108	81	24	816	
2002 Summer Allocation Carryover	502	671	2,355	0	0	0	0	0	0	0	0	0	3,528	
Exchange approved water from Metropolitan	0	0	0	0	0	0	0	0	0	0	4,683	20,191	24,874	
Pool A water sale[a]	16,900	0	0	0	0	0	0	0	0	0	0	0	16,900	
Pool B water sale[a]	2,500	0	0	0	0	0	0	0	0	0	0	0	2,500	
Agency Total[a]	502	671	2,750	2,211	1,025	678	1,024	908	1,288	1,871	5,116	20,449	38,493	
Palmdale Water District														
Approved Table A water	0	0	148	688	1,021	1,333	1,810	746	1,170	1,566	1,042	177	9,701	21,300
Article 56(c) extended carryover	0	0	781	0	0	0	0	0	0	0	0	0	781	
2002 Summer Allocation Carryover	421	565	79	0	0	0	0	0	0	0	0	0	1,065	
Agency Total	421	565	1,008	688	1,021	1,333	1,810	746	1,170	1,566	1,042	177	11,547	
San Bernardino Valley Municipal Water District														
Approved Table A water	0	0	0	959	865	1,096	1,986	2,384	3,266	3,579	2,541	3,695	20,371	102,600
Article 21 water	0	0	120	80	0	0	0	0	0	0	0	0	200	
2002 Summer Allocation Carryover	1,177	597	70	0	0	0	0	0	0	0	0	0	1,844	
Table A transfer to Metropolitan[a]	0	0	0	0	0	0	0	0	0	0	0	5,000	5,000	
Agency Total	1,177	597	190	1,039	865	1,096	1,986	2,384	3,266	3,579	2,541	3,695	22,415	
San Gabriel Valley Municipal Water District														
Approved Table A water	0	0	0	746	2,713	2,613	2,686	1,936	0	0	0	2,340	13,034	28,800
Article 21 water	0	0	136	64	0	0	0	0	0	0	0	0	200	
Exchange approved water from Dudley	0	0	0	0	0	0	0	754	2,555	2,889	2,502	0	8,700	
Agency Total	0	0	136	810	2,713	2,613	2,686	2,690	2,555	2,889	2,502	2,340	21,934	
San Gorgonio Pass Water Agency														
Approved Table A water	0	0	0	0	0	0	2	14	13	22	26	39	116	4,000
Agency Total	0	0	0	0	0	0	2	14	13	22	26	39	116	
Ventura County Watershed Protection District														
Approved Table A water	154	154	154	154	484	1,186	572	1,501	177	154	154	156	5,000	20,000
Local water from the Department to United Conservation District	0	0	0	0	768	2,000	2,737	1,263	0	0	0	0	6,768	
Pool A water sale[a]	6,750	0	0	0	0	0	0	0	0	0	0	0	6,750	
Pool B water sale[a]	750	0	0	0	0	0	0	0	0	0	0	0	750	
Agency Total	154	154	154	154	1,252	3,186	3,309	2,764	177	154	154	156	11,768	
Recreation/Fish and Wildlife														
Castaic Lake	13	0	16	17	30	34	50	46	50	45	23	32	356	
Castaic Lake to Lagoon	256	0	0	0	0	0	168	182	292	297	0	225	1,420	
Silverwood Lake	2	2	2	2	6	13	18	15	15	14	3	3	95	
Lake Perris	0	0	3	3	2	39	49	47	44	30	18	25	260	
Agency Total	271	2	21	22	38	86	285	290	401	386	44	285	2,131	
Recreation/Fish and Wildlife														
USFWS recreation/fish and wildlife water (Pyramid Lake)	1	1	1	1	1	3	2	2	2	2	0	0	16	
SWP	99,210	100,128	142,042	148,662	156,838	150,401	184,626	188,318	170,481	172,365	134,479	144,553	1,792,103	
Non-SWP	1	99	123	111	882	2,031	2,739	1,265	2	2	0	102	7,357	
Southern California Area Total	99,211	100,227	142,165	148,773	157,720	152,432	187,365	189,583	170,483	172,367	134,479	144,655	1,799,460	2,558,200
SWP Water														
SWP Approved Table A Water														
Agricultural and M&I approved water	2,155	8,801	113,876	148,557	241,225	362,310	453,892	407,954	261,304	245,734	195,795	186,579	2,628,182	

[a]Excluded water from Agency Total

[b]EWA water is not included in the Grand Total to prevent double counting.

Table 9-5. Water Delivered in 2003, by Month (Acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	2003 Total Deliveries	2003 Contract Table A
Agricultural and M&I approved water for EWA[a]	0	0	0	0	29,596	36,000	36,000	36,000	17,000	0	0	0	154,596	
Article 21 water	0	0	29,126	3,445	1,210	1,070	0	0	0	0	0	0	34,851	
Article 21 water for EWA	0	0	7,180	0	0	0	0	0	0	0	0	0	7,180	
Article 56(c) extended carryover	15,286	28,921	40,577	0	0	0	0	0	0	0	0	0	84,784	
2002 Summer Allocation Carryover	45,586	33,251	10,367	0	0	0	0	0	0	0	0	0	89,204	
Carryover 12(e) carryover	0	18	122	0	0	0	0	0	0	0	0	0	140	
Carryover (wet)	187	0	0	0	0	0	0	0	0	0	0	0	187	
Exchange approved water	0	0	0	0	11,103	3,000	0	754	2,555	2,889	7,185	20,191	47,677	
Exchange approved water for banked water[a]	0	0	350	8,867	1,133	0	0	0	0	0	0	0	10,350	
Exchange approved water for nonproject water supplied[a]	0	0	0	0	0	0	0	0	11,838	5,283	2,141	953	20,215	
Exchange banked water in behalf of EWA	12,287	15,309	2,000	0	0	0	0	0	0	0	0	0	29,596	
Flexible storage replacement with Article 21 water (Lake Perris)	0	0	1,139	0	0	0	0	0	0	0	0	0	1,139	
Flexible storage replacement with Article 21 water (Castaic Lake)	0	0	12,000	4,483	0	0	0	0	0	0	0	0	16,483	
Flexible storage replacement with carryover water (Lake Perris)[a]	0	1,100	0	0	0	0	0	0	0	0	0	0	1,100	
Flexible storage replacement with carryover water (Castaic Lake)[a]	0	6,000	38,500	0	0	0	0	0	0	0	0	0	44,500	
Flexible storage replacement (Lake Perris)[a]	0	0	0	15,754	0	0	0	0	0	0	0	0	15,754	
Flexible storage replacement (Castaic Lake)[a]	0	0	0	16,821	0	0	0	0	0	0	0	0	16,821	
Flexible storage withdrawal (Lake Perris)	9,712	8,281	0	0	0	0	0	0	0	0	0	0	17,993	
Flexible storage withdrawal (Castaic Lake)	36,059	41,745	0	0	0	0	0	0	0	0	0	0	77,804	
Flow capacity test[a]	27	0	0	0	0	0	0	0	0	0	0	0	27	
Pool A water	0	0	0	15,909	0	2,097	8,294	45	0	0	0	0	26,345	
Pool B water	0	0	0	97	0	2,276	1,045	7	0	0	0	0	3,425	
Pool A water sale[a]	26,345	0	0	0	0	0	0	0	0	0	0	0	26,345	
Pool B water sale[a]	3,425	0	0	0	0	0	0	0	0	0	0	0	3,425	
Pump-in recoveries	0	0	678	19,808	0	0	0	0	0	0	0	0	20,486	
Transfer approved water	0	0	0	0	250	3,450	250	0	5,300	3,800	250	5,700	19,000	
Unscheduled water	0	0	171	4	0	0	0	0	0	0	0	0	175	
Water Bank water recoveries	5,795	5,688	1,247	8,867	1,133	0	0	0	0	0	0	0	22,730	
Agency Total	127,067	142,014	218,483	201,170	254,921	374,203	463,481	408,760	269,159	252,423	203,230	212,470	3,127,381	
SWP Table A-related water														
Recreation/fish and wildlife water	299	18	64	34	113	179	422	352	468	444	112	341	2,846	
Subtotal (SWP water)	127,366	142,032	218,547	201,204	255,034	374,382	463,903	409,112	269,627	252,867	203,342	212,811	3,130,227	
Non-SWP Water														
Other water														
Dry Year Purchase Program	0	0	0	0	0	0	0	0	0	1,249	6,139	0	7,388	
Conveyance of nonproject water to O'Neill Forebay	0	0	0	0	0	0	0	0	6,000	0	0	0	6,000	
Local	35,497	486	1,744	7,833	104,482	175,648	195,495	162,314	88,824	78,289	105,241	76,871	1,032,724	
Solano settlement water	0	0	0	0	0	0	0	0	0	860	0	0	860	
Vallejo permit water	0	0	0	0	0	0	0	0	26	1,338	941	1,435	3,740	
Subtotal	35,497	486	1,744	7,833	104,482	175,648	195,495	162,314	94,850	81,437	112,321	78,306	1,049,235	
CVP Water														
Conveying water to CVP contractor	0	0	0	242	2,114	0	0	0	0	0	0	0	2,356	
Conveying CVP water annual contract	45	55	65	68	70	80	86	88	89	94	59	5	804	
Conveying CVP water (Kern National Wildlife Refuge–the Bureau)	1,136	2,139	1,291	220	236	145	0	1,008	3,497	0	1,255	4,009	14,936	
Conveying CVP water recreation/fish and wildlife water (San Luis/Pyramid)	19	14	35	6	54	63	90	37	40	39	52	43	492	
Delivery of CVP water from CVP/CVC to SWP contractor	0	13,012	5,265	151	0	0	0	0	0	0	0	0	18,428	
Transfer of CVP water to SWP contractor	0	0	0	0	0	0	0	0	500	3,600	0	0	4,100	
Transfer of CVP/CVC water to CVP contractor	0	0	0	0	0	0	0	0	0	1,200	0	0	1,200	
Subtotal (CVP water)	1,200	15,220	6,656	687	2,474	288	176	1,133	4,126	4,933	1,366	4,057	42,316	
Total (Non-SWP water)	36,697	15,706	8,400	8,520	106,956	175,936	195,671	163,447	98,976	86,669	113,687	82,363	1,093,028	
Grand Total	164,063	157,738	226,947	209,724	361,990	550,318	659,574	572,559	368,603	339,536	317,029	295,174	4,223,255	4,126,926

[a]Excluded water from Agency Total

Table 9-6. Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962-03 (Acre-feet)

Year	Annual Table A Water According to Long-Term Water Supply Contract							Water Conveyed								
								Deliveries								
	Upper Feather River Area (1)	*North Bay Area (2)*	*South Bay Area (3)*	*San Joaquin Valley Area (4)*	*Central Coastal Area (5)*	*Southern California Area (6)*	*Total (7)*	*Annual Table A Water (8)*	*Article 21 Surplus and Unscheduled Water[a] (9)*	*Other Water[b] (10)*	*Feather River Diversions[c] (11)*	*Wildlife/ Recreation Water (12)*	*Subtotal (13)*	**Initial Fill Water (14)**	**Operational Losses and Storage Changes[d] (15)**	**Total (16)**
1962	0	0	0	0	0	0	0	0	0	18,289	0	0	18,289	9	272	18,570
1963	0	0	0	0	0	0	0	0	0	22,456	0	0	22,456	71	185	22,712
1964	0	0	0	0	0	0	0	0	0	32,507	0	0	32,507	171	152	32,830
1965	0	0	0	0	0	0	0	0	0	44,105	0	0	44,105	93	729	44,927
1966	0	0	0	0	0	0	0	0	0	67,928	0	0	67,928	0	1,746	69,674
1967	0	0	11,538	0	0	0	11,538	11,538	0	53,605	0	0	65,143	8,328	4,212	77,683
1968	550	0	109,900	77,350	0	3,700	191,500	171,709	121,534	14,777	866,926	0	1,174,946	498,926	117,906	1,791,778
1969	620	0	98,700	163,075	0	5,000	267,395	193,020	72,397	18,829	794,374	0	1,078,620	510,614	72,196	1,661,430
1970	700	0	114,200	202,000	0	5,700	322,600	233,993	133,024	38,080	759,759	0	1,164,856	23,947	2,435	1,191,238
1971	890	0	116,200	251,800	0	6,700	375,590	357,340	296,019	44,119	778,362	8	1,475,848	7,853	5,812	1,489,513
1972	970	0	118,300	413,066	0	209,423	741,759	611,801	423,964	66,638	817,398	6,489	1,926,290	100,274	53,062	2,079,626
1973	1,100	0	120,400	383,652	0	481,100	986,252	694,388	296,416	42,511	800,743	1,155	1,835,213	204,638	53,798	2,093,649
1974	1,230	0	122,400	460,650	0	597,920	1,182,200	874,077	417,676	46,224	911,613	2,118	2,251,708	237,554	10,657	2,499,919
1975	1,610	0	124,500	545,809	0	714,950	1,386,869	1,223,990	622,902	63,793	862,218	3,377	2,776,280	103,352	(94,606)	2,785,026
1976	1,990	0	126,500	543,417	0	836,480	1,508,387	1,373,002	580,110	115,217	946,440	1,745	3,016,514	61,122	(681,025)	2,396,611
1977	2,420	0	128,600	581,400	0	954,901	1,667,321	574,155	0	389,065	581,994	1,111	1,546,325	0	(131,151)	1,415,174
1978	1,850	0	130,700	635,900	0	1,049,584	1,818,034	1,452,699	16,914	121,225	786,517	1,691	2,379,046	64,443	717,370	3,160,859
1979	2,130	0	132,700	702,685	0	1,190,573	2,028,088	1,659,896	648,389	187,630	882,549	1,766	3,380,230	12,302	(83,430)	3,309,102
1980	1,810	500	134,800	758,100	1,946	1,317,614	2,214,770	1,529,749	404,557	46,459	875,045	2,131	2,857,941	0	(26,606)	2,831,335
1981	1,940	650	137,000	818,000	2,813	1,432,065	2,392,468	1,909,562	908,428	279,161	838,557	4,688	3,940,396	0	(802,263)	3,138,133
1982	1,970	800	139,200	876,500	5,626	1,550,449	2,574,545	1,750,024	215,873	154,882	776,330	4,646	2,901,755	0	480,752	3,382,507
1983	2,000	950	141,400	867,118	8,439	1,681,257	2,701,164	1,184,869	13,019	181,453	602,905	7,849	1,990,095	0	(90,997)	1,899,098
1984	3,630	1,100	143,600	979,211	12,698	1,744,098	2,884,337	1,588,619	262,917	381,024	832,332	7,040	3,071,932	0	(140,182)	2,931,750
1985	3,760	1,250	145,800	1,019,049	21,138	1,864,849	3,055,846	1,995,453	307,672	404,842	870,008	4,033	3,582,008	0	92,885	3,674,893
1986	4,190	1,400	148,100	1,091,946	28,210	1,983,890	3,257,736	1,995,636	36,620	193,606	791,737	3,865	3,021,464	0	284,380	3,305,844
1987	4,620	1,550	150,300	1,188,500	35,204	2,103,941	3,484,115	2,130,086	114,907	377,592	831,947	7,672	3,462,204	0	(390,413)	3,071,791
1988	5,060	15,471	152,500	1,246,100	43,722	2,225,482	3,688,335	2,385,122	0	507,076	794,834	4,889	3,691,921	0	(92,850)	3,599,071
1989	5,500	24,615	156,700	1,290,400	56,342	2,424,633	3,958,190	2,853,747	0	474,559	830,500	8,135	4,166,941	0	447,917	4,614,858
1990	6,040	28,190	160,900	1,313,450	70,486	2,500,600	4,079,666	2,582,151	90	424,697	875,099	9,262	3,891,299	0	(528,869)	3,362,430
1991	11,880	29,590	166,400	1,338,011	70,486	2,510,200	4,126,567	549,113	3,521	551,051	565,395	4,879	1,673,959	0	167,435	1,841,394
1992	11,920	32,010	171,900	1,342,300	70,486	2,510,200	4,138,816	1,471,454	1,156	144,789	613,978	2,605	2,233,982	0	(63,541)	2,170,441
1993	11,960	34,620	177,400	1,342,300	70,486	2,510,200	4,146,966	2,315,235	0	254,854	822,589	2,609	3,395,287	0	726,123	4,121,410
1994	12,000	37,215	182,000	1,342,300	70,486	2,510,200	4,154,201	1,749,351	112,625	236,739	874,018	8,200	2,980,933	0	(295,405)	2,685,528
1995	12,050	44,030	184,000	1,342,300	70,486	2,510,200	4,163,066	1,967,093	64,330	78,425	860,077	2,575	2,972,500	0	69,536	3,042,036
1996	12,100	48,225	186,000	1,301,630	70,486	2,492,900	4,111,341	2,514,825	28,647	251,391	934,997	3,907	3,733,767	86	491,550	4,225,403
1997	12,150	49,315	188,000	1,297,300	45,201	2,492,900	4,084,866	2,325,775	21,432	322,000	993,211	4,146	3,666,564	527	(11,806)	3,655,285
1998	12,200	50,420	188,000	1,272,300	45,201	2,517,900	4,086,021	1,725,519	20,288	134,682	872,738	2,108	2,755,335	0	(132,491)	2,622,844
1999	12,250	51,500	188,000	1,272,300	70,486	2,519,900	4,114,436	2,738,891	158,070	85,312	1,108,672	4,324	4,095,269	0	(189,525)	3,905,744
2000	14,000	55,945	210,000	1,205,300	70,486	2,565,900	4,121,631	3,200,677	308,785	322,655	1,085,886	4,030	4,932,032	0	(20,103)	4,911,929
2001	14,670	66,561	220,000	1,185,519	70,486	2,566,900	4,124,136	1,690,926	43,435	477,835	1,078,656	2,929	3,293,781	0	159,983	3,453,764
2002	14,730	67,396	220,000	1,195,219	70,486	2,557,200	4,125,031	2,573,030	37,165	307,162	1,132,938	3,694	4,053,989	0	80,709	4,134,698
2003	14,790	68,231	220,400	1,194,819	70,486	2,558,200	4,126,926	2,901,041	59,828	251,447	1,008,093	2,846	4,223,255	0	459,377	4,682,632
Total	**223,280**	**711,534**	**5,567,038**	**33,040,776**	**1,152,372**	**59,707,709**	**100,402,709**	**59,059,556**	**6,752,710**	**8,240,690**	**30,659,435**	**132,522**	**104,844,913**	**1,834,310**	**725,916**	**107,405,139**

[a] Values include amounts of deliveries to short-term contractors (Mustang Water District, 1970-72; Tracy Golf and Country Club, 1974, 1979, and 1980; Green Valley Water District, 1974, 1975, 1978, 1979, 1980, and 1985; Granite Construction Company, 1980).
[b] Includes amounts of SWP non-Table A water and non-SWP water conveyed for SWP and non-SWP water contractors.
[c] Includes amounts of water diverted under various water rights agreements.
[d] Amounts reflect net effect of (1) operational losses from SWP transportation facilities; (2) changes in reservoir storage south of Delta; (3) storable local inflows to SWP reservoirs; (4) side inflow to San Luis Canal; and (5) inflow into California Aqueduct from Kern River Intertie.

Information for this chapter was provided by the State Water Project Analysis Office.

United States District Court, Eastern District of California, "*Natural Resources Defense Council v. Kempthorne*, 506 F.Supp.2d 322 (E.D. Cal. 2007)" ("2007 Wanger decision")

Natural Resources Defense Council v. Kempthorne
E.D.Cal.,2007.
Only the Westlaw citation is currently available.
United States District Court,E.D. California.
NATURAL RESOURCES DEFENSE COUNCIL, et al., Plaintiffs,
v.
Dirk KEMPTHORNE, in his official capacity as Secretary of the Interior, et al., Defendants,
California Department of Water Resources, Defendant-Intervenor,
State Water Contractors, Defendant-Intervenor,
San Luis & Delta-Mendota Water Authority, et al., Defendant-Intervenors.
No. 1:05-CV-01207 OWW (TAG).

May 25, 2007.

Andrea Arnold Treece, Deborah S. Reames, Michael Ramsey Sherwood, Earthjustice Legal Defense Fund Incorporated, Oakland, CA, Hamilton Candee, Katherine Scott Poole, Natural Resources Defense Council, Trent William Orr, Law Office of Trent W. Orr, San Francisco, CA, for Plaintiffs.
James A. Maysonett, Keith W. Rizzardi, Department of Justice, Wildlife and Marine Resources Section, Washington, DC, for Defendants.
Daniel Joseph O' Hanlon, Clifford W. Schulz, Kronick, Moskovitz, Tiedemann & Girard, Jon David Rubin, Diepenbrock Harrison, Brenda Washington Davis, Christian Charles Scheuring, John Robert Hewitt, Ronda Azevedo Lucas, California Farm Bureau Federation, Deborah A. Wordham, California Attorney General's Office, Andrew Morrow Hitchings, Somach, Simmons & Dunn, Kevin M. O' Brien, Steven Paul Saxton, Downey Brand LLP, Sacramento, CA, Christopher H. Buckley, Jr., Gibson Dunn and Crutcher, Washington, DC, Gregory K. Wilkinson, Anthony Leon Beaumon, Best Best & Krieger, LLP, Riverside, CA, Mark Diaz Servino, Best Best and Krieger LLP, Irvine, CA, Clifford Thomas Lee, California Attorney General's Office, San Francisco, CA, J. Mark Atlas, Frost Krup and Atlas, Willows, CA, for Defendants-Intervenors.

OLIVER W. WANGER, United States District Judge.

***1** This case concerns the effect on a threatened species of fish, the Delta smelt (*Hypomesus transpacificus*) FN1, of the coordinated operation of the federally-managed Central Valley Project (" CVP") and the State of California's State Water Project (" SWP"), among the world's largest water diversion projects. Both projects divert large volumes of water from the California Bay (Sacramento-San Joaquin) Delta (" Delta") and use the Delta to store water.

For over thirty years, the projects have been operated pursuant to a series of cooperation agreements. In addition, the projects are subject to ever-evolving statutory, regulatory, contractual, and judicially-imposed requirements. The Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (" 2004 OCAP" or " OCAP") surveys how the projects are currently managed in light of these evolving circumstances. At issue in this case is a 2005 FN2 biological opinion (" BiOp"), issued by the United States Fish and Wildlife Service (" FWS" or " Service") pursuant to the Endangered Species Act (" ESA"), which concludes that current project operations described in the OCAP and certain planned future actions will not jeopardize the continued existence of the Delta smelt or adversely modify its critical habitat.

The Delta smelt is a small, slender-bodied fish endemic to the Delta. Historically, Delta smelt could be found throughout the Delta. Although abundance data on the smelt indicates that the population has fluctuated wildly in the past, it is undisputed that, overall, the population has declined significantly in recent years, to its lowest reported volume in fall 2004.

In this case, Plaintiffs, a coalition of environmental and sportfishing organizations, challenge the 2005 BiOp's no jeopardy and no adverse modification findings as arbitrary, capricious, and contrary to law under the Administrative Procedure Act, 5 U.S.C. §§ 702 et seq. Before the court for decision is Plaintiffs' motion for summary judgment. Among other things, Plaintiffs allege that the BiOp fails to consider the best available science, relies upon uncertain (and allegedly inadequate) adaptive management processes to monitor and mitigate the potential impacts of the OCAP, fails to meaningfully analyze whether the 2004 OCAP will jeopardize the continued existence of the Delta smelt, fails to consider the OCAP's impact upon previously designated critical habitat, and fails to address the impacts of the entire project.

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Separate opposition briefs were filed by the Federal Defendants (Doc. 242), the Department of Water Resources (" DWR") (Doc. 246), and the State Water Contractors (" SWC") (Doc. 241), along with a final brief filed collectively by San Luis & Delta-Mendota Water Authority, Westlands Water District, and the California Farm Bureau Federation (" the San Luis Parties") (Doc. 247).

A recent Ninth Circuit opinion in *National Wildlife Federation v. National Marine Fisheries Service,* 481 F.3d 1224 (9th Cir.2007) [hereinafter " *NWF v. NMFS*"], succinctly summarizes the relevant provisions of the ESA:

***2** The ESA requires federal agencies to " insure that any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [designated critical] habitat...." 15 U.S.C. § 1536(a)(2). The ESA imposes a procedural consultation duty whenever a federal action may affect an ESA-listed species.*Thomas v. Peterson,* 753 F.2d 754, 763 (9th Cir.1985). To that end, the agency planning the action, usually known as the " action agency," must consult with the consulting agency. This process is known as a " Section 7" consultation. The process is usually initiated by a formal written request by the action agency to the consulting agency. After consultation, investigation, and analysis, the consulting agency then prepares a biological opinion. *See generally Ariz. Cattle Growers' Ass'n v. U.S. Fish & Wildlife Serv.,* 273 F.3d 1229, 1239 (9th Cir.2001). In this case, the action agencies are the U.S. Army Corps of Engineers and the Bureau of Reclamation, while the consulting agency is NMFS.

The consulting agency evaluates the effects of the proposed action on the survival of species and any potential destruction or adverse modification of critical habitat in a biological opinion, 16 U.S.C. § 1536(b), based on " the best scientific and commercial data available," *id.* § 1536(a)(2). The biological opinion includes a summary of the information upon which the opinion is based, a discussion of the effects of the action on listed species or critical habitat, and the consulting agency's opinion on " whether the action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat...." 50 C.F.R. § 402.14(h)(3). In making its jeopardy determination, the consulting agency evaluates " the current status of the listed species or critical habitat," the " effects of the action," and " cumulative effects." *Id.* § 402.14(g)(2)-(3). " Effects of the action" include both direct and indirect effects of an action " that will be added to the environmental baseline." *Id.* § 402.02. The environmental baseline includes " the past and present impacts of all Federal, State or private actions and other human activities in the action area" and " the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation." *Id.* If the biological opinion concludes that jeopardy is not likely and that there will not be adverse modification of critical habitat, or that there is a " reasonable and prudent alternative[ ]" to the agency action that avoids jeopardy and adverse modification and that the incidental taking of endangered or threatened species will not violate section 7(a)(2), the consulting agency can issue an " Incidental Take Statement" which, if followed, exempts the action agency from the prohibition on takings found in Section 9 of the ESA. 16 U.S.C. § 1536(b)(4); *ALCOA v. BPA,* 175 F.3d 1156, 1159 (9th Cir.1999).

* * *

***3** The issuance of a biological opinion is considered a final agency action, and therefore subject to judicial review. *Bennett v. Spear,* 520 U.S. 154, 178, 117 S.Ct. 1154, 137 L.Ed.2d 281 (1997); *Ariz. Cattle Growers' Ass'n,* 273 F.3d at 1235.

Id. at *2-*3.

For over thirty years the state and federal agencies charged with management of the CVP and SWP have operated the projects in an increasingly coordinated manner pursuant to a Coordinated Operating Agreement (" COA"). The COA, which dates to 1986, has evolved over time to reflect, among other things, changing facilities, delivery requirements, and regulatory restrictions. The most recent document surveying how the COA is implemented in light of these evolving circumstances is the 2004 Operating Criteria and Plan (" 2004 OCAP" or " OCAP") issued June 30, 2004. (AR 489-728.) [FN3]

A. *Overview of the 2004 OCAP.*

The OCAP begins with a " Purpose of Document" section which states:

This document has been prepared to serve as a baseline description of the facilities and operating environment of the Central Valley Project (CVP) and State Water Project (SWP). The Central Valley Project-Operations and

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Criteria Plan (CVP-OCAP) identifies the many factors influencing the physical and institutional conditions and decision-making process under which the project currently operates. Regulatory and legal instruments are explained, alternative operating models and strategies described.
The immediate objective is to provide operations information for the Endangered Species Act, Section 7, consultation. The long range objective is to integrate CVP-OCAP into the proposed Central Valley document. It is envisioned that CVP-OCAP will be used as a reference by technical specialists and policymakers in and outside the Bureau of Reclamation (Reclamation) in understanding how the CVP is operated. The CVP-OCAP includes numeric and nonnumeric criteria and operating strategies. Emphasis is given to explaining the analyses used to develop typical operating plans for simulated hydrologic conditions.
All divisions of CVP are covered by this document, including the Trinity River Division, Shasta and Sacramento Divisions, American River Division and Friant Division.

(AR 506.) [FN4]

The introductory chapter provides an overview of all of the physical components of the CVP and SWP (AR 507-520), as well as all of the relevant legal authorities affecting CVP operations (508-512).

Chapter 2, explains, among other things, that water needs assessments have been performed for each CVP water contractor, to confirm each contractor's past beneficial use in order to anticipate future demands. (AR 521.) Chapter 2 also reviews the 1986 COA and how it is implemented on a daily basis by Reclamation and DWR. (AR 523-25.) Also provided is a detailed overview of the " changes in [the] operations coordination environment since 1986," which include:
***4** Changes due to temperature control operations on the Sacramento River;
Increases in the minimum release requirements on the Trinity River;
Implementation of CVPIA 3406(b)(2) and Refuge Water Supply contracts;
Commitments made by the CVP and SWP pursuant to the Bay-Delta Accord and the subsequent implementation of State Water Resources Control Board (" SWRCB") Decision-1641;
The Monterey Agreement;
The Operation of the North Bay Aqueduct (which was not included in the 1986 COA).
The SWP's commitment to make up for 195,000 acre-feet of pumping lost to the CVP due to SWRCB Decision 1485;
Implementation of the Environmental Water Account; and Constraints imposed by various endangered species act listings, including that of the Sacramento River Winter-Run Chinook Salmon, the Sacramento River Spring-Run Chinook Salmon, the Steelhead Trout, and the Delta Smelt (which resulted in the issuance of biological opinions in 1993, 1994, and 1995 concerning CVP/SWP operations and the South Delta Temporary Barriers Biological Opinion in 2001)

(AR 525-28.) The OCAP also reviews the regulatory standards imposed by SWRCB D-1641, which include water quality standards based on the geographic position of the 2-parts-per-thousand isohale (otherwise known as " X2"), a Delta export restriction standard known as the export/inflow (E/I) ratio, minimum Delta outflow requirements, and Sacramento River and San Joaquin River flow standards. (AR 530-537.) In addition to imposing requirements, D-1641 granted the Bureau and DWR permission to use each project's capabilities in a coordinated manner. (AR 537-38.)

This is not a complete overview of the projects' operations covered in the OCAP. Numerous regulatory and operational changes have taken place in recent years. As the OCAP's " Purpose of Document" section explains, the immediate objective of the OCAP is to lay out all such regulatory and other operational information so that ESA Section 7 consultation can proceed to evaluate how project operations will effect the Delta smelt under various projected future conditions.

B. *Applying the ESA to Project Operations.*

Because endangered and/or threatened species, including the Delta smelt, reside in the area affected by the CVP and SWP, the 2004 OCAP, administered on behalf of the federal government by the Bureau of Reclamation (" Bureau"), must comply with various provisions of the ESA. Specifically, prior to authorizing, funding, or carrying out any action, the acting federal agency (in this case, the Bureau) must first consult with FWS and/or NMFS to " insure that [the] action ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined ... to be critical...." 16 U.S.C. § 1536(a)(2) [ESA § 7(a)(2)]. This form of consultation is called " formal consultation," and concludes with the issuance of a biological opinion. 50 C.F.R. § 402.02.

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***5** Alternatively, under certain circumstances, a federal agency may pursue " early consultation," on behalf of an agency or private party (referred to as a " prospective applicant") who will require formal approval or authorization to undertake a project. *Id.* Early consultation may be requested when the prospective applicant " has reason to believe that an endangered species or a threatened species may be present in the area affected by this project and that implementation of such action will likely affect such species." 50 C.F.R. § 402.11(b). The result of early consultation is a " preliminary biological opinion," the contents of which are " the same as for a biological opinion issued after formal consultation except that the incidental take statement provided with a preliminary biological opinion does not constitute authority to take listed species." § 402.11(e). Subsequently, the preliminary biological opinion may be " confirmed" after the prospective applicant applies to the federal agency for a permit or licence. Once a request for confirmation is received, the FWS must either confirm that the preliminary biological opinion stands as the final biological opinion or must request that the federal agency initiate formal consultation. § 402.11(f).

In this case, the 2004 OCAP BiOp [FN5] contemplates increases in water diversions and the construction of new facilities in the Delta. (AR 256-271.) The maximum daily diversion rate in Clifton Court Forebay will increase from 6,680 cubic feet per second (CFS) to 8,500 CFS (27% increase in pumping) and eventually to 10,300 CFS (54% increase). Permanent barriers within the south Delta will be constructed and operated. An intertie between the California Aqueduct and the Delta-Mendota Canal will be constructed and operated. Water deliveries from the American River will be doubled. New deliveries of CVP water to the Freeport Regional Water Project will be made. Water transfers resulting in an annual 200,000 to 600,000 acre-feet increase in Delta exports will result. (AR 256, 339-40, 357-59, 371, 382-83, 465.)

The Bureau submitted some of these operational changes for formal consultation with FWS concerning their impact on the Delta smelt, while other changes were subject only to early consultation:

This biological opinion covers formal and early consultation for the operations of the CVP and SWP. The formal consultation effects described in this biological opinion cover the proposed 2020 operations of the CVP including the Trinity River Mainstem ROD (Trinity ROD) flows on the Trinity River, the increased water demands on the American River, the delivery of CVP water to the proposed Freeport Regional Water Project (FRWP), water transfers, the long term Environmental Water Account (EWA), the operation of the Tracy Fish Facility, and the operation of the SWP-CVP intertie. The effects of operations of the SWP are also included in this opinion and include the operations of the North Bay Aqueduct, the Suisun Marsh Salinity Control Gates, the Skinner Fish Facility and water transfers.

***6** Early consultation effects include the effects of operations of components of the South Delta Improvement Program (SDIP). These operations include pumping of 8500 cubic feet per second (cfs) at the SWP and Banks Pumping Plant (hereafter referred to as 8500 Banks), permanent barrier operations in the South Delta, the long term EWA, water transfers, and CVP and SWP operational integration. There are two separate effects sections in this biological opinion, one for Formal Consultation and one for Early Consultation. In addition, there is an incidental take for formal consultation and a preliminary incidental take for early consultation.

(AR 2, 248.) [FN6]

C. *History of This Lawsuit.*

On July 30, 2004, FWS issued a Biological Opinion (the " 2004 OCAP BiOp"), addressing both formal and early consultation for the above-described OCAP actions. (AR 1.) [FN7]

On August 4, 2004, the Ninth Circuit decided *Gifford Pinchot Task Force v. United States Fish & Wildlife Serv.*, 378 F.3d 1059, 1069 (9th Cir.2004), which held that the FWS's definition of " adverse modification" to critical habitat is an impermissible interpretation of the ESA because it focuses on whether critical habitat modifications would impact the *survival* of a species, effectively ignoring the statutorily-mandated goal of " *recovery.*" On November 4, 2004, in response to this ruling, the Bureau requested reinitiation of consultation to address critical habitat issues.

Plaintiffs in this case, a coalition of non-profit conservation organizations, filed suit on February 15, 2005, alleging that the 2004 OCAP BiOp was legally inadequate in light of *Gifford Pinchot* and should be invalidated. (Doc. 1.) Plaintiffs named as defendants the Department of the Interior and the FWS. (*Id.*)

On February 16, 2005, FWS issued an amended BiOp (the " 2005 OCAP BiOp," " OCAP BiOp," or " BiOp"), which superceded the 2004 OCAP BiOp. (AR 247.) The 2005 OCAP BiOp concludes that the coordinated operation of the SWP and CVP, including the proposed future actions, will not jeopardize the Delta smelt's

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continued existence. (AR at 469.) Although the BiOp recognizes that *existing* protective measures may be inadequate, the FWS concluded that certain *proposed* protective measures, including the EWA and a proposed " adaptive management" protocol would provide adequate protection. (*Id.*)

Since the filing of this complaint, Federal Defendants have reinitiated § 7 consultation and contend this case should be dismissed as moot, or stayed for a voluntary remand of the 2005 BiOp without vacatur.

Plaintiffs filed a supplemental complaint on May 20, 2005, challenging the amended BiOp on various grounds. (Doc. 128 pt. 8.)

D. *Delta Smelt Abundance.*

Smelt once were one of the most common pelagic [FN8] fish in the Delta, having previously occupied the waters from " Suisun Bay and Montezuma Slough, upstream to at least Verona on the Sacramento River, and Mossdale on the San Joaquin River." (AR 365.) Smelt abundance has " declined irregularly" for at least the past 20 years. (AR 365-67.) FWS relies primarily upon two indices to monitor Delta smelt abundance, calculated from the Summer Tow Net Survey (" TNS") and the Fall Midwater Trawl (" FMWT"). (AR 366-67, 1022.) The TNS index, which measures the abundance and distribution of juvenile Delta smelt, constitutes " one of the more representative indices because the data have been collected over a wide geographic area (from San Pablo Bay upstream through most of the Delta) for the longest period of time (since 1959)." (AR 370.) Since 1983, except for three years (1986, 1993, and 1994), the TNS has remained consistently lower than ever previously recorded. (*Id.*)

***7** The FMWT index, which measures the abundance and distribution of late juveniles and adult Delta smelt from San Pablo Bay to Rio Vista on the Sacramento River and Stockton on the San Joaquin River, is the second longest running survey (since 1967). The BiOp reviewed the FMWT trends as follows:

Although this index has fluctuated widely (AR 9201-02, 9222), it has " declined irregularly over the past 20 years." (AR 370-71.) Since 1983, the FMWT has registered more low indices for more consecutive years than previously recorded. Until recently, except for 1991, this index has declined irregularly over the past 20 years. Since 1983, the delta smelt population has exhibited more low fall midwater trawl abundance indices, for more consecutive years, than previously recorded. The 1994 FMWT index of 101.7 is a continuation of this trend. This occurred despite the high 1994 summer townet index for reasons unknown. The 1995 summer townet was a low index value of 319 but resulted in a high FMWT index of 898.7 reflecting the benefits of large transport and habitat maintenance flows with the Bay-Delta Accord in place and a wet year. The abundance index of 128.3 for 1996 represented the fourth lowest on record. The abundance index of 305.6 for 1997 demonstrated that the relative abundance of delta smelt almost tripled over last years results, and delta smelt abundance continued to rise, peaking in 1999 to an abundance index of 863, only to fall back down to the low abundance indexes of 139 for 2002 and 213 for 2003.

(AR at 371.)

The 2004 FMWT index, which was not discussed in the BiOp, was calculated to be 74, the lowest ever recorded. (AR 9202.) (This omission forms the basis of one of Plaintiffs' challenges to the BiOp.) The survey was apparently released in December 2004, and was specifically cited to FWS in February 2005.

At the hearing on the summary judgment motions, Federal Defendants in substance argued that despite years of study, the abundance data for the annual Delta smelt population is fraught with uncertainties and " not enough is known about the species" to accurately and finitely measure with certainty the project's effects on Delta smelt. FWS maintains the one to two year life expectancy of the smelt also contribute to this lack of certainty.

E. *Relationship Between Abundance and Project Operations.*

The BiOp cites several reasons for the smelt's decline. First, since the mid 1800s, mining, agricultural use, and levee construction caused the loss of a large portion of smelt habitat. (AR at 365.) Second, recreational boating in the Delta has resulted in the presence and propagation of " predatory non-native fish" and an increase in the rate of smelt erosion resulting from boat wakes.(*Id.*) Third, reduced water quality " from agricultural runoff, effluent discharge and boat effluent has the potential to harm the pelagic larvae and reduce the availability of the planctonic food source." (*Id.* at 366.)Finally, the BiOp acknowledges that " delta smelt have been increasingly subject to entrainment, upstream or reverse flows of waters in the Delta and San Joaquin River, and constriction of low salinity habitat to deep-water river channels of the interior Delta." (*Id.*) The BiOp acknowledges that these final adverse effects are " *primarily a result of the steadily*

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increasing proportion of river flow being diverted from the Delta by the Projects, and occasional droughts." (*Id.* (emphasis added).) The BiOp in no way quantifies the contribution of each of these factors to the smelt's decline. The parties dispute the extent to which project operations jeopardize the smelt.

F. *Relationship Between Smelt and " X2."*

***8** Smelt are euryhaline (tolerant of a wide range of salinities), but generally occur in water with less than 10-12 parts per thousand (ppt) salinity. (AR at 362.) For a large part of its life span, Delta smelt are thought to be associated with the " freshwater edge of the mixing zone," where the salinity is approximately 2 parts per thousand (often referred to as " X2"). (AR at 366.) The summer TNS index increases dramatically whenever X2 is located between Chipps and Roe islands. (*Id.*) Whenever the location of X2 shifts upstream of the confluence of the Sacramento and San Joaquin, either as a result of water diversions or natural conditions, smelt abundance decreases.(*Id.* at 371.)

G. *The Concept of " Salvage."*

The BiOp's " no jeopardy" conclusion relies on the concept of " salvage," which refers generally to the process of using mechanical devices to screen fish that would otherwise be entrained in project facilities (e.g., pumps) into holding tanks for transport to other parts of the Delta. (*See e.g.*, AR 321.) Unlike many other fish species in the Delta, Delta smelt do not survive the salvage process, " either due to stress and injury from handling, trucking and release, or from predation in or near the salvage facilities, the release sites, or in Clifton Court Forebay." (AR at 413.) As a result, for Delta smelt, FWS uses the terms salvage and entrainment essentially interchangeably. (*See id.*(" To simplify predictions of the difference in salvage (and by extension entrainment) between model scenarios....") FN9

Previous BiOps regarding CVP and SWP operations used salvage to set take limits. For example, the 1995 BiOp's incidental take statement set take exceedence levels for Delta smelt based on " [m]onthly average delta smelt salvage at the Federal and State Fish Facilities from 1980 to 1992 by water year type." (AR at 11765.) Essentially, take limits were set according to how much salvage had occurred in the past.

More recently, project managers, fisheries officials, and other experts came to the consensus that the salvage approach was insufficient on its own. For example, one DWR biologist noted that the singular focus on historic salvage had problems:

Higher levels of take are allowed in below normal years merely because this is what the projects " took" historically. However, the population is more condensed in below normal years and possibly more vulnerable to entrainment.

(AR 5532.) Experts advocated (a) further research into the relationship between the position of the Delta smelt and environmental conditions (AR 4881); and (b) the adoption of a flexible management approach, which would allow new information to be " folded back into the operation and conservation strategies." (AR 4870.) The result was a " layered" approach to managing the smelt, made up of more protective take limits than previously imposed along with the implementation of an adaptive management protocol.

I. *Revised Take Exceedence Levels Used In the BiOp.*

***9** The BiOp includes " hard" take limits,[FN10] based on historic " salvage density estimates," adjusted to account for operational constraints under the 2004 OCAP and presumed increased environmental water flows. Separate take limits were established for formal and early consultation purposes.

The revision of the take limits began with historic catch data from periodic samples of salvaged fish. (*See* AR 413.) Data about the volume of water diverted during the collection period is then used to estimate the fish per volume of water diverted. This is referred to as the " salvage density." [FN11](*Id.*) Historically, salvage density varied greatly depending on whether the year was wet (above normal), dry (below normal, dry, or critical) year. Wet and dry year data were analyzed separately. (*Id.*) The estimates were then inputted into a computer modeling system, CALSIM II, to estimate take under varying assumptions about future project operations, including programs designed to improve environmental conditions, such as the Environmental Water Account. (AR 413-14.)

Several different scenarios or " Studies" were run through CALSIM II and included in the BiOp. For example, Study No. 1 reflects the 1995 regulatory base case, without any changes in project operations and without the addition of any environmental water programs. Study No. 4a estimates a take level for flow conditions planned under the operations subject to final consultation (changes to flows in the Trinity River, future development levels, and the operation of the Freeport Regional Water Project and the Intertie). Study 4a

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included flow adjustments required by D-1641 and VAMP, along with projected CVPIA (b)(2) flows, but *did not include* operation of the EWA. Study No. 5a was similar to 4a, except that it added projected EWA flows. Separately, in Study No. 5, CALSIM II simulated flow modifications projected to occur as a result of " those projects subject to early consultation," specifically the increased pumping and permanent barriers called for in the planned South Delta Improvement Project (" SDIP"). (AR 374, 414-19; Sommer Decl. ¶ 5.) Each modeling scenario was run separately for various water year types (Wet, Above Normal, Below Normal, Dry, and Critically Dry) and independently estimated take at CVP and SWP facilities.

The BiOp based its conclusions for formal consultation on the results of the Study No. 5a, and for early consultation on the results of Study No. 5. The results of the modeling scenarios for Study No. 5a are set forth in several tables at pages 414 through 419 of the AR. The following table summarizes the changes in estimated take for Study No. 5a, for each type of water year, relative to the 1995 base case. In other words, the positive figures represent the number of additional smelt that will be taken per month under formal consultation relative to the 1995 base case (Study No. 1) while negative numbers represent how many fewer smelt will be taken per month relative to the 1995 base case.[FN12]

Table 1:

Summary of Results for CVP Salvage Under Study No. 5a

Month	Wet Year	Above Normal Year	Below Normal Year	Dry Year	Critically Dry Year
Adults					
December	-1	-1	-3	-3	-41
January	-13	-13	-12	-10	-98
February	-33	-36	+63	-60	+9
March	+29	-40	-83	-19	+1
Largely Juveniles					
April	0	0	-16	+5	0
May	0	0	-9017	-14469	-11652
June	0	0	0	-2910	0
July	0	+11	+7	-74	0
Net: December-March	-17	-89	-35	+28	-130
Net: April-July	0	+11	-9025	-17448	-1165

Table 2:

Summary of Results for SWP Salvage Under Study No. 5a

Month	Wet Year	Above Normal Year	Below Normal Year	Dry Year	Critically Dry Year
Adults					
December	-6	-6	-16	-15	-11

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January	-76	-87	-82	-87	-104
February	+86	-94	0	0	+51
March	+98	+91	+63	0	+2
Largely Juveniles					
April	-60	-77	-365	-144	0
May	-27188	-25933	-31122	-32083	-7269
June	-1096	-129	-53	1267	0
July	0	+282	+318	+493	+175
Net: December-March	+102	-95	-35	-102	-62
Net: April-July	-28346	-25857	-31213	-33000	-7095

***10** For the CVP, CALSIM II predicts significant reductions in smelt salvage during the months of December through July in below normal and dry years, when compared to the regulatory base case.[FN13] However, under certain scenarios, CVP salvage increases during other months of the year relative to the regulatory base case, because pumping is predicted to increase during these months to make up for water released from storage for fish protection purposes. For the SWP, salvage stays relatively level for the months of December through March. However, salvage decreases for the months of April through July relative to the regulatory base case.

Based on CALSIM II Study 5a, FWS calculated the amount of " combined salvage" (i.e., for both projects) estimated under the formal consultation scenario, for each month, according to water year type. The BiOp rounded the numbers up to the nearest 100 and used those figures to set incidental take limits by water year type. (AR 471-472.)

Table 3: Incidental Take Limits by Water Year Type (For Both CVP and SWP)

	Water Year Type		
	Month	Wet or Above Normal	Below Normal, Dry, or Critical
	October	100	100
	November	100	100
	December	700	400
Monthly	January	3000	1900
Incidental	February	2300	1700
Take	March	1300	1300
	April	1000	1100
	May	37800	30500
	June	45300	31700

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July	3500	2500
August	100	100
September	100	100

Because these incidental take levels are based on predictions produced by CALSIM II Study 5a, they do *not* assume any smelt protection actions under the DSRAM, but do assume continued availability of the EWA water. (AR 374, 471.)

FWS determined that the level of anticipated take " is not likely to result in jeopardy to the smelt because this level of take is at or below historical levels of take." (AR 474.)

However, the BiOp also acknowledges that " the operations of the Projects under formal consultation as described in the Project Description *will result in adverse effects to delta smelt* through entrainment at the CVP and SWP and by drawing delta smelt into poorer quality habitat in the south delta." (AR 422 (emphasis added).) The BiOp concludes that " with the inclusion of [certain] conservation measures described [in the BiOp] *and* the implementation of the [Delta Smelt Risk Assessment Matrix], these adverse effects would be avoided or minimized." (*Id.* (emphasis added).) " [W]ith these conservation measures in place, the re-operation of the Trinity River, the increased level of development on the American River, the Freeport Diversion, the Suisun Marsh Salinity Control Gates, the Barker Slough Diversion, or due to changes to X2 ... are not expected to result in adverse effects to delta smelt." (AR 423.)

FWS' conclusions admit project operations will result in adverse effects to delta smelt, which are unquantified, and can only be avoided by conservation measures and implementation of the DSRAM.

H. " *Conservation Measures.*"

***11** The " conservation measures" contemplated are listed in the Summary of Effects section of the BiOp and include: (1) the Environmental Water Account (" EWA"); (2) Central Valley Project Improvement Act (b)(2) water; (3) State Water Resource Control Board's Water Rights Decision 1641; (4) the Vernalis Adaptive Management Plan (" VAMP"); and (5) the DSRAM adaptive management plan. (AR 466-68.)

1. CVPIA (b)(2) Water.

According to the 1992 Central Valley Project Improvement Act, the CVP must " dedicate and manage annually 800,000 acre-feet of Central Valley Project yield for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized by this title; to assist the State of California in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and to help to meet such obligations as may be legally imposed upon the Central Valley Project under State or Federal law following the date of enactment of this title, including but not limited to additional obligations under the Federal Endangered Species Act." Title XXXXIV of the Reclamation Projects Authorization and Adjustment Act of 1992, Pub.L. 102-575, 106 Stat. 4600, 4706 (1992). (*See* AR 372.)

FWS, in consultation with the Bureau and other agencies, may use this " (b)(2) water" to meet Water Quality Control Plan (WQCP) obligations and any other requirements imposed by law after 1992. " For example, (b)(2) water has been used to maintain flows on Clear Creek to provide adequate spawning and rearing habitat for Chinook salmon. Water exports at the CVP have also been reduced using (b)(2) water to reduce entrainment of salmon or delta smelt at the salvage facilities. This ongoing action provides a benefit to delta smelt in most years." (AR 372.)

The base CVP yield committed to fish restoration is fixed by statute and is mandatory. This fixed supply is subject to reduction up to 25% in critically dry years under CVPIA § 3406(b)(2)(C).

2. Environmental Water Account.

The Environmental Water Account (" EWA") is " an adaptive management tool that aims to protect both fish and water users as it modifies water project operations in the Bay-Delta." (AR 373.)
The EWA provides water for the protection and recovery of fish beyond that which would be available through the existing baseline of regulatory protection related to project operations. The EWA buys water from willing sellers or diverts surplus water when safe for fish, then banks, stores, transfers and releases it as needed to protect fish and compensate water users for deferred diversions.

(*Id.*)

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The EWA has been used to benefit smelt by allowing for the curtailment of project export pumping during critical time periods. (*Id.*) The EWA could also be used to increase in-stream flows or increase outflows in the Delta, both of which would benefit the smelt. (*Id.*) The EWA is not fixed by statute nor is annual funding assured, and the water supply it provides, though reasonably anticipated, is not immutable.

3. Water Rights Decision 1641.

***12** State Water Resource Control Board Decision 1641 (D-1641) imposes certain minimum flow and water quality objectives upon the projects:
D-1641 includes specific outflow requirements throughout the year, specific export restraints in the spring, and export limits based on a percentage of estuary inflow throughout the year. D-1641 obligates the SWP and CVP to comply with the objectives in the 1995 Bay-Delta Plan. The Service issued a biological opinion on the Bay-Delta plan to the Environmental Protection Agency on November 2, 1994. The water quality objectives in the 1995 Bay-Delta Plan and in D-1641 are designed to protect in-Delta agricultural, municipal and industrial, and fishery uses and vary throughout the year and by water year type.... D-1641 will also protect delta smelt by providing transport, habitat and attraction flows.

(AR 373 (citations omitted).)

The D-1641 requirements are mandatory under the projects' operating permits. The water to satisfy D-1641 comes from 3406(b) (2) yield and supplemental sources the Bureau utilizes.

4. Vernalis Adaptive Management Plan (VAMP).

The Vernalis Adaptive Management Plan (VAMP) is an experimental program that had its origin in D-1641. (AR 373.) It provides for flows on the lower San Joaquin River and export curtailments at the projects. (*Id.*) VAMP's purpose is to " provide pulse flows on the San Joaquin River and improve habitat conditions in the Delta by reducing exports at the CVP and SWP" over a 31 day period in April and May for the benefit of Chinook salmon and Delta smelt.(*Id.*) Currently, water used to reduce exports at the CVP under VAMP is accounted for as CVPIA (b)(2) water. (*Id.*) If export reductions are taken, the EWA is used to supply contractors to make up for the transfers. VAMP flows " allow larval and juvenile smelt to avoid becoming entrained at the export facilities and to move downstream to Suisun Bay." (*Id.*)

The VAMP water supply is not irrevocably fixed or assured.

I. *Delta Smelt Risk Assessment Matrix (DSRAM).*

The BiOp's other, primary protection for the smelt is the implementation of a new adaptive management protocol, known as the Delta Smelt Risk Assessment Matrix (" DSRAM"). The DSRAM utilizes a list of trigger criteria to precipitate responses. (AR at 344.) The criteria are:

(1) the previous year's FMWT index;

(2) the risk of smelt entrainment based upon the location of X2;

(3) the estimated duration of the smelt spawning period, based on water temperature;

(4) the presence of spawning female smelt;

(5) the proximity of the smelt to project pumping facilities; and

(6) a salvage trigger for adult and juvenile smelt. (AR 346.)

1. The DSRAM Process.

If any trigger criteria is met or exceeded, a Delta Smelt Working Group (" DSWG") is convened. The DSWG consists of representatives from FWS, the California Department of Fish and Game, DWR, the United States Environmental Protection Agency, the Bureau, and the California Bay-Delta Authority. (*See* AR 344-45.) The DSWG then recommends corrective actions to a Water Operations Management Team (" WOMT").(*Id.*) The OCAP BiOp identifies four specific actions that the DSWG and WOMT must consider taking if one or more trigger criteria occur: (1) export reductions at one or both of the projects; (2) changes in the south Delta barrier operations; (3) changes in San Joaquin River flows; and (4) changes in the operation of the Delta cross channel.[FN14]The DSRAM does not contain defined action criteria, but instead leaves any response wholly to the discretion of the two groups who administer the DSRAM (DSWG and WOMT).

2. DSRAM Implementation.

***13** The BiOp acknowledges although FWS is " confident that use of the DSRAM will reduce the frequency with

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which actual salvage exceeds the median predicted salvage, the exceedence frequency could be as high as 50%." (AR 471.) There is no analysis of the duration or consequences from such exceedence. The DSRAM provides no operating criteria or action schedule, specifying when mitigation actions must be taken. It is not possible to predict what, how and when DSRAM measures will be implemented.

J. *Recent Experience with DSRAM.*

DWR offered post-record evidence regarding the manner in which DSRAM has actually been implemented since its inception. This post-record activity could not have been considered by the agency. A motion to strike the proffered evidence was sustained. The offer of proof includes two " fish actions" that were taken in 2005 in response to " triggers" and a third that was planned but avoided when project water increased in early 2006, a wet year. DWR's offer of proof is to show positive experience in operation of the DSRAM.

K. *Recent Procedural History.*

The Federal Defendants acknowledge that " [s]hortly before the 2005 OCAP BiOP was completed, a fall midwater trawl survey of delta smelt revealed a substantial decline in the population index for the species" to the lowest ever. (Doc. 242-1, at 4.) The Federal Defendants do not concede that the existence of this data renders the BiOp arbitrary and capricious, because " limited analysis of this data existed, and the Service relied on the raw data, and its own professional judgments as the best available scientific and commercial data available." (*Id.*) Nevertheless, " the CALFED agencies have continued to assemble and analyze new data and information." (*Id.*) For example, scientists from CALFED agencies " recently" developed a document based upon the new data: the Interagency Ecological Program Synthesis of 2005 Work to Evaluate the Pelagic Organism Decline (POD) in the Upper San Francisco Estuary (the " IEP POD Synthesis"). This document led the Federal Defendants to conclude that the OCAP for the CVP and SWP may affect Delta smelt in a manner or to an extent not previously considered. (IEP POD Synthesis, Doc. 240, Attachment 1.)

On July 6, 2006, the Bureau requested that the FWS re-initiate consultation concerning the impact of the OCAP on the Delta smelt. (Doc. 240.) In a July 6, 2006 letter to the FWS, the Bureau acknowledged that " emerging data indicates an apparent substantial decline in the Delta smelt population index." (Doc. 240-2.)

1. *No Dismissal or Stay.*

In light of the second re-initiation of consultation, federal defendants sought dismissal on prudential mootness grounds, a voluntarily remand without vacatur, or a stay pending the completion of reconsultation. (*See* Docs. 242-1, 273.) The motion for stay was joined by the DWR (Doc. 277), and various Defendant-Intervenors (Doc. 274). Plaintiffs opposed because Federal Defendants refused to withdraw the challenged BiOp and stated their intent to continue CVP and SWP operations under the disputed BiOp and its incidental take statements during the time period necessary to complete re-consultation, now projected to be July 2008, more than two and one-half water years following the effective date of the disputed BiOp. (*See* Doc. 279.)

***14** Defendants' motion to dismiss on prudential mootness grounds was denied:
Plaintiffs' concerns have not been fully addressed by the reinitation of consultation. Federal Defendants are relying in part on the challenged BiOps in operating the CVP and intend to continue to do so. The controversy over whether the BiOps and OCAP should have continued viability is real and substantial. and this court could provide relief, in the form of a decision invalidating the BiOps followed by hearings on interim remedies. Under these circumstances, it is not appropriate to deem this case prudentially moot.

(Doc. 301 at 18 (footnotes omitted).)

The motion for voluntary remand without vacatur was denied based on the general standard for vacatur set forth in *Natural Resources Defense Council v. U.S. Dept. of the Interior*, 275 F.Supp.2d 1136, 1143 (C.D.Cal.2002), which considers " the seriousness of the order's deficiencies" and " the disruptive consequences of an interim change that may itself be changed." No evidence or argument was presented regarding the nature of the prejudice that might result from invalidating the BiOp (*id.* at 20), and numerous factual and legal disputes exist regarding the seriousness of the order's deficiencies (*see id.* at 27). The court was left to speculate what consequences to the species would result if injunctive relief were ordered against continued implementation of the disputed BiOp.

The stay motion, based on the primary jurisdiction doctrine, was denied on the authority of *Lockyer v. Mirant Corp.*, 398 F.3d 1098, 1109 (9th Cir.2005) (a party seeking a stay " must make out a clear case of hardship or inequity in being required to go forward, if there is even a

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fair possibility that the stay for which he prays will work damage to someone else."). The order held: " Plaintiffs are entitled to have their complaint decided on the merits, particularly given the fact that Defendants continue to rely on the challenged BiOps as if they were lawfully enacted." (Doc. 301 at 33.) The apparent increasing jeopardy to the smelt by and after February of 2005 militates against further delay while FWS continue " to study" the issue of jeopardy, an exercise that has continued for almost a decade.

A. *Objections to Declaration of Ted Sommer.*

DWR offers the post-record declaration of Ted Sommer, Ph.D, to explain (1) the concept of salvage and its relationship to the take exceedence levels in the BiOp; (2) the operation of DSRAM; (3) and the manner in which DSRAM has been implemented since its inception.

Generally, " the focal point for judicial review should be the administrative record already in existence, not some new record made initially in the reviewing court." *Camp v. Pitts*, 411 U.S. 138, 142, 93 S.Ct. 1241, 36 L.Ed.2d 106 (1973). However, the Ninth Circuit recognizes three main exceptions to this rule, allowing courts to consider extra-record evidence:
(1) if necessary to determine " whether the agency has considered all relevant factors and has explained its decision," (2) " when the agency has relied on documents not in the record," or (3) " when supplementing the record is necessary to explain technical terms or complex subject matter."

***15** *Southwest Ctr. for Biological Diversity v. U.S. Forest Service*, 100 F.3d 1443, 1450 (9th Cir.1996). A court may also consider extra-record evidence " when plaintiffs make a showing of agency bad faith." *Nat'l Audubon Soc. v. U.S. Forest Serv.*, 46 F.3d 1437, 1447 n. 9 (9th Cir.1993).

DWR maintains that the Sommer declaration explains " technical or complex subject matters" admissible under the exception for evidence " necessary to explain technical or complex subject matters." (Doc. 246-1 at 5-6 n. 5.) Plaintiffs move to strike the declaration on the ground that subject matters covered by Mr. Sommer are " neither technical nor complex." (Doc. 305 at 4 n. 1.) Rather, Plaintiffs contend that the declaration is offered to explain the agency's post-BiOp experience with DSRAM in an effort to counter the Plaintiffs' argument that the DSRAM is wholly discretionary and contains no defined standards or enforceable requirements.

Generally, " post hoc rationalizations of the agency ... cannot serve as a sufficient predicate for agency action." *Am. Textile Manuf. Inst. v. Donovan*, 452 U.S. 490, 539, 101 S.Ct. 2478, 69 L.Ed.2d 185 (1981); *see also* *Sierra Club v. Bosworth*, 199 F.Supp.2d 971, 986 (N.D.Cal.2002) (refusing to consider post hoc explanations that were " neither addressed nor supported by the record"). DWR does not disagree with this general principle, but instead insists that the declaration is offered only to explain complex and technical aspects of the incidental take exceedence levels and the DSRAM.

Paragraphs 11 through 15 of the Sommer Declaration concern the implementation measures taken under the DSRAM after the BiOp issued. There is no basis in the law for the admission of this post-record evidence. DWR does not assert otherwise. Plaintiffs' motion to strike is **GRANTED** as to paragraphs 11 through 15.

The information contained in the remainder of the Sommers declaration is drawn directly from the BiOp itself, explaining in plain language how the incidental take limits were set and how DSRAM operates. Although, much of the same information can be found in the BiOp, the subject matters covered are technical and complex and Dr. Sommer's declaration clarifies or explains them. This exception saves the remaining paragraphs of the Sommers declaration to explain the incidental take limits.

The motion to strike is **DENIED IN PART** as to the past record evidence paragraphs only.[FN15]

B. *Federal Defendants' Renewed Objections to Previously Admitted Extra-Record Documents.*

The May 13, 2006 memorandum decision admitted certain extra-record documents, for limited purposes (Doc. 219), including Document 10 (a Powerpoint presentation by Michael Dettinger given to the Bay-Delta Authority on December 8, 2004 entitled " Uncertainties & CALFED Planning What Are Current Observations and Models Saying?") for two purposes. First, " for the limited purpose[ ] of determining whether [ ]FWS failed to adequately consider the climate change issue and the scientific significance of any such failure....;" but not legal opinions. (Doc. 219 at 25.) Second, to the extent appropriate, all twenty two extra record documents presented by Plaintiffs, including Document 10, may be referenced to aid the court's understanding of various technical concepts under the " technical terms and complex subject matter exception." (*Id.* at 32.)

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***16** In the footnote to their opposition brief, Federal Defendants renew their objection to consideration of any of the documents under the technical terms and complex subject matter exception. (Doc. 242-1 at 22 n. 12.) The May 13, 2006 memorandum decision notes: " Defendants and Defendant Intervenors suggest that Plaintiff has failed to establish that the existing record is inadequate to explain the technical terms, but point to no authority requiring such a showing." (Doc. 219 at 30.) Federal Defendants now assert: " numerous courts, including the Supreme Court and district courts in this Ninth Circuit, have held that a record may not be supplemented for explanatory purposes unless the existing record has been demonstrated inadequate." (Doc. 242-1 at 22 n. 12.), citing an unpublished district court decision, City of *Santa Clarita v. United Stats Dept. Of Interior*, 2005 WL 2972987 at *2 n. 3 (C.D.Cal.2005):

... Plaintiffs bear the burden of making an initial showing that the administrative record is inadequate for effective judicial review and that one of the exceptions to record review applies. Animal Defense Council v. Hodel, 840 F.2d at 1436-38 (affirming district court order limiting review to administrative record and prohibiting discovery because plaintiffs did not show record presented was insufficient for review or that any of the exceptions to record review were applicable)....

(emphasis added).

A district court decision not cited by Defendants, *Karuk Tribe of Cal. v. U.S. Forest Serv.*, 379 F.Supp.2d 1071, 1087 (N.D.Cal.2005), reiterated this holding:

The Ninth Circuit allows a reviewing court to consider extra-record materials in an APA case only under four narrow exceptions: (1) when it needs to determine whether the agency has considered all relevant factors and has explained its decision; (2) when the agency has relied upon documents or materials not included in the record; (3) when it is necessary to explain technical terms or complex matters; and (4) when a plaintiff makes a showing of agency bad faith. *Southwest Center for Biological Diversity v. United States Forest Service*, 100 F.3d 1443, 1450 (9th Cir.1996).*For extra-record material to be considered, a plaintiff must first make a showing that the record is inadequate. Animal Defense Council v. Hodel,* 840 F.2d 1432, 1437 (9th Cir.1988) (" The [plaintiff] makes no showing that the district court needed to go outside the administrative record to determine whether the [agency] ignored information"). At the *1088 same time, " [a] satisfactory explanation of agency action is essential for adequate judicial review, because the focus of judicial review is not on the wisdom of the agency's decision, but on whether the process employed by the agency to reach its decision took into consideration all the relevant facts." *Asarco, Inc. v. U.S. Environmental Protection Agency*, 616 F.2d 1153, 1160 (9th Cir.1980).

(emphasis added).[FN16] *Karuk Tribe,* and *Animal Defense Council v. Hodel*, 840 F.2d 1432, 1437 (9th Cir.1988), on which it relies, do stand for the proposition that, before admitting documents under any exception to the general rule against extra-record evidence, a court should require that a plaintiff make an initial showing that the existing record is insufficient. Here, defendants maintain that those documents plaintiffs have referenced to explain complex or technical matters, are " the cart before the horse," because Plaintiffs have not shown the existing record is inadequate.

***17** First, Federal Defendants objection is arguably untimely. They did not cite cases requiring a preliminary showing of insufficiency when the motion to augment was briefed and heard. Nor did Federal Defendants timely move for reconsideration of the May 13, 2006 ruling on the motion to augment. Striking the challenged documents now, would cause prejudice to Plaintiffs, who relied upon these rulings to prepare their dispositive motions.

Even assuming a timely and specific objection, on the merits, Plaintiffs' extra-record documents were properly admitted. Of these twenty-two documents, Plaintiffs' papers only referenced eight: Docs. 9, 10, 11, 12, 13, 20, 21 & 22. With the exception of Documents 12 and 22, all were admitted on multiple grounds. (Documents 12 and 22 were admitted for the limited purpose of explaining technical materials.) The documents and the bases for their admission are as follows:

Document 9:	Summary of Annual Joint Meeting of California Bay-Delta Authority and Bay-

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	Delta Public Advisory Committee (December 8-9, 2004).	
	Admitted " for the limited purpose of determining whether USFWS failed to adequately consider the EWA/CVPIA(b)(2) issue," " for the limited purposes of determining whether USFWS failed to adequately consider the climate change issue and the scientific significance of any such failure ...," and, as appropriate, to explain complex and technical matters.	
Document 10:	Climate Change Uncertainties & CALFED Planning: What Are Current	

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	Observations and Models Saying? Powerpoint presentation by Michael Dettinger, U.S. Geological Survey at the Scripps Institute for Oceanography, et al. to Bay-Delta Authority (December 8, 2004).
	Admitted " for the limited purposes of determining whether USFWS failed to adequately consider the climate change issue and the scientific significance of any such failure," and as appropriate, to explain complex and technical matters.
Document 11:	Summary of Annual Joint Meeting of California Bay-Delta Authority

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	and Bay-Delta Public Advisory Committee (February 9-10, 2005).	
	Admitted for the limited purpose of showing that USFWS failed to consider relevant Delta smelt population data and its scientific significance," and, as appropriate, to explain complex and technical matters.	
Document 12:	Letter from H. Candee and K. Poole, NRDC, to S. Thompson re Consultation on OCAP: Significant New Delta Smelt Information, Service (Feb. 14, 2005).	
	Admitted only to explain, as	

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	appropriate, complex and technical matters.
Document 13:	Delta smelt abundance trends, Powerpoint presentation by Chuck Armor, DFG, to Bay-Delta Authority
	Admitted for the limited purpose of showing that USFWS failed to consider relevant Delta smelt population data and its scientific significance ," and, as appropriate, to explain complex and technical matters.
Document 20:	Supplemental Biological Opinion on CVP and SWP Operations, April 1, 2004 through March 31, 2006 (Feb. 27, 2004).
	Admitted "

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	for the limited purpose of determining whether USFWS failed to adequately consider the EWA/CVPIA(b)(2) issue," and, as appropriate, to explain complex and technical matters.	
Document 21:	Future Water Availability in the West: Will there be enough? Powerpoint presentation by M. Dettinger to 24th Annual Conference on Water, Climate and Uncertainty: Implications for Western Water Law, Policy, and Management (June 11-13, 2003).	
	Admitted " for the limited purposes of determining whether USFWS	

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	failed to adequately consider the climate change issue and the scientific significance of any such failure ...," and, as appropriate, to explain complex and technical matters.
Document 22:	Letter from John W. Keys, Bureau, to Hon. George Miller, House of Representatives re Bureau's renewal of CVP water contracts (Dec. 23, 2004).
	Admitted only to explain, as appropriate, complex and technical matters.

***18** With the exception of Documents 12 and 22, Plaintiffs were permitted to reference these documents to show whether FWS adequately considered included subject matter to support the BiOp. Although Plaintiffs did not expressly demonstrate that the record was insufficient, a finding of insufficiency can be implied from the rulings admitting the documents. For example, Document 10, the powerpoint presentation regarding " Climate Change Uncertainties & CALFED Planning" presented to the Bay-Delta Authority on December 8, 2004, references climatological information and issues not otherwise discussed in the administrative record, bearing on whether FWS failed to adequately consider the climate change issue. The same reasoning applies to Documents 9, 10, 11, 13, 20 & 21. As for Documents 12 and 22, were which were only admitted under the complex and technical matters exception, no prior

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showing of insufficiency was made. However, Documents 12 and 22 were only referenced as secondary citations or for context. Even if, any document was admitted in error, no prejudice has resulted.

Summary judgment is appropriate where there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. Fed. R. Civ. Pro. 56(c). This is a challenge to the lawfulness of a biological opinion brought under the ESA and the Administrative Procedure Act (" APA"). Agency decisions made under the ESA are governed by the APA, which requires that the agency action be upheld unless it is found to be " arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law," or " without observance of procedure required by law." 5 U.S.C. § 706(2)(A), (D). The inquiry is designed to " ensure that the agency considered all of the relevant factors and that its decision contained no clear error of judgment." *Pacific Coast Fed'n of Fishermen's Ass'ns v. NMFS,* 265 F.3d 1028, 1034 (9th Cir.2001). Agency action should only be overturned if the agency has " relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Id.* In sum, a court must ask " whether the agency considered the relevant factors and articulated a rational connection between the facts found and the choice made." *Id.*" A biological opinion is arbitrary and capricious and will be set aside when it has failed to articulate a satisfactory explanation for its conclusions or when it has entirely failed to consider an important aspect of the problem." *Greenpeace v. NMFS,* 80 F.Supp.2d 1137, 1147 (W.D.Wash.2000). Alternatively, a biological opinion may also be invalid if it fails to use the best available scientific information as required by 16 U.S.C. § 1536(a)(2).*Id.* at 1150.

***19** As a general rule, a court must defer to the agency on matters within its expertise. *See National Wildlife Federation v. National Marine Fisheries Service,* 422 F.3d 782, 798 (9th Cir.2005). However, " [t]he deference accorded an agency's scientific or technical expertise is not unlimited." *Id.*" Deference is not owed when the agency has completely failed to address some factor consideration of which was essential to [making an] informed decision." *Id.* (internal citations and quotations omitted).

A final BiOp is final agency action for judicial review purposes. *American Rivers, infra,* 126 F.3d at 1124-25.

Plaintiffs move for summary judgment on the following grounds:

(1) First, the BiOp did not utilize the Best Available Science by: (a) failing to reference the " most recent Delta Smelt abundance data," namely the 2004 Fall Midwater Trawl Data; and (b) failing to consider the possible effects that climate change might have on the smelt's habitat.

(2) Second, the BiOp unlawfully relies upon the DSRAM as a mitigation measure because the DSRAM process is " entirely discretionary, uncertain, and unenforceable." In addition, Plaintiffs allege that Federal Defendants acted arbitrarily and capriciously by relying upon the EWA, CVPIA(b)(2), and/or VAMP programs as water sources necessary to implement the DSRAM. Plaintiffs allege that Federal Defendants have (a) failed to demonstrate that EWA, CVPIA and/or VAMP will continue to be available over the 20-year term of the BiOp and (b) failed to demonstrate that DSRAM can reliably operate without water assets from those programs.

(3) Third, there is no rational connection between the evidence in the record and the BiOp's " no jeopardy" conclusion. Specifically, Plaintiffs allege (a) that the BiOp's focus on salvage as the measure of harm to the species underestimates project impacts and results in a meaningless take limit; and (b) that the BiOp fails to explain how its no jeopardy conclusion can be justified in light of the identified adverse effects of the project, along with indirect and cumulative effects.

(4) Fourth, the BiOp failed to adequately analyze whether the OCAP's impacts on the Delta smelt's critical habitat are consistent with the smelt's recovery. In addition, the Federal Defendants failed to adequately take into account smelt habitat areas other than defined by X2.

(5) Finally, the BiOp is unlawfully narrow in its scope because it (a) fails to provide a comprehensive analysis of the effects of constructing facilities required to carry out long term CVP and SWP operations and (b) fails to analyze the impacts of the projects delivering the full amount of water authorized under CVP and SWP water service contracts.

A. *Threshold Issues.*

1. ESA 60-day notice requirement.

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The San Luis Parties argue that Plaintiffs have not complied with the ESA's citizen suit notice requirement, 16 U.S.C. § 1540(g)(2) (A)(I), that written notice be given to " the Secretary, and to any alleged violator" at least sixty days in advance of filing suit. Failure to give this notice is a bar to bringing suit under the ESA. *Southwest Ctr. for Biological Diversity v. U.S. Bureau of Reclamation*, 143 F.3d 515, 520 (9th Cir.1998).

***20** In *American Rivers v. National Marine Fisheries Serv.*, 126 F.3d 1118, 1124-25 (9th Cir.1997), the Ninth Circuit held that issuance of a biological opinion is a final agency action that is properly pled as a challenge under the APA, rather than as a citizen suit claim under the ESA. Failure to comply with the 60-day notice requirement does not deprive the court of jurisdiction. *Id.*

The San Luis Parties advocate an approach that ignores *American Rivers*,[FN17] taken in an unpublished district court opinion, *Pacific Coast Fed' of Fishermen's Ass'ns v. U.S. Bureau of Reclamation*, 2006 WL 1469390 at 27 n. 8 (N.D.Cal.2006).*Pacific Coast Federation* declined to apply *American Rivers'* general rule because the injunctive relief the Plaintiffs sought went beyond simply having the biological opinion invalidated. The *Pacific Coast Federation* Plaintiffs sought to have any new biological opinion first reviewed by the court. This requested *relief*, fell outside the scope of the APA but was " within the scope of the ESA and thus trigger[ed] the notice period requirement." *Id.* Here, the requested relief is invalidation of the BiOp, a remedy undeniably available under the APA. *American Rivers* controls. There was no need to comply with the ESA 60-day notice requirement. The district court has jurisdiction over APA review of the BiOp.

2. Jurisdiction to Review Challenges to Early Consultation and Preliminary Biological Opinion.

Defendants contend the case is not ripe for decision. The BiOp covers not only current operations, but also a variety of future actions, some subject to formal consultation, others to early consultation:

This biological opinion covers formal and early consultation for the operations of the CVP and SWP. The formal consultation effects described in this biological opinion cover the proposed 2020 operations of the CVP including the Trinity River Mainstem ROD (Trinity ROD) flows on the Trinity River, the increased water demands on the American River, the delivery of CVP water to the proposed Freeport Regional Water Project (FRWP), water transfers, the long term Environmental Water Account (EWA), the operation of the Tracy Fish Facility, and the operation of the SWP-CVP intertie. The effects of operations of the SWP are also included in this opinion and include the operations of the North Bay Aqueduct, the Suisun Marsh Salinity Control Gates, the Skinner Fish Facility and water transfers.

Early consultation [issues address] the effects of operations of components of the South Delta Improvement Program (SDIP). These operations include pumping of 8500 cubic feet per second (cfs) at the SWP and Banks Pumping Plant (hereafter referred to as 8500 Banks), permanent barrier operations in the South Delta, the long term EWA, water transfers, and CVP and SWP operational integration. There are two separate effects sections in this biological opinion, one for Formal Consultation and one for Early Consultation. In addition, there is an incidental take for formal consultation and a preliminary incidental take for early consultation.

***21** (AR 2, 248.)

The San Luis Parties object that the early consultation portions of the BiOp are not final agency action and any challenges to the early consultation process are not subject to judicial review. Early consultation, by definition, results in only a " preliminary opinion" and in a preliminary incidental take statement that " does not constitute authority to take listed species." 50 C.F.R. § 402.11(e). Upon request for " confirmation" of a preliminary biological opinion, FWS will review the proposed action to determine if there have been " significant changes in the action as planned or in the information used during early consultation." § 402.11(f). Within 45 days of such request, FWS must either confirm the preliminary biological opinion or request formal consultation. *Id.*

Plaintiffs concede that they " are not challenging the validity of FWS's early consultation or its preliminary biological opinion regarding certain segregated components of the 2004 OCAP." (Doc. 306 at 37.) Rather, Plaintiffs argue that the portion of the BiOp covering formal consultation is flawed because it fails to examine the full impacts of all aspects of the 2004 OCAP. (Doc. 306 at 37.) Plaintiffs maintain the formal consultation should have covered certain planned actions included in the early consultation that are interdependent with other planned actions not included in either consultation. This claim is cognizable, as it challenges the scope of the formal consultation and the completeness of evaluation of overall OCAP operations on jeopardy to the smelt, not the lawfulness of the early consultation on

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future actions.

B. *The Biological Opinion Unlawfully Relies Upon Uncertain, Unenforceable Mitigation Measures.*

The BiOp concludes that the " operations of the Projects under formal consultation ... will result in adverse effects to the delta smelt through entrainment at the CVP and SWP facilities and by drawing delta smelt into poorer quality habitat in the south delta. However with the inclusion of the *conservation measures* described above *and the implementation of the DSRAM,* these adverse effects would be avoided or minimized." (AR 467 (emphasis added).) The " conservation measures" mentioned in the BiOp's conclusion are various regulatory mechanisms already in place to " provide protection to delta smelt and/or their habitats," including D-1641, the EWA, CVPIA (b)(2) water, and VAMP. (AR 421-22, 466-67.)

1. Law Governing Mitigation Measures.

Mitigation measures must be " reasonably specific, certain to occur, and capable of implementation; they must be subject to deadlines or otherwise-enforceable obligations; and most important, they must address the threats to the species in a way that satisfies the jeopardy and adverse modification standards." *Ctr. for Biological Diversity v. Rumsfeld,* 198 F.Supp.2d 1139, 1152 (D.Ariz.2002) (citing *Sierra Club v. Marsh,* 816 F.2d 1376 (9th Cir.1987)); *see also NWF v. NMFS,* 481 F.3d 1224 at *12 & n. 16 (" Although the record does reflect a general desire to install structural improvements [to benefit fish] where feasible, it does not show a clear, definite commitment of resources for future improvements.").

***22** Plaintiffs allege that, in depending on the DSRAM and the other " conservation measures" to support its no jeopardy conclusion, the BiOp unlawfully relies upon uncertain, unenforceable mitigation measures which do not constitute a clear, definite commitment of resources. Specifically, Plaintiffs argue: (a) the DSRAM process is " entirely discretionary, uncertain, and unenforceable and (b) the biological opinion unjustifiably assumes that the other, currently operational " conservation measures" (e.g., the EWA and CVPIA(b) (2) water) will continue to be available for use by DSRAM in the future.

2. The DSRAM is Unlawfully Uncertain and Unenforceable.

All Defendants argue that the DSRAM is an effective adaptive management program that provides the agency the necessary remedial flexibility that makes the BiOp lawful. The BiOp describes the DSRAM as follows:

The delta smelt risk assessment matrix (DSRAM) consists of month by month criteria which, when exceeded will trigger a meeting of the Delta Smelt Working Group (Working Group). The purpose of the DSRAM is to take actions to protect delta smelt in a proactive manner prior to salvage events....The DSRAM is an adaptive management tool which may be further modified by the Working Group/WOMT as new information becomes available, without undergoing formal reconsultation....Data will be updated at least weekly to determine the need for a meeting.

Should a triggering criterion be met or exceeded, Reclamation and/or DWR will inform the members of the Working Group and the Working Group will determine the need to meet. Any member of the Working Group may set up a meeting of the Working Group at any time. A meeting of the Working Group may consist of an in-person meeting, a conference call, or a discussion by email. If needed, the Working Group will meet prior to the weekly meetings of the DAT and the WOMT and information will be shared with these groups.

Should a meeting of the Working Group prove necessary, the group will decide whether to recommend a change in exports, change in south delta barrier operations, San Joaquin River flows, or a change in delta cross channel operations, and the extent and duration of the potential action. These *potential actions* are listed in the DSRAM by the months wherein each of these tools generally become available. *The group will recommend actions which will be shared with the DAT and forwarded to the WOMT for discussion and potential implementation.*This recommendation will include a discussion of the level of concern for delta smelt and will include who participated in the working group discussions. All dissenting opinions and/or discussion points will also be forwarded to the WOMT. The Working Group will meet at least weekly throughout the period in which the triggering criteria are met or exceeded, to determine the need to provide further recommendations to the WOMT.

Notes and findings of Working Group meeting will be submitted to the Service and members of the WOMT for their records. *The WOMT will respond to the Working Group's recommendations and the actions taken by the WOMT will be summarized by Reclamation and/or DWR annually and submitted to all WOMT agencies.*

***23** *If an action is taken, the Working Group will follow up on the action to attempt to ascertain its effectiveness.*An assessment of effectiveness will be attached to the notes from the Working Group's discussion concerning the action.

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(AR 344-45 (emphasis added).)

The trigger criteria, which vary slightly from month to month, are set forth in a table (or matrix) at page 100 of the BiOp. (AR 346.) The criteria include: (1) the previous year's fall midwater trawl recovery index; (2) the risk of smelt entrainment based upon the location of X2; (3) the estimated duration of the smelt spawning period based upon water temperature; (4) the presence of spawning female smelt; (5) the proximity of the smelt to the Project pumping facilities; and, (6) a salvage trigger for adult smelt (calculated as the ratio of adult smelt salvage to the FMWT index) and juvenile smelt (set at zero for May and June, the months of the year during which salvage of smelt is highest). (AR 346-49.)

Plaintiffs argue that the DSRAM is not " reasonably specific, certain to occur, and capable of implementation" because: (1) the DSWG has complete discretion over whether to meet and whether to recommend mitigation measures; (2) even if the DSWG meets and recommends mitigation measures, the WOMT group is free to reject any recommendations; (3) there are no standards to measure the effectiveness of actions taken; (4) reconsultation is not required should mitigation measures prove ineffective; and (5) ultimately, no action is ever required.

DWR responds that implementation of the DSRAM *process* is " mandatory." For example, the incidental take statement requires that the projects shall be implemented " as described" in the BiOp. (AR 475.) Because the BiOp " describes" operation of the DSRAM, DWR asserts that its implementation is made mandatory by the incidental take statement's command that the project shall be implemented " as described;" if a DSRAM triggering criteria is met, the DSWG " *will* determine the need to meet." (AR 344 (emphasis added).) If circumstances warrant action, the DSWG will recommend fish protection actions and forward those recommendations to the WOMT. (*Id.*) The BiOp provides that the DSWG " *will* meet at least weekly throughout the period in which the triggering criteria are met or exceeded, to determine the need to provide further recommendations to the WOMT." (*Id.* at 345 (emphasis added).) The WOMT must then " respond" to DSWG's recommendations. (*Id.*) If actions are taken, the DSWG will monitor the action to determine its effectiveness. (*Id.*)

DWR correctly asserts that the DSRAM *process* must be followed; this does not address Plaintiffs' argument: that the DSRAM process itself does not *require* any mitigation *actions* be taken. Nothing in DSRAM requires the DSWG to make action recommendations, whatever the circumstances, and no criteria prescribe when the WOMT must act to effect DSWG's recommendations.

***24** DWR responds that as adaptive management, " DSRAM is intentionally flexible, taking into consideration the uncertainties surrounding delta smelt population abundance and dynamics ... [D]elta smelt abundance has fluctuated widely, without a clear explanation why. While experts can monitor trends in delta smelt populations, estimating overall population abundance presently is ' not possible,' nor are the sources of year-to-year variability in abundance well understood." (Doc. 246-1 at 12.) DWR suggests that " hard-wiring" the DSRAM to require specific actions be taken when triggering criteria occur would impair the DSRAM's flexibility. For example, the trigger for salvage of juvenile smelt is set at zero. This trigger was designed not to precipitate a meeting every time that standard is exceeded, but to cause heightened awareness of conditions that might require protective action. (Doc. 246-1, at 12, citing AR at 8217-18.)

The conflict between Defendants' choice of a flexible management approach and Plaintiffs' concern to ensure enforceable protective actions are taken when necessary, highlights the extent to which overly flexible adaptive management may be incompatible with the requirements of the ESA. Commentators recognize that adaptive management schemes do not fit neatly within the ESA's existing regulatory structure. *See J.B. Ruhl,*Taking Adaptive Management Seriously: A Case Study of the Endangered Species Act, 52 U. Kan. L.Rev. 1249, 1284 (2004) (" The [ESA] as a whole lacks a cohesive adaptive management architecture...."). H. Doremus, *Adaptive Management, The Endangered Species Act, and the Institutional Challenges of " New Age" Environmental Protection,* 41 Washburn. L.J. 50, 52 (2000) (" Adaptive Management ... runs counter to human nature and the current structure of our management institutions."); (" One key institutional challenge is to combine the flexibility required by adaptive management with the long-term certainty we often seek through our legal and political institutions.") 41 Washburn L.J. at 55.

The case law sheds little light on how to harmonize these competing objectives. The parties cite no cases applying the " reasonably specific, certain to occur, and capable of implementation" concept (or any closely related doctrine) to mitigation measures employed under an adaptive management protocol. Most cases the parties cite are either wholly inapplicable or factually distinguishable.

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For example, mitigation measures have been found unlawfully uncertain because their implementation was not within the control of the relevant federal agencies. *National Wildlife Federation v. NMFS,* 254 F.Supp.2d 1196, 1213 (D.Or.2003), invalidated a 2000 biological opinion addressing the effects of the operation of the Federal Columbia River Power System (" FCRPS") on several listed fish species. A 2000 biological opinion concluded that continued operation of the FCRPS would jeopardize several of the species and adversely modify their critical habitat and adapted mitigation measures to avoid jeopardy. The mitigation measures included a variety of short- and long-term state, regional, tribal, and private off-site mitigation actions. The plaintiffs argued that reliance on such " uncertain and vaguely defined actions of third parties to protect and restore salmon habitat," violated the " reasonably certain to occur" standard. *Id.* at 1209.The district court agreed, concluding that the no jeopardy determination unlawfully relied on " non-federal off-site mitigation actions that are not reasonably certain to occur." *Id.* at 1214.*See also* *Sierra Club v. Marsh,* 816 F.2d 1376, 1385 (9th Cir.1987) (invalidating biological opinion that relied on mitigation measure involving the transfer of 188 acres of marshland from private ownership to a publicly owned wildlife refuge; land remained under private control and subject to easements that rendered the land valueless for mitigation purposes, and private owners and local government indicated intent to increase use of one of the easements); *Oregon Natural Desert Ass'n v. Lohn,* 485 F.Supp.2d 1190, 2007 WL 1170629 (D.Or.2007) (setting aside biological opinion in part because it overly relied on the actions of private individuals who had a poor past record of compliance with standards); *Florida Key Deer v. Brown,* 364 F.Supp.2d 1345, 1355-56 (S.D.Fla.2005) (setting aside biological opinion that relied on mitigation measures to be implemented by private landowners; nothing compelled the landowners to act and " the record indicate[d] that some landowners entirely disregarded [prior mitigation measures]").

***25** Here, the BiOp's mitigation measures *are* largely under the control of the action agency (the Bureau), which, operating in concert with the DWR, directly regulates water pumping and releases from upstream reservoirs.*Natural Resources Defense Council v. Rodgers,* 381 F.Supp.2d 1212, 1241 (E.D.Cal.2004), does not provide guidance. In that case, plaintiffs contended a BiOp's mitigation measures were not reasonably certain to occur because the action agency had a poor track record of following through on prior commitments. The acknowledging that the agency's track record was " discouraging" district court recognized that the agency had made some progress toward implementing its prior commitments, *id.,* and declined to find that the new commitments were not certain to occur. *Id.* However, the *Rogers* plaintiffs did not attack the efficacy of the mitigation measures themselves, only the likelihood that the agency would not satisfy its commitment to implement them. Here, Plaintiffs challenge the inherent uncertainty and unenforceability of the DSRAM and the other conservation measures.

Plaintiffs cite *American Rivers v. U.S. Army Corps of Engineers,* 271 F.Supp.2d 230, 252 (D.D.C.2003), where, despite the fact that a prior biological opinion required the Corps to implement flow restrictions to mitigate impacts to listed species, the Corps " made it perfectly clear" to the district court " that it ha[d] no intention of ensuring that its future operations will be consistent" with the mitigation requirements. *Id.* at 253.A motion for preliminary injunction was granted: " Plaintiffs will be likely to prove that the 2003 Supplemental BiOp violated the ESA and APA by improperly and unreasonably relying on future actions by the Corps that are *virtually certain not to occur." Id.* at 254 (emphasis added). Here, in contrast, there is no such " smoking gun" evidence of the agency's intent to disregard its mitigation responsibilities, just no definite, certain, or enforceable measures.

Center for Biological Diversity v. Rumsfeld, 198 F.Supp.2d 1139, 1151-53 (D.Ariz.2002) addressed a biological opinion that concluded the Army's continued operations at Fort Huachuca, Arizona would not cause jeopardy to listed species that relied on flows from the Upper San Pedro River, even though rapid development in the area and uncontrolled groundwater pumping at the Fort posed threats to the species. The " no jeopardy" finding was premised on several required mitigation measures.

First, the Army had to develop and implement an on-base plan to protect and maintain populations of listed species and habitats; *id.* at 1148, even though the on-base plan was not designed to address the underlying problem of diminishing flows in the San Pedro River, *see id.* at 1153.Second, the Army had to develop a regional water resources plan, sufficient to maintain flows in the San Pedro River to sustain the protected species and their habitats. *Id.* at 1148.The biological opinion acknowledged, that the Army had no authority over the implementation of the regional plan and was only required to participate along with other stakeholders. *Id.* at 1153.Third, the Army had to monitor progress and

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report on the implementation of the various projects.*Id.* at 1149.Fourth, the biological opinion assumed the operation of a water recharge facility designed to temporarily delay the impact of groundwater overdraft, which the *Rumsfeld* court acknowledged was " subject to substantial uncertainty." *Id.* at 1145.

***26** Leaving it to the Army and other interested parties to develop a regional water management plan " enables the Army to sidestep any direct responsibility for addressing deficit groundwater pumping," and was " an admission that what is currently on the table as far as mitigation measures is inadequate to support the [ ] ' no jeopardy' decision." 198 F.Supp.2d at 1153-54.[FN18]

DWR distinguishes *Rumsfeld*, claiming it is like *NWF v. NMFS,* 254 F.Supp.2d 1196, where mitigation measures were unlawful because they depended upon third parties without any guarantee that those parties would implement the measures. Here, the DSRAM does not depend on actions by outsiders. *Rumsfeld* further found that the Army's on-base mitigation measures were insufficient because they did not require any measurable goals or an implementation schedule:

*There are no requirements in the Final BO to reduce reliance on groundwater pumping by any particular amount or to achieve any measurable goals with respect to water recharge. There is no date certain implementation requirement.*The MOA includes a laundry list of possible mitigation measures related to water conservation and recharge that the Army may implement, but it does not establish which projects have to be undertaken, when, nor what the conservation objectives are for the respective projects. Without such specificity, the mitigation measures in the Final BO are merely suggestions.

Id. at 1153 (emphasis added).*Rumsfeld* stands for the proposition that, at a minimum, a mitigation strategy must have some form of measurable goals, action measures, and a certain implementation schedule; i.e., that mitigation measures must incorporate *some* definite and certain requirements that ensure needed mitigation measures will be implemented.

Here, the agency's BiOp admits that mitigation measures are essential. The no jeopardy finding is conditioned on conservation measures *and the DSRAM.*(*See* AR 422.)

DWR's protestations that hard-wiring the DSRAM would cripple its effectiveness ignore the ESA's requirements of reasonable certainty, timetables, and enforceability standards for mitigation measures. The existing DSRAM process provides *absolutely no* certainty that any needed smelt protection *actions* will be taken at any time by DSWG or WOMT. The DSRAM is in substance an organizational flow chart that prescribes that certain administrative processes (meetings) will be held whenever a trigger criteria is met or exceeded. Although mitigation measures are identified, no defined mitigation goals are required, nor is any time for implementation prescribed. Incorporating *some* ascertainable mitigation standards and enforceable mitigation measures is not inconsistent with avoiding unduly restrictive " hard-wiring" of the DSRAM.

National Wildlife Federation v. Babbit, 128 F.Supp.2d 1274 (E.D.Cal.2000)(" *NWF v. Babbit*"), addresses an adaptive management approach that accommodated uncertainty by allowing regulators to apply new information gathered through monitoring to *adjust and employ well-defined* mitigation measures. There, a Habitat Conservation Plan (" HCP") called for a development fee to be collected on all acreage developed in the Natomas Basin, north of Sacramento, home to a number of endangered species. The HCP also incorporated adaptive management provisions designed to allow the mitigation fee to be modified if new information justified an adjustment:

***27** The [HCP] recognizes that the current state of knowledge as to the conservation needs of protected species is imperfect, and that its assumptions as to the amount, location, and pace of development in the Basin and as to the adequacy of the mitigation fee to accommodate increased expenses may prove inaccurate. The Plan addresses these uncertainties through its " adaptive management" provisions, which permit the Plan's conservation strategy to be adjusted based on new information. The HCP's conservation program can be modified under the adaptive management provisions if: (1) new information results from ongoing research on the GGS or other covered species; (2) recovery strategies under Fish and Wildlife Service recovery plans for the GGS or the Swainson's hawk differ from the measures contemplated by the HCP; (3) certain of the HCP's mitigation measures are shown through monitoring to require modification; or (4) the HCP's required minimum block sizes for reserve lands are shown to require revision. The Plan anticipates that the NBC will make discretionary decisions in future years based upon new information. The NBC will decide, for example, which lands to purchase, depending on a variety of future considerations difficult now to predict, and whether to change the mix of in and out of Basin reserve lands and agricultural as opposed to marsh reserve lands.

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Id. at 1281-82.[FN19]

Here, the adaptive management process has no quantified objectives or required mitigation measures. Although the *process* must be implemented by holding meetings and making recommendations, nothing requires that any *actions* ever be taken.[FN20]The BiOp asks the court to trust the agency to protect the species and its habitat. Notwithstanding any required deference to expertise, the ESA requires more.

All parties agree that adaptive management can be beneficial and that flexibility is a necessary incident of adaptive management. The law requires that a balance be struck between the dual needs of flexibility and certainty. The DSRAM, as currently structured, does not provide the required reasonable certainty to assure appropriate and necessary mitigation measures will be implemented. The DSRAM does not provide reasonable assurance admitted adverse impacts of the 2004 OCAP will be mitigated. This aspect of the BiOp is arbitrary and capricious and contrary to law. Plaintiffs' motion for summary adjudication as to this claim is **GRANTED.**The agency has not provided a reasonable explanation showing the DSRAM will satisfy ESA requirements to assure survival and recovery of the Delta smelt.

The Ninth Circuit's *recent NWF v. NMFS* decision suggests that mitigation measures that are not reasonably certain to occur should be excluded from the agency's no jeopardy analysis. *See*481 F.3d 1224 at *12 n. 16.[FN21]Because mitigation is insufficiently certain to occur under the DSRAM, the DSRAM cannot cure other shortcomings of the BiOp.

3. Plaintiffs' Alternative Argument that the BiOp is Arbitrary and Capricious Because DSRAM Depends Upon EWA, VAMP, CVPIA(b)(2) Water, Programs that are Uncertain in Terms of Funding and Effectiveness.

***28** Plaintiffs maintain that the DSRAM cannot feasibly be implemented without adequate water assets from the EWA, CVPIA(b)(2), and VAMP programs. Plaintiffs allege that Defendants have not demonstrated that adequate assets from these programs will be available during the 20 year term of the BiOp. (*See* Doc. 306 at 17.)

Plaintiffs correctly observe that the BiOp does not assure that adequate water assets from these programs will be available for future use under DSRAM. The BiOp itself acknowledges that " [a]lthough VAMP and [EWA] have helped to ameliorate these threats, it is unclear how effective these will continue to be over time based on available funding and future demands for water." (AR 367-68.) The BiOp recognizes that the " EWA Agencies envision implementation of a long-term EWA as part of the operation of the Project." (AR 335.) However, the BiOp cannot and does not commit to implement the EWA in the long run. (*Id.*)

The record reveals that the loss of EWA assets will " reduce the ability of the EWA agencies to provide [ ] fish protections...." (SAR 20.) Plaintiffs refer to statements made by FWS's D. Harlow during an annual joint meeting of CALFED and the Bay-Delta Public Advisory Committee, that a proposal to change CVPIA(b)(2) policy would " change fish protection envisioned in the Record of Decision (ROD)." (Doc. 9 at 4.) At the same time, Mr. Harlow also noted that this would " not necessarily diminish fish protection." (*Id.*) However, he opined that such a change would " necessitate an increase in the size of the EWA." (*Id.*) National Oceanic and Atmospheric Administration (" NOAA") staff questioned FWS's reliance on the EWA in the BiOp, noting that EWA assets would likely be used up for protective actions during the winter, before the peak months for Delta smelt salvage (May and June). (AR 8574.)

Plaintiffs' claim rests in part on the assumption that the EWA, CVPIA(b)(2), and VAMP programs are the *only* mechanisms by which DSRAM may be implemented. The record does not support this assumption. Under the BiOp, the DSWG is tasked to make recommendations regarding fish protection actions by selecting from a list of " tools for change," which include: (1) " export reduction[s] at one or both facilities" ; (2) " change[s] in barrier operations" ; (3) " change[s] in San Joaquin River flows" ; and (4) " change[s] [in the] position of cross channel gates." (AR 346 and 348 n. 7.) No mention is made of the EWA, CVPIA(b)(2), or VAMP in the DSRAM or its description of the " tools for change." DWR rejoins that, regardless of whether these programs are fully funded and/or remain functional mechanisms to provide water to the Delta, " the burden....falls on the Projects, not the smelt." (Doc. 246 at 10.)

The EWA is simply a means by which the SWP and CVP can obtain water by purchasing it from willing sellers. (AR 373.) EWA water may be used either to protect fish or to compensate project water users for reduced exports at the project pumps. (*Id.*) If money is unavailable to fund the EWA, Defendants are nonetheless required to prevent smelt take from exceeding permissible take limits.

***29** The BiOp sets forth a three-tier process to supply

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water to protect the smelt:
Tier 1 (Regulatory Baseline). Tier 1 is baseline water and consists of currently existing BOs, water right decisions and orders, CVPIA Section 3406(b)(2) water, and other regulatory actions affecting operations of the CVP and SWP. Also included in Tier 1 are other environmental statutory requirements such as Level 2 refuge water supplies.
Tier 2(EWA). Tier 2 is the EWA and provides fish protection actions supplemental to the baseline level of protection (Tier 1). Tier 2 consists of EWA assets, which combined with the benefits of CALFED's ERP, will allow water to be provided for fish actions when needed without reducing deliveries to water users. EWA assets will include purchased (fixed) assets, operational (variable) assets, and other water management tools and agreements to provide for specified level of fish protection. Fixed assets are those water supplies that are purchased by the EWA Agencies. These purchased quantities are approximations and subject to some variability. Operational assets are those water supplies made available through CVP and SWP operational flexibility. Some examples include the flexing of the export-to-inflow ratio standard required [ ] for meeting Delta water quality and flows, and ERP water resulting from upstream releases pumped at the SWP Banks Pumping Plant. Water management tools provide the ability to convey, store, and manage water that has been secured through other means. Examples include dedicated pumping capacity, borrowing, banking, and entering into exchange agreements with water contractors. Chapter 8 of this BA contains a more detailed description of EWA operations, as characterized in the CALSIM II modeling for the CVP OCAP.
Tier 3 (Additional Assets). In the event the EWA Agencies deem Tiers 1 and 2 levels of protection insufficient to protect at-risk fish species in accordance with the Act, Tier 3 would be initiated. Tier 3 sets in motion a process based upon the commitment and ability of the EWA Agencies to make additional water available, should it be needed. *This Tier may consist of additional purchased or operational assets, funding to secure additional assets if needed, or project water if funding or assets are unavailable.*It is unlikely that protection beyond those described in Tiers 1 and 2 will be needed to meet requirements of the Act.

(*Id.* at 336-37.)DWR emphasizes that, if all else fails, Tier 3 assets may be brought to bear, which include " additional purchased or operational assets, funding to secure additional assets if needed, or *project water* if funding or assets are unavailable." (*Id.* (emphasis added).)

There is a difference between the DSRAM's failure to require mitigation actions in response to trigger events, designed to assure the commitment of necessary resources to smelt protection, and the duty to have available or acquire those necessary resources. A court must leave to the agency the application of its expertise and authority to manage the complex hydrologic, legal, financial, physical, and logistical aspects of protecting the delta smelt. Plaintiffs motion for summary adjudication is **DENIED** as to the issue of the insufficiency of the EWA, VAMP, and CVPIA (b)(2) programs.

C. *Best Available Science.*

***30** The § 7 formal consultation process is designed to " insure" that any agency action " is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined ... to be critical...." 16 U.S.C. § 1536(a)(2)." In fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available." *Id.*

An agency has wide discretion to determine what is " the best scientific and commercial data available." *San Luis v. Badgley*, 136 F.Supp.2d 1136, 1151 (E.D.Cal.2000). Yet, an agency must make its decision about jeopardy based on the best science available at the time of the decision, and may not defer that jeopardy analysis by promising future studies to assess whether jeopardy is occurring. *Rumsfeld*, 198 F.Supp.2d at 1156. While uncertainty is not necessarily fatal to an agency decision, *e.g.*, *Greenpeace Action v. Franklin*, 14 F.3d 1324, 1337 (9th Cir.1992) (" *Greenpeace I*") (upholding agency decision even though there was uncertainty about the effectiveness of management measures because agency premised its decision on a reasonable evaluation of all available data), an agency may not entirely fail to develop appropriate projections where data " was available but [was] simply not analyzed," *Greenpeace v. NMFS*, 80 F.Supp.2d 1137, 1149-50 (W.D.Wash.2000) (" *Greenpeace II*") (where agency totally failed to develop any projections regarding population viability, it could not use as an excuse the fact that relevant data had not been analyzed). Here, EWS maintains the necessary data cannot be obtained.

1. Does a " Benefit of the Doubt to the Species" Presumption Apply?

The parties debate at length whether the best available scientific information principle includes a requirement that the agency " give the benefit of the doubt to the

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species." This language has its origins in the legislative history of the ESA, H.R. Conf. Rep. No. 96-697, 96th Cong., 1st Sess. 12, reprinted in 1979 U.S.C.C.A.N. 2572, 2576:

Section 7(b) of the act requires the fish and wildlife service and the national marine fisheries service to render biological opinions which advise whether or not proposed agency actions would violate section 7(a)(2). Courts have given substantial weight to these biological opinions as evidence of an agency's compliance with section 7(a). The amendment would not alter this state of the law or lessen in any way an agency's obligation under section 7(a)(2).

As currently written, however, the law could be interpreted to force the fish and wildlife service and the national marine fisheries service to issue negative biological opinions whenever the action agency cannot guarantee with certainty that the agency action will not jeopardize the continued existence of the listed species or adversely modify its critical habitat. The amendment will permit the wildlife agencies to frame their section 7(b) opinions on the best evidence that is available or can be developed during consultation. If the biological opinion is rendered on the basis of inadequate information then the federal agency has a continuing obligation to make a reasonable effort to develop that information.

***31** *This language continues to give the benefit of the doubt to the species,* and it would continue to place the burden on the action agency to demonstrate to the consulting agency that its action will not violate section 7(a)(2). Furthermore, the language will not absolve federal agencies from the responsibility of cooperating with the wildlife agencies in developing adequate information upon which to base a biological opinion. If a federal agency proceeds with the action in the face of inadequate knowledge or information, the agency does so with the risk that it has not satisfied the standard of section 7(a)(2) and that new information might reveal that the agency has not satisfied the standard of section 7(a)(2).

(emphasis added).

In *Conner v. Burford,* 848 F.2d 1441, 1454 (9th Cir.1988), the Ninth Circuit applied this " benefit of the doubt" language to hold that FWS violated the ESA by " failing to use the best information available to prepare comprehensive biological opinions considering all stages of the agency action...." At dispute in *Conner* was a biological opinion reviewing the proposed sale of oil and gas leases on National Forest land. The biological opinion analyzed the impact of the " initial lease phase," but failed to address the potential impact of post leasing activities, such as oil and gas development. FWS reasoned that there was " insufficient information available to render a comprehensive biological opinion beyond the initial lease phase," relying instead on " incremental-step consultation." *Id.* at 1452.The Ninth Circuit recognized that " the precise location and extent of future oil and gas activities were unknown at the time," but, " extensive information about the behavior and habitat of the species in the areas covered by the leases was available." *Id.* at 1453.With this information, " FWS could have determined whether post-leasing activities in particular areas were fundamentally incompatible with the continued existence of the species." *Id.* at 1454.

In light of the ESA requirement that the agencies use the best scientific and commercial data available to insure that protected species are not jeopardized, 16 U.S.C. § 1536(a)(2), the FWS cannot ignore available biological information or fail to develop projections of oil and gas activities which may indicate potential conflicts between development and the preservation of protected species. We hold that the FWS violated the ESA by failing to use the best information available to prepare comprehensive biological opinions considering all stages of the agency action, and thus failing to adequately assess whether the agency action was likely to jeopardize the continued existence of any threatened or endangered species, as required by section 7(a)(2).*To hold otherwise would eviscerate Congress' intent to " give the benefit of the doubt to the species."*

Id. (emphasis added).*Conner* does not directly support the broader interpretation urged by Plaintiffs, that the agency should err on the side of the species when evaluating uncertain evidence. *Conner* stands for the proposition that an agency cannot abdicate its responsibility to evaluate the impacts of an action on a species by labeling available information " uncertain," because doing so violates Congress' intent that the agencies " give the benefit of the doubt to the species."

***32** *Center for Biological Diversity v. Lohn,* 296 F.Supp.2d 1223, 1239 (W.D.Wash.2003) (rev'd on other grounds, 483 F.3d 984, 2007 WL 1217738 (9th Cir.)), applied the Conner holding in conformity with Plaintiffs' interpretation. *Lohn* addressed the listing under the ESA of a population of orca whales. Despite considerable record evidence suggesting the Orca whales should be considered a separate species, the Orca population had not yet been identified as a separate *taxon.*NMFS decided not to list the species based on the scientific uncertainty that existed in the field of taxonomy, relying on the fact that the new taxon had not yet been designated. The district court ruled this decision was arbitrary and capricious:

Given the considerable morphological, behavioral, and

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genetic evidence that the global Orcinus orca taxon is inaccurate and that residents and transients do not belong to the same taxon, the decision not to list the Southern Residents cannot be based upon a lack of consensus in the field of taxonomy regarding the precise, formal taxonomic redefinition of killer whales, particularly when that lack of agreement is compounded by the extreme difficulty in gathering evidence to achieve consensus. *The best available science standard gives " the benefit of the doubt to the species."* Conner v. Burford, 848 F.2d 1441, 1454 (9th Cir.1988) (observing one of the purposes of the best available science standard in review of whether agency action may result in destruction or adverse modification of listed species' habitat pursuant to 16 U.S.C. § 1536(a)(2)).*To deny listing of a species simply because one scientific field has not caught up with the knowledge in other fields does not give the benefit of the doubt to the species and fails to meet the best available science requirement.*

Id. at 1239 (emphasis added).[FN22]

In response, Defendant Intervenors cite *Oceana, Inc. v. Evans*, 384 F.Supp.2d 203 (D.D.C.2003), a challenge to NMFS's choice between two estimates of how much take a particular type of fishing gear would cause. The agency chose the lower estimate, reasoning that it was the " best estimate possible." The plaintiff argued that this estimate failed to give the " benefit of the doubt" to the species. *Id.* at 228.Although the lower estimate was uncertain, the district court reasoned that " the ESA does not require the agency to reject the ' best estimate possible' in favor of a more ' conservative' estimate that, according to the scientists, would be lacking in support." *Id.*

Lohn and *Oceana* appear irreconcilable, but, they can be harmonized.*Lohn* rejected an agency's decision to follow the taxonomy in the face of significant and compelling scientific evidence favoring a different conclusion. To side with the agency under such circumstances would " not give the benefit of the doubt to the species...." *Id.* at 1239.In contrast, *Oceana*, concerned an agency's choice of the " best estimate possible" over a more " conservative" estimate that lacked scientific support. The *Oceana* court refused to ignore the general rule that an agency must choose the best available science, simply because the ESA commands that the agency give the " benefit of the doubt" to the species. *Both* cases stand for the proposition that the agency must carefully examine the available scientific data and models and rationally choose the most reliable.

2. The BiOp's Failure to Address the 2004 Fall Midwater Trawl Data.

***33** Plaintiffs assert that " one of the most egregious errors in the [BiOp] is its failure to consider available fall 2004 Delta smelt abundance data, which evoked grave concern among agencies involved in smelt management." [FN23](Doc. 232 at 5.) On February 9, 2005, FWS and other CALFED members met to discuss Delta smelt abundance. Among other things, participants discussed data from the 2004 fall midwater trawl (" FMWT") survey, which revealed that " estimates of Delta smelt appear to be their lowest since 1964." (Doc. 11 at 5; AR 9199-9200, 9202; Doc. 12.) The February 16, 2005, BiOp, contained no mention of the 2004 FMWT data.

Plaintiffs assert that FWS acted arbitrarily, capriciously and unlawfully by " ignoring" the 2004 FMWT data and relying instead on the more favorable abundance data from earlier abundance surveys. (AR 366-67 (noting that the 2003 FMWT results were more favorable than those from 2002, while simultaneously acknowledging that the 2003 summer townet index (1.6) was " well below the pre-decline average of 20.4 in (1959).").) Despite the receipt of the new, even less favorable 2004 FMWT data, FWS made no substantive changes to its jeopardy analysis in the biological opinion and did not use or address the new data in any way, not even to explain why the data was not discussed. At oral argument, the agency maintained that ESA analysis cannot go on forever, that there must be a cutoff.

Plaintiffs note that the low population numbers revealed by the FMWT data were " not unexpected," as smelt abundance had been on a downward trend for at least two years prior. (AR 370-71; 9199-9200, 9202.) One prominent smelt biologist warned at a June 2003 OCAP symposium that managers should expect very low smelt abundance data in the near future and that water exports were a key factor in the population decline, noting that the " cumulative proportion of the population lost to exports relative to abundance" could be as high as 30 percent. (AR 5069.)

Federal Defendants suggest that Plaintiffs' entire argument should be rejected as internally inconsistent. (Doc. 242 at 26-27.) Plaintiffs contend that FWS should have revised the BiOp in light of the 2004 FMWT data and that additional evidence of a downward trend was " not unexpected." These contentions are consistent with the central premise of Plaintiffs' position-that the 2004 FMWT data reflected a *record* low abundance (the data showed " estimates of Delta smelt appear to be at their lowest since 1964" (Doc. 11 at 5)); so low that the data

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should have been addressed in the BiOp, even if the agency already knew that smelt abundance was trending downward.

The State Water Contractors suggest that Plaintiffs' acknowledgment that the downward trend was " not unexpected," establishes that the BiOp fully recognizes the dire situation of the smelt. (Doc. 241 at 4.) The BiOp reflects that FWS had knowledge that smelt population levels were at extremely low levels, " [s]ince 1983, the delta smelt population has exhibited more low FMWT abundance indices, for more consecutive years, than previously recorded." (AR 367.)
***34** The results of seven surveys conducted by the Interagency Ecological Program (IEP) corroborate the dramatic decline in delta smelt....According to seven abundance indices designed to record trends in the status of the delta smelt, this species was consistently at low population levels during the last ten years (Stevens et al.1990). These same indices also show a pronounced decline from historical levels of abundance (Stevens et al.1990).

(AR at 370.) The State Water Contractors' argument ignores that the 2004 FMWT data evidences *record* low (the lowest) smelt abundance. Plaintiffs maintain that FWS' acknowledgment of a downward trend is inadequate as it does not address or analyze in survival and recovery terms, that smelt abundance levels had reached the lowest ever recorded.

The State Water Contractors argue that, although the BiOp admits the *fact* of the smelt's declining population, it does not and cannot explain the *cause* of the decline, because there is no scientific consensus as to causation. (Doc. 241 at 5.) " Contributing to [this] uncertainty," " is the fact that SWP and CVP operations have been ongoing for decades-a period during which Delta smelt abundance has increased as well as declined." (*Id.* at 6.) The State Water Contractors assert that the DSRAM was adopted in part to protect the smelt while further monitoring and research is carried out to resolve these uncertainties. They conclude that even if the 2004 FMWT data had been addressed in the BiOp, the ultimate opinion reached would not have differed; i.e., that operation of the projects under the 2004 OCAP BiOp would not jeopardize the smelt because, among other things, take will remain at or below historic levels and the DSRAM will protect smelt from salvage at project facilities.[FN24]But, this is post hoc argument; neither the agency or the biological opinion addressed the 2004 FMWT data and available scientific information opined that Project operations contributed to the decline of the smelt.

The cases the parties cite do not answer whether FWS did not have to analyze most recent data because it would not have altered the ultimate conclusion. Some cases suggest that FWS must use all available information to ensure that a biological opinion analyzes the threats to a species in a comprehensive manner. Plaintiffs refer to *Greenpeace II,* 80 F.Supp.2d at 1149-50, for the proposition that failure to analyze and incorporate available data is fatal to a biological opinion. In that case, NMFS concluded in a biological opinion that the total groundfish catch authorized in the Bering Sea and Gulf of Alaska in a single fishing season (1999) would not jeopardize the endangered Stellar sea lion. NMFS limited the scope of the biological opinion to that single year of fisheries management activities. The district court ruled that the agency should have broadened the scope of the biological opinion to consider the overall fishery management regime, including relevant regulations and specifications. *Id.* at 1146-47.This failure to produce a comprehensive biological opinion permeated all other aspects of the agency's decision. The district court found fault with the BiOp's superficial analysis, emphasizing the agency's failure to address the overall effects of the fisheries upon the sea lion:
***35** As far as the Court can ascertain, the focus of BiOp2 is limited to analyzing whether the fisheries compete with the sea lion for prey. In particular, BiOp2 focuses on the potential for localized depletions of prey caused by the fisheries. BiOp2 at 90, 112. *Even with respect to this limited topic of discussion, meaningful analysis is virtually non-existent. NMFS itself repeatedly concludes in BiOp2 that it simply lacks the information to make any determination one way or the other.*See BiOp2 at 111-118. Thus, NMFS's analysis is admittedly incomplete and its conclusions inconclusive. Although inconclusive data does not necessarily render a particular scientific conclusion invalid, the limited scope and quality of analysis that is contained in BiOp2 serves to highlight its overall inadequacy. For example, NMFS relies substantially on its conclusion that many of the target groundfish species are not important sea lion prey, despite uncertain evidence. BiOp2 at 114. That many of the target species may not individually constitute a major prey source, however, does not mean the cumulative impact of these fisheries is insignificant. *In other words, limited analysis which suggests the fisheries do not jeopardize the sea lion does not obviate the requirement that NMFS address the full scope of the FMPs in order to ascertain their overall effects.*
In sum, BiOp2 is limited in scope, heavy on general background information, and deficient in focused and meaningful discussion and analysis of how these large

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fisheries, and the complex management measures which regulate them, affect endangered Steller sea lions. That NMFS now finds it necessary to undertake yet another " comprehensive consultation" is a final indication to this Court that BiOp2 is not the broad and in-depth consultation it was purported to be by NMFS, much less coextensive in scope with the FMPs as required under the ESA.

A biological opinion which is not coextensive in scope with the identified agency action necessarily fails to consider important aspects of the problem and is, therefore, arbitrary and capricious. Here, BiOp2 not only fails to consider important aspects of the problem, the analysis it does contain is simply not adequate. Although an agency need not rely on conclusive scientific proof in a biological opinion, its conclusions must be based on " the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2). Thus, an agency *" cannot ignore available biological information or fail to develop projections" which may indicate potential conflicts between the proposed action and the preservation of endangered species.*Conner, 848 F.2d at 1454.

Id. at 1149-50 (emphasis added).

In *Greenpeace II,* NMFS admitted that the information it needed to perform a more comprehensive review was available, but argued that it " could not have been analyzed in the time allowed." *Id.* at 1150.The district court rejected this argument:

***36** A federal agency ... is not " excused from [fulfilling the dictates of the ESA] if, in its judgment, there is insufficient information available to complete a comprehensive opinion and it takes upon itself [a more limited analysis]." Conner, 848 F.2d at 1455. This is not a situation where NMFS fully addressed the problem based on uncertain scientific data. *See Greenpeace Action v. Franklin,* 14 F.3d 1324, 1337 (9th Cir.1992).*Rather, NMFS entirely ignored relevant factors and admittedly failed to analyze and develop projections based on information that was available.*

Id. at 1150 (emphasis added); *see also Conner,* 848 F.2d at 1454 (biological opinion invalidated because agency failed to " use best information available to prepare comprehensive biological opinions considering all stages of agency action").

Plaintiffs analogize this case to *Greenpeace II,* because the agency has ignored available biological information. Here, Plaintiffs complain that FWS failed to incorporate into *existing* models and analyses that already reflected concern over an overall declining trend in smelt, the *most recent* survey information, evidencing a more pronounced decline in smelt populations than ever before recorded. In *Greenpeace II,* the agency entirely failed to perform a comprehensive review of threats to the sea lion. The difference in degree is not significant.

Federal Defendants cite *Oceana,* 384 F.Supp.2d 203, where NMFS concluded that an amendment to the Atlantic Sea Scallop Fishery Management Plan would not jeopardize the protected loggerhead sea turtle, based on a population model that involved a degree of uncertainty, but that the agency determined was the " most reliable method." *Id.* at 215.The *Oceana* plaintiffs did not dispute that the model represented the " best available science," instead arguing that the model was " so ill-suited to the purpose for which it was used, and so fraught with uncertainties," that the agency could not rationally reach its no jeopardy conclusion. *Id.* at 218.The district court upheld the agency's use of the model, reasoning " [t]ime and again courts have upheld agency action based on the ' best available' science, recognizing that some degree of speculation and uncertainty is inherent in agency decisionmaking, even in the precautionary context of the ESA." *Id.* at 219.Though the ESA should not be implemented " haphazardly, on the basis of speculation, *id.* at 219, the model " bears a rational relationship to the reality it purports to represent" and no other alternative model was available, *id.* at 221.

The circumstances here are not analogous to those in *Oceana,* where the plaintiffs *admitted* that the challenged model was the best, albeit uncertain, available science. Here, Plaintiffs maintain the agency's failure to analyze the most recent smelt population information prevented consideration of the best available, consequential scientific information.

***37** Federal Defendants also rely on *Greenpeace I,* 14 F.3d at 1337, an earlier challenge to a Stellar sea lion biological opinion. The *Greenpeace I* plaintiffs argued that the agency acted arbitrarily and capriciously by approving certain fishery management measures despite uncertainty about the effects of the measures on the sea lion. The Ninth Circuit concluded that the presence of some uncertainty did not violate the best available science requirement in part because that BiOp analyzed *all* the available data:

We hold that the Service has fulfilled its substantive duties as well. Despite Greenpeace's assertions to the contrary, the Service supported its conclusions with ample data and analysis. The June biological opinion indicates that the Service, the Alaska Fisheries Science Center, and the National Marine Mammal Laboratory " *analyzed all*

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the available data on the pollock fishery and Steller sea lions" in the Gulf of Alaska. The Service also sought the recommendations of the Steller Sea Lion Recovery Team. The opinion demonstrates that the Service evaluated the spatial and temporal distribution of commercial fishing across the Gulf of Alaska. It then addressed not only the total biomass of pollock in the Gulf and the effects of fishery removals on that biomass, but also the spatial and temporal distribution of pollock across the Gulf. And despite Greenpeace's claims to the contrary, the Service did not ignore hydroacoustic surveys of pollock biomass, but considered and compared them to bottom trawl surveys. *Finally, while the Service has repeatedly conceded that it was uncertain about the effectiveness of its management measures, it premised these measures on a reasonable evaluation of available data, not on pure speculation.*
The biological opinions indicate that the Service, an expert agency, consulted with other teams of experts to consider all relevant factors pertaining to the effects of the Gulf fishery on the Steller sea lion. And they indicate that the Service did not ignore data, as Greenpeace suggests. The Service's decision to go ahead with the 1991 fishery under the proposed restrictions, despite some uncertainty about the effects of commercial pollock fishing on the Steller sea lion, was not a clear error of judgment.

(Emphasis added.) *Id.* at 1337.Here, unlike *Greenpeace I,* FWS failed to analyze all of the available data on the Delta smelt, as the 2004 FMWT data is not mentioned in the BiOp. Nor has FWS resolved uncertainties about the identified causes of the serious decline in Delta smelt abundance by adopting unenforceable management measures.

" Although a decision of less than ideal clarity may be upheld if the agency's path may reasonably be discerned, [a court] cannot infer an agency's reasoning from mere silence. Rather, an agency's action must be upheld, if at all, on the basis articulated by the agency itself." *Pacific Coast Fed'n of Fishermen's Ass'ns v. United States Bureau of Reclamation,* 426 F.3d 1082, 1091 (9th Cir.2005) (internal citations and quotations omitted)." [W]hen reviewing a biological opinion, [a court may] rely only ' on what the agency actually said' ...." *Id.*(quoting *Gifford Pinchot Task Force,* 378 F.3d at 1072 & n. 9). Had FWS examined the FMWT 2004 data in the BiOp, the weight it gave to that data would have been entitled to deference. The agency's silence cannot be afforded deference.

a. *The timing of the 2004 FMWT Data relative to the issuance of the BiOp.*

***38** Federal Defendants complain the timing of the release of the 2004 FMWT data did not leave enough time to address the data before issuance of the biological opinion. The record shows at the very latest, the 2004 FMWT data was presented to FWS and other CALFED members on February 9, 2005, less than a week before the February 16, 2005, issuance of the biological opinion. Federal Defendants assert they were not required to rewrite the BiOp at the " eleventh hour." (Doc. 242 at 27).

Although the record shows the 2004 FMWT data was presented at the February 9, 2005 CALFED meeting, it is unclear when FWS *first* saw this data. Plaintiffs' claim that the data was available in December 2004, is not supported.[FN25]However, even assuming FWS was not aware of the 2004 FMWT data until February 9, 2005, the agency was not operating under a deadline. As in *Greenpeace II,* where the agency's statutory duty was not excused because the data could not be " analyzed in the time allowed," 80 F.Supp.2d at 1150, here, FWS could have delayed releasing the biological opinion until it had reviewed and analyzed the new abundance data, which was especially significant as it showed Delta smelt abundance at its nadir.

Defendants and Defendant-Intervenors rejoin that the failure of the BiOp to *directly* address the 2004 FMWT is harmless, because one of the DSRAM's trigger criteria is an index based upon the previous years' FMWT results, calling for any new abundance data to be incorporated into the adaptive management process. However, even if the data were considered later in the DSRAM process, no designated protective actions are required to be taken in response to any of the triggering criteria.[FN26]

Federal Defendants raise a legitimate concern about having to prolong completion of the BiOp on the eve of its release. In theory, new scientific information could arrive on FWS's doorstep on a daily basis. If FWS was required to consider and address every new piece of information it received prior to publication of its decision, it would be effectively impossible for the agency to complete a biological opinion. But, this is not such a case. The FMWT is a credible and reliable Delta smelt population abundance survey, regularly compiled on an annual basis, and relied upon by the agency in the past. There is no rational reason to ignore such important data. The BiOp places great weight on the FMWT as " the second longest running survey." (AR 366, 370). The agency does not suggest the time of receipt of the 2004 FMWT data was unexpected. The agency's failure to

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acknowledge and analyze the record low abundance levels revealed by the 2004 FMWT is unreasonable and violated its duty to use the best available scientific information. 16 U.S.C. § 1536(a)(2).

Plaintiffs' motion for summary adjudication is **GRANTED** as to this claim.

3. Global Climate Change Evidence.

Plaintiffs next argue that the BiOp ignored data about Global Climate Change that will adversely affect the Delta smelt and its habitat. (Doc. 232 at 7.) This is potentially significant because the BiOp's conclusions are based in part on the assumption that the hydrology of the water bodies affected by the OCAP will follow historical patterns for the next 20 years. (AR 375 (explaining that CALSIM II modeling involved making " adjustments to historic water supplies ... by imposing future level land use on historical meteorological and hydrologic conditions").)

***39** In a July 28, 2004 comment letter, Plaintiff NRDC directed FWS's attention to several studies on the potential effects of climate change on water supply reliability, urging that the issue be considered in the BiOp. (AR 8552-56.) The comment letter stated:

The best scientific data available today establishes that global climate change is occurring and will affect western hydrology. At least half a dozen models predict warming in the western United States of several degrees Celsius over the next 100 years (Redmond, 2003). Such sophisticated regional climate models must be considered as part of the FWS' consideration of the best available scientific data.8:43 AM 6/5/2007

Unfortunately, the Biological Assessment provided by the Bureau to FWS entirely ignores global climate change and existing climate change models. Instead, the BA projects future project impacts in explicit reliance on seventy-two years of historical records. In effect, the Biological Assessment assumes that neither climate nor hydrology will change. This assumption is not supportable.

In California, a significant percentage of annual precipitation falls as snow in the high Sierra Nevada mountains. Snowpack acts as a form of water storage by melting to release water later in the spring and early summer months (Minton, 2001). The effects of global climate change are expected to have a profound effect on this dynamic. *Among other things, more precipitation will occur as rain rather than snow, less water will be released slowly from snowpack " storage" during spring and summer months, and flooding is expected to increase* (Wilkinson, 2002; Dettinger, 2003).*These developments will make it more difficult to fill the large reservoirs in most years, reducing reservoir yields and will magnify the effect of CVP operations on downstream fishes* (Roos, 2001). These developments will also dramatically increase the cost of surface storage relative to other water supply options, such as conservation.

While the precise magnitude of these changes remains uncertain, judgments about the likely range of impacts can and have been made. *See e.g.,*U.S. Global Climate Action Report-2002; Third National Communication of the United States Under the United Nations Framework Convention on Climate Change at 82, 101 (2002). [FN3]. The Service can and must evaluate how that range of likely impacts would affect CVP operations and impacts, including the Bureau's ability to provide water to contractors while complying with environmental standards. We therefore request that the Service review and consider the work cited above, as well as the background and Dettinger presentation at a recent climate change conference held in Sacramento, June 9-11, 2004 [citation omitted] and climate change reports [citation omitted].

(AR at 8554-55 (emphasis added).)

A second presentation by Michael Dettinger at a December 8-9, 2004 CALFED meeting, attended by FWS staff, concluded that " warming is already underway ..." ; that this would result in earlier flows, more floods, and drier summers; and that " California water supplies/ecosystems are likely to experience [ ] changes earliest and most intensely." (Doc. 10 at 18.) Following Dettinger's presentation, members of CALFED noted " the need to reevaluate water storage policies and ERP [Ecosystem Recovery Program] recovery strategies, all of which would be affected by projected climate changes." (Doc. 9 at 3.) The record reflects that extreme water temperatures can have dramatic impacts upon smelt abundance. (AR 8979-80.)

***40** In addition to the specific studies and data cited by NRDC, FWS scientists recognized the issue of climate change warranted further consideration. At a June 2003 symposium entitled " Framing the issues for Environmental and Ecological Effects of Proposed Changes in Water Operations: Science Symposium on the State of Knowledge," a number of questions regarding climate change were raised, including: " How does the proposed operations plan account for the potential effects of climate change (e.g., El Nino or La Nina, long term changes in precipitation and runoff patters, or increases in

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water temperature)?" (AR at 4839.)

Plaintiffs argue that, despite this evidence that climate change could seriously impact the smelt by changing Delta hydrology and temperature, the BiOp " did not so much as mention the probable effects of climate change on the delta smelt, its habitat, or the magnitude of impacts that could be expected from the 2004 OCAP operations, much less analyze those effects." (Doc. 232 at 8.) Defendants and Defendant-Intervenors respond by arguing (1) that the evidence before FWS at the time the BiOp was issued was inconclusive about the impacts of climate change; and (2) that, far from ignoring climate change, the issue is built into the BiOp's analysis through the use of X2 as a proxy for the location and distribution of Delta smelt.

a. *Inconclusive Nature of Available Information Regarding the Impacts of Global Climate Change on Precipitation.*

Federal Defendants and the State Water Contractors characterize Mr. Dettinger's presentation, as reflecting " a great deal of uncertainty that climate change will impact future precipitation." The presentation is entitled " Climate Change Uncertainties and CALFED Planning." (Doc. 10 at 1.) Dettinger acknowledges that, although current climate models " yield consistent warming scenarios for California" (*id.* at 6), there is no similar consensus regarding the impact of warming on future precipitation (*id.* at 7). Federal Defendants suggest that FWS " responsibly refused to engage in sheer guesswork, and properly declined to speculate as to how global warming might affect delta smelt." (Doc. 242 at 23.) But, the NRDC letter cited a number of studies in addition to Mr. Dettinger's presentations, all of which predict that anticipated climate change will adversely impact future water availability in the Western United States.

At the very least, these studies suggest that climate change will be an " important aspect of the problem" meriting analysis in the BiOp. *Pacific Coast Fed'n,* 265 F.3d at 1034. However, as with the 2004 FMWT data, the climate change issue was not meaningfully discussed in the biological opinion, making it impossible to determine whether the information was rationally discounted because of its inconclusive nature, or arbitrarily ignored.[FN27]

b. *X2 as a Proxy for Climate Change.*

The State Water Contractors argue that the approaches taken in the DSRAM are " more than adequate to deal with the projected impacts of climate change-assuming they occur." (Doc. 241 at 8.) For example, Plaintiffs' suggestion that climate change will produce earlier flows, more floods, and drier summers is addressed by the DSRAM's X2 trigger. Flow level changes will be reflected in the position of X2. If climate change alters water temperatures, DSRAM also includes a temperature trigger, that monitors the temperature range within which successful Delta smelt spawning occurs.

***41** The DSRAM offers no assurance that any mitigating fish protection actions will be implemented if the X2 criteria is triggered. That X2 indirectly monitors climate change does not assuage Plaintiffs' concerns that the BiOp has not adequately analyzed the potential impact of climate change on the smelt.

The BiOp does not gauge the potential effect of various climate change scenarios on Delta hydrology. Assuming, *arguendo,* a lawful adaptive management approach, there is no discussion when and how climate change impacts will be addressed, whether existing take limits will remain, and the probable impacts on CVP-SWP operations.

FWS acted arbitrarily and capriciously by failing to address the issue of climate change in the BiOp. This absence of *any* discussion in the BiOp of how to deal with any climate change is a failure to analyze a potentially " important aspect of the problem." [FN28]

Plaintiffs' motion for summary adjudication is **GRANTED** as to this claim.

D. *There is No Rational Connection Between the No Jeopardy Finding and the Status of the Species.*

Plaintiffs next allege that there is no rational connection between the record evidence and the BiOp's " no jeopardy" conclusion. Plaintiffs first argue that the BiOp's approach to setting take limits is arbitrary and capricious because FWS failed to consider defined take limits in the context of current smelt abundance. Plaintiffs complain that the BiOp does not explain how its no jeopardy conclusion can be justified in light of the admitted adverse effects of the project, along with indirect and cumulative effects on the species.

In a formal consultation, the ESA requires FWS to " [f]ormulate its biological opinion as to whether the action, taken together with cumulative effects, is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical

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habitat." 50 C.F.R. § 402.14; *see also*16 U.S.C. § 1536(a)(2). The phrase " jeopardize the continued existence of" means " to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02.

Agency action may be overturned if the agency has " relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Pacific Coast Fed'n,* 265 F.3d at 1034. A court must ask " whether the agency considered the relevant factors and articulated a rational connection between the facts found and the choice made." *Id.* The agency must " examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made." *Motor Vehicle Mfrs. Ass'n v. State Farm Mutual Ins.,* 463 U.S. 29, 43, 103 S.Ct. 2856, 77 L.Ed.2d 443 (1983).

1. Plaintiffs' Argument that Salvage Underestimates Project Impacts on the Smelt.

***42** Plaintiffs assert that the BiOp's reliance on salvage is arbitrary and capricious because salvage is not a reliable basis for setting Project take limits. Plaintiffs cite record evidence, including statements made by smelt biologists and FWS employees, that salvage does not accurately estimate incidental take of young Delta smelt. (*See* AR 8403, 7578.) The BiOp admits that salvages does not fully account for all smelt losses. (AR 419 (" It should be noted that although salvage is used to index delta smelt take, it does not reliably index delta smelt entrainment. Furthermore, delta smelt salvage is highly variable at all time scales....).") Plaintiffs have not shown that a better measure of smelt take could have been generated from available data. The agency is entitled to rely on this approach as it appears to be the " best estimate possible," no party has suggested an alternative. *See Oceana,* 384 F.Supp.2d at 228.

This objection standing alone is insufficient to justify summary adjudication.

2. The BiOp's Approach to Estimating Future Take Without Considering the Smelt's Current Abundance Is Arbitrary and Capricious.

The take limits are based on historic sampling from " salvage density" (number of fish taken per unit of water), which data is adjusted using CALSIM II modeling to reflect water flows anticipated under the circumstances of the final consultation. FWS's no jeopardy determination is based in part on flow modeling for the final consultation scenario that predicted *lower* than historic salvage levels during critical times. (AR 474 (finding that the level of anticipated take " is not likely to result in jeopardy to the smelt because this level of take is at or below historical levels of take.")

A close examination of the administrative record reveals that this conclusion relies upon an unsupported irrational assumption not justified by the record, i.e., that maintaining salvage at or below historic salvage levels will ensure that the 2004 OCAP is not likely to jeopardize the continued existence of the Delta smelt. First, by focusing only on how proposed operations will either increase or decrease smelt take, FWS effectively limited its analysis to determining whether the magnitude of the OCAP's impact upon the smelt would be different from the Projects' impact under the regulatory historical baseline. FWS did not analyze how the absolute number of smelt taken during any given period of Project operations will impact overall smelt abundance at the time of the 2005 BiOp or in the future. Nor does the finding the smelt " still persists," even at the lowest recorded abundance levels, have any meaning if the smelt's " persistence" is at a level at or near extinction. Evaluating " persistence" instead of smelt population abundance is irrational, arbitrary, and runs counter to the evidence before the agency.

The Ninth Circuit, in *NWF v. NMFS,* 481 F.3d 1224 at *8, invalidated a biological opinion in part because it failed to view the agency action " in the present and future human and natural contexts." Here, the BiOp similarly fails to provide a scientific explanation for why it is appropriate to set incidental take without considering the most current smelt population data. This methodology fails to take most recent available natural conditions (i.e., the smelt's current and/or future population abundance) into consideration. For example, if the smelt's population is currently 600,000, it might be justifiable to permit a monthly take of over 30,000. However, if the smelt's current population is only 60,000, allowing 30,000 to be entrained in the pumps in a single month would represent a 50% reduction in smelt population. Even if the 30,000 figure was significantly lower than historic take, Defendant-Intervenors agree " that salvage impacts cannot be accurately identified without a population

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estimate." (Doc. 247 at 9 n. 13.)

***43** DWR asserts that, in setting the take limits, the BiOp took into consideration concerns expressed by experts that using historic information alone would not create an appropriate take limit. (*See* AR 4880, 5532, 5543). The first of the citations offered by DWR, an email sent by FWS's Wim Kimmerer to several individuals at DWR, EPA and elsewhere, states that there was some discussion at FWS about " getting away from take as the principle criterion governing management and recovery of delta smelt." (AR 4880.) The next page of this email goes on to admit that " determining what level of mortality is acceptable or ' safe' is going to be difficult ...*Ultimately ... this should be done through some sort of population model or viability analysis."* (AR 4881 (emphasis added).) The other cited communications express similar concerns. (*See* AR 5532, 5543.) It is time to do it, yet FWS continues to profess the smelt population cannot be reliably measured.

DWR argues that, together, the take limits *and* the DSRAM address these concerns by moving the focus of management away from salvage. However, there is no way to know when or what measures will be taken under the DSRAM, which leaves the existing take limits as the only enforceable measures in the BiOp, [FN29] while the species heads toward extinction. Using flawed take limits and refusing to quantify smelt population and recent viability trends create substantial doubt about the reliability of the BiOp.

Defendants and Defendant-Intervenors suggest that sufficient information was simply not available to accurately determine smelt abundance.[FN30] Plaintiffs rejoin by referring to an email sent by Zachary Hymanson to Ryan Olah at FWS, with copies to others at concerned federal and state agencies. Mr. Hymanson opined: " I think we are at the point where we should report and use quantified estimates of the total number of individuals at the various life stages monitories. Quantified population and life stage estimates of fishes around the world are routinely made with A LOT less data than we have for delta smelt." (AR 7542 (emphasis in original).)

The viability of Delta smelt has been under scrutiny for over ten years. No party has shown that producing a reliable population estimate is scientifically unfeasible. Information does not have to be perfect or infallible for the agency to be required to use it to create a population estimate. *See Greenpeace II*, 80 F.Supp.2d at 1149-50 (finding it unlawful for agency to entirely ignore relevant factor and fail to analyze and develop projections regarding that factor based on information that was available); *see also Conner*, 848 F.2d at 1454 (biological opinion invalidated because agency failed to " use best information available to prepare comprehensive biological opinions considering all stages of agency action."). Without population estimates, it is arbitrary for the agency to conclude that project operations will not result in jeopardy simply because the projects will take relatively fewer smelt than they did in the past, in the face of the undisputed fact that the smelt population has been declining steadily in recent years. Failing to incorporate any information about smelt population abundance into the setting of the take limits is a fundamental failure rendering the BiOp arbitrary and capricious.

***44** The San Luis Parties' rationalization of FWS's approach, setting the incidental take limits using a model that does not take current abundance data into consideration, is that historic records reveal " either no, or perhaps a very weak relationship, between juvenile abundance measured by the TNS and adult abundance measured by the FMWT." (Doc. 247 at 5.) This " lack of [a] linear relationship between the two indices, shows that events after the TNS, in late summer and early fall, are probably affecting the number of juveniles that mature into spawners." (Doc. 247 at 6.) From the lack of a linear relationship, San Luis infers that something other than salvage (i.e. entrainment in the pumps) is causing the smelt's decline.[FN31]

The BiOp interprets the data differently:
In a near-annual fish like delta smelt, a strong relationship would be expected between number of spawners present in one year and number of recruits to the population the following year. Instead, the stock-recruit relationship for delta smelt is weak, accounting for about a quarter of the variability in recruitment (Sweetnam and Stevens 1993).*This relationship does indicate, however, that factors affecting numbers of spawning adults* (e.g., *entrainment*, toxics, and predation) *can have an effect on delta smelt numbers the following year.*

(AR at 364 (emphasis added).) [FN32] Plaintiffs refer to other record evidence creating doubt that salvage is not a statistically reliable indicator of smelt abundance, including high entrainment events in the early 1980s and other " extreme events," including the El Niño of 1982-83, which caused significant declines in smelt abundance. (AR 8979.)

The BiOp acknowledges that salvage can have an impact on smelt abundance (although the statistical relationship is non-linear). It is arbitrary and capricious for FWS to

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base take limits on a projection of future salvage calculated without considering the most current or future smelt abundance and without reliable smelt population estimate.

Plaintiffs' motion for summary adjudication is **GRANTED** as to this issue. The BiOp's approach to setting incidental take limits is arbitrary and capricious because it fails to incorporate reliable smelt population data and the most recent information regarding smelt abundance.

3. Plaintiffs' Argument That the Biop Fails to Explain How its No Jeopardy Conclusion Can Be Justified in Light of the Identified Adverse Effects of the Project, along with Indirect and Cumulative Effects.

In formulating a biological opinion, the ESA requires FWS to determine " whether the action, *taken together with cumulative effects,* is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat." 50 C.F.R. § 402.14 (emphasis added). " Jeopardize the continued existence of" means " to engage in an action that reasonably would be expected, *directly or indirectly,* to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02 (emphasis added).

***45** The BiOp concludes that the 2004 OCAP will have numerous direct and indirect impacts apart from salvage, including habitat loss, increased vulnerability of Delta smelt to predation, and increased vulnerability to adverse temperature effects. (*See* AR 399, 443-44.) Plaintiffs allege that, although the BiOp lists indirect impacts, it fails to explain how they relate to the potential for jeopardy.

Federal Defendants respond to this allegation with a single paragraph, asserting generally that " the biological opinion considers the effects of dozens of project components, each with a multi-layered analysis," and indicating how many times the topics of predation (18), temperature changes (180 references), life cycle impacts (75 references to the term " juveniles") are discussed in the BiOp. (Doc. 242 at 30.) What Federal Defendants do not do is point to those portions of the BiOp which analyze these issues in *a way that demonstrates why these indirect impacts will not cause jeopardy or how they relate to survival and recovery of the smelt.*A review of the BiOp does not reveal such an analysis.

The State Water Contractors suggest that the DSRAM trigger criteria were designed to address all of the potential impacts identified in the BiOp. (Doc. 241 at 8.) This leaves for future consideration and speculation the impacts events activating DSRAM triggers will have.

a. *Cumulative Impacts.*

Plaintiffs also argue that the BiOp fails to meaningfully address cumulative impacts, " those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." 50 C.F.R. § 402.02. The BiOp highlights a number of predicted cumulative effects:

Any continuing or future non-Federal diversions of water that may entrain adult or larval fish would have cumulative effects to the smelt. Water diversions through intakes serving numerous small, private agricultural lands contribute to these cumulative effects. These diversions also include municipal and industrial uses. State or local levee maintenance may also destroy or adversely modify spawning or rearing habitat and interfere with natural long term habitat-maintaining processes.

Additional cumulative effects result from the impacts of point and non-point source chemical contaminant discharges. These contaminants include but are not limited to selenium and numerous pesticides and herbicides as well as oil and gasoline products associated with discharges related to agricultural and urban activities. Implicated as potential sources of mortality for smelt, these contaminants may adversely affect fish reproductive success and survival rates. Spawning habitat may also be affected if submersed aquatic plants, used a[s] substrates for adhesive egg attachment, are lost due to toxic substances.

Other cumulative effects could include: the dumping of domestic and industrial garbage may present hazards to the fish because they could become trapped in the debris, injure themselves, or ingest the debris; golf courses reduce habitat and introduce pesticides and herbicides into the environment; oil and gas development and production remove habitat and may introduce pollutants into the water; agricultural uses on levees reduce riparian and wetland habitats; and grazing activities may degrade or reduce suitable habitat, which could reduce vegetation in or near waterways.

***46** (AR 468.) There is no quantitative and qualitative analysis of the potential impact of these cumulative effects on the smelt and its habitat, except to identify the causes, the BiOp concludes without explanation, " [t]he cumulative effects of the proposed action [are] not

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expected to alter the magnitude of cumulative effects on the above described actions upon the critical habitat's conservation function for the smelt." (*Id.*)

The San Luis Parties argue that FWS's no jeopardy conclusion and impacts analysis is " rationally based on its determination that the proposed future changes will not significantly increase the magnitude of the ongoing Project's potential impacts." (Doc. 247 at 9.) This conclusion is the kind of analysis recently rejected by the Ninth Circuit in *NWF v. NMFS:*

To " jeopardize the continued existence of" means " to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 CFR § 402.02; 16 U.S.C. § 1536(a)(2). NMFS argues that, under this definition, it may satisfy the ESA by comparing the effects of proposed FCRPS operations on listed species to the risk posed by baseline conditions. Only if those effects are " appreciably" worse than baseline conditions must a full jeopardy analysis be made. Under this approach, a listed species could be gradually destroyed, so long as each step on the path to destruction is sufficiently modest. This type of slow slide into oblivion is one of the very ills the ESA seeks to prevent.

Requiring NMFS to consider the proposed FCRPS operations in their actual context does not, as NMFS argues, effectively expand the " agency action" at issue to include all independent or baseline harms to listed species. Nor does it have the effect of preventing any federal action once background conditions place a species in jeopardy. To " jeopardize" -the action ESA prohibits- means to " expose to loss or injury" or to " imperil." Either of these implies causation, and thus some new risk of harm. Likewise, the suffix " -ize" in " jeopardize" indicates some active change of status: an agency may not " cause [a species] to be or to become" in a state of jeopardy or " subject [a species] to" jeopardy. American Heritage Dictionary of the English Language (4th ed.). Agency action can only " jeopardize" a species' existence if that agency action causes some deterioration in the species' pre-action condition.

Even under the so-called aggregation approach NMFS challenges, then, an agency only " jeopardize[s]" a species if it causes some new jeopardy. An agency may still take action that removes a species from jeopardy entirely, or that lessens the degree of jeopardy. *However, an agency may not take action that will tip a species from a state of precarious survival into a state of likely extinction. Likewise, even where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm.*

***47** Our approach does not require NMFS to include the entire environmental baseline in the " agency action" subject to review. It simply requires that NMFS appropriately consider the effects of its actions " within the context of other existing human activities that impact the listed species." *ALCOA,* 175 F.3d at 1162 n. 6 (citing 50 C.F.R. § 402.02's definition of the environmental baseline).*This approach is consistent with our instruction (which NMFS does not challenge) that " [t]he proper baseline analysis is not the proportional share of responsibility the federal agency bears for the decline in the species, but what jeopardy might result from the agency's proposed actions in the present and future human and natural contexts."* *Pac. Coast Fed'n,* 426 F.3d at 1093 (emphasis added).

481 F.3d 1224 at *7-8 (emphasis added) (footnote omitted).

Here, the BiOp does not consider the cumulative effects of any future DSRAM actions, which it relies on to avoid jeopardy, nor does it meaningfully relate the most current abundance of the species to future OCAP operations to assess jeopardy. The BiOp unlawfully fails to adequately analyze indirect and cumulative impacts of the 2004 OCAP. Summary adjudication on this issue is appropriate.

E. *Did the BiOp Fail to Adequately Consider Impacts to Critical Habitat?*

Plaintiffs allege that the BiOp fails to adequately consider critical habitat in two respects. First, by failing to analyze the impacts of the 2004 OCAP on the value of critical habitat for *the recovery* as opposed to just the survival of the smelt. Second, failure to consider impacts to all of the Delta smelt's critical habitat because it focuses only on X2.

1. Did the BiOp Fail to Consider Whether 2004 OCAP Would Diminish Value of Critical Habitat for Recovery?

The ESA requires FWS to determine whether the 2004 OCAP will destroy or adversely affect Delta smelt critical habitat. 16 U.S.C. § 1536(a)(2)." Destruction or adverse modification of critical habitat" means " a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical

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or biological features that were the basis for determining the habitat to be critical." 50 C.F.R. § 402.02

Initially, the critical habitat analysis was conducted pursuant to agency regulations that defined adverse modification as:
[A] direct or indirect alteration that appreciably diminishes the value of critical habitat for **both survival *and* recovery** of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.

50 C.F.R. § 402.02 (emphasis added).

Following the issuance of the 2004 BiOp, the Ninth Circuit invalidated the adverse modification regulation, based on its own interpretation of the regulation's language, " alteration that appreciably diminish the value of critical habitat for both the survival *and* recovery of a listed species," " reads the ' recovery' goal out of the adverse modification inquiry." *Gifford Pinchot*, 378 F.3d at 1069-70.

***48** The Bureau requested that FWS reinitiate consultation on the 2004 OCAP to ensure compliance with *Gifford Pinchot.*The result was the disputed 2005 BiOp, which expressly states that it does not rely on the invalidated regulation. (AR 248.) Rather, the BiOp " relied on the statutory provisions of the ESA to complete the analysis with respect to critical habitat." (*Id.*) The ESA defines critical habitat as including " the specific areas ... occupied by the species ... which are ... essential to the *conservation* of the species" and the " specific areas outside the geographical area occupied by the species ... that ... are essential for the *conservation* of the species...." 16 U.S.C. § 1532(5)(A). This statutory reference to " conservation" was the premise for the Ninth Circuit's *Gifford Pinchot* reasoning:
" Conservation" is a much broader concept than mere survival. The ESA's definition of " conservation" speaks to the recovery of a threatened or endangered species. Indeed, in a different section of the ESA, the statute distinguishes between " conservation" and " survival." Requiring consultation only where an action affects the value of critical habitat to both the recovery and survival of a species imposes a higher threshold than the statutory language permits

378 F.3d at 1070 (internal citation omitted).

The 2005 BiOp uses the term " conservation," rather than " survival" and/or " recovery," several times in connection with its critical habitat analysis. In the " Critical Habitat Effects" section, the BiOp states that the " primary constituent elements essential to conservation of the species will not be affected by the proposed project." (AR 423.) In addition, after discussing critical habitat, including those areas essential to spawning, transport, rearing and migration, the BiOp acknowledges impacts, but explains that after the proposed diversions in the OCAP are implemented " the primary constituent elements [of critical habitat] essential to the conservation of the species still function." (*Id.* at 371.)[FN33]What specific effects any DSRAM measures will have on the smelt are not described, nor is there discussion of how the survival and recovery of the smelt will be accomplished.

The Ninth circuit explained in *NWF v. NFMS,* that the agency must conduct a " full analysis" of risks to recovery.
*The question before us is not whether, on the merits, recovery risks in fact require a jeopardy finding here, but whether, as part of the consultation process, NMFS must conduct a**full analysis**of those risks and their impacts on the listed species' continued existence.*Although recovery impacts alone may not often prompt a jeopardy finding, NMFS's analytical omission here may not be dismissed as harmless: the highly precarious status of the listed fishes at issue raises a substantial possibility that considering recovery impacts could change the jeopardy analysis. The only reasonable interpretation of the jeopardy regulation requires NMFS to consider recovery impacts as well as survival.

***49** 481 F.3d 1224 at *9-*10 (emphasis added).[FN34]

Plaintiffs claim that although the BiOp includes generic promises to consider recovery of the smelt, it does not competently analyze nor provide for recovery. Federal Defendants and Defendant Intervenors respond that the BiOp's discussion of critical habitat effects, in conjunction with the BiOp's conclusion that " the smelt's primary constituent elements essential to the conservation of the species [will] still function" (AR 371) under the 2004 OCAP, is a sufficient analysis of the impacts on recovery.

The BiOp's overarching conclusion is that " the smelt's primary constituent elements essential to the conservation of the species [will] still function." In designating critical habitat for a listed species, FWS must " consider those physical and biological features that are essential to the conservation of [the] species and that may require special management considerations or protection." 50 C.F.R. § 424.12. The features that must be considered include, but are not limited to, the following:

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1. Space for individual and population growth, and for normal behavior;
2. Food, water, air, light, minerals, or other nutritional or physiological requirements;
3. Cover or shelter;
4. Sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and
5. Habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Id. The BiOp explained that, in designating critical habitat for the Delta smelt, FWS identified the following primary constituent elements " essential to the conservation of the species" :Physical habitat, water, river flow, and salinity concentrations required to maintain delta smelt habitat for spawning, larval and juvenile transport, rearing, and adult migration.

* * *
Specific areas that have been identified as important delta smelt spawning habitat include Barker, Lindsey, Cache, Prospect, Georgiana, Beaver, Hog, and Sycamore sloughs and the Sacramento River in the Delta, and tributaries of northern Suisun Bay.
Larval and juvenile transport. Adequate river flow is necessary to allow larvae from upstream spawning areas to move to rearing habitat in Suisun Bay and to ensure that rearing habitat is maintained in Suisun Bay. To ensure this, X2 must be located westward of the confluence of the Sacramento-San Joaquin Rivers, located near Collinsville (Confluence), during the period when larvae or juveniles are being transported, according to historical salinity conditions. X2 is important because the " entrapment zone" or zone where particles, nutrients, and plankton are " trapped," leading to an area of high productivity, is associated with its location. Habitat conditions suitable for transport of larvae and juveniles may be needed by the species as early as February 1 and as late as August 31, because the spawning season varies from year to year and may start as early as December and extend until July.
***50** Rearing habitat. An area extending eastward from Carquinez Strait, including Suisun, Grizzly, and Honker bays, Montezuma Slough and its tributary sloughs, up the Sacramento River to its confluence with Three Mile Slough, and south along the San Joaquin River including Big Break, defines the specific geographic area critical to the maintenance of suitable rearing habitat. Three Mile Slough represents the approximate location of the most upstream extent of historical tidal incursion. Rearing habitat is vulnerable to impacts of export pumping and salinity intrusion from the beginning of February to the end of August.
Adult migration. Adequate flow and suitable water quality is needed to attract migrating adults in the Sacramento and San Joaquin river channels and their associated tributaries, including Cache and Montezuma sloughs and their tributaries. These areas are vulnerable to physical disturbance and flow disruption during migratory periods.

(AR 368-69.)

The BiOp acknowledges that this Delta smelt critical habitat has been adversely affected by numerous activities, but indicates that the 1994 and 1995 OCAP BiOps " provide a substantial part of the necessary riverine flows and estuarine outflows that allow smelt larvae to move downstream to suitable rearing habitat ... outside the influence of marinas, agricultural diversions, and Federal and State pumping plant." (AR 371.) The BiOp also explains that increasing demands for surface water " would likely result in lower delta outflows and increased entrainment," but that the impacts of these demands " have not altered critical habitat's conservation function for the delta smelt, and *the smelt's primary constituent elements essential to the conservation of the species still function."* (*Id.*) Finally, the BiOp concludes:
In evaluating the Status of the Species for critical habitat and the Environmental Baseline, while there are current actions that result in adverse effects to delta smelt critical habitat, the primary constituent elements continue to remain functional for the smelt. In the effects section, the Service determined that the primary constituent elements of delta smelt critical habitat would not be affected by the proposed project since there will not be a loss of physical habitat in the delta, river flows will continue to provide habitat, salinity will not be affected by the proposed project, and no breeding habitat will be affected and the sustainability of the food base will not be affected. In the cumulative effects section, we determined that the cumulative effects of the proposed action are not expected to alter the magnitude of future actions' effects on critical habitat's conservation function for the smelt. Based on the analysis in these four areas, it is our conclusion that Critical habitat is not likely to be adversely modified or destroyed as a result of implementing the proposed project.

(AR 469 (emphasis added).)

These conclusions are not supported by most recent smelt data to corroborate that the primary constituent elements of Delta smelt habitat will still function in a manner consistent with conservation (i.e.recovery). The functions and their locations are identified, but impacts upon

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breeding habitat are not analyzed. Second, although " there will still be water in the Delta....whether the water will be of adequate quality and quantity to allow the delta smelt to recover is an entirely different question." (Doc. 306 at 25.) The BiOp does not *analyze* the water supply, temperature, and quality under variable conditions with results that demonstrate the impact on smelt, nor is such an analysis found elsewhere in the administrative record.[FN35]

***51** The analysis of the predicted movement of X2 is more specific. When X2 is located upstream of Chipps Island, smelt are vulnerable to entrainment and are located in an area that is not ideal for feeding or protection. (*See* AR 424.) FWS opines that smelt reproduce better when X2 remains in a specific area, west of the confluence of the Sacramento and San Joaquin Rivers. That smelt reproduction is increased and the fish may be located where there are better sources of food does not assure that the smelt are on a path to *recovery*.The DSRAM is to provide the means by which FWS will maintain X2 in the most beneficial location. As the DSRAM is uncertain, speculative, and lacking enforceable action measures, there is no reasonable assurance that X2 will be maintained in the necessary protective location.

DSRAM utilizes other trigger criteria, arguably aimed at the recovery of the smelt. (Doc. 241 at 13-14.) One criteria is the " recovery index trigger," derived from the September and October FMWT sampling. (AR 347; Sommer Decl. at ¶ 9a.) The number used to trigger the DSWG is 74, the median value of the recovery index for the 1980-2002 period. Whenever the recovery index falls below this median, the DSWG convenes to decide whether to recommend actions. (AR 346-47.) Use of the term " recovery" in the title of the trigger index, suggests that this index will serve to monitor the potential for the smelt population to recover. This title is inaccurate. All that this trigger criteria monitors is whether the abundance of smelt drops below the 1980-2002 median abundance. As smelt have been in decline throughout the period to February 2005, the opinion that maintaining abundance slightly above this median leads to recovery of the smelt is unjustified.

The temperature trigger criterion of 12-18°C, the range within which the *most* smelt spawning occurs, is more arguably focused on recovery. (AR 347.) If the number of days falling within the temperature range is 39 days or less by April 15, or 50 days or less by May 1, DSWG is triggered. This trigger is arguably related to the recovery of smelt, because it focuses on spawning. However, no action except a group meeting is required in response to the trigger. Moreover, maximizing the potential for smelt to spawn is only one aspect of recovery. If Project operations and/or other impacts kill more smelt than are produced during spawning, recovery does not occur. The existence of this trigger, alone, does not establish that recovery of smelt was adequately considered or addressed.[FN36]

2. *The Biop Does Not Adequately Assess Impacts to All Areas of Critical Habitat.*

Plaintiffs also allege that the BiOp arbitrarily ignores impacts to certain areas of critical habitat because it focuses on X2 as a proxy for Delta smelt habitat. Plaintiffs argue that the focus on X2 ignores other areas of designated critical habitat.

The BiOp focuses on the impact project operations have had and will have on the position of X2. Defendants and Defendant-Intervenors argue that critical habitat will be protected, because any impacts to the position of X2 will be addressed by the DSRAM. The State Water Contractors contend that protecting critical habitat outside X2 " makes no sense if they are not the areas in which the fish resides." (Doc. 241 at 17.)

***52** Plaintiffs do not dispute the notion that X2 directly relates to where most smelt are located. Rather, Plaintiffs maintain that critical habitat is not coextensive with X2. The BiOp identifies numerous areas in which smelt occur (AR 362) and acknowledges that X2 " does not necessarily regulate smelt distribution in all years." (*Id.*) Delta smelt critical habitat is defined by physical boundaries:

California-Areas of all water and all submerged lands below ordinary high water and the entire water column bounded by and contained in Suisun Bay (including the contiguous Grizzly and Honker Bays); the length of Montezuma Slough; and the existing contiguous waters contained within the Delta, as defined by section 12220, of the State of California's Water Code of 1969 (a complex of bays, dead-end sloughs, channels typically less than 4 meters deep, marshlands, etc.) as follows:

Bounded by a line beginning at the Carquinez Bridge which crosses the Carquinez Strait; thence, northeasterly along the western and northern shoreline of Suisun Bay, including Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma Sloughs; thence, upstream to the intersection of Montezuma Slough with the western boundary of the Delta as delineated in section 12220 of the State of California's Water Code of 1969; thence, following the boundary and including all contiguous

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water bodies contained within the statutory definition of the Delta, to its intersection with the San Joaquin River at its confluence with Suisun Bay; thence, westerly along the south shore of Suisun Bay to the Carquinez Bridge.

59 Fed.Reg. 65,256, 65,277 (Dec. 19, 1994).

Federal Defendants respond that " the agencies have developed an operating and adaptive management system that adequately protects the existing critical habitat, that reasonably uses X2 as an evaluation tool, and that also ensures that ' additional measures' will be taken in accordance with the DSRAM to affirmatively and proactively manage habitat, as needed." (Doc. 242 at 26.) But, apart from the X2 analyses, Federal Defendants identify no other record evidence that reflects the agency *analyzed* impacts to critical habitat or that any " additional measures" will be required under DSRAM, as the DSRAM does not require any measure be implemented.

Defendant Intervenors assert that it is unnecessarily costly to accommodate impacts to all of the geographically designated critical habitats because the smelt are not located in the entirety of their critical habitat range all of the time. They argue the focus must be on protecting the habitat occupied by the smelt. Even if more sensible, the law requires that the agency analyze whether project operations will directly or indirectly alter critical habitat in a way that " appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species." 50 C.F.R. § 402.02. " Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical." *Id.* The statute defines critical habitat to include both " the specific areas within the geographical area occupied by the species ... on which are found those physical or biological features ... essential to the conservation of the species" *and*" specific areas outside the geographical area occupied by the species ... upon a determination by the Secretary that such areas are essential for the conservation of the species." 16 U.S.C. § 1532(5)(A). The definition of critical habitat is broader than the specific areas of occupation.

***53** Here, the agency defined critical habitat to have a geographic scope. Absent any alterations to the critical habitat designation, the agency must address in the BiOp the full extent of impacts to the currently designated critical habitat,[FN37] which excluded " already degraded areas." Alternatively, the Delta smelt's critical habitat should be redefined to reflect the actual location of the smelt, if such redesignation would be consistent with law.

This has not been done. Plaintiffs motion for summary adjudication is **GRANTED** as to this issue.

F. ***Did the BiOp Fail to Address the Impacts of the Whole Project?***

1. Plaintiffs' Argument That the Biop Should Have Analyzed the Effects of Constructing the SDIP, Intertie, and FRWP.

Plaintiffs complain that the BiOp's scope is unlawfully narrow because it fails to consider all planned actions. The BiOp includes within its formal consultation, " delivery of CVP water to the proposed Freeport Regional Water Project (FRWP)" as well as the " operation of the SWP-CVP intertie." The BiOp designates as an early consultation issue " operations of components of the South Delta Improvement Program (SDIP)," which include " permanent barrier operations in the South Delta." (AR 248.) The effects of constructing the FRWP, the Intertie, and the permanent barriers are to be covered in separate formal consultations. (AR 256, 339, 341, 421.)

The ESA requires FWS to address impacts associated with the entire agency action. *See Conner*, 848 F.2d at 1453-54 (holding that agency violated ESA by choosing not to analyze the effects of all stages of oil and gas activity on federal lands). According to ESA regulations, the effects of an agency action include " direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." 50 C.F.R. § 402.02. " The meaning of ' agency action' is determined as a matter of law by the Court, not by the agency." *Greenpeace II*, 80 F.Supp.2d at 1146 (citing *Pacific Rivers Council v. Thomas*, 30 F.3d 1050, 1054 (9th Cir.1994).)

The BiOp explains its approach to scope as follows:
The proposed action is to continue to operate the CVP and SWP in a coordinated manner. In addition to current day operations, several future actions are to be included in this consultation. These actions are: (1) increased flows in the Trinity River, (2) 8500 Banks, (3) permanent barriers operated in the South Delta, (4) an intertie between the California Aqueduct (CA) and the Delta-Mendota Canal (DMC), (5) a long-term EWA, (6) delivery of CVP water to the FRWP, and (7) various operational changes that are identified in this project description. Some of these items will be part of early consultation including 8500 Banks,

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permanent barriers and the long-term EWA. These proposed actions will come online at various times in the future. Thus, the proposed action is continued operation of the Project without these actions, and operations as they come online.
***54** The actions listed in the preceding paragraph are not being implemented at present; however, they are part of the future proposed action on which Reclamation is consulting. Only the operations associated with the proposed activities are addressed in this consultation; i.e., the activities do not include construction of any facilities *to implement* the actions. All site specific/localized activities of the actions such as construction/screening and any other site specific effects will be addressed in separate action specific section 7 consultations.

(AR at 256 (emphasis added).) In sum, only those aspects of the 2004 OCAP that will be implemented without further approval were the subject of formal consultation. However, certain other changes that will be effectuated in the future were the subject of early consultation. With respect to future operational changes, including some subject to formal consultation, full implementation will require the construction of specified facilities. The impact of the construction activities themselves will be the subject of separate § 7 consultation.

Plaintiffs argue that the BiOp should have addressed the full impacts of construction of the Intertie, Freport diversion, and the SDIP because those projects are within the scope of the agency action as a whole and are " interrelated and interdependent" with the 2004 OCAP.FN38

In response, Federal Defendants cite the Endangered Species Consultation Handbook, which explains, in a hypothetical example, that operation of an existing dam project need not be considered an interrelated or interdependent activity, where the agency action being evaluated in a biological opinion was the addition of a new turbine to an existing dam.[FN39](Handbook at 4-25 to 4-29.) Although not cited by the Federal Defendants for this purpose, the Handbook also describes a general approach FWS should use when determining whether certain actions are " interrelated or interdependent," so as to be considered part of the action:
Interrelated and interdependent actions: Effects of the action under consultation are analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. (Note: the regulations refer to the action under consultation as the " larger action" [50 CFR § 402.02]) ....
As a practical matter, the analysis of whether other activities are interrelated to, or interdependent with, the proposed action under consultation should be conducted by applying a " but for" test. *The biologist should ask whether another activity in question would occur " but for" the proposed action under consultation.*If the answer is " no," that the activity in question would not occur but for the proposed action, then the activity is interrelated or interdependent and should be analyzed with the effects of the action. If the answer is " yes," that the activity in question would occur regardless of the proposed action under consultation, then the activity is not interdependent or interrelated and would not be analyzed with the effects of the action under consultation. There will be times when the answer to this question will not be apparent on its face. The biologist should ask follow-up questions to the relevant parties to determine the relationship of the activity to the proposed action under consultation. It is important to remember that interrelated or interdependent activities are measured against the proposed action. That is, the relevant inquiry is whether the activity in question should be analyzed with the effects of the action under consultation because it is interrelated to, or interdependent with, the proposed action. Be careful not to reverse the analysis by analyzing the relationship of the proposed action against the other activity. For example, as cited below, if the proposed action is the addition of a second turbine to an existing dam, the question is whether the dam (the other activity) is interrelated to or interdependent with the proposed action (the addition of the turbine), not the reverse.

***55** Section 7 Handbook at 4-26.

Here, applying the Handbook test, the question is whether the other activities (construction and operation of SDIP, Freeport, and the Intertie) are interrelated to or interdependent with the proposed actions subject to formal consultation? The formal consultation, as described in the BiOp, covers
... the proposed 2020 operations of the CVP including the Trinity River Mainstem ROD (Trinity ROD) flows on the Trinity River, the increased water demands on the American River, the *delivery of CVP water to the proposed Freeport Regional Water Project (FRWP),* water transfers, the long term Environmental Water Account (EWA), the operation of the Tracy Fish Facility, and *the operation of the SWP-CVP intertie.*The effects of operations of the SWP are also included in this opinion

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and include the operations of the North Bay Aqueduct, the Suisun Marsh Salinity Control Gates, the Skinner Fish Facility and water transfers.

(AR 248 (emphasis added).) The formal consultation admittedly covers *delivery* of CVP water to the proposed FRWP and operation of the Intertie. But, the BiOp expressly excludes the impacts of construction associated with FRWP or the Intertie:The actions listed in the preceding paragraph [including permanent barriers in the South Delta, an intertie, and the FRWP] are not being implemented at present; however, they are part of the future proposed action on which Reclamation is consulting. *Only the operations associated with the proposed activities are addressed in this consultation; i.e., the activities do not include construction of any facilities to implement the actions.*All site specific/localized activities of the actions such as construction/screening and any other site specific effects will be addressed in separate action specific section 7 consultations.

(AR 256 (emphasis added).)

Is there a " but-for" relationship between the 2004 OCAP and the new projects? The FRWP and the Intertie are designed to more effectively distribute CVP and SWP waters. There is no evidence in the record indicating that construction of either project is tied in any way to the pre-approval of delivery of water to the projects. Flow operations could be approved *after* or simultaneously with the approval of new construction. Under the Handbook test, the construction projects are not considered interdependent and interrelated. These projects may be consulted upon separately. By approving a flow regime before the construction, the Bureau may plann for the *possibility* that the FRWP will be constructed in the future. The entire OCAP BiOp would not need to be revised should the projects be constructed. This is a reasonable approach.

With respect to the SDIP, the BiOp currently excludes *both* its operation and related construction coverage under the formal consultation. Plaintiffs allege that *both* should have been covered by the BiOp because they are interrelated with or interdependent on the agency action. Applying the Handbook analysis, the operation and construction of the SDIP (which includes increased pumping at Banks and operation of permanent barriers) will not occur " but for" the approval of the 2004 OCAP for CVP-SWP operations? Each action is independent of the 2004 OCAP. The SDIP is a separate addition that may or may not be constructed. Project operations under the 2004 OCAP in no way depend upon the SDIP. There is no prohibition to addressing the future operation, if and when the construction of the SDIP will occur, in a separate consultation.

***56** Plaintiffs' motion for summary adjudication is **DENIED** as to the future projects issue.

2. Plaintiffs' Argument that the BiOp Failed to Analyze the Impact of Full Contract Deliveries.

A biological opinion must consider the effects of the entire agency action, meaning " all activities or programs of any kind authorized, funded, or carried out," including " the granting of ... contracts." 50 C.F.R. § 402.02. One of the primary purposes of the 2004 OCAP is to " deliver water supplies to affected water rights holders as well as project contractors." (AR 259.) The Bureau delivers water to numerous parties pursuant to long-term contracts (" CVP Contracts"), some of which were renewed shortly after the BiOp was issued. (AR 4732, 4796, 4855.)

The CALSIM II model incorporated water deliveries into its various flow scenarios, but only performed its analysis based on the effects of delivering between 11 and 89 percent of the full CVP Contract allocations. (*See* AR 1067; see also Doc. 242 at 31 (acknowledging that the agency " did not evaluate the impacts of 100% percent delivery of all contracted waters").) This range of delivery scenarios is based on historic average water deliveries.

Plaintiffs allege that, by failing to evaluate the impact of delivering full amount (100%) of contracted water, the BiOp violates the requirement that the it evaluate the entire agency action. Plaintiffs cite *Rodgers,* 381 F.Supp.2d at 1237-40, which examined a biological opinion approving long term water contracts in the Friant, Buchanan, and Hidden water units of the CVP. The BiOp only examined the impacts of the amount of historical water deliveries, which amounted to less than half of the water deliveries authorized under the long term water service contracts. *Id.* at 1237-28.
The Friant long-term contracts cumulatively authorized the Bureau to deliver more than 2.1 million acre-feet of water per year, for twenty-five years. Rather than analyzing the effects of 2.1 million acre-feet of water delivery, FWS explained that its " effects analysis is conducted under the expectation that water will be delivered to CVP service contractors in quantities that approximate historic deliveries (1988 through 1997), as given in Appendix D of the November 21, 2000 programmatic long-term CVP contracts consultation."

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This assumption was made, the BiOp explained, because " delivery of full contract quantities is unrealistic."

Id. at 1238. *Rodgers* rejected FWS's approach, reasoning that the " ESA requires that all impacts of agency action-both present and future effects-be addressed in the consultation's jeopardy analysis." The fact that it was thought by FWS that " delivery of full contract quantities is unrealistic" and that " deliveries continue to be impacted by existing climate, hydrology, actions and statutes, ... socio-economic factors" does not excuse consulting on the " entire agency action," which was the authorized delivery of over 2.1 million acre-feet of water, and nothing less than that.

***57** *Id.* at 1239.

Federal defendants assert that the *Rodgers* decision was wrong, arguing that " [a]bsent alternative information that the agency failed to consider, and given the fact that the agency did use the best available information, the *Rodgers* court should have deferred to the agency." (Doc. 242 at 32.) It is not the province of another district court to decide whether *Rodgers* is " wrong." *Rodgers* is distinguishable as it specifically addressed the government authorization of CVP water users' long-term water service contracts. Those contracts authorized 2.1 MAF of water deliveries in total. *Rodgers* found unlawful the biological opinion's limitation in its scope to approximate historic deliveries, instead of the full contract allocations. Here, however, the agency action subject to consultation is not the authorization or merits of the water service contracts, rather, it is the *operation* of the CVP and SWP under the OCAP and whether those projected operations will cause jeopardy to the survival and recovery of smelt or smelt habitat. The government is entitled to make *reasonable* assumptions about the operational volume of water flows, water levels, temperature, and quality based on the historical and projected data in the administrative record. The BiOp explains that the delivery of full water service contract entitlements is expected only when excess water conditions exist, i.e., in a wet water year when sufficient water is available to meet all beneficial needs. (AR 259.) Plaintiffs do not suggest that this assumption is factually impossible. (Nor would it be unreasonable for FWS to model a full (100%) water contract delivery scenario, even if it has not happened in the past fifteen years.) The agency model for the worst case scenario is indispensable. Analysis of a " best of the best" case in a wet water year is not indispensable, as such " wet" water year conditions do not present any reasonable likelihood of jeopardy, absent an additional showing. However, because such a scenario could eventuate, it is not unlawful for the agency to analyze the effects on the smelt of 100% water contract deliveries. However, the 100% delivery analysis is not required. This is a matter committed to the agency's expertise and discretion.

Plaintiffs motion for summary adjudication is **DENIED** as to this issue.

As the history of the many CVP water cases decided in this court evidences, the duty to defer to the agency's expertise is well recognized and honored, when the agency has acted reasonably and lawfully to discharge its statutory responsibilities. The disputed BiOp depends in material measure for its no jeopardy finding on the DSRAM, which is legally insufficient. The agency's recognition the Delta smelt is increasingly in jeopardy; that its operative BiOp is inadequate, as evidenced by its second initiation of reconsultation for the 2004 OCAP, now pending, and its insistence that it will nonetheless operate the Projects under the challenged BiOp is unreasonable. The agency could have, but did not, offer a viable protective alternative. Adaptive management is within the agency's discretion to choose and employ, however, the absence of any definite, certain, or enforceable criteria or standards make its use arbitrary and capricious under the totality of the circumstances.

***58** The agency's failure to reasonably estimate the Delta smelt population and to analyze most recent smelt abundance data make the take limits based on historical data unreliable and unreasonable. The Delta smelt is undisputedly in jeopardy as to its survival and recovery. The 2005 BiOp's no jeopardy finding is arbitrary, capricious, and contrary to law.

For all the reasons set forth above, the 2005 OCAP BiOp is unlawful and inadequate on the following grounds:
(1) The DSRAM, as currently structured, does not provide a reasonable degree of certainty that mitigation actions will take place, even if the agency retains the discretion to draw upon numerous sources of water, not just the EWA, CVPIA(b)(2), and VAMP programs, to support fish protection.
(2) The agency failed to utilize the best available scientific information by not addressing the 2004 FMWT data and the issue of climate change.
(3) The BiOp's historical approach to setting take limits fails to consider take in the context of most recent overall species abundance and jeopardy.
(4) The BiOp did not adequately consider impacts to critical habitat by (a) failing to analyze how project

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operations will impact the value of critical habitat for the recovery of the smelt and (b) failing to consider impacts upon the entire extent of known smelt critical habitat.

The Plaintiffs' motions for summary judgment are GRANTED IN PART AND DENIED IN PART, as delineated above.

Based on the legally flawed BiOp, an appropriate interim remedy must be implemented. All parties agree that it is not prudent to impose a remedy without further input from the parties. A separate remedies hearing will be scheduled within thirty days at the parties' mutual convenience.[FN40]During oral argument, Federal Defendants and Defendant-Intervenors jointly requested a stay of any order finding the BiOp unlawful to avoid the draconian consequences of operating the CVP-SWP without a lawful take limit. Affording all parties the opportunity to participate in a remedies hearing will not jeopardize the species or the public interest during interim operation of the projects. Plaintiffs did not object to such an approach.

A Scheduling Conference is set for May 30, 2007, at 8:45 a.m. in Courtroom 3 to afford the parties time for discussions to set a remedies hearing, and to consider the entry of a stay, if necessary.

Plaintiffs shall submit a form of order on the motions for summary judgment consistent with this decision within five (5) days following service of this decision.

IT IS SO ORDERED.

FN1. The Delta smelt was listed as a threatened species under the ESA, March 5, 1992, 58 Fed.Reg. 12863.

FN2. The biological opinion was first issued in July 2004. Then, after reconsultation, was reissued in February 2005.

FN3. All " AR" references are to the administrative record provided by the U.S. Fish and Wildlife Service..

FN4. Whether the 2004 OCAP is a " final agency action" for the purposes of the National Environmental Policy Act is at issue in a related lawsuit, *Pacific Coast Federation of Fishermen's Associations v. Gutierrez*, 1:06-cv-00245 OWW (TAG) (" *PCFFA"*). This overview of the OCAP does not prejudge the merits of the pending motion to dismiss in *PCFFA.*

FN5. The OCAP itself does not plan for increased pumping or the construction or operation of any new facilities, nor does it describe or model flow regimes under any of these future plans. These planned operational changes are set forth in the BA and the BiOp. (*See* AR 381-423 (describing the effects of those actions included in formal consultation, including re-operation of the Trinity River, increased demands on the American River, operation of the Freeport Regional Water Project (" FRWP"), and operation of an intertie between the Delta-Mendota Canal and the California Aqueduct); AR 357-61 (describing the " items for early consultation," including operation of components of the South Delta Improvement Project, which calls for pumping at Banks to increase to 8500 cfs, operation of permanent barriers in various places within the Delta, the operation of a long term EWA, the use of CVP/SWP capacity to facilitate expanded water transfers, and further integration of CVP/SWP operations.)

FN6. The first step in the consultation process is usually the preparation of a Biological Assessment (" BA") by the action agency (in this case, the Bureau), the purpose of which is to " evaluate the potential effects of the action on listed [ ] species and designated [ ] critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action...." 50 C.F.R. § 402.12(a). In this case, the Bureau issued its BA regarding the " Long-Term Central Valley Project and State Water Project Operations and Criteria Plan" on June 30, 2004. (AR 729.) The BA describes the project on which consultation is being held, both early and formal, in much the same terms as are used in the BiOp.

FN7. Prior to 2004, the OCAP operated under Biological Opinions issued in 1993 and 1995.

FN8. Pelagic fish live in open water, generally away from vegetation or the bottom. (AR 365.) A significant amount of the smelt's habitat are the Delta waters and waters of surrounding areas.

FN9. The BiOp contradictorily acknowledges that " although salvage is used to index delta

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smelt take, it does not reliably index delta smelt entrainment." (AR 419.)

FN10. These " hard" take limits, as the Defendants and Defendant Intervenors referred to them during oral argument are different from a separate take trigger that is part of the DSRAM process described below.

FN11. DWR insisted during oral argument that the data used to run the CALSIM II models was not " salvage" data but was rather " density data." The BiOp is explicit that the models were run using a " salvage density" estimate generated from periodic samplings of salvaged fish.

FN12. The information contained in these tables was derived by the court from the BiOp but was not presented in this form in the BiOp.

FN13. The tables at pages 414 and 419 of the AR do not list the absolute number of smelt estimated to be taken in any given month under the 1995 regulatory base case (Study No. 1). However, the incidental take limits (set forth in the Table 3 below) were based on the absolute numbers of smelt that are projected to be taken under Study No. 5a. For example, the take limit for the month of May in a Critically Dry year, set at 30,500, under the CALSIM II results in a reduction of the 30,500 to 18,921 (representing 11,652 reduction in CVP salvage plus 7,269 reduction in SWP salvage) *lower* than the 1995 regulatory base case.

FN14. The DSRAM also includes a chart illustrating when during the year each of these actions will be available. (AR 346.)

FN15. In a footnote at the end of Plaintiffs' motion to strike the Sommer Declaration, Plaintiffs also challenge Federal Defendants' reliance on the declaration of Ann Lubas-Williams, which Federal Defendants filed with their response to Plaintiffs' motion for summary judgment/cross motion to dismiss. (*See* Doc. 242-4.) The Lubas-Williams declaration concerns the implementation of DSRAM and the sources from which DWR plans to obtain water to protect Delta smelt in the near future. Federal defendants relied on her declaration primarily to support their motion to dismiss or for voluntary remand. No party has relied upon this declaration in the context of the pending motions; it was not considered by the court. It is unnecessary to rule on this motion to strike.

FN16. Federal Defendants also cite *Pension Benefit Guar. Corp. v. LTV Corp.*, 496 U.S. 633, 654-655, 110 S.Ct. 2668, 110 L.Ed.2d 579 (1990), in which the Supreme Court reasoned: " Here, unlike in *Overton Park*, the Court of Appeals did not suggest that the administrative record was inadequate to enable the court to fulfill its duties under § 706."
Federal Defendants quote *Pension Benefit* entirely out of context. The quoted language is drawn from a part of the opinion addressing the Second Circuit's ruling about the adequacy of *procedures* used by the defendant agency. Specifically, that court ruled that the agency acted arbitrarily and capriciously because it failed to apprise the plaintiff of the material on which it was to base its decision, never gave plaintiff an adequate opportunity to offer contrary evidence, failed to proceed according to ascertainable standards, and failed to provide plaintiff a statement showing its reasoning. *Id.* at 653.One party claimed that *Overton Park* validated a court's order that an agency undertakes additional procedures.*Id.* The Supreme Court rejected this argument, reasoning that, at most, *Overton Park*" imposes a general ' procedural' requirement of sorts by mandating that an agency take whatever steps it needs to provide an explanation that will enable the court to evaluate the agency's rationale at the time of decision." *Id.* at 654.The Supreme Court then distinguished *Overton Park*, reasoning that " [h]ere, unlike in *Overton Park*, the Court of Appeals did not suggest that the administrative record was inadequate to enable the court to fulfill its duties under § 706." *Id.* at 655.This was a specific reference to language in *Overton Park* which criticized the lower courts for relying only on the litigation affidavits, rather than the whole administrative record. *Pension Benefit* sheds absolutely no light on the admissibility of extra-record evidence.

FN17. At least one district court has followed the holding in *American Rivers.See NRDC v. Rodgers*, 381 F.Supp.2d 1212, 1230 (E.D.Cal.2005).

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FN18.*Rumsfeld* also found fault with the biological opinion's monitoring plan, characterizing it as a means of delaying the implementation of necessary mitigation measures:
The Army may not delay identifying the measures necessary to mitigate the effects of its ten-year plan based on the monitoring provisions in the Final BO....
The Final BO's monitoring requirements do not measure the success or failure of the on-base and/or regional mitigation measures to reduce the groundwater deficit. It only requires the Army to develop " a monitoring program designed to assess progress," and requires an annual review of the AWRMP, as to which projects have been implemented the past year and which are to be implemented in the coming year. Especially since the Final BO and the AWRMP fail to quantify the remedial value of the proposed projects, simply reporting project implementation is not a meaningful assessment of the success or failure of the mitigation measures in protecting the water umbel, willow flycatcher, and critical habitat from adverse impact. Such an assessment would require systematic monitoring of either San Pedro baseflows or the groundwater aquifer.
198 F.Supp.2d at 1154 (internal record citations omitted). No such failure is alleged here. Plaintiffs do not suggest that the monitoring called for by the DSRAM is flawed.

FN19. In *NWF v. Babbit,* the district court expressly approved the design of the HCP as a whole, but invalidated the permit issued in connection with the plan on grounds wholly independent from the design of the HCP and/or the adaptive management plan. *See 128 F.Supp.2d* at 1298-99.

FN20. The only clearly enforceable standard or benchmark in the BiOp is compliance with the BiOp's " hard" take exceedence limits. But, the existence of enforceable take limits does not shield the DSRAM from scrutiny. There is no provision to allow the " hard" take exceedence limits to be adjusted to reflect new information about the species. Moreover, the BiOp expressly recognizes that the take limits alone are not enough to prevent jeopardy, requiring, among other things, implementation of the DSRAM as a reasonable and prudent measure. (*See* AR 475 (" The Project shall be implemented as described.") This is exactly the reason why the DSRAM must be made more certain and enforceable.

FN21. As of the date of oral argument, the mandate has not yet issued in *NWF v. NMFS.*

FN22. Plaintiffs cite another district court decision that applied the benefit of the doubt language: " To the extent that there is any uncertainty as to what constitutes the best scientific information, Congress intended for the agency to ' give the benefit of the doubt to the species.' " *Ctr. for Biological Diversity v. Bureau of Land Mgmt.,* 422 F.Supp.2d 1115, 1127 (N.D.Cal.2006) (citing *Conner,* 848 F.2d at 1454). However, that district court did not apply the " benefit of the doubt" concept in its analysis in any way, let alone as a presumption governing the agency's analysis of scientific information.
Another case Plaintiffs cite, *Rock Creek Alliance v. U.S. Fish & Wildlife Service,* 390 F.Supp.2d 993, 1003 (D.Mont.2005), does not support imposing a " benefit of the doubt" presumption to uncertain scientific evidence:
Though the agency has discretion to make decisions based in its expertise, the ESA expresses a legislative mandate " to require agencies to afford first priority to the declared national policy of saving endangered species.... Congress has spoken in the plainest of words, making it abundantly clear that the balance has been struck in favor of affording endangered species the highest of priorities, thereby adopting a policy which it described as ' institutionalized caution.' "
Id. (quoting *Tennessee Valley Authority v. Hill,* 437 U.S. 153, 185, 98 S.Ct. 2279, 57 L.Ed.2d 117 (1978)). However, as in *Center for Biological Diversity,* this language was part of a general discussion of the legal framework; the *Rock Creek* court never applied a benefit of the doubt presumption in the manner Plaintiffs suggest it should be applied here.

FN23. Defendants and Defendant-Intervenors dispute whether the data " evoked grave concern." The degree of concern is irrelevant to the inquiry, as it is undisputed that the 2004 FMWT data showed the lowest smelt abundance on record.

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FN24. The State Water Contractors maintain that CVP/SWP operations have been on-going for decades, during which time Delta smelt abundance has fluctuated greatly.

FN25. Plaintiffs' record citations, AR 9199-9202, are print-outs of the FMWT data which post date the issuance of the BiOp.

FN26. Abundance data is relevant to aspects of the BiOp that are independent of the DSRAM process. For example, the agency's conclusion that the level of anticipated take " is not likely to result in jeopardy to the smelt because this level of take is at or below historical levels of take" (AR 474), is irrational because no consideration is given to the current decline in smelt abundance nor any explanation provided how the further decline of the smelt does not exacerbate jeopardy to the species' survival and recovery.

FN27. Plaintiffs argue that " [r]egardless of the uncertainty involved in predicting the consequences of climate change, FWS had an obligation under the ESA to address the probable effects on Delta smelt." (Doc. 232 at 7.) In response, the State Water Contractors quote the following passage from *Bennett v. Spear,* 520 U.S. 154, 176-177, 117 S.Ct. 1154, 137 L.Ed.2d 281 (1997), in support of the proposition that the ESA intended to preclude exactly this kind of argument:

The obvious purpose of the requirement that each agency " use the best scientific and commercial data available" is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise. While this no doubt serves to advance the ESA's overall goal of species preservation, we think it readily apparent that another objective (if not indeed the primary one) is to avoid needless economic dislocation produced by agency officials zealously but unintelligently pursuing their environmental objectives.

But, this passage from *Bennet* was part of a broader discussion holding that persons who are economically burdened by a decision made under the ESA fall within the zone of interests the statute protects for the purposes of standing. *Bennet* sheds little light on the current inquiry-whether and to what extent the data that was before the FWS regarding climate change should have been considered and addressed in the BiOp.

FN28. There is no basis to determine what weight FWS should ultimately give the climate change issue in its analysis.

FN29. There is no recognized mechanism for introducing any population viability data, collected through the adaptive management process, into the setting of the take limits.

FN30. The San Luis Parties mischaracterize Plaintiffs argument as a request for FWS to undertake additional research projects. (Doc. 247.) Defendant Intervenors are correct that FWS is not required to undertake new research, *Greenpeace Action v. Franklin,* 14 F.3d 1324, 1335 (9th Cir.1992) (agency may proceed despite uncertainty about accuracy of modeling effort); Southwest Ctr for Biological Diversity, 215 F.3d 58, 60 (D.C.Cir.2000) (agency could rely on inconclusive data to make decision; not obligated to conduct new independent studies). Plaintiffs do point out that FWS acknowledges in the AR that an accurate determination of non-jeopardy would require knowledge of how many smelt existed, what proportion would be lost due to the projects, and what level of loss would be sustainable. (Doc. 232 at 23 (citing AR 8221).) However, the crux of Plaintiffs' concern is that FWS has not developed such population data and ignored important existing data on abundance in setting the take limits.

FN31. The Administrative Record reflects various explanations for the lack of a linear relationship between the TNS and the FMWT. (AR 1025-26.) One possible explanation for why the number of spawning age smelt (indexed by the FMWT) seems to be a poor predictor of subsequent offspring (indexed by the TNS) is that there is some environmental factor (not directly related to entrainment at the projects) limiting survivability, inferring that there is a carrying capacity for the population. (*Id.*) Alternatively, some scientists question whether it is proper to try to draw statistical conclusions from the entire 1969-2002 data pool, given that the smelt experienced a precipitous decline in 1981. These scientists have postulated that the data " may reflect two different relationships from two time periods with different delta smelt carrying capacities." (*Id.* at 1026.)One study cited in the AR indicates that food supply may

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be the limiting factor during this time period. (AR 8976.)

FN32. The San Luis Parties raise numerous questions regarding FWS's conclusion that there is a statistical relationship between the numbers of spawning adults and Delta smelt abundance the following year, criticizing the statistical analyses referenced in the BiOp. (Doc. 247 at 5.) It is unnecessary to adjudicate these issues, as the San Luis Parties have not separately challenged the conclusions reached in the BiOp on this ground nor have they moved for summary judgment on any issue in this case.

FN33. Defendant-Intervenors argue that, because of these mentions of " conservation," FWS is entitled to a " presumption of regularity," and the court must *assume* that agency considered recovery. (Doc. 247 at 12.) In *Gifford Pinchot,* after invalidating the destruction and adverse modification regulation, the Ninth Circuit considered whether it should presume that the agency followed its own regulation that was valid at the time the biological opinion was issued. The Ninth Circuit concluded that, because the agencies must be afforded a " presumption of regularity," a court must assume that the agency followed the then applicable regulation.*Id.* at 1072.Applying this presumption here, given that the agency specifically applied the statute, not the invalid regulation, there is no evidence the agency applied an invalid regulation. However, Defendant-Intervenors' suggestion that the presumption should be applied to validate the BiOp's *analysis* of recovery is misplaced. The agency still has an obligation to thoroughly consider the issue of recovery and to reach a reasoned conclusion based on the evidence in the administrative record.

FN34. Although this portion of *NWF v. NMFS* concerned analysis of recovery in the context of the " no jeopardy" determination, as opposed to the " destruction or adverse modification of critical habitat" analysis, the holding is equally applicable to habitat jeopardy.

FN35. There is also merit to Plaintiffs' argument that " [g]iven that the very same sorts of impacts to critical habitat have contributed to the species decline, one might expect FWS to examine carefully how the continuance and magnification of these kinds of impacts could allow for the survival of the species, much less its recovery." (Doc. 306 at 5.)

FN36. The San Luis Parties correctly note that the CALSIM II models indicate that increased pumping capacity and operational flexibility may actually *increase* the smelt's prospects vis-a-vis the regulatory baseline. However, that the species will fare better than in the past does not assure that the totality of OCAP operations are consistent with the smelt's recovery.

FN37. Plaintiffs raise an additional contention why the critical habitat analysis is insufficient; i.e., that the BiOp unlawfully " writes off" areas of critical habitat because they have already been degraded. For example, the BiOp concludes that " [a]n upstream movement of X2 of 0.5 km would not be significant when [X2] is located upstream of the [Sacramento-San Joaquin River] confluence because *smelt habitat is already poor* and the upstream movement does not result in any substantial additional loss of habitat or increase in adverse effects." (AR 443.) This issue need not be reached, as the critical habitat analysis is insufficient on other grounds. Federal Defendants are already revising the BiOp to reflect new information and new law.

FN38. The San Luis Parties cite *Gifford Pinchot* in support of the proposition that this is a properly " tiered" biological opinion. *In Gifford Pinchot,* the Ninth Circuit approved for the the tiering of a biological opinion for timber harvests in specified forest areas. The no jeopardy conclusion contained in that biological opinion relied on compliance with a very thorough, overarching forest management plan that was previously approved by the court. 378 F.3d at 1067-68. *Gifford Pinchot* allowed the agency to tier its BiOp of a timber harvest with a programmatic forest management plan that provided guidelines regarding the harvesting of timber. *Rodgers,* 381 F.Supp.2d at 1228 n. 27, interpreted the holding narrowly to apply tiering only to cases in which the programmatic opinion was particularly thorough. Tiering of future construction projects is not appropriate here, because the BiOp provides no programmatic guidelines regarding construction activities. However, just because the later projects cannot

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be " tiered" off the current BiOp does not mean they must be included in the current BiOp. The relevant inquiry is whether the construction projects are interrelated to and/or interdependent upon the BiOp and the 2004 OCAP.

FN39. Federal Defendants correctly point out that the FWS uses as a guidance document the ESA Section 7 Consultation Handbook (March 1998), available at " http:/ / www.fws.gov/endangered/consultations/s7hndbk /s7hndbk.htm" (last visited Apr. 27, 2006).*See e.g.*, *Oregon Natural Res. Council v. Allen*, 476 F.3d 1031, 1039 n. 7 (9th Cir.2007); *Ariz. Cattle Growers' Ass'n v. U.S. Fish & Wildlife Serv.*, 273 F.3d 1229 (9th Cir.2001).

FN40. The parties stated that they may be able to reach an agreement as to interim remedies, avoiding the need for a remedies hearing.

E.D.Cal.,2007.
Natural Resources Defense Council v. Kempthorne
--- F.Supp.2d ----, 2007 WL 1577896 (E.D.Cal.)

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California Court of Appeal, Second District, Division Six, "*Santa Clarita Organization for Planning the Environment v. County of Los Angeles* (2007) 157 Cal.App.4th 149" (2007)

Santa Clarita Organization for **Planning** the **Environment** v. **County** of **Los Angeles**
Cal.App. 2 Dist.,2007.

Court of Appeal, Second District, Division 6, California.
SANTA CLARITA ORGANIZATION FOR **PLANNING** THE **ENVIRONMENT** et al., Plaintiffs and Appellants,
v.
COUNTY OF **LOS ANGELES**, Defendant and Respondent;
Newhall Land and Farming Company et al., Real Parties in Interest and Respondents.
No. B189116.

Nov. 26, 2007.

Background: **Environmental organizations** petitioned for writ of mandate, requesting that court order **county** to vacate resolution certifying final **environmental** impact report (EIR) which approved development project. The trial court denied the petition, **organizations** appealed, and the Court of Appeal, 106 Cal.App.4th 715, 131 Cal.Rptr.2d 186, reversed. On remand after **county** revised and recertified EIR, the Superior Court, **Santa** Barbara **County**, No. 1043805,James W. Brown, J., again denied petition. **Organizations** appealed. The Court of Appeal, 66 Cal.Rptr.3d 559, affirmed, but granted rehearing, vacating its opinion.

Holdings: The Court of Appeal, Gilbert, P.J., held that:
(1) law of the case did not bar **organizations**' challenge to water transfer in revised EIR;
(2) EIR was not inadequate as it related to water transfer involved in pending litigation; and
(3) EIR was not required to discuss funding to remediate perchlorate contamination of local water wells.

Affirmed.

West Headnotes

[1] Environmental Law 149E 695

149E Environmental Law
149EXIII Judicial Review or Intervention
149Ek694 Determination, Judgment, and Relief
149Ek695 k. In General. Most Cited Cases
Court of Appeal's finding that water service portion of environmental impact report (EIR) for residential subdivision did not comply with California Environmental Quality Act (CEQA) did not bar, under doctrine of law of the case, environmental organizations' subsequent challenge to specific water transfer in revised EIR; Court of Appeal had stated no principle or rule of law bearing on the adequacy of the EIR's discussion of this water transfer, and silence on issue did not transform issue into law of the case. West's Ann.Cal.Pub.Res.Code § 21005(c).

[2] Appeal and Error 30 1097(1)

30 Appeal and Error
30XVI Review
30XVI(M) Subsequent Appeals
30k1097 Former Decision as Law of the Case in General
30k1097(1) k. In General. Most Cited Cases

Appeal and Error 30 1195(1)

30 Appeal and Error
30XVII Determination and Disposition of Cause
30XVII(F) Mandate and Proceedings in Lower Court
30k1193 Effect in Lower Court of Decision of Appellate Court
30k1195 As Law of the Case
30k1195(1) k. In General. Most Cited Cases
Where an appellate court states in its opinion a principle or rule of law necessary to its decision, that principle or rule becomes the "law of the case," which must be adhered to both in the lower court and upon subsequent appeal, even if the court that issued the opinion becomes convinced in a subsequent consideration that the former opinion is erroneous.

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[3] Environmental Law 149E 614

149E Environmental Law
149EXII Assessments and Impact Statements
149Ek612 Evidence
149Ek614 k. Presumptions, Inferences, and Burden of Proof. Most Cited Cases
Under California Environmental Quality Act (CEQA), an environmental impact report (EIR) approved by the appropriate governmental agency is presumed adequate, and the party challenging the EIR has the burden of showing otherwise. West's Ann.Cal.Pub.Res.Code § 21000 et seq.

[4] Environmental Law 149E 689

149E Environmental Law
149EXIII Judicial Review or Intervention
149Ek677 Scope of Inquiry on Review of Administrative Decision
149Ek689 k. Assessments and Impact Statements. Most Cited Cases
A party may challenge an environmental impact report (EIR) by showing the agency has abused its discretion either by reaching factual conclusions unsupported by substantial evidence or by failing to proceed in the manner California Environmental Quality Act (CEQA) provides. West's Ann.Cal.Pub.Res.Code § 21000 et seq.

[5] Environmental Law 149E 689

149E Environmental Law
149EXIII Judicial Review or Intervention
149Ek677 Scope of Inquiry on Review of Administrative Decision
149Ek689 k. Assessments and Impact Statements. Most Cited Cases
Where the alleged defect in an environmental impact report (EIR) under California Environmental Quality Act (CEQA) is that the agency's conclusions are not supported by substantial evidence, courts must accord deference to the agency's factual conclusions and may not weigh conflicting evidence to determine who has the better argument. West's Ann.Cal.Pub.Res.Code § 21000 et seq.

[6] Environmental Law 149E 689

149E Environmental Law
149EXIII Judicial Review or Intervention
149Ek677 Scope of Inquiry on Review of Administrative Decision
149Ek689 k. Assessments and Impact Statements. Most Cited Cases
Courts may not set aside an agency's approval of an environmental impact report (EIR) under California Environmental Quality Act (CEQA) on the ground that an opposite conclusion would have been equally or more reasonable. West's Ann.Cal.Pub.Res.Code § 21000 et seq.

[7] Environmental Law 149E 689

149E Environmental Law
149EXIII Judicial Review or Intervention
149Ek677 Scope of Inquiry on Review of Administrative Decision
149Ek689 k. Assessments and Impact Statements. Most Cited Cases
Where the alleged defect in an environmental impact report (EIR) is that the agency has failed to proceed in a manner provided by California Environmental Quality Act (CEQA), judicial review is de novo. West's Ann.Cal.Pub.Res.Code § 21000 et seq.

[8] Environmental Law 149E 599

149E Environmental Law
149EXII Assessments and Impact Statements
149Ek598 Adequacy of Statement, Consideration, or Compliance
149Ek599 k. In General. Most Cited Cases
An agency that fails to require an applicant to disclose information mandated by California Environmental Quality Act (CEQA) and to include that information in the environmental impact report (EIR), fails to proceed in a manner prescribed by CEQA. West's Ann.Cal.Pub.Res.Code § 21000 et seq.

[9] Environmental Law 149E 599

149E Environmental Law
149EXII Assessments and Impact Statements
149Ek598 Adequacy of Statement, Consideration, or Compliance
149Ek599 k. In General. Most Cited Cases
Where a party challenges an environmental impact report (EIR) under California Environmental Quality

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Act (CEQA) because it fails to disclose evidence that conflicts with its conclusions, the party must show that the failure to disclose the conflicting evidence precludes informed decision making or informed public participation. West's Ann.Cal.Pub.Res.Code § 21000 et seq.

[10] Environmental Law 149E 604(3)

149E Environmental Law
149EXII Assessments and Impact Statements
149Ek598 Adequacy of Statement, Consideration, or Compliance
149Ek604 Particular Projects
149Ek604(3) k. Waters and Water Courses; Dams and Flood Control. Most Cited Cases
Under California Environmental Quality Act (CEQA), water service portion of environmental impact report (EIR) for residential subdivision was not inadequate as it related to availability of water from water transfer agreement involved in pending litigation; EIR acknowledged that litigation made transfer legally uncertain, but substantial evidence supported finding that degree of uncertainty was small as transfer was intended to be permanent and any adverse outcome in litigation was unlikely to "unwind" transfer agreement in light of existing law and contracts. West's Ann.Cal.Pub.Res. Code § 21000 et seq.
See 12 Witkin, Summary of Cal. Law (10th ed. 2005) Real Property, § 840 et seq.; 9 Miller & Starr, Cal. Real Estate (3d ed. 2001) § 25:182 et seq.; Cal. Jur. 3d, Pollution and Conservation Laws, § 543 et seq.; Cal. Civil Practice (Thomson/West 2003) Environmental Litigation, § 8:17 et seq.

[11] Environmental Law 149E 604(3)

149E Environmental Law
149EXII Assessments and Impact Statements
149Ek598 Adequacy of Statement, Consideration, or Compliance
149Ek604 Particular Projects
149Ek604(3) k. Waters and Water Courses; Dams and Flood Control. Most Cited Cases
Under California Environmental Quality Act (CEQA), environmental impact report (EIR) for residential subdivision was not required to discuss funding to remediate perchlorate contamination of local water wells, since nothing suggested that described mitigation measures would not be implemented. West's Ann.Cal.Pub.Res. Code § 21000 et seq.

****451** Law Office of Alyse M. Lazar and Alyse M. Lazar, Westlake Village, for Plaintiffs and Appellants **Santa Clarita Organization** for **Planning** the **Environment** and Friends of the **Santa** Clara River.
Rossmann & Moore, Antonio Rossmann, Roger B. Moore and David Rowen, for amicus curiae **Planning** and Conservation League in support of Plaintiffs and Appellants.
Raymond Fortner, **County** Counsel, Richard D. Weiss, Assistant **County** Counsel, Tracy D. Swann, Principal Deputy **County** Counsel, and Lawrence Hafetz, Deputy **County** Counsel, for Defendant and Respondent **County** of **Los Angeles**.
Paul, Hastings, Janofsky & Walker, Robert I. McMurry, A. Catherine Norian, **Los Angeles**, and Edgar Kalatian, for Real Parties in Interest and Respondents Newhall Land and Farming Company and Valencia Corporation.

****452** OPINION ON REHEARING

GILBERT, P.J.
152** In ***Santa Clarita Organization** for **Planning** the **Environment** v. **County** of **Los Angeles (2003) 106 Cal.App.4th 715, 131 Cal.Rptr.2d 186 (*Scope I*), we held that the water service portion of an **environmental** impact report (EIR) must analyze the actual amount of water that will be available for a project. In *Scope I*, the EIR for the West Creek residential subdivision did not comply with the California **Environmental** Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).[FN1] It relied on contractual entitlements to water. Because this water is not of the "wet" variety, it has been called "paper water."

FN1. All statutory references are to the Public Resources Code unless otherwise stated.

After remand, the **County** of **Los Angeles** (**County**) revised and recertified the West Creek EIR. **Santa Clarita Organization** for **Planning** the **Environment** (SCOPE) again challenges the water services portion of the EIR. This time, SCOPE focuses on the EIR's analysis of a water transfer agreement and remediation costs for perchlorate contamination of water wells. The trial court denied SCOPE's petition for writ of administrative mandate.

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After the trial court denied SCOPE's petition, our Supreme Court decided *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 53 Cal.Rptr.3d 821, 150 P.3d 709*(Vineyard).* *Vineyard* states four principles governing the analysis of the water services portion of an EIR. We conclude the West Creek EIR satisfies all four principles.

FACTS

Background

In the 1950s, the Legislature and the voters approved the State Water Project (SWP). It was designed to deliver 4.23 million acre-feet of water annually. It is managed by the Department of Water Resources (DWR).

The DWR contracted to deliver water to water agencies throughout the state. The contracts entitle the agencies to specified amounts of water calculated on the designed capacity of the SWP. Only half of the SWP was constructed. The completion of the SWP was an expectation that has not grown beyond a hope. There is no reasonable expectation that the original plan will ever be completed. This leaves a vast difference between the amount of water to which the local agencies are entitled, and the amount of water the SWP can actually deliver.

***153** A drought in the 1990s highlighted the disparity between water entitlements and actual water. Agricultural and urban agencies disputed how shortfalls in water delivery would be allocated. The interested parties met in Monterey, and produced the Monterey Agreement.

Under the Monterey Agreement, the DWR and the contracting water agencies agreed to a statement of 14 principles. One principle provided for the permanent sale of water among agencies. The Castaic Lake Water Agency (Castaic) purchased 41,000 acre-feet per year (afy) from the Kern County Water Agency. Castaic serves the Santa Clarita Valley area, and the 41,000 afy constitutes over 40 percent of the 95,200 afy available to Castaic.

The Monterey Agreement scuttled the term "entitlement" to describe the amount of water the SWP has contracted to deliver to local water agencies. Instead, the agreement uses the term "Table A Amount." Table A of the agreement lists ****453** the contracting agencies and the amount of water the SWP has contracted to deliver. The change is not substantive.

In *Planning & Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 100 Cal.Rptr.2d 173 (*PCL*), the court ordered the EIR for the Monterey Agreement decertified. The court determined that the EIR was prepared by the wrong lead agency, a water agency instead of the DWR, and failed to consider the "no project" alternative. Because the EIR for the Kern-Castaic 41,000 afy transfer was "tiered" on the Monterey Agreement EIR, the EIR for the Kern-Castaic transfer was also ordered decertified. (*Friends of Santa Clara River v. Castaic Lake Water Agency* (2002) 95 Cal.App.4th 1373, 1387, 116 Cal.Rptr.2d 54(*Friends*).) Although the EIRs for the Monterey Agreement and the Kern-Castaic transfer were decertified, the projects were not enjoined. The agreements remain in effect to this day.

On July 22, 2002, the parties to the *PCL* litigation that decertified the Monterey Agreement EIR entered into a settlement agreement approved by the Sacramento County Superior Court. The settlement agreement requires the DWR as the lead agency to prepare a new EIR for the Monterey Agreement. The settlement agreement acknowledges that certain water transfers listed in Attachment E to the settlement agreement are final, and the parties agree not to challenge those transfers. The Kern-Castaic transfer is not listed in Attachment E. Instead, the settlement agreement provides:

"*Acknowledgement and Agreement Regarding Kern-Castaic Transfer.*With respect to ... the Kern-Castaic Transfer, the Parties recognize that such water transfer is subject to pending litigation in the Los Angeles County Superior Court following remand from the Second District Court of Appeal (See ***154** *Friends of the Santa Clara River v. Castaic Lake Water Agency*, 95 Cal.App.4th 1373, 116 Cal.Rptr.2d 54 (2002); *review denied* April 17, 2002). The Parties agree that jurisdiction with respect to that litigation should remain in that court and that nothing in this Settlement Agreement is intended to predispose the

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remedies or other actions that may occur in that pending litigation."

In 2004, Castaic certified a revised EIR for the Kern-Castaic transfer. This EIR is not tiered on the Monterey Agreement EIR. SCOPE's opening brief states that Castaic's EIR is being challenged in **Los Angeles County** Superior Court by **environmental** groups.

West Creek

West Creek is a proposed mixed residential and commercial development in the **Santa Clarita** Valley area of northern **Los Angeles County**. The project includes 2,545 housing units, 180,000 square feet of commercial retail space and 46 acres of community facilities. The **County** served as the lead agency in preparing the EIR for the project. The project developers are The Newhall Land and Farming Company and Valencia Corporation (hereafter collectively Newhall).

SCOPE challenges the **County's** certification of the West Creek EIR. The trial court denied SCOPE's petition for a writ of administrative mandate. We reversed on the ground that the EIR's evaluation of the availability of the water supply was inadequate. (*Scope I, supra*, 106 Cal.App.4th 715, 131 Cal.Rptr.2d 186.) The EIR relied on water entitlements instead of actual water in analyzing water availability. (*Ibid.*)

The County revised the water supply analysis, and recertified the EIR. SCOPE challenges the water supply analysis in the ****454** recertified EIR. This time it opposes the 41,000 afy Kern-Castaic water transfer.

The recertified EIR states that Castaic's total maximum SWP water allocation is 95,200 afy. The Kern-Castaic transfer accounts for 41,000 afy of that. The EIR acknowledges that the EIR for the Monterey Agreement and the original EIR for the Kern-Castaic transfer were decertified.

With regard to the status of the Kern-Castaic transfer, the EIR states:

"The [Kern-Castaic] transfer of SWP Table A Amount was the type of water transfer that fell within the provisions of the Monterey Agreement. As stated above, under the Monterey Agreement, certain SWP agricultural contractors agreed that 130,000 AF of their Table A Amount could be ***155** transferred to urban contractors. The [Castaic] 41,000-AF acquisition was a part of the 130,000 AF of SWP Table A Amount, which has been transferred under the Monterey Agreement.

"... The Monterey Agreement provides ... for those transfers by the participating SWP contractors, thus facilitating transfers of Table A Amounts from agricultural to urban SWP contractors. As stated above, the environmental documentation for the Monterey Agreement has been decertified. However, the ... legal proceedings (*Planning and Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 100 Cal.Rptr.2d 173 [*PCL litigation*]) did not invalidate ... the Monterey Agreement or enjoin[ ] either the Monterey Agreement or further implementation of the Monterey Agreement.

"In addition, the subsequent Settlement Agreement in the *PCL litigation* did not invalidate or otherwise enjoin the Monterey Agreement.

"Even in the absence of the Monterey Agreement, [Castaic's] permanent acquisition of an additional 41,000 AF of SWP Table A Amount could occur under existing SWP water supply contract provisions, subject to appropriate environmental review.

"Nothing in the existing SWP water supply contracts, or applicable law, prohibit such water transfers with or without the Monterey Agreement. The Monterey Agreement simply provides a specific vehicle for accomplishing transfers of SWP Table A Amounts from agricultural to urban SWP contractors; the amendments under the Monterey Agreement are not the exclusive means by which that Amount may be transferred. In support of that fact, in 1981 (almost 15 years before the Monterey Agreement), the entire SWP Table A Amount of the Hacienda Water District was permanently transferred to the Tulare Lake Basin Water Storage District, pursuant to an agreement approved by DWR.

"The acquisition could proceed as a water transfer under existing law. See, e.g., Water Code §§ 382, 383

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(authority for transferring surplus water) and Water Code §§ 1745, et seq. (authority for transferring non-surplus water). The Kern County Water Agency has reaffirmed its willingness to allow transfers of up to 130,000 AF of SWP table A Amounts under pre-Monterey Agreement conditions and/or under the terms of the Settlement Agreement....

"Finally, [Castaic] is not a party to the pending Monterey Agreement litigation (*Planning Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 100 Cal.Rptr.2d 173). Although not a party, an adverse final judgment invalidating the Monterey Agreement could affect [Castaic's] completed ***156** acquisition of the 41,000 AF, which ****455** could in turn impair [Castaic's] supply of SWP water through its contracts with DWR and other SWP contractors. Nevertheless, [Castaic] believes that an adverse outcome in the Monterey Agreement litigation is not likely to adversely affect [Castaic's] water supplies over the long-term because (a) [Castaic] believes that such a result is unlikely to 'unwind' executed and completed agreements with respect to the permanent transfer of SWP water amounts; (b) existing SWP water supply contract provisions allow such transfers (without the need for the Monterey Agreement); and (c) existing law enables [Castaic] to enter into contracts outside the context of the Monterey Agreement."

The EIR also discloses that there is perchlorate contamination in six water wells that will comprise part of the water service for West Creek. The EIR identifies remediation measures, but does not identify any source of funding for those measures.

DISCUSSION

I

[1] Newhall contends the doctrine of law of the case bars SCOPE's Kern-Castaic transfer arguments.

[2] Where an appellate court states in its opinion a principle or rule of law necessary to its decision, that principle or rule becomes the law of the case. (*Clemente v. State of California* (1985) 40 Cal.3d 202, 211, 219 Cal.Rptr. 445, 707 P.2d 818.) The law of the case must be adhered to both in the lower court and upon subsequent appeal. (*Ibid.*) This is true even if the court that issued the opinion becomes convinced in a subsequent consideration that the former opinion is erroneous. (*Ibid.*)

But our former opinion in this case (*Scope I*) stated no principle or rule of law bearing on the adequacy of the West Creek EIR's discussion of the Kern-Castaic transfer. Newhall attempts to turn silence into positive effect by citing section 21005, subdivision (c). The subdivision requires that our opinion discuss all the alleged grounds for noncompliance with CEQA. Newhall concludes that because we did not discuss the Kern-Castaic transfer in *Scope I*, we approved the transfer.

Newhall cites no authority, however, for the proposition that not discussing an issue as required by section 21005, subdivision (c), transforms that issue into law of the case. In *Friends, supra*, 95 Cal.App.4th at page 1387, 116 Cal.Rptr.2d 54, on which Newhall relies, after finding one of appellant's contentions meritorious, the court expressly stated it considered all of appellant's other contentions ***157** and found them without merit. *(iBid.)FRiends* does not discuss the effect of a failure to consider an issue, and does not even mention the doctrine of law of the case. If Newhall believed we failed to discuss an issue raised in *Scope I*, its remedy was a timely petition for rehearing. (Cal. Rules of Court, rule 8.268 (formerly cited as rule 25).) The time for such a petition has long since passed.

Moreover, we discussed all issues raised in *Scope I*. SCOPE mentioned the Kern-Castaic transfer in its opening brief, but SCOPE did not raise the transfer as an issue. In fact, Newhall argued that we could not consider *Friends*, the decision that decertified the Kern-Castaic transfer EIR, because it occurred after the County approved the West Creek project. Newhall pointed out that once a project is approved, new information does not require reopening the approval. (*Scope I, supra*, 106 Cal.App.4th at p. 723, 131 Cal.Rptr.2d 186.) SCOPE replied that it cited *Friends* only to show that SWP entitlements cannot be taken at face value. ****456** (*Ibid.*) Thus, at Newhall's urging, we did not consider in *Scope I* the issues SCOPE now raises. They arose after the County's initial approval of the project. Newhall cites no authority that prevents us from considering issues that arose prior to the recertification of the EIR.[FN2]

FN2. SCOPE contends the EIR's failure to

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properly analyze the Kern-Castaic transfer violated the terms of the remittitur in *Scope I*. It follows from what we have said that the contention has no merit. We did not consider the Kern-Castaic transfer in *Scope I*, and it was not within the terms of our remittitur in that case.

II

Newhall contends SCOPE waived its perchlorate contamination arguments by failing to appeal them. Newhall argues SCOPE's claim is waived because it is essentially identical to that denied by the trial court in the first challenge to the project's EIR.

But SCOPE's first challenge to the project's EIR concerned disclosure of the extent of perchlorate contamination of local water wells. SCOPE did not appeal the trial court's denial of that challenge. Here SCOPE is not challenging the EIR's disclosure of the extent of perchlorate contamination. Instead, it is challenging the mitigation measures suggested by the EIR. That issue is not substantially identical to the issue raised in the first challenge. There has been no waiver.

III

[3][4] We now consider SCOPE's challenge to the West Creek EIR. An EIR approved by the appropriate governmental agency is presumed adequate, and ***158** the party challenging the EIR has the burden of showing otherwise. (*Barthelemy v. Chino Basin Mun. Water Dist.* (1995) 38 Cal.App.4th 1609, 1617, 45 Cal.Rptr.2d 688(*Barthelemy*).) A party may challenge an EIR by showing the agency has abused its discretion either by reaching factual conclusions unsupported by substantial evidence or by failing to proceed in the manner CEQA provides. (*Vineyard*, *supra*, 40 Cal.4th at p. 435, 53 Cal.Rptr.3d 821, 150 P.3d 709.)

[5][6] In evaluating an EIR for CEQA compliance, we must adjust our scrutiny to the nature of the alleged defect. (*Vineyard*, *supra*, 40 Cal.4th at p. 435, 53 Cal.Rptr.3d 821, 150 P.3d 709.) Where the alleged defect is that the agency's conclusions are not supported by substantial evidence, we must accord deference to the agency's factual conclusions. (*Ibid.*) We may not weigh conflicting evidence to determine who has the better argument. (*Ibid.*) Thus we may not set aside an agency's approval of an EIR on the ground that an opposite conclusion would have been equally or more reasonable. (*Ibid.*)

[7][8][9] Where the alleged defect is that the agency has failed to proceed in a manner provided by CEQA, our review is de novo. (*Vineyard*, *supra*, 40 Cal.4th at p. 435, 53 Cal.Rptr.3d 821, 150 P.3d 709.) An agency that fails to require an applicant to disclose information mandated by CEQA and to include that information in the EIR, fails to proceed in a manner prescribed by CEQA. (*Ibid.*) Where a party challenges an EIR because it fails to disclose evidence that conflicts with its conclusions, the party must show that the failure to disclose the conflicting evidence precludes informed decision making or informed public participation. (*Barthelemy*, *supra*, 38 Cal.App.4th at p. 1617, 45 Cal.Rptr.2d 688.)

IV

[10] SCOPE challenges the adequacy of the EIR's water supply analysis as it relates to the Kern-Castaic transfer.

****457** Recently, our Supreme Court in *Vineyard* articulated four principles for analysis of future water supplies under CEQA:

"First, CEQA's informational purposes are not satisfied by an EIR that simply ignores or assumes a solution to the problem of supplying water to a proposed land use project. Decision makers must, under the law, be presented with sufficient facts to 'evaluate the pros and cons of supplying the amount of water that the [project] will need.' [Citation.]" (*Vineyard*,*supra*, 40 Cal.4th at pp. 430-431, 53 Cal.Rptr.3d 821, 150 P.3d 709.)

"Second, an adequate environmental impact analysis for a large project, to be built and occupied over a number of years, cannot be limited to the water supply for the first stage or the first few years. While proper tiering ***159** of environmental review allows an agency to defer analysis of certain details of later phases of long-term linked or complex projects until those phases are up for approval, CEQA's demand for meaningful information 'is not satisfied by simply stating information will be provided in the future.' [Citation.]" (*Vineyard*, *supra*, 40 Cal.4th at p. 431,

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53 Cal.Rptr.3d 821, 150 P.3d 709.)

"Third, the future water supplies identified and analyzed must bear a likelihood of actually proving available; speculative sources and unrealistic allocations ('paper water') are insufficient bases for decisionmaking under CEQA. [Citation.] An EIR for a land use project must address the impacts of *likely* future water sources, and the EIR's discussion must include a reasoned analysis of the circumstances affecting the likelihood of the water's availability. [Citation.]" (*Vineyard, supra*, 40 Cal.4th at p. 432, 53 Cal.Rptr.3d 821, 150 P.3d 709.)

"Finally, where, despite a full discussion, it is impossible to confidently determine that anticipated future water sources will be available, CEQA requires some discussion of possible replacement sources or alternatives to use of the anticipated water, and of the environmental consequences of those contingencies. [Citation.] The law's informational demands may not be met, in this context, simply by providing that future development will not proceed if the anticipated water supply fails to materialize. But when an EIR makes a sincere and reasoned attempt to analyze the water sources the project is likely to use, but acknowledges the remaining uncertainty, a measure for curtailing development if the intended sources fail to materialize may play a role in the impact analysis. [Citation.]" (*Vineyard, supra*, 40 Cal.4th at p. 432, 53 Cal.Rptr.3d 821, 150 P.3d 709.)

The West Creek EIR does not simply ignore or assume a solution to the problem of supplying water to the project. It identifies specific water sources, including the Kern-Castaic transfer. Nor is the EIR's water supply analysis limited to the first stage or the first few years of the project. The EIR analyzes the Kern-Castaic transfer as part of the permanent supply for the entire project.

SCOPE's concerns center on the third principle articulated in *Vineyard*, that "the future water supplies identified and analyzed must bear a likelihood of actually proving available...."(*Vineyard, supra*, 40 Cal.4th at p. 432, 53 Cal.Rptr.3d 821, 150 P.3d 709.)

SCOPE challenges the EIR's conclusion that an adverse outcome in the Monterey Agreement litigation is unlikely to affect Castaic's water supplies over the long term. The EIR supports this conclusion by stating that an adverse outcome in the Monterey Agreement litigation is unlikely to "unwind" existing agreements for permanent transfer of SWP water amounts, ****458** and that existing law and contracts allow transfers without the need for the Monterey Agreement.

***160** SCOPE argues the EIR fails to disclose that the Kern-Castaic transfer is not final and permanent. SCOPE points out that the Kern-Castaic transfer is not included among the water transfers listed as final and permanent in the Monterey Settlement Agreement.

But the Monterey Settlement Agreement makes it clear that the Kern-Castaic transfer is not listed among the final transfer agreements because its EIR is subject to pending litigation in the Los Angeles Superior Court. (Citing *Friends, supra*, 95 Cal.App.4th 1373, 116 Cal.Rptr.2d 54.) SCOPE points to no evidence that the parties to the Monterey Settlement Agreement consider the transfer as anything other than permanent now that the revised EIR for the transfer has been certified. The Monterey Settlement Agreement did not make the Kern-Castaic transfer temporary. A disclosure that the Monterey Settlement Agreement does not include the Kern-Castaic transfer on its list of final transfer agreements adds nothing substantial to an understanding of water availability.

In *California Oak Foundation v. City of Santa Clarita* (2005) 133 Cal.App.4th 1219, 1237-1238, 35 Cal.Rptr.3d 434, the court reviewed the adequacy of the discussion of the Kern-Castaic transfer contained in an EIR for an unrelated project. The court determined the EIR was inadequate because it failed to discuss the legal uncertainty of the Kern-Castaic transfer; specifically, the uncertainty created by the decertification of the transfer's original EIR.

In contrast, here the EIR discloses that the Monterey Agreement litigation makes the Kern-Castaic transfer legally uncertain. The EIR states that a judgment invalidating the Monterey Agreement could affect Castaic's acquisition of the 41,000 acre feet of water. The EIR concludes, however, that as a practical matter an adverse outcome in the Monterey Agreement litigation is unlikely to "unwind" the transfer agreement. Contrary to SCOPE's argument,

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this conclusion is supported by reasoned analysis. The EIR points out that the Kern-Castaic transfer is intended to be permanent, and that the transfer can be valid even without the Monterey Agreement.

SCOPE argues the Monterey Agreement is necessary to validate the Kern-Castaic transfer because all transfers of SWP water require the DWR's consent. SCOPE cites no authority that expressly requires the DWR's consent for water transfers. Instead, SCOPE reasons the DWR's consent is required because it controls the SWP facilities necessary for delivery of the water. Assuming DWR's consent is necessary, SCOPE cites no authority that the consent must come through the Monterey Agreement. In fact, the EIR discloses that the transfer of surplus and nonsurplus water is authorized by statute. (Water Code, §§ 382, 383, 1745 et seq.) The EIR also notes that at ***161** least one Table A Amount of water was permanently transferred with the DWR's consent almost 15 years prior to the Monterey Agreement.

Quite aside from the Monterey Agreement, the legislative policy of this state is to facilitate water transfers. (See Water Code, §§ 475, 480 et seq.) SCOPE points to no evidence whatsoever that the DWR has any inclination to disapprove the Kern-Castaic transfer even if the Monterey Agreement is ultimately invalidated.

SCOPE points to a letter from the DWR to Castaic dated July 30, 2004. The letter is in an appendix to the West Creek EIR. ****459** The letter states that the DWR staff has reviewed the draft EIR for the Kern-Castaic transfer and found that the document "adequately and thoroughly discusses the proposed project and its impacts," and provides a good discussion of the relationship between the Kern-Castaic transfer and the current Monterey Agreement process. The letter also states that the DWR is using a new model to assess the potential impacts of Table A transfers in preparing the revised Monterey Agreement EIR. It acknowledges that Castaic used an earlier model to analyze the effect of the Kern-Castaic transfer. It states that the use of the new model "may cause slight changes in results, which may lead DWR to different conclusions than the conclusions made by [Castaic] in the current EIR."Nevertheless, the letter states Castaic's draft EIR adequately discusses SWP reliability and pre- and post-Monterey Agreement conditions.

SCOPE argues the West Creek EIR is deficient in that it fails to include or discuss information that a new water model may lead the DWR to different conclusions than those made by Castaic and its draft EIR. But the letter describes any possible change in result as "slight." The letter does not state that the slight change in results will probably lead to different conclusions; it says only that it "may" lead to unspecified different conclusions. It is highly improbable that a slight change in results will lead to radically different conclusions. In fact, the letter praises the draft EIR's discussion of the proposed project and its impacts. The information contained in the letter adds nothing substantial to West Creek's EIR.

SCOPE argues the EIR is devoid of any factual discussion of the impacts of the *PCL* decision on the West Creek project. But the EIR discloses that a final judgment invalidating the Monterey Agreement could impair Castaic's supply of SWP water. The EIR goes on to state that such a result is unlikely because the Kern-Castaic transfer can be validated outside the Monterey Agreement. SCOPE cites no authority for the proposition that the West Creek EIR must discuss the factors the DWR will be required to consider in preparing a revised Monterey Agreement EIR. The Kern-Castaic transfer is not dependent on the Monterey Agreement. Such a discussion is not necessary for informed decision making or public participation.

***162** SCOPE cites *Vineyard, supra*, 40 Cal.4th at p. 440, 53 Cal.Rptr.3d 821, 150 P.3d 709, for the proposition that it is improper for an EIR to tier from an environmental document that will be completed in the future. SCOPE points out that West Creek's EIR was certified without waiting for the DWR to complete its revised EIR for the Monterey Agreement. But West Creek's EIR was not tiered on future Monterey Agreement environmental documents. In fact, West Creek's water supply analysis is based on the premise that the Monterey Agreement litigation is unlikely to affect the Kern-Castaic transfer.

West Creek's EIR satisfies the third principle of analysis stated in *Vineyard.* The record contains substantial evidence demonstrating a reasonable likelihood that water from the Kern-Castaic transfer

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will be available for the project's near- and long-term needs. (See *Vineyard, supra*, 40 Cal.4th at p. 437, 53 Cal.Rptr.3d 821, 150 P.3d 709.) The record also shows the County proceeded in a manner required by CEQA. The EIR neither improperly used tiering to defer all analysis of supplies to future stages of the project, nor relied upon demonstrably illusory supplies. (*Ibid.*)

****460** SCOPE argues that West Creek's EIR is deficient because it fails to analyze the project's water supply in the absence of the 41,000 afy Kern-Castaic transfer. When first published, *Vineyard's* fourth principle was slightly different than the one stated in the subsequent modified opinion. Principle four then stated that an EIR requires analysis of replacement or alternative water sources where "a full discussion leaves some uncertainty regarding actual availability of the anticipated future water sources...." Principle four in the modified version of *Vineyard* allows slightly more flexibility in determining the issue of available future water sources. It requires analysis of replacement or alternative sources only if it is "impossible to confidently determine" that anticipated future water sources will be available.

Here West Creek's EIR acknowledges there is at least some legal uncertainty about the Kern-Castaic transfer. The EIR states in part: "An adverse final judgment invalidating the Monterey Agreement could affect [Castaic's] completed acquisition of the 41,000 AF, which could in turn impair [Castaic's] supply of SWP water through its contracts with DWR and other SWP contractors."

Some would argue it is certain that the outcome of litigation is seldom certain. But whatever the outcome of the *PCL litigation*, it is highly unlikely it will affect the Kern-Castaic water transfer. The water is now available, and for years has been available for the project under executed agreements. The recertified EIR notes that the Kern-Castaic transfer can legally occur without the Monterey Agreement. Suffice it to say, however the Monterey Agreement ***163** litigation is eventually decided, the Kern-Castaic transfer will likely not be affected. Per principle four, we can confidently determine that the water will be available.

V

[11] SCOPE contends West Creek's EIR is deficient in that it fails to discuss the impact of the lack of funding to remediate perchlorate contamination of local water wells. SCOPE has no quarrel with the EIR's discussion of perchlorate contamination of local wells. Its contention is limited to the lack of funding for remediation measures.

In addition to SWP water, two local aquifers will serve as part of the project's water supply, the Alluvial Aquifer and the Saugus Aquifer. SCOPE argues there are 67 wells owned by water companies in these aquifers and an undisclosed number of private wells. SCOPE points to evidence that the estimated cost of remediation is $500,000 per well. No source of funding is identified in the EIR to pay for the equipment necessary for remediation.

SCOPE relies on *Federation of Hillside & Canyon Associations v. City of Los Angeles* (2000) 83 Cal.App.4th 1252, 1261-1262, 100 Cal.Rptr.2d 301(*Federation*). There the city adopted a general plan framework (GPF) as part of its general plan. The GPF identified mitigation measures, including a transportation plan designed to mitigate the transportation impacts of the GPF's growth policies. The transportation plan acknowledged that to implement the mitigation measures would require the cooperation of various public agencies, that the city's portion of the costs would exceed its revenues, and that there is "great uncertainty" whether the mitigation measures would ever be funded or implemented. Although the city adopted the mitigation measures, it made no effort to ensure they will actually be implemented or enforceable. The court determined that the city's approval of the GPF must be vacated for failing to ensure that feasible mitigation measures will actually****461** be implemented. (*Id.* at p. 1261, 100 Cal.Rptr.2d 301, citing §§ 21002.1, subd. (b); 21081.)

Here, although water agencies may have 67 wells, only six of them have been identified as being contaminated with perchlorate. Unlike the city in *Federation*, here the County did not acknowledge there is great uncertainty that mitigation measures would ever be funded or implemented. To the contrary, the EIR states in part: "Due to the high value of this local water resource, the purveyors have placed a high priority on replacing the impacted groundwater capacity by installing wellhead

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treatment and the construction of new wells." Here, unlike *Federation,* there is nothing to suggest the mitigation measures will not be implemented. Finally, SCOPE points to nothing in *Federation* or any other case that requires the EIR to discuss funding for mitigation measures.

***164** DISPOSITION

The judgment is affirmed. Costs on appeal are awarded to respondents and real parties in interest.

COFFEE and PERREN, JJ., concur.
Cal.App. 2 Dist.,2007.
Santa Clarita Organization for Planning the Environment v. County of Los Angeles
157 Cal.App.4th 149, 68 Cal.Rptr.3d 449, 07 Cal. Daily Op. Serv. 13,422, 2007 Daily Journal D.A.R. 17,387

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California Court of Appeal, Second District, Division Three,
"*Sierra Club, et al. v. City of Santa Clarita, et al.*, Case No. B194771"
(January 2008)

Filed 1/29/08 Sierra Club v. City of Santa Clarita CA2/3

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

California Rules of Court, rule 8.1115(a), prohibits courts and parties from citing or relying on opinions not certified for publication or ordered published, except as specified by rule 8.1115(b). This opinion has not been certified for publication or ordered published for purposes of rule 8.1115.

IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

SECOND APPELLATE DISTRICT

DIVISION THREE

SIERRA CLUB et al., Plaintiffs and Appellants, v. CITY OF SANTA CLARITA et al., Defendants and Respondents; THE NEWHALL LAND AND FARMING COMPANY, Real Party in Interest and Respondent.	B194771 (Los Angeles County Super. Ct. No. BS098722)

APPEAL from a judgment of the Superior Court of Los Angeles County, Dzintra Janavs, Judge. Affirmed.

Law Office of Babak Naficy and Babak Naficy for Plaintiffs and Appellants.

Burke, Williams & Sorenson, Carl K. Newton and Geralyn L. Skapik for Defendants and Respondents.

Paul, Hastings, Janofsky & Walker, Robert I. McCurry and A. Catherine Norian for Real Party in Interest and Respondent.

Sierra Club, Center for Biological Diversity, Friends of the Santa Clara River, and California Water Impact Network (collectively Petitioners) challenge the certification by City of Santa Clarita (city) of an environmental impact report (EIR) and the city's approval of a mixed-use development project known as Riverpark. Petitioners appeal a judgment denying their petition for a writ of mandate and denying relief on their complaint. They challenge the adequacy of the EIR and the city's findings under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) with respect to impacts on water supply and biological resources, and the city's finding under the Planning and Zoning Law (Gov. Code, § 65000 et seq.) that the project is consistent with the city's general plan.

We conclude that the water supply analysis in the EIR, the analysis of impacts on the holly-leaf cherry and San Diego black-tailed jackrabbit, and the discussion of measures to mitigate the impacts on the western spadefoot toad were adequate, and that the city reasonably concluded that the project is consistent with the city's general plan. We therefore affirm the judgment.

FACTUAL AND PROCEDURAL BACKGROUND

1. *Proposed Project*

The Newhall Land and Farming Company (Newhall) proposed the development of 1,183 residential units, consisting of 439 single-family homes and 744 apartment units, and 40,000 square feet of commercial space, together with trails, a 29-acre park, and open space. The proposed project site is in the central part of the city, north of Soledad Canyon Road and east of Bouquet Canyon Road, and includes a section of the

Santa Clara River running east-west through the site. The total site acreage is 695.4 acres including the river, and 357 acres excluding the river.

The Santa Clara River is the last major unchannelized river in Los Angeles County. The city has designated the Santa Clara River a Significant Ecological Area (SEA). The SEA supports a variety of natural habitats including freshwater marsh, coastal sage scrub, oak woodlands, and riparian woodlands. The 100-year storm limit line determined by the Federal Emergency Management Agency defines the boundaries of the SEA. The proposed project includes 16.9 acres of development within the 100-year storm limit line and therefore within the SEA.

The proposed project site is predominantly undeveloped, but with some disturbed areas including several buildings used for construction purposes and electrical transmission lines. Plant communities on the site include coastal sage scrub, southern riparian scrub, native and non-native grasses and ruderal vegetation, small patches of oak trees, and other native and non-native trees. To the north of the site are undeveloped property, a water treatment facility and administrative offices owned by the Castaic Lake Water Agency, and single-family residential uses. To the south of the site, across the river from the proposed development, are retail commercial uses, the Saugus Speedway, a Metrolink commuter railway station, a mobile home park, and a business park. To the east of the site are undeveloped property and a business park, and to the west are retail commercial uses and open space.

2. *Environmental Review and Project Approval*

The city circulated a draft EIR for the proposed project on March 2, 2004. Focused surveys performed on March 5 and 6, 2004, at the request of the Department of Fish and Game disclosed the presence of western spadefoot toads on the proposed project site. The city circulated a revised biological resources section of the draft EIR discussing the western spadefoot toad on March 24, 2004.

The city's planning commission conducted several public hearings on the proposed project and recommended approval of the project with certain modifications. Newhall modified the proposed project accordingly. Those modifications reduced the number of residential units to 1,123, consisting of 419 single-family homes, 380 condominium units, and 324 apartment units, and reduced the area of commercial space to 16,000 square feet, among other changes.

A final EIR was prepared in December 2004. The city council conducted a public hearing on the proposed project in January 2005, and suggested further modifications. The city council conducted additional public hearings in March and May 2005. The final EIR was revised in May 2005. On May 25, 2005, the city council certified the final EIR, made findings under CEQA and other findings, adopted a statement of overriding considerations, and approved the project. The project approvals included a vesting tentative tract map, general plan amendment, conditional use permit, oak tree permit, and setback and wall height adjustments. The city council approved a zone change on second reading, on June 14, 2005.

The project as approved includes 1,098 residential units, consisting of 439 single-family homes and 657 condominium units, and 16,000 square feet of commercial space, in addition to trails, a 29-acre park, and open space.

3. *Trial Court Proceedings*

Petitioners filed a combined petition for writ of mandate and complaint against the city and its city council in the Ventura County Superior Court in June 2005, challenging the city's certification of the EIR and project approval. The city moved for a change of venue to Los Angeles County Superior Court. The court granted the motion.

The trial court conducted a hearing on the merits in May 2006. The court rejected the Petitioners' contentions in a Decision on Submitted Matter filed on August 14, 2006, and entered a judgment denying the petition for writ of mandate. Petitioners timely appealed the judgment.

CONTENTIONS

Petitioners contend (1) the EIR failed to adequately discuss the uncertainty of the proposed water supplies; (2) due to the uncertainty of the proposed water supplies, the EIR was required to discuss alternative sources and the environmental impact of supplying water from those alternative sources, but failed to do so; (3) the Department of Water Resources rather than the Castaic Lake Water Agency should be the lead agency for environmental review of a water transfer from Kern County; (4) the EIR applied an incorrect legal standard to determine the significance of impacts on the holly leaf cherry; (5) the EIR applied an incorrect legal standard to determine the significance

of impacts on the San Diego black-tailed jackrabbit, and the evidence does not support the city's finding that the impacts on the species will be less than significant; (6) the city failed to consider project revisions or feasible alternatives to reduce the significant impacts on the western spadefoot toad to an insignificant level, and the evidence does not support the city's finding that significant impacts on the species are unavoidable; and (7) the evidence does not support the city's finding that the project is consistent with particular general plan goals and policies.

DISCUSSION

1. *CEQA Requirements*

"CEQA is a comprehensive scheme designed to provide long-term protection to the environment. [Citation.] In enacting CEQA, the Legislature declared its intention that all public agencies responsible for regulating activities affecting the environment give prime consideration to preventing environmental damage when carrying out their duties. [Citations.] CEQA is to be interpreted 'to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.' [Citation.]" (*Mountain Lion Foundation v. Fish & Game Com.* (1997) 16 Cal.4th 105, 112 (*Mountain Lion*).)

An EIR is required for any project that a public agency proposes to carry out or approve that may have a significant effect on the environment. (Pub. Resources Code,

§§ 21100, subd. (a), 21151, subd. (a); Guidelines, § 15064,[1] subd. (a)(1).) An EIR must describe the proposed project and its environmental setting, state the objectives sought to be achieved, identify and analyze the significant effects on the environment, state how those impacts can be mitigated or avoided, and identify and analyze alternatives to the project, among other requirements. (Pub. Resources Code, §§ 21100, subd. (b), 21151; Guidelines, §§ 15124, 15125, 15126.6.) "The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project." (Pub. Resources Code, § 21061.)

The lead agency must notify the public of the draft EIR, make the draft EIR and all documents referenced in it available for public review, and respond to comments that raise significant environmental issues. (Pub. Resources Code, §§ 21092, 21091, subds. (a), (d); Guidelines, §§ 15087, 15088.) The agency also must consult with and obtain comments from other agencies affected by the project and respond to their comments. (Pub. Resources Code, §§ 21092.5, 21104, 21153; Guidelines, § 15086.)

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[1] All references to Guidelines are to the CEQA Guidelines (Cal. Code Regs., Tit. 14, § 15000 et seq.) developed by the Office of Planning and Research and adopted by the Resources Agency. (Pub. Resources Code, §§ 21083, 21087.) "[C]ourts should afford great weight to the Guidelines except when a provision is clearly unauthorized or erroneous under CEQA." (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 391, fn. 2 (*Laurel Heights I*).)

The agency must prepare a final EIR including any revisions to the draft EIR, comments received from the public and from other agencies, and responses to comments. (Guidelines, §§ 15089, subd. (a), 15132.)

An agency may not approve a project that will have significant environmental effects if there are feasible alternatives or feasible mitigation measures that would substantially lessen those effects.[2] (Pub. Resources Code, §§ 21002, 21002.1, subd. (b); Guidelines, § 15021, subd. (a)(2); *Mountain Lion*, *supra*, 16 Cal.4th at p. 134.) An agency may find, however, that particular economic, social, or other considerations make the alternatives and mitigation measures infeasible and that particular project benefits outweigh the adverse environmental effects. (Pub. Resources Code, § 21081, subds. (a)(3), (b); Guidelines, § 15091, subd. (a)(3).) Specifically, an agency cannot approve a project that will have significant environmental effects unless it finds as to each significant effect, based on substantial evidence in the administrative record, that (1) mitigation measures required in or incorporated into the project will avoid or substantially lessen the significant effect; (2) those measures are within the jurisdiction of another public agency and have been adopted, or can and should be adopted, by that agency; or (3) specific economic, legal, social, technological, or other considerations make the mitigation measures or alternatives identified in the EIR infeasible, and

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[2] " 'Feasible' means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (Pub. Resources Code, § 21061.1; see also Guidelines, § 15364.)

specific overriding economic, legal, social, technological, or other benefits outweigh the significant environmental effects. (Pub. Resources Code, §§ 21081, 21081.5; Guidelines, § 15091, subds. (a), (b).) A finding that specific overriding project benefits outweigh the significant environmental effects (Pub. Resources Code, § 21081, subd. (b)) is known as a statement of overriding considerations. (Guidelines, § 15093.)

Thus, a public agency is not required to favor environmental protection over other considerations, but it must disclose and carefully consider the environmental consequences of its actions, mitigate or avoid adverse environmental effects if feasible, explain the reasons for its actions, and afford the public and other affected agencies an opportunity to participate meaningfully in the environmental review process. The purpose of these requirements is to ensure that public officials and the public are aware of the environmental consequences of decisions before they are made. (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564 (*Goleta Valley*).) The EIR process also informs the public of the basis for environmentally significant decisions by public officials and thereby promotes accountability and informed self-government. (*Laurel Heights I, supra*, 47 Cal.3d at p. 392; *Concerned Citizens of Costa Mesa, Inc. v. 32nd Dist. Agricultural Assn.* (1986) 42 Cal.3d 929, 935-936.) Before approving the project, the agency must certify that its decisionmaking body reviewed and considered the information contained in the EIR, that the EIR reflects the agency's independent judgment and analysis, and that the EIR was completed in compliance with CEQA. (Pub. Resources Code, § 21082.1, subd. (c); Guidelines, § 15090.)

"We have repeatedly recognized that the EIR is the 'heart of CEQA.' [Citations.] 'Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made. Thus, the EIR "protects not only the environment but also informed self-government." [Citations.]' To this end, public participation is an 'essential part of the CEQA process.' [Citations.]" (*Laurel Heights Improvement Assn. v. Regents of University of California* (1993) 6 Cal.4th 1112, 1123 (*Laurel Heights II*).) "The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been taken into account. (*Laurel Heights I*, *supra*, 47 Cal.3d at pp. 391-392.) For the EIR to serve these goals it must present information in such a manner that the foreseeable impacts of pursuing the project can actually be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made." (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-450 (*Vineyard Area Citizens*).)

" 'Significant effect on the environment' means a substantial, or potentially substantial, adverse change in the environment." (Pub. Resources Code, § 21068.) The Guidelines define "significant effect on the environment" in relevant part as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals,

flora, fauna, ambient noise, and objects of historic or aesthetic significance."[3] (Guidelines, § 15382.)

"Substantial evidence" under CEQA "includes fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact." (Pub. Resources Code, § 21080, subd. (e)(1); see Guidelines, §§ 15384, subd. (b), 15064, subd. (f)(5).) The Guidelines define "substantial evidence" as "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached," and state that this determination must be made "by examining the whole record before the lead agency." (Guidelines, § 15384, subd. (a).) "Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative, evidence that is clearly inaccurate or erroneous, or evidence of social or economic impacts that do not contribute to, or are not caused by, physical impacts on the environment." (Pub. Resources Code, § 21080, subd. (e)(2); accord, *id.* § 21082.2, subd. (c); see also Guidelines, § 15384, subd. (a).)

2. *Standard of Review*

The standard of review of an agency's decision under CEQA is abuse of discretion. Abuse of discretion means the agency failed to proceed in a manner required

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[3] " 'Environment' means the physical conditions which exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. The area involved shall be the area in which significant effects would occur either directly or indirectly as a result of the project. The 'environment' includes both natural and man-made conditions." (Guidelines, § 15360; see also Pub. Resources Code, § 21060.5.)

by law or there was no substantial evidence to support its decision. (Pub. Resources Code, §§ 21168, 21168.5; *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 945.) Whether the agency failed to proceed in a manner required by law is a question of law. A court determines de novo whether the agency complied with CEQA's procedural requirements, " 'scrupulously enforc[ing] all legislatively mandated CEQA requirements' (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564 [276 Cal.Rptr. 410, 801 P.2d 1161])." (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 435.) The failure to provide information required by CEQA in an EIR is a failure to proceed in a manner required by law. (*Save Our Peninsula Committee v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99, 118.) The failure to comply with CEQA's procedural or information disclosure requirements is a prejudicial abuse of discretion if the decision makers or the public is deprived of information necessary to make a meaningful assessment of the environmental impacts. (*Sierra Club v. State Bd. of Forestry* (1994) 7 Cal.4th 1215, 1236-1237; *County of Amador*, *supra*, at p. 946; see Pub. Resources Code, § 21005.)

Findings of fact made by the agency and factual conclusions stated in an EIR are reviewed under the substantial evidence standard. (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 435; *Laurel Heights I*, *supra*, 47 Cal.3d at pp. 392-393, 407.) Under the substantial evidence standard, the court does not determine whether the agency's factual determinations were correct, but only determines whether they were supported by substantial evidence. (*Laurel Heights I*, *supra*, at pp. 392-393.) On appeal, we

independently review the agency's decision under the same standard of review that governs the trial court. (*Vineyard Area Citizens*, *supra*, at p. 427.)

3. *Water Supply*

a. *CEQA Requirements for Water Supply Analysis*

An EIR must identify and analyze the significant environmental impacts that may result from the project. (Pub. Resources Code, § 21100, subds. (a), (b); Guidelines, §§ 15126.2, subd. (a), 15143.) It must include facts and analysis sufficient to allow the decision makers and the public to understand the environmental consequences of the project. (Guidelines, § 15151; *Laurel Heights I*, *supra*, 47 Cal.3d at pp. 404-405; *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 356 (*Napa Citizens*).) An EIR for a large, mixed-use development project such as the present project must include an analysis of the reasonably foreseeable environmental impacts of supplying water to the project. (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at pp. 428, 434.) The analysis must include a discussion of the planned and likely sources of water and the impacts of supplying water from those sources. (*Id.* at pp. 428, 432, 434.)

Vineyard Area Citizens involved an EIR prepared for a community plan and a specific plan for a large, mixed-use development project. The EIR stated that the project would rely on both groundwater and surface water for its water supplies. (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 423.) The projected long-term water supplies consisted of an unspecified combination of groundwater and surface water in "conjunctive use." (*Id.* at p. 440.) The EIR stated that a full analysis of the

"conjunctive use" program must await the pending environmental review of a master plan update by the county water agency. (*Id.* at p. 440.) Because the project did not have legal rights to the projected water supplies, a mitigation measure provided that subdivision maps, building permits, and other entitlements would not be granted unless agreements and financing for the water supplies were in place. (*Id.* at p. 424.)

Vineyard Area Citizens discussed several opinions by the Courts of Appeal concerning the sufficiency of an EIR's analysis of water supply (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at pp. 428-430) and derived four principles from those opinions:

"First, CEQA's informational purposes are not satisfied by an EIR that simply ignores or assumes a solution to the problem of supplying water to a proposed land use project. Decision makers must, under the law, be presented with sufficient facts to 'evaluate the pros and cons of supplying the amount of water that the [project] will need.' (*Santiago County Water Dist. v. County of Orange* [(1981)] 118 Cal.App.3d [818,] 829.)

"Second, an adequate environmental impact analysis for a large project, to be built and occupied over a number of years, cannot be limited to the water supply for the first stage or the first few years. While proper tiering of environmental review allows an agency to defer analysis of certain details of later phases of long-term linked or complex projects until those phases are up for approval, CEQA's demand for meaningful information 'is not satisfied by simply stating information will be provided

in the future.' (*Santa Clarita* [*Organization for Planning the Environment v. County of Los Angeles* (2003)] 106 Cal.App.4th [715,] 723.) . . . .

"Third, the future water supplies identified and analyzed must bear a likelihood of actually proving available; speculative sources and unrealistic allocations ('paper water') are insufficient bases for decisionmaking under CEQA. (*Santa Clarita*, *supra*, 106 Cal.App.4th at pp. 720-723.) An EIR for a land use project must address the impacts of *likely* future water sources, and the EIR's discussion must include a reasoned analysis of the circumstances affecting the likelihood of the water's availability. (*California Oak* [*Foundation v. City of Santa Clarita* (2005)] 133 Cal.App.4th [1219,] 1244.)

"Finally, where, despite a full discussion, it is impossible to confidently determine that anticipated future water sources will be available, CEQA requires some discussion of possible replacement sources or alternatives to use of the anticipated water, and of the environmental consequences of those contingencies. (*Napa Citizens*, *supra*, 91 Cal.App.4th at p. 373.)" (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at pp. 430-432.)

Vineyard Area Citizens stated further: "[W]e emphasize that the burden of identifying likely water sources for a project varies with the stage of project approval involved; the necessary degree of confidence involved for approval of a conceptual plan is much lower than for issuance of building permits. The ultimate question under CEQA, moreover, is not whether an EIR establishes a likely source of water, but

whether it adequately addresses the reasonably foreseeable *impacts* of supplying water to the project." (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 434.)

Vineyard Area Citizens concluded that the analysis of near-term groundwater supplies in the EIR was adequate. It stated that the county's conclusion that certain groundwater supplies would be available to the project in the near term was supported by substantial evidence, and rejected the petitioners' argument that competing uses were likely to exhaust those water supplies. (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at pp. 436-437.)[4] It stated further that the county did not fail to proceed in the manner required by law in that the EIR neither improperly deferred analysis of water supplies to future stages of the project nor relied on illusory water supplies. (*Id.* at p. 437.)

Vineyard Area Citizens concluded that the analysis of long-term water supplies in the EIR was inadequate. It stated that the county's conclusion that surface water supplies would satisfy the project's long-term demands was not supported by substantial evidence because the EIR failed to explain inconsistencies in the figures provided on total demand and supply, failed to identify the intended and likely long-term water sources, relied on "vague and unquantified" water supplies (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 440), and failed to identify competing uses. (*Id.* at pp. 439-442.)[5]

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[4] "While much uncertainty remains, then, the record contains substantial evidence demonstrating a reasonable likelihood that a water source the provider plans to use . . . will indeed be available at least in substantial part to supply the Sunrise Douglas project's near-term needs." (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 437.)

[5] "Factual inconsistencies and lack of clarity in the FEIR leave the reader—and the decision makers—without substantial evidence for concluding that sufficient water is, in

It stated further that the county failed to proceed in the manner required by law by deferring environmental review of the conjunctive use program to a future EIR (*id.* at pp. 440-441), failing to properly incorporate information or tier from a prior EIR regarding surface water supplies on which the project relied (*id.* at pp. 442-443), failing to include enforceable mitigation measures for those surface water diversions (*id.* at p. 444), and by relying on a provision precluding further development in lieu of identifying and analyzing the project's intended and likely water sources (*ibid.*) *Vineyard Area Citizens* stated that there was "no plainly stated, coherent analysis of how the supply is to meet the demand." (*Id.* at p. 445.)

b. *Background of the State Water Project*

The State Water Project is a water storage and delivery system operated by the Department of Water Resources. It includes reservoirs, dams, power plants, pumping plants, canals, aqueducts, and other facilities. (See *Planning & Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 898-899 (*PCL*).) California voters approved a bond measure in 1960 to fund its construction. (Stats. 1961, p. cxliii; Wat. Code, § 12930 et seq.) Although the system was designed to deliver 4.23 million acre-feet of water annually, for many years it delivered significantly less than that amount. (See *California Oak Foundation v. City of Santa Clarita* (2005) 133 Cal.App.4th 1219, 1227-1228 (*California Oak*); *PCL*, *supra*, at pp. 898-899.)

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fact, likely to be available for the Sunrise Douglas project at full build-out." (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 439.)

The Department of Water Resources is a party to 29 long-term contracts with local water agencies. Under the original contracts, each agency had the right to receive a proportionate share of the 4.23 million acre-feet of water per year that was projected to be supplied by the State Water Project. (See *PCL*, *supra*, 83 Cal.App.4th at p. 899; Wat. Code, § 12937, subd. (b).) The agencies were required to pay for their contractual entitlements of water regardless of whether they actually received the water. (See *PCL*, *supra*, 83 Cal.App.4th at p. 899.) Article 18(a) of the water supply contracts provided that in times of temporary shortage, the agricultural water agencies would receive a reduced allocation. Article 18(b) provided that in times of permanent water shortage, the allocations of all contracting agencies would be reduced proportionately. (See *id.* at pp. 899-900.)

After several years of drought in the late 1980's and early 1990's resulting in disputes between agricultural and urban water agencies, several contracting agencies and the Department of Water Resources entered into an agreement known as the Monterey Agreement. (See *PCL*, *supra*, 83 Cal.App.4th at pp. 897, 901.) The Monterey Agreement is a statement of 14 principles designed to govern revisions to the water supply contracts. It calls for the elimination of the provision requiring agricultural agencies to absorb the first deficiency and provides that in times of shortage, deliveries to all contracting agencies will be reduced in proportion to their entitlements. (See *Friends of the Santa Clara River v. Castaic Lake Water Agency* (2002) 95 Cal.App.4th 1373, 1376 (*Friends*).) The Monterey Agreement also provides for the agricultural agencies to permanently transfer to the urban agencies 130,000

acre-feet of annual water entitlements. (See *id.* at pp. 1376-1377; *PCL*, *supra*, 83 Cal.App.4th at pp. 901-902.) The Monterey Agreement provides for its implementation through amendments to the long-term water supply contracts. (See *PCL*, *supra*, at p. 902.) Table A of those contracts states the amount of each agency's annual water allocation from the State Water Project. The amendments pursuant to the Monterey Agreement are known as the Monterey Amendments.

Pursuant to the Monterey Agreement, the Castaic Lake Water Agency entered into an agreement with the Kern County Water Agency in 1999 for the permanent transfer of 41,000 acre-feet of annual State Water Project water entitlement from the Kern County Water Agency to the Castaic Lake Water Agency (Kern-Castaic transfer). The Department of Water Resources approved the transfer in March 1999, and the long-terms water supply contracts between the two water agencies and the Department of Water Resources were amended accordingly.

The Central Coast Water Agency as lead agency prepared a program EIR for the Monterey Agreement and certified the EIR in October 1995.[6] The Department of Water Resources as a responsible agency also made findings and adopted the EIR. (*PCL*, *supra*, 83 Cal.App.4th at p. 902.) The Sacramento County Superior Court denied a petition for writ of mandate challenging the EIR. In September 2000, the Court of

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[6] A program EIR may be prepared for a series of related actions that can be characterized as one large project. (Guidelines, § 15168, subd. (a).) Subsequent program activities that would cause environmental impacts not analyzed in the program EIR require additional environmental review. (*Id.*, subd. (c).)

Appeal in *PCL* reversed the judgment by the trial court with directions to grant the petition. (*Id*. at pp. 903, 926.) *PCL* held that the Department of Water Resources rather than the Central Coast Water Agency was the proper lead agency, and that the EIR failed to provide a sufficient analysis of the no project alternative. (*Id.* at pp. 907, 916.) *PCL* directed the trial court to vacate the certification of the EIR and make any other order appropriate under Public Resources Code section 21168.9, subdivision (a), but did not direct the court to vacate the project approval, and declined to stay the implementation of the Monterey Agreement. (*PCL*, *supra*, at p. 926 & fn. 16.)

The Castaic Lake Water Agency as lead agency prepared an EIR for the Kern-Castaic transfer in March 1999. It was a project EIR that tiered from three other EIR's, including the Monterey Agreement program EIR.[7] (*Friends*, *supra*, 95 Cal.App.4th at pp. 1379-1380.) The Los Angeles County Superior Court denied a petition for writ of mandate challenging the Castaic Lake Water Agency's EIR. (*Id.* at p. 1381.) The appellate opinion invalidating the Monterey Agreement EIR (*PCL*, *supra*, 83 Cal.App.4th 892) was filed while the appeal in *Friends* was pending. (*Friends*, *supra*, at p. 1382.) In January 2002, the Court of Appeal in *Friends* reversed the

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[7] A project EIR "examines the environmental impacts of a specific development project." (Guidelines, § 15161.) " 'Tiering' or 'tier' means the coverage of general matters and environmental effects in an environmental impact report prepared for a policy, plan, program or ordinance followed by narrower or site-specific environmental impact reports which incorporate by reference the discussion in any prior environmental impact report and which concentrate on the environmental effects which (a) are capable of being mitigated, or (b) were not analyzed as significant effects on the environment in the prior environmental impact report." (Pub. Resources Code, § 21068.5.)

judgment by the trial court with directions to grant the petition. (*Id.* at p. 1388.) *Friends* concluded that the Castaic Lake Water Agency's EIR relied on the analysis of environmental impacts in the Monterey Agreement EIR and that the decertification of the Monterey Agreement EIR precluded reliance on that analysis. (*Id.* at pp. 1384-1387.) *Friends* directed the trial court to vacate the certification of the EIR and make any other order appropriate under Public Resources Code section 21168.9, but did not direct the court to vacate the project approval, and stated that the trial court should determine whether to enjoin the project. (*Friends*, *supra*, at p. 1388.) The trial court entered a judgment on remand in October 2002 vacating the certification of the EIR but not the project approval. The trial court declined the petitioners' request to enjoin the use of water received pursuant to the transfer. The Court of Appeal in an unpublished opinion affirmed the judgment, rejecting the petitioners' challenge to the denial of an injunction (*Friends of the Santa Clara River v. Castaic Lake Water Agency* (Dec. 1, 2003, B164027)).

The parties to the proceeding involving a challenge to the Monterey Agreement EIR (*PCL*, *supra*, 83 Cal.App.4th 892) entered into a settlement agreement in May 2003 specifying certain subjects to be discussed in a new Monterey Agreement EIR to be prepared by the Department of Water Resources. Those subjects included the environmental impacts relating to the transfers of water rights effected pursuant to the Monterey Agreement. The settlement agreement included an Attachment E listing certain transfers other than the Kern-Castaic transfer. The settlement agreement separately identified the Kern-Castaic transfer, and stated that the new Monterey

Agreement EIR would include an analysis of the impacts of both the Attachment E transfers and the Kern-Castaic transfer.

The settlement agreement stated with respect to the Attachment E transfers: "[N]otwithstanding the analysis of the potential impacts of the Attachment E Transfers in the New EIR and without specifically endorsing or opposing those transfers or any prior environmental assessments of them, the Parties recognize that such water transfers are final. Each of the Parties agrees not to, and it shall be a condition to the initial and continuing effectiveness of this Settlement Agreement that Plaintiffs do not, hereafter challenge the effectiveness or validity of such water transfers." It stated with respect to the Kern-Castaic transfer: "[R]egarding the Kern-Castaic Transfer, the Parties recognize that such water transfer is subject to pending litigation in the Los Angeles County Superior Court following remand from the Second District Court of Appeal (*See* Friends of the Santa Clara River v. Castaic Lake Water Agency, 95 Cal.App.4th 1373, 116 Cal.Rptr.2d 54 (2002); *review denied* April 17, 2002). The Parties agree that jurisdiction with respect to that litigation should remain in that court and that nothing in this Settlement Agreement is intended to predispose the remedies or other actions that may occur in that pending litigation."

The settlement agreement included certain proposed amendments to the long-term water service contracts, known as the Attachment A amendments. The settlement agreement stated that the parties would request an order authorizing the operation of the State Water Project on an interim basis in accordance with the Monterey Agreement, the

Attachment A amendments, and other terms of the settlement. The trial court approved the settlement and issued the requested order.

The Castaic Lake Water Agency prepared a second EIR for the Kern-Castaic transfer and certified the EIR in December 2004. The Los Angeles County Superior Court granted a petition for writ of mandate challenging the second EIR for the Kern-Castaic transfer in May 2007 (*Planning and Conservation League v. Castaic Lake Water Agency* (Super. Ct. L.A. County No. BS098724)).[8] The court concluded that although the EIR analyzed the environmental impacts of the project assuming three different State Water Project water allocation scenarios, it failed to adequately explain how those scenarios could result from the pending environmental review of the Monterey Amendments and any challenge to the new Monterey Agreement EIR. The court rejected all other challenges to the EIR. The petitioners, the Castaic Lake Water Agency, and the Kern County Water Agency appealed the judgment. That appeal is currently pending in the Second District Court of Appeal (No. B200673).

c. *Petitioners' Specific Contention*

Petitioners contend the ongoing environmental review of the Monterey Agreement and the possibility that the Department of Water Resources ultimately will exercise its discretion to disapprove or modify the Kern-Castaic transfer render the

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[8] We granted a joint request by the city and Newhall to judicially notice the judgment filed on May 22, 2007, and the statement of decision filed on April 2, 2007, in *Planning and Conservation League v. Castaic Lake Water Agency*, *supra*, No. BS098724.

transfer uncertain. They argue that the EIR fails to acknowledge that uncertainty. Petitioners cite a statement by the department in *Planning and Conservation League v. Castaic Lake Water Agency*, *supra*, No. BS098724, that, "[T]he contract amendments that effectuated the transfers under the Monterey Amendment do not preclude DWR in its choice of alternatives in the Monterey Amendment EIR or mitigation measures that may need to be imposed to reduce significant impacts to less than significant. Any contractual agreement to transfer SWP water from one contractor to another is always subject to possible changes or curtailments."[9]

d. *Draft EIR, Response to Comments, and the City's Findings*

The draft EIR here stated that the Castaic Lake Water Agency serves the proposed project area and relies on imported water from the State Water Project. It described the State Water Project and the Monterey Agreement. It stated that the agency's total annual water allocation from the State Water Project is 95,200 acre-feet and that the Kern-Castaic transfer represents 41,000 acre-feet of that amount. It explained that the amounts requested by the contracting agencies from the State Water Project and the amounts actually delivered to the agencies by the State Water Project vary from year to year and can be less than the maximum amounts allocated. It projected that 59.7 percent of the State Water Project water allocation would be available to the city in average years, and that 20 to 39.8 percent would be available in

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[9] We granted Petitioners' request for judicial notice of the Department of Water Resource's opposition brief filed on December 6, 2006, in *Planning and Conservation League v. Castaic Lake Water Agency*, *supra*, No. BS098724.

dry years. It stated that water transfer agreements made pursuant to the Monterey Agreement "are effective upon execution . . . and, therefore, are considered permanent water reallocations of SWP Table A water."

The draft EIR stated that the agency had completed an EIR for the Kern-Castaic transfer, that the trial court had rejected the petitioners' challenges to the EIR, and that the Court of Appeal had reversed the judgment on the sole ground that the EIR tiered from another EIR (the Monterey Agreement EIR) that had been decertified. It stated that neither the Court of Appeal nor the trial court had ordered the agency to vacate its approval of the transfer agreement pending completion of a new EIR, and that the trial court on remand had allowed the agency to continue to operate under the agreement. It stated that the agency was in the process of preparing a new EIR for the transfer.

The draft EIR stated further that the Court of Appeal had ordered the decertification of the Monterey Agreement EIR on the grounds that the Department of Water Resources should have been the lead agency and that the analysis of the no project alternative was inadequate. It stated that the Court of Appeal had directed the trial court to order the preparation of a new EIR and that neither the Court of Appeal nor the trial court had stayed the implementation of the Monterey Agreement.

The draft EIR stated that the Kern-Castaic transfer could have taken place even without the Monterey Agreement, "under existing SWP water supply contract provisions, subject to appropriate environmental review." It stated that the Kern-Castaic transfer "has been completed, CLWA has paid approximately $47 million for the additional Table A Amount, the monies have been delivered, . . . and DWR has

increased CLWA's SWP maximum Table A Amount to 95,200 AFY because it was a permanent transfer/reallocation of SWP Table A entitlement between SWP contractors." It stated further, "an adverse outcome in the Monterey Agreement litigation is not likely to adversely affect CLWA's water supplies over the long term because CLWA believes that such a result is unlikely to 'unwind' executed and completed agreements with respect to the permanent transfer of SWP Water Amounts."

Thus, the draft EIR characterized the Kern-Castaic transfer as "permanent" and downplayed the likelihood that the "permanent transfer" could be affected by the Monterey Agreement litigation. The draft EIR did not acknowledge the possibility that the environmental review of the Monterey Agreement by the Department of Water Resources could result in the modification of the Kern-Castaic transfer and a reduced allocation to the Castaic Lake Water Agency.

The draft EIR estimated the amounts of groundwater and imported water supplies that would be available in the project area. The estimate of imported water supplies was based on different percentages of the total Table A amount for average years and dry years. The draft EIR also estimated the demand for water and concluded that the supplies would be sufficient to meet the demand.

Several comments to the draft EIR objected to its reliance on the Kern-Castaic transfer and stated that the transfer was uncertain due to pending litigation and the absence of a certified EIR for either the transfer or the Monterey Agreement. The city in a "topical response" to the comments reiterated the discussion in the EIR of the reasons that it considered the transfer reliable "despite potential uncertainty arising from

litigation." The topical response stated, "Because the 41,000 AFY was a permanent water transfer, because DWR includes the 41,000 AFY in calculating CLWA's share of SWP Table A Amount, and because the courts have not prohibited CLWA from using or relying on those additional SWP supplies, the City has determined that it remains appropriate for the Riverpark project to include those water supplies in its water supply and demand analysis, while acknowledging and disclosing the potential uncertainty created by litigation." It stated further that the ongoing environmental review by the Department of Water Resources of the Monterey Agreement, including the Kern-Castaic transfer, did not preclude the city's reliance upon the transfer in these circumstances.

The city's findings under CEQA stated that the project would have no significant impacts on water supply and that no mitigation was required.

e. *The EIR Adequately Analyzed the Uncertainty of the Kern-Castaic Transfer*

We repeat with emphasis, "An EIR for a land use project must address the impacts of likely future water sources, and the EIR's discussion must include a reasoned analysis of the circumstances affecting the likelihood of the water's availability. (*California Oak*, *supra*, 133 Cal.App.4th at p. 1244.)" (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 432.) The sufficiency of an analysis in an EIR is measured by reference to a practical standard that demands neither technical perfection nor full disclosure of all information available on a subject. (*Berkeley Keep Jets Over the Bay Com. v. Board of Port Cmrs.* (2001) 91 Cal.App.4th 1344, 1355; *Al Larson Boat Shop, Inc. v. Board of*

Harbor Commissioners (1993) 18 Cal.App.4th 729, 748.) "The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure." (Guidelines, § 15151.) " 'To facilitate CEQA's informational role, the EIR must contain facts and analysis, not just the agency's bare conclusions or opinions.' [Citations.] An EIR must include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." (*Laurel Heights I*, *supra*, 47 Cal.3d at pp. 404-405.) The role of a reviewing court is not to determine whether the EIR's conclusions are correct, but only whether they are supported by substantial evidence and sufficient analysis to serve the EIR's informational purposes. (*Id.* at p. 407.)

The absence of relevant information from an EIR does not necessarily constitute a prejudicial abuse of discretion. Rather, a prejudicial abuse of discretion occurs only if the absence of relevant information precludes informed decisionmaking and informed public participation and thereby thwarts the statutory goals of the EIR process. (*Berkeley Keep Jets Over the Bay Com. v. Board of Port Cmrs.*, *supra*, 91 Cal.App.4th at p. 1355.)

The draft EIR and the final EIR, including the responses to comments, explained at length and in detail the reasons for the city's conclusion that water provided by the State Water Project pursuant to the Kern-Castaic transfer would continue to be available to serve the area of the proposed project. The analysis provided was incomplete because it failed to acknowledge the possibility that the environmental review of the Monterey Agreement by the Department of Water Resources could result in the

modification of the transfer and a reduced allocation to the Castaic Lake Water Agency. In our view, the analysis nonetheless was "a reasoned analysis" (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 432) that was adequate in these circumstances. This is true particularly in light of the indications that the Department of Water Resources, Castaic Lake Water Agency, and Kern County Water Agency did not wish to disturb the transfer and the fact that the trial courts and Courts of Appeal in the litigation directly involving the Monterey Agreement and the Kern-Castaic transfer never vacated the approval of either of those projects or enjoined the flow of water. These circumstances do not compel the conclusion that the transfer will be "permanent," but they support our conclusion that the failure to acknowledge the uncertainty of the transfer arising from the department's ongoing environmental review of the Monterey Agreement was not so momentous as to render the analysis provided in the EIR inadequate for its informational purposes.

The water supply analysis here did not rely on inconsistent figures or "vague and unquantified" water supplies (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 440), or fail to provide a complete and coherent analysis of water supply and demand as did the analysis of long-term water supply in *Vineyard Area Citizens*. Moreover, the city did not fail to comply with procedures required by law by, for example, deferring environmental review to a future EIR (*id.* at pp. 440-441), relying on a prior EIR without proper incorporation or tiering (*id.* at pp. 442-443), or relying on a provision precluding further development in lieu of identifying and analyzing the project's intended and likely water sources (*id.* at p. 444).

California Oak, *supra*, 133 Cal.App.4th 1219 is distinguishable. *California Oak* involved a proposed industrial/business park in Santa Clarita. (*Id.* at p. 1224.) The city certified an EIR and approved the project in June 2003. (*Id.* at p. 1225.) The primary dispute on appeal concerned the same 41,000 acre-feet of State Water Project water allocation at issue here. The text of the EIR failed to mention the January 2002 invalidation of the Castaic Lake Water Agency's EIR for the Kern-Castaic transfer and offered no explanation for the city's continued reliance on the transfer (*id.* at p. 1236), and apparently also failed to mention the invalidation of the Monterey Agreement EIR. The city's response to comments was "completely devoid of any direct discussion of the 41,000 AFY" (*id.* at p. 1237) and only referred obliquely to litigation "challenge[s]" (*id.* at pp. 1232-1233). The only mention of the invalidation of the Castaic Lake Water Agency's EIR was in an appendix to the final EIR. (*Id.* at p. 1239.) *California Oak* stated that the issue should be discussed, or at least referenced, in the text of the EIR and that the brief mention of the invalidation in the appendix with no meaningful and forthright discussion was insufficient in any event.[10] (*Ibid.*) Absent a reasoned analysis in the EIR of the uncertainty created by the invalidation of the EIR for the Kern-Castaic transfer, *California Oak* concluded that there was no substantial evidence to support the

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[10] *Vineyard Area Citizens* later endorsed this view, stating, " '[I]nformation "scattered here and there in EIR appendices," or a report "buried in an appendix," is not a substitute for "a good faith reasoned analysis . . . ." ' (*California Oak*, *supra*, 133 Cal.App.4th at p. 1239, quoting *Santa Clarita*, *supra*, 106 Cal.App.4th at pp. 722-723." (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 442.)

conclusion that the water supplies for the project were sufficient. (*Id.* at pp. 1226, 1240.)

Here, in contrast to *California Oak*, *supra*, 133 Cal.App.4th 1219, the EIR contains a reasoned analysis of the circumstances affecting the availability of the 41,000 acre-feet of water allocation. The analysis is supported by facts and discloses pertinent facts, including the invalidation of both the Castaic Lake Water Agency's EIR for the Kern-Castaic transfer and the Department of Water Resource's EIR for the Monterey Agreement. The city's EIR neither relegates that discussion to an appendix to the final EIR nor assumes without analysis that the 41,000 acre-feet of water allocation will be available. In light of that discussion, the EIR's failure to acknowledge the particular uncertainty arising from the Department's ongoing environmental review of the Monterey Agreement stands in stark contrast to the complete failure to offer any reasoned analysis of the circumstances affecting the availability of the transferred water in *California Oak*.

Petitioners also argue that the EIR for the Kern-Castaic transfer should tier from the Monterey Agreement EIR and that absent a proper EIR for the transfer, the present EIR cannot rely on the transfer. The question whether the EIR for the Kern-Castaic transfer complies with CEQA is beyond the scope of this appeal. The EIR for the Kern-Castaic transfer is the subject of a separate mandamus proceeding and a separate appeal (No. B200673). Absent a judgment determining that the EIR for the Kern-Castaic transfer fails to comply with CEQA in the manner asserted, we will not determine in this appeal the merits of a separate proceeding.

Petitioners argue further that due to the uncertainty of the Kern-Castaic transfer, the EIR here was required to discuss alternative sources of water and the environmental impact of supplying water from those alternative sources. *Vineyard Area Citizens* stated, "[W]here, despite a full discussion, it is impossible to confidently determine that anticipated future water sources will be available, CEQA requires some discussion of possible replacement sources or alternatives to use of the anticipated water, and of the environmental consequences of those contingencies. (*Napa Citizens*, *supra*, 91 Cal.App.4th at p. 373.)" (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 432.) "If the uncertainties inherent in long-term land use and water planning make it impossible to confidently identify the future water sources, an EIR may satisfy CEQA if it acknowledges the degree of uncertainty involved, discusses the reasonably foreseeable alternatives—including alternative water sources and the option of curtailing the development if sufficient water is not available for later phases—and discloses the significant foreseeable environmental effects of each alternative, as well as mitigation measures to minimize each adverse impact. ([Pub. Resources Code,] § 21100, subd. (b).)" (*Id.* at p. 434.)

Napa Citizens, *supra*, 91 Cal.App.4th 342, involved a subsequent EIR for an updated specific plan providing for the industrial development of a formerly agricultural area. (*Id.* at pp. 352-353.) The EIR stated that the City of American Canyon supplied water to the project area and would continue to do so in the future. The EIR acknowledged that American Canyon's current water supply would be inadequate in the longer term, but stated that American Canyon was in the process of reaching an

agreement with another municipality that would provide additional water. The EIR assumed that an agreement would be reached and therefore concluded that the project would have no significant impact on long-term water supply. (*Id.* at p. 372.) *Napa Citizens* concluded that the EIR could not rely on the uncertain water supplies without identifying alternative water sources and analyzing the environmental impacts of supplying water from those sources. *Napa Citizens* stated: "Because of the uncertainty surrounding the anticipated sources for water . . . , the FSEIR also cannot simply label the possibility that they will not materialize as 'speculative,' and decline to address it. The County should be informed if other sources exist, and be informed, in at least general terms, of the environmental consequences of tapping such resources. Without either such information or a guarantee that the resources now identified in the FSEIR will be available, the County simply cannot make a meaningful assessment of the potentially significant environmental impacts of the Project. [Citation.]" (*Id.* at pp. 373-374.)

We conclude that whether an EIR can "confidently determine that anticipated future water sources will be available" (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 432; see also *id.* at p. 434) is a question of fact. If the EIR confidently concludes that future water supplies will be sufficient to serve the project, and if that conclusion is supported by reasoned analysis and facts stated in the EIR, the EIR satisfies its informational purposes and a reviewing court must defer to the EIR's conclusion. (See *Laurel Heights*, *supra*, 47 Cal.3d at pp. 404-405, 407.) In those circumstances, the EIR need not evaluate alternative water sources and the environmental impacts of supplying

water from those sources. On the other hand, if the EIR reveals a substantial degree of uncertainty as to the availability of future water supplies, as in *Napa Citizens*, *supra*, 91 Cal.App.4th 342, the EIR must discuss alternative sources of water or alternatives to use of the water and the environmental impacts of those contingencies. (*Vineyard Area Citizens*, *supra*, 40 Cal.4th at p. 432 ["[W]here, despite a full discussion, it is impossible to confidently determine that anticipated future water sources will be available, CEQA requires some discussion of possible replacement sources or alternatives to use of the anticipated water, and of the environmental consequences of those contingencies"].)

After explaining in detail the circumstances affecting the availability of the imported water, the EIR here confidently concluded that water provided by the State Water Project pursuant to the Kern-Castaic transfer would continue to be available to serve the proposed project area despite the pending Monterey Agreement environmental review and litigation challenges. The EIR did not reveal a substantial degree of uncertainty as to the continued availability of the transferred water, unlike the situation in *Napa Citizens*, *supra*, 91 Cal.App.4th 342, where no agreement had been reached to secure the water transfer and no deliveries had occurred. We conclude that the facts stated in the EIR, including the executed agreements effecting the transfer, the implementation of those agreements and delivery of water for several years, and the absence of any court order vacating the approval of the transfer or the Monterey Agreement or staying the implementation of those agreements, constitute substantial evidence supporting the EIR's conclusion. Accordingly, we conclude that the EIR need

not identify alternative water sources or other alternatives to use of the anticipated water.

4. *Holly-Leaf Cherry*

Petitioners contend the EIR applied an incorrect legal standard in determining that the impacts on the holly-leaf cherry would be insignificant. They argue that in evaluating the impact of the proposed elimination of 3.6 acres of the species on the project site, the EIR failed to apply the Guidelines definition of "rare" (Guidelines, § 15380, subd. (b)(2)). We conclude that they have not shown a prejudicial abuse of discretion.

a. *CEQA Requirements*

A project will have a significant effect on the environment if it will cause "a substantial, or potentially substantial, adverse change in the environment." (Pub. Resources Code, § 21068; see also Guidelines, § 15382.) The "environment" means the existing physical conditions in the area of the proposed project, including flora, fauna, and other conditions. (Pub. Resources Code, § 21060.5; Guidelines, § 15360.) "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting." (Guidelines, § 15064, subd. (b).)

An EIR must identify and analyze the significant environmental effects of a project. (Pub. Resources Code, § 21100, subd. (b)(1); Guidelines, § 15126.2.) An

EIR must identify mitigation measures for each significant effect and discuss alternatives to the project that would avoid or substantially lessen the significant effects, and the lead agency must make detailed findings on the infeasibility of any mitigation measures and alternatives rejected as infeasible. (Pub. Resources Code, §§ 21100, subd. (b)(3), (4), 21081, subd. (a)(3); Guidelines, §§ 15126.4, subd. (a)(1)(A), 15126.6, subd. (a), 15091, subd. (a)(3).) If an EIR determines that particular environmental impacts are insignificant, it must "contain a statement briefly indicating the reasons for determining that various effects on the environment of a project are not significant and consequently have not been discussed in detail in the environmental impact report." (Pub. Resources Code, § 21100, subd. (c); see also Guidelines, § 15128.)

Guidelines section 15065 describes certain impacts that necessarily are significant and therefore require the preparation of an EIR and must be analyzed in an EIR. (*Id.* subds. (a), (c).) These are known as mandatory findings of significance. A project necessarily will have a significant effect on the environment if it will "substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or *restrict the range of an endangered, rare or threatened species*; or eliminate important examples of the major periods of California history or prehistory." (Guidelines, § 15065, subd. (a)(1), italics added; see *Mountain Lion*, *supra*, 16 Cal.4th at p. 124 [equating "range" with "habitat"]; *Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777, 792 (*Endangered Habitats*).)

Guidelines section 15065 describes impacts that must be considered significant, but "an impact need not satisfy the requirements of a mandatory finding of significance to be considered a significant impact." (*Mejia v. City of Los Angeles* (2005) 130 Cal.App.4th 322, 338, fn. 9.)

A species is "rare" under the Guidelines if "[a]lthough not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or [¶] [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the Federal Endangered Species Act."[11] (*Id.*, § 15380, subd. (b)(2).) A species also is "presumed to be endangered, rare or threatened, as it is listed in" federal regulations under the Federal Endangered Species Act and California regulations under the Fish and Game Code. (Guidelines, § 15380, subd. (c).) "A species not included in any listing identified in subdivision (c) shall nevertheless be considered to be endangered, rare or threatened, if the species can be shown to meet the criteria in subdivision (b)." (*Id.*, subd. (d).)

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[11] A species is "endangered" under the Guidelines if "its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors." (Guidelines, § 15380, subd. (b)(1).)

b. *Draft EIR, Response to Comments, and the City's Findings*

A rare plant survey conducted in the spring of 2003 and attached as an appendix to the draft EIR described "a unique stand of holly-leaf cherry scrub" on the project site. The survey stated, "The stand is dominated by relatively large, mature shrubs of holly-leaf cherry (*Prunus ilicifolia* ssp. *ilicifolia*), 3 to 5 m in height." It stated that although "mainland cherry forest" is ranked "very threatened" by the California Natural Diversity Database, "[t]he canopy cover of the holly-leaf cherry shrubs at this site did not amount to a forest canopy. Holly-leaf cherry scrub, as identified in this survey, is not defined in Holland (1986), and therefore, it has no assigned ranking. However, it should be recognized as a unique and sensitive community at the site."

The draft EIR described the holly-leaf cherry on the project site and stated that the project would result in the direct and permanent loss of 3.6 acres of holly-leaf cherry, which it quantified as approximately 67.9 percent of the holly-leaf cherry on the site. It stated further, "Because holly-leaf cherry scrub on the project site is not known to support special-status plant or wildlife species, and because this plant community is not considered to be sensitive by resource agencies, the loss of 3.6 acres of this habitat type is not considered a significant impact." The draft EIR defined "special-status plant or wildlife species" as "those species considered Rare, Threatened, Endangered, or otherwise sensitive by various state and federal resource agencies," and identified several published listings used as references.

The Department of Fish and Game stated in a comment letter: "The Department considers holly-leafed cherry woodland a declining vegetative community the loss of

which would be considered a significant adverse impact to wildlife habitat. This vegetative community is being systematically eliminated and/or degraded within the Santa Clara River watershed by development. . . . All holly-leafed cherry habitat should be avoided by project alternatives." The comment stated further that even temporary impacts to the plant community involving removal and replanting "will still result in an unacceptable impact to this resource."

The city responded: "The holly-leaf cherry habitat on-site is considered scrub habitat because the canopy cover of this habitat did not amount to a woodland canopy. According to the CDFG's [California Department of Fish and Game] List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Data Base (September 2003 Edition), holly-leaf cherry scrub is not considered a special-status plant community. As stated in Revised Riverpark Draft EIR Section 4.6, Biological Resources, p. 4.6-65, because of the relatively small amount of habitat (3.6 acres) to be lost and because this stand of trees was not considered a sensitive plant community as identified by CDFG, the loss of the 3.6 acres was not considered a significant impact under CEQA."

The city's findings under CEQA stated that the impacts of the proposed project on the holly-leaf cherry would be less than significant.

c. *The EIR Adequately Analyzed the Impacts on the Holly-Leaf Cherry*

The draft EIR described the holly-leaf cherry on the project site and explained the impact of the project on the species. It stated that holly-leaf cherry scrub was not

a designated special status species and was not considered to be sensitive by the resource agencies, and that the loss of 3.6 acres of the species was not a significant impact. The response to the comment explained that the holly-leaf cherry on the project site was in scrub habitat rather than woodland, and therefore was different from the holly-leaf cherry woodland noted by the Department of Fish and Game to be in decline. We conclude that the information provided in the EIR supports the conclusion that the holly-leaf cherry on the project site is not "rare" as defined in Guidelines section 15380(b)(2) because it is not existing in such small numbers that it may become endangered, and that it does not otherwise satisfy the Guidelines definition. The EIR provided information and analysis sufficient to serve the EIR's informational purposes, and Petitioners have shown no abuse of discretion.

5. *San Diego Black-tailed Jackrabbit*

Petitioners contend the EIR failed to apply the correct legal standard to determine the significance of impacts on the San Diego black-tailed jackrabbit, and the evidence does not support the city's finding that the impact on the species will be less than significant. We conclude that they have not shown a prejudicial abuse of discretion.

a. *Draft EIR, Response to Comments, and the City's Findings*

The draft EIR stated that the San Diego black-tailed jackrabbit is designated by California as a species of special concern and is designated by the federal government as a species of concern. It stated that several San Diego black-tailed jackrabbits had been observed on the project site in areas that are subject to natural or manmade disturbances and that the species' habitat on site is considered to be of moderate quality.

It stated: "Where this species occurs within the region, it is common and found in relatively high numbers in some locations (e.g., coastal Orange County and the high desert of northern Los Angeles County). The habitat on the project site for this species is considered of moderate quality. Most individual jackrabbits are expected to disperse to remaining open space areas and the actual number of individual animals that would be lost due to grading and/or construction activities is expected to be low. Because this species is not state or federally listed as Endangered or Threatened, because it is considered relatively abundant in suitable habitat areas within its range, and because the direct loss of individual jackrabbits is expected to be low, it is expected that the regional population would not drop below a self-sustaining level with the implementation of this project. Therefore, the loss of any individual jackrabbits associated with the implementation of this project would not be considered a significant impact."
A biology report in the appendix stated that the species was "relatively common in the project area."

The draft EIR also described the Natural River Management Plan (NRMP), a long-term management plan for projects and activities potentially affecting the Santa Clara River and San Francisquito Creek. It stated that a certified combined EIR and federal environmental impact statement (EIS) for the NRMP had analyzed impacts associated with various proposed infrastructure improvements along the Santa Clara River, including bank stabilization, bridges, utility crossings, and storm drain outlets, and that the United States Army Corps of Engineers, Department of Fish and Game, and California Regional Water Quality Control Board had approved the NRMP. It also

stated that certain proposed infrastructure improvements on the project site (including two bridges, bank stabilization, and outlets) were governed by the NRMP and were subject to mitigation requirements imposed by the NRMP, including the capture of San Diego black-tailed jackrabbits and their relocation "to nearby undisturbed areas with suitable habitat," and the creation or enhancement of habitat for jackrabbits and other species. The draft EIR stated that those mitigation measures had been incorporated into the proposed project.

The draft EIR concluded that although the project impacts to the San Diego black-tailed jackrabbit would be insignificant, cumulative impacts to biological resources, apparently including the San Diego black-tailed jackrabbit, from the proposed project and related projects would be significant due to loss of habitat and increased human activities.

The Department of Fish and Game stated in a written comment: "The DEIR states that the San Diego black-tailed jackrabbit is common where it occurs in the region and abundant in coastal Orange County and the high deserts of Los Angeles County; that displaced individuals of this jackrabbit species will disperse to remaining open space; and that individuals lost i.e. killed by the project is expected to be low. This conclusion is difficult to draw since population estimates were not submitted with the DEIR.

"It is the Department's opinion that the project will result in a cumulative adverse impact to San Diego black-tailed jackrabbit, a California Species of Special Concern. This subspecies is localized within the coastal plains of southern California

including the Santa Clara River Valley. These areas have been and are continuing to be heavily developed and degraded. Jackrabbits do not adapt well to habitat losses and associated disturbances from human proximity. . . . The assumption that displaced jackrabbits will somehow survive by dispersing into remaining degraded open areas of uncertain protected status does not meet the mitigation requirements set forth and described under Section 15021 of CEQA. Insufficient mitigation measure for this subspecies will further assist its decline and may in the future cause more restrictive regulatory measures to protect this resource. The Department recommends a more detailed discussion in the EIR of the project related impacts to San Diego black-tailed jackrabbit with a tangible habitat avoidance and/or preservation element."

The city responded that because the habitat on site is "moderate in quality," "the Riverpark site is not considered to be occupied by a significant population of San Diego black-tailed jackrabbits." The response stated that NRMP mitigation measures had been incorporated into the proposed project with respect to infrastructure improvements governed by the NRMP. It stated that the EIR/EIS for the NRMP had analyzed in detail the impacts on the San Diego black-tailed jackrabbit and had concluded that certain NRMP mitigation measures "requiring capture and relocation of sensitive species including the San Diego black-tailed jackrabbit, and . . . replacement of habitat . . . reduced the impacts to less than significant." The response stated further that some of the infrastructure improvements in the proposed project were less extensive than those contemplated in the NRMP. The response also noted that the draft EIR had

concluded that cumulative impacts due to the loss of habitat were significant and unavoidable.

The city's findings under CEQA stated that the cumulative impacts on biological resources were unavoidable, and the city adopted a statement overriding considerations with respect to that cumulative impact.

b. *The EIR Adequately Analyzed the Impacts on the San Diego Black-tailed Jackrabbit*

The draft EIR explained its conclusion that the project's impacts on the San Diego black-tailed jackrabbit would be insignificant. It stated that the jackrabbit habitat on site was only moderate in quality, that the species is relatively common in other areas within the region, that most individuals of the species are expected disperse to other areas, and that the species is not designated endangered or threatened. The draft EIR also stated that mitigation measures from the NRMP had been incorporated into the project, including the capture and relocation of individual jackrabbits to suitable habitat nearby and the creation or enhancement of habitat for the species. The response to the comment explained further that the jackrabbit population on the site was low.

The statement that the species is relatively common in the region is supported by the statement in the biology report to that effect. The characterization of the habitat on site as only moderate in quality and the statement that individual jackrabbits are likely to disperse to other areas also are supported by substantial evidence, which "includes fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact" (Pub. Resources Code, § 21080, subd. (e)(1)).

We conclude further that the information provided in the EIR supports the conclusion that the San Diego black-tailed jackrabbit is not "rare" as defined in Guidelines section 15380(b)(2) because it is not existing in such small numbers that it may become endangered, and that it does not otherwise satisfy the Guidelines definition. The EIR provided information and analysis sufficient to serve the EIR's informational purposes, and Petitioners have shown no abuse of discretion.

Endangered Habitats, *supra*, 131 Cal.App.4th 777, is distinguishable. The EIR in *Endangered Habitats* stated that an environmental impact was considered significant only if it caused the population of a species to drop below a self-perpetuating level or caused the species to become threatened or endangered. (*Id.* at pp. 792-793.) *Endangered Habitats* concluded that that was an impermissibly lenient standard and that the county failed to proceed in the manner required by law. (*Id.* at p. 793.) Here, in contrast, the statement in the EIR, "it is expected that the regional population would not drop below a self-sustaining level with the implementation of this project" was not the sole reason provided for the conclusion that the project's impacts on the San Diego black-tailed jackrabbit would be insignificant. Rather, the EIR also explained that the impacts would be insignificant because the jackrabbit population on the site was low, the habitat on site was only moderate in quality, and because individual jackrabbits were likely to disperse to other areas.

6. *Western Spadefoot Toad*

Petitioners challenge the EIR's failure to discuss project revisions or alternatives that would reduce the significant impacts on the western spadefoot toad to an

insignificant level. They argue that the proposed mitigation of constructing ponds and relocating the toads is inadequate and the city was required to consider more effective feasible mitigation. We conclude that Petitioners have not shown an abuse of discretion.

a. *Draft EIR, Response to Comments, and the City's Findings*

The city circulated a revised biological resources section of the draft EIR in March 2004 after the discovery of western spadefoot toads on the project site. The western spadefoot toad is designated by California as a species of special concern and by the federal government as a species of concern. The draft EIR estimated that 16 to 20 pairs of breeding western spadefoot toads were present in three seasonal rainpools on the site, all of which were located in areas of proposed development. A biology report in the appendix described the three seasonal rainpools. The draft EIR stated that the potential loss of that population of toads and their eggs would be a significant impact.

The draft EIR recommended several mitigation measures described in the biology report, including the construction of ponds, of a design and location to be approved by the Department of Fish and Game, and the capture and relocation of western spadefoot toads and their eggs to the new ponds. The biology report stated that although very few attempts had been made to relocate western spadefoot toads, there was "a very good possibility of success." The draft EIR concluded nonetheless that the impacts would remain significant despite mitigation: "While mitigation measures can be implemented to create habitat and relocate individuals observed on the project site, these measures are not considered highly effective. It is expected that not all individual

toads would be captured and relocated and that the created habitat might not meet the specific requirements for this species, thus, not supporting the relocated individuals. The loss of those individuals that are not captured and relocated, and those that are not adaptable to the created habitat, would be considered a significant and unavoidable impact."

The Department of Fish and Game stated in a written comment: "The continual loss of western spadefoot habitat within the Santa Clarita Valley, and Southern California as a whole, concerns the Department. The seasonal pools and associated uplands and floodplains habitats associated with the species are often lost with project development. Mitigation measures for this species are often experimental, and not always successful. The recent discovery of western spadefoot on the project site, despite past negative survey results for this species suggests the potential undocumented loss of occupied habitat for this species in the Santa Clarita area. These potential undocumented losses increase the importance of the known populations on the project site. The preservation, avoidance and protection of all existing seasonal pools which support or could support western spadefoot should be accomplished on the project site." The department stated further that if habitat avoidance is not feasible, breeding pools should be created away from areas of human activity and at least 150 feet away from any road or recreational trail.

The city responded that the existing seasonal pools were in disturbed areas and cited a discussion in another EIR stating that the western spadefoot toad " 'is apparently capable of adapting to a variety of artificial habitats in which to breed.' " The response

stated that this "illustrates that the species adapts well to disturbed environments." It also stated: "[W]estern spadefoot toads have no federal or State protected status, but are classified only as California Species of Special Concern and as a federal Species of Concern, which indicates that the species warrants monitoring due to population decline. Therefore, the species is not entitled to legal protection and a project redesign to preserve existing habitat is not required." The Department of Fish and Game later approved a habitat enhancement and relocation plan for the western spadefoot toad on the site.

The city's findings under CEQA stated that the proposed project's impacts on the western spadefoot toad cannot feasibly be mitigated to a level of insignificance and therefore are considered unavoidable, and the city adopted a statement of overriding considerations with respect to those impacts.

b. *The Discussion of Measures to Mitigate the Impacts on the Western Spadefoot Was Adequate*

CEQA does not require the avoidance of all significant environmental impacts or ensure that an approved project will minimize environmental harm. Rather, an adequate EIR that complies with CEQA's procedural requirements and serves its purpose as an informational document, together with appropriate findings by the lead agency, can support an agency's decision to approve the project despite adverse environmental consequences.

An EIR must discuss mitigation measures designed to avoid or reduce each significant impact, but need not discuss project alternatives that would avoid each

significant impact. (*Big Rock Mesas Property Owners Assn. v. Board of Supervisors* (1977) 73 Cal.App.3d 218, 227; see 1 Kostka & Zischke, Practice Under the California Environmental Quality Act (Cont.Ed.Bar 2006) § 15.15, p. 745.) Rather, an EIR must discuss a reasonable range of alternatives to the proposed project as a whole. (*Big Rock Mesas*, *supra*, at p. 227.) The draft EIR discussed several project alternatives, including a no project alternative that would not disturb the existing seasonal rainpools. Petitioners do not challenge the reasonableness of the range of alternatives. We conclude that the discussion of measures to mitigate the significant impacts on the western spadefoot toad was sufficient to serve CEQA's informational purposes and therefore was adequate, that the EIR need not discuss either a project revision or alternative (other than the no project alternative) that would reduce the impacts to the species to an insignificant level, and that Petitioners have shown no abuse of discretion in this regard.

Petitioners challenge the statement in the city's response to comments that "the species is not entitled to legal protection and a project redesign to preserve existing habitat is not required." They argue that the city declined to consider any project revision or alternative to avoid significant impacts to the western spadefoot toad and therefore could not reasonably conclude that the significant impacts to the species are unavoidable. We construe the statement to mean not that the city believed that it had no obligation to avoid or reduce the significant impacts to the western spadefoot toad, if feasible, but that the city understood that it had the discretion to determine that the

benefits of the project outweighed the significant impacts to the species. Petitioners have not shown an abuse of discretion.

7. *Consistency with the General Plan*

Every county and city must adopt a "comprehensive, long-term general plan" for its physical development. (Gov. Code, § 65300.) A general plan must include "a statement of development policies and . . . objectives, principles, standards, and plan proposals." (*Id.*, § 65302.) A general plan embodies fundamental policy decisions (*Goleta Valley*, *supra*, 52 Cal.3d at p. 571) and serves as a "charter for future development" (*Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal.3d 531, 540). "The policies in a general plan typically reflect a range of competing interests. [Citation.]" (*Federation of Hillside & Canyon Assns. v. City of Los Angeles* (2004) 126 Cal.App.4th 1180, 1194.)

A subdivision must be consistent with applicable general and specific plans. (Gov. Code, §§ 66473.5, 66474.) A subdivision is consistent with an adopted plan only if "the proposed subdivision or land use is compatible with the objectives, policies, general land uses, and programs specified in such a plan." (*Id.*, § 66473.5.)

Consistency does not require full compliance with all general and specific plan policies. Rather, "[o]nce a general plan is in place, it is the province of elected city officials to examine the specifics of a proposed project to determine whether it would be 'in harmony' with the policies stated in the plan. [Citation.]" (*Sequoyah Hills Homeowners Assn. v. City of Oakland* (1993) 23 Cal.App.4th 704, 719 (*Sequoyah Hills*).) A local agency has unique competence to interpret the policies of its own

general plan and weigh competing interests in determining how to apply those policies. (*Save Our Peninsula Committee v. Monterey County Bd. of Supervisors*, *supra*, 87 Cal.App.4th at p. 142; *Sequoyah Hills*, *supra*, at p. 719.) "It is, emphatically, *not* the role of the courts to micromanage these development decisions." (*Sequoyah Hills*, *supra*, at p. 719.)

We review the city's finding that the subdivision is consistent with its general plan under the abuse of discretion standard. (Code Civ. Proc., § 1094.5, subd. (b); *Youngblood v. Board of Supervisors* (1978) 22 Cal.3d 644, 651, fn. 2; *Sequoyah Hills*, *supra*, 23 Cal.App.4th at p. 717.) To prevail on their contention that the project is inconsistent with the general plan, Petitioners must show that there is no substantial evidence to support the city's finding. (Code Civ. Proc., § 1094.5, subd. (b); *Sequoyah Hills*, *supra*, at p. 717.) In other words, Petitioners must show that no reasonable decision maker could conclude that the project is in harmony with the stated policies. (*No Oil, Inc. v. City of Los Angeles* (1987) 196 Cal.App.3d 223, 243.)

The Open Space and Conservation Element of the city's general plan states several goals and policies promoting the protection of natural features, significant ecological resources, and SEA's. The general plan goals cited by Petitioners include: "To preserve the special natural features which define the Santa Clarita planning area and give it its distinct form and identity," and, "To protect significant ecological resources and ecosystems, including, but not limited to, sensitive flora and fauna habitat areas." The general plan policies cited by Petitioners include: "Utilize major environmental features (significant landforms, significant ridgelines, significant

vegetation, ecologically significant areas, other natural resources) as open space within the planning area," "Identify and protect areas of significant ecological value, including, but not limited to, significant ecological habitats . . . and preserve and enhance existing Significant Ecological Areas (SEAs)," and "Preserve to the extent feasible natural riparian habitat and ensure that adequate setback is provided between riparian habitat and surrounding urbanization." Petitioners also cite a Land Use Element policy that "New development must be sensitive to the Significant Ecological Areas (SEAs) through utilization of creative site planning techniques to avoid and minimize disturbance of these and other sensitive areas."

The draft EIR discussed these general plan goals and policies. It stated that the proposed project would preserve the Santa Clara River and much of the significant vegetation on the site, restrict development on the steepest slopes on the site, and mitigate impacts on the portions of the SEA located on the project site, and concluded that the project was consistent with these goals and policies. The draft EIR also discussed numerous other general plan goals and policies and the project's consistency with them. The city in approving the project found that the project would preserve large areas of open space, including the river, and that the project was consistent with the general plan.

Petitioners' argument that the project is inconsistent with the cited general plan goals and policies is based on the presumption that any development incursion within the SEA necessarily would be inconsistent with those goals and policies. The argument largely disregards the city's considerable discretion to determine that the project, on

balance, is in harmony with those goals and policies, and merely expresses Petitioners' contrary point of view. Moreover, Petitioners focus only on particular goals and policies and do not attempt to show, and have not shown, that the project necessarily is inconsistent with the general plan as a whole. We conclude that they have not shown an abuse of discretion.

DISPOSITION

The judgment is affirmed. The city and Newhall are entitled to recover their costs on appeal.

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

CROSKEY, J.

WE CONCUR:

KLEIN, P. J.

KITCHING, J.

CM2MHill, "Effect of Urbanization on Aquifer Recharge in the Santa Clarita Valley" (February 22, 2004)

Effect of Urbanization on Aquifer Recharge in the Santa Clarita Valley

TO: Tom Worthington/Impact Sciences, Inc.

FROM: John Porcello/CH2M HILL

DATE: February 22, 2004

Introduction

In a groundwater basin, the effect of urbanization on recharge to underlying groundwater is dependent on land uses, water uses, vegetative cover, and geologic conditions. Groundwater recharge from undeveloped lands occurs from precipitation alone, whereas areas that are developed for agricultural or urban land uses receive both precipitation and irrigation of vegetative cover. In an urban area, groundwater recharge occurs directly beneath irrigated lands and in drainages whose bottoms are not paved or cemented. This memorandum discusses the general effects of urbanization on groundwater recharge and the specific effects in the Santa Clarita Valley.

Summary of Findings

In the Santa Clarita Valley, stormwater runoff finds its way to the Santa Clara River and its tributaries, whose channels are predominantly natural and consist of vegetation and coarse-grained sediments (rather than concrete). The stormwater that flows across paved lands in the Santa Clarita Valley is routed to stormwater detention basins and to the river channels, where the porous nature of the sands and gravels forming the streambeds allow for significant infiltration to occur to the underlying groundwater.

Increased urbanization in the Valley has resulted in the irrigation of previously undeveloped lands. The effect of irrigation is to maintain higher soil moisture levels during the summer than would exist if no irrigation were occurring. Consequently, a greater percentage of the fall/winter precipitation recharges groundwater beneath irrigated land parcels than beneath undeveloped land parcels. In addition, urbanization in the Santa Clarita Valley has occurred in part because of the importation of State Water Project (SWP) water, which began in 1980. SWP water use has increased steadily, reaching nearly 44,500 acre-feet (AF) in 2003. Two-thirds of this water is used outdoors, and a portion of this water eventually infiltrates to groundwater. The other one-third is used indoors and is subsequently routed to local water reclamation plants (WRPs) and then to the Santa Clara River (after treatment). A portion of this water flows downstream out of the basin, and a portion infiltrates to groundwater.

Records show that groundwater levels and the amount of groundwater in storage were similar in both the late 1990s and the early 1980s, despite a significant increase in the

urbanized area during these two decades. This long-term stability of groundwater levels is attributed in part to the significant volume of natural recharge that occurs in the streambeds, which do not contain paved, urban land areas. On a long-term historical basis, groundwater pumping volumes have not increased due to urbanization, compared with pumping volumes during the 1950s and 1960s when water was used primarily for agriculture. Also, the importation of SWP water is another process that contributes to recharge in the Valley. In summary, urbanization has been accompanied by long-term stability in pumping and groundwater levels, plus the addition of imported SWP water to the Valley, which together have not reduced recharge to groundwater, nor depleted the amount of groundwater that is in storage within the Valley.

Effect of Pavement on Recharge Beneath Specific Land Parcels

The amount of paved cover on the ground affects the degree to which rainfall and outdoor-applied urban water will be able to infiltrate to groundwater. In heavily industrialized areas with high percentages of paved cover, such as exist in portions of the Los Angeles Basin, less rainfall recharge will occur than if the land is in an undeveloped condition. Furthermore, if the bottoms of rivers and other drainages are paved, then the majority of stormwater generated during a rainfall event will be unable to infiltrate to groundwater. In contrast, the amount of recharge to groundwater will be greater in urbanized areas, such as the Santa Clarita Valley, that have natural soils in the bottoms of rivers and local drainages or that have lower percentages of paved cover on the developed areas lying outside the principal drainages. In these areas, the outdoor use of water for irrigation landscape vegetation or agricultural lands can notably increase the amount of groundwater recharge, particularly if the outdoor water is imported from outside the local groundwater basin. This is discussed further below.

Effect of Vegetative Cover and Water Use

From the 1930s through the 1960s, H.F. Blaney and other researchers at the U.S. Department of Agriculture performed numerous studies to measure the amount of infiltration to groundwater that occurs beneath undeveloped lands and irrigated farmlands, and the differences in recharge rates for different types of native vegetation and crops. In California, these studies included a 1933 study by Blaney in Ventura County, a 1963 study by Blaney and others in the Lompoc Uplands, studies by the U.S. Geological Survey and various consultants in the Montecito and Carpenteria groundwater basins, and a groundwater basin study by Santa Barbara County[1] that incorporated the results of these earlier studies.

Together, these studies concluded that deep percolation to groundwater from undeveloped lands occurs only during years of average or above-average precipitation. This occurs because:

1. Southern California's rainfall is highly seasonal in nature, whereupon most rainfall occurs during the relatively cool period November through March, when plant water

[1] See Santa Barbara County Water Agency, December 15, 1977. *Report on Adequacy of the Groundwater Basins of Santa Barbara County.*

requirements are low, and little, if any, rainfall occurs during the remaining (and warmer months) when plant water requirements increase.

2. During the summer, when little or no rainfall occurs, the native vegetation extracts the residual moisture that is present in the soil, which substantially decreases the soil moisture within the root zone of the vegetation. At the end of the dry season, soil moisture levels on undeveloped lands are below the soil's field capacity, which is the amount of moisture that must be present in the soil before free drainage of water can occur below the rooting zone of the native vegetation.

3. When the seasonal rains arrive, the incident rainfall that is not consumed by plants and does not become stormwater runoff must first raise the soil moisture level to the soil's field capacity before any groundwater recharge will occur. The various studies indicate that about 17 inches/year of rainfall is necessary to raise the soil moisture to the field capacity on an undeveloped parcel of land. This is similar to the average annual rainfall in the Santa Clarita Valley and in other lowland coastal and near-coastal valleys in southern California.

On irrigated lands, irrigation occurs during several months of the year, with the exact duration depending on the amount and timing of rainfall and also the crops or type of urban landscaping being irrigated. The principal effect of converting undeveloped land to land that receives agricultural or urban irrigation is to increase the amount of water that is applied to the land during the low-rainfall months. This application of water to the vegetative cover on the surface of the developed land parcel results in the maintenance of higher soil moisture levels during the warm, dry months than would occur without development. This has three effects:

1. Because irrigation will generally be performed in a manner that maintains the health of the vegetative cover, enough water will be applied to maintain the soil moisture at, or close to, the field capacity of the soil. This in turn will allow some deep percolation to occur from the irrigation water itself.

2. When the rainy season begins, because irrigation has maintained soil moisture at or near field capacity, less of the initial rainfall entering the root zone needs to be stored in the soil (to meet soil moisture deficits) beneath an irrigated parcel than in the case of an undeveloped parcel. Therefore, a greater percentage of the initial rainfall and annual rainfall will be able to infiltrate to groundwater. The southern California studies estimated that irrigated land parcels would allow rainfall infiltration to occur in years when annual rainfall is at least 10.5 inches/year. This threshold rainfall value is 6.5 inches less than the threshold rainfall value that the studies estimated to be necessary for generating groundwater recharge beneath undeveloped land parcels.

3. Because the majority of irrigation occurs during the dry (low-rainfall) months, the total annual recharge to groundwater from irrigated developed lands is the sum of: (a) the deep percolation arising from irrigation (during the low-rainfall months); and (b) rainfall (during the months when less irrigation is occurring). Therefore, groundwater recharge beneath developed lands is greater and occurs for a longer period of time each year than in the case of undeveloped lands where no irrigation is occurring.

Historical Observations of Groundwater Conditions in the Santa Clarita Valley

The findings of the studies described above for other groundwater basins in southern California are consistent with observations that have been made in the Santa Clarita Valley, which are based on long-term water level records, water budget analyses, and groundwater modeling. Based on a month-by-month calibration to a 20-year record of historical water level records (throughout the Valley) and stream gaging records (at the Los Angeles – Ventura County line), the model simulates 10 percent of the applied outdoor water as being available for recharge to groundwater in retail and residential areas, with greater percentages infiltrating beneath golf courses and agricultural lands. This is consistent with a 1980 study by DWR of the groundwater resources of the Santee and El Monte hydrologic subareas of San Diego County. In that study, which was performed to evaluate reclaimed water use plans, DWR concluded that approximately 20 percent of the applied outdoor water in municipal areas infiltrates to the water table, with the remaining 80 percent going to evapotranspiration and direct evaporation. DWR also concluded that there would likely be no significant change in these percentages as urbanization continues.[2]

In the Santa Clarita Valley, as in any urbanized area, urbanization increases the paved area and can increase the magnitude and intensity of stormwater runoff from paved land areas. In the Santa Clarita Valley, this stormwater runoff will find its way to the Santa Clara River and its tributaries, whose channels are predominantly natural and consist of vegetation and coarse-grained sediments (rather than concrete). The stormwater that flows across paved lands in the Santa Clarita Valley is routed to stormwater detention basins and to the river channels, where the porous nature of the sands and gravels forming the streambeds allow for significant infiltration to occur to the underlying groundwater. Consequently, for a developed land parcel, the water that runs off of the paved portion of the land parcel will infiltrate to groundwater from a detention basin or a riverbed, rather than infiltrating onsite.

Riverbed infiltration is a significant percentage of total recharge in the Santa Clarita Valley in any given year. Streamflow records and the model calibration process together demonstrate that year-to-year fluctuations in total recharge in the Valley arise not just from year-to-year variations in incident rainfall within the Valley, but also from year-to-year variations in streamflows in the Santa Clara River and its tributaries. Because the areas contributing flow to the rivers are located both within and outside of the Valley, the recharge that occurs from riverbeds is a significant source of groundwater recharge within the Valley.

Evidence that stormwater infiltration to groundwater is not significantly decreased by urbanization comes from long-term water level records at wells completed in the Alluvial aquifer. These records show that groundwater levels and the amount of groundwater in storage were similar in both the late 1990s and the early 1980s, despite a significant increase in the urbanized area during these two decades. This long-term stability is attributed in part to the significant volume of natural recharge that occurs in the streambeds, which do not contain paved, urban land areas. Also, groundwater pumping volumes have not increased

[2] See State of California, Department of Water Resources, Southern District. August 1984, *San Diego County Cooperative Ground Water Studies: Reclaimed Water Use, Phase II*. Pages 40-41.

due to urbanization, compared with pumping volumes during the 1950s and 1960s when water was used primarily for agriculture. Additionally, beginning in 1980, water was imported into the Santa Clarita Valley from the State Water Project (SWP) for urban use, with SWP water use reaching nearly 30,000 acre-feet per year (AF/yr) by the end of the 1990s, and progressively increasing from about 32,500 AF in 2000 to nearly 44,500 AF in 2003. Because two-thirds of the total urban water demand is used outdoors, a substantial portion of the imported SWP water has been and continues to be applied to urban landscaping, thereby increasing the amount of recharge to groundwater. The remaining urban water is used indoors, and is subsequently routed to local water reclamation plants (WRPs) and then to the Santa Clara River (after treatment). A portion of this water flows downstream out of the basin, and a portion infiltrates to groundwater.

In summary, urbanization has been accompanied by long-term stability in pumping and groundwater levels, plus the addition of imported SWP water to the Valley, which together have not reduced recharge to groundwater, nor depleted the amount of groundwater that is in storage within the Valley.

Luhdorff & Scalmanini Consulting Engineers, "Evaluation of Groundwater Recharge Methods for the Saugus Formation in the Newhall Ranch Specific Plan Area" (March 2006)

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TECHNICAL MEMORANDUM

LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Evaluation of Groundwater Recharge Methods for the Saugus Formation in the Newhall Ranch Specific Plan Area

Prepared for: Tom Worthington, Impact Sciences

Prepared by: Joseph C. Scalmanini

Date: March 8, 2006

Project Number: 06-1-017

Introduction

Included with the approval of the Newhall Ranch Specific Plan was a condition that "prior to approval of the first subdivision map which permits construction, a report will be provided by the applicant which evaluates methods to recharge the Saugus Aquifer within the Specific Plan, including the identification of appropriate candidate land areas for recharge". In response to that condition, this technical memorandum has been prepared to address recharge of the Saugus Formation in general, as well as within the Specific Plan area. It also addresses groundwater recharge methods as might be applicable to the Saugus Formation, and it provides a summary of artificial recharge feasibility that was previously assessed for the Saugus Formation. Finally, this technical memorandum includes a summary of the recently completed analysis of groundwater basin yield, where that yield is comprised of both the Alluvial and Saugus aquifers, as a basis for concluding about the need for identifying land areas for recharge of the Saugus Formation within the Specific Plan area.

The Saugus Formation

The Saugus Formation is one of two significant aquifers in the Santa Clara River Valley Groundwater Basin, East Subbasin, the other being the less extensive Alluvium that overlies part of the Saugus Formation, generally near the main Santa Clara River and several of its tributaries. The Alluvium extends to a maximum depth of about 200 feet and has been estimated to have a maximum storage capacity of about 240,000 acre-feet. The geologically older Saugus Formation extends several thousand feet in total depth but, for groundwater supply purposes, contains sand and gravel units that represent aquifer materials generally between depths of about 300 and 2,500 feet. The fresh water storage capacity of the Saugus in that depth interval has been estimated to be about 1.65 million acre-feet.

In general, natural groundwater recharge in the Santa Clarita Valley occurs in the eastern portion of the basin, and at the northern and southern limits of the basin. Natural groundwater discharge occurs from the Saugus Formation and the Alluvium in the west-central portion of the basin, in the alluvial valley occupied by the Santa Clara River. Of course, groundwater pumping is also a groundwater discharge mechanism that occurs at distinct locations throughout the basin. Ultimately, however, in the general context of the Specific Plan condition regarding recharge of the Saugus Formation, the occurrence of natural groundwater discharge in the west-central portion of the basin is suggestive of prevailing groundwater conditions that support such a discharge; in other words, the basin has sufficient natural recharge and groundwater flow toward the west that additional efforts to identify and potentially utilize new recharge areas in the Newhall Ranch Specific Plan area, which is where groundwater is already discharging from the basin, would be counter-productive. To place that in some context, however, artificial recharge methods and their potential applicability in the basin are discussed in some detail below, as is the operating plan for groundwater use in the basin and its associated effects on the prevailing groundwater flow direction and associated groundwater storage and discharge.

Groundwater Recharge Methods

The implied intent of the Specific Plan condition addressed in this technical memorandum is an evaluation of purposeful supplemental groundwater recharge, commonly called artificial recharge, to augment natural recharge processes, presumably to benefit the yield of the basin. By specifically noting that the evaluation of recharge methods should also identify appropriate land areas for recharge, the condition further implies that potential artificial recharge would most likely involve the spreading of surface water for infiltration and deep percolation to the water table. Despite the latter implication, however, rather than limit this overall discussion to potential surface spreading of water for artificial recharge, and recognizing the nature of the aquifer systems in the basin, and particularly in the Specific Plan area, the following discussion of artificial recharge methods is included to provide a context for considering the applicability of artificial recharge in that local setting, and also to provide a context for the recent investigation of the feasibility of injection as a potential recharge mechanism, the results of which are summarized in the next section of this technical memorandum.

In most general terms, artificial recharge can be defined as augmenting the natural movement of surface water into underground formations by some method of construction, by spreading of water, or by artificially changing natural conditions. While a variety of artificial recharge methods have been developed and applied in various areas, they can generally be grouped into three categories: water spreading on the ground surface to increase infiltration, recharging through wells to directly introduce water into the aquifer system, and pumping in proximity to surface water bodies to induce recharge from them.

Of the three general categories of artificial recharge methods, the most widely practiced are water spreading operations, where surface waters are purposely introduced to a spreading basin,

or onto selected lands, or into a stream channel such that the water can infiltrate from the surface and then deep percolate to the water table, thus adding to other waters that "naturally" recharge the aquifer, e.g. precipitation, water applied for irrigation, etc. In contrast to surface spreading, artificial recharge of groundwater through wells is much less widely practiced and is typically much smaller in rate of recharge. Individual wells might be capable of recharge rates of a few acre-feet per day, where surface spreading, depending on the nature and physical extent of the spreading ponds or in-channel watercourse, can infiltrate tens to hundreds of acre-feet per day. Despite such limitations, two key factors that lead toward the potential applicability of recharge wells, rather than spreading basins, in some settings are the physical presence of confining layers in the aquifer system that could impede the deep percolation of infiltration from the surface, and the lack of available surface area for surface spreading. In this setting, the nature and depth of the Saugus Formation, which contains alternating layers of fine (confining) and coarse aquifer materials, would likely warrant consideration of recharge wells for those reasons, if artificial recharge of the Saugus were being considered. However, as discussed below, neither recharge method (surface spreading or recharge wells) is warranted in the basin, and particularly in the westerly portion of the Saugus Formation in the vicinity of the Newhall Ranch Specific Plan.

Feasibility of Injection for Saugus Formation Recharge

Early considerations of potential water supply for the Newhall Ranch Specific Plan included so-called Aquifer Storage and Recovery, or "ASR", whereby water from outside the local basin would be imported and injected into the Saugus Formation, where it would be stored for subsequent recovery by pumping for the municipal water requirements of the project. While ASR is not part of the integrated groundwater/imported surface water/reclaimed water supply that is the current and planned future water supply in the valley, the consideration of ASR as a water supply concept for Newhall Ranch resulted in field testing and analysis to assess the hydrogeologic feasibility of injecting and recovering water in the Saugus Formation. That work, briefly summarized as follows, provides some useful insight to potential artificial recharge of the Saugus Formation since it specifically tested both injection (recharge) into, and recovery of water from that aquifer.

A detailed description of the assessment of the hydrogeologic feasibility of injection and recovery in the Saugus Formation, which was conducted in the summer-fall of 2000, is documented in **Assessment of the Hydrogeologic Feasibility of Injection and Recovery of Water in the Saugus Formation, Santa Clarita Valley** (Richard C. Slade & Associates, 2001). That feasibility assessment included the injection of water from Valencia Water Company's municipal distribution system into Valencia's Saugus Well No. 205 for seven day periods at each of 500, 800, and 1,100 gallons per minute (gpm). That injection was followed by a brief (9 days) observation of groundwater storage, followed in turn by pumping (recovery) of water from the same well at its normal operating capacity of about 2,300 gpm over a period of 10 days. During injection, groundwater quality sampling at a nearby production well was conducted to assess any discernable impacts of injection on groundwater quality during injection. During subsequent

pumping of the tested injection well, daily water quality sampling was conducted to assess the "recovery" of injected water, followed by extraction of typical formation water quality after recovery of the injected water. Other related work at the time of injection feasibility testing included the separate pumping of another Saugus Formation well, and concurrent observation of groundwater response in a number of wells completed in either the Saugus Formation or the overlying Alluvium. The purpose of the latter testing was to examine the extent of direct effects, if any, of Saugus pumping on the Alluvium.

The results of the testing described above were interpreted by Slade to conclude that it is hydrogeologically feasible to inject (recharge) and recover water in the Saugus Formation. The aquifer readily accepted water from the injection well, and it subsequently yielded a comparable volume to the same well when it was pumped. The measured effects of injection and pumping were indistinguishable from normal seasonal fluctuations in groundwater levels in the Saugus Formation. The yield of the injection/production well, as measured by its specific capacity (injection or pumping rate divided by water level increase during injection, or drawdown during pumping) was determined to be as generally expected; specific capacity during injection was about 60 to 80 percent of specific capacity during pumping, a phenomenon typically attributed to clogging during injection by some combination of sediment and air. Finally, the injection into, and pumping from the Saugus wells were observed to have no measurable effect on water levels in the overlying Alluvial aquifer system.

In the context of this technical memorandum, the conclusions derived from the assessment of hydrogeologic feasibility of injection and extraction in the Saugus Formation can be extrapolated to project that the Saugus can be recharged via injection at capacities that correlate with fractions of the yields of equivalent Saugus production wells. Some amount of clogging of the injection wells can be expected, resulting in a probable need to regularly interrupt injection (recharge) for routine "purging" of the wells by pumping and, probably less frequently, for well rehabilitation of a more complex nature, e.g. using chemical and/or mechanical means to restore and maintain well injectivity. In the more focused context of the Specific Plan condition regarding land areas for potential recharge, the feasibility assessment and conclusions to date suggest that typical well sites, plumbed with provisions to deliver water from the municipal distribution system for injection and also to discharge water from routine and other well rehabilitation efforts, can be adequate to provide for the installation of injection (recharge) wells if artificial recharge of the Saugus were to be desired for some reason. In that light, however, the next section discusses the yield of the local groundwater basin, and the integration of supplemental water supplies with that yield to meet existing and projected water requirements in the basin, including those of the Specific Plan area.

Groundwater Basin Yield

Total water requirements in the Santa Clarita Valley were nearly 88,000 acre-feet in 2004. That total demand represents an average annual increase of about 3.5 percent per year since 1980,

when surface water from the State Water Project (SWP) was initially imported to supplement local groundwater for municipal and agricultural water supply. Current groundwater use is lower than peak historic, pre-SWP use, and it has remained within a generally constant range of about 38,000 to 44,000 acre-feet per year over the last 15 years. That historical groundwater use and resultant conditions, i.e. no long-term changes in groundwater levels and storage, have been such that there has been no need to initiate and operate artificial groundwater recharge projects. In effect, natural recharge processes have resulted in recharge that sustains, i.e. refills, the aquifer system sufficiently that there has been no long-term depletion of groundwater. Groundwater levels have remained basically unchanged for several decades throughout the western half of the basin; to varying degrees, groundwater levels in the eastern part of the basin have fluctuated through wet and dry hydrologic cycles, but fully recover through natural recharge processes in wet and normal periods of rainfall and stream flow. Thus, with particular focus on the western portion of the basin where the Specific Plan is located, the aquifer system has remained basically full, discharging to some degree to the Santa Clara River to sustain surface water flows out of the basin and downstream to Ventura County.

Based on empirical observation of groundwater basin conditions in response to historical pumping, and also in recognition of the increases in Santa Clara River flows and related groundwater recharge that indirectly derive in part from increased imported SWP water, the concept of a groundwater operating plan was developed to define the groundwater component of overall water supply in the basin. The groundwater operating plan is also a product of the formal Groundwater Management Plan adopted for the basin in 2003, which incorporates a number of elements aimed at developing groundwater in conjunction with other water supplies to meet existing and projected water requirements, and to do so without overdrafting the groundwater basin. The groundwater operating plan is based on the concept that pumping can vary from year to year to allow increased groundwater use in dry periods and increased recharge during wet periods, and to collectively assure that the groundwater basin is adequately replenished through various wet/dry cycles, thus maintaining the basin in a sustainable condition, i.e. no long-term depletion of groundwater or interrelated surface water. In summary, the operating yield concept has been quantified as ranges of annual pumping volumes as follows:

Alluvium – Pumping from the Alluvial Aquifer in a given year is governed by local hydrologic conditions in the eastern Santa Clara River watershed. Pumping ranges between 30,000 and 40,000 afy during normal and above-normal rainfall years. However, due to hydrogeologic constraints in the eastern part of the Basin, pumping is reduced to between 30,000 and 35,000 afy during locally dry years.

Saugus Formation – Pumping from the Saugus Formation in a given year is tied directly to the availability of other water supplies, particularly from the SWP. During average-year conditions within the SWP system, Saugus pumping ranges between 7,500 and 15,000 afy. Planned dry-year pumping from the Saugus Formation ranges between 15,000 and 25,000 afy during a drought year and can increase to between 21,000 and

25,000 afy if SWP deliveries are reduced for two consecutive years and between 21,000 and 35,000 afy if SWP deliveries are reduced for three consecutive years. Such high pumping would be followed by periods of reduced (average-year) pumping, at rates between 7,500 and 15,000 afy, to further enhance the effectiveness of natural recharge processes that would recover water levels and groundwater storage volumes after the higher pumping during dry years.

To examine the sustainability of the groundwater basin under the operating plan, which already derived from observation of actual basin response to generally comparable historical operations, the municipal purveyors in the Santa Clarita Valley commissioned the development and calibration of a numerical groundwater flow model which could be used to project groundwater level and storage response to the variations in pumping planned through wet and dry hydrologic cycles as described in the operating plan. That model was developed and calibrated in 2004 (CH2M Hill, 2004) to simulate the basin's response to the various natural recharge processes (e.g. infiltration of precipitation, infiltration of applied water, infiltration of stream flow) and discharge processes (e.g. pumping, groundwater discharge to streams). The calibrated model was then used to analyze the yield of the basin, i.e. the groundwater operating plan, in 2005 (CH2M Hill and LSCE, 2005). Basin yield was examined by running the model over a 78-year hydrologic period, which was selected from actual historical precipitation to examine a number of hydrologic conditions which could be expected to affect both groundwater pumping and groundwater recharge. The selected 78-year simulation period was assembled from an assumed recurrence of 1980 to 2003 conditions, followed by an assumed recurrence of 1950 to 2003 conditions. The 78-year period was analyzed to define both local hydrologic conditions (normal and dry), which affect the rate of pumping from the Alluvium, and hydrologic conditions that affect SWP operations, which in turn affect the rate of pumping from the Saugus. The resultant simulated pumping cycles included the distribution of pumping among existing and planned Alluvial and Saugus Aquifer wells, for normal and dry years respectively, including the planned restoration of wells that have been impacted by perchlorate in the central part of the basin.

Simulated Alluvial Aquifer and Saugus Formation response to the ranges of pumping under assumed recurrent hydrologic conditions is essentially a long-term repeat of the historical conditions that have resulted from similar pumping over the last several decades in the Alluvium, and consistent with actual experience under smaller pumping rates in the Saugus Formation. The resultant response consists of: (1) generally constant groundwater levels in the middle to western portion of the Alluvium and fluctuating groundwater levels in the eastern portion as a function of wet and dry hydrologic conditions, (2) variations in natural recharge that directly correlate with wet and dry hydrologic conditions, and (3) no long-term decline in groundwater levels or storage. The combination of actual experience with Alluvial Aquifer pumping at capacities similar to those in the operating plan, and the resultant natural recharge of groundwater levels and storage, complemented by modeled projections of similar recharge to future pumping, result in a conclusion that the operating plan represents a sustainable yield of the Alluvium.

In the Saugus Formation, the simulated response consists of (1) short-term declines in groundwater levels and storage near pumped wells during dry-period pumping, (2) rapid recovery of groundwater levels and storage after cessation of dry-period pumping, and (3) no long-term decreases or depletion of groundwater levels or storage. The combination of actual experience with Saugus pumping and recharge up to about 15,000 afy, complemented by modeled projections of aquifer response that show long-term utility of the Saugus at 7,500 to 15,000 afy in normal years and rapid recovery from higher pumping rates during intermittent dry periods, all without any purposeful artificial recharge, shows that the Saugus Formation can be considered a sustainable water supply source to meet the Saugus portion of the operating plan for the groundwater Basin.

As a result of the analysis described in the preceding, i.e. the combination of actual historical basin conditions and simulated future basin conditions, the groundwater operating plan and the natural recharge associated with it have become the existing and projected groundwater supply component of water supply to meet ongoing water requirements in the valley.

For purposes of this technical memorandum, the existence of historical and existing groundwater conditions, combined with the balance of the hydrogeologic setting in the Specific Plan area, indicates that there has been no need for artificial recharge of the aquifer system in that portion of the basin. Since natural recharge processes have maintained long-term stable groundwater conditions, including sufficiently high groundwater storage that there is groundwater discharge from the aquifer to the Santa Clara River, efforts to artificially augment natural recharge in that area could be expected to result in "rejected" recharge, i.e. recharged water would simply add to groundwater discharging from the aquifer system, resulting in no net benefit to the basin's yield or storage. Recent analysis of the groundwater basin's yield and the projected impact of the operating plan for groundwater pumping in the basin shows that future conditions are expected to generally repeat historical observations, resulting in no need for artificial recharge in the western (Specific Plan) portion of the basin.

Need for Saugus Formation Recharge Locations in Newhall Ranch Area

All the preceding description and discussion of the occurrence of groundwater, its recharge and discharge areas, and its sustainable yield maintained by natural recharge processes can be summarized to conclude that there is no definable need to identify land areas for artificial recharge of the Saugus Formation. More specifically, there is no need to identify land areas for artificial recharge of the Saugus Formation in the small part of that aquifer system that underlies the Newhall Ranch Specific Plan area. In summary form, that conclusion derives from the following points.

- The Upper Santa Clara River Groundwater Basin, East Subbasin is comprised of two aquifers, the Alluvium and the Saugus Formation, which are generally recharged in the east to central portion of the basin, well east of the Newhall Ranch Specific Plan

area. Groundwater flow in the basin is generally east to west, with resultant groundwater discharge at the western end of the basin.

- The Newhall Ranch Specific Plan area overlies a very small portion of the Saugus Formation at the far western end of the basin, as illustrated in Figure 1, where the basin is discharging water that flows downstream toward Ventura County.

- Historical observations for several decades have shown no long-term changes in groundwater storage or levels. Natural recharge processes have sustained groundwater levels, including long-term essentially constant, high groundwater levels. There has thus been no need for addition of artificial recharge operations to augment natural recharge to the basin.

- The presence of high, relatively constant groundwater levels in the Specific Plan area is indicative of no vacant aquifer storage space into which artificial recharge might be introduced. Thus, attempts to artificially recharge the basin in that area can be expected to result in rejected recharge, or the rapid discharge of any recharged water to the overall outflow from the basin.

- The future operating plan for the basin includes future pumping that is generally similar to historic pumping, with one notable change whereby short-term intermittent increases in Saugus pumping would occur during dry periods when supplemental imported State Water Project deliveries might be reduced. Simulation of basin response to such pumping projects conditions generally comparable to historic experience: future Alluvial aquifer levels and storage comparable to historical conditions; and future Saugus Formation levels and storage lowered during dry periods (in response to increased pumping) but fully replenished by natural recharge processes in subsequent wet/normal conditions.

- While there is no defined need for artificial recharge in the western part of the basin, the nature of the Saugus Formation is such that, physically, recharge to that formation would likely be more effective through injection wells. Thus, if artificial recharge of the Saugus Formation were to become desirable for some reason, feasibility testing of injection has been undertaken, with results showing such a mechanism to be hydrogeologically feasible.

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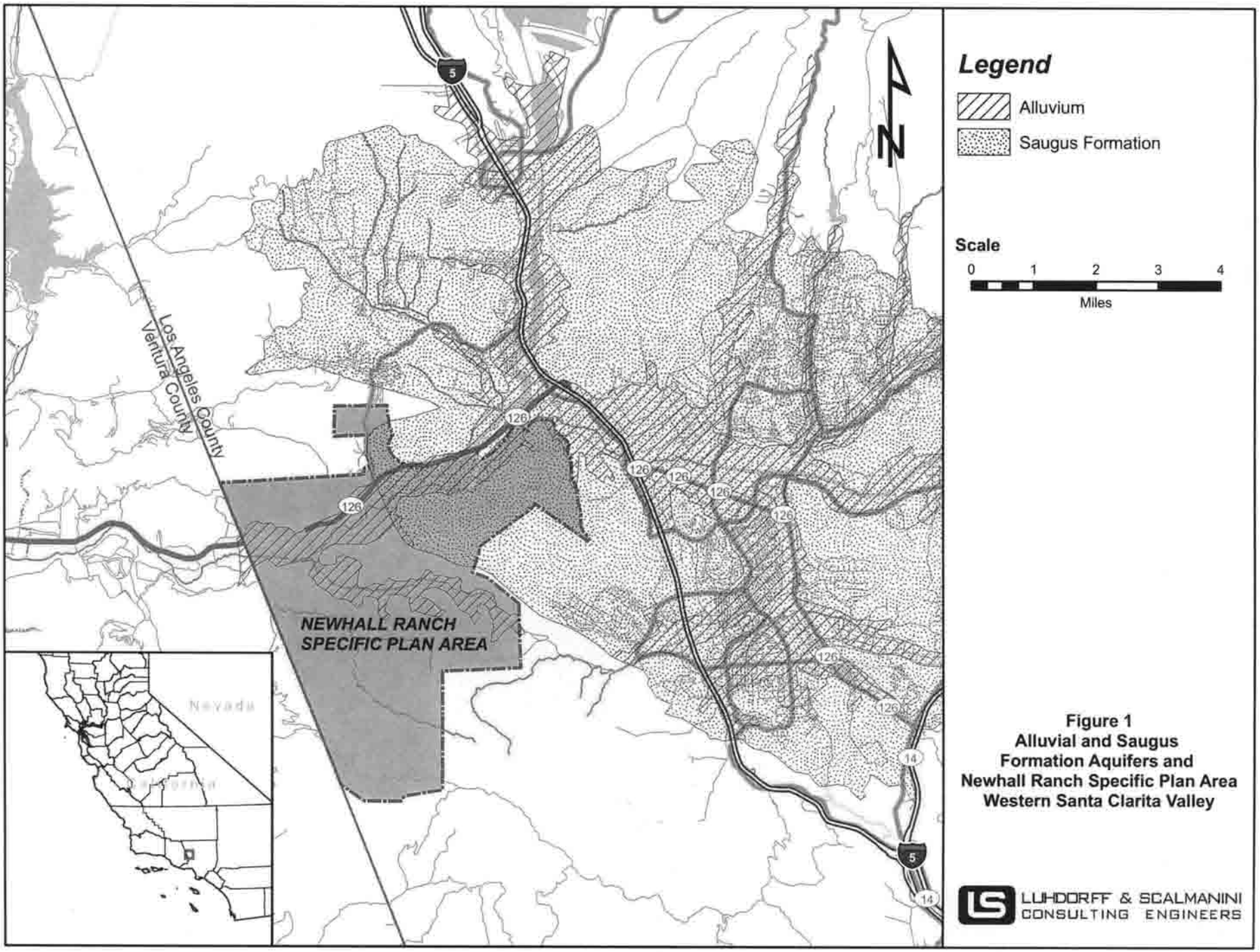

Figure 1
Alluvial and Saugus Formation Aquifers and Newhall Ranch Specific Plan Area Western Santa Clarita Valley

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TRANSMITTAL

Date *March 17, 2006*

TO: *Tom Worthington*
Steve Zimmer
Mark Dillon
Glenn Adamick

Phone

FROM: *Bob DiPrimio*
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Phone *661-295-6501*
Fax Phone *661-294-3806*

CC:

REMARKS: ☐ *Urgent* ☒ *For your review* ☐ *Reply ASAP* ☐ *Please Comment*

Note: Here is Joe's signed Tech memo.

Bob

Filed 5/13/09 Cal. Water Impact Network v. Newhall County Water Dist. CA2/8

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

California Rules of Court, rule 8.1115(a), prohibits courts and parties from citing or relying on opinions not certified for publication or ordered published, except as specified by rule 8.1115(b). This opinion has not been certified for publication or ordered published for purposes of rule 8.1115.

IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

SECOND APPELLATE DISTRICT

DIVISION EIGHT

CALIFORNIA WATER IMPACT NETWORK, Plaintiff and Appellant, v. NEWHALL COUNTY WATER DISTRICT et al., Defendants and Respondents; GATE KING PROPERTIES et al., Real Parties in Interest.	B203781 (Los Angeles County Super. Ct. No. BS098727)
CALIFORNIA OAK FOUNDATION et al., Plaintiffs and Appellants, v. CITY OF SANTA CLARITA, Defendant and Respondent; GATE KING PROPERTIES et al., Real Parties in Interest.	B203782 (Los Angeles County Super. Ct. No. BS084677)

APPEAL from judgments of the Superior Court of Los Angeles County, Dzintra Janavs, Judge. Affirmed.

Law Offices of Babak Naficy and Babak Naficy for Plaintiffs and Appellants.

Lagerlof, Senecal, Gosney & Kruse LLP, Thomas S. Bunn III; Carl K. Newton, City Attorney; Burke Williams & Sorensen LLP, Brian A. Pierik and Gregory M. Murphy for Defendants and Respondents.

Cox, Castle & Nicholson, Anne E. Mudge and Sarah E. Owsowitz for Real Parties in Interest.

This is the second time we address issues associated with a proposal to develop an industrial park in the City of Santa Clarita, the City's environmental impact report (EIR) for the proposed project, and water. Four years ago, we ruled that the City's EIR did not include an adequate discussion on the subject of water supplies for the proposed project. (See *California Oak Foundation v. City of Santa Clarita* (2005) 133 Cal.App.4th 1219 (*California Oak*).) At that time, we directed the trial court to issue a writ of mandate commanding the City to decertify its EIR, and to prepare and recertify an EIR complying with the requirements of the California Environmental Quality Act (CEQA).[1] We further directed the trial court to retain jurisdiction over the cause until the City recertified its EIR.

The consolidated appeals before our court today arise from two judgments which, together, have the effect of approving the City's recertification of its EIR — with a final additional analysis (FAA) — for the proposed project. We agree with the trial court that the City's EIR/FAA now complies with CEQA, and affirm both judgments.

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[1] See Public Resources Code section 21000 et seq. All section references are to the Public Resources Code, except where noted otherwise. All references to the CEQA Guidelines are to the California Code of Regulations, title 14, section 15000 et seq.

FACTS

I. Water

We begin our examination of the current appeal by revisiting some foundational background facts summarized in our prior opinion on the first appeal. The State Water Project (SWP) was authorized in the 1950s, and was envisioned to become a system of reservoirs, dams and other facilities for the storage and delivery of 4.23 million acre-feet of water per year (AFY). The Department of Water Resources (DWR) manages the SWP and operates its facilities. (*California Oak, supra*, 133 Cal.App.4th at p. 1227.)

When the SWP began, DWR entered into a number of long-term contracts with water suppliers (DWR contractors) throughout the state. The central provisions of these long-term contracts were the same: a DWR contractor was allotted an entitlement to a certain amount of water from the SWP each year, in exchange for which the contractor agreed to pay, on a proportionate basis, the costs of financing and maintaining the SWP's facilities. (*California Oak, supra*, 133 Cal.App.4th at p. 1227.) The long-term contracts also included a provision — "Article 18" — outlining the procedures for the reallocation of water among contractors in the event of water shortages within the SWP system. (See generally, *Planning & Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 898-900 (*PCL*).)

The entitlements to SWP water which were allotted to the contractors under their long-term contracts with DWR were based on the predicate that the state would actually build out the SWP as planned, so that it actually had the capacity and capability to store and deliver 4.23 million AFY of water. The state, however, never completed the SWP as envisioned, and, today, the SWP simply does not have the physical capability to deliver 4.23 million AFY of water to its contractors. On the contrary, the actual, reliable water supply in the SWP is more in the vicinity of 2 to 2.5 million AFY of water. (*California Oak, supra*, 133 Cal.App.4th at pp. 1227-1228.)

With this general background of the state's water resources and some relevant statutory schemes in mind, we move on to other events.

II. The Monterey Agreement and Monterey Amendments

During the late 1980s and early 1990s, ongoing drought conditions in California diminished the supply of water in the SWP, and generated "Article 18 disputes" among state's agricultural water contractors, urban water contractors, and DWR regarding the distribution of water from the SWP. In the fall of 1994, DWR and its contractors met in Monterey to discuss the allocation of SWP water in times of shortage. These so-called "Article 18 negotiations" morphed into an attempt to implement an "omnibus revision of the SWP long-term contracts and their administration" (see *PCL, supra*, 83 Cal.App.4th at p. 901), and, in early 1995, DWR and a number of contractors took the first step toward that end by agreeing to a statement of principles known as the Monterey Agreement.

For purposes of the appeal before us today, the Monterey Agreement embodied two key principles: first, it contemplated that the then-existing long-term contracts with DWR would be amended to allow for the reallocation of the entitlements to SWP water which the state's agricultural contractors and urban contractors had previously enjoyed, and, second, it envisioned that these amendments would authorize contractors to transfer SWP water amongst themselves on a "willing buyer/willing seller" basis. (*California Oak, supra*, 133 Cal.App.4th at p. 1228; *PCL, supra*, 83 Cal.App.4th at pp. 900-902.)

In the years following the Monterey Agreement, various DWR contractors began implementing the agreement's principles by negotiating and purchasing transfers of SWP water. These consummated transfers of entitlements to SWP water became known as the Monterey Amendments. In 1999, the Castaic Lake Water Agency (CLWA) purchased a transfer of an entitlement to 41,000 AFY of SWP water from the Kern County Water Agency (KCWA). (*California Oak, supra*, 133 Cal.App.4th at p. 1228.)[2]

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[2] "CLWA is a public agency created and governed by the uncodified Castaic Lake Water Agency Law. (Stats. 1962, 1st Ex. Sess., ch. 28, §1, p, 208 . . . .) CLWA was formed to provide a . . . supply of imported water to . . . water purveyors of the Santa Clarita Valley. . . . CLWA contracts with [DWR] for water from the [SWP] . . . , treats those supplies at its treatment plants, and delivers the treated water to [local] water

As we will see below, the 1999 transfer of SWP water from KCWA to CLWA is the proverbial seed from which the appeal before us today is grown. With this second part of our story tucked away in mind, we turn to still more events.

III. Related Litigation

A. The CEQA Case Involving the Monterey Agreement/Monterey Amendments

The DWR contractors who negotiated the Monterey Agreement, along with DWR, recognized that implementation of the agreement's principles for the reallocation of water from the SWP might have potential adverse environmental effects, and, thus required the preparation of an EIR, including an opportunity for public input during the environmental review process. To that end, the Monterey Agreement adherents appointed one of their own contractors to serve as the "lead agency" in charge of preparing an EIR. In 1995, the contractor certified an EIR for the Monterey Agreement, and, later that same year, DWR, acting in the role of a "responsible agency," issued findings and adopted the EIR. (*PCL, supra,* 83 Cal.App.4th at p. 902.)

Shortly thereafter, two citizens groups (and others) filed a petition for writ of mandate in the Sacramento County Superior Court, challenging the sufficiency of the EIR for the Monterey Agreement. In 1996, the trial court entered judgment rejecting the

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retailers within [the Santa Clarita Valley] area." (*Friends of the Santa Clara River v. Castaic Lake Water Agency* (2004) 123 Cal.App.4th 1, 4.) CLWA is a statutorily-defined "urban water supplier" under the Urban Water Management Planning Act or UWMPA. (Stats. 1983, ch. 1009, § 1, p. 3555; Wat. Code, § 10610 et. seq.) The UWMPA requires all such water suppliers to prepare an Urban Water Management Plan (UWMP) every five years. Among other elements, a UWMP must provide information on a supplier's water usage, resources, reliability planning, demand management measures, and shortage contingency planning. A UWMP is intended to function as a planning tool to guide broad-perspective decision-making by the management of the water supplier; an UWMP is not a substitute for project-specific planning documents, such as those which are required under CEQA. In *Friends of the Santa Clara River v. Castaic Lake Water Agency, supra*, 123 Cal.App.4th 1, the Fifth District Court of Appeal in Fresno addressed challenges to CLWA's 2000 UWMP. In 2005, CLWA prepared its most recent UWMP. CLWA's UWMP envisions use of the transfer of the 41,000 AFY of SWP water purchased from KCWA.

CEQA challenges, ruling that, although the appointed contractor should not have been the lead agency for the preparation of the EIR, the EIR was nonetheless adequate, which meant that the CEQA violation was not prejudicial.

In 2000, the Third District Court of Appeal agreed with the trial court that DWR, not the appointed contractor, should have acted as the lead agency for the preparation of the EIR for the Monterey Agreement, but disagreed with the trial court that the EIR itself was adequate. The Third District reversed the judgment, concluding that the omissions in the EIR mandated preparation of a new EIR for the Monterey Agreement, under DWR's direction. (*PCL, supra*, 83 Cal.App.4th at p. 898.)

In June 2003, the Sacramento County Superior Court entered an order approving a settlement agreement in the CEQA case involving the Monterey Agreement. The order provided that the trial court would issue a writ of mandate compelling DWR to prepare a new EIR for the Monterey Agreement, and that the court would retain jurisdiction over the cause until DWR filed a return to the writ of mandate showing that it had complied with CEQA, and the court issued an order discharging the writ of mandate. (*Planning & Conservation League v. Department of Water Resources* (Super. Ct. Sacramento County, 2003, No. 95CS03216.)

The record before us today shows that the parties who are involved in the current appeal are of the understanding that, notwithstanding the passage of more than five years, DWR still has not yet completed its EIR for the Monterey Agreement.

With this summary of the CEQA litigation involving the Monterey Agreement, we turn to still more events.

B. The First CEQA Case Involving the Transfer of 41,000 AFY of SWP Water from KCWA to CLWA

In 1999, while the CEQA case involving the Monterey Agreement as a whole was pending in the Third District, the Castaic Lake Water Agency (CLWA) — in accord with the Monterey Agreement — agreed to purchase an entitlement to 41,000 AFY of SWP water from the Kern County Water Agency (KCWA) for approximately $47 million. The transfer of 41,000 AFY of water was memorialized in an amendment to the water supply

contract between DWR and CLWA, which now reflects that CLWA is entitled to receive its original entitlement of SWP water, and is entitled to receive an additional entitlement of 41,000 AFY of SWP water, i.e. the water KCWA transferred to CLWA. Also in 1999, CLWA certified an EIR for the transfer of the 41,000 AFY of SWP water. (*Friends of the Santa Clara River v. Castaic Lake Water Agency* (2002) 95 Cal.App.4th 1373, 1379 (*Friends I*).)

Shortly after CLWA certified its EIR for the transfer of the 41,000 AFY of SWP water from KCWA, a nonprofit corporation filed a petition for writ of mandate in the Los Angeles County Superior Court, challenging the sufficiency of CLWA's EIR. In 2000, the trial court entered a final judgment denying the petition.

In 2002, Division Four of our court ruled that the decision by the Third District Court of Appeal in *PCL, supra*, 83 Cal.App.4th 892 — decertifying the original EIR for the Monterey Agreement/Monterey Amendments as a whole program — required the decertification of CLWA's "tiered" EIR for the ensuing transfer of the 41,000 AFY of SWP water from KCWA to CLWA. As Division Four explained, "tiering" — meaning the practice of incorporating prior environmental studies — is permitted under CEQA, but had resulted in a "defect" in CLWA's EIR when the original, underlying EIR for the Monterey Agreement as a whole, upon which CLWA's ensuing EIR had been expressly tiered, was decertified. (*Friends I, supra*, 95 Cal.App.4th at pp. 1375-1376, 1384-1387.) In short, Division Four ruled that an EIR may not be "tiered" on a decertified EIR. CLWA's options, suggested Division Four, were to wait until the EIR review process in the CEQA case involving the Monterey Agreement/Monterey Amendments had been completed (see *III., A., ante*), or to prepare its own independent EIR for the transfer of the 41,000 of SWP water from KCWA.

After *Friends I* was remanded to the trial court, the case litigants agreed the trial court should issue a writ of mandate directing CLWA to decertify its EIR, but a "bone of contention" remained whether the trial court should also enjoin CLWA from proceeding with the transfer of the entitlement to the 41,000 AFY of SWP water from KCWA before CLWA completed an adequate EIR for the transfer. (*Friends of the Santa Clara River v.*

Castaic Lake Water Agency (Dec. 1, 2003, B164027) [nonpub. opn. at p. 3] (*Friends II*).) In October 2002, the trial court denied the request to enjoin the transfer, and another appeal ensued. In December 2003, Division Four of our court affirmed the denial of injunctive relief. (*Ibid*.)

In February 2005, the California Water Impact Network (CWIN) dismissed its petition with prejudice.

C. The Second CEQA Case Involving the Transfer of 41,000 AFY of SWP Water from KCWA to CLWA

In 2004 (after Division Four decided *Friends II*), the CLWA certified an EIR for the permanent transfer of 41,000 AFY of SWP water from the Kern County Water District (KCWD). In January 2005, CWIN filed a petition for writ of mandate in the Ventura County Superior Court, challenging the EIR.[3] According to CWIN's petition, the EIR did not adequately discuss the threat posed by the permanent transfer of the water, i.e., the promotion of large-scale urban sprawl in Ventura and Los Angeles Counties, while diverting water forever from Kern County. On the same day that CWIN filed its petition, the Planning and Conservation League filed its own petition in Ventura County Superior Court challenging the transfer of water from KCWD to CLWA. The two petitions in Ventura County were consolidated, and, in June 2005, the consolidated Ventura County petitions were transferred to the Los Angeles County Superior Court and assigned case number BS098724.

On April 2, 2007, the trial court (Hon. James Chalfant) ruled that CLWA properly acted as the lead agency for the preparation of the 2004 EIR for the water transfer from KCWD to CLWA, and that CLWA's 2004 EIR "was properly prepared," except for one element — the EIR did not explain that the availability of water from the SWP "may be

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[3] CWIN filed its petition in the Ventura County Superior Court about one month before it filed its request for dismissal of its action in the Los Angeles County Superior Court (case No. BS056954) in which its request for a preliminary injunction had been denied. (See *III., B., ante*; and see also *Friends II, supra*, B164027.)

impacted" by the outcome of DWR's pending preparation of an EIR for the Monterey Agreement/Monterey Amendments as a whole. For this reason, the trial court issued a writ commanding CLWA to set aside its approval of its 2004 EIR for the transfer of the 41,000 AFY of SWP water from KCWD, and to comply with CEQA, either through the preparation of a new EIR or an addendum "addressing the analytic route of the three water allocations." Judge Chalfant expressly ruled that that the transfer itself would not be set aside.

With this part of the related litigation in mind, we can now take a look at the proposed project at the heart of the appeal which is before us today.

IV. The Proposed Industrial Park Project, and the EIR Process for the Project

A. The Proposed Project

In 1999, Gate King Properties submitted a series of project requests to the City of Santa Clarita related to a proposal to develop an industrial/commercial park on a 584-acre site in the southern portion of the City. As described in our prior opinion, Gate King's original proposal envisioned the development of approximately 4.45 million square feet of industrial/commercial structures on 170.1 acres, with another 64.3 acres dedicated to rights-of-way (including public streets) and water wells. The remaining acreage was to include a combination of slopes, trails and open space. (See *California Oak, supra*, 133 Cal.App.4th at p. 1224.)

Gate King's proposed project envisions that the water which will be consumed on site by the industrial park's eventual occupants will be delivered at the retail level by the Newhall County Water District (NCWD). Moving up along the supply channel, NCWD obtains water at the wholesale level from the CLWA, and, as noted above, CLWA obtains water from the SWP, including an entitlement/transfer of an additional 41,000 AFY of SWP water from the KCWA.

B. The EIR Process for Gate King's Proposed Project

In January 2002, the City circulated a draft EIR for Gate King's proposed project. Section 4.10 of the City's draft EIR addressed the subject of "Utilities," including "Water Supplies." The discussion of water supplies explained that the NCWD would supply

water for the Gate King site at the retail level, and that NCWD obtained its water from local groundwater wells and the CLWA. The City's draft EIR also explained that CLWA obtained water from the SWP, and that CLWA's current total water entitlement from the SWP included 41,000 AFY of SWP water which CLWA had purchased from the KCWD. The draft EIR's discussion of water supplies included this broad proviso: "It should be noted . . . that CLWA's . . . entitlement [to SWP water] can fluctuate from year to year based on a number of factors, including hydrologic conditions, the status of [SWP] facilities, construction, environmental requirements, and evolving policies for the Bay-Delta."

During the comment period on the City's draft EIR, the Santa Clarita Organization for Planning the Environment (SCOPE) objected that the discussion of water supplies in the draft EIR for Gate King's proposed project was inadequate because it did not disclose that there was ongoing litigation which might affect the availability of the 41,000 AFY of SWP water transferred from KCWA to CLWA. The City, in turn, prepared a response to SCOPE's comments in which the City explained that the Newhall County Water District (NCWD) had completed a water supply assessment (WSA) for Gate King's proposed project, and that NCWD had concluded that it would have sufficient water to supply the needs of the project.

In October 2002, the City circulated a final EIR for Gate King's proposed project. In June 2003, the City passed a resolution adopting the findings set forth in the EIR, and certifying the EIR as final. The City's final EIR did not make any material alterations in the discussion of water supplies set forth in the draft EIR. SCOPE's comments regarding ongoing litigation involving the transfer of the 41,000 AFY of SWP water from KCWD to CLWA, along with the City's response, were included — along with other comments and responses — in the final EIR as "Appendix H." The final EIR also included a document prepared by NCWD entitled "Additional Water Supply Information" as "Appendix K."

Now, with the basic framework of Gate King's proposed project in mind, and the City's EIR for the project in mind, we may finally turn to the litigation from which the current appeal arises.

V. The Two Cases Giving Rise to the Current Appeal

A. Santa Clarita Oak Conservancy v. City of Santa Clarita (the California Oak case)

In July 2003, shortly after the City certified its final EIR for Gate King's proposed project, the Santa Clarita Organization for Planning the Environment (SCOPE) and other groups filed a petition for writ of mandate seeking to compel the City to decertify its EIR on the ground that it did not include adequate information on the "uncertainties" which were then still attendant to the transfer of the 41,000 AFY of SWP water from KCWA to CLWA. (L.A. Super. Ct. No. BS084677.) In March 2004, the trial court entered judgment denying SCOPE's writ petition, and, shortly thereafter, SCOPE filed an appeal.

In November 2005, we ruled that the information on the subject of water supplies set forth in the City's EIR for Gate King's proposed project was inadequate. There, we determined "the EIR's failure to present . . . an analysis of how demand for water would be met without the 41, 000 AFY entitlement, or of why it is appropriate to rely on the 41,000 transfer . . . render[ed] the EIR defective . . . ." (*California Oak*, *supra*, 133 Cal.App.4th at p. 1242.) We reversed the judgment, and remanded the cause with directions to the trial court to issue a writ of mandate compelling the City to decertify its EIR for Gate King's project, and to retain jurisdiction over the cause until such time as the City certified an EIR which complied with CEQA. (*Id*. at p. 1245.)

In March 2006, NCWD completed preparation of a new WSA for Gate King's proposed industrial park project. That same month, the City circulated a draft additional analysis for the EIR for Gate King's proposed project. The City's draft additional analysis stated that, "[b]ased on th[e] . . . [new WSA] prepared by NCWD, an adequate supply of water is available to serve the Gate-King project, [and] existing and planned future uses in the Santa Clarita [area]. No significant water supply . . . impacts are expected from supplying available water to meet the demands of both the project and

cumulative development in the [area]." The report went into detail in explaining its conclusions.

In July 2006, the City certified a final additional analysis (FAA) for the EIR for Gate King's proposed project. In August 2006, the City filed a return in the trial court, including requests to discharge the peremptory writ of mandate which had been issued in accord with *California Oak*, and to dismiss SCOPE's petition. In October 2006, SCOPE filed an objection to the City's return to the peremptory writ of mandate.

In June 2007, the adequacy of the City's EIR/FAA was argued to the trial court. On August 15, 2007, the trial court entered a statement of decision setting forth its ruling that the City's EIR/FAA was adequate. On September 5, 2007, the trial court entered judgment accepting the City's return to the court's peremptory writ of mandate, and discharging its preemptory writ of mandate.

In November 2007, SCOPE filed a timely notice of appeal. (case No. B203782.)

B. California Water Impact Network v. Newhall County Water District

In July 2005, about three months before we issued our opinion in *California Oak*, NCWD approved a water supply assessment (WSA) in connection with an application by Gate King to have the site of its proposed industrial park project annexed into NCWD's service territory. In August 2005, the California Water Impact Network (CWIN) filed a petition for writ of mandate, coupled with a complaint for declaratory and injunctive relief, challenging NCWD's WSA for purposes of annexation, and seeking to enjoin NCWD from proceeding with the annexation of the site of Gate King's proposed industrial park. (L.A. Super. Ct. No. BS098727.)

In November 2005, we issued our decision in *California Oak*. As noted above, we directed the trial court to issue a writ of mandate compelling the City to decertify its EIR for Gate King's proposed project on the ground that the EIR's discussion of the subject of water supplies was inadequate, and compelling the City to recertify an EIR after it had complied with CEQA.

In spring 2006, before the adequacy of the City's EIR for Gate King's proposed project had been resolved, CWIN and NCWD agreed on a stipulation for judgment in their parallel annexation case. On June 1, 2006, the trial court entered a judgment on the parties' stipulation. The judgment provided that the trial court would issue a peremptory writ of mandate commanding NCWD to set aside its WSA for the annexation of the Gate King site, and to stay all proceedings to annex the Gate King site, until such time as the City recertified its EIR for Gate King's proposed project in compliance with *California Oak*, and NCWD then "considered the project based on the City['s] certified EIR."

As noted above, the City certified its EIR/FAA for Gate King's proposed project in July 11, 2006. On July 13, 2006, NCWD adopted a resolution approving the City's EIR/FAA, and reaffirming NCWD's annexation of the Gate King site.

In October 2006, NCWD filed a return to the trial court's peremptory writ of mandate in which it requested an order discharging the trial court's writ, and dismissing CWIN's case. Broadly summarized, NCWD's return argued that the trial court's writ should be discharged because CWIN had complied with the writ's command to consider Gate King's project based on the City's recertified EIR/FAA. In November 2006, CWIN filed an objection to the return.

In June 2007, CWIN's objections to NCWD's return were argued to the trial court (on the same day that SCOPE's contentions were argued regarding the adequacy of the City's recertified EIR/FAA). On August 15, 2007, the trial court issued a statement of decision in which it ruled that NCWD had not violated CEQA by incorporating the City's environmental findings regarding Gate King's project. It followed, concluded the court, that its writ should be discharged, and that CWIN's petition should be dismissed.

On September 5, 2007, the trial court entered a formal order discharging its peremptory writ of mandate, and dismissing CWIN's petition.

In November 2007, CWIN filed a timely notice of appeal. (case No. B203781.)

VI. The Consolidation of the Appeals

In January 2008, the Newhall County Water District (NCWD) filed a motion in our court, asking us to consolidate SCOPE's appeal in the *California Oak* case involving the City's EIR/FAA (case No. B203782), and CWIN's appeal in its parallel annexation-related case (case No. B203781). In February 2008, we granted the motion to consolidate the appeals.

DISCUSSION

I. The City's EIR/FAA Includes Adequate Information on the Subject of Water Supplies for the Proposed Project

Picking up where our prior opinion in *California Oak* left off, CWIN contends the City's recertified EIR/FAA for Gate King's proposed project violates CEQA because the City still has not discussed the subject of water supplies adequately.[4] More specifically, CWIN contends the City's EIR/FAA does not adequately inform the public, and/or the appropriate decision-making government officials, that DWR's still-not-yet-completed "programmatic" review of the Monterey Agreement and Monterey Amendments may "undermine" the continuing viability of the transfer of 41,000 AFY of SWP water from the Kern County Water Agency (KCWA) to the Castaic Lake Water Agency (CLWA). This omission, argues CWIN, means that the relevant decision-makers do not have an adequate understanding of the potential problems that might affect the amount of water which CLWA will receive, meaning they do not have an adequate understanding of the potential problems which CLWA may have in delivering water to the Newhall County Water District (NCWD), meaning they do have an adequate understanding of the potential problems which NCWD may have in delivering water to the Gate King project. We disagree with CWIN's contention that the City's EIR/FAA is inadequate.

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[4] Our references to CWIN include both CWIN and SCOPE, which have filed joint briefs on appeal.

A. CEQA and EIRs

As noted above, the "heart" of CEQA lies in its mandate that a government agency shall prepare an EIR before approving a proposed project which may have a significant effect on the environment. (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 392; and see also § 21100, subd. (a).) An EIR is intended to be an *informational* document; its purpose is to provide public officials, and the public, with information regarding the potential environmental consequences that a proposed project may have on the environment, and to identify ways in which those consequences may be minimized, and to indicate alternatives to the project, including a "no project" alternative. (*California Oak, supra*, 133 Cal.App.4th at p. 1225; and see also § 21061.) Once an EIR is adequately presented, the governing agency may find that the project's environmental effects have been reasonably mitigated, and approve the project; or the agency may find that the unmitigated environmental effects of the project are outweighed by the project's benefits, and approve the project, or the agency may find the adverse environmental effects are so profound that the project should not go forward, in which case something else (or nothing else) must be done in place of the proposed project. (*California Oak, supra*, 133 Cal.App.4th at p. 1225.)

In short, "[t]he purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind." (*Bozung v. Local Agency Formation Com*. (1975) 13 Cal.3d 263, 283.)

B. Analysis

We simply disagree with CWIN's perspective that the City's EIR/FAA for Gate King's proposed project — when viewed as an *informational* document — "never fully admits or explains" the uncertainties which may be attendant with the transfer the 41,000 AFY of water from KCWA to CLWA. In our view, CWIN is just plain wrong that the City's EIR/FAA for Gate King's proposed project fails to *disclose* — and that is the operative word — that DWR may, in preparing its new EIR for the Monterey Agreement, adopt mitigation measures which may undermine the continued availability of the transfer of the 41,000 AFY of water from KCWA to CLWA.

The City's EIR/FAA for Gate King's proposed project expressly discusses the Third District's decision in *PCL, supra*, 83 Cal.App.4th 892 — decertifying the original EIR for the Monterey Agreement — and its aftermath — DWR's pending preparation of a new EIR for the Monterey Agreement. The EIR/FAA also discusses Division Four's decision in *Friends I, supra*, 95 Cal.App.4th 1373 — decertifying the original EIR for the transfer of the 41,000 AFY of SWP water from KCWA to CLWA. The EIR/FAA also discusses our opinion in *California Oak*. And, the EIR/FAA expressly acknowledges that DWR's still-pending preparation of a new EIR for the Monterey Agreement "introduces an element of potential uncertainty" regarding the 41,000 AFY transfer of SWP water from KCWA to CLWA.

The City's EIR/FAA for Gate King's proposed project further sets forth reasons in support of the City's conclusion that DWR's still-pending preparation of an EIR for the Monterey Agreement is not expected to impact the amount of water available to CLWA vis-à-vis the transfer of the 41,000 AFY of SWP water from KCWA to CLWA.

No more is needed in an *informational* document. According to CWIN, the City's EIR/FAA for Gate King's proposed project is deficient because it does not include an "objective analysis" of the potential impacts that may follow when DWR completes its EIR for the Monterey Agreement and Monterey Amendments. We understand CWIN's arguments to embody the proposition that the City's EIR/FAA for Gate King's proposed project will not be adequate until it (1) sets forth, essentially in list form, all of the possible mitigation measures which DWR may adopt in the course of the ongoing EIR review process for the Monterey Agreement and Monterey Amendments, and then (2) sets forth the corresponding amounts of water which will be subtracted from the transfer of the 41,000 AFY of SWP water from KCWA to CLWA.

The cases cited by CWIN in support of its arguments — our decision in *California Oak, supra*, 133 Cal.App.4th 1219, and the Supreme Court's decision in *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412 (*Vineyard*) — do not, in our reading, support the proposition that the City's EIR/FAA for Gate King's proposed project must include the intricate specificity demanded by CWIN.

As we explained in *California Oak*, an EIR is adequate when it includes sufficient detail to enable those who did not participate in its preparation to understand and meaningfully consider the environmental issues raised by the proposed project. (See *California Oak, supra*, 133 Cal.App.4th at p. 1237, citing *Santa Clarita Organization for Planning the Environment v. County of Los Angeles* (2003) 106 Cal.App.4th 715, 721.) This standard necessarily contemplates a dose of common sense, and a rejection of the proposition that CEQA demands the inclusion of ever more information in an EIR, until the EIR itself becomes so overwhelmingly complex that it becomes essentially meaningless. We are satisfied that the City's decision-making officials were informed by the City's EIR/FAA for Gate King's proposed project that approval of Gate King's proposed project carried with it a number of potential water supply problems.

CWIN's arguments on appeal offer a well-written treatise explaining the rules governing EIRs. But CWIN's arguments then fail, in our view, to connect those rules to its claims of "inadequacy" in the present case. In other words, CWIN correctly states that CEQA jurisprudence requires an EIR to set forth adequate information upon which an agency may make an educated decision, but we see no discussion in CWIN's arguments in which it specifically offers an example of the type of information which it wants to see in the City's EIR/FAA. We see little explanation by CWIN of any possible mitigation scenario which may result from DWR's ongoing EIR review of the Monterey Agreement.

If we may take another tack, we understand CWIN to be arguing that the City's EIR/FAA for Gate King's proposed project is required to state something to this effect: "If DWR adopts _____ (with the City filling in the blank with a possible mitigation measure), then the 41,000 AFY of water from KCWD to CLWA will be diminished by _____ (with the City filling in the blank with the corresponding AFY figure)." CWIN's argument would be more convincing had CWIN explained to us even one possible mitigation measure which DWR may possibly take. We decline to accept CWIN's contention that the City is required to include something more in its EIR/FAA for Gate King's proposed project when CWIN has not offered us a

suggestion about what sort of "something more" might, in the real world, be a realistic possibility.

The City's EIR/FAA for Gate King's proposed project is now adequate.

II. The City's Conclusions Are Supported by Substantial Evidence

CWIN argues the City's recertification of its EIR/FAA for Gate King's proposed project must be vacated because the City's conclusion that the 41,000 AFY of water is reliable for planning purposes is not supported by substantial evidence. We disagree.

A. The Standard of Review

Noticeably absent from CWIN's argument is any acknowledgment of just what the concept of "substantial evidence" means in the context of judicial review of an agency's conclusions in the course of certifying an EIR. We begin our discussion of CWIN's substantial evidence claim by filling in that void.

Substantial evidence challenges in CEQA cases are resolved in the same manner as substantial evidence claims in other settings: a reviewing court, whether at trial court or on appeal, will resolve reasonable doubts in favor of the governing agency's administrative decision, and will not set aside an agency's determination on the ground that the opposite conclusion would have been equally or more reasonable. (*County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 945-946, citing *Laurel Heights Improvement Assn. v. Regents of University of California, supra,* 47 Cal.3d at pp. 392-393.) In other words, an appellate court's review of the administrative record for substantial evidence in a CEQA case "is the same" as the trial court's review of the administrative record. (*Vineyard, supra,* 40 Cal.4th at p. 427.) The appellate court reviews the agency's action, not the trial court's decision, and, "in that sense appellate judicial review under CEQA is de novo" insofar as the trial court's findings are concerned, but deferential to the agency's findings where they are supported by substantial evidence. (*Ibid*.) With this standard as our guide, we turn to an examination of CWIN's claim.

B. The Evidence

The City's EIR/FAA for Gate King's proposed project includes a broad overview of the SWP, a review of the historical deliveries of SWP water to CLWA and other local contractors, and DWR's projections of SWP water supplies which will be available for delivery to CLWA (which were projected for "average/normal" conditions, and "a single dry year . . . based on a repeat of the worst-case historic hydrologic conditions of 1977," and "a multiple dry-year period . . . based on a repeat of the worst-case historic four-year drought of 1931-1934").

The City's EIR/FAA for Gate King's proposed project also includes an extensive review of the myriad of litigation arising from the Monterey Agreement and Monterey Amendments, and the transfer of 41,000 AFY from KCWD to CLWA, and includes the accurate observation that "[n]o court has ordered any stay or suspension of the Monterey Agreement pending certification of a new EIR," and that no court has ordered any stay or suspension of the 41,000 AFY from KCWD to CLWA. The City's EIR/FAA further notes (correctly) that DWR and its contracting water agencies "continue to abide by the Monterey Agreement[,] as implemented by the Amendments, as the operating framework for the SWP."

We are satisfied that the evidence summarized above supports the City's finding that the 41,000 AFY of water from KCWD to CLWA is reliable for planning purposes, and we consider CWIN's real objection not to be that there is an absence of substantial evidence in support of the City's conclusions, but that City's conclusions are, themselves, wrong. Where, as here, substantial evidence supports an agency's findings, we will not substitute our conclusions for those of the agency.

Finally, even assuming we were inclined to discard the City's conclusions, and to take it upon ourselves to make our own independent conclusions based on the evidence, our decision would be the same. Although CWIN is abstractly correct that DWR's new EIR for the Monterey Agreement/Monterey Amendments *may* (if and when feasible mitigation measures are adopted) affect the amount of SWP water which will be delivered to CLWA pursuant to the transfer of 41,000 AFY of water from KCWD, that

potentiality must be juxtaposed against what we do know for a *certainty*, and that is that DWR is not now considering whether the transfer itself is valid.[5]

We find the City reasonably concluded — based on substantial evidence — that the 41,000 AFY of SWP water from KCWD to CLWA is reliable for planning purposes.

III. Alternative Water Sources for the Project

CWIN contends the City's EIR/FAA for Gate King's proposed project violates CEQA because it fails to discuss alternative sources of water for Gate King's proposed project in the event that the transfer of 41,000 AFY of water from KCWD to CLWA becomes unavailable. CWIN's argument is based on *Vineyard, supra,* 40 Cal.4th 412. We find CWIN's reliance on *Vineyard* to be unhelpful within the framework of the case before us today.

In *Vineyard*, the Supreme Court addressed the adequacy of an EIR for a proposed mixed-use project in Sacramento County which was to be built out in phases. A group of "objectors" filed a petition for writ of mandate challenging the EIR. The essential issue presented by the objectors' contentions was that, while the EIR may have adequately evaluated an initial phase of development, it was nonetheless inadequate under CEQA because its promise of future environmental analysis as each phase was to be built side-stepped the County's obligation to disclose and consider at the outset the environmental impacts of supplying water to the entire planned development. (*Vineyard, supra*, at p. 427.)

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[5] In this respect, we note Judge Chalfant's conclusions in the CEQA case involving the transfer itself (L.A. Super. Ct. No. BS098724): "Under contract and validation law, the Kern water transfer contract, entered into in 1999, is valid, has been approved by DWR, and Castaic has paid . . . for it. . . . DWR [cannot] terminate the Kern transfer contract. Nothing in CEQA permits a public agency to void a contract. . . . [¶] Thus, in evaluating the environmental effects of the Monterey Agreement, DWR may impose mitigations that are legal. But it cannot invalidate the Kern transfer."

The trial court denied the objectors' petition, and the Court of Appeal affirmed the trial court, but the Supreme Court reversed the Court of Appeal. Broadly summarizing its decision, the Supreme Court ruled that, while the EIR adequately discussed "near-term" water supplies for the project, it did not adequately discuss "long-term" water supplies.

Vineyard has attained a place of importance in CEQA jurisprudence insofar as the Supreme Court identified four elements which must be included in an EIR's discussion of water supplies for a proposed project that envisions development in stages: (1) the EIR must evaluate the pros and cons of supplying the amount of water that the project — in its entirety — will need; (2) the EIR cannot be limited to a discussion of the water supply which is needed for the first stages of the project's development, and cannot state that "information will be provided in the future" as new stages of development commence, (3) the future water supplies which are identified must bear an actual likelihood of being available; and (4) where it is impossible to determine confidently that future water sources will be available, CEQA requires a discussion of possible replacement water sources or alternatives. (*Vineyard, supra,* at pp. 430-432.)

The case before us today does not present a *Vineyard* problem because the full extent of Gate King's proposed industrial park project is described at the outset in the City's EIR/FAA, including the project's ultimate anticipated water consumption, and the anticipated water supplies for the project. In other words, the City's EIR/FAA for Gate King's proposed project does not limit its assessment of water supplies to a "first stage" of the project, with a mere promise of "further analysis" for later stages of the project. We see no *Vineyard* omission in the City's EIR/FAA for Gate King's proposed project.

IV. The CalSim-II Model

As noted above, the City's EIR/FAA for Gate King's proposed project relies on water supply projections from DWR. Those projection are based on data derived from a computer model used by DWR for predicting future availability of water supplies from the SWP — the so-called "CalSim-II model." CWIN contends the City's EIR/FAA for

Gate King's proposed project violates CEQA because the City's discussion and analysis of the CalSim-II model is inadequate. Again, we disagree.[6]

A. The Discussion of the CalSim-II Model

As noted above, the CalSim-II model is a computer program developed and used by DWR to predict future availability of SWP water. This is the information that the City disclosed about the CalSim-II model in the EIR/FAA for Gate King's proposed project:

> "Comments submitted on the [draft additional analysis for the EIR for Gate King's proposed project] state that the CalSim-II computer model is flawed, and provide articles and other attachments that are critical of DWR's use of the CalSim-II model, pointing out that '[a]ll of [the] documents [provided] clearly lay out the problems for anyone who wants to rely on CalSim-II as the predictor of reliability for the SWP.' . . . [O]ther comments . . . have criticized DWR's reliance upon the CalSim-II model, claiming that the model overstates the amount of water the SWP can deliver during average and dry years. Those comments rely on the . . . decision [to grant a preliminary injunction in *Planning and Conservation League v. United States Bureau of Reclamation* (N.D.Cal. Feb. 15, 2006, No. C 05 – 3527 CW)] as authority for limiting future SWP water deliveries because of flaws in DWR's CalSim-II model. The City . . . is aware of the criticisms leveled against DWR's CalSim-II model, including criticisms noted in the following documents:
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> "• *A Strategic Review of CALSIM[-]II And Its Use For Water Planning, Management And Operations in Central California*, submitted to the California Bay-Delta Authority Science Program Association of Bay Governments, by A. Close, *et al*., dated December 4, 2003;
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> "• *Musings On A Model: CalSim[-]II In California's Water Community*, San Francisco Estuary and Watershed Science, Vol. 3, Issue 1 (March 2005), Article 1, by Ines C. Ferriera, *et al*;

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[6] We reject respondents' contention that CWIN's arguments regarding the CalSim-II model are barred by the "law of the case doctrine" (see, e.g., *Searle v. Allstate Life Ins. Co*. (1985) 38 Cal.3d 425, 434), and the law of this case as set forth in our prior opinion in *California Oak*. We did not address the validity of the CalSim-II model in *California Oak*. To the extent respondents seem to contend that CWIN should have raised the issue earlier, we are satisfied that CWIN had no meaningful opportunity to address the CalSim-II model until the City filed its return to the trial court's peremptory writ of mandate in 2006.

"• *An Environmental Review Of CalSim[-]II: Defining 'Full Environmental Compliance' And 'Environmentally Preffered' Formulations Of The CalSim[-]II Model*, by Jeffrey T. Payne, *et al*., dated November 2005;

"• *Gerald Johns' Memo*, prepared by Jan de Leeuw, dated October 23, 2005; and

"• *On The Adequacy Of CALSIM[-]II For Environmental Impact Analysis And SWP Reliability Analysis*, prepared by Arve R. Sjovold, dated August 12, 2004; and *Some Insights On Water Deliveries To Settlement Contractors*, prepared by Arve R. Sjovold, dated October 24, 2004."

"Like any computer model, CalSim-II is subject to criticism, but the City has nonetheless considered DWR's view that CalSim-II is a generally well-rated and accurate model for California's two largest water projects, [the federal Central Valley Project (CVP)] and SWP. DWR has explained that:

'*CALSIM[-]II is a general water resources planning software developed by DWR. CALSIM[-]II, developed through a collaborative effort by DWR and [the United States Bureau of] Reclamation, represents a comprehensive simulation of the SWP and CVP. . . . CALSIM[-]II provides a reasonable planning level simulation of existing project operations, recognizing that the operating environment and regulatory requirements for the projects are in a constant state of transition and change. Since CALSIM[-]II is not a detailed operations model, it does not capture many of the complexities of forecasted and actual operations of project facilities. In determining suitability of these studies to a particular analysis, the user should consult all documentation that accompanies this release and the [Technical Coordination Team] and [Benchmark Study Team] as appropriate*.' [fn. omitted.]

"One of the above articles [fn. omitted.] states that:

'*The CalSim[-]II model is the most prominent water management model in California, and has become central to a variety of water management and policy issues and controversies. . . . CalSim[-]II is a complex model of a complex part of California's changing multi-purpose water system. As such, analytic controversies and misunderstandings are inevitable. . . . While CalSim[-]II is generally seen as a significant improvement over previous models, a wide variety of ideas suggested for improvements*.'

"The City further acknowledges that the CalSim-II model, like other computer models, contains several perceived strengths as well as weaknesses, several of which were noted in the article, *A Strategic Review of CALSIM[-]II And Its Use For Water Planning, Management And Operations in Central California*, [submitted to California Bay-Delta Authority Science Program Association of Bay Governments,] by A. Close,

et al., dated December 4, 2003, pp. 6-9. The City further acknowledges that CalSim[-]II is not a perfect model; no computer model is perfect. However, on balance, and after considering the various articles criticizing the CalSim-II model, the City agrees with DWR's determination that CalSim-II is a 'useful and appropriate tool for assessing the delivery capability of the SWP.' The City further believes that, despite criticisms of CalSim-II, it is still appropriate to rely on DWR for information based on the CalSim-II model, unless and until a new or updated model is known to exist and available for use.

"As stated above, other comments rely on the [federal district court's decision in *Planning and Conservation League v. United States Bureau of Reclamation, supra*] to support the claim that SWP delivery reliability is suspect, because DWR's CalSim-II model is flawed. The City does not believe that the comments properly characterize the *PCL/Bureau* decision.

"In the *PCL/Bureau* decision, the federal court issued an order granting [a] motion for a preliminary injunction . . . which enjoined construction of the 'Intertie' project until the case is decided on the merits. (The Intertie project is a proposed pipeline project that would connect the main delivery canals of two water diversion projects, the federal CVP and the state SWP, in California's Central Valley. The proposed pipeline is known as the 'Delta-Mendota Canal/California Aqueduct Intertie.' At issue is the [*PCL/Bureau* case] is the Bureau's decision to rely on [a negative declaration] for environmental review of the Intertie project under both [federal National Environmental Policy Act (NEPA)] and CEQA *in lieu* of an [Environmental Impact Study] EIS/EIR.)

"In granting the preliminary injunction, the federal court [incorporated its] . . . earlier . . . order granting [an] application for a temporary restraining order . . . In that [prior] order, the court addressed [a] claim that an EIS/EIR was required for the Intertie project because the existing environmental documents that found no significant impacts were based on CalSim-II modeling which [the plaintiff had claimed] was 'too unreliable to rule out the potential for significant impacts.' Order, p. 9. [fn. omitted.] In [addressing] that claim, the federal court did not appear concerned with the perceived shortcomings of the model, but rather the Bureau's failure to *disclose* the shortcomings. In fact, the court specifically stated that the use of CalSim-II 'alone does not show that [the Bureau] was arbitrary and capricious in reaching its finding of no significant impact.' *Id*. at p. 11.

"In short, the federal court did not prohibit the Bureau or any other agency from using or relying on the CalSim-II model, but rather, stated that the Bureau could rely on the model, provided it disclosed relevant shortcomings in the data or model . . . . Here, based on a review of the above reports, the City . . . is apprised of all known, perceived

shortcomings with DWR's CalSim-II model; nonetheless, the City believes that substantial evidence supports is conclusion that the model remains the best available data for assessing SWP operations and constraints."

B. The Discussion of the CalSim-II Model is Sufficient

We are satisfied that the City's EIR/FAA for Gate King's proposed project sets forth a sufficient discussion of the CalSim-II model, including its recognized shortcomings. In our view, the City's EIR/FAA for Gage King's proposed project is adequate because it summarizes points of disagreement regarding the CalSim-II model, and then explains the City's reasons for accepting one set of judgments instead of another. (*Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1390-1391.) A fair review and assessment of the City's EIR/FAA for Gate King's proposed project belies CWIN's contention that the City did not "describe objectively" the expert critiques of the model, and did not explain why, despite those critiques, it elected to consider the model an appropriate predictive tool. The City gave numerous examples of criticisms of the CalSim-II model, and explained that it decided to accept DWR's data based on the CalSim-II model because, for present purpose, the model provides the best available data.

We see nothing in CWIN's arguments which suggests that a better model exists, and, even assuming such a model did exist, the insurmountable problem for CWIN would remain that objections reflecting a conflict amongst conclusions do not show that an EIR is *inadequate.* (See CEQA Guidelines, section 15151 [disagreement among experts does not make an EIR inadequate].) Inadequate means an absence or omission of information needed to make an informed decision, and the City's EIR/FAA for Gate King's proposed project does not suffer from such a deficiency.

V. The State Water Resources Control Board

CWIN contends the City's EIR/FAA for Gate King's proposed project violates CEQA because its does not discuss adequately the potential impact on water supplies

which may result from DWR's compliance with an order issued by the State Water Resources Control Board (SWRCB).[7] Once more we find that CWIN is mistaken.

A. The SWRCB Order

SWRCB is authorized to issue a cease and desist order (CDO) when it determines that a government agency is violating or threatening to violate any condition of a permit or license issued by SWRCB. A CDO may only be issued after notice and an opportunity for hearing. In May 2005, SWRCB issued draft CDOs to DWR and the United States Bureau of Reclamation (USBR) regarding alleged threatened violations of their licenses and permits to divert water from the San Joaquin River and Bay Delta. The water rights granted to DWR and USBR include prescribed salinity standards for water at various specified geographic locations. As we can understand it, salinity levels of the water can be affected by diverting less water, i.e., allowing more water to remain in place, or, alternatively, by building "permanent operable barriers or other equivalent measures along with an operation plan," all designed to prevent salinity-increasing elements from accumulating in the water.

On February 15, 2006, SWRCB issued "Order WR 2006-0006" in the matter of the draft CDOs against DWR and USBR. Relevant provisions of the Order are set forth in the following paragraphs.

B. The EIR/FAA's Discussion of the Order

At about the same time that SWRCB was issuing Order WR 2006-0006, the City was circulating its draft additional analysis for the EIR for Gate King's proposed project. During the comment period on the draft additional analysis, CWIN claimed that Order WR 2006-0006 will require DWR to "shut down its pumps" in the event that prescribed

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[7] As we understand the state's organization structure, DWR and SWRCB appear to function as distinct but co-equal state agencies with possibly overlapping responsibilities. According to its official website, the SWRCB has authority (along with regional boards) over water allocation and water quality protection. According to the official website of its acting director, DWR protects, conserves and manages the state's water supply, which includes, of course, the operation of the SWP.

salinity standards for the San Joaquin River and Bay Delta are not met, and that the result will be "less water pumped to Southern California."

The City's EIR/FAA for Gate King's proposed project provides the following information on Order WR 2006-0006:

> "In . . . Order WR 2006-0006, [SWRCB] issued a cease and desist order requiring . . . DWR and [USBR] to take corrective action under a time schedule to correct threatened violations of their permits and license. *SWRCB Order*, p. 1. Their permits and license require DWR and [USBR] to meet salinity objectives at three locations in the southern Delta between April 1 and August 31 of each year. . . . Starting April 2006, [SWRCB] is now requiring DWR and [USBR] to meet the adopted salinity standards . . . , but not immediately. Instead, it allows the two agencies until July 1, 2009, to meet the adopted salinity objectives. *Id*. at p. 28-29. This is the date by which the agencies now predict completion of a 'permanent barriers project or equivalent measures' that will enable the agencies to meet the salinity objectives. In the interim, the two agencies are required to provide [SWRCB] Board with a detailed plan and schedule for compliance with the conditions set forth in the Order. *Id*. at p. 29-30.
>
> "In the event that DWR or [USBR] project a potential exceedance in the salinity objectives prior to July 1, 2009, the two agencies are required to immediately inform [SWRCB] of the potential exceedance, and describe the corrective actions they are initiating to avoid the exceedance. *Id.*, p. 30. The 'corrective actions' may include, but are not limited to 'additional releases from upstream [CVP] facilities or south of the Delta [SWP] or CVP facilities, modification in the timing of releases from Project facilities, reduction in exports, recirculation of water through the San Joaquin River, purchases or exchanges of water under transfers from other entities, modified operations of temporary barriers, reductions in highly saline drainage from upstream sources, or alternative supplies to Delta farmers (including overland supplies).' *Id.*
>
> "In response to comments, [SWRCB] determined that DWR and [USBR] were partially responsible for the salinity problems at certain locations because of export pumping. Decision 1641, which allocated the responsibility for implementing the salinity objectives of the 1995 Bay-Delta Plan, noted that the implementation of a 'barrier program' could help improve salinity concentrations and that DWR and [USBR] were working together on such a program. (*State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674, 711.) To the extent that the comment letters on the Gate-King Industrial Park Additional Analysis infer that meeting the salinity objectives will necessarily result in less water to pump to southern California, such an assumption is not accurate because it assumes that the

only way to control salinity is to reduce export pumping. While the reduction of exports is listed as one means of improving salinity concentrations, it is only one of many such methods. As noted above, implementation of a barrier program is another means for improving salinity concentrations and, in fact, DWR and the [USBR] are working on such a program. In addition, the Order itself emphasizes that constructing permanent barriers is not the exclusive method for compliance with the salinity objectives, and that additional potential corrective actions to avoid potential exceedance of the salinity objectives include actions such as additional releases from upstream CVP facilities or south of the Delta SWP or CVP facilities, modifications in the timing of releases from Project facilities, reduction in exports, purchases or exchanges of water under transfers from other entities, modified operations of temporary barriers, and several other options. *Id*. pp. 23, 30.

"Thus, the assertion in comments submitted on the Gate-King Industrial Park Additional Analysis that DWR and [USBR] must 'shut down their pumps if the salinity standards are not met' is not accurate. [SWRCB]'s amended approval of the 'Water Quality Response Plan' (WQRP) requires that DWR and [USBR] be in compliance with the conditions contained in their permits and license, including salinity objectives, in order to enable 'joint points of diversion' (JPOD) operations, and orders that JPOD operations must cease if such conditions are not met. Hence, if the salinity objectives are not met, DWR and [USBR] may not conduct JPOD operations. However, this means that they are only restricted from use of *one another's* facilities – they are not restricted from using their *own* facilities. As such, DWR and [USBR] are not being ordered to 'shut down their pumps.' *Id.*, pp. 25, 32-33.

"As to the Board's Order that DWR and [USBR] take corrective actions under a time schedule to correct threatened violations of their permits and license in order to meet the salinity objectives, it is true that a complete failure to meet the salinity requirements by the time schedule (July 1, 2009) could result in further action by the Board. However, the Order encourages communication by requiring DWR and [USBR] to submit plans and schedules detailing how DWR and [USBR] intend to meet the objectives, periodic updates and progress reports, and notification of the Board if DWR and the [USBR] anticipate a potential exceedance of the salinity objectives, or if an exceedance has occurred. *Id.*, p. 29-31. The Order states that in the event of an exceedance, the Executive Director will *make a recommendation* to [SWRCB] *regarding whether to take enforcement action. Id.*, p. 30. In deciding *whether* to initiate enforcement action, the Executive Director must consider the extent to which the non-compliance was beyond DWR's or [USBR]'s control and the actions taken to correct the exceedance. *Id.*

> "Lastly, the Order provides that upon the failure . . . to comply with the requirements contained in the Order (by July 1, 2009), [SWRCB] Board may request the Attorney General to petition the Superior Court for injunctive relief, as appropriate. *Id.*, pp. 28-32. [SWRCB] also may issue monetary fines. *Id.*, p. 32. However, nowhere does the Order mandate that DWR and [USBR] shut down their pumps."

C. Analysis

In the light of the discussion reproduced above, we reject CWIN's argument that the City's EIR/FAA for Gate King's proposed project "does not provide any discussion or analysis from which the reader could decide the likelihood that meeting the salinity standards will in fact result in a reduction in [SWP] deliveries." Far from not providing "any discussion," the City's EIR/FAA for Gate King's proposed project contains an extensive discussion, and states the City's reasons for its conclusion that there is limited likelihood that measures taken by DWR and USBR to meet salinity standard will reduce SWP deliveries to CLWA.

As with its previous arguments, CWIN's assertions begin with abstractly correct assertions that information must be provided in an EIR, but then just seem to ignore that the City's EIR/FAA does contain information from which the decision-makers could make a reasoned decision on Gate King's proposed project.

VI. The Trial Court' Analysis of NCWD's Annexation Resolution

A. The Resolution

On July 11, 2006, the City recertified its EIR/FAA for Gate King's proposed project. Two days later, on July 13, 2006, the Newhall County Water District (NCWD) adopted a resolution approving the annexation of the Gate King site into NCWD's service territory. Section 2 of NCWD's resolution recites a finding by NCWD to the effect that City had then-recently recertified an EIR which complied with our decision in *California Oak* (i.e., the EIR/FAA), and that, for this reason, NCWD then considered it "appropriate" to annex the Gate King site "based on the [re]certified EIR."

B. The Trial Court's Decision on the Annexation

On August 15, 2007, the trial court entered its statement of decision in which it rejected CWIN's challenges to NCWD's annexation of the Gate King site. The trial court's order expresses the court's conclusion that NCWD — in making its annexation decision — had been required to presume that the City's EIR/FAA complied with CEQA. In other words, the trial court ruled that, for purpose of annexing the site of Gate King's proposed project, NCWD could not independently determine for itself whether the City's EIR/FAA was adequate or inadequate. That determination, the trial court explained, had to be made in a "single forum," i.e., in the context of SCOPE's parallel case directly challenging the City's EIR/FAA for Gate King's proposed project.

C. CWIN's Claim on Appeal

On appeal, CWIN contends the trial court "got it wrong," and that it should have required NCWD to "reach its own conclusions" on the adequacy of the City's EIR/FAA. Although we tend to agree with respondents that "[t]he purpose of [CWIN's] argument is not clear," we construe CWIN to argue that NCWD's reliance on the City's EIR/FAA in July 2006 (when NCWD approved its annexation resolution) must be "undone," and that this means that NCWD should also undo anything and everything which it has already has done in the annexation process, and that NCWD should then start all over again after making its owns determination on whether or not the City's EIR/FAA is adequate. In other words, we understand CWIN to be arguing either (1) NCWD "jumped the gun" by relying on the City's EIR/FAA before it had been approved by the trial court upon the City's return, or (2) NCWD had its own duty to review and pass the City's EIR/FAA for adequacy, and that NCWD did not fulfill that duty. It appears to be CWIN's position (in either event) that NCWD must go back to square one, and that approval of Gate King's proposed project must be delayed accordingly.

D. Analysis

Assuming that CWIN contends NCWD 'jumped the gun" by relying on the City's EIR/FAA prior to judicial review, we find the issue is moot. The trial court approved the City's EIR/FAA, and, for the reasons explained above, we have affirmed the trial court's decision.

Assuming that CWIN contends NCWD had a duty, independent of the trial court's jurisdiction, to review and determine the adequacy of the City's EIR/FAA, we disagree. Section 21167.3, subdivision (b), provides: "In the event that an action or proceeding is commenced [alleging an EIR does not comply with CEQA], but no injunction or similar relief is sought and granted, responsible agencies *shall* assume that the [EIR] . . . for the project does comply with [CEQA] and shall approve or disapprove the project according to the timetable for agency action [prescribed in the Government Code]. Such approval shall constitute permission to proceed with the project at the applicant's risk pending final determination of such action or proceeding [challenging the EIR for the project]."

We agree with NCWD that section 21167.3, subdivision (b), says what it says. A responsible agency must use the EIR prepared by the lead agency, even if the responsible agency believes that the EIR is inadequate. (See *Central Delta Water Agency v. State Water Resources Control Bd*. (2004) 124 Cal.App.4th 245, 274.) A responsible agency with permit authority, however, must still reach its own conclusions on whether and how to approve of the project, regardless of the lead agency's approval the project. (*Ibid*.) We see no error in the trial court's analysis insofar as the determination of the adequacy of the City's EIR/FAA is concerned. We can now turn to CWIN's attacks on NCWD's findings and conclusions.

VII. NCWD's Findings

CWIN contends NCWD violated CEQA and the CEQA Guidelines when it passed its resolution approving the annexation of the Gate King site into NCWD's service territory. More specifically, CWIN contends that NCWD violated CEQA and the CEQA Guidelines in two respects: first, NCWD should not have "incorporated" the City's findings regarding the significant environment effects identified in the City's EIR, and

should not have "incorporated" the City's statement of overriding considerations in favor of Gate King's proposed project, and second, NCWD should have made its own findings, and adopted its statement of overriding considerations. For the most part, the two challenges are corollaries of each other. We find no error in either respect.

A. NCWD's Resolution

Section 3 of NCWD's resolution is entitled "Environmental Impact Findings Required by CEQA." Section 3 sets forth NCWD's finding that the City's EIR/FAA for Gate King's proposed project "identifies and discloses project-specific impacts . . . ." Section 3 also sets forth NCWD's finding that Gate King's proposed project will result in potentially significant environmental impacts, but that the City has imposed mitigation measures and/or changes to the project which the City has determined will eliminate the impacts or reduce them to a level of less significance. Section 3 of NCWD's resolution also includes the following provision which gives rise to CWIN's claim that a responsible agency such as NCWD violates CEQA when it "incorporates" a lead agency's findings:

> "Although . . . NCWD lacks jurisdiction over most of the issues covered in the City's CEQA findings contained in the City's [resolution certifying the EIR for Gate King's proposed project, NCWD now] incorporate[s] by reference, as though fully set forth herein, the City's findings with respect to all significant environmental effects identified in the EIR, including those related to Land Use and Planning, Geology, Hydrology and Water Quality, Air Quality, Transportation and Circulation, Biological Resources, Noise, Human Health and Safety, Public Services, Public Utilities, Aesthetics, Cultural Resources, and Recreation."

B. The CEQA Guidelines

Article 7 of the CEQA Guidelines (§§ 15080–15097) governs the "EIR Process." Broadly summarized, sections 15080 through 15090 prescribe the rules with which the "Lead Agency" for a proposed project must comply during the process of preparing and certifying an EIR for the project.

Section 15091 prescribes the "Findings" which are required in the EIR process. Section 15091(a) provides: "No public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding. The possible findings are: [¶] (1) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effects identified in the final EIR. [¶] 2. Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency. [¶] 3. Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR."

CEQA Guidelines section 15092 prescribes the rules governing the Lead Agency's approval of the project; section 15093 governs the Lead Agency's approval of the project with a statement of overriding considerations; section 15094 prescribes the rules under which the Lead Agency files its notice of determination with the appropriate authority; and section 15095 governs the Lead Agency's disposition of a final EIR.

CEQA Guidelines section 15096 specifically addresses the responsibilities of a "Responsible Agency" in the EIR Process. Unfortunately, the section is not a model of internal consistency.

Section 15096(a) provides: "A Responsible Agency complies with CEQA by considering the EIR . . . prepared by the Lead Agency *and by reaching its own conclusions on whether on how to approve the project involved. . . .* " At the same time, however, section 15096(g)(1) states that, "[w]hen considering alternative and mitigation measures, a Responsible Agency is more limited than a Lead Agency. A Responsible Agency has responsibility for mitigating or avoiding only the direct or indirect environmental effects *of those parts of the project which [the Responsible Agency]*

decides to carry out, finance, or approve," and section 15096(g)(2) provides that "the Responsible Agency shall not approve the project as proposed if [it] finds any feasible alternative or feasible mitigation measures *within its powers* that would substantially lessen or avoid any significant effect the project would have on the environment." (Emphasis added.) And then there is section 15096(h), which provides that "[t]he Responsible Agency *shall make the findings required by Section 15091 for each significant effect of the project . . . .*" (Emphasis added.)

C. The CEQA Guidelines Interpreted

We agree with the trial court that the most reasonable interpretation to be given to section 15096's provisions is as follows: section 15096(h)'s mandate that a Responsible Agency must make findings for each significant effect of a proposed project must itself be read in conjunction with section 15096(g), limiting the authority and responsibility of a Responsible Agency to avoid or mitigate only the environmental effects of those parts of the project which the Responsible Agency decides to carry out, finance, or approve. In short, CEQA Guidelines section 15096 requires a Responsible Agency to make findings about alternatives and mitigation measures only in connection with those environmental effects over which it has the jurisdiction to impose alternatives or mitigation measures. Otherwise, the CEQA Guidelines would require a Responsible Agency to make findings regarding matters over which it could no nothing. We decline to interpret the CEQA Guidelines to require such a pointless exercise.

D. NCWD Did Not Violate CEQA by Incorporating the City's Findings

CWIN contends NCWD violated CEQA and CEQA Guidelines section 15091 by "incorporating" the City's findings, instead of independently "adopting" its own findings. We disagree.

CWIN's argument rests (incorrectly) on the predicate that NCWD was required in the first instance to adopt findings regarding the potential adverse environmental impacts identified in the EIR for Gate King's proposed project. We agree with the trial court that NCWD did not have such an obligation, and adopt its reasoning. NCWD acted as a responsible agency for the Gate King project, and, as such, its discretionary authority was

limited to the annexation of the Gate King project into NCWD's service territory, so that NCWD could provide water service to the project. CEQA provides that a responsible agency is responsible for considering only the effect of those activities involved in a project which the agency is required by law to carry out or approve.

NCWD's resolution correctly stated that the City's EIR/FAA for Gate King's proposed project indentified significant effects in the area of air quality, biology, solid waste, and aesthetics. And NCWD's resolution further correctly stated that mitigation measures and alternatives in those areas were the authority and responsibility of the City as lead agency, and not NCWD, whose jurisdictional authority extended only insofar as the annexation of the project site was concerned. Under these circumstances, NCWD did not have a duty to make findings on those issues which were within and under the City's area of control, and thus, cannot be found to have acted inappropriately when it "incorporated" the City's findings. In other words, NCWD's incorporation of the City's findings was, for the most part, a superfluous act, not an act in violation of CEQA.

The bottom line is that the part of the "project" with which NCWD was concerned was the annexation of the Gate King site into NCWD's service territory. It makes no sense in our view to require NCWD to make findings with regard to alternatives and/or mitigation measures which may reasonably be imposed upon Gate King's proposed project when NCWD did not have control over such matters.

E. NCWD Did Not Have a Duty to Make Its Own Independent Findings

In a variation on its "incorporation" theme, CWIN contends NCWD violated CEQA Guidelines section 15091 because it did not make its own independent findings related to the potential adverse environmental impacts posed by Gate King's proposed project. For the reasons explained above, we disagree.

Although NCWD perhaps could have included in its resolution a specific finding that the City's EIR did not identify any project-related environmental impacts associated with NCWD's annexation of the Gate King site into NCWD's service area, we decline to undo the annexation process for no other purpose than to accommodate that technicality. The omitted finding, if any, plainly did not result in any harm under CEQA. By noting

the environmental effects that are attendant with Gate King's proposed project, NCWD's resolution implicitly notes that no other effects pose a significant environmental threat. In short, we find NCWD's findings to be sufficient.

F. NCWD Was Not Required to Adopt an Independent Statement of Overriding Considerations

Section 5 of NCWD's resolution states: "Changes or alternatives to address the significant and unavoidable impacts of the project related to air quality, biology, solid waste, and aesthetics are within the responsibility and jurisdiction of the City . . . , the lead agency under CEQA. NCWD finds that with respect to these impacts, the City has adopted a statement of overriding considerations, which NCWD incorporates herein by reference. Because the [EIR/FAA] identified no significant and unavoidable impacts of the project within the jurisdiction and responsibility of . . . NCWD, no additional statement of overriding considerations is required."

CWIN's objection to NCWD's incorporation of the City's statement of overriding considerations does not include a challenge to the City's decision itself. In other words, CWIN does not dispute that the City obeyed the procedural requirements of CEQA when it decided that the benefits of the project outweigh its environmental impacts. Given this context, we see no showing of harm in NCWD's "incorporation" of the City's statement of overriding considerations. Assuming, NCWD should have included a finding in its resolution to the effect that NCWD itself found that the benefits of the annexation were outweighed by environmental impacts, we find this omission, if any, did not cause any harm under CEQA.

To the extent that CWIN seems to contend that NCWD did not evaluate the City's findings or its statement of overriding considerations, we reject CWIN's claim. NCWD's resolution expressly represents that the City presented its EIR/FAA to NCWD, and that NCWD reviewed and considered the information contained in the City's EIR/FAA. The resolution further states that NCWD's decision to approve the annexation of the Gate King site reflected the independent judgment and analysis of NCWD. In short, NCWD did consider the City's findings and statement of overriding considerations before

incorporating/adopting them. In the absence of evidence to the contrary, we will not presume that NCWD simply rubber-stamped the City's findings and statement of overriding considerations. (Evid. Code, § 664.)

In the final analysis, we see no purpose to be served in requiring NCWD to expend scrivener's ink and paper to restate in rote findings with which it agrees and has adopted after due consideration. (*Fund For Environmental Defense v. County of Orange* (1988) 204 Cal.App.3d 1538, 1552-1553.)

DISPOSITION

The judgment dated September 5, 2007, in case number BS084677, *Santa Clarita Oak Conversancy v. City of Santa Clarita*, is affirmed.

The order dated September 5, 2007, in case number BS098727, *California Water Impact Network v. Newhall County Water District*, is affirmed.

Respondents shall recover their costs on appeal.

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

BIGELOW, J.

We concur:

RUBIN, Acting P. J.

O'NEILL, J.*

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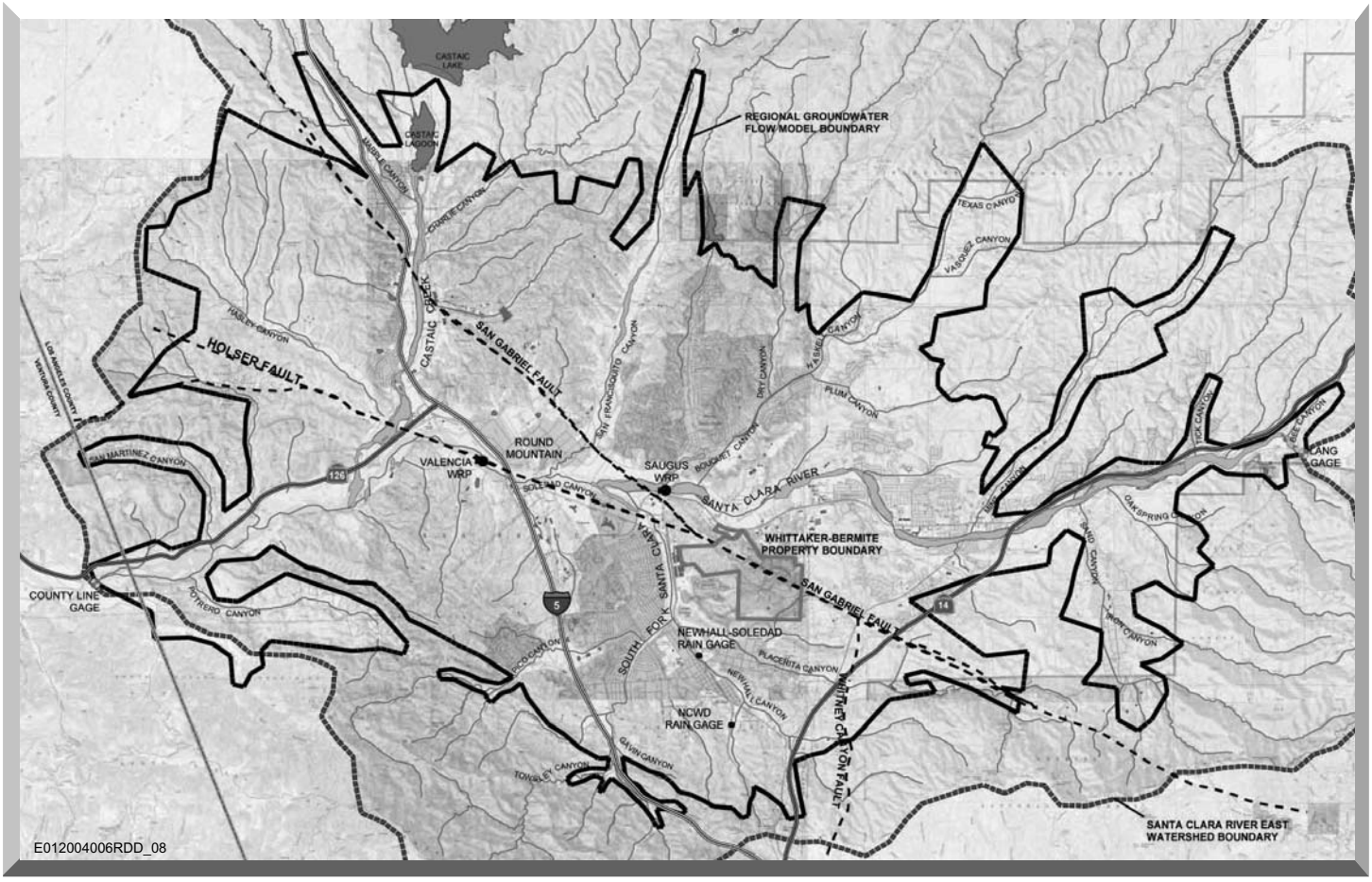
* Judge of the Ventura Superior Court, assigned by the Chief Justice pursuant to article VI, section 6 of the California Constitution.

FINAL REPORT

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property

Prepared in Support of the 97-005 Permit Application



Prepared for
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27234 Bouquet Canyon Road
Santa Clarita, California 91350-2173

Mr. William Manetta
Santa Clarita Water Division, CLWA
22722 Soledad Canyon Road
Saugus, California 91350

Mr. Steve Cole
Newhall County Water District
P.O. Box 220970
23780 North Pine Street
Santa Clarita, California 91322-0970

Subject: Submittal of Final Report on Perchlorate Containment Analysis

Dear Mr. DiPrimio, Mr. Masnada, Mr. Manetta, and Mr. Cole:

CH2M HILL is pleased to submit the enclosed final report titled *Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California*. This report has been developed for the Upper Basin Water Purveyors and is the second of two reports that present and evaluate the strategy for containing perchlorate that is emanating from the Whittaker-Bermite site. This work has been performed as part of the Environmental Oversight Agreement with DTSC, which has approved both reports. The first report, dated April 2004, documented the construction and calibration of a ground-water flow model for the Santa Clarita Valley. The enclosed report presents a modeling analysis of the perchlorate containment plan and also discusses the general design of a sentinel monitoring plan that will be implemented in conjunction with the perchlorate containment plan (per the requirements of the Department of Health Services' 97-005 Policy).

It has been our pleasure to serve the Upper Basin Water Purveyors on this important project. Please feel free to call me at 503/235-5022, if you have any questions.

Sincerely,

CH2M HILL

John J. Porcello
Project Manager

Nathan R. Brown
Hydrogeologist

RDD/041620011(clr2739.doc)
Enclosures

Final

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Prepared in Support of the 97-005 Permit Application

Prepared for

Upper Basin Water Purveyors:

Castaic Lake Water Agency (CLWA)
Newhall County Water District
Santa Clarita Water Division of CLWA
Valencia Water Company

December 2004

CH2MHILL

Executive Summary

ES.1 Introduction

This report presents an analysis of a plan to contain perchlorate that is present in the Saugus Formation aquifer, which lies beneath a portion of the Santa Clarita Valley (located in northwestern Los Angeles County, California). The containment plan consists of pumping from two deep production wells (SCWC-Saugus1 and SCWC-Saugus2) that have not operated in several years because of elevated concentrations of perchlorate in groundwater. The SCWC-Saugus1 and SCWC-Saugus2 wells will be pumped on a nearly continual basis at a rate of 1,200 gallons per minute (gpm) at each well. A third impacted well, NCWD-11, might be pumped seasonally (during the summer) at 1,200 gpm if it is put back into service. However, this well is not needed to meet the containment objectives and might be destroyed. The groundwater that is pumped from these wells will then be treated at a central location to remove perchlorate prior to entering the potable water conveyance system. The treated water will be pumped to the Rio Vista Intake Pump Station (owned and operated by the Castaic Lake Water Agency [CLWA]) for subsequent distribution, to help meet water demands. In addition to these containment operations, one perchlorate-impacted production well (VWC-157) that lies downgradient of SCWC-Saugus1 and SCWC-Saugus2 will be destroyed, rather than being used for containment. Also, a network of sentinel monitoring wells will be used for performance monitoring of the containment plan and for providing early warning of any changes that might occur in groundwater quality upgradient of the containment wells.

The selected pumping plan has been designed to cause perchlorate, which is migrating in groundwater from the nearby Whittaker-Bermite property, to be captured by these wells, thereby controlling its movement toward other portions of the aquifer, where additional water supplies could otherwise be impacted. The operation of these wells is also designed to capture perchlorate-containing groundwater that is present just downgradient of these two wells. The pumping rates have been selected by considering the water supply needs of the valley and analyses of groundwater flow patterns that are expected under the pumping plan for these wells. The analyses of groundwater flow patterns have been performed using a numerical regional-scale groundwater flow model of the valley, which was developed by the local water purveyors (herein referred to as the Purveyors[1]) for use in managing the local groundwater resource. Figure ES-1 shows the study area, including the model boundaries (tables and figures are located at the end of this summary).

Returning perchlorate-impacted production wells to service with treatment requires the issuance of a permit by the California Department of Health Services (DHS) before the water can serve as a potable water supply. Before issuing a permit, DHS requires that formal studies and engineering work be performed to demonstrate that pumping these wells and

[1]The Purveyors, also referred to as the Upper Basin Water Purveyors, consist of the Castaic Lake Water Agency (CLWA), the Newhall County Water District, the Santa Clarita Water Division of CLWA, and the Valencia Water Company.

treating the water will be protective of human health for the users of the water[2]. To obtain a permit, the owner of the well must perform a detailed evaluation of the effects of returning the well to service. The process for conducting the evaluation is called the 97-005 process, named after the policy memo that describes the process (DHS, 1997). The policy memo also discusses the basic tenets under which the DHS Drinking Water Program evaluates proposals, establishes appropriate permit conditions, and approves returning an impacted well to service for direct potable use.

This report presents the modeling analysis of the Purveyors' preferred pumping plan for the Saugus Formation in the vicinity of the impacted Saugus production wells. This report also presents the objectives and general design of a groundwater quality monitoring program that will be implemented conjunctively with the pumping and treatment program, to identify any changes in groundwater quality that might adversely affect the treatment process. This monitoring program will include water level monitoring and groundwater modeling activities during startup of the long-term containment system, to verify that containment is being achieved and evaluate whether adjustments to the pumping program are warranted. This report has been prepared to support the source assessment and permitting process that the Purveyors are performing under the 97-005 Policy.

ES.2 Background

In 1997, two Saugus Formation production wells owned by the Santa Clarita Water Company (SCWC)[3] (wells SCWC-Saugus1 and SCWC-Saugus2), one Saugus Formation production well owned by the Newhall County Water District (NCWD) (well NCWD-11), and one Saugus Formation production well owned by Valencia Water Company (VWC) (well VWC-157) were shut down because perchlorate was detected in groundwater at these wells. In 2002, an Alluvial Aquifer production well owned by SCWC (well SCWC-Stadium) was shut down because of a perchlorate detection. The locations of the five impacted production wells and nearby nonimpacted production wells are shown on Figure ES-2, along with the locations of monitoring wells and exploratory borings that have been installed to investigate the extent of perchlorate contamination. Figure ES-2 also shows perchlorate concentrations at locations where perchlorate has been detected in groundwater. At each of the five production wells, the detected perchlorate concentrations exceeded the State of California's Action Level (AL) for perchlorate at the time of the detection[4].

Together, the four impacted production wells in the Saugus Formation pumped between 1,900 and 6,800 acre-feet per year (AF/yr) during the early and mid-1990s, prior to being shut down. The average pumping from these four wells was 4,186 AF/yr from 1991 through 1996, the 6 years preceding the perchlorate detections (see Table ES-1). The four wells have a combined instantaneous pumping capacity of 7,900 gpm. The Purveyors plan to return three of the four impacted Saugus Formation production wells to service (SCWC-Saugus1,

[2]The Purveyors and DHS require that water provided to customers contain no detectable perchlorate.

[3]The SCWC was acquired by CLWA in 1999. It was formerly called the Santa Clarita Water Company and is now called the Santa Clarita Water Division of CLWA.

[4]The AL has varied over time. DHS initially established an AL of 18 micrograms per liter (μg/L) in 1997, at the same time the four impacted Saugus Formation production wells were taken offline. In 2002, DHS revised the AL to 4 μg/L based on studies by the U.S. Environmental Protection Agency (EPA). In March 2004, the AL was revised to 6 μg/L based on a public health goal published by the Office of Environmental Health Hazard Assessment. See the internet site http://www.dhs.ca.gov/ps/ddwem/chemicals/perchl/actionlevel.htm for further details.

SCWC-Saugus2, and NCWD-11) and to replace one well (VWC-157) with a newer well located in the western portion of the valley (west of the area shown on Figure ES-2).

ES-3 Objectives

In addition to meeting the requirements of the 97-005 Policy Memo (DHS, 1997), the Purveyors have identified the following objectives that must be met by the pumping plan for the impacted Saugus Formation production wells:

1. Hydraulically contain perchlorate that is migrating westward in the Saugus Formation from the Whittaker-Bermite property toward the impacted production wells.
2. Hydraulically contain perchlorate that is present at wells MP-5 and VWC-157, which are located downgradient of the impacted wells.
3. Protect downgradient production wells that are currently not impacted.
4. Restore the annual volumes of water that were pumped from the impacted wells before they were shut down.
5. Operate the impacted wells in a manner consistent with the Purveyors' operational plan for the groundwater resources in the Santa Clarita Valley[5].
6. If possible, pump one or more of the impacted Saugus Formation production wells in a manner that also contains perchlorate migrating in the Alluvial Aquifer from the northern portion of the Whittaker-Bermite property. Unlike the previous objectives, this is a secondary objective for operating the impacted Saugus Formation production wells, because other long-term remedies are being developed for the Alluvial Aquifer. Consequently, this objective is not the basis for selecting or rejecting any given pumping plan for the impacted Saugus Formation production wells.

The pumping plan that is developed and evaluated in this report for the impacted Saugus Formation production wells is an interim program that will operate throughout the period of evaluating, designing, and permitting long-term remedial actions for the Whittaker-Bermite property and nearby groundwater. It is anticipated that the pumping plan for the impacted Saugus Formation production wells will continue to be implemented after the long-term remedies are in place on the Whittaker-Bermite property, in part because the pumping plan is intended to meet the water supply needs of the Purveyors.

ES.4 Methodology

The containment evaluation for the impacted Saugus Formation production wells was performed using the regional groundwater flow model for the Santa Clarita Valley (Regional Model). The Regional Model's construction and calibration are discussed in detail in *Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration* (CH2M HILL, 2004a). The Regional Model simulates the temporal and spatial variations in groundwater flow patterns in three dimensions, including the recharge and

[5]This operational plan is described in the documents titled *Urban Water Management Plan 2000* (Black & Veatch, 2000) and *Santa Clarita Valley Water Report 2003* (Luhdorff & Scalmanini Consulting Engineers, 2004).

discharge rates of groundwater in the valley. The Regional Model covers the entire area underlain by the Saugus Formation, plus the portions of the Alluvial Aquifer that lie beyond the limits of the Saugus Formation. The Regional Model area largely coincides with the Santa Clara River Valley East Groundwater Subbasin, extending from the Lang stream gage at the eastern end of the valley to the County Line stream gage area in the west.

The process of designing a modeling analysis to evaluate perchlorate containment consisted of the following activities:

1. Refining the model grid in and around the areas where impacted wells are located
2. Selecting a period over which to simulate groundwater conditions resulting from various pumping configurations
3. Defining the pumping plan at the impacted wells and all other wells in the Santa Clarita Valley, considering the objectives above and the variability in pumping demands that occur due to cycles of drought and nondrought conditions and year-to-year variations in the availability of other water supplies
4. Defining the variation in local hydrology (rainfall, streamflows, and groundwater recharge) on a month-to-month basis throughout the simulation period
5. Running the model to calculate time-varying (monthly) groundwater elevations and groundwater discharge terms throughout the multi-year simulation period
6. Evaluating the modeling results, as follows:
    a. Examining forecasted time-series plots (hydrographs) of water budget terms and groundwater elevations to evaluate the effects of the pumping plan at the impacted Saugus Formation production wells and across the basin
    b. Analyzing forecasted groundwater flowpaths (using particle-tracking techniques) to identify the degree of containment provided by the pumping plan for the impacted Saugus Formation production wells
7. Performing two sets of sensitivity analyses to address the following questions concerning the selected pumping plan for the impacted Saugus Formation production wells:
    a. Can the containment objectives be met by using lower pumping rates at SCWC-Saugus1 and SCWC-Saugus2, rather than the rate of 1,200 gpm that has been selected for each well, based, in part, on the water supply needs of the valley?
    b. How would the model predictions change if the degree of connection between the Alluvial Aquifer and the Saugus Formation is less than the degree of connection that is simulated by the calibrated model?

Of importance to the analysis was not only the operation of the impacted wells, but also the operational pumping plan for other production wells in the Santa Clarita Valley. The operational plan for the Santa Clarita Valley's groundwater resources has been defined in the *Urban Water Management Plan 2000* (UWMP) for the Santa Clarita Valley (Black & Veatch, 2000) and in annual water reports that discuss the water demands, water supplies, and surface water and groundwater resources of the valley (including the *Santa Clarita*

Valley Water Report 2003 [Luhdorff & Scalmanini Consulting Engineers, 2004]). These reports provide ranges of values for groundwater extractions from the Alluvial Aquifer and the Saugus Formation during average/normal years and dry years. For the modeling analysis, the locations and temporal variation in pumping from the Alluvial Aquifer were defined from the operational plan and from historical records of the year-to-year variability in local hydrology. Simulated pumping from the Saugus Formation was defined from the operational plan, historical pumping records, and operational constraints and historical patterns of water supply availability for water supplies that are imported from the State Water Project (SWP). Pumping rates at individual wells were assigned using the recent and planned production schedules for each well and by evaluating the type of pumping plan that will meet the perchlorate containment objectives for the impacted wells.

The Regional Model was run using a synthetic 78-year period that was derived from historical records of year-to-year variations in both the local hydrology and the hydrology of the SWP system. The 78-year period simulates the following conditions:

1. Average rainfall during this period is similar to the long-term mean of approximately 18 inches per year, as measured at the Newhall-Soledad rain gage. The period includes long periods (i.e., on the order of decades) of relatively dry conditions and relatively wet conditions.
2. For the Saugus Formation, the simulation period includes 18 years of SWP drought and corresponding dry-year pumping during the 78-year period, including two droughts that last for 3 years and two droughts that last for 2 years. Dry-year pumping from the Saugus Formation ranges between 15,000 and 35,000 AF/yr, compared with 15,000 AF/yr or less in nondrought years (see Table ES-2).
3. For the Alluvial Aquifer, the 78-year period includes 24 years of dry-year pumping, which is approximately 5,000 AF/yr lower than the pumping that occurs during years of normal or above-normal rainfall and streamflows. This period includes one drought lasting for 4 years and two droughts that last 3 years.

Model results were evaluated as follows:

1. Time-series plots (hydrographs) of water budget terms and groundwater elevations were used to forecast the effects of the pumping plan at the impacted wells and across the basin.
2. Groundwater flowpaths were forecast using three-dimensional particle-tracking techniques to identify the degree to which pumping from the impacted Saugus Formation production wells contains perchlorate migrating westward toward these wells from the Whittaker-Bermite property.

ES.5 Conclusions from the Modeling Analysis

The major conclusions from the modeling analysis are as follows:

1. Operating production wells SCWC-Saugus1 and SCWC-Saugus2 at rates of 1,200 gpm each on a nearly continual basis will effectively contain perchlorate migrating westward in the Saugus Formation from the Whittaker-Bermite property, and will also contain perchlorate that is present at Saugus wells MP-5 and VWC-157. This is shown by Figure

ES-3, which displays groundwater flowpaths from MP-5, VWC-157, and the Whittaker-Bermite property; and by Figure ES-4, which displays the areas within the Saugus Formation where water is obtained by each of the impacted production wells and each of the nonimpacted production wells that are located downgradient of SCWC-Saugus1 and SCWC-Saugus2.

2. Operating production wells SCWC-Saugus1 and SCWC-Saugus2 at rates as low as 700 to 800 gpm each will not fully contain groundwater that is migrating westward from the Whittaker-Bermite property. Additionally, if these wells are operated at 1,000 gpm each, perchlorate that is present in the Saugus Formation at wells MP-5 and VWC-157 will not be captured, and will instead migrate to existing nonimpacted wells VWC-160 and VWC-205.

3. No new production wells are needed in the Saugus Formation to meet the perchlorate containment objectives.

4. Impacted well NCWD-11 is not a required component of the containment program.

5. Use of other water supplies in lieu of pumping at SCWC-Saugus1 and SCWC-Saugus2 will likely be detrimental to the long-term quality of groundwater in the Saugus Formation. Pumping at these two wells is necessary to prevent migration of perchlorate to other portions of the Saugus Formation.

6. The pumping plan for SCWC-Saugus1 and SCWC-Saugus2 may contain perchlorate that is migrating in the Alluvial Aquifer from the northern portion of the Whittaker-Bermite property, including perchlorate that has been detected in the Alluvial Aquifer at and south of Bouquet Junction.

7. The operational plan for the impacted production wells will not cause detrimental short-term or long-term effects to the groundwater and surface water resources of the Santa Clarita Valley. In particular, the modeling analysis indicates that short- and long-term variability in local rainfall and streamflows is the predominant cause of fluctuating groundwater elevations, river flows, and groundwater storage volumes. This is indicated by Figures ES-5 through ES-7, which together show that year-to-year changes in groundwater recharge volumes and groundwater storage volumes are much greater than year-to-year fluctuations in pumping. Compared to local hydrology, implementation of the operational pumping plan for the valley, including the planned use of wells SCWC-Saugus1 and SCWC-Saugus2, has much less influence on the water resources of the valley.

It is important to note that the model simulations described in this report distribute pumping in a manner that is based on current and projected uses of both the Alluvial Aquifer and the Saugus Formation. The conclusions presented in this report regarding containment of perchlorate-containing groundwater will potentially be different if the pumping plan for other Saugus Formation wells is significantly different than what was simulated. In particular, a significant change in the Saugus Formation pumping regime in the South Fork Santa Clara River area or near its mouth could potentially cause groundwater flow patterns and capture zones to be notably different from those described in this report. Changes that could appreciably alter groundwater flow patterns and capture zones could include the operation of new wells in that area, or notably greater instantaneous

pumping rates or annual pumping volumes than those simulated by the Regional Model. Consequently, before a new well is sited in that area or a significant increase in pumping occurs from an existing wellfield in that area, it is recommended that an analysis first be conducted of the potential effects of the contemplated change on the perchlorate containment program.

ES.6 Sentinel Monitoring Program

DHS Policy Memo 97-005 requires the implementation of sentinel monitoring in groundwater upgradient of impacted wells to provide early warning of any unanticipated changes in groundwater quality. Based on this policy, the sentinel monitoring plan for the impacted Saugus Formation production wells is intended to provide advanced warning of concentration changes or the presence of additional contaminants in groundwater that might affect the perchlorate treatment processes. Additionally, groundwater elevation and pumping data will be collected under the sentinel monitoring plan to evaluate the effectiveness of the perchlorate containment plan that is described in this report.

As shown on Figure ES-8 and in Table ES-3, the monitoring well network for the sentinel monitoring program will monitor both the Alluvial Aquifer and the Saugus Formation upgradient of each production well. Monitoring will occur at eleven wells, seven of which do not yet exist. Well locations were selected according to the following considerations:

1. Locating sentinel wells sufficient distances from the production well to allow adequate time to respond to significant concentration changes
2. Using existing monitoring wells, to the degree possible
3. Locating new monitoring wells in areas where site access will not cause undue restrictions on drilling, installing, and monitoring new sentinel monitoring wells

Table ES-4 lists the chemical constituents to be monitored, and the frequency at which monitoring will occur as the operational plan for the impacted wells is implemented. The program will focus primarily on monitoring for perchlorate, volatile organic compounds, nitrate, and sulfate, which are the constituents most likely to affect the treatment system if present at concentrations greater than those observed to date. General minerals (anions and cations) will be sampled on a biannual basis to provide geochemical information that may be helpful for evaluating groundwater migration in the vicinity of each impacted production well. However, nitrate and sulfate will be analyzed annually because of their potential influence on the ion-exchange treatment system, which is the system likely to be selected for perchlorate treatment at SCWC-Saugus1, SCWC-Saugus2, and NCWD-11.

Performance monitoring of the pumping plan's ability to meet the containment objectives will be accomplished by monitoring groundwater levels and pumping rates during system startup and analyzing these data with the Regional Model. Water level monitoring will be conducted at each sentinel well that is completed in the Saugus Formation and at multi-port monitoring well MP-5, which is also completed in the Saugus Formation and is located downgradient of SCWC-Saugus1 and SCWC-Saugus2. Water levels will be measured at these wells during the start-up period for the containment system, as well as immediately prior to startup. The water level trends will then be compared with water level trends that

are calculated from Regional Model simulations of the pumping at impacted and non-impacted wells during the initial startup period for the containment pumping plan. Together, the system monitoring data and the subsequent modeling analysis will used to draw conclusions concerning the effectiveness of the containment plan and whether adjustments to the pumping operations at SCWC-Saugus1 and SCWC-Saugus2 are warranted.

Tables

TABLE ES-1

Historical Pumping at Impacted Saugus Formation Production Wells

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner - Well Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
VWC-157	635	604	529	239	387	314	581	484	1,222	1,146	635	1,005	570	436	616	403	46	81	0	0	0
SCWC-Saugus1	0	0	0	0	0	0	0	0	31	0	0	1,690	437	1,226	1,333	0	410	451	0	0	0
SCWC-Saugus2	0	0	0	0	0	0	0	0	32	0	40	3,091	2,476	1,675	2,530	1,726	1,766	617	0	0	0
NCWD-11	729	870	715	754	1,159	1,278	2,209	2,371	1,265	1,280	1,252	1,034	428	730	614	522	353	81	14	0	0
Total	**1,364**	**1,474**	**1,244**	**993**	**1,546**	**1,592**	**2,790**	**2,855**	**2,550**	**2,426**	**1,927**	**6,820**	**3,911**	**4,067**	**5,093**	**2,651**	**2,575**	**1,230**	**14**	**0**	**0**

1991 through 1996 average = 4,186

Note:

All pumping volumes are listed in AF/yr.

TABLE ES-2
Annual Pumping Rates Specified by the Operational Plan for the Santa Clarita Valley's Groundwater Resources
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Aquifer	Normal Years	Dry Year 1	Dry Year 2	Dry Year 3
Operational Plan Pumping				
Alluvium	30,000 to 40,000	30,000 to 35,000	30,000 to 35,000	30,000 to 35,000
Saugus	7,500 to 15,000	7,500 to 25,000	21,000 to 25,000	21,000 to 35,000
Total	**37,500 to 55,000**	**37,500 to 60,000**	**51,000 to 60,000**	**51,000 to 70,000**
Modeled Pumping				
Alluvium	38,429	33,767	33,767	33,767
Saugus	10,679	15,760	24,346	34,096
Total	**49,108**	**49,527**	**58,113**	**67,863**

Notes:

All pumping volumes are listed in acre-feet.

The operational plan is defined in the documents titled *Urban Water Management Plan 2000* (Black & Veatch, 2000) and *Santa Clarita Valley Water Report 2003* (Luhdorff & Scalmanini Consulting Engineers, 2004).

In the model simulations, total pumping is different than listed in this table when dry-year pumping conditions in one aquifer coincide with normal-year pumping conditions in the other aquifer (due to differences in the timing of dry conditions locally versus reduced deliveries of water imports from the State Water Project).

TABLE ES-3

Well Network for Sentinel Groundwater Quality Monitoring

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Production Well	Sentinel Monitoring Locations	New Monitoring Well Needed?	Actual or Target Depth Interval for Well Screen (ft bgs)	Well Name	TOT Distance from Production Well	Rationale, Comments
SCWC-Saugus1	Alluvium: New well in Magic Mountain	Yes	40-60	AL-12A	1 year or less	Alluvial and Saugus HSU S-I monitoring is for a possible pathway to SCWC-Saugus1. Access constraints might require installation of these wells in the City of Santa Clarita right of way along Magic Mountain Parkway. There are currently no Saugus Formation monitoring wells within the delineated capture zone of SCWC-Saugus1. The Saugus wells for HSU S-III will be installed near the corner of San Fernando Road and Magic Mountain Parkway on land owned by the Newhall Land & Farming Company.
	Parkway north of Saugus1	Yes	170-180	AL-12B		
	Saugus (S-I unit): Adjacent to new alluvium well	Yes	230-250 (HSU S-I)	SG1-HSU1		
	Saugus (S-III unit): NLF land north of SCWC-Saugus1	Yes	490-520 (HSU S-III)	SG1-HSU3a		
		Yes	580-640 (HSU S-III)	SG1-HSU3b		
		Yes	750-770 (HSU S-III)	SG1-HSU3c		
SCWC-Saugus2	Alluvium: Existing well AL06	No	65-85	AL06	10 years	Alluvial monitoring is recommended to assess perchlorate near the SCWC-Saugus2 well. At MP-1, the port 2 screen correlates with the top of the screened intervals at SCWC-Saugus1 and SCWC-Saugus2. Port 4 is the uppermost port below a depth of 1,000 feet and below the zones containing perchlorate.
	Saugus: MP-1, ports 2 and 4	No	391.4-401.4 (HSU S-III)	MP-1 (port 2)		
		No	747.5-757.5 (HSU S-V)	MP-1 (port 4)		
NCWD-11	Alluvium: Existing well AL03	No	91-111	AL03	2 years	Alluvial monitoring is recommended because of the potential for the Alluvial Aquifer to be a pathway for perchlorate migration from the site to well NCWD-11. Additionally, movement within the Saugus Formation could be occurring from the site, which is the reason to install a Saugus sentinel well near the Alluvial sentinel well.
	Saugus: New well at AL03 location	Yes	280-320 (HSU S-III)	NC11-HSU3		

Notes:

TOT = time-of-travel

HSU = hydrostratigraphic unit (See *Draft Final Conceptual Hydrogeology Technical Memorandum for the Eastern Santa Clara Sub-basin Groundwater Stud*) [CH2M HILL, 2004b] for discussions of the locations and characteristics of the HSUs.)

TABLE ES-4
Chemical Constituents and Sampling Frequency for the 97-005 Sentinel Monitoring Program
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

		Frequency			
Analytical Parameters	**EPA Method**	**Initial**	**Semiannual**	**Annual**	**Biannual**
Organic Constituents					
Perchlorate	314.0	X	X		
Volatile Organic Compounds	524.2[a]	X	X		
1,2,4-Trimethyl Benzene		X	X		
Methyl Tertiary Butyl Ether		X	X		
General Minerals (Cations and Anions)					
Aluminum	6010	X			X
Bicarbonate/Alkalinity	310.1	X			X
Calcium	6010	X			X
Chloride	300	X			X
Total Phosphorus	365.3	X			X
Potassium	7610	X			X
Iron	6010	X			X
Magnesium	6010	X			X
Manganese	6010	X			X
Sodium	7770	X			X
Sulfate	300	X		X	
Nitrate	352.1	X		X	
Ammonia	350.3	X			X

[a]Tentatively identified compounds will also be reported.

Figures

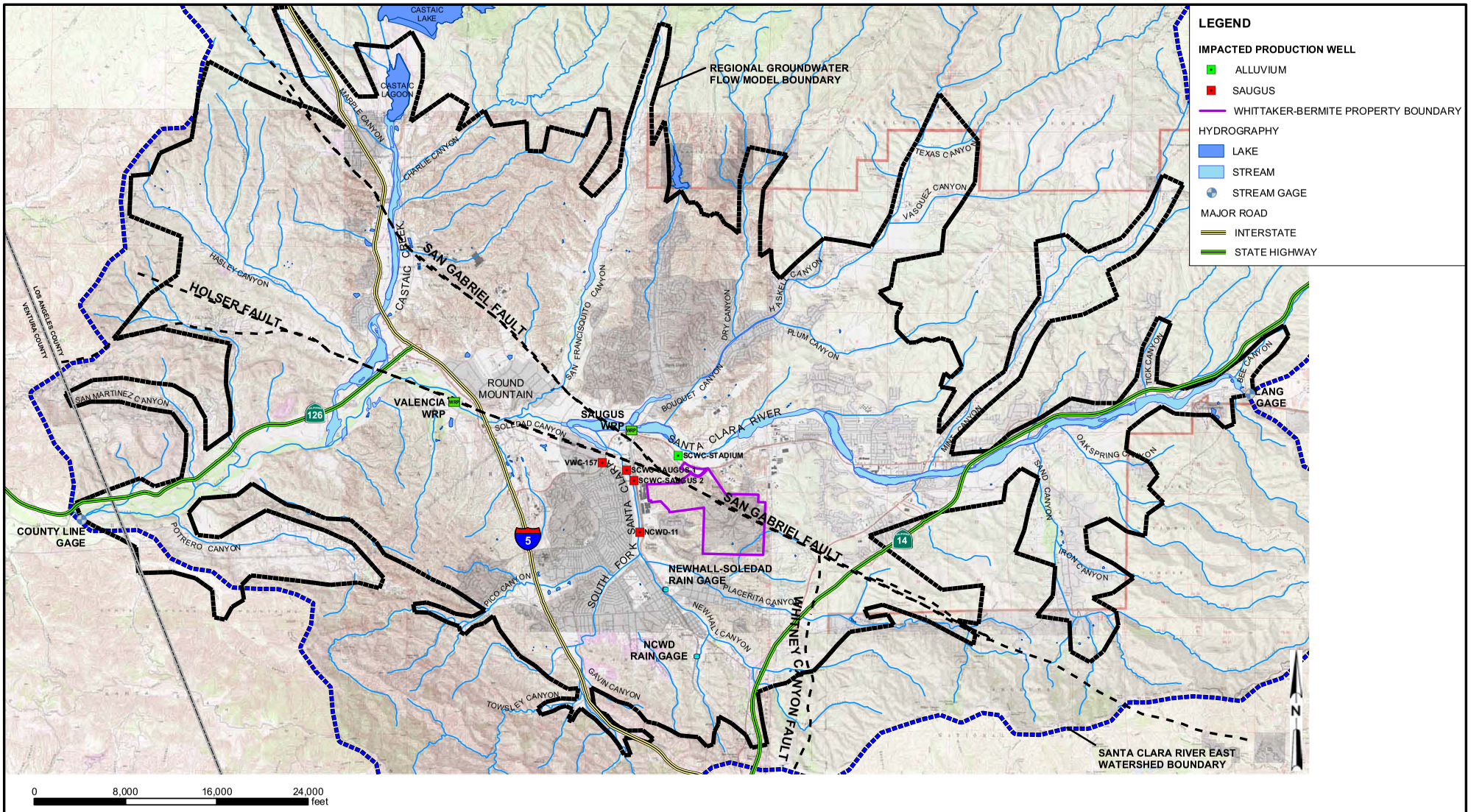

FIGURE ES-1
MAP OF STUDY AREA
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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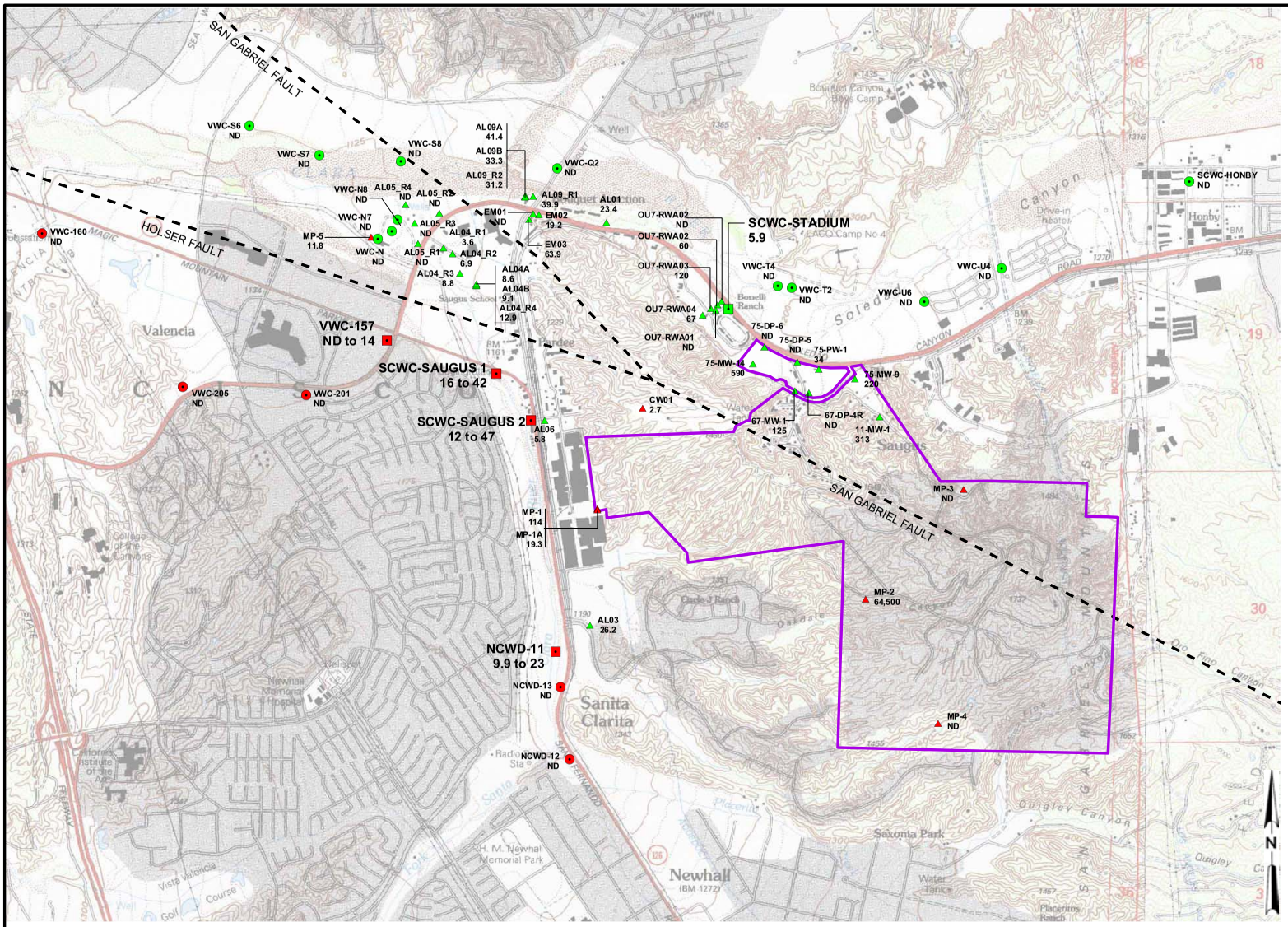

0 2,000 4,000 6,000 feet

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NONIMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
3. µg/L = MICROGRAMS PER LITER.

FIGURE ES-2
WELL LOCATION MAP
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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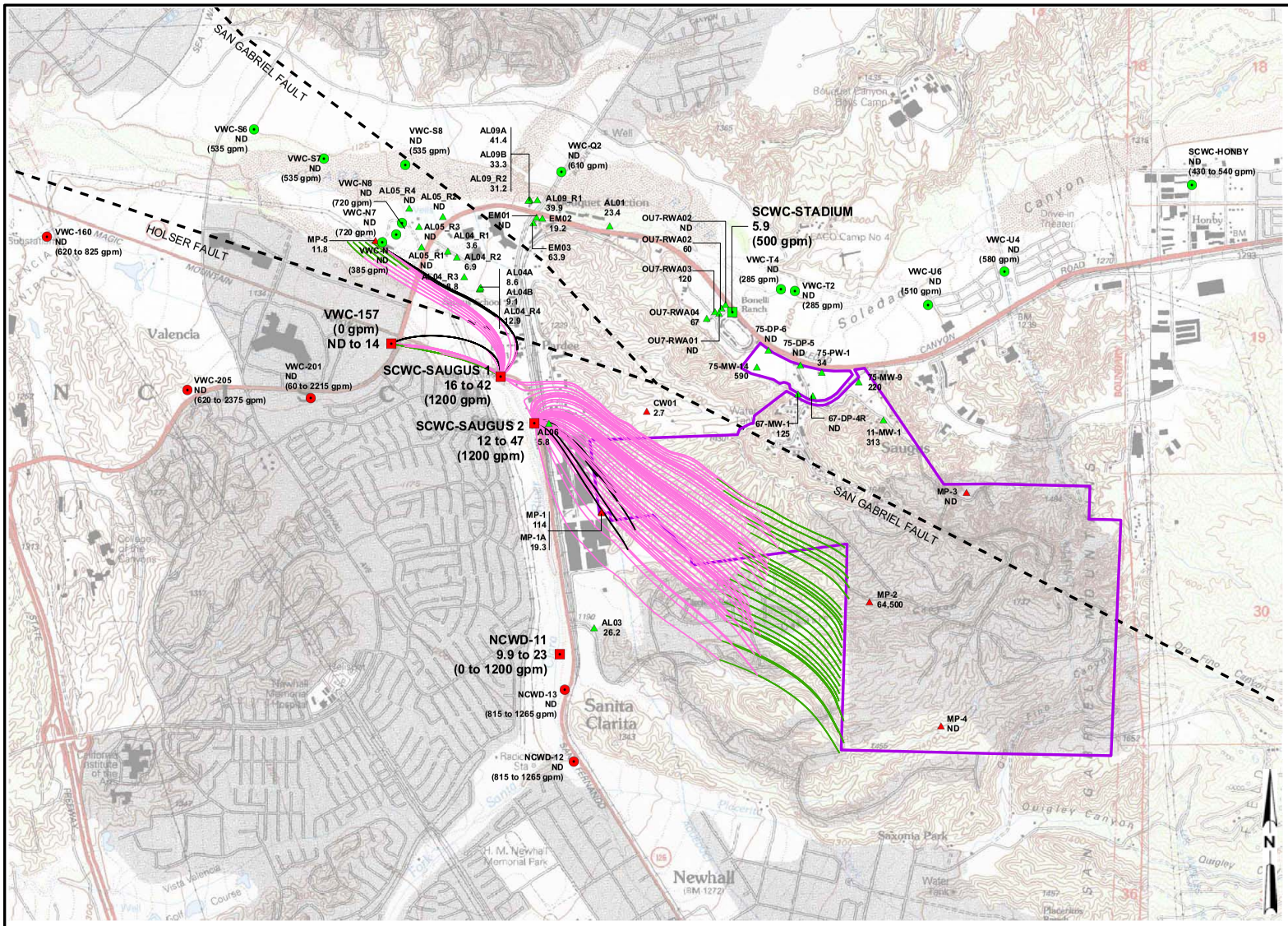

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATH

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. FLOWPATHS AT VWC-157 AND MP-5 ARE INITIATED IN MODEL LAYERS 2, 3, 4, AND 5. FLOWPATHS AT THE WHITTAKER-BERMITE PROPERTY BOUNDARY ARE INITIATED IN MODEL LAYER 3.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE ES-3
GROUNDWATER FLOWPATHS IN THE SAUGUS FORMATION FROM VWC-157, MP-5, AND THE WESTERN BOUNDARY OF THE WHITTAKER-BERMITE PROPERTY

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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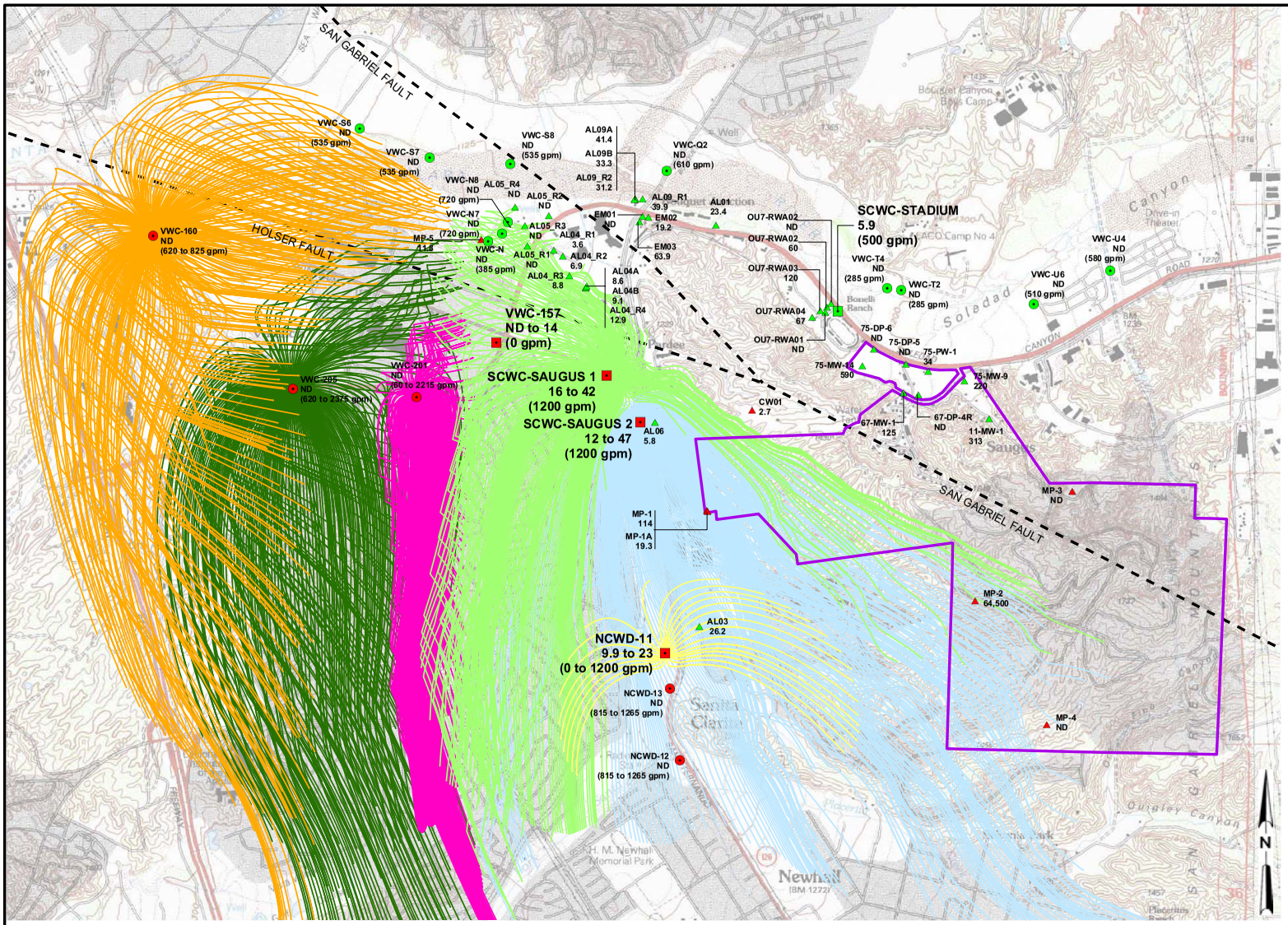

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LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS
- SCWC-SAUGUS 1
- SCWC-SAUGUS 2
- VWC-160
- VWC-201
- VWC-205
- NCWD-11
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. PARTICLES WERE INITIATED IN LAYERS 3, 4, AND 5. ALTHOUGH EACH WELL MAY DERIVE A PORTION OF ITS WATER FROM THE ALLUVIAL AQUIFER, PARTICLES THAT ARE TRACED INTO THE ALLUVIAL AQUIFER ARE NOT SHOWN ON THIS FIGURE BECAUSE THE INTENT OF THE FIGURE IS TO SHOW AREAS IN THE SAUGUS FORMATION THAT ARE CAPTURED BY EACH WELL.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE ES-4
SAUGUS FORMATION CAPTURE ZONES FOR IMPACTED AND NONIMPACTED PRODUCTION WELLS
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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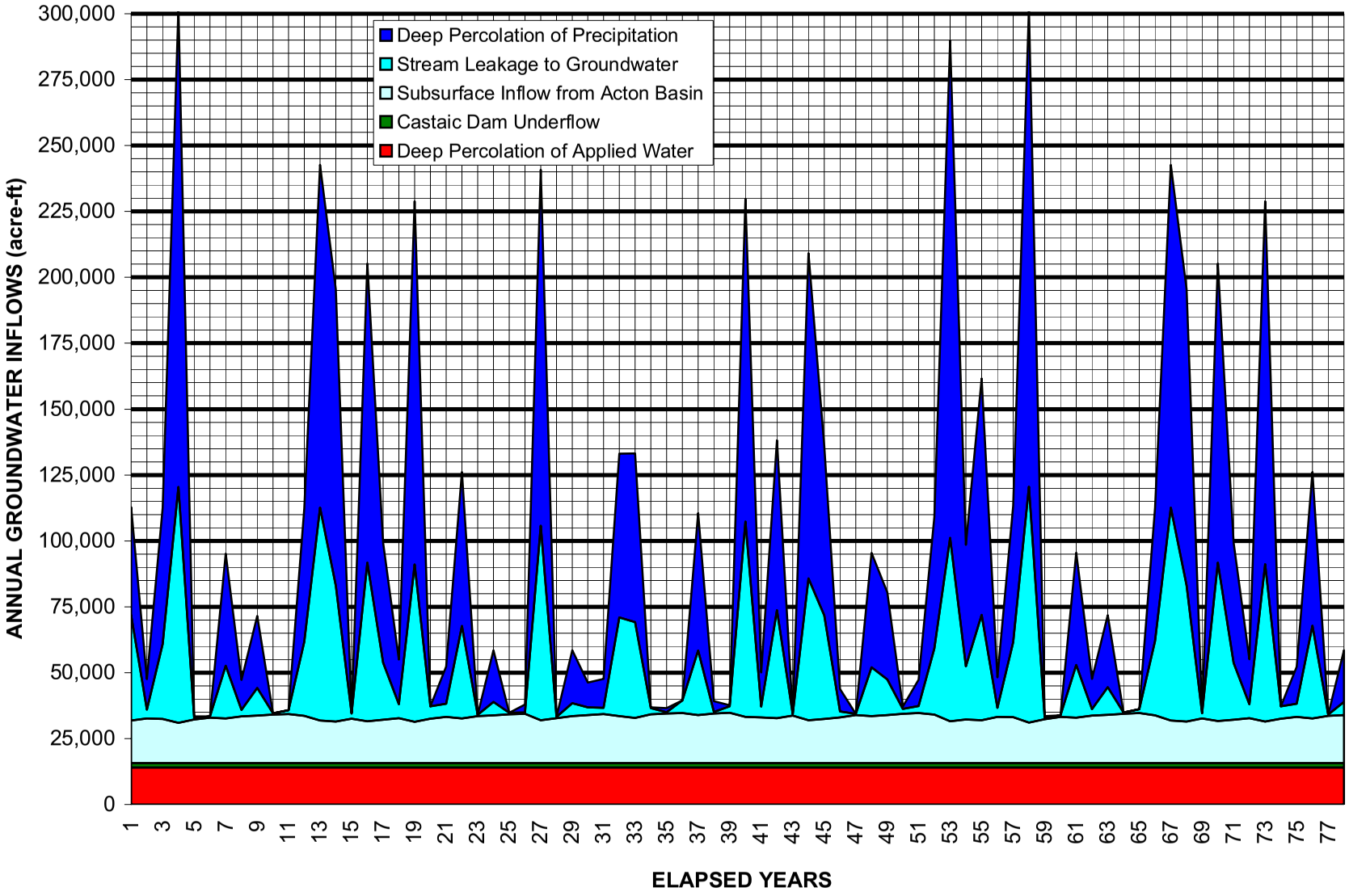

FIGURE ES-5
ANNUAL GROUNDWATER INFLOWS
ANALYSIS OF PERCHLORATE CONTAINMENT IN
GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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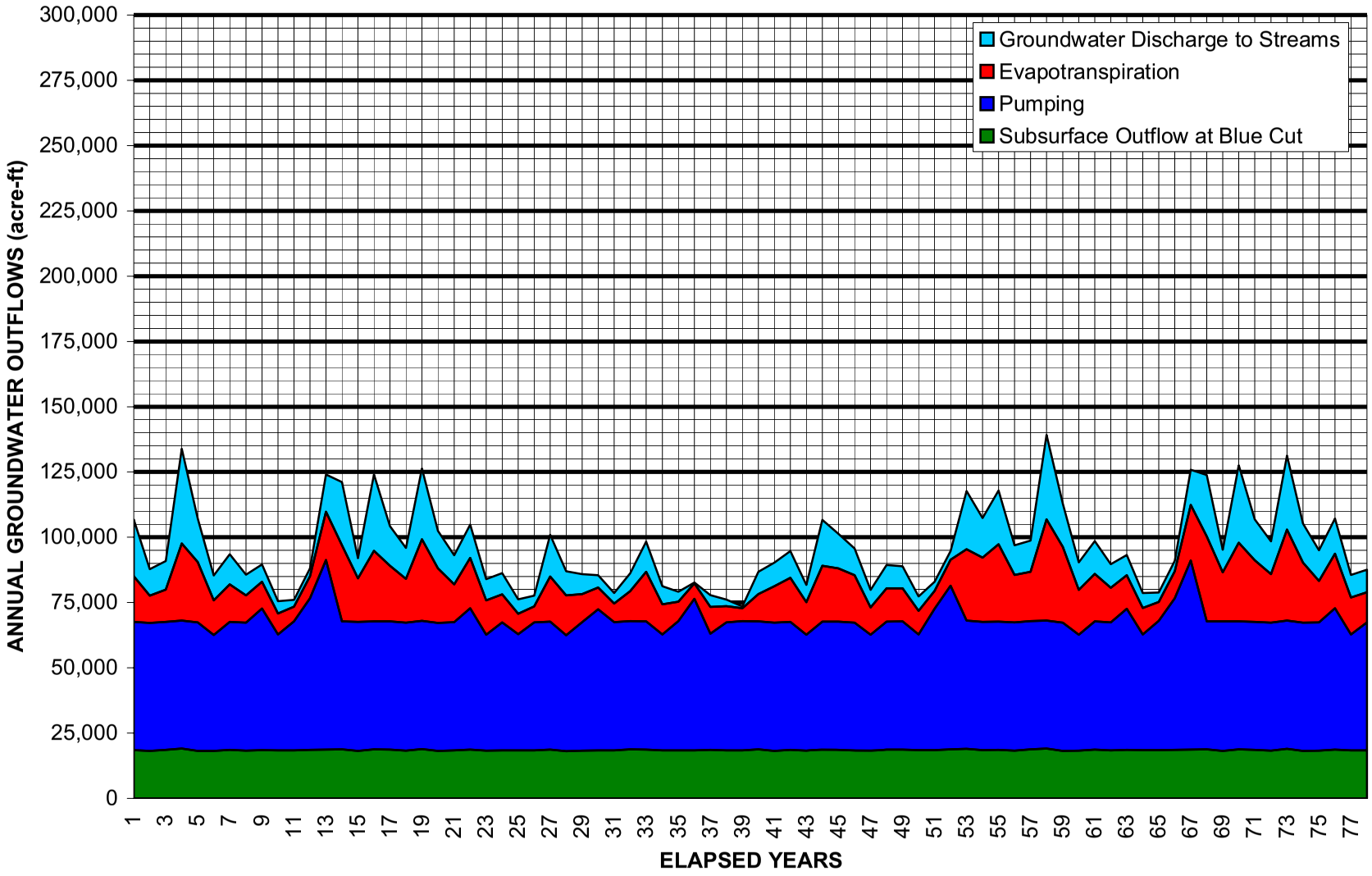

FIGURE ES-6
ANNUAL GROUNDWATER OUTFLOWS
ANALYSIS OF PERCHLORATE CONTAINMENT IN
GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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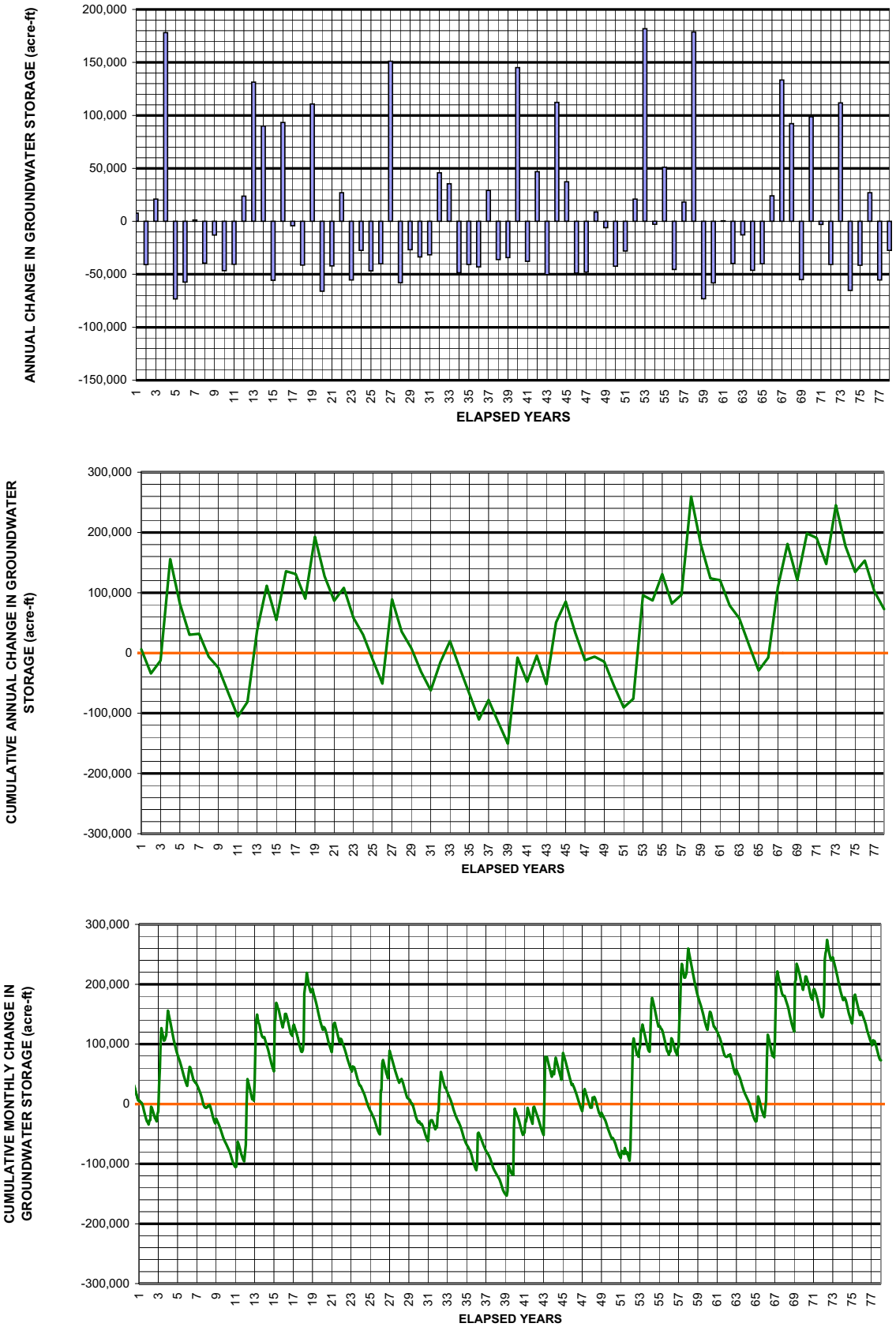

FIGURE ES-7
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SANTA CLARITA, CALIFORNIA

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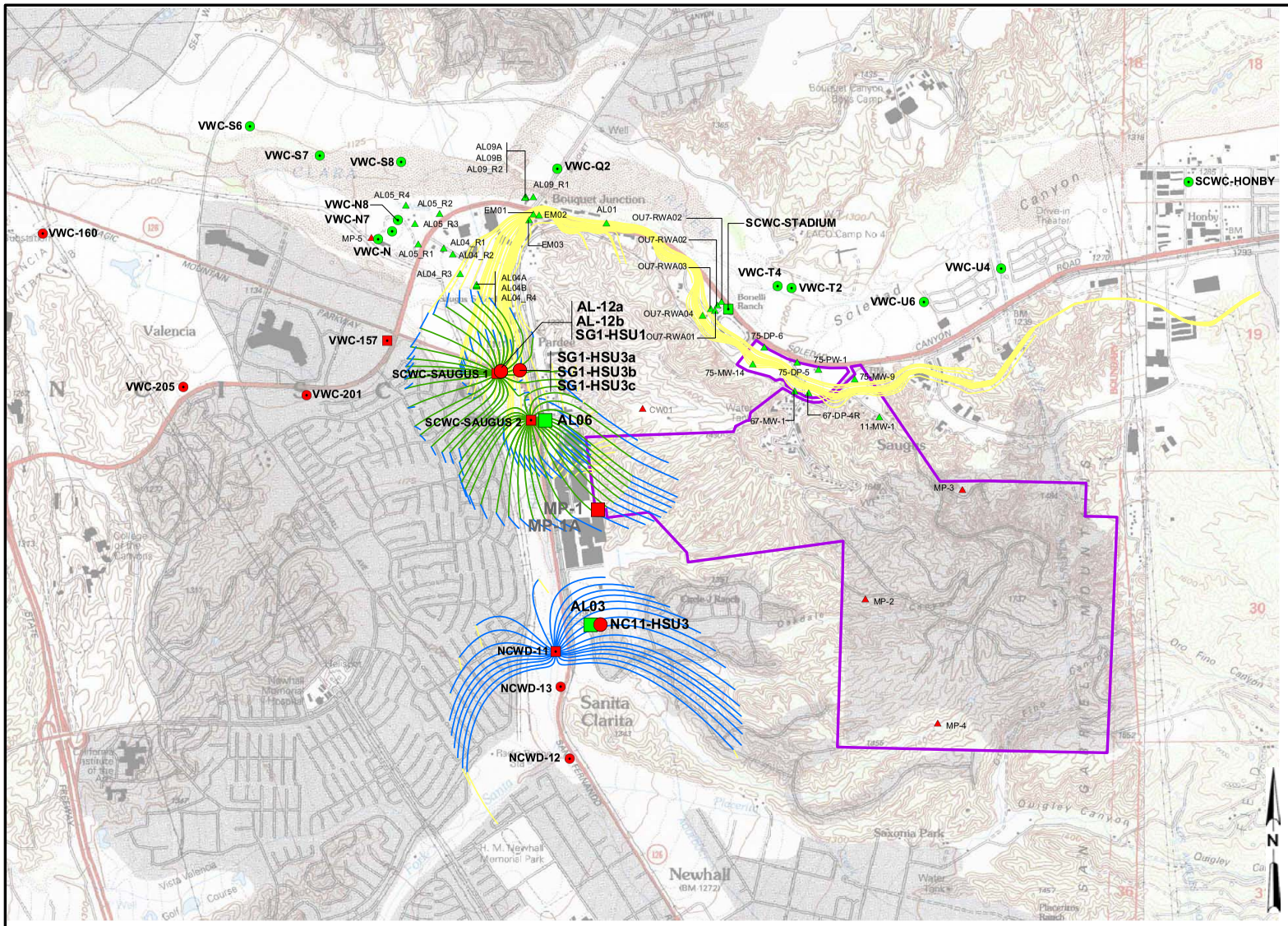

LEGEND

SENTINEL WELLS

EXISTING SENTINEL WELL

- ALLUVIUM
- SAUGUS

NEW SENTINEL WELL

- ALLUVIUM
- SAUGUS

PRODUCTION WELL

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

OTHER MONITORING WELL

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATHS

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. FLOWLINES STARTED THROUGHOUT MODEL LAYERS 2 AND 3 AND TRACED BACKWARDS FOR 20 YEARS.
2. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION. .

0 2,000 4,000 6,000 feet

FIGURE ES-8
WELL LOCATIONS FOR SENTINEL MONITORING OF GROUNDWATER QUALITY
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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3-1 Well Locations for Sentinel Monitoring of Groundwater Quality

Acronyms and Abbreviations

°F	degrees Fahrenheit
µg/L	micrograms per liter
AF	acre-feet
AF/yr	acre-feet per year
AL	State of California Action Level
ASR	aquifer storage and recovery
bgs	below ground surface
CIMIS	California Irrigation Management Information Service
CLWA	Castaic Lake Water Agency
DHS	California Department of Health Services
DMS	Development Monitoring System
DWR	California Department of Water Resources
EPA	U.S. Environmental Protection Agency
ET	evapotranspiration
ft/day	feet per day
ft^2/day	square feet per day
gpm	gallons per minute
HSU	hydrostratigraphic unit
I-5	Interstate 5
in/yr	inches per year
Kh	horizontal hydraulic conductivity
Kv	vertical hydraulic conductivity
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation District
LACWWD	Los Angeles County Waterworks District
LADPW	Los Angeles County Department of Public Works
MCL	Maximum Contaminant Level
MP	multi-port monitoring well
NCWD	Newhall County Water District

NLF	Newhall Land & Farming Company
Purveyors	Upper Basin Water Purveyors
R	vertical anisotropy ratio (Kh:Kv)
Regional Model	Santa Clarita Valley Regional Groundwater Flow Model
SCWC	Santa Clarita Water Company
SWP	State Water Project
SWRM	Surface Water Routing Model
T	transmissivity
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
UWMP	*Urban Water Management Plan 2000*
VWC	Valencia Water Company
WHR	Wayside Honor Rancho
WRP	water reclamation plant
WY	water year

SECTION 1

Introduction

This report presents an analysis of a plan to contain perchlorate that is present in the Saugus Formation aquifer, which lies beneath a portion of the Santa Clarita Valley (located in northwestern Los Angeles County, California). The containment plan consists of pumping from two deep production wells that have not operated in several years because of elevated concentrations of perchlorate in groundwater. The selected pumping plan has been designed to cause perchlorate, which is migrating in groundwater from the nearby Whittaker-Bermite property, to be captured by these wells, thereby controlling its movement toward other portions of the aquifer, where additional water supplies could otherwise be impacted. The operation of these wells is also designed to capture perchlorate-containing groundwater that is present just downgradient of these two wells. The pumping rates have been selected by considering the water supply needs of the valley and analyses of groundwater flow patterns that are expected under the pumping plan for these wells. The analyses of groundwater flow patterns have been performed using a numerical regional-scale groundwater flow model of the valley, which was developed by the local water purveyors (herein referred to as the Purveyors[1]) for use in managing the local groundwater resource. Figure 1-1 shows the study area, including the model boundaries.

Following is background information on the impacted production wells and the presence of perchlorate, followed by a summary of the state regulatory program under which the evaluation work was conducted, and a summary of the purpose and content of this report.

1.1 Background

In 1997, two Saugus Formation production wells owned by the Santa Clarita Water Company (SCWC)[2] (wells SCWC-Saugus1 and SCWC-Saugus2), one Saugus Formation production well owned by the Newhall County Water District (NCWD) (well NCWD-11), and one Saugus Formation production well owned by Valencia Water Company (VWC) (well VWC-157) were shut down because perchlorate was detected in groundwater at these wells. In 2002, an Alluvial Aquifer production well owned by SCWC (well SCWC-Stadium) was shut down because of a perchlorate detection. The locations of the five impacted production wells and nearby nonimpacted production wells are shown on Figure 1-2, along with the locations of monitoring wells and exploratory borings that have been installed to investigate the extent of perchlorate contamination. Figure 1-2 also shows perchlorate concentrations at locations where perchlorate has been detected in groundwater. At each of

[1]The Purveyors, also referred to as the Upper Basin Water Purveyors, consist of the Castaic Lake Water Agency (CLWA), the Newhall County Water District, the Santa Clarita Water Division of CLWA, and the Valencia Water Company.

[2]The SCWC was acquired by CLWA in 1999. It was formerly called the Santa Clarita Water Company and is now called the Santa Clarita Water Division of CLWA.

the five production wells, the detected perchlorate concentrations exceeded the State of California's Action Level (AL) for perchlorate at the time of the detection[3].

The four production wells that were shut down in 1997 are constructed in the Saugus Formation, a deep aquifer system that underlies much of the Santa Clarita Valley. Wells SCWC-Saugus1 and SCWC-Saugus2 are screened from depths ranging between 490 and 1,620 feet below ground surface (ft bgs), and NCWD-11 well is screened from 200 to 1,075 ft bgs. Well VWC-157 is screened from 586 to 2,008 ft bgs. The production well that was shut down in 2002 (SCWC-Stadium) pumps groundwater from the Alluvial Aquifer, and is screened from 33 to 130 ft bgs.

Together, the four impacted production wells in the Saugus Formation pumped between 1,900 and 6,800 acre-feet per year (AF/yr) during the early and mid-1990s, prior to being shut down. The average pumping from these four wells was 4,186 AF/yr from 1991 through 1996, the 6 years preceding the perchlorate detections (see Table 1-1). The four wells have a combined instantaneous pumping capacity of 7,900 gallons per minute (gpm). The Purveyors plan to return three of the four impacted Saugus Formation production wells to service (SCWC-Saugus1, SCWC-Saugus2, and NCWD-11) and to replace one well (VWC-157) with a newer well located in the western portion of the valley (west of the area shown on Figure 1-2). The Purveyors have concluded that it is important to return these wells to service for the following reasons:

1. They are important sources of water supply to the valley, particularly in years of reduced availability of other water supplies.
2. Two of these wells (SCWC-Saugus1 and SCWC-Saugus2) are located in an area where they must be pumped to prevent perchlorate from migrating to currently nonimpacted areas in the Saugus Formation.

In addition, the Purveyors have established that the design of the operational plan for SCWC-Saugus1, SCWC-Saugus2, and NCWD-11 should be protective of human health as follows:

1. Implementation of the selected pumping plan for the impacted Saugus Formation production wells should minimize the risks to other water supply wells in the valley.
2. A sentinel monitoring program should be implemented to provide early warning of any changes in groundwater quality that could adversely affect the perchlorate treatment system or other water supplies.

Accordingly, the Purveyors have developed the following primary elements for the perchlorate containment plan:

1. Pumping and treating groundwater from wells SCWC-Saugus1, SCWC-Saugus2, and NCWD-11. The pumped groundwater will be treated at a central location to remove perchlorate prior to entering the potable water conveyance system. The treatment

[3]The AL has varied over time. The California Department of Health Services (DHS) initially established an AL of 18 micrograms per liter (μg/L) in 1997, at the same time that the four impacted Saugus Formation production wells were taken offline. In 2002, DHS revised the Action Level to 4 μg/L based on studies by the U.S. Environmental Protection Agency (EPA). In March 2004, the Action Level was revised to 6 μg/L based on a public health goal (PHG) published by the Office of Environmental Health Hazard Assessment. See http://www.dhs.ca.gov/ps/ddwem/chemicals/perchl/actionlevel.htm for further details.

process will include the use of ion-exchange resins, followed by disinfection. The treatment system will be designed for a capacity of at least 2,400 gpm.

2. Pumping the treated groundwater to CLWA's Rio Vista Intake Pump Station for subsequent distribution, to help meet water demands.
3. Destroying one perchlorate-impacted production well (VWC-157) that lies downgradient of SCWC-Saugus1 and SCWC-Saugus2 and will not be used for containment.
4. Installing a network of sentinel monitoring wells for performance monitoring of the containment plan and sentinel water quality monitoring.

The pumping, treatment, and subsequent conveyance of water will be performed by CLWA for wells SCWC-Saugus1 and SCWC-Saugus2 and by NCWD for well NCWD-11.

1.2 State Regulatory Program

Returning perchlorate-impacted production to service with treatment requires the issuance of a DHS permit before the water can serve as a potable water supply. Before issuing a permit, DHS requires that formal studies and engineering work be performed to demonstrate that pumping these wells and treating the water will be protective of human health for the users of the water[4]. To obtain a permit, the owner of the well must perform a detailed evaluation of the effects of returning the well to service. The process for conducting the evaluation is called the 97-005 process, named after the policy memo that describes the process (DHS, 1997). The policy memo also discusses the basic tenets under which the DHS Drinking Water Program evaluates proposals, establishes appropriate permit conditions, and approves returning an impacted well to service for direct potable use.

1.3 Report Purpose and Content

Numerical modeling has been performed to forecast the degree of perchlorate containment in groundwater that is likely to be achieved by the pumping plan, and to assist in the selection of a monitoring well network for a sentinel monitoring program. This report presents a modeling analysis of the Purveyors' preferred pumping plan for the Saugus Formation in the vicinity of the impacted Saugus production wells. The modeling analysis was designed to evaluate the following aspects of the pumping plan:

1. Whether the existing impacted Saugus Formation production wells (SCWC-Saugus1, SCWC-Saugus2, and NCWD-11) could be used to contain perchlorate while meeting the water supply needs of the valley
2. Whether additional Saugus Formation production wells are needed in addition to, or instead of, these three impacted wells to meet the containment objectives
3. How the wells should be operated (i.e., the frequency and magnitude of pumping)
4. How operation of other wells in the valley might affect perchlorate containment

[4]The Purveyors and DHS require that water provided to customers contain no detectable perchlorate.

In addition to the modeling analysis, this report discusses the general design of a groundwater quality monitoring program that will be implemented conjunctively with the pumping and treatment program, to identify changes in groundwater quality that might adversely affect the treatment process. This monitoring program will include water level monitoring and groundwater modeling activities during the startup of the long-term containment system, to verify that containment is being achieved and evaluate whether adjustments to the pumping program are warranted.

Although the impacted Alluvial Aquifer production well (SCWC-Stadium) has remained shut down, it is not part of the focus of this analysis because pumping activities, and any necessary perchlorate treatment for this well, will resume only after containment pumping has begun in the Saugus Formation. The longer period for returning the SCWC-Stadium well to service arises from the dependence of this activity on the effectiveness of ongoing groundwater remediation activities being conducted by the Whittaker-Bermite Corporation. Consequently, the plan for the SCWC-Stadium well will be developed in the future, separately from the plan that is described in this report.

This report has been prepared to support the source assessment and permitting process that the Purveyors are performing under the 97-005 Policy. Section 2 of this report presents the analysis of perchlorate containment, including its relationship to the operational plan for Santa Clarita Valley groundwater resources. Section 3 presents the objectives and general design of the sentinel groundwater quality monitoring program, which includes identifying the network of existing and new wells that will be sampled under this program. Section 4 is the reference list.

Table

TABLE 1-1

Historical Pumping at Impacted Saugus Formation Production Wells

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner - Well Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
VWC-157	635	604	529	239	387	314	581	484	1,222	1,146	635	1,005	570	436	616	403	46	81	0	0	0
SCWC-Saugus1	0	0	0	0	0	0	0	0	31	0	0	1,690	437	1,226	1,333	0	410	451	0	0	0
SCWC-Saugus2	0	0	0	0	0	0	0	0	32	0	40	3,091	2,476	1,675	2,530	1,726	1,766	617	0	0	0
NCWD-11	729	870	715	754	1,159	1,278	2,209	2,371	1,265	1,280	1,252	1,034	428	730	614	522	353	81	14	0	0
Total	**1,364**	**1,474**	**1,244**	**993**	**1,546**	**1,592**	**2,790**	**2,855**	**2,550**	**2,426**	**1,927**	**6,820**	**3,911**	**4,067**	**5,093**	**2,651**	**2,575**	**1,230**	**14**	**0**	**0**

1991 through 1996 average = 4,186

Note:

All pumping volumes are listed in AF/yr.

Figures

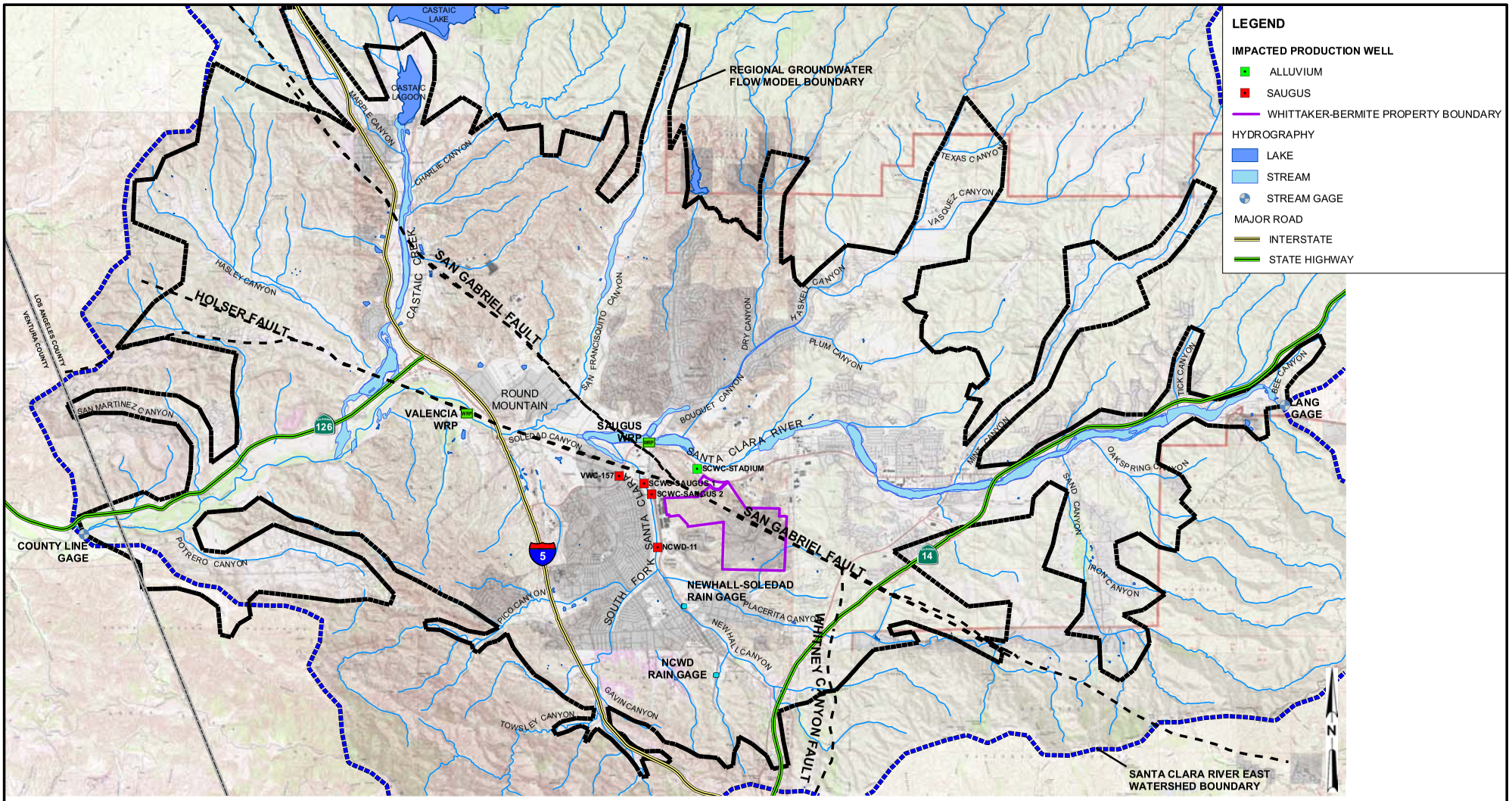

FIGURE 1-1
MAP OF STUDY AREA
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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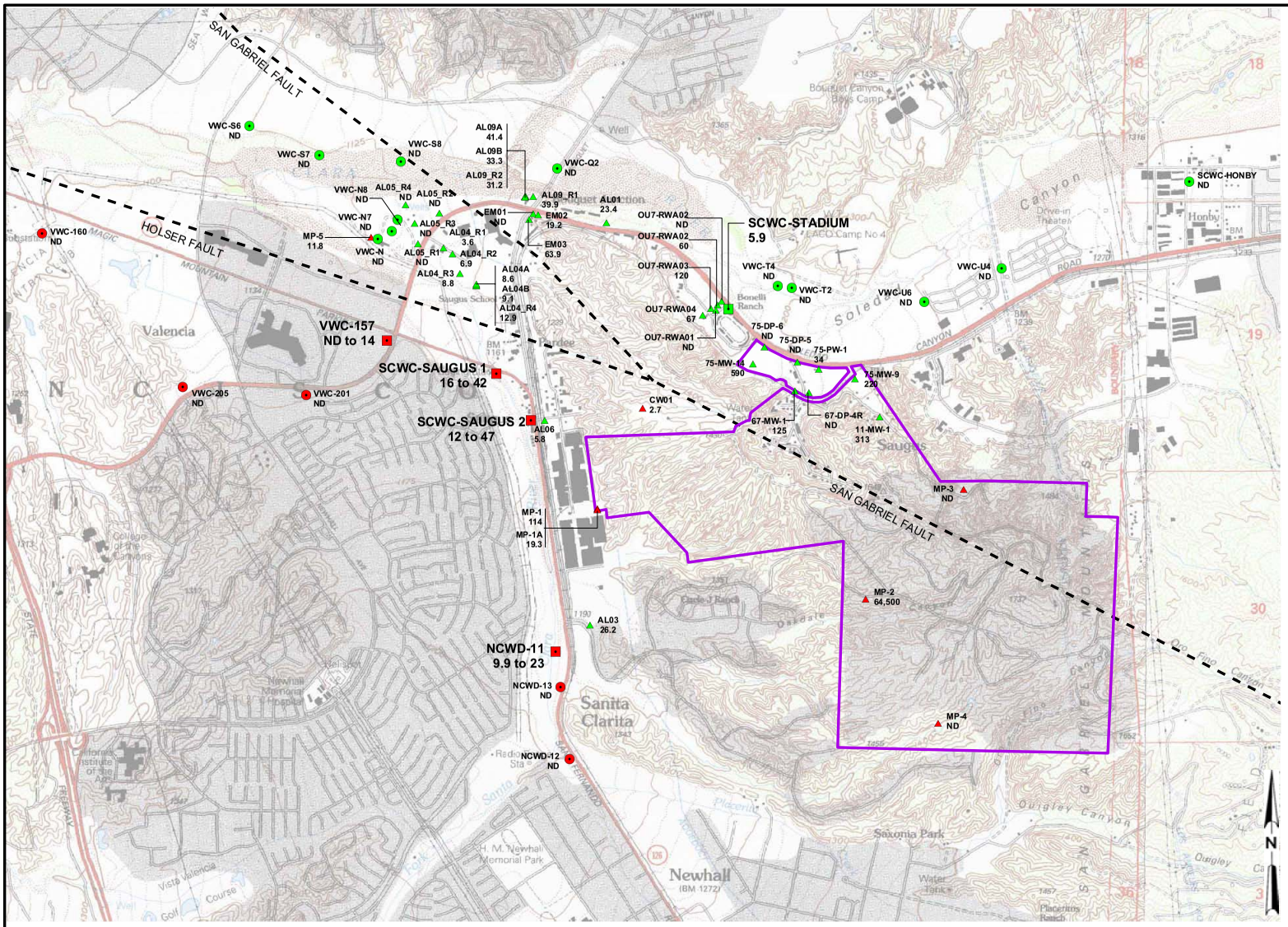

0 2,000 4,000 6,000 feet

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NONIMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
3. µg/L = MICROGRAMS PER LITER.

FIGURE 1-2
WELL LOCATION MAP
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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SECTION 2

Analysis of Perchlorate Containment

2.1 Objectives

In addition to meeting the requirements of the 97-005 policy memo (DHS, 1997), the Purveyors have identified the following objectives that must be met by the pumping plan for the impacted Saugus Formation production wells:

1. Hydraulically contain perchlorate that is migrating westward in the Saugus Formation from the Whittaker-Bermite property toward the impacted production wells.
2. Hydraulically contain perchlorate that is present at wells MP-5 and VWC-157, which are located downgradient of the impacted wells.
3. Protect downgradient production wells that are currently not impacted.
4. Restore the annual volumes of water that were pumped from the impacted wells before they were shut down.
5. Operate the impacted wells in a manner that is consistent with the Purveyors' operational plan for the groundwater resources in the Santa Clarita Valley[5].
6. If possible, pump one or more of the impacted Saugus Formation production wells in a manner that also contains perchlorate migrating in the Alluvial Aquifer from the northern portion of the Whittaker-Bermite property. Unlike the previous objectives, this is a secondary objective for operating the impacted Saugus Formation production wells, because other long-term remedies are being developed for the Alluvial Aquifer. Consequently, this objective is not the basis for selecting or rejecting any given pumping plan for the impacted Saugus Formation production wells.

The pumping plan that is developed and evaluated in this report for the impacted Saugus Formation production wells is an interim program that will operate throughout the period of evaluating, designing, and permitting long-term remedial actions for the Whittaker-Bermite property and nearby groundwater. It is anticipated that the pumping plan for the impacted Saugus Formation production wells will continue to be implemented after the long-term remedies are in place on the Whittaker-Bermite property, in part because the pumping plan is intended to meet the water supply needs of the Purveyors.

2.2 Methodology

The containment evaluation for the impacted Saugus Formation production wells was performed using the Regional Groundwater Flow Model for the Santa Clarita Valley (Regional Model). The Regional Model's construction and calibration are discussed in detail

[5]This operational plan is described in the documents titled *Urban Water Management Plan 2000* (Black & Veatch, 2000) and *Santa Clarita Valley Water Report 2003* (Luhdorff & Scalmanini Consulting Engineers, 2004).

in *Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration* (CH2M HILL, 2004a). The Regional Model simulates the temporal and spatial variations in groundwater flow patterns in three dimensions, including the recharge and discharge rates of groundwater in the valley. Table 2-1 summarizes the components of the valley's hydrology that are simulated by the model. Figure 2-1 shows these processes schematically. Following are discussions of the Regional Model's design and the methods by which the model was used to evaluate the containment approach for the impacted Saugus Formation wells.

2.2.1 Regional Model Design

The Regional Model is a three-dimensional numerical model that uses the MicroFEM® finite-element software (Hemker and de Boer, 2003). The Regional Model covers the entire area underlain by the Saugus Formation, plus the portions of the Alluvial Aquifer that lie beyond the limits of the Saugus Formation. The Regional Model area largely coincides with the Santa Clara River Valley East Groundwater Subbasin, extending from the Lang stream gage at the eastern end of the valley to the County Line stream gage area in the west. The Regional Model is based on a finite-element mesh consisting of 7 layers, with 17,103 nodes and 32,496 elements in each layer. The upper model layer simulates the Alluvial Aquifer, or the upper portion of the Saugus Formation where the Alluvial Aquifer is not present. The underlying layers simulate the underlying freshwater Saugus Formation and the Sunshine Ranch Member. Figure 2-2 is a geologic map of the valley, including the boundaries of the Regional Model.

The boundary conditions in the model consist of the following:

1. Specified flux boundaries for:
    a. Precipitation
    b. Irrigation
    c. Recharge from ephemeral streams
    d. Pumping
    e. Underflow from beneath Castaic Dam
2. Head-dependent flux boundaries for:
    a. Groundwater discharges to the perennial reach of the Santa Clara River
    b. Residual drainage of groundwater to the Santa Clara River in the ephemeral reach under high water table conditions
    c. Evapotranspiration (ET) by phreatophyte plants, which extract groundwater from the shallow water table that lies along riparian river corridors

3. Constant-head boundaries for:
   a. Subsurface inflow to the valley in the Alluvial Aquifer at the eastern end of the valley, at the Lang gage[6]
   b. Subsurface outflow in the Alluvial Aquifer at the western end of the valley, at the County Line gage

Groundwater recharge rates are estimated using precipitation records; streamflow records; watershed maps; topographic maps; and aerial photography. These recharge rates are calculated using a detailed Surface Water Routing Model (SWRM) that was written specifically to provide time-dependent, spatially varying recharge rates as input to the Regional Model. The SWRM relies on historical records of rainfall and streamflow data from several sources. Rainfall data have been recorded since 1883 at the Newhall-Soledad gage (Station No. FC32CE), located at the Los Angeles County Department of Public Works (LADPW) Newhall-Soledad Division Headquarters office, on San Fernando Road in the community of Newhall. A second rain gage is located approximately 1.3 miles to the south, at the NCWD office. Figure 2-3 shows the annual rainfall at the Newhall-Soledad rain gage for calendar years 1950 through 2000 and at the NCWD gage from 1979 through 2000. Rainfall varies across the basin according to elevation differences and the locations of surrounding mountain ranges. Figure 2-4 shows lines of equal precipitation (rainfall isohyets) throughout the Santa Clara River East watershed, based on long-term mean annual precipitation data compiled from the U.S. Geological Survey (USGS), the California Department of Water Resources (DWR), and California Division of Mines and Geology maps and data.

The depths from which production wells obtain water are defined in the Regional Model from well construction records. The locations and rates of pumping are based on the Purveyors' pumping plan for the basin and on the surveyed location of each production well.

2.2.2 Design of Modeling Analysis

The process of designing a modeling analysis to forecast perchlorate containment consisted of the following activities:

1. Refining the model grid in and around the areas where impacted wells are located
2. Selecting a period over which to simulate groundwater conditions resulting from various pumping configurations
3. Defining the pumping plan at the impacted wells and all other wells in the Santa Clarita Valley, considering the objectives above and the variability in pumping demands that occur due to cycles of drought and nondrought conditions and year-to-year variations in the availability of other water supplies
4. Defining the variation in local hydrology (rainfall, streamflows, and groundwater recharge) on a month-to-month basis throughout the simulation period

[6]A constant-head boundary was established in the model at this location based on recent field conditions that were observed after the model calibration report (CH2M HILL, 2004) was published. This change to the model improved the model's calibration in the Alluvial Aquifer in the upper reaches of Soledad Canyon and did not appreciably change the calibration quality elsewhere.

5. Running the model to calculate time-varying (monthly) groundwater elevations and groundwater discharge terms throughout the multi-year simulation period
6. Evaluating the modeling results, as follows:
   a. Examining forecasted time-series plots (hydrographs) of water budget terms and groundwater elevations to evaluate the effects of the pumping plan at the impacted Saugus Formation production wells and across the basin
   b. Analyzing forecasted groundwater flowpaths (using particle-tracking techniques) to identify the degree of containment provided by the pumping plan for the impacted Saugus Formation production wells
7. Performing two sets of sensitivity analyses to address the following questions concerning the selected pumping plan for the impacted Saugus Formation production wells:
   a. How large a factor of safety does the Purveyors' pumping plan for the impacted Saugus Formation wells provide for containment of Saugus groundwater migrating westward from the Whittaker-Bermite property, given that the plan is based, in part, on restoring groundwater pumping at the impacted production wells?
   b. How would the model predictions change if the degree of connection between the Alluvial Aquifer and the Saugus Formation is less than the degree of connection that is simulated by the calibrated model?

These activities are described in further detail below.

2.2.3 Grid Refinements

The Regional Model grid is shown on Figure 2-5. The Regional Model grid contains 17,103 nodes that are spaced 500 feet apart in the majority of the modeled area. However, the Regional Model contains finer node spacing (150 feet) along the Santa Clara River and its tributaries, to allow for improved resolution and precision in calculations of surface water/groundwater exchange rates. Nonetheless, it was deemed necessary to reduce the node spacing in the area around the impacted wells to increase the spatial resolution of the model, including its ability to calculate groundwater flowlines (groundwater particle traces) and hydraulic capture zones.

A node spacing of 75 feet was applied to an area of approximately 2,500 acres (approximately 4 square miles [mi^2]), which is approximately 3 percent of the 119-mi^2 area contained within the Regional Model's boundaries. This smaller node spacing was used within the northwestern portion of the Whittaker-Bermite property and adjacent areas to the north and west where perchlorate has been detected in groundwater. The 75-foot node spacing was used for all nodes in this area, including stream nodes. Figure 2-6 shows the refined finite-element grid in this localized area. The refinement of the grid caused the total number of nodes in the Regional Model to increase by 20,180 nodes per layer, for a total of 37,283 nodes per layer.

2.2.4 Simulation Period

The operational pumping plan for the Santa Clarita Valley's groundwater resources has been defined in the *Urban Water Management Plan 2000* (UWMP) for the Santa Clarita Valley (Black & Veatch, 2000) and in annual water reports that discuss the water demands, water

supplies, and surface water and groundwater resources of the valley (including the *Santa Clarita Valley Water Report 2003* [Luhdorff & Scalmanini Consulting Engineers, 2004]). These reports provide ranges of values for groundwater extractions from the Alluvial Aquifer and the Saugus Formation during average/normal years and dry years. For the modeling analysis, the locations and temporal variation in pumping from the Alluvial Aquifer were defined from the operational plan and from historical records of the year-to-year variability in local hydrology. Simulated pumping from the Saugus Formation was defined from the operational plan, historical pumping records, and operational constraints and historical patterns of water supply availability for water supplies that are imported from the State Water Project (SWP).

Because the local pumping plan for the Saugus Formation is linked to the hydrology and operational constraints for the SWP system, the year-to-year variability in Saugus Formation pumping is, to a certain extent, dependent on the hydrology outside the valley (i.e., in northern California). As shown in Table 2-2, local hydrology is often not a good indicator of local pumping conditions in the Saugus Formation, because local droughts and SWP droughts frequently do not coincide with each other. The following are examples:

1. In 1955, dry conditions in the SWP system coincided with approximately 14 inches of rainfall at the Newhall-Soledad rain gage, which is similar to the long-term median rainfall recorded at this gage.

2. In 1976 and 1977, the SWP system hydrology was critical, while the local hydrology during those years was near normal (1976) and wetter than normal (1977).

3. In 1987 and 1988, the SWP system hydrology was dry (1987) and critical (1988), while the local hydrology during those years was near normal (1987) and wetter than normal (1988).

4. In 1991 and 1992, the SWP system hydrology was in its fifth and sixth consecutive years of dry or critical hydrology, while the local hydrology was wetter than normal both years.

5. In 2001, dry conditions in the SWP system coincided with wetter-than-normal local conditions.

Consequently, it was decided that the model would need to be run over several decades to capture the year-to-year variability in the hydrology of each system, as well as the less frequent times when both systems are experiencing similar hydrologic conditions (as occurred periodically during the 1960s and in 1994). Analyses of historical records were then conducted to identify a synthetic simulation period that would meet the following criteria:

1. The simulation time should be long enough to include an historical period that accounts for the year-to-year variations in local hydrology that have been observed in the past.

2. The period should be long enough to include longer-term (i.e., on the order of decades) periods of relatively dry conditions and relatively wet conditions.

3. The average rainfall during the simulation period should be similar to the average rainfall of 17.84 inches per year (in/yr) that was observed from 1950 through 2000 at the Newhall-Soledad gage.
4. The period should be sufficiently long to allow simulation of two occurrences of reduced SWP water supplies during the period 1990 through 1992, which corresponds to periods of increased pumping from the Saugus Formation under the valley's operational plan.
5. The frequency of dry-year occurrences in the SWP system, corresponding to increased pumping from the Saugus Formation, should be similar to the historical frequency.
6. If necessary to meet other criteria, the simulation should repeat parts of this sequence before and/or after the historical sequence.

Examination of historical local hydrology and independent simulations of SWP deliveries resulted in the selection of a 78-year period over which the model was run, with monthly time steps. Details regarding how the pumping conditions and local hydrology were defined during this period are described below in Section 2.2.5.

2.2.5 Assignment of Pumping Rates

Pumping rates were assigned in accordance with the operational plan for the Santa Clarita Valley, which defines ranges of valleywide annual pumping, given the water supply needs of the Purveyors. Pumping rates at individual wells were assigned using the recent and planned production schedules for each well and by evaluating the type of pumping plan that will meet the perchlorate containment objectives for the impacted wells. Details of pumping rate assignments are discussed below.

2.2.5.1 Description of Operational Plan for Groundwater Pumping

The operational plan for the Santa Clarita Valley's groundwater resources defines the ranges of annual groundwater pumping rates that are planned for the Alluvial Aquifer and the Saugus Formation under variable hydrologic conditions as follows (Black & Veatch, 2000; Luhdorff & Scalmanini Consulting Engineers, 2004):

1. Pumping from the Alluvial Aquifer in a given year is governed by local hydrologic conditions in the eastern Santa Clara River watershed. Under the operational plan, pumping ranges between 30,000 and 40,000 AF/yr during normal and above-normal rainfall years, but is reduced to between 30,000 and 35,000 AF/yr during locally dry years.
2. Pumping from the Saugus Formation in a given year is tied directly to the availability of other water supplies, particularly imported water from the SWP system. For the Saugus Formation, the operational plan consists of pumping between 7,500 and 15,000 AF/yr during average-year conditions within the SWP system. Planned dry-year pumping from the Saugus Formation ranges between 7,500 and 25,000 AF/yr during a drought year, and increases to between 21,000 and 25,000 AF/yr if SWP deliveries are reduced for longer than 1 year.

Table 2-3 summarizes the operational pumping plan for the Alluvial Aquifer and the Saugus Formation and compares this plan with the model-simulated valleywide pumping

rates for each type of year (normal and above-normal years, dry year 1, dry year 2, and dry year 3). The selections of the simulated valleywide pumping rates are described below.

2.2.5.2 Variations in State Water Project Hydrology and Saugus Formation Pumping

CLWA has performed a statistical evaluation of SWP deliveries using the 2021B scenario from the CALSIM II model, which was developed by DWR for its SWP Delivery Reliability Report (DWR, 2002). The CALSIM II model and the SWP Delivery Reliability Report were developed to support (1) the preparation of urban water management plans by the water agencies that are SWP contractors, (2) analyses required to comply with Senate Bills 221 and 610, and (3) other water supply planning activities that include the SWP as a component of supply. The 2021B scenario simulates the anticipated deliveries of water to the 29 SWP contractors using an historical hydrologic record and anticipated operating and regulatory conditions for the SWP system in 2021. In addition to the CLWA evaluation (Kennedy/Jenks Consultants, 2003), the U.S. Bureau of Reclamation (USBR) has used CALSIM II to perform biological assessment studies for the Operating Criteria and Plan (OCAP) for the SWP (USBR, 2004). These studies, which were made public for review in February 2004, include evaluations of the role and function of an Environmental Water Account (EWA) that consists of water purchased to mitigate the water supply impacts of protection measures for endangered species. These CALSIM II simulations have been performed for the SWP system at a present-day level of development and for the anticipated level of development in 2020. Table 2-4 compares the municipal and industrial water use allocations calculated by CALSIM II for the SWP Reliability Report (DWR, 2002) and for the OCAP (USBR, 2004) for the hydrology that occurred from 1950 through 1993.

CLWA's evaluation reached the following conclusions regarding the deliveries it will receive under this scenario (Kennedy/Jenks Consultants, 2003):

1. A regression analysis indicates that there is a weak relationship between the SWP delivery in a given year and the previous year's delivery.
2. SWP deliveries will equal or exceed 70 percent of CLWA's 95,200 AF/yr Table A Amount during approximately 75 percent of the simulated years. During the remaining years, the deliveries will vary between 20 and 70 percent.
3. A Monte Carlo analysis of projected deliveries during 73 consecutive years indicated that at a 95 percent confidence level, 4 years of a 7-year drought period in the SWP system (such as was observed from 1988 through 1994) will have sufficiently low deliveries to require short-term pumping of increased groundwater volumes to meet local water demands. This includes a period of 3 consecutive years of increased pumping.

As discussed in Sections 2.2.4 and 2.2.5.3, a 78-year period was simulated with the groundwater model. Table 2-5 shows the sequence of SWP droughts, SWP allocations, and resulting pumping volumes for the Saugus Formation that have been defined based on the CLWA and USBR analyses. The 78-year period contains the following:

1. Eighteen years of dry-year pumping from the Saugus Formation, or an average of 1 dry year approximately every 4 years

2. Two droughts lasting 3 years, plus (in both cases) a dry year that occurs 2 years before the beginning of each 3-year drought and another dry year that begins 1 year after each 3-year drought has ended
3. Two droughts lasting 2 years
4. Sixty years of normal-year pumping from the Saugus Formation

Pumping rates at specific wells were assigned for each type of year (normal, dry year 1, dry year 2, and dry year 3) using the operational plan for the valley and information on the capacity, recent and planned use, and location of each well. Figure 2-7 shows the locations of these wells and other wells in the valley. Table 2-6 summarizes the annual pumping volumes at each Saugus Formation well[7]. Significant aspects of the pumping rate selection at each well are as follows:

1. Two of the three impacted wells (SCWC-Saugus1 and SCWC-Saugus2) were assumed to operate on a continuous basis to contain perchlorate in this portion of the Saugus Formation. The modeling analysis simulated a continual pumping rate of 1,200 gpm at each well, consistent with the Purveyors' water supply needs from these wells. The analysis assumed each well will be offline 1 month each year for routine maintenance, but would otherwise operate on a continuous basis. The resulting simulated annual pumping volume was 1,772 AF at each of these two wells, for a combined annual pumping volume of 3,544 AF from both wells.
2. In contrast to the near-continuous operation of SCWC-Saugus1 and SCWC-Saugus2, modeling simulations showed that well NCWD-11 can operate on a seasonal basis without any adverse effects on the objective of containing perchlorate in the Saugus Formation east of this well. Consequently, well NCWD-11 was assumed to operate at a yield of 1,200 gpm for a period of 5 months during the peak-demand season, providing a volume of 811 acre-feet (AF) during this period. Consequently, total pumping from the three impacted Saugus Formation wells that will be returned to service (SCWC-Saugus1, SCWC-Saugus2, and NCWD-11) was simulated as 4,355 AF/yr.
3. Pumping from other existing Saugus Formation production wells was based on recent and planned use of these wells, as defined by the Purveyors. The simulation included increased dry-year pumping from the Saugus Formation in the western portion of the basin, where it is anticipated that future wells will be installed.

The pumping rates at each Saugus Formation well were also allocated in specific manners with respect to the pumping depth and the time of year. These allocations were as follows:

1. Except for one well (NCWD-13), each Saugus Formation production well has open intervals that are significantly longer in vertical extent than the thicknesses of the individual layers that represent the Saugus Formation in the Regional Model. Consequently, the pumping rates were assigned to multiple layers in the model by considering the depths of the open interval and the transmissivity of each model layer. Table 2-7 shows the allocation of pumping in each model layer for each Saugus

[7]Table 2-5 only lists wells that are anticipated to be operating in the future. Existing wells that are not listed in this table (including VWC-157) are currently not in service or pump very limited quantities of groundwater, and therefore are not expected to provide significant quantities of water in the future. Well VWC-157 has been replaced by new well VWC-206.

Formation production well, as well as the open intervals of each well and the model-simulated transmissivity in each layer at each well location.

2. Table 2-8 shows the allocation of pumping, by month, for agricultural and urban production wells in both the Saugus Formation and the Alluvial Aquifer. Separate distributions were used because agricultural demands are for exclusively outdoor uses, whereas urban demands are for both indoor and outdoor uses. As discussed in the model development report (CH2M HILL, 2004a), the monthly distribution of agricultural pumping was derived from crop consumptive use requirements published by the California Irrigation Management Information Service (CIMIS). The monthly distribution of urban demand was determined by examining historical monthly flow records for the two LACSD water reclamation plants (WRP) and monthly demand distributions recorded by VWC during the past several years.

2.2.5.3 Variations in Local Hydrology and Alluvial Aquifer Pumping

Annual rainfall records from 1950 through 2003 at the Newhall-Soledad rain gage (Station No. FC32CE) were inspected to identify dry years, wet years, and years of near-normal rainfall in the Santa Clarita Valley. For near-normal and wet years, the operational plan for the Valley's groundwater resources calls for Alluvial Aquifer pumping to range between 35,000 and 40,000 AF/yr. During locally dry years, groundwater elevations in eastern Soledad Canyon can decline several feet per year, and the historical record shows that multiple dry years can occur before sufficient rainfalls return to increase streamflows and groundwater recharge (see Section 2.6 of the Regional Model development and calibration report [CH2M HILL, 2004a]). Consequently, the operational plan calls for reducing pumping to between 30,000 and 35,000 AF/yr during dry years. As shown on Figure 2-8, the average rainfall from 1950 through 2000 at the Newhall-Soledad rain gage was 17.84 in/yr. To define pumping trends in the Alluvial Aquifer, the dry-year pumping rate was assigned to years when rainfall at the Newhall-Soledad rain gage is below 12 in/yr.

Figure 2-9 shows the year-to-year rainfall in the valley and the cumulative departure from average rainfall for each year during the 78-year simulation period. The figure also shows each simulation year's corresponding historical year. The cumulative departure from average rainfall is plotted to show the occurrence of relatively wet versus relatively dry periods. A year-to-year decline in the slope of the cumulative departure curve indicates conditions are dry, whereas a year-to-year increase indicates rainfall is above normal. Also plotted are the occurrences of SWP droughts. The figure shows the following:

1. The first 19 years of the simulation period are generally wet, as a whole, though a multi-year drought occurs in years 5 through 12 (1984 through 1991).

2. A prolonged dry period begins in year 20, as indicated by the downward slope in the cumulative departure curve. This period lasts through year 39, as the curve starts to slope upward to the right beginning in year 40[8]. This 20-year period of generally dry conditions corresponds to the historical period 1999 through 2003, followed by 1950 through 1964.

[8]Year 40 is equivalent to historical year 1965, when rainfall was over 32 inches, or 2.2 times the long-term median rainfall and 1.8 times the long-term average rainfall.

3. Rainfall was generally at or above normal from years 40 through 45 (historical years 1965 through 1970), before a drought ensued from years 46 through 51 (historical years 1971 through 1976).

4. Rainfall was then generally above normal during years 52 through 58 (1977 through 1983), followed by the drought years 59 through 66 (1984 through 1991), the wetter-than-normal years 67 through 76 (1992 through 2001), and dry years 77 and 78 (2002 and 2003).

Table 2-9 shows the sequence of local hydrologic conditions and resulting valleywide pumping volumes for the Alluvial Aquifer that have been defined from the operational pumping plan for the valley. The 78-year simulation period contains the following:

1. Twenty-four years of dry-year pumping, which is approximately 30 percent of the simulated 78-year period.

2. One drought consisting of 4 consecutive years of below-normal pumping (in years 34 through 37, based on historical hydrology from 1959 through 1962).

3. Two droughts consisting of 3 consecutive years of below-normal pumping (in years 10 through 12 and 64 through 66, both of which are based on historical hydrology from 1989 through 1991).

4. Three years (years 12, 37, and 66) when rainfall is near or above normal, but pumping is assigned at a dry-year rate because the year was preceded by a multi-year local drought.

Pumping rates at specific wells were assigned for normal and dry years using the operational plan and information on the capacity, recent and planned use, and location of each well. Figure 2-7 shows the locations of these wells and other wells in the valley. Table 2-10 compares recent annual pumping volumes at each Alluvial Aquifer well with the assumed future production rates at each well under normal and dry-year conditions. Significant aspects of the pumping rate selection at each well are as follows:

1. The SCWC-Stadium well was simulated as pumping 800 AF/yr. The Whittaker Corporation is developing plans to mitigate the source of perchlorate to the portion of the Alluvial Aquifer situated immediately north and downgradient of the Whittaker-Bermite property. The modeled pumping scenario simulates the possibility that the well will be returned to service in the future, and will pump at a rate similar to historical volumes, after source mitigation activities have reduced perchlorate concentrations to undetectable levels in the Alluvial Aquifer at and near this well.

2. As shown in Table 2-10, most Alluvial Aquifer wells were specified to operate at similar rates regardless of year type. However, there were two exceptions, as follows:

    a. Wells in the eastern portion of the basin (the NCWD-Pinetree wells, nine wells owned by SCWC, and the privately owned Robinson Ranch well) were assumed to have lower pumping capacities during dry years than nondrought years because of lower groundwater elevations during dry periods. This assumption was based on historical observations indicating that the eastern portion of the Alluvial Aquifer

experiences declines in water levels, in contrast to other parts of the valley, during dry periods.

b. Pumping was also reduced at NCWD's three operating wells in Castaic Valley, in accordance with recent pumping records from those wells.

2.2.6 Simulation Method for Other Local Hydrologic Processes

In addition to groundwater pumping, infiltration from irrigation (from urban and agricultural lands), precipitation, and streamflows (stormwater and WRP discharges) were also modeled. These other local hydrologic processes were defined using the SWRM, which is described in Appendix C to the Regional Model development and calibration report (CH2M HILL, 2004a). Key aspects of the derivation of these terms are as follows:

1. **Urban Irrigation.** Under existing land use and water use conditions, the estimated long-term infiltration rates of applied irrigation water beneath urban areas, under full build-out conditions in the valley, were estimated to be 1.0 in/yr for industrial and retail lands, 2.2 in/yr for residential developments and parks, and 4.6 in/yr for golf courses. These rates were applied during each year (and each month) of the 78-year simulation period. The areas over which these rates were applied were larger than under current conditions. The areas were defined from existing land use data and from LACSD mapping of projected future land uses in the rest of the Santa Clarita Valley[9].

2. **Agricultural Irrigation.** As discussed in the *Newhall Ranch Updated Water Resources Impact Evaluation* (CH2M HILL, 2002), irrigation of lands owned by the Newhall Land & Farming Company results in existing agricultural return flows. The source of most irrigation water is groundwater pumping from the Alluvial Aquifer, with some limited pumping occurring from one Saugus Formation well (NLF-156). Under full valley build-out conditions, the currently irrigated lands will no longer be irrigated because their water source will be used as part of the water supply for Newhall Ranch. Therefore, under full build-out conditions, no agricultural irrigation will occur within the area simulated by the Regional Model.

3. **Precipitation.** Infiltration from direct precipitation within the Regional Model domain was defined using data from the two rain gages in the valley (the Newhall-Soledad and NCWD gages), an isohyet map of rainfall throughout the watershed, and a power-function equation developed by Turner (1986) that describes the relationship between annual rainfall and ET rates within the valley. Details concerning the derivation of precipitation infiltration rates from these data are contained in Appendix C to the Regional Model development and calibration report (CH2M HILL, 2004a). Table 2-11 lists the simulated monthly precipitation at the NCWD rain gage for the 78-year model period[10].

4. **Stormwater Flows in Streams.** For each month of the simulation, the SWRM calculated the amounts of stormwater flow and groundwater recharge in all streams, plus the

[9]LACSD land use mapping indicates that, including Newhall Ranch, approximately 14,000 acres of currently undeveloped land will be urbanized in the future within the Regional Model simulation area. Additional urbanization will also occur in areas that are within the watershed, but outside the Regional Model's boundaries.

[10]The simulated monthly precipitation was defined from measurements at the NCWD gage from 1979 through 2003, as well as by combining the isohyet map with measurements at the Newhall-Soledad gage from 1950 through 1978.

amount of flow and groundwater recharge arising from projected future WRP discharges to the Santa Clara River. For the Santa Clara River, the volume of streamflow was defined from measured and estimated streamflow data at the Lang gage (Table 2-12). For Castaic Creek, the volume of streamflow was defined from historical DWR operations and consideration of the hydrologic year type (Table 2-13). For the remaining Santa Clara River tributaries, streamflow volumes were defined by the SWRM using monthly rainfall data and the Turner (1986) relationship between rainfall, ET, and the subsequent yield from each watershed.

5. **WRP Discharges to the Santa Clara River.** Under full valley build-out conditions, future flows into and from WRPs will be higher than historical flows because of increased development and the associated increase in indoor water use volumes. Additionally, a portion of the future treated water will be reclaimed. Future inflows to the Saugus and Valencia WRPs were estimated from projected future water demands and from comparisons of historical water use and measured inflows to both WRPs. Table 2-14 shows the derivation of urban water demands outside the Newhall Ranch development (which will be served by a new, separate WRP). Table 2-15 shows the total amount of treated water generated by the Saugus and Valencia WRPs, and the amount of this water that is reclaimed and discharged to the river. Table 2-15 shows this information by month, and the analysis assumes that the reclaimed water volume will be no more than 16,000 AF/yr, to maintain existing flow volumes in the Santa Clara River. For the Newhall Ranch WRP, discharges to the river will be 286 AF/yr, occurring primarily in December and January, when demands for reclaimed water are at their seasonal low. The total combined volumes of treated water discharged to the Santa Clara River under full valley build-out conditions (including Newhall Ranch) are summarized, by month, in Table 2-16. These rates were used in each year of the 78-year model run.

The month-by-month assignment of rates and locations of surface water infiltration to the underlying Alluvial Aquifer system was performed by the SWRM using the procedures described in Section C.8.5 of Appendix C to the Regional Model development and calibration report (CH2M HILL, 2004a). Streambed infiltration capacities were the same as those used in the calibrated model. For each of the 78 years in the model simulation, the streambed infiltration capacity values were selected by matching the year to one of the 20 years (1980 through 1999) from the model calibration runs, using rainfall and streamflow data to select the corresponding streambed infiltration rates.

The SWRM also tracked the volume of surface water in each simulated stream that does not infiltrate during each month because of gaining stream conditions (i.e., rejected stream leakage). This rejected stream leakage was calculated to remain as surface water in the Santa Clara River and to eventually exit the Regional Model at the west end of the valley at the County Line gage.

2.2.7 Running the Model

As discussed in the previous sections, the Regional Model was run with monthly time steps, in which pumping and recharge terms were varied each month. The model was run using a convergence criterion of 0.0001 foot for groundwater elevations, and a water budget convergence criterion of 1 cubic foot per day.

2.2.8 Evaluation Methods (Particle Tracking)

Model results were evaluated as follows:

1. Time-series plots (hydrographs) of water budget terms and groundwater elevations were used to evaluate the potential effects of the pumping plan at the impacted wells and across the basin; and

2. Groundwater flowpaths were calculated using three-dimensional particle-tracking techniques to identify the degree to which pumping from the impacted Saugus Formation production wells contains perchlorate migrating westward toward these wells from the Whittaker-Bermite property. Particle tracking was performed by first calculating the time-weighted average groundwater elevations at each node in each model layer, using the monthly elevations calculated by the model. The particle tracking was then performed in two manners:

   a. Forward in time. Particles traces were delineated forward in time, starting along the western boundary of the Whittaker-Bermite property. These traces were delineated to evaluate the degree to which perchlorate-containing groundwater moving westward from the Whittaker-Bermite property will be captured by the impacted wells. This evaluation also provided an indication of whether this groundwater could migrate to currently nonimpacted production wells.

   b. Backward in time. Particle traces were tracked backward in time from SCWC-Saugus1, SCWC-Saugus2, and NCWD-11 to delineate the groundwater capture zones of each well. The 2-year, 5-year, 10-year, and 20-year capture zones were defined for each of these wells, to support other 97-005 work activities (identifying contaminant sources and locating sentinel groundwater monitoring wells). The time-related capture zone delineations were based on an effective porosity of 0.10. Long-term particle tracking was also performed to define the size of the combined capture zone within the Saugus Formation that is created by pumping SCWC-Saugus1, SCWC-Saugus2, and NCWD-11. This included evaluating whether two wells with perchlorate detections to the northwest (former production well VWC-157 and Saugus monitoring well MP-5) would lie within the combined capture zone created by SCWC-Saugus1, SCWC-Saugus2, and NCWD-11.

2.2.9 Sensitivity Analyses

Two sets of sensitivity analyses were performed to address the following questions:

1. Can the containment objectives be met by using lower pumping rates at SCWC-Saugus1 and SCWC-Saugus2, rather than the rate of 1,200 gpm that has been selected for each well based, in part, on the water supply needs of the valley? This was evaluated by running the model several times to identify the pumping rates at the two wells (SCWC-Saugus1 and SCWC-Saugus2) that would potentially cause Saugus Formation groundwater to migrate to Saugus Formation wells that are not impacted by perchlorate. Particle-tracking analyses were performed for the entire 78-year simulation and for shorter periods within the 78-year period.

2. How would the model predictions change if the degree of connection between the Alluvial Aquifer and the Saugus Formation is less than the degree of connection that is

simulated by the calibrated model? This was evaluated by reducing the connection by a factor of 4, which corresponds to decreasing the vertical hydraulic conductivity of the Alluvial Aquifer and/or the uppermost beds of the Saugus Formation.

2.3 Results

This section presents and discusses the following analyses from the 78-year model runs:

1. Hydrographs of groundwater elevations and Santa Clara River flows. The purpose of the hydrographs is to show that the pumping plan at the impacted wells is consistent with the objective of operating the basin in a manner that maintains long-term stability in groundwater levels and river flows.
2. Maps of particle traces showing forecasted Saugus Formation groundwater flowpaths that leave the Whittaker-Bermite property.
3. A map of particle traces showing the area of forecasted hydraulic containment (capture) within the Saugus Formation that is achieved by pumping wells SCWC-Saugus1, SCWC-Saugus2, and NCWD-11 at the planned pumping rates described in Section 2.2.5.2 of this report.
4. Maps showing the forecasted 2-year, 5-year, 10-year, and 20-year capture zones for SCWC-Saugus1, SCWC-Saugus2, and NCWD-11.

2.3.1 Hydrographs

Hydrographs are displayed for different portions of the Alluvial Aquifer on Figures 2-10 through 2-14 and for different portions of the Saugus Formation on Figures 2-15 and 2-16. Each figure shows results for the 78-year model run to illustrate the potential effect of the operational plan for the Santa Clarita Valley, including the planned pumping at the impacted Saugus Formation production wells. These figures show that the spatial distribution and temporal variation of pumping are not expected to cause a long-term decline in groundwater levels in the Alluvial Aquifer or the Saugus Formation. The model simulates distinct multi-year periods of overall declining or overall increasing groundwater elevations, due to cycles of below-normal and above-normal rainfall periods. This variation is consistent with historical observations of the relationship between rainfall and groundwater level fluctuations (CH2M HILL, 2004). The model also simulates short-term declines in Saugus Formation groundwater elevations that arise from the increased Saugus pumping that occurs during the second and third years of a drought in the SWP system.

Figure 2-17 shows the total flows estimated by the model for the Santa Clara River at the County Line gage, which is located at the western end of the valley. The figure contains both a linear plot and a semi-logarithmic plot, to better illustrate the flows during low-flow periods. As shown by both plots, the total streamflows vary considerably over time at this location, due primarily to variations in rainfall.

The relative influences of local hydrology and the operational plan on the Santa Clara River are illustrated by Figure 2-18, which shows the model-calculated volumes of monthly groundwater discharge to the river. Groundwater discharges to the river occur along the river reach lying downstream of the mouth of San Francisquito Canyon. The figure shows

that the groundwater discharges to the river also vary over time, both seasonally and over multi-year periods. Additionally, the figure shows a period of relatively low groundwater discharge to the river occurs from years 23 through 39 (historical years 2002 through 2003, followed by 1950 through 1964), which corresponds to the prevailing below-normal rainfall conditions in those years. The figure also shows higher volumes of groundwater discharge to the river in years of above-normal rainfall, particularly the very wet periods years 1 through 4, years 13 through 19, years 52 through 58, and years 67 through 72. The similarity between rainfall and groundwater discharges to the river indicates that local hydrology is the primary influence on these discharges. Additionally, the groundwater discharge hydrographs do not show any marked short-term declines in flows that coincide with the marked short-term declines in Saugus Formation groundwater levels when Saugus wells pump at drought-year rates. The model therefore indicates that the operational plan for the groundwater system is not expected to notably affect river flows.

Figures 2-19 and 2-20 show the variations in groundwater recharge and groundwater discharge, respectively, throughout the 78-year simulation period. These annual valleywide groundwater recharge and discharge rates are also listed in Table 2-17. Figure 2-21 shows the annual and cumulative changes in groundwater storage volumes. Figures 2-19 through 2-21 and Table 2-17 together show the following:

1. Groundwater recharge rates (Figure 2-19) are highly variable from year to year, due to variations in precipitation within the Regional Model domain, and precipitation and stormwater generation in the watersheds lying upstream of the aquifer system. In contrast, total groundwater discharge (Figure 2-20) is much less variable from year to year, with the more limited variations arising from increased pumping during drought years and increased ET and groundwater discharge to the Santa Clara River during wet years.

2. Year-to-year and cumulative changes in groundwater storage during the 78-year simulation period (Figure 2-21) provide insights as to the manner in which the basin is functioning hydrologically under the operational pumping plan for the Valley. The cumulative change in groundwater storage is a measure of the longer-term trends in the amount of groundwater in storage, and is plotted on a monthly basis. Table 2-17 tabulates the annual water budget for each year of the 78-year simulation, and shows the cumulative change on an annual basis (in contrast to the monthly basis shown on Figure 2-21). Figure 2-21 and Table 2-17 together show the following:

    a. The cumulative change in total groundwater storage volume, which measures the continuous change in storage since the beginning of the simulation, ranges between approximately a 150,000 AF decline and a 260,000 AF increase. The change in groundwater storage during a single year ranges from approximately an 80,000 AF/yr decline to a 170,000 AF/yr increase.

    b. A nearly 20-year period of overall decline in the cumulative groundwater storage volume occurs between years 19 and 39, as shown on Figure 2-21. Beginning in year 40, the cumulative change in storage shows a generally upward trend, with occasional downward trends during specific drought periods.

c. The Regional Model estimates that the total volume of groundwater in storage above a depth of 2,500 feet is approximately 5 million AF[11]. Consequently, the cumulative declines and increases in groundwater storage represent 5 percent or less of the volume of groundwater in storage.

3. Implementation of the operational pumping plan, including operation of the impacted Saugus Formation production wells, will have no significant effect on long-term groundwater conditions. This is shown by the forecasted recovery of groundwater storage volumes after periods of continued decline, such as the 20-year period of groundwater declines that occurs during years 19 through 39.

4. Based on the previous observations, changes in groundwater storage volumes, particularly over a period of many years, are governed primarily by local hydrologic conditions, not by the operational pumping plan. Local precipitation and streamflows are the most important influences on the year-to-year and longer-term changes in groundwater storage volumes.

The curves presented on Figures 2-10 through 2-21 provide a general indication of the types of fluctuations in groundwater conditions that could be expected to occur in the future in the Santa Clarita Valley over a period of many years. However, these curves have been derived using an assumed sequence of local hydrologic conditions that is based on the sequence of rainfall and streamflow volumes that were measured during the past several decades. In the future, the volumes and year-to-year trends in rainfall and streamflow could vary from those observed in the past. Consequently, the most significant conclusion from the 78-year simulations is that local hydrologic conditions, rather than the operational pumping plan and the use of the impacted Saugus Formation production wells, will be the predominant influence on the water resources (groundwater and river flows) of the Santa Clarita Valley.

2.3.2 Hydraulic Containment

As discussed previously in Section 2.2.5.2, the combined pumping volume from the three impacted wells was modeled as 4,355 AF/year. Figures 2-22 and 2-23 show the long-term average groundwater elevations in the Alluvial Aquifer and the Saugus Formation, respectively, in the vicinity of the Whittaker-Bermite property and the impacted production wells[12]. These groundwater elevations were used to delineate three-dimensional groundwater flowpaths using the MicroFEM® model's particle-tracking routines. The flowpaths were used to forecast the degree of hydraulic containment in the Saugus Formation that will arise from the pumping plan at wells SCWC-Saugus1, SCWC-Saugus2, and NCWD-11.

Figure 2-24 shows the traces of groundwater particles (1) migrating westward in the Saugus Formation from the Whittaker-Bermite property and (2) migrating away from Saugus wells

[11]This calculation excludes groundwater deeper than 2,500 feet and shallower groundwater residing in the Sunshine Ranch Member of the Saugus Formation. The calculation also assumes a specific yield of 0.15 for the Alluvial Aquifer and 0.065 for the Saugus Formation, which are similar to values used by Richard C. Slade and Associates, LLC (2002), for similar calculations of the volume of groundwater in storage. The model-based calculations estimate that the groundwater storage volumes are 1 million AF of groundwater in the Alluvial Aquifer and 4 million AF in the Saugus Formation. Richard C. Slade and Associates, LLC, estimated these volumes to be 0.16 million AF and 1.65 million AF, respectively. Robson (1972) estimated this volume to be 6 million AF based on a specific yield of 0.10 and a Saugus Formation thickness of 3,500 feet.

[12]Figure 2-23 shows the average groundwater elevations in the fourth layer of the model, which represents the depth interval from 1,000 to 1,500 ft bgs.

MP-5 and VWC-157. The figure uses different colors for the flowpaths to illustrate the depths in the Saugus Formation from which the wells derive their water. The flowpaths extending westward from the Whittaker-Bermite property were initiated at depths between 500 and 1,000 ft bgs, and the flowpaths migrating from MP-5 and VWC-157 were initiated at depths between 150 and 1,500 ft bgs. Three principal observations about the flowpaths are as follows:

1. Each flowpath initiated at these depths along the Whittaker-Bermite property's western boundary on Figure 2-24 ends at wells SCWC-Saugus1 and SCWC-Saugus2. This includes flowpaths originating near multi-port monitoring well MP-2, which end at well SCWC-Saugus2. Groundwater sampling results at MP-2 indicate that perchlorate is present as deep as approximately 800 ft bgs (CH2M HILL, 2003).
2. None of the groundwater particles migrate to nonimpacted production wells lying downgradient (west and northwest) of the three impacted wells that are closest to the Whittaker-Bermite property (SCWC-Saugus1, SCWC-Saugus2, and NCWD-11). Consequently, no new production wells are needed in the area around SCWC-Saugus1, SCWC-Saugus2, and NCWD-11 to control groundwater migrating from the Whittaker-Bermite property.
3. None of the flowpaths end at NCWD-11, which indicates that the pumping plan for SCWC-Saugus1 and SCWC-Saugus2 alone will contain groundwater migrating from areas on the Whittaker-Bermite property where perchlorate has been detected in groundwater, south and west of the San Gabriel Fault.
4. Saugus Formation groundwater at wells MP-5 and VWC-157 is captured by containment pumping at SCWC-Saugus1.

Figure 2-25 shows the area of hydraulic containment within the Saugus Formation that will be achieved by the planned pumping for SCWC-Saugus1, SCWC-Saugus2, and NCWD-11. The figure shows groundwater flowpaths that have been traced backward from these three wells to delineate the horizontal extent of the capture zone in the Saugus Formation created by pumping from these wells. Capture zones are also shown for three nearby nonimpacted Saugus Formation production wells (VWC-160, VWC-201, and VWC-205) that lie downgradient of SCWC-Saugus1, SCWC-Saugus2, and NCWD-11. The flowpaths were drawn by placing imaginary groundwater particles through the entire open interval of each well and tracing the flowpaths in a backward direction to delineate the full extent of the capture zones created in the Saugus Formation for each well[13] (see Table 2-7 for the depths of the open intervals at each Saugus Formation production well). Figure 2-25 shows the following:

1. The capture zones for SCWC-Saugus1 and SCWC-Saugus2 occupy a large volume of the Saugus Formation, extending as far east as the Whittaker-Bermite property and as far northwest as wells VWC-157 and MP-5, which have historical detections of perchlorate.
2. The capture zones for VWC-160, VWC-201, and VWC-205 lie west of, and generally do not overlap, the capture zones for SCWC-Saugus1 and SCWC-Saugus2.

[13]For clarity, flowlines that were delineated to the base of the Alluvial Aquifer were stopped at that location so Figure 2-25 would show capture zones only in the Saugus Formation, which is the focus of the containment evaluation.

3. The capture zones for VWC-160, VWC-201, and VWC-205 do not extend to the locations of other Saugus Formation wells that have historical perchlorate detections (VWC-157 and MP-5).

In summary, Figures 2-24 and 2-25 together indicate that the pumping plan for production wells SCWC-Saugus1 and SCWC-Saugus2 will likely meet the objectives of (1) containing perchlorate that is migrating westward in the Saugus Formation from the Whittaker-Bermite property, (2) containing perchlorate that is present in the Saugus Formation at wells MP-5 and VWC-157, and (3) preventing perchlorate migration to nonimpacted Saugus Formation wells located farther west in the Santa Clarita Valley. Additionally, pumping at NCWD-11 is not necessary for meeting these objectives. These conclusions are further reinforced by the results of sensitivity analyses that are described in Section 2.3.4.

2.3.3 Time-related Capture Zones

Delineations of the 2-year, 5-year, 10-year, and 20-year capture zones of the impacted wells have been developed at DHS' request, for use in conducting the contaminant source inventory that is required by DHS Policy Memo 97-005. These capture zones are shown on Figures 2-26 through 2-29 respectively. As shown by the color scheme for the flowlines in each figure, the hydraulic capture zones lie not only in the Saugus Formation, but also in portions of the Alluvial Aquifer. The particle traces indicate that a portion of the yield to the impacted Saugus Formation production wells comes from downward leakage of groundwater from the Alluvial Aquifer to the Saugus Formation. This finding is consistent with the understanding of the basinwide and localized hydrogeology, which is discussed in the Regional Model development and calibration report (CH2M HILL, 2004a) and is based on drilling records, well-yield data, aquifer tests, streamflow data, and long-term monitoring of pumping rates and groundwater elevations across the basin. These data together indicate SCWC-Saugus1, SCWC-Saugus2, and NCWD-11 lie in a regional groundwater recharge area where the Saugus Formation is recharged by the Alluvial Aquifer, which in turn receives recharge from rainfall and streamflows. Figure 2-30 shows where the Saugus Formation is recharged by the Alluvial Aquifer.

Figures 2-26 through 2-29 also show that the portion of the Alluvial Aquifer that would contain groundwater migrating toward production well SCWC-Saugus1 lies within an area where perchlorate has been detected in the Alluvial Aquifer, north of this well and south of the Santa Clara River. In this area, perchlorate detections in Alluvial Aquifer monitoring wells have ranged from as little as 3.6 μg/L (well AL04_R1) to as high as 40 μg/L (well AL09_R1) and 64 μg/L (well EM03). The flowpaths suggest that the Alluvial Aquifer monitoring wells with perchlorate detections contain groundwater that will eventually migrate to SCWC-Saugus1, and thereby be contained by the near-continuous pumping activity that is planned for SCWC-Saugus1. This conclusion is supported by recent groundwater elevation data from the Alluvial Aquifer that show higher groundwater elevations exist at the AL09 series wells than at the AL04 series wells (see Figure 2-31). These data indicate that under the nonpumping conditions that have existed in the Saugus Formation in this area since 1997, the groundwater flow direction in the Alluvial Aquifer in this area is from north and northeast to south and southwest. This observation is consistent with water budget analyses that indicate significantly greater flow rates of surface water and Alluvial Aquifer groundwater occur along the Santa Clara River than along the South

Fork Santa Clara River. Because the Saugus Formation is recharged by the Alluvial Aquifer in this area, this hydraulic connection between the two aquifers means that implementation of Saugus Formation pumping could gradually increase the rate of downward leakage from the Alluvial Aquifer over a long period of time. This, in turn, could potentially help reduce the migration of Alluvial Aquifer groundwater farther west from the area around monitoring wells AL04 and AL06. This is evaluated in further detail in the sensitivity analysis, which is discussed below.

2.3.4 Sensitivity Analysis

As discussed in Section 2.2.9, sensitivity analyses were performed to further evaluate the likelihood that implementation of the Purveyors' pumping plan for the impacted Saugus Formation production wells will meet the containment objectives, particularly the objective of preventing movement of perchlorate to nonimpacted Saugus Formation wells located farther downgradient (to the west of the impacted wells). A model run was performed to evaluate each of the following questions:

1. **Can the containment objectives be met by using lower pumping rates at SCWC-Saugus1 and SCWC-Saugus2, rather than the rate of 1,200 gpm that has been selected for each well based, in part, on the water supply needs of the valley?** The purpose of this simulation was to evaluate whether the pumping plan for SCWC-Saugus1 and SCWC-Saugus2 does either of the following:

    a. Involves more pumping than is necessary for containment reasons alone

    b. Provides a high degree of certainty that groundwater migrating westward from the western boundary of the Whittaker-Bermite property will be prevented from moving farther west to wells that are not currently impacted by perchlorate

2. **How would the model predictions change if the degree of connection between the Alluvial Aquifer and the Saugus Formation is less than the degree of connection that is simulated by the calibrated model?** The purpose of this simulation was to evaluate whether uncertainty in the degree of hydraulic connection would notably affect the Regional Model's prediction that Alluvial Aquifer groundwater north of this well will migrate to this well, rather than migrating westward in the Alluvial Aquifer. This was evaluated by reducing the hydraulic connection by a factor of 4, which corresponds to decreasing the vertical hydraulic conductivity (Kv) of the Alluvial Aquifer and/or the uppermost beds of the Saugus Formation.

The sensitivity analyses showed the following:

1. Containment of Saugus groundwater migrating westward from the Whittaker-Bermite property will not be completely achieved if the two wells are operated at 800 gpm each or lower. Figure 2-32 compares groundwater flowpaths initiated at the western boundary of the Whittaker-Bermite property for the base model run and the sensitivity run that models a pumping rate of 700 gpm at each of these two wells. The figure shows that for the lower pumping rate, the southern end of the western property boundary will not lie within the capture zone of SCWC-Saugus1 and SCWC-Saugus2. At monitoring wells MP-2 and MP-4, which are both located on the Whittaker-Bermite property, Saugus groundwater migrates northwest and lies within the capture zones of

SCWC-Saugus1 and SCWC-Saugus2 for both sets of pumping rates (1,200 gpm per well and 700 gpm per well).

2. Although Figure 2-32 shows that pumping rates of 800 gpm per well or higher will capture most of the Saugus groundwater moving west from the Whittaker-Bermite property, pumping rates below 1,200 gpm will not completely capture perchlorate and groundwater that are present in the Saugus Formation at wells MP-5 and VWC-157. This is illustrated on Figure 2-32 by the blue flowpaths, which were generated using a pumping rate of 1,000 gpm per well at SCWC-Saugus1 and SCWC-Saugus2. At MP-5, groundwater above a depth of 1,000 feet migrates to SCWC-Saugus1 and to nonimpacted well VWC-205, while groundwater at and below 1,000 feet migrates to nonimpacted well VWC-160. At VWC-157, groundwater within the well's open interval migrates to SWC-Saugus1 and nonimpacted well VWC-205. Consequently, because these lower pumping rates are unable to fully contain perchlorate that is present at MP-5 and VWC-157, the containment plan will consist of pumping SCWC-Saugus1 and SCWC-Saugus2 at 1,200 gpm each.

3. The continuous pumping of wells SCWC-Saugus1 and SCWC-Saugus2 will likely capture much of the Alluvial Aquifer groundwater north of these wells that has historically contained perchlorate detections (see Figure 2-33, which compares the 20-year capture zones for the base model run and the sensitivity run). Modeling analyses indicate that if the vertical anisotropy[14] is as high as 200:1 in the upper beds of the Saugus Formation, it is still possible to contain Alluvial Aquifer groundwater from this area.

2.4 Conclusions

Analyses using a locally scaled version of the Regional Model of Santa Clarita Valley's groundwater resources indicate that the Purveyors' pumping plan for the impacted Saugus Formation production wells will meet the following objectives that have been defined by the Purveyors:

1. Hydraulically contain perchlorate migrating westward in the Saugus Formation from the Whittaker-Bermite property toward the impacted wells.

2. Hydraulically contain perchlorate that is present at wells MP-5 and VWC-157, which are located downgradient of the impacted wells.

3. Protect downgradient production wells that are currently not impacted.

4. Restore the annual volumes of water that were pumped from the impacted wells before they were shut down because of perchlorate detections.

5. Operate the impacted wells in a manner that is consistent with the Purveyors' operational plan for the Santa Clarita Valley's groundwater resources.

[14]The vertical anisotropy of a geologic unit is the ratio of its horizontal hydraulic conductivity (Kh) to its vertical hydraulic conductivity (Kv). In the Saugus Formation, the vertical anisotropy of 50:1 in the Regional Model was revised upward to 200:1 for this sensitivity analysis.

6. If possible, pump one or more of the impacted Saugus Formation production wells in a manner that also contains perchlorate migrating in the Alluvial Aquifer from the northern portion of the Whittaker-Bermite property.

The major conclusions from the modeling analysis are as follows:

1. Operating production wells SCWC-Saugus1 and SCWC-Saugus2 at rates of 1,200 gpm each on a nearly continual basis will effectively contain perchlorate migrating westward in the Saugus Formation from the Whittaker-Bermite property and will also contain perchlorate that is present at Saugus wells MP-5 and VWC-157. This is shown by Figure 2-24, which displays groundwater flowpaths from MP-5, VWC-157, and the Whittaker-Bermite property; and by Figure 2-25, which displays the areas within the Saugus Formation where water is obtained by each of the impacted production wells and each of the nonimpacted production wells that are located downgradient of SCWC-Saugus1 and SCWC-Saugus2.
2. Operating production wells SCWC-Saugus1 and SCWC-Saugus2 at rates as low as 700 to 800 gpm each will not fully contain groundwater that is migrating westward from the Whittaker-Bermite property. Additionally, if these wells are operated at 1,000 gpm each, perchlorate that is present in the Saugus Formation at wells MP-5 and VWC-157 will not be captured and will instead migrate to existing nonimpacted wells VWC-160 and VWC-205. (See Figure 2-32.)
3. No new production wells are needed in the Saugus Formation to meet the perchlorate containment objective.
4. Impacted well NCWD-11 is not a required component of the containment program.
5. Use of other water supplies in lieu of pumping at SCWC-Saugus1 and SCWC-Saugus2 will likely be detrimental to the long-term quality of groundwater in the Saugus Formation. Pumping at these two wells is necessary to prevent migration of perchlorate to other portions of the Saugus Formation.
6. The pumping plan for SCWC-Saugus1 and SCWC-Saugus2 might contain perchlorate that is migrating in the Alluvial Aquifer from the northern portion of the Whittaker-Bermite property, including perchlorate that has been detected in the Alluvial Aquifer at and south of Bouquet Junction.
7. Planned operation of the impacted production wells will not cause detrimental short-term or long-term effects to the groundwater and surface water resources of the Santa Clarita Valley. In particular, the modeling analysis indicates that short- and long-term variability in local rainfall and streamflows is the predominant cause of fluctuating groundwater elevations, river flows, and groundwater storage volumes. Compared to local hydrology, implementation of the operational pumping plan for the valley, including the planned use of wells SCWC-Saugus1 and SCWC-Saugus2, has much less influence on the water resources of the valley.

It is important to note that the model simulations described in this report distribute pumping in a manner that is based on current and projected uses of both the Alluvial Aquifer and the Saugus Formation. The conclusions presented in this report regarding containment of perchlorate-containing groundwater will potentially be different if the

pumping plan for other Saugus Formation wells is significantly different than what was simulated. In particular, a significant change in the Saugus Formation pumping regime in the South Fork Santa Clara River area or near its mouth could potentially cause groundwater flow patterns and capture zones to be notably different from those described in this report. Changes that could appreciably alter groundwater flow patterns and capture zones could include the operation of new wells in that area, or notably greater instantaneous pumping rates or annual pumping volumes than those simulated by the Regional Model. Consequently, before a new well is sited in that area or a significant increase in pumping occurs from an existing wellfield in that area, it is recommended that an analysis first be conducted of the potential effects of the contemplated change on the perchlorate containment program.

Tables

TABLE 2-1
Recharge and Discharge Components of the Hydrologic Cycle in the Upper Santa Clara River Basin
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Recharge	Discharge
Surface Water	
Direct runoff of precipitation	Evapotranspiration of precipitation
Precipitation runoff from upstream watershed areas	Santa Clara River flow to Ventura County
Castaic Lake/Lagoon releases into Castaic Creek	Streamflow seepage to the Alluvial Aquifer
WRP discharges into the Santa Clara River	Evapotranspiration of applied irrigation water
Groundwater seepage into the Santa Clara River	
Irrigation return flows (agricultural and urban)	
Groundwater	
Infiltration of precipitation	Pumping
Infiltration of outdoor applied water (agricultural and urban)	Evapotranspiration of Alluvial Aquifer groundwater by riparian vegetation
Alluvial Aquifer subsurface inflow (Castaic Dam, Lang gage)	Alluvial Aquifer subsurface outflow (western study area boundary)
Streamflow seepage to Alluvial aquifer	Groundwater seepage into the Santa Clara River

Notes:

The two sources of water for agricultural and municipal water uses in the basin are groundwater pumping and imported water from the SWP.

Because SWP water is stored in Castaic Lake, which is outside the limits of the Alluvial and Saugus aquifers, it is not considered a part of the valley's hydrologic cycle while it is still in storage. However, SWP water that is land-applied or that is discharged from a WRP qualifies as a component of the hydrologic cycle. In addition, subsurface groundwater flow occurs into the Santa Clarita Valley beneath Castaic Creek through water seepage beneath Castaic Dam.

TABLE 2-2
Historical Hydrology in Northern California and the Santa Clarita Valley, 1950 through 2003
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Northern California Hydrology[a]	Local Rainfall[b]
1950	Below Normal	6.84
1951	Above Normal	12.42
1952	Wet	34.19
1953	Wet	4.88
1954	Above Normal	15.82
1955	Dry	13.91
1956	Wet	14.21
1957	Above Normal	22.85
1958	Wet	23.14
1959	Below Normal	9.81
1960	Dry	11.64
1961	Dry	8.82
1962	Below Normal	21.22
1963	Wet	12.79
1964	Dry	10.09
1965	Wet	32.28
1966	Below Normal	14.57
1967	Wet	23.23
1968	Below Normal	6.90
1969	Wet	32.42
1970	Wet	23.19
1971	Wet	13.75
1972	Below Normal	4.15
1973	Above Normal	19.79
1974	Wet	18.04
1975	Wet	10.92
1976	Critical	14.02
1977	Critical	20.87
1978	Above Normal	42.17
1979	Below Normal	21.47
1980	Above Normal	27.00
1981	Dry	13.42
1982	Wet	20.20
1983	Wet	39.07
1984	Wet	12.86

TABLE 2-2
Historical Hydrology in Northern California and the Santa Clarita Valley, 1950 through 2003
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Northern California Hydrology[a]	Local Rainfall[b]
1985	Dry	8.37
1986	Wet	18.02
1987	Dry	14.45
1988	Critical	16.92
1989	Dry	7.56
1990	Critical	6.98
1991	Critical	17.21
1992	Critical	32.03
1993	Above Normal	32.72
1994	Critical	10.27
1995	Wet	29.15
1996	Wet	15.88
1997	Wet	13.35
1998	Wet	30.73
1999	Wet	8.96
2000	Above Normal	14.04
2001	Dry	22.24
2002	Dry	7.90
2003	Above Normal	15.70

[a]Defined by water year, using DWR's Sacramento Valley Unimpaired Runoff Index: wet = wettest; critical = driest.

[b]Records are for the Newhall-Soledad rain gage (Station No. FC32CE), in inches. As shown on Figure 2-3, the median and average rainfall at this gage from 1950 through 2002 were 14.57 in/yr and 17.84 in/yr, respectively.

TABLE 2-3
Annual Pumping Rates Specified by the Operational Plan for the Santa Clarita Valley's Groundwater Resources
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Aquifer	Normal Years	Dry Year 1	Dry Year 2	Dry Year 3
Operational Plan Pumping				
Alluvium	30,000 to 40,000	30,000 to 35,000	30,000 to 35,000	30,000 to 35,000
Saugus	7,500 to 15,000	7,500 to 25,000	21,000 to 25,000	21,000 to 35,000
Total	**37,500 to 55,000**	**37,500 to 60,000**	**51,000 to 60,000**	**51,000 to 70,000**
Modeled Pumping				
Alluvium	38,429	33,767	33,767	33,767
Saugus	10,679	15,760	24,346	34,096
Total	**49,108**	**49,527**	**58,113**	**67,863**

Notes:

All pumping volumes are listed in acre-feet.

The operational plan is defined in the documents titled *Urban Water Management Plan 2000* (Black & Veatch, 2000) and *Santa Clarita Valley Water Report 2003* (Luhdorff & Scalmanini Consulting Engineers, 2004).

In the model simulations, total pumping is different than listed in this table when dry-year pumping conditions in one aquifer coincide with normal-year pumping conditions in the other aquifer (due to differences in the timing of dry conditions locally versus reduced deliveries of water imports from the State Water Project).

TABLE 2-4

CALSIM II Calculated State Water Project Municipal and Industrial Allocations

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	OCAP Current EWA[a]	OCAP Future EWA[a]	2020 SWP Reliability[b]
1950	0.88	0.91	0.79
1951	1.00	1.00	0.96
1952	1.00	1.00	1.00
1953	1.00	1.00	0.95
1954	1.00	1.00	0.96
1955	0.44	0.45	0.43
1956	1.00	1.00	1.00
1957	0.94	0.91	0.75
1958	1.00	1.00	1.00
1959	0.84	0.88	0.83
1960	0.51	0.55	0.56
1961	0.68	0.72	0.76
1962	0.93	0.98	0.87
1963	1.00	1.00	1.00
1964	0.84	0.74	0.73
1965	0.87	0.81	0.77
1966	1.00	1.00	0.92
1967	1.00	1.00	1.00
1968	0.89	0.90	0.85
1969	1.00	1.00	1.00
1970	1.00	1.00	0.95
1971	1.00	1.00	1.00
1972	0.76	0.75	0.65
1973	1.00	1.00	0.91
1974	1.00	1.00	1.00
1975	1.00	1.00	1.00
1976	0.78	0.75	0.65
1977	0.03	0.04	0.20
1978	1.00	1.00	1.00
1979	1.00	0.94	0.89
1980	1.00	0.91	0.85
1981	0.90	0.92	0.84
1982	1.00	1.00	1.00
1983	1.00	1.00	1.00
1984	0.66	1.00	0.99
1985	0.97	0.91	0.83
1986	0.74	0.70	0.78
1987	0.70	0.77	0.71
1988	0.12	0.17	0.23
1989	0.96	0.95	0.83
1990	0.24	0.27	0.28
1991	0.24	0.29	0.25
1992	0.39	0.43	0.29
1993	1.00	1.00	1.00

[a]Source: USBR, 2004

[b]Source: DWR, 2002

Notes:

EWA = Environmental Water Account
OCAP = Operating Criteria and Plan

TABLE 2-5
State Water Project Allocations and Corresponding Saugus Formation Pumping for the 78-year Simulation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	SWP Hydrology[a]	SWP Allocations[b] (%)	Simulated Saugus Pumping Conditions (AF/yr)
1	Above Normal	90	Normal (7,500-15,000)
2	Dry	90	Normal (7,500-15,000)
3	Wet	100	Normal (7,500-15,000)
4	Wet	100	Normal (7,500-15,000)
5	Wet	100	Normal (7,500-15,000)
6	Dry	95	Normal (7,500-15,000)
7	Wet	70	Normal (7,500-15,000)
8	Dry	75	Normal (7,500-15,000)
9	Critical	15	Dry Year 1 (15,000)
10	Dry	95	Normal (7,500-15,000)
11	Critical	25	Dry Year 1 (15,000)
12	Critical	30	Dry Year 2 (25,000)
13	Critical	45	Dry Year 3 (35,000)
14	Above Normal	100	Normal (7,500-15,000)
15	Critical	50	Dry Year 1 (15,000)
16	Wet	80	Normal (7,500-15,000)
17	Wet	100	Normal (7,500-15,000)
18	Wet	100	Normal (7,500-15,000)
19	Wet	100	Normal (7,500-15,000)
20	Wet	100	Normal (7,500-15,000)
21	Above Normal	90	Normal (7,500-15,000)
22	Dry	39	Dry Year 1 (15,000)
23	Dry	70	Normal (7,500-15,000)
24	Above Normal	90	Normal (7,500-15,000)
25	Below Normal	90	Normal (7,500-15,000)
26	Above Normal	100	Normal (7,500-15,000)
27	Wet	100	Normal (7,500-15,000)
28	Wet	100	Normal (7,500-15,000)
29	Above Normal	100	Normal (7,500-15,000)
30	Dry	45	Dry Year 1 (15,000)
31	Wet	100	Normal (7,500-15,000)
32	Above Normal	90	Normal (7,500-15,000)
33	Wet	100	Normal (7,500-15,000)
34	Below Normal	85	Normal (7,500-15,000)
35	Dry	55	Dry Year 1 (15,000)
36	Dry	70	Dry Year 2 (25,000)
37	Below Normal	95	Normal (7,500-15,000)
38	Wet	100	Normal (7,500-15,000)
39	Dry	75	Dry Year 1 (15,000)
40	Wet	80	Normal (7,500-15,000)
41	Below Normal	100	Normal (7,500-15,000)
42	Wet	100	Normal (7,500-15,000)
43	Below Normal	90	Normal (7,500-15,000)

TABLE 2-5
State Water Project Allocations and Corresponding Saugus Formation Pumping for the 78-year Simulation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	SWP Hydrology[a]	SWP Allocations[b] (%)	Simulated Saugus Pumping Conditions (AF/yr)
44	Wet	100	Normal (7,500-15,000)
45	Wet	100	Normal (7,500-15,000)
46	Wet	100	Normal (7,500-15,000)
47	Below Normal	75	Normal (7,500-15,000)
48	Above Normal	100	Normal (7,500-15,000)
49	Wet	100	Normal (7,500-15,000)
50	Wet	100	Normal (7,500-15,000)
51	Critical	75	Dry Year 1 (15,000)
52	Critical	4	Dry Year 2 (25,000)
53	Above Normal	100	Normal (7,500-15,000)
54	Below Normal	95	Normal (7,500-15,000)
55	Above Normal	90	Normal (7,500-15,000)
56	Dry	90	Normal (7,500-15,000)
57	Wet	100	Normal (7,500-15,000)
58	Wet	100	Normal (7,500-15,000)
59	Wet	100	Normal (7,500-15,000)
60	Dry	95	Normal (7,500-15,000)
61	Wet	70	Normal (7,500-15,000)
62	Dry	75	Normal (7,500-15,000)
63	Critical	15	Dry Year 1 (15,000)
64	Dry	95	Normal (7,500-15,000)
65	Critical	25	Dry Year 1 (15,000)
66	Critical	30	Dry Year 2 (25,000)
67	Critical	45	Dry Year 3 (35,000)
68	Above Normal	100	Normal (7,500-15,000)
69	Critical	50	Dry Year 1 (15,000)
70	Wet	80	Normal (7,500-15,000)
71	Wet	100	Normal (7,500-15,000)
72	Wet	100	Normal (7,500-15,000)
73	Wet	100	Normal (7,500-15,000)
74	Wet	100	Normal (7,500-15,000)
75	Above Normal	90	Normal (7,500-15,000)
76	Dry	39	Dry Year 1 (15,000)
77	Dry	70	Normal (7,500-15,000)
78	Above Normal	90	Normal (7,500-15,000)

[a]Defined by water year, using DWR's Sacramento Valley Unimpaired Runoff Index: wet = wettest; critical = driest. SWP = State Water Project.

[b]Defined from simulations performed by CLWA (Kennedy/Jenks Consultants, 2003) and USBR (2004) using the CALSIM II model. This condition is for the year 2020 level of development. In any given year, the allocation may be made up, in part, of carryover water from the prior year.

TABLE 2-6
Simulated Annual Groundwater Pumping from the Saugus Formation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Owner	Well Name	Normal Years	Dry Year 1	Dry Year 2	Dry Year 3
NCWD	11	811	811	811	811
	12	1,315	2,044	2,044	2,044
	13	1,315	2,044	2,044	2,044
Total Pumping (NCWD)		**3,441**	**4,899**	**4,899**	**4,899**
NLF	156	369	369	369	369
Total Pumping (NLF)		**369**	**369**	**369**	**369**
SCWC	Saugus1	1,772	1,772	1,772	1,772
	Saugus2	1,772	1,772	1,772	1,772
Total Pumping (SCWC)		**3,544**	**3,544**	**3,544**	**3,544**
VWC	159	50	50	50	50
	160 (Municipal)	500	830	830	830
	160 (Val. Ctry Club)	500	500	500	500
	201	100	100	3,577	3,577
	205	1,000	2,734	3,827	3,827
	206	1,175	2,734	3,500	3,500
Total Pumping (VWC)		**3,325**	**6,948**	**12,284**	**12,284**
To Be Determined	Future #1	0	0	3,250	3,250
	Future #2	0	0	0	3,250
	Future #3	0	0	0	3,250
	Future #4	0	0	0	3,250
Total Pumping (Future)		**0**	**0**	**3,250**	**13,000**
Total Saugus Formation Pumping		**10,679**	**15,760**	**24,346**	**34,096**

Notes:

All pumping volumes are listed in acre-feet.

Wells VWC-157 and NCWD-7, 8, 9, and 10 are assumed to no longer operate in the future.

NCWD = Newhall County Water District
NLF = Newhall Land and Farming Company
SCWC = Santa Clarita Water Company
VWC = Valencia Water Company
Val. Ctry Club = Valencia Country Club

TABLE 2-7
Allocation of Pumping by Layer for Wells Completed in the Saugus Formation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner - Well Name	Model Layer	Depth to Open Interval (feet) Top	Bottom	Length of Open Interval in Model Layer (feet)	Kh (ft/day)	T in Open Interval (ft^2/day)	Percentage of Yield from Model Layer
NCWD-11	2	200	1,075	300	10	3,000	72.3
	3			500	2	1,000	24.1
	4			75	2	150	3.6
NCWD-12	2	485	1,280	15	10	150	8.8
	3			500	2	1,000	58.5
	4			280	2	560	32.7
NCWD-13	2	420	750	80	10	800	61.5
	3			250	2	500	38.5
NLF-156	2	320	1,800	180	10	1,800	21.8
	3			500	6.5	3,250	39.4
	4			500	4	2,000	24.2
	5			300	4	1,200	14.5
SCWC-Saugus1	2	490	1,620	10	10	100	1.8
	3			500	6.5	3,250	59.9
	4			500	4	2,000	36.8
	5			20	4	80	1.5
SCWC-Saugus2	2	490	1,591	10	10	100	1.7
	3			500	6.5	3,250	56.9
	4			500	4	2,000	35.0
	5			91	4	364	6.4
VWC-159	3	662	1,900	338	0.025	8.45	27.3
	4			500	0.025	12.5	40.4
	5			400	0.025	10	32.3
VWC-160	3	950	2,000	50	6.5	325	7.6
	4			500	4	2,000	46.2
	5			500	4	2,000	46.2
VWC-201	3	540	1,670	460	6.5	2,990	52.7
	4			500	4	2,000	35.3
	5			170	4	680	12.0
VWC-205	3	820	1,930	180	6.5	1,170	23.9
	4			500	4	2,000	40.9
	5			430	4	1,720	35.2
VWC-206	3	500	2,000	500	6.5	3,250	44.8
	4			500	4	2,000	27.6
	5			500	4	2,000	27.6

TABLE 2-7
Allocation of Pumping by Layer for Wells Completed in the Saugus Formation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner - Well Name	Model Layer	Depth to Open Interval (feet) Top	Bottom	Length of Open Interval in Model Layer (feet)	Kh (ft/day)	T in Open Interval (ft^2/day)	Percentage of Yield from Model Layer
Future Wells	3	820	1,930	180	6.5	1,170	23.9
Near VWC-206	4			500	4	2,000	40.9
(Assumed)	5			430	4	1,720	35.2

Notes:

Wells VWC-157 and NCWD-7, 8, 9, and 10 are assumed to no longer operate in the future.

Kh = horizontal hydraulic conductivity
T = transmissivity
ft/day = feet per day
ft^2/day = square feet per day

TABLE 2-8
Allocation of Pumping by Month for Agricultural and Urban Production Wells
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Month	Percent of Annual Water Use, Agricultural	Percent of Annual Water Use, Urban	Percent of May through October Water Use, Urban
January	3.75	5.2	
February	5.10	3.7	
March	6.60	5.2	
April	9.10	6.6	
May	10.55	8.7	13.2
June	11.40	10.4	15.8
July	14.10	13.0	19.7
August	12.95	13.6	20.6
September	10.20	10.9	16.6
October	7.50	9.3	14.1
November	5.00	7.1	
December	3.75	6.3	
Total	**100.0**	**100.0**	**100.0**

TABLE 2-9
Local Hydrology and Corresponding Pumping from the Alluvial Aquifer for the 78-year Simulation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Model Year	Based on Historical Year	Local Rainfall[a]	Alluvial Aquifer Pumping under the Operational Pumping Plan (AF/yr)[b,c]
1	1980	27.00	35,000-40,000
2	1981	13.42	35,000-40,000
3	1982	20.20	35,000-40,000
4	1983	39.07	35,000-40,000
5	1984	12.86	35,000-40,000
6	1985	8.37	30,000-35,000
7	1986	18.02	35,000-40,000
8	1987	14.45	35,000-40,000
9	1988	16.92	35,000-40,000
10	1989	7.56	30,000-35,000
11	1990	6.98	30,000-35,000
12	1991	17.21	30,000-35,000
13	1992	32.03	35,000-40,000
14	1993	32.72	35,000-40,000
15	1994	10.27	30,000-35,000
16	1995	29.15	35,000-40,000
17	1996	15.88	35,000-40,000
18	1997	13.35	35,000-40,000
19	1998	30.73	35,000-40,000
20	1999	8.96	30,000-35,000
21	2000	14.04	35,000-40,000
22	2001	22.24	35,000-40,000
23	2002	7.90	30,000-35,000
24	2003	15.70	35,000-40,000
25	1950	6.84	30,000-35,000
26	1951	12.42	35,000-40,000
27	1952	34.19	35,000-40,000
28	1953	4.88	30,000-35,000
29	1954	15.82	35,000-40,000
30	1955	13.91	35,000-40,000
31	1956	14.21	35,000-40,000
32	1957	22.85	35,000-40,000
33	1958	23.14	35,000-40,000
34	1959	9.81	30,000-35,000
35	1960	11.64	30,000-35,000
36	1961	8.82	30,000-35,000
37	1962	21.22	30,000-35,000
38	1963	12.79	35,000-40,000
39	1964	10.09	30,000-35,000
40	1965	32.28	35,000-40,000
41	1966	14.57	35,000-40,000
42	1967	23.23	35,000-40,000
43	1968	6.90	30,000-35,000

TABLE 2-9
Local Hydrology and Corresponding Pumping from the Alluvial Aquifer for the 78-year Simulation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Model Year	Based on Historical Year	Local Rainfall[a]	Alluvial Aquifer Pumping under the Operational Pumping Plan (AF/yr)[b,c]
44	1969	32.42	35,000-40,000
45	1970	23.19	35,000-40,000
46	1971	13.75	35,000-40,000
47	1972	4.15	30,000-35,000
48	1973	19.79	35,000-40,000
49	1974	18.04	35,000-40,000
50	1975	10.92	30,000-35,000
51	1976	14.02	35,000-40,000
52	1977	20.87	35,000-40,000
53	1978	42.17	35,000-40,000
54	1979	21.47	35,000-40,000
55	1980	27.00	35,000-40,000
56	1981	13.42	35,000-40,000
57	1982	20.20	35,000-40,000
58	1983	39.07	35,000-40,000
59	1984	12.86	35,000-40,000
60	1985	8.37	30,000-35,000
61	1986	18.02	35,000-40,000
62	1987	14.45	35,000-40,000
63	1988	16.92	35,000-40,000
64	1989	7.56	30,000-35,000
65	1990	6.98	30,000-35,000
66	1991	17.21	30,000-35,000
67	1992	32.03	35,000-40,000
68	1993	32.72	35,000-40,000
69	1994	10.27	30,000-35,000
70	1995	29.15	35,000-40,000
71	1996	15.88	35,000-40,000
72	1997	13.35	35,000-40,000
73	1998	30.73	35,000-40,000
74	1999	8.96	30,000-35,000
75	2000	14.04	35,000-40,000
76	2001	22.24	35,000-40,000
77	2002	7.90	30,000-35,000
78	2003	15.70	35,000-40,000

[a]From records at Newhall-Soledad rain gage (Station No. FC32CE).

[b]Alluvial pumping rates listed in this column are the rates that will occur under the operational plan for the Valley if the 1950 through 2003 local hydrology repeats itself in the future.

[c]Alluvial pumping is set at the dry-year rate in years 12, 37, and 66 because each of these years is the first nondrought year that occurs after a multi-year drought ends.

TABLE 2-10

Recent and Simulated Future Annual Groundwater Pumping Volumes from the Alluvial Aquifer

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

		Historical Pumping			UWMP Pumping	
Well Name	**Location**	**2001**	**2002**	**2003**	**Normal Years**	**Dry Years**
NCWD-Castaic 1	Castaic Valley	345	385	561	385	345
NCWD-Castaic 2	Castaic Valley	166	0	123	166	125
NCWD-Castaic 3	Castaic Valley	0	0	0	0	0
NCWD-Castaic 4	Castaic Valley	100	47	56	100	45
NCWD-Pinetree 1	Mint Canyon	164	0	0	164	0
NCWD-Pinetree 2	Mint Canyon	0	0	0	0	0
NCWD-Pinetree 3	Mint Canyon	566	544	525	545	525
NCWD-Pinetree 4	Mint Canyon	300	5	0	300	0
NCWD Total		**1,641**	**981**	**1,265**	**1,660**	**1,040**
NLF-161	Downstream of Valencia WRP	496	485	2,021	485	485
NLF-B10	Downstream of Valencia WRP	1,240	534	344	344	344
NLF-B11	Downstream of Valencia WRP	205	232	271	232	232
NLF-B5	Downstream of Valencia WRP	1,680	2,280	1,582	1,582	1,582
NLF-B6	Downstream of Valencia WRP	1,312	2,175	1,766	1,766	1,766
NLF-B7	Downstream of Valencia WRP	474	584	402	584	584
NLF-C	Downstream of Valencia WRP	1,319	1,720	1,373	1,373	1,373
NLF-C3	Downstream of Valencia WRP	93	192	186	192	192
NLF-C4	Downstream of Valencia WRP	1,028	809	764	809	809
NLF-C5	Downstream of Valencia WRP	680	850	622	850	850
NLF-C6	Downstream of Valencia WRP	231	241	108	241	241
NLF-C7	Downstream of Valencia WRP	741	866	443	866	866
NLF-C8	Downstream of Valencia WRP	286	593	408	594	594
NLF-C9	Downstream of Valencia WRP	7	1	0	0	0
NLF-E	Castaic Valley	1,691	16	28	16	16
NLF-E2	Castaic Valley	141	55	14	55	55
NLF-E4	Downstream of Valencia WRP	0	0	0	0	0
NLF-E5	Downstream of Valencia WRP	172	679	537	679	679
NLF-E9	Downstream of Valencia WRP	238	814	47	814	814
NLF-G45	Downstream of Valencia WRP	291	283	60	283	283
NLF-S3	Downstream of Valencia WRP	0			0	0
NLF-W4	San Francisquito Canyon	46	1	0	0	0
NLF-W5	San Francisquito Canyon	276	104	23	107	107
NLF-X3	Downstream of Valencia WRP	12	0	0	0	0
NLF Total		**12,659**	**13,514**	**10,999**	**11,872**	**11,872**
SCWD-Clark	Bouquet Canyon	696	782	712	782	700
SCWD-Guida	Bouquet Canyon	1,047	1,320	1,230	1,320	1,230
SCWD-Honby	Above Saugus WRP	721	696	874	696	870
SCWD-Lost Canyon 2	Mint Canyon	741	730	644	741	640
SCWD-Lost Canyon 2A	Mint Canyon	1,034	905	593	1,034	590
SCWD-Mitchell #5A	Mint Canyon	407	143	19	0	0
SCWD-Mitchell #5B	Mint Canyon	0	150	0	557	0
SCWD-N. Oaks Central	Mint Canyon	822	1,646	1,641	822	1,640
SCWD-N. Oaks East	Mint Canyon	1,234	448	485	1,234	485
SCWD-N. Oaks West	Mint Canyon	898	1,123	31	898	0
SCWD-Sand Canyon	Mint Canyon	930	705	195	930	195
SCWD-Sierra	Mint Canyon	846	87	0	846	0
SCWD-Stadium	Above Saugus WRP	565	778	0	800	800
SCWD Total		**9,941**	**9,513**	**6,424**	**10,660**	**7,150**

TABLE 2-10

Recent and Simulated Future Annual Groundwater Pumping Volumes from the Alluvial Aquifer

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

		Historical Pumping			UWMP Pumping	
Well Name	**Location**	**2001**	**2002**	**2003**	**Normal Years**	**Dry Years**
VWC-D	Castaic Valley	645	772	687	690	690
VWC-I	San Francisquito Canyon	0	0	0	0	0
VWC-K2	Downstream of Saugus WRP	669	955	364	0	0
VWC-L2	Downstream of Saugus WRP	349	490	71	0	0
VWC-N	Downstream of Saugus WRP	591	700	622	620	620
VWC-N3	Downstream of Saugus WRP	226	857	255	0	0
VWC-N4	Downstream of Saugus WRP	458	909	248	0	0
VWC-N7	Downstream of Saugus WRP				1,160	1,160
VWC-N8	Downstream of Saugus WRP				1,160	1,160
VWC-Q2	Downstream of Saugus WRP	923	1,167	1,451	985	985
VWC-S6	Downstream of Saugus WRP	1,490	1,320	2,134	865	865
VWC-S7	Downstream of Saugus WRP	564	419	1,095	865	865
VWC-S8	Downstream of Saugus WRP	327	190	409	865	865
VWC-T2	Above Saugus WRP	900	696	1,014	460	460
VWC-T4	Above Saugus WRP	690	831	799	460	460
VWC-U3	Above Saugus WRP	956	572	823	0	0
VWC-U4	Above Saugus WRP	942	796	934	935	935
VWC-U6	Above Saugus WRP	0	0	0	825	825
VWC-W10	San Francisquito Canyon	182	0		0	0
VWC-W11	San Francisquito Canyon	806	939	764	600	600
VWC-W6	San Francisquito Canyon	0	0	36	865	865
VWC-W9	San Francisquito Canyon				350	350
VWC Total		**10,718**	**11,613**	**11,706**	**11,705**	**11,705**
Robinson Ranch	Mint Canyon				932	400
WHR (All Wells)	Castaic Valley	1,604	1,602	2,273	1,600	1,600
Total Alluvial Aquifer Pumping		**36,563**	**37,223**	**32,667**	**38,429**	**33,767**

Notes:

All pumping volumes are listed in AF/yr.

Wells that are not listed are assumed to not be pumping in the future.

NCWD = Newhall County Water District
NLF = Newhall Land and Farming Company
SCWC = Santa Clarita Water Company
VWC = Valencia Water Company
WHR = Wayside Honor Rancho, owned by LACWWD

TABLE 2-11

Simulated Monthly Precipitation at the Newhall County Water District Rain Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	10.36	14.63	4.84	0.36	0.40	0.00	0.00	0.00	0.00	0.00	0.00	1.36	31.95
2	4.76	1.66	5.50	0.46	0.00	0.00	0.00	0.00	0.00	0.58	3.62	0.22	16.80
3	3.33	1.21	9.50	1.09	0.13	0.00	0.00	0.00	1.02	0.25	5.34	2.95	24.82
4	8.67	6.85	13.07	4.61	0.20	0.00	0.00	1.17	1.85	1.74	5.04	5.13	48.33
5	0.00	0.00	0.27	0.07	0.00	0.00	0.00	0.00	0.05	0.16	3.87	8.13	12.55
6	0.78	1.20	1.04	0.14	0.07	0.00	0.06	0.00	0.12	0.54	5.11	0.70	9.76
7	5.84	6.65	5.39	0.88	0.00	0.00	0.05	0.00	1.78	0.68	1.55	0.24	23.06
8	2.10	0.61	1.69	0.14	0.00	0.00	0.09	0.02	0.00	3.47	3.84	4.80	16.76
9	3.27	3.39	1.16	3.98	0.09	0.00	0.00	0.00	0.10	0.00	0.92	7.14	20.05
10	0.89	4.13	1.30	0.30	0.00	0.00	0.00	0.00	0.62	0.86	0.37	0.00	8.47
11	2.89	4.23	0.22	0.48	0.88	0.00	0.00	0.00	0.00	0.00	0.63	0.01	9.34
12	1.11	5.72	11.33	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	5.95	24.61
13	3.28	16.64	9.73	0.15	0.34	0.00	0.30	0.00	0.00	1.55	0.00	7.25	39.24
14	17.11	11.73	4.27	0.00	0.00	0.65	0.00	0.00	0.00	0.57	0.75	1.00	36.08
15	0.48	5.31	2.33	0.42	0.00	0.00	0.00	0.00	0.00	0.78	0.71	1.94	11.97
16	21.98	1.93	8.30	0.72	0.26	0.76	0.00	0.00	0.00	0.00	0.00	2.33	36.28
17	2.97	6.73	2.08	0.13	0.68	0.00	0.00	0.00	0.00	1.30	1.06	8.70	23.65
18	6.67	0.23	0.00	0.00	0.00	0.00	0.05	0.00	0.53	0.00	3.73	6.72	17.93
19	3.49	22.00	3.98	2.28	5.50	0.06	0.00	0.00	0.21	0.33	1.36	1.39	40.60
20	2.08	0.65	3.00	3.78	0.00	0.48	0.00	0.00	0.01	0.00	0.00	0.05	10.05
21	1.21	9.43	3.15	2.10	0.00	0.00	0.00	0.31	0.00	1.13	0.00	0.00	17.33
22	5.96	9.79	3.70	1.88	0.00	0.00	0.00	0.00	0.00	0.36	3.33	1.08	26.10
23	1.08	1.10	0.26	0.05	0.05	0.00	0.00	0.00	0.01	0.00	2.48	4.25	9.27
24	0.00	9.88	2.73	2.42	0.05	0.00	0.00	0.00	0.09	0.10	0.63	2.57	18.47
25	2.58	1.69	1.27	0.86	0.01	0.00	0.00	0.00	0.32	0.36	0.73	0.21	8.03
26	2.96	0.93	1.16	1.69	0.09	0.00	0.00	0.05	0.00	0.49	1.33	5.88	14.57
27	17.68	0.61	10.30	1.80	0.00	0.00	0.00	0.00	0.12	0.00	4.52	5.09	40.12
28	0.80	0.02	0.21	1.64	0.69	0.00	0.00	0.00	0.00	0.00	2.32	0.04	5.73
29	6.38	3.36	4.86	0.12	0.00	0.00	0.00	0.00	0.00	0.00	2.38	1.47	18.56
30	5.69	1.69	0.21	3.38	1.91	0.00	0.00	0.00	0.00	0.00	1.43	2.01	16.32
31	7.55	1.00	0.00	5.90	1.82	0.00	0.11	0.00	0.00	0.15	0.00	0.15	16.68
32	7.22	2.71	3.05	1.16	1.06	0.25	0.00	0.00	0.00	2.68	0.40	8.30	26.81
33	2.11	10.42	5.82	7.18	0.00	0.00	0.00	0.00	0.04	1.35	0.23	0.00	27.15
34	3.70	5.47	0.00	0.59	0.00	0.00	0.00	0.00	0.08	0.00	0.00	1.68	11.51
35	4.17	2.21	0.20	2.05	0.00	0.00	0.00	0.00	0.00	0.00	4.96	0.07	13.66
36	1.88	0.00	0.76	0.33	0.09	0.00	0.07	0.00	0.11	0.00	4.12	2.99	10.35
37	3.86	19.44	1.53	0.00	0.02	0.00	0.00	0.00	0.00	0.05	0.00	0.00	24.90
38	0.99	3.63	4.10	2.23	0.06	0.43	0.00	0.00	0.77	0.50	2.29	0.01	15.01
39	2.95	0.00	1.88	2.41	0.04	0.12	0.00	0.00	0.00	0.52	1.47	2.48	11.84
40	0.25	0.07	1.65	9.14	0.00	0.02	0.26	0.16	0.95	0.00	17.49	7.89	37.88
41	1.42	1.55	0.33	0.00	0.09	0.00	0.00	0.00	0.09	0.11	7.56	5.95	17.10

TABLE 2-11

Simulated Monthly Precipitation at the Newhall County Water District Rain Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
42	6.76	0.22	3.23	5.41	0.19	0.00	0.00	0.00	0.50	0.00	9.36	1.58	27.26
43	0.86	0.93	2.91	0.97	0.07	0.00	0.00	0.38	0.00	0.39	0.35	1.24	8.10
44	19.53	13.89	0.82	1.16	0.05	0.05	0.18	0.00	0.00	0.00	2.32	0.05	38.04
45	0.94	6.63	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.13	8.86	6.33	27.21
46	1.23	1.41	0.48	0.94	0.15	0.00	0.00	0.00	0.47	0.50	0.38	10.57	16.14
47	0.00	0.12	0.00	0.02	0.05	0.05	0.00	0.06	0.00	0.05	3.45	1.08	4.87
48	5.19	11.74	3.29	0.00	0.00	0.00	0.00	0.00	0.00	0.15	1.83	1.03	23.22
49	10.58	0.02	4.30	0.06	0.00	0.00	0.02	0.00	0.00	1.17	0.12	4.89	21.17
50	0.28	3.02	6.04	2.96	0.00	0.00	0.00	0.00	0.00	0.39	0.04	0.09	12.81
51	0.00	7.39	1.47	0.46	0.15	0.35	0.01	0.00	3.40	0.22	2.09	0.90	16.45
52	5.75	0.12	2.15	0.00	5.27	0.00	0.00	2.68	0.02	0.05	0.06	8.40	24.49
53	10.74	13.23	17.10	2.72	0.00	0.00	0.00	0.00	1.23	0.01	2.70	1.76	49.49
54	12.44	3.20	6.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.89	1.19	23.75
55	10.36	14.63	4.84	0.36	0.40	0.00	0.00	0.00	0.00	0.00	0.00	1.36	31.95
56	4.76	1.66	5.50	0.46	0.00	0.00	0.00	0.00	0.00	0.58	3.62	0.22	16.80
57	3.33	1.21	9.50	1.09	0.13	0.00	0.00	0.00	1.02	0.25	5.34	2.95	24.82
58	8.67	6.85	13.07	4.61	0.20	0.00	0.00	1.17	1.85	1.74	5.04	5.13	48.33
59	0.00	0.00	0.27	0.07	0.00	0.00	0.00	0.00	0.05	0.16	3.87	8.13	12.55
60	0.78	1.20	1.04	0.14	0.07	0.00	0.06	0.00	0.12	0.54	5.11	0.70	9.76
61	5.84	6.65	5.39	0.88	0.00	0.00	0.05	0.00	1.78	0.68	1.55	0.24	23.06
62	2.10	0.61	1.69	0.14	0.00	0.00	0.09	0.02	0.00	3.47	3.84	4.80	16.76
63	3.27	3.39	1.16	3.98	0.09	0.00	0.00	0.00	0.10	0.00	0.92	7.14	20.05
64	0.89	4.13	1.30	0.30	0.00	0.00	0.00	0.00	0.62	0.86	0.37	0.00	8.47
65	2.89	4.23	0.22	0.48	0.88	0.00	0.00	0.00	0.00	0.00	0.63	0.01	9.34
66	1.11	5.72	11.33	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	5.95	24.61
67	3.28	16.64	9.73	0.15	0.34	0.00	0.30	0.00	0.00	1.55	0.00	7.25	39.24
68	17.11	11.73	4.27	0.00	0.00	0.65	0.00	0.00	0.00	0.57	0.75	1.00	36.08
69	0.48	5.31	2.33	0.42	0.00	0.00	0.00	0.00	0.00	0.78	0.71	1.94	11.97
70	21.98	1.93	8.30	0.72	0.26	0.76	0.00	0.00	0.00	0.00	0.00	2.33	36.28
71	2.97	6.73	2.08	0.13	0.68	0.00	0.00	0.00	0.00	1.30	1.06	8.70	23.65
72	6.67	0.23	0.00	0.00	0.00	0.00	0.05	0.00	0.53	0.00	3.73	6.72	17.93
73	3.49	22.00	3.98	2.28	5.50	0.06	0.00	0.00	0.21	0.33	1.36	1.39	40.60
74	2.08	0.65	3.00	3.78	0.00	0.48	0.00	0.00	0.01	0.00	0.00	0.05	10.05
75	1.21	9.43	3.15	2.10	0.00	0.00	0.00	0.31	0.00	1.13	0.00	0.00	17.33
76	5.96	9.79	3.70	1.88	0.00	0.00	0.00	0.00	0.00	0.36	3.33	1.08	26.10
77	1.08	1.10	0.26	0.05	0.05	0.00	0.00	0.00	0.01	0.00	2.48	4.25	9.27
78	0.00	9.88	2.73	2.42	0.05	0.00	0.00	0.00	0.09	0.10	0.63	2.57	18.47

TABLE 2-12

Simulated Monthly Streamflows in the Santa Clara River at the Lang Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, Californi

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1,310	7,449	1,213	568	218	78	6	0	37	274	467	553	12,175
2	594	98	339	240	107	18	18	12	338	321	258	394	2,739
3	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
4	1,922	16,971	2,755	2,576	958	523	639	512	0	0	0	0	26,855
5	0	596	405	240	143	166	228	411	154	220	904	578	4,044
6	483	461	274	215	77	0	0	0	12	179	221	301	2,224
7	483	1,138	488	283	107	6	0	12	6	12	80	129	2,744
8	117	117	65	31	12	0	0	0	0	0	258	516	1,116
9	222	209	506	117	77	68	0	0	0	0	12	25	1,236
10	50	111	60	25	6	0	0	0	102	94	34	18	499
11	212	276	230	46	46	5	0	0	0	27	36	147	1,025
12	162	775	879	736	145	142	14	0	45	69	62	263	3,291
13	336	534	429	398	117	84	16	5	108	144	498	1,446	4,115
14	14,709	5,336	1,194	530	239	110	54	10	64	145	264	281	22,937
15	388	493	497	319	163	80	20	7	37	102	193	941	3,239
16	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104
17	666	896	730	315	151	46	7	0	54	154	307	510	3,836
18	517	346	140	85	33	5	4	50	66	240	566	809	2,859
19	18,997	8,508	3,837	961	667	347	81	91	70	139	190	186	34,074
20	92	85	204	224	197	107	80	46	52	54	31	80	1,252
21	117	117	65	31	12	0	0	0	0	0	258	516	1,116
22	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
23	50	111	60	25	6	0	0	0	102	94	34	18	499
24	666	896	730	315	151	46	7	0	54	154	307	510	3,836
25	83	198	184	126	105	83	51	54	56	53	43	42	1,078
26	49	40	66	91	98	84	79	72	57	71	47	53	807
27	9,629	636	7,091	2,114	895	326	153	138	86	97	178	313	21,656
28	300	282	271	237	165	134	102	86	85	83	74	68	1,888
29	145	278	404	356	181	108	110	99	91	90	80	75	2,017
30	103	156	157	128	153	99	78	76	74	68	66	62	1,220
31	69	85	130	137	139	98	86	80	77	76	67	69	1,113
32	67	55	78	90	93	80	78	78	76	79	66	71	910
33	66	329	743	4,550	825	283	130	108	95	145	146	116	7,536
34	246	351	189	127	111	92	84	86	83	69	68	68	1,575
35	68	67	70	69	70	68	65	65	60	58	316	164	1,140
36	124	91	38	38	36	32	28	33	22	19	19	119	597
37	139	1,904	791	449	329	169	97	82	80	84	82	82	4,287
38	85	142	145	131	104	86	79	74	66	65	62	58	1,096
39	69	50	51	62	66	54	53	53	54	45	43	41	640
40	30	23	25	46	43	36	31	34	37	35	1,305	3,300	4,944
41	1,765	1,014	778	450	308	115	68	54	45	63	91	523	5,274

TABLE 2-12

Simulated Monthly Streamflows in the Santa Clara River at the Lang Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, Californi

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
42	757	489	1,028	2,295	1,880	729	212	104	89	73	255	487	8,397
43	300	247	276	180	72	32	32	30	25	133	208	851	2,384
44	13,797	2,856	1,005	489	320	147	98	98	46	318	392	399	19,966
45	461	550	1,168	465	290	169	74	60	58	27	501	1,338	5,161
46	614	524	556	397	262	167	70	25	5	30	200	420	3,270
47	332	250	131	90	50	22	32	6	0	0	11	58	983
48	153	1,717	950	471	226	71	18	12	8	3	8	44	3,679
49	608	229	392	190	129	49	17	6	0	3	19	87	1,728
50	53	90	228	181	104	31	15	3	0	0	0	0	704
51	0	110	63	39	33	12	0	0	1	0	0	0	258
52	28	7	28	19	60	5	0	0	0	0	0	0	147
53	744	9,486	11,412	1,696	2,736	1,154	418	209	101	264	422	86	28,730
54	1,254	433	1,113	506	246	190	178	111	125	90	120	558	4,925
55	1,310	7,449	1,213	568	218	78	6	0	37	274	467	553	12,175
56	594	98	339	240	107	18	18	12	338	321	258	394	2,739
57	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
58	1,922	16,971	2,755	2,576	958	523	639	512	0	0	0	0	26,855
59	0	596	405	240	143	166	228	411	154	220	904	578	4,044
60	483	461	274	215	77	0	0	0	12	179	221	301	2,224
61	483	1,138	488	283	107	6	0	12	6	12	80	129	2,744
62	117	117	65	31	12	0	0	0	0	0	258	516	1,116
63	222	209	506	117	77	68	0	0	0	0	12	25	1,236
64	50	111	60	25	6	0	0	0	102	94	34	18	499
65	212	276	230	46	46	5	0	0	0	27	36	147	1,025
66	162	775	879	736	145	142	14	0	45	69	62	263	3,291
67	336	534	429	398	117	84	16	5	108	144	498	1,446	4,115
68	14,709	5,336	1,194	530	239	110	54	10	64	145	264	281	22,937
69	388	493	497	319	163	80	20	7	37	102	193	941	3,239
70	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104
71	666	896	730	315	151	46	7	0	54	154	307	510	3,836
72	517	346	140	85	33	5	4	50	66	240	566	809	2,859
73	18,997	8,508	3,837	961	667	347	81	91	70	139	190	186	34,074
74	92	85	204	224	197	107	80	46	52	54	31	80	1,252
75	117	117	65	31	12	0	0	0	0	0	258	516	1,116
76	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
77	50	111	60	25	6	0	0	0	102	94	34	18	499
78	666	896	730	315	151	46	7	0	54	154	307	510	3,836

TABLE 2-13

Simulated Monthly Water Releases from Castaic Lagoon to Castaic Creek

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0	0	0	0	0	834	1,052	919	0	0	0	0	2,805
2	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
3	0	0	0	0	0	667	842	735	0	0	0	0	2,244
4	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
8	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
9	0	0	809	341	900	0	0	0	0	0	0	0	2,050
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	66	66
13	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450
14	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
15	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
16	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611
17	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
18	0	0	8,701	873	0	0	0	0	0	0	0	310	9,884
19	1,186	19,545	10,747	4,566	7,561	47	1,370	436	464	302	652	926	47,802
20	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830
21	0	660	855	0	2,087	3,484	0	0	0	0	0	0	7,086
22	0	0	0	0	0	667	842	735	0	0	0	0	2,244
23	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
25	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
28	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
30	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
31	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
32	0	0	0	0	0	667	842	735	0	0	0	0	2,244
33	0	0	0	0	0	667	842	735	0	0	0	0	2,244
34	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
35	0	0	0	0	0	0	0	0	0	0	0	0	0
36	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830
37	0	0	0	0	0	667	842	735	0	0	0	0	2,244
38	0	0	0	0	0	0	0	0	0	0	0	0	0
39	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
40	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450
41	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853

TABLE 2-13

Simulated Monthly Water Releases from Castaic Lagoon to Castaic Creek

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
42	0	0	0	0	0	667	842	735	0	0	0	0	2,244
43	0	0	0	0	0	0	0	0	0	0	0	0	0
44	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
45	0	0	0	0	0	667	842	735	0	0	0	0	2,244
46	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
47	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	667	842	735	0	0	0	0	2,244
49	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
50	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
51	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
52	0	0	0	0	0	667	842	735	0	0	0	0	2,244
53	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928
54	0	0	0	0	0	667	842	735	0	0	0	0	2,244
55	0	0	0	0	0	834	1,052	919	0	0	0	0	2,805
56	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
57	0	0	0	0	0	667	842	735	0	0	0	0	2,244
58	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928
59	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0
61	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
62	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
63	0	0	809	341	900	0	0	0	0	0	0	0	2,050
64	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	66	66
67	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450
68	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
69	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
70	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611
71	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
72	0	0	8,701	873	0	0	0	0	0	0	0	310	9,884
73	1,186	19,545	10,747	4,566	7,561	47	1,370	436	464	302	652	926	47,802
74	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830
75	0	660	855	0	2,087	3,484	0	0	0	0	0	0	7,086
76	0	0	0	0	0	667	842	735	0	0	0	0	2,244
77	0	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632

TABLE 2-14
Water Demands and Indoor Water Use under Full Build-out Conditions (Excluding Newhall Ranch)
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year 2000 Actual (AF/yr)	Full Build-out Conditions (AF/yr)	Comments
Annual Urban Water Use Outside Newhall Ranch		
60,988	123,038	Year 2000 value is retail purveyor demand plus other demands in Tables III-6 and IV-1 of the *Santa Clarita Valley Water Report 2000* (Luhdorff & Scalmanini Consulting Engineers, 2001). Year 2045 value is from Table 2.5-4 of the *Newhall Ranch Draft Additional Analysis* (Impact Sciences, Inc., 2001). Consists of 89,805 AF/yr Development Monitoring System (DMS)[a] demand, plus 55,995 AF/yr additional urban demand, minus 14,480 AF/yr conservation, minus 5,193 AF/yr agricultural uses and 3,089 AF/yr "other" uses. Does not include 4,500 AF/yr for aquifer storage and recovery (ASR) or the 17,680 AF/yr demand for the Newhall Ranch Specific Plan.
Annual Indoor Water Use Outside Newhall Ranch (Equal to LACSD WRP Influent Volumes)		
18,723	40,313 (average year)	The year 2000 volume is from the Saugus and Valencia WRPs for the period January 2000 through December 2000. The long-term current generated effluent volume is based on the influent volume estimated from water balance calculations performed for the chloride mass balance analysis. The effluent volume is 32.8 percent of the total urban water production of 123,038 AF/yr, which includes other uses.

[a]DMS water demands are demands associated with future build-out of developments identified in Los Angeles County's DMS for the Santa Clarita Valley.

TABLE 2-15
Treated Water Discharges from the Saugus and Valencia WRPs to the Santa Clara River under Full Build-out Conditions
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Month	Treated Water Volume (2000)[a]	Treated Water Volume (Full Build-out Conditions)[b]	Percent of Annual Outdoor Demand	Reclaimed Volume under Full Build-out Conditions (Before Maintaining Existing Streamflows)	Reclaimed Volume under Full Build-out Conditions (After Maintaining Existing Streamflows)	WRP Discharges to River under Full Build-out Conditions[c]	Month
January	1,503	3,237	3.75	637	637	2,600	January
February	1,443	3,106	5.10	867	867	2,239	February
March	1,528	3,290	6.60	1,122	1,122	2,168	March
April	1,505	3,240	9.10	1,547	1,547	1,693	April
May	1,569	3,379	10.55	1,794	1,794	1,585	May
June	1,543	3,322	11.40	1,938	1,781	1,541	June
July	1,606	3,459	14.10	2,397	1,854	1,605	July
August	1,649	3,550	12.95	2,202	1,902	1,648	August
September	1,593	3,430	10.20	1,734	1,734	1,696	September
October	1,631	3,512	7.50	1,275	1,275	2,237	October
November	1,546	3,329	5.00	850	850	2,479	November
December	1,607	3,459	3.75	637	637	2,822	December
Total Annual	**18,723**	**40,313**	**100.0**	**17,000**	**16,000**	**24,313**	**Total Annual**

[a]Values shown are the actual volume of treated water discharged to the Santa Clara River from the Saugus and Valencia WRPs during calendar year 2000. (See also Table 2-14.)

[b]Values shown are the combined treated water volumes estimated to be produced by the Saugus and Valencia WRPs for full build-out conditions in the Santa Clarita Valley. These values do not include the future Newhall Ranch WRP, which will be operated by LACSD.

[c]Values shown do not include discharges of treated water to the river from the future Newhall Ranch WRP. These volumes are 10 AF in November, 138 AF in December, and 138 AF in January. During the other nine months of the year, this WRP will not discharge treated water to the river (see the *Newhall Ranch Draft Additional Analysis* [Impact Sciences, Inc., 2001] for further details). The combined total discharge from the Saugus, Valencia, and Newhall Ranch WRPs is summarized in Table 2-16 of this report.

Note:
All units are in acre-feet, unless otherwise indicated.

TABLE 2-16
Simulated Monthly Treated Wastewater Discharges from Santa Clarita Valley WRPs under Full Build-out Conditions
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

WRP	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Saugus	493	487	500	490	503	466	457	508	586	555	514	596	6,155
Valencia	2,107	1,752	1,668	1,203	1,082	1,075	1,148	1,140	1,110	1,682	1,965	2,226	18,158
Newhall	138	0	0	0	0	0	0	0	0	0	10	138	286
Total	**2,738**	**2,239**	**2,168**	**1,693**	**1,585**	**1,541**	**1,605**	**1,648**	**1,696**	**2,237**	**2,489**	**2,960**	**24,599**

Note:

Wastewater discharge volumes are listed in acre-feet.

TABLE 2-17
Simulated Annual Groundwater Budget
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year			Precipitation Infiltration	Infiltration of Applied Water	Streambed Infiltration	Subsurface Inflow	Total Recharge	Pumping	Groundwater Discharge to Streams	ET	Subsurface Outflow at County Line	Total Discharge	Change in Groundwater Storage	Cumulative Change in Groundwater Storage
0	to	1	41,053	13,970	39,953	17,871	112,847	49,119	21,649	17,524	18,464	106,756	6,091	6,091
1	to	2	11,601	13,970	3,373	18,632	47,576	49,035	10,147	10,469	18,136	87,788	-40,212	-34,120
2	to	3	51,672	13,970	28,415	18,444	112,501	49,035	10,925	12,319	18,585	90,863	21,638	-12,483
3	to	4	181,820	13,970	89,448	16,985	302,223	49,035	36,265	29,506	19,056	133,861	168,361	155,879
4	to	5	687	13,970	527	18,253	33,437	49,119	16,665	23,150	18,225	107,158	-73,721	82,158
5	to	6	2	13,970	535	18,927	33,434	44,372	9,497	13,286	18,171	85,326	-51,891	30,266
6	to	7	42,574	13,970	19,998	18,619	95,161	49,035	11,479	14,376	18,568	93,458	1,703	31,969
7	to	8	11,415	13,970	2,484	19,419	47,288	49,035	7,923	10,419	18,277	85,654	-38,366	-6,397
8	to	9	27,363	13,970	10,507	19,743	71,583	54,214	6,664	10,234	18,507	89,618	-18,036	-24,433
9	to	10	0	13,970	523	20,113	34,606	44,372	4,739	8,041	18,359	75,510	-40,904	-65,336
10	to	11	0	13,970	1,472	20,347	35,789	49,446	2,584	5,612	18,354	75,996	-40,208	-105,544
11	to	12	50,580	13,970	28,173	19,613	112,336	58,025	3,061	8,476	18,563	88,125	24,211	-81,334
12	to	13	130,074	13,970	80,760	17,850	242,654	72,600	14,234	18,462	18,728	124,024	118,630	37,296
13	to	14	112,433	13,970	51,561	17,509	195,472	49,035	24,221	29,084	18,797	121,137	74,335	111,632
14	to	15	414	13,970	1,979	18,575	34,939	49,446	7,788	16,616	18,157	92,007	-57,068	54,563
15	to	16	113,543	13,970	60,100	17,636	205,250	49,035	29,255	26,983	18,745	124,018	81,232	135,795
16	to	17	45,609	13,970	21,594	18,204	99,376	49,119	15,122	21,342	18,635	104,218	-4,842	130,954
17	to	18	16,967	13,970	5,320	18,758	55,015	49,035	11,851	16,757	18,242	95,885	-40,870	90,084
18	to	19	137,727	13,970	59,717	17,397	228,810	49,035	27,143	31,249	18,923	126,350	102,460	192,544
19	to	20	13	13,970	4,717	18,586	37,286	49,035	14,305	20,865	18,200	102,405	-65,119	127,425
20	to	21	14,095	13,970	4,962	19,294	52,321	49,119	11,194	14,485	18,342	93,139	-40,818	86,607
21	to	22	58,364	13,970	35,154	18,639	126,127	54,116	12,710	19,337	18,655	104,818	21,309	107,917
22	to	23	0	13,970	523	19,557	34,050	44,372	8,105	13,129	18,311	83,916	-49,866	58,051
23	to	24	19,602	13,970	5,065	19,867	58,504	49,035	8,138	10,710	18,375	86,258	-27,754	30,297
24	to	25	0	13,970	524	20,258	34,752	44,441	5,486	7,896	18,418	76,240	-41,489	-11,192
25	to	26	3,053	13,970	518	20,406	37,947	49,035	4,033	6,132	18,386	77,587	-39,639	-50,832
26	to	27	135,033	13,970	73,747	18,014	240,763	49,035	16,024	17,254	18,639	100,951	139,812	88,980
27	to	28	0	13,970	536	18,764	33,270	44,372	9,238	15,229	18,125	86,963	-53,693	35,287
28	to	29	20,048	13,970	4,960	19,518	58,496	49,119	7,646	10,808	18,326	85,898	-27,402	7,885
29	to	30	9,397	13,970	2,999	19,929	46,296	54,116	4,726	8,252	18,339	85,433	-39,138	-31,253
30	to	31	11,022	13,970	2,348	20,308	47,647	49,035	4,024	7,140	18,409	78,609	-30,962	-62,215
31	to	32	62,138	13,970	37,429	19,568	133,105	49,035	6,854	11,497	18,820	86,205	46,900	-15,315
32	to	33	63,939	13,970	36,375	18,890	133,174	49,119	11,471	19,025	18,678	98,293	34,881	19,566
33	to	34	244	13,970	2,395	20,199	36,808	44,372	6,943	11,585	18,375	81,275	-44,466	-24,900
34	to	35	1,555	13,970	524	20,530	36,579	49,446	3,767	7,507	18,404	79,124	-42,545	-67,445
35	to	36	32	13,970	4,852	20,690	39,543	58,025	303	5,882	18,401	82,610	-43,067	-110,512
36	to	37	52,098	13,970	24,510	19,931	110,509	44,441	4,564	10,236	18,620	77,860	32,648	-77,864
37	to	38	4,170	13,970	616	20,483	39,239	49,035	2,503	6,237	18,378	76,152	-36,913	-114,777
38	to	39	362	13,970	2,463	20,816	37,610	49,446	719	4,966	18,418	73,549	-35,938	-150,716
39	to	40	122,459	13,970	74,037	19,276	229,741	49,035	8,546	10,468	18,766	86,814	142,927	-7,789
40	to	41	12,997	13,970	4,096	19,066	50,129	49,119	8,998	13,953	18,220	90,290	-40,161	-47,950
41	to	42	64,499	13,970	40,945	18,797	138,210	49,035	10,243	16,890	18,577	94,745	43,465	-4,484
42	to	43	0	13,970	536	19,752	34,258	44,372	6,577	12,461	18,301	81,711	-47,454	-51,938
43	to	44	123,377	13,970	53,751	18,022	209,121	49,035	17,543	21,442	18,640	106,660	102,461	50,523
44	to	45	64,250	13,970	39,379	18,423	136,022	49,119	13,271	20,449	18,544	101,383	34,639	85,163
45	to	46	8,541	13,970	2,217	19,103	43,830	49,035	10,232	18,196	18,249	95,712	-51,882	33,281
46	to	47	0	13,970	533	19,897	34,399	44,372	6,746	10,372	18,334	79,823	-45,424	-12,143

TABLE 2-17
Simulated Annual Groundwater Budget
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Precipitation Infiltration	Infiltration of Applied Water	Streambed Infiltration	Subsurface Inflow	Total Recharge	Pumping	Groundwater Discharge to Streams	ET	Subsurface Outflow at County Line	Total Discharge	Change in Groundwater Storage	Cumulative Change in Groundwater Storage
47 to 48	43,414	13,970	18,560	19,505	95,448	49,035	8,927	12,755	18,638	89,355	6,094	-6,050
48 to 49	32,966	13,970	13,527	19,953	80,416	49,119	8,497	12,634	18,666	88,916	-8,499	-14,549
49 to 50	839	13,970	1,856	20,451	37,117	44,372	5,528	8,992	18,434	77,326	-40,209	-54,758
50 to 51	9,990	13,970	2,645	20,684	47,289	54,116	3,517	6,845	18,455	82,933	-35,643	-90,401
51 to 52	49,961	13,970	25,027	20,153	109,112	62,702	3,319	9,913	18,755	94,689	14,423	-75,978
52 to 53	188,493	13,970	69,633	17,584	289,679	49,119	22,292	27,398	18,933	117,742	171,937	95,959
53 to 54	46,125	13,970	20,155	18,290	98,539	49,035	15,148	24,661	18,522	107,366	-8,827	87,132
54 to 55	89,718	13,970	39,953	17,979	161,620	49,035	20,589	29,655	18,624	117,903	43,716	130,848
55 to 56	11,601	13,970	3,373	19,267	48,211	49,035	11,347	18,242	18,316	96,940	-48,729	82,119
56 to 57	51,672	13,970	28,415	19,203	113,260	49,119	11,982	18,862	18,806	98,769	14,491	96,610
57 to 58	181,820	13,970	89,448	17,106	302,343	49,035	32,399	38,747	19,048	139,229	163,114	259,725
58 to 59	687	13,970	527	18,350	33,534	49,035	16,623	29,046	18,213	112,917	-79,383	180,342
59 to 60	2	13,970	535	19,266	33,773	44,372	10,576	17,223	18,266	90,437	-56,664	123,678
60 to 61	42,574	13,970	19,998	18,987	95,529	49,119	12,553	18,152	18,704	98,527	-2,998	120,680
61 to 62	11,415	13,970	2,484	19,754	47,622	49,035	9,005	13,268	18,366	89,674	-42,052	78,628
62 to 63	27,363	13,970	10,507	20,014	71,853	54,116	7,752	12,812	18,539	93,219	-21,366	57,262
63 to 64	0	13,970	523	20,416	34,909	44,372	5,755	10,119	18,437	78,683	-43,774	13,488
64 to 65	0	13,970	1,472	20,680	36,121	49,522	3,569	7,254	18,475	78,820	-42,698	-29,210
65 to 66	50,580	13,970	28,173	19,854	112,576	58,025	4,004	10,335	18,623	90,989	21,588	-7,622
66 to 67	130,074	13,970	80,760	17,898	242,702	72,452	13,502	21,223	18,686	125,863	116,839	109,216
67 to 68	112,433	13,970	51,561	17,536	195,499	49,035	23,462	32,532	18,803	123,833	71,667	180,883
68 to 69	414	13,970	1,979	18,661	35,024	49,522	8,596	18,842	18,226	95,186	-60,162	120,721
69 to 70	113,543	13,970	60,100	17,647	205,261	49,035	29,552	30,176	18,761	127,523	77,737	198,459
70 to 71	45,609	13,970	21,594	18,166	99,339	49,035	15,740	23,534	18,602	106,911	-7,572	190,886
71 to 72	16,967	13,970	5,320	18,777	55,034	49,035	12,551	18,552	18,264	98,402	-43,368	147,518
72 to 73	137,727	13,970	59,717	17,442	228,856	49,119	28,296	34,847	19,001	131,263	97,592	245,111
73 to 74	13	13,970	4,717	18,592	37,292	49,035	14,986	23,059	18,220	105,299	-68,007	177,103
74 to 75	14,095	13,970	4,962	19,254	52,281	49,035	11,783	15,930	18,311	95,059	-42,779	134,324
75 to 76	58,364	13,970	35,154	18,654	126,142	54,116	13,385	20,958	18,673	107,132	19,010	153,334
76 to 77	0	13,970	523	19,646	34,139	44,441	8,624	14,082	18,380	85,527	-51,388	101,946
77 to 78	19,602	13,970	5,065	19,899	58,536	49,035	8,607	11,515	18,393	87,550	-29,014	72,932
Minimum	0	13,970	518	16,985	33,270	44,372	303	4,966	18,125	73,549	-79,383	-150,716
Maximum	188,493	13,970	89,448	20,816	302,343	72,600	36,265	38,747	19,056	139,229	171,937	259,725
Average	42,498	13,970	21,480	19,092	97,040	49,823	11,520	16,262	18,498	96,105	935	44,866
Median	19,602	13,970	5,193	19,153	58,500	49,035	9,822	14,430	18,446	92,573	-28,384	36,292

Note:
All flow volumes are listed in AF/yr.

Figures

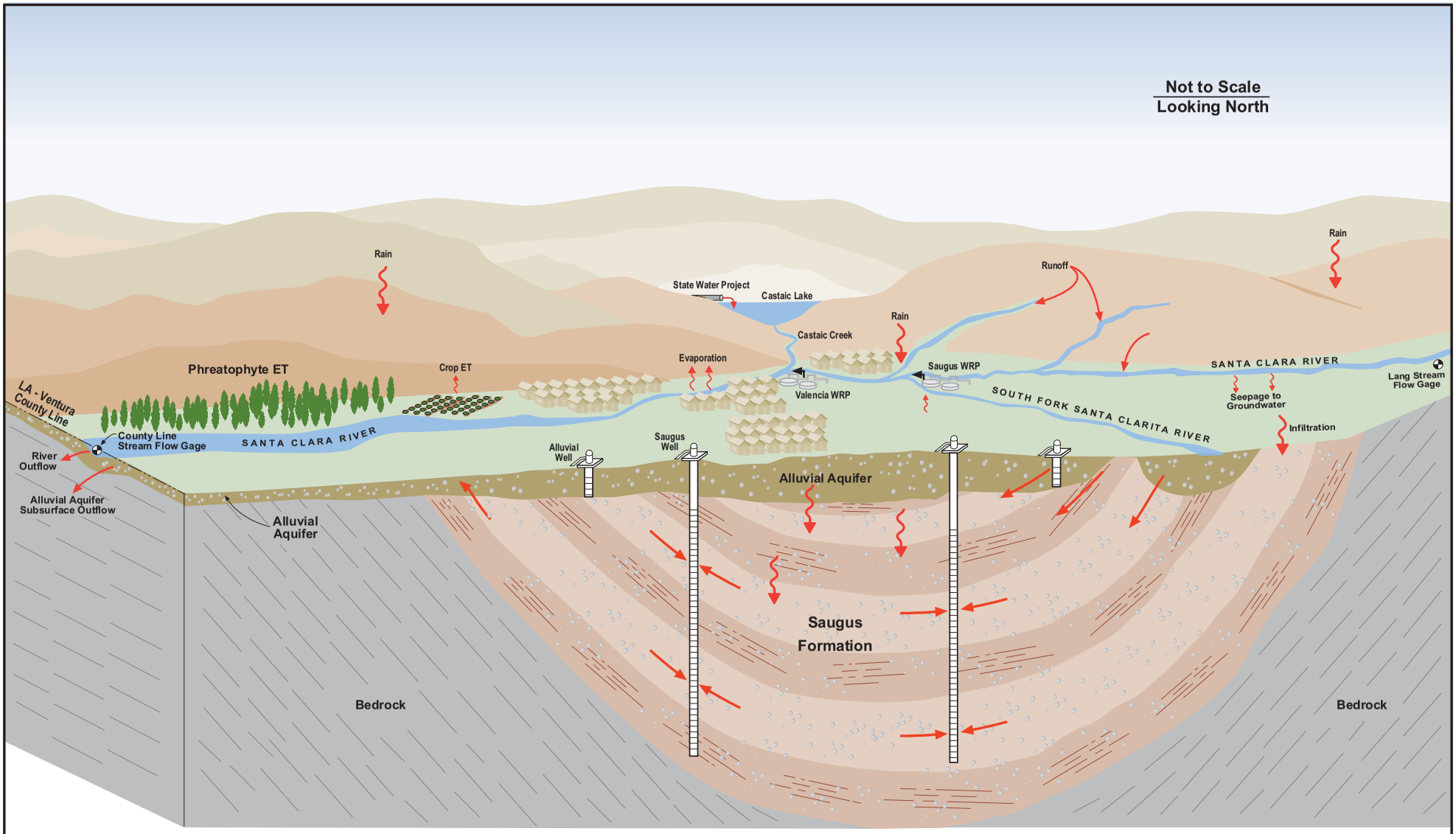

FIGURE 2-1
SANTA CLARITA VALLEY HYDROLOGY
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

E012004006RDD_07 (11/30/04)

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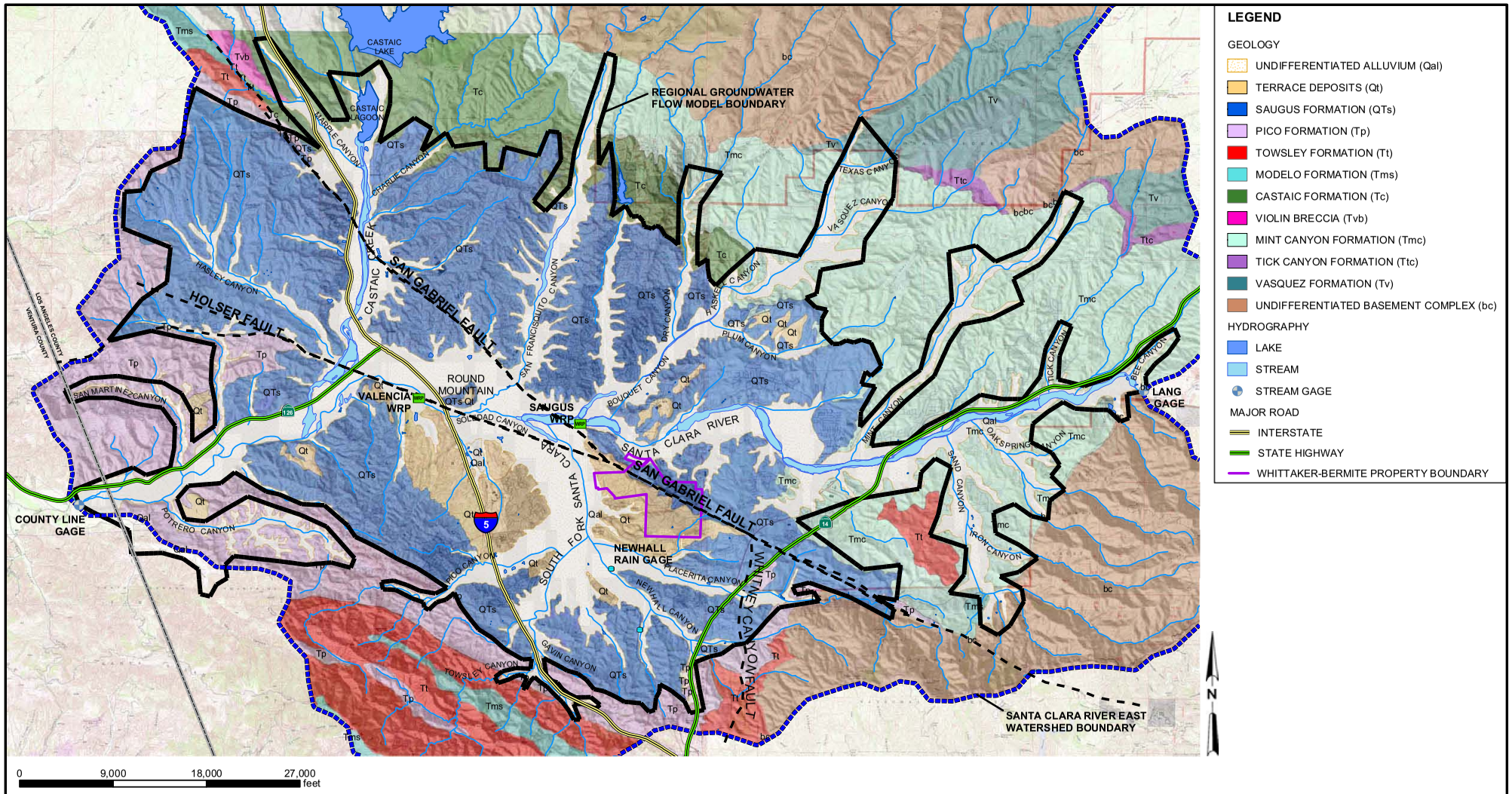

FIGURE 2-2
BASIN GEOLOGIC MAP
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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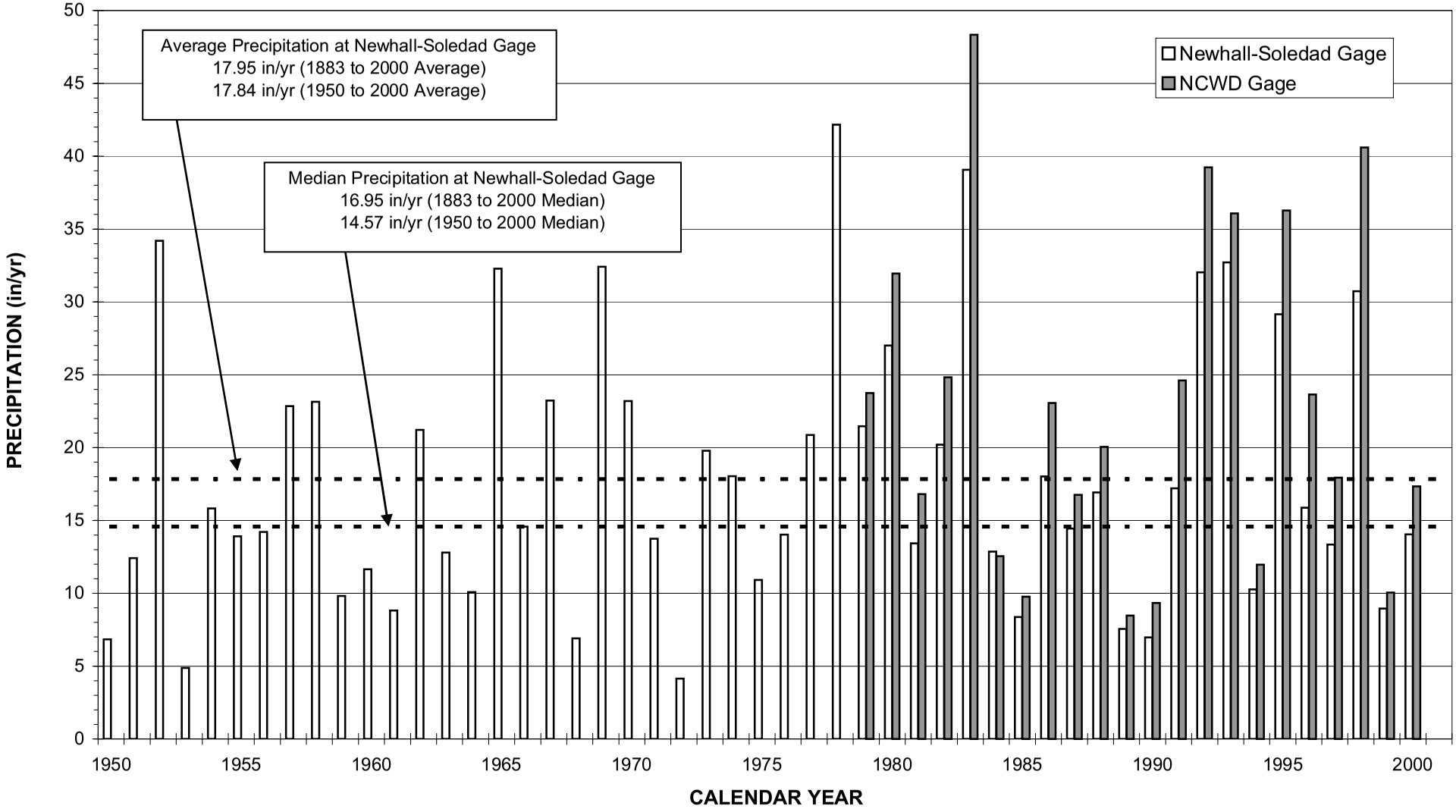

FIGURE 2-3
ANNUAL PRECIPITATION AT THE NEWHALL-SOLEDAD AND NCWD RAIN GAGES SINCE 1950
ANALYSIS OF PERCHLORATE CONTAINMENT IN
GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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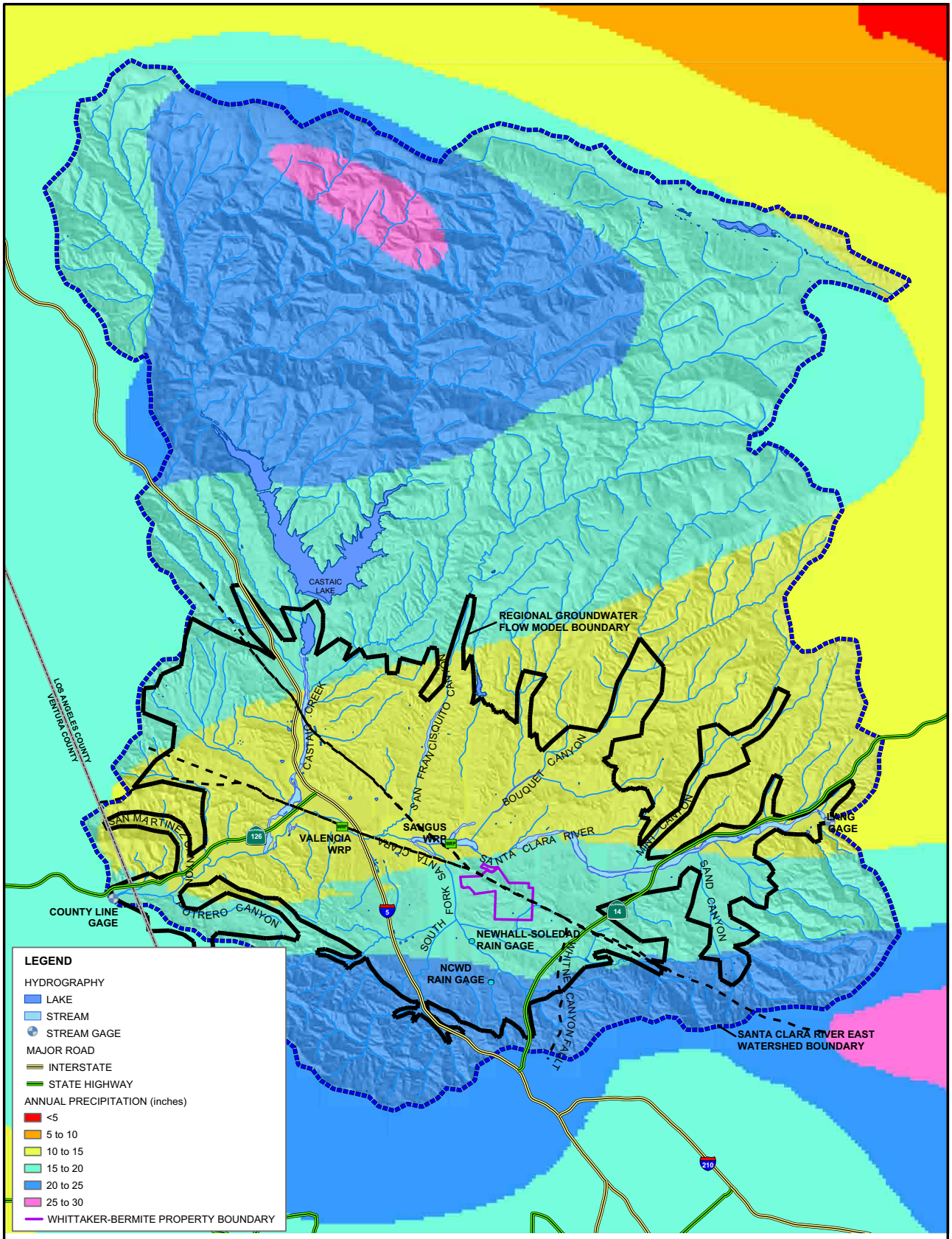
178973-P2-3.xls\Fig 2-3



SOURCE: SEE THE INTERNET SITE HTTP://GIS.CA.GOV/META.EPL?OID=286 FOR MORE INFORMATION.

N

0 2.5 5 miles

FIGURE 2-4
ISOHYETAL MAP SHOWING AVERAGE ANNUAL PRECIPITATION PATTERN FROM 1900 TO 1960
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

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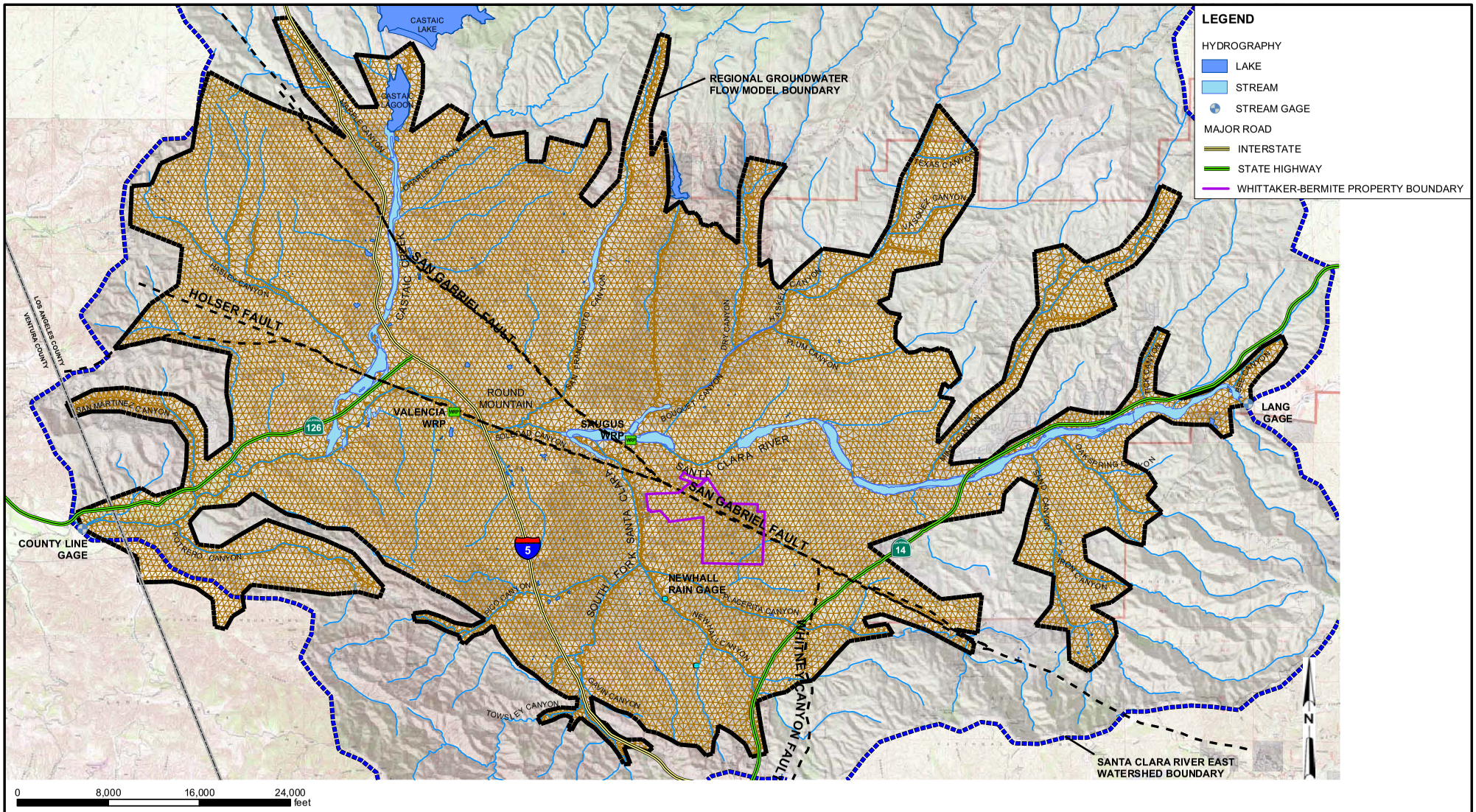

FIGURE 2-5
REGIONAL MODEL GRID
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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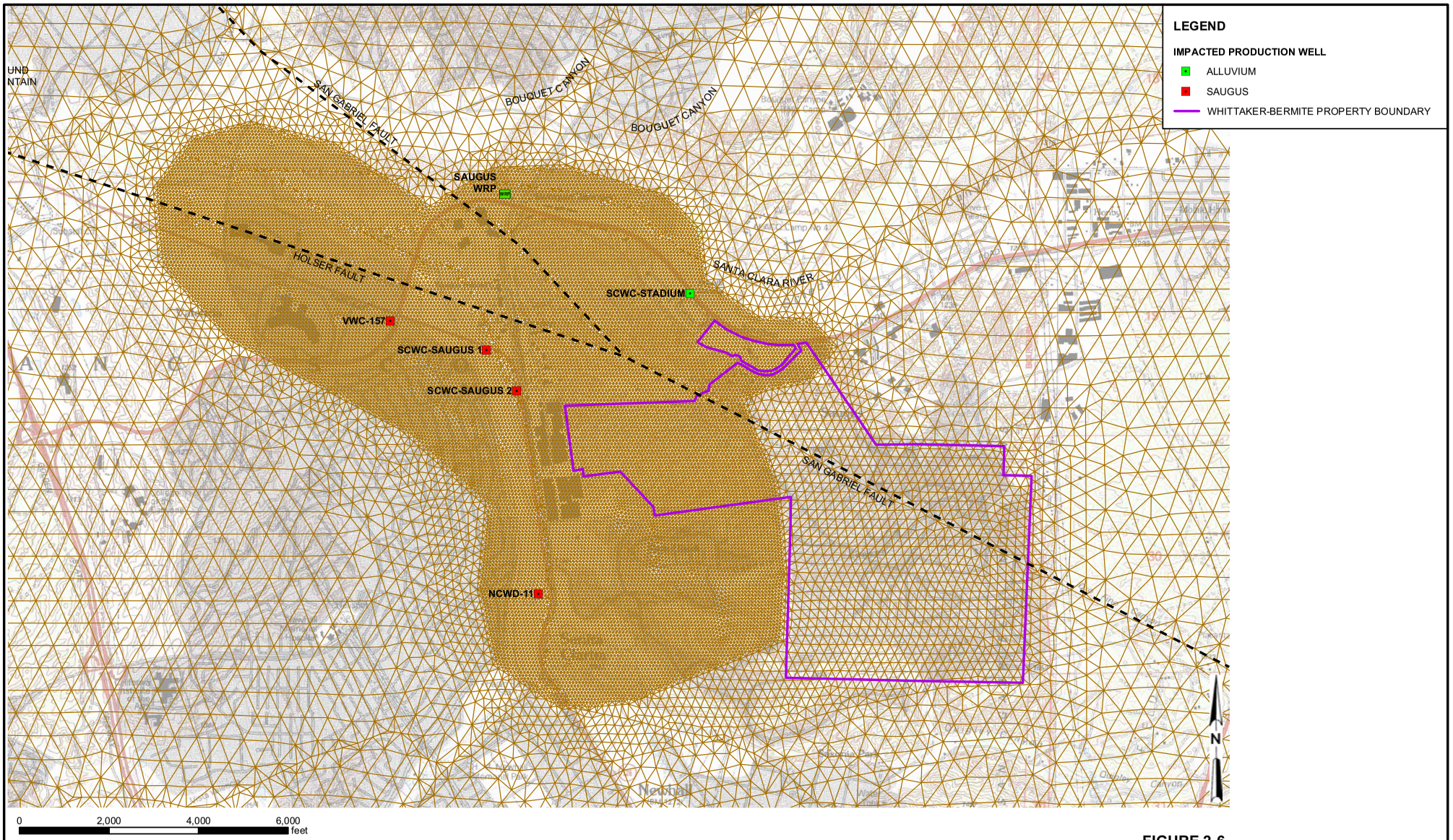

FIGURE 2-6
LOCAL MODEL GRID
ANALYSIS OF PERCHLORATE CONTAINMENT IN
GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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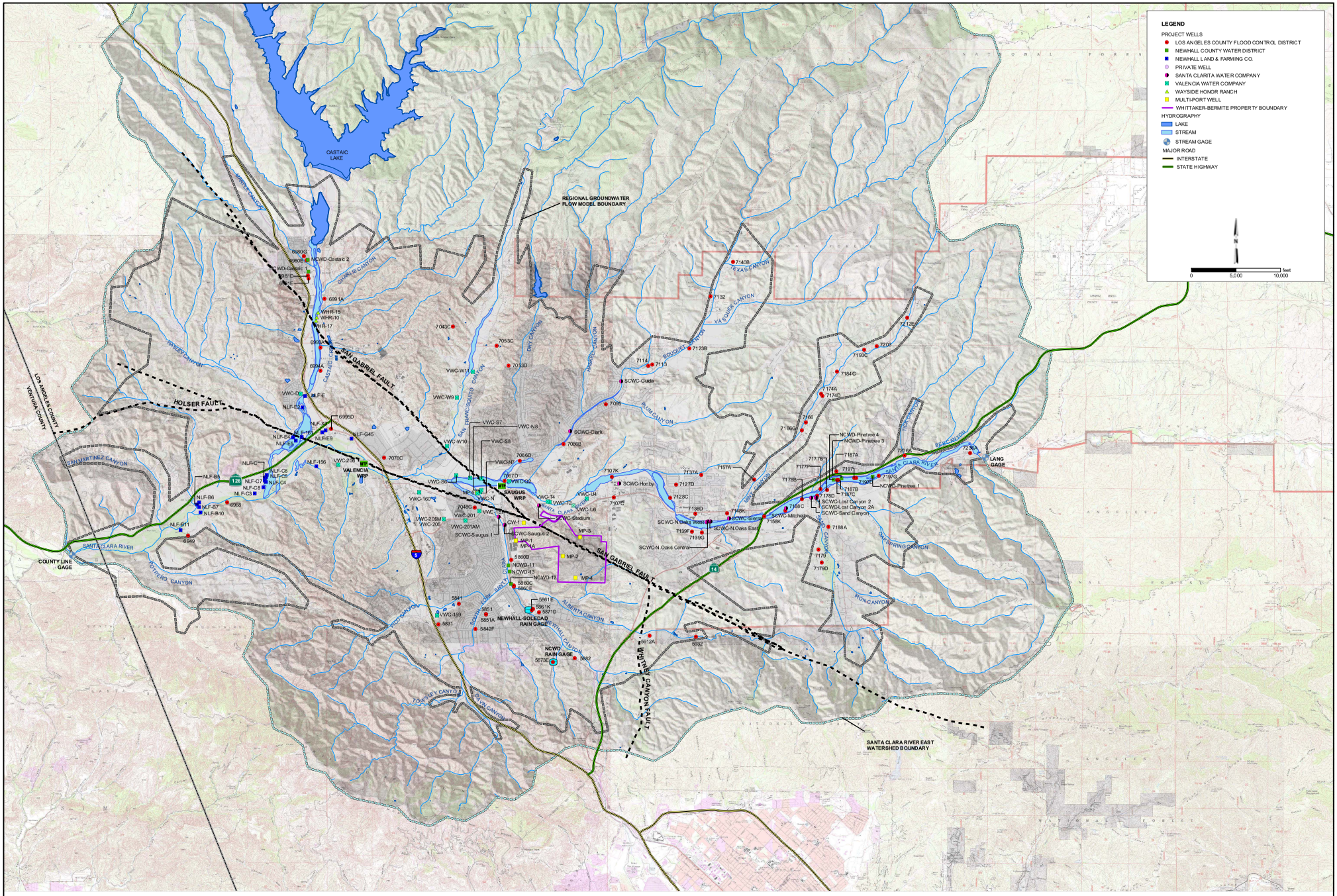

FIGURE 2-7
REGIONAL WELL LOCATION MAP
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

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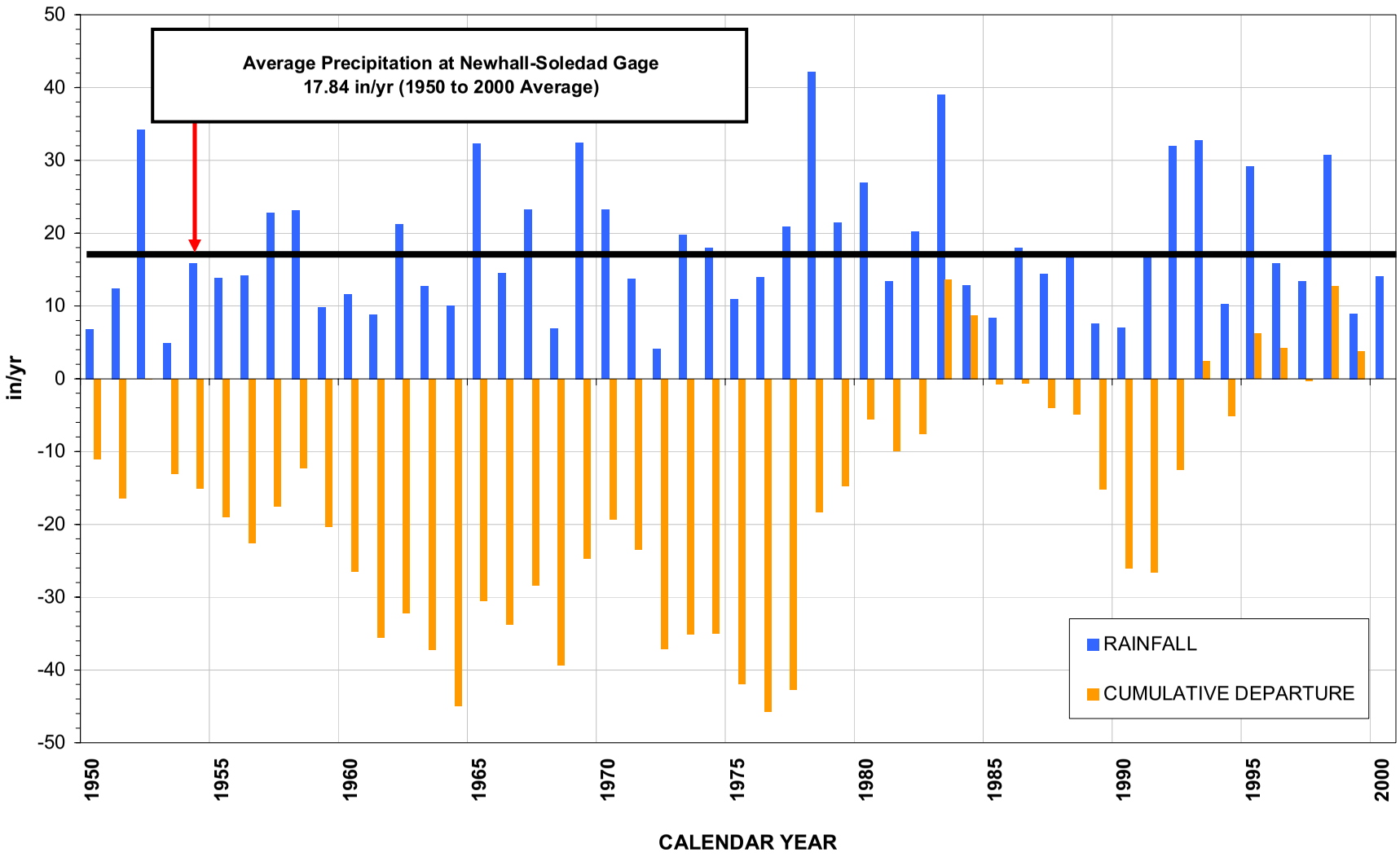

FIGURE 2-8
ANNUAL PRECIPITATION AND CUMULATIVE DEPARTURE FROM THE 1950 THROUGH 2000 AVERAGE AT THE NEWHALL-SOLEDAD RAIN GAGE

ANALYSIS OF PERCHLORATE CONTAINMENT IN
GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-P2-8_9.xls/FIG2-8

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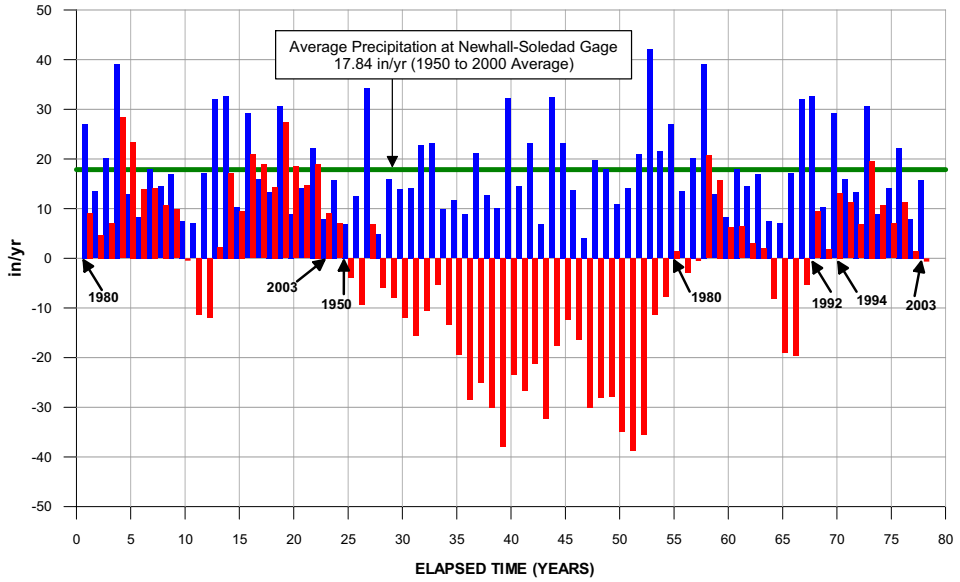
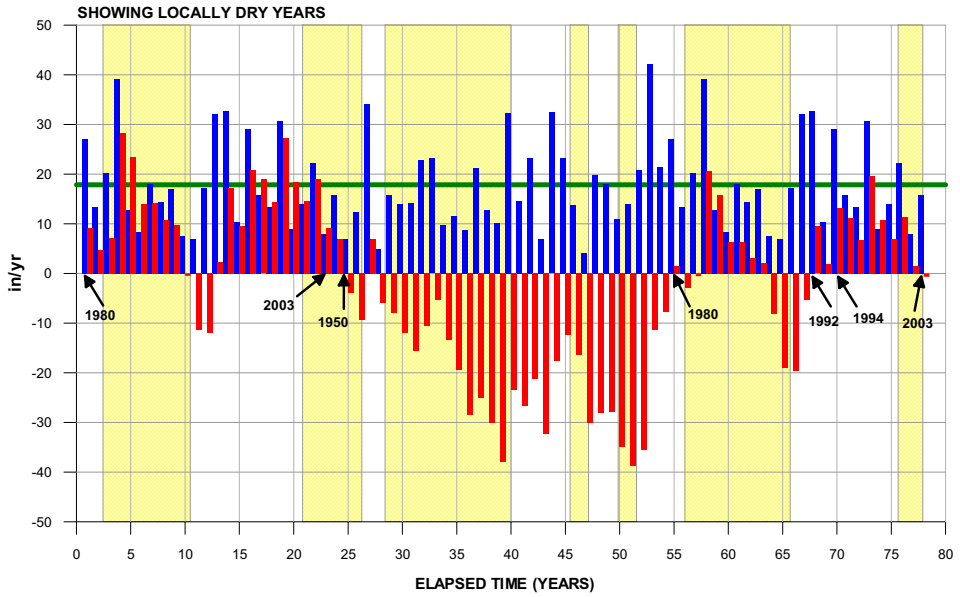
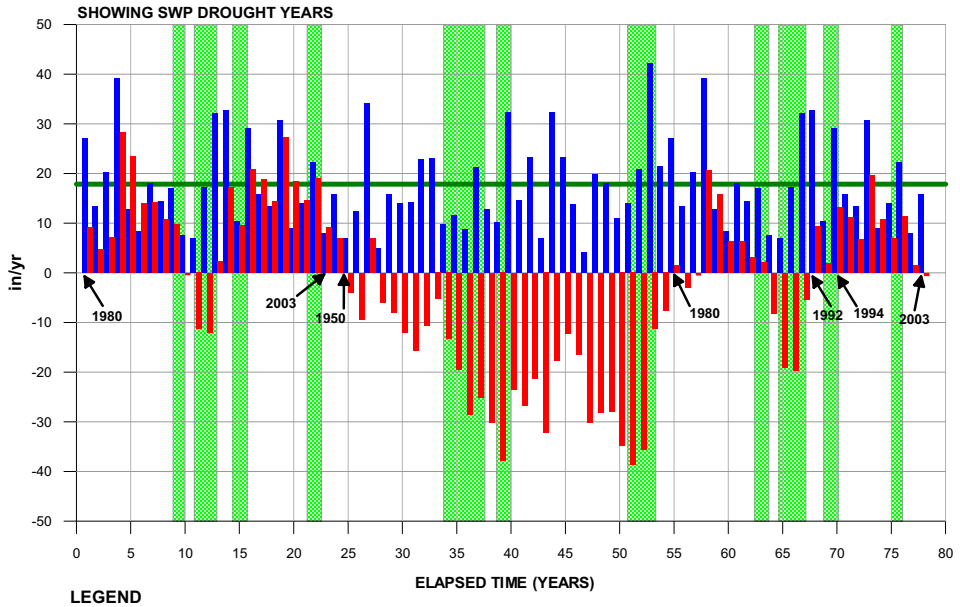






LEGEND

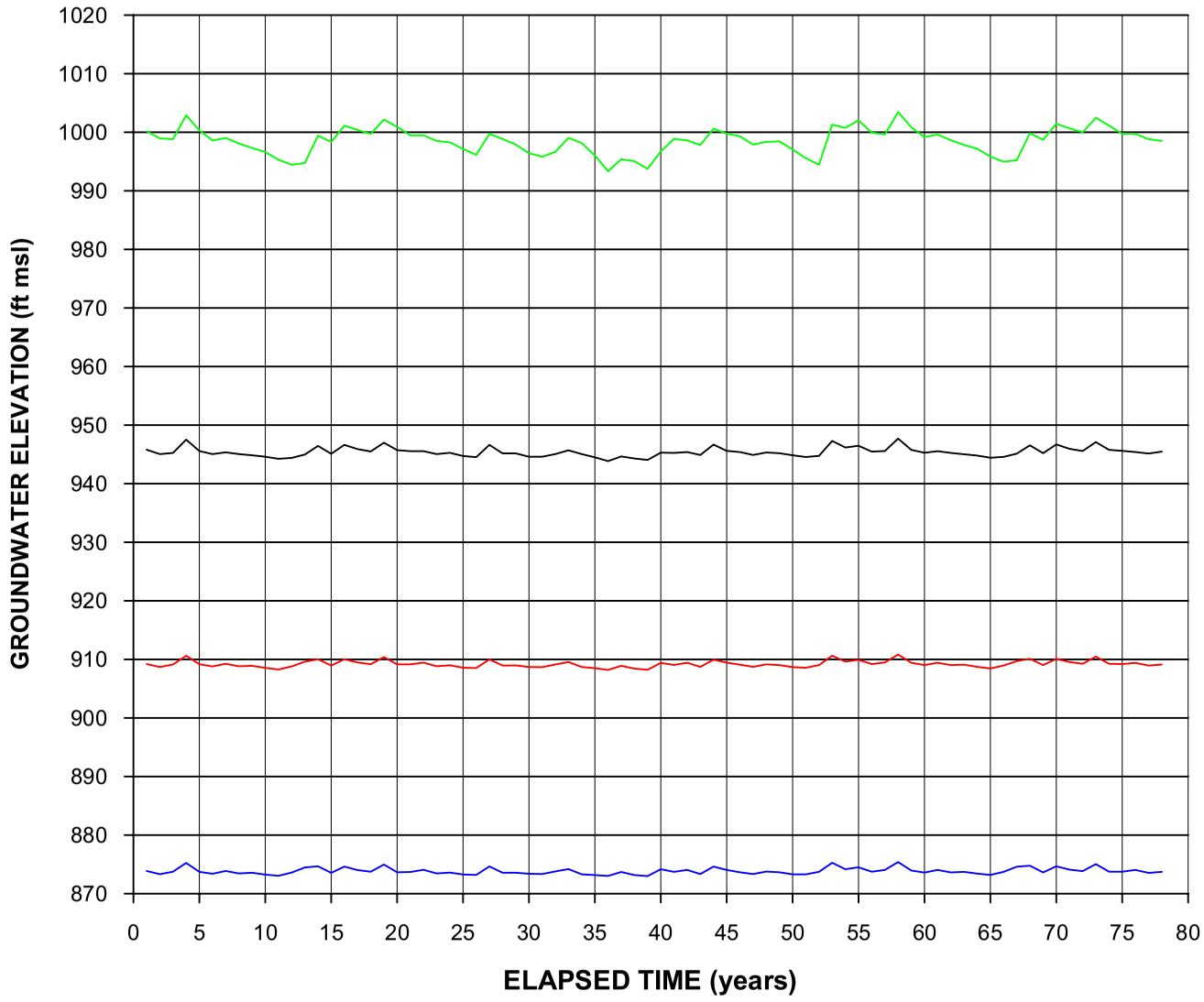
- RAINFALL
- CUMMULATIVE DEPARTURE
- LOCAL DRY YEARS
- SWP DROUGHT YEARS

FIGURE 2-9
ANNUAL PRECIPITATION AND CUMULATIVE DEPARTURE FROM THE 1950 THROUGH 2000 AVERAGE AT THE NEWHALL-SOLEDAD RAIN GAGE FOR THE 78-YEAR SIMULATION PERIOD

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-355.GRF

CH2MHILL



LEGEND

- LACFCD-6968
- NLF-TOPCO1
- NLF-C6
- NLF-6995D

NOTES:

1. SEE FIGURE 2-7 FOR LOCATIONS OF WELLS.

FIGURE 2-10
SIMULATED AVERAGE ANNUAL GROUNDWATER ELEVATIONS IN THE ALLUVIAL AQUIFER WEST OF INTERSTATE 5
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-346.GRF

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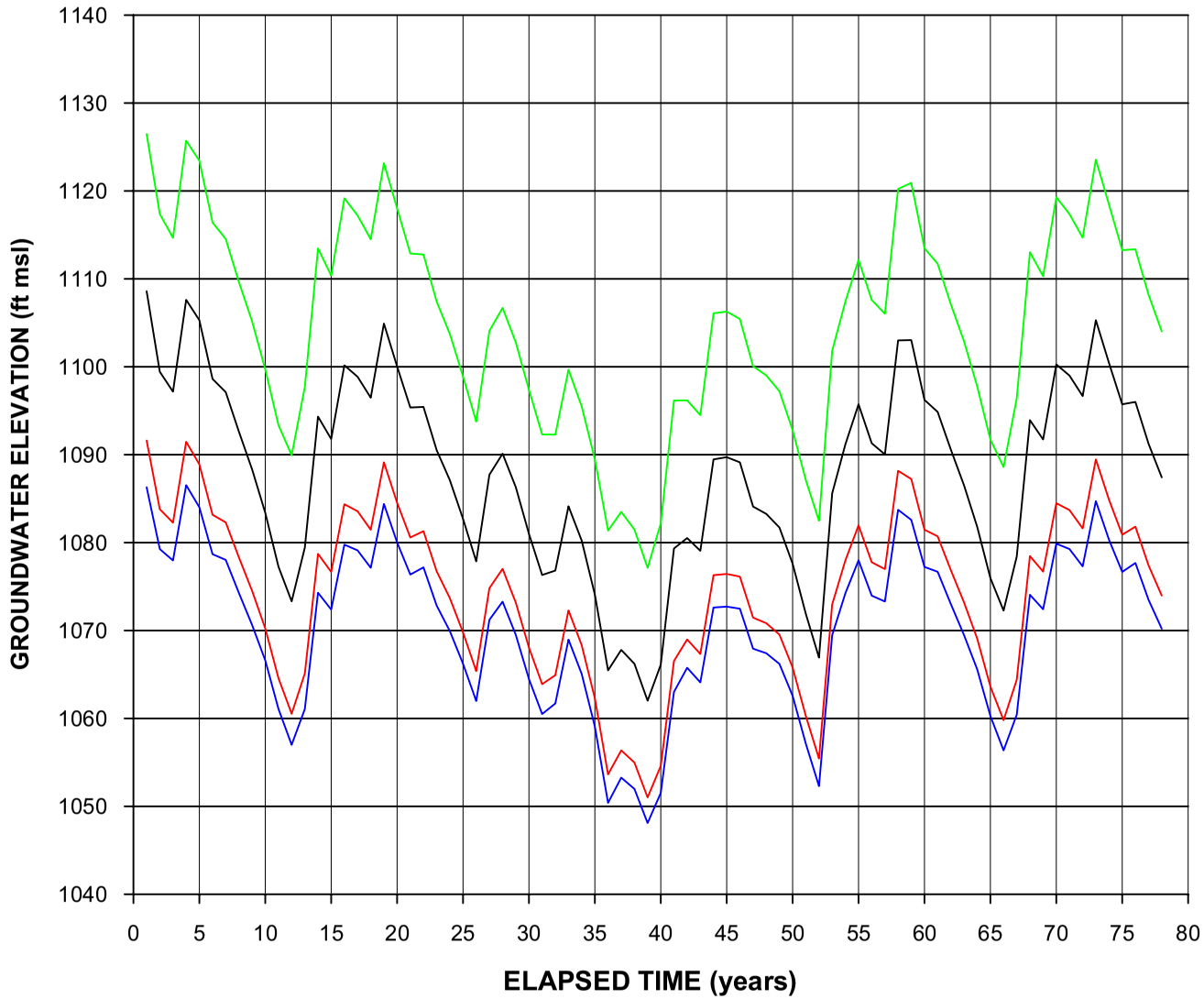


LEGEND

- NLF-S3
- NLF-S
- VWC-N3
- AL-09

NOTES:

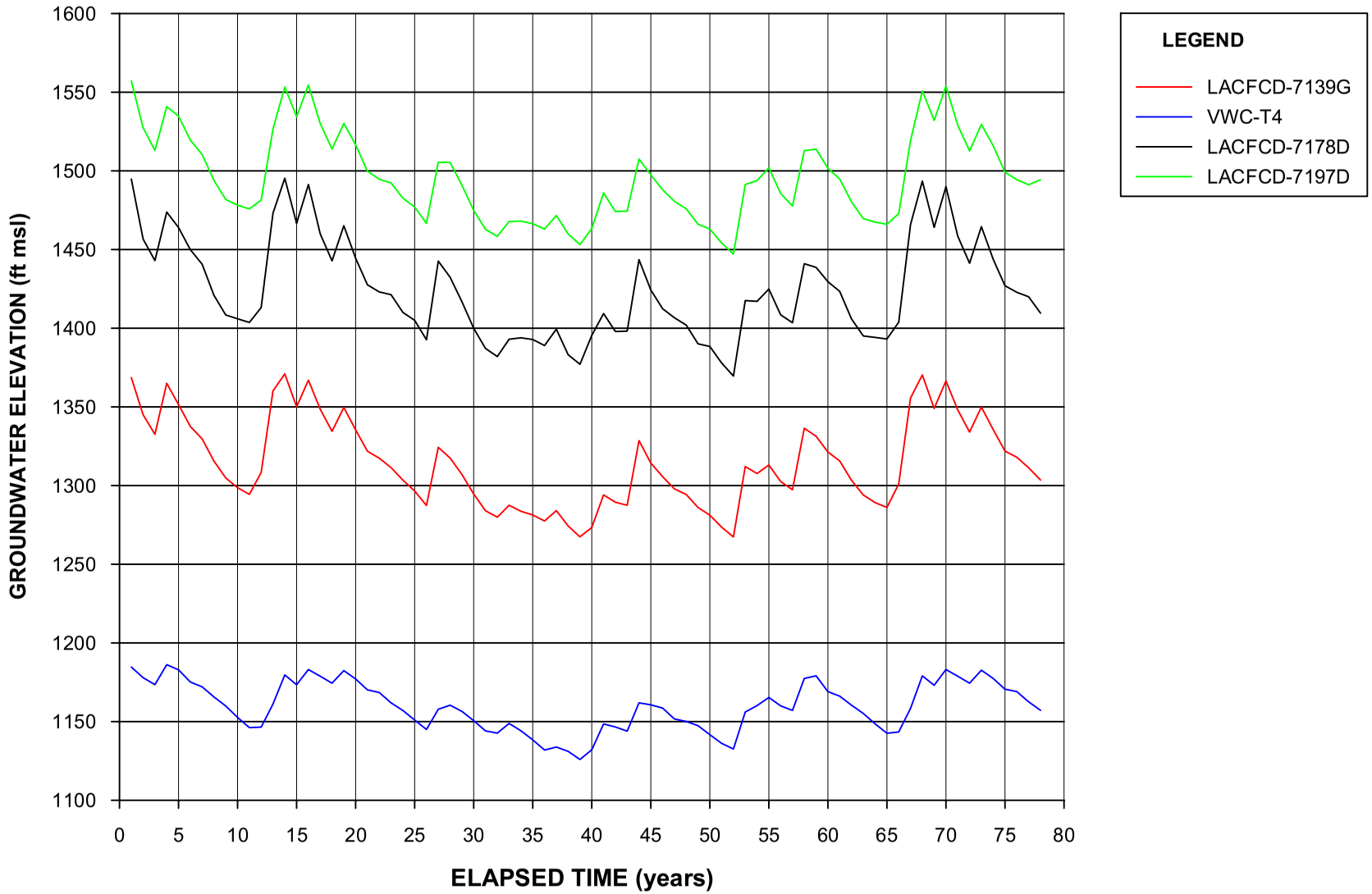
1. SEE FIGURE 2-7 FOR LOCATIONS OF WELLS.

FIGURE 2-11
SIMULATED AVERAGE ANNUAL GROUNDWATER ELEVATIONS IN THE ALLUVIAL AQUIFER EAST OF INTERSTATE 5

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-347.GRF

CH2MHILL



NOTES:

1. SEE FIGURE 2-7 FOR LOCATIONS OF WELLS.
2. LOWEST HISTORICAL GROUNDWATER ELEVATIONFOR VWC- T4 = 1101 ft msl
   ALLUVIUM BOTTOM ELEVATION ~1050 TO 1065 ft msl.
3. LOWEST HISTORICAL GROUNDWATER ELEVATION FOR LACFCD-7139G = 1289 ft msl
   ALLUVIUM BOTTOM ELEVATION ~1256 ft msl OR LOWER.
4. LOWEST HISTORICAL GROUNDWATER ELEVATION FOR LACFCD-7178D = 1463 ft msl
   ALLUVIUM BOTTOM ELEVATION ~1398 TO 1425 ft msl.
5. LOWEST HISTORICAL GROUNDWATER ELEVATION FOR LACFCD-7197D = 1474 ft msl
   ALLUVIUM BOTTOM ELEVATION ~1423 TO 1447 ft msl.

FIGURE 2-12
SIMULATED AVERAGE ANNUAL GROUNDWATER ELEVATIONS IN THE ALLUVIAL AQUIFER IN SOLEDAD CANYON

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-348.GRF

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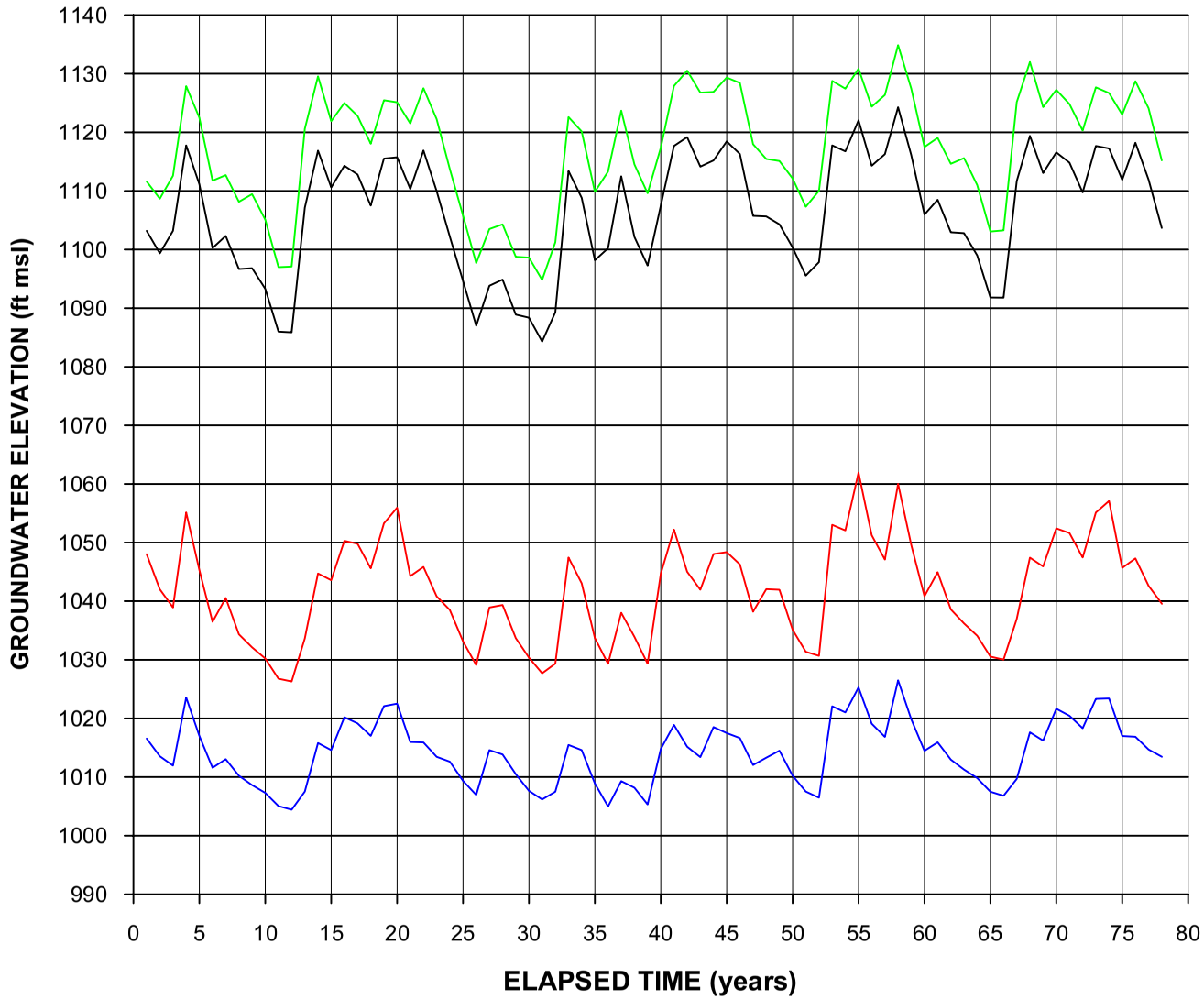

LEGEND

- LACFCD-6993
- VWC-D
- LACFCD-6981D
- LACFCD-6980E

NOTE:

1. SEE FIGURE 2-7 FOR LOCATIONS OF WELLS.

FIGURE 2-13
SIMULATED AVERAGE ANNUAL GROUNDWATER ELEVATIONS IN THE ALLUVIAL AQUIFER ALONG CASTAIC CREEK
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-349.GRF

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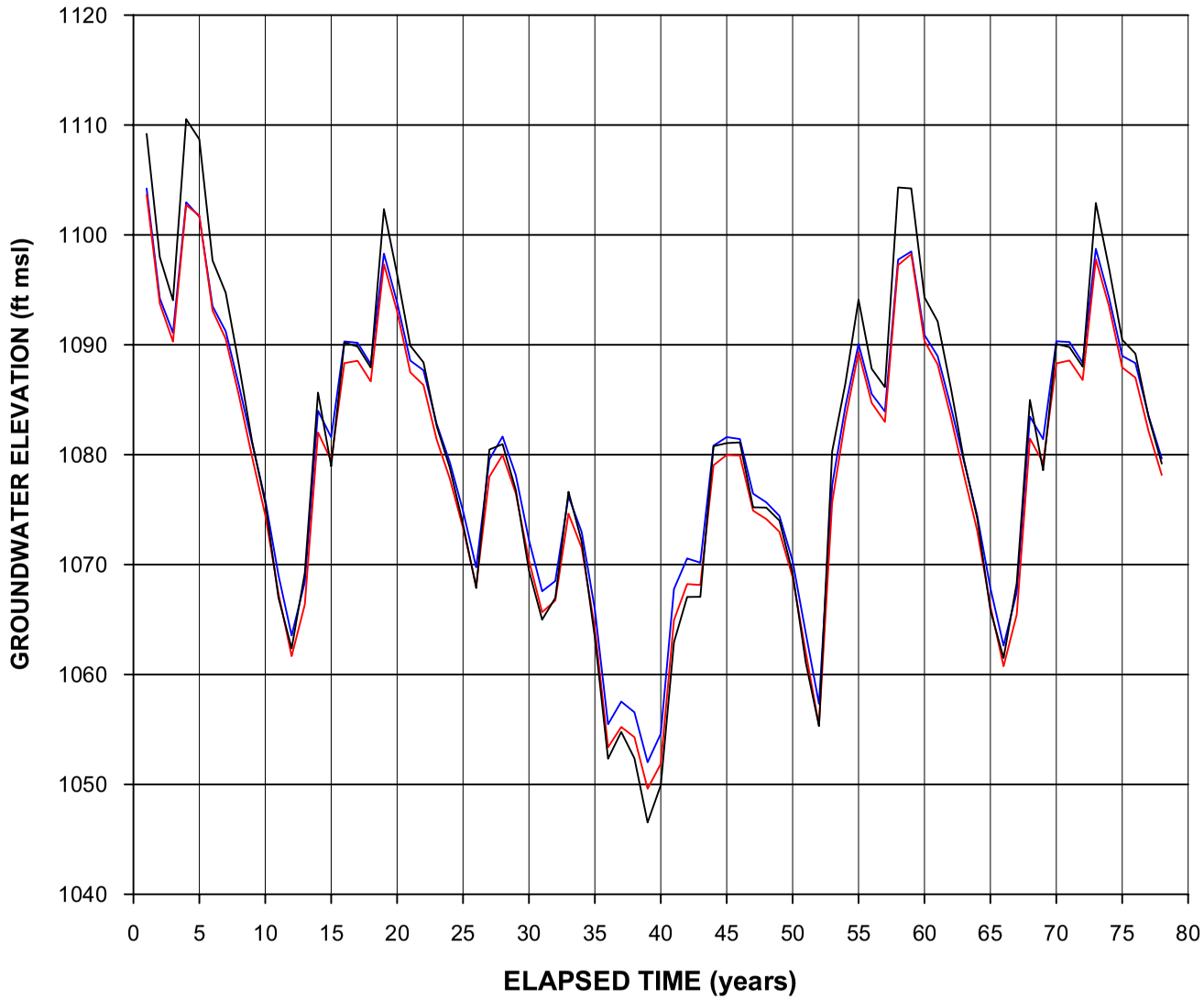

LEGEND

- SCWC-SAUGUS1
- SCWC-SAUGUS2
- NCWD-11

NOTE:

1. SEE FIGURE 2-7 FOR LOCATIONS OF WELLS.

FIGURE 2-14
SIMULATED AVERAGE ANNUAL GROUNDWATER ELEVATIONS IN THE ALLUVIAL AQUIFER AT IMPACTED SAUGUS WELLS

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-350.GRF

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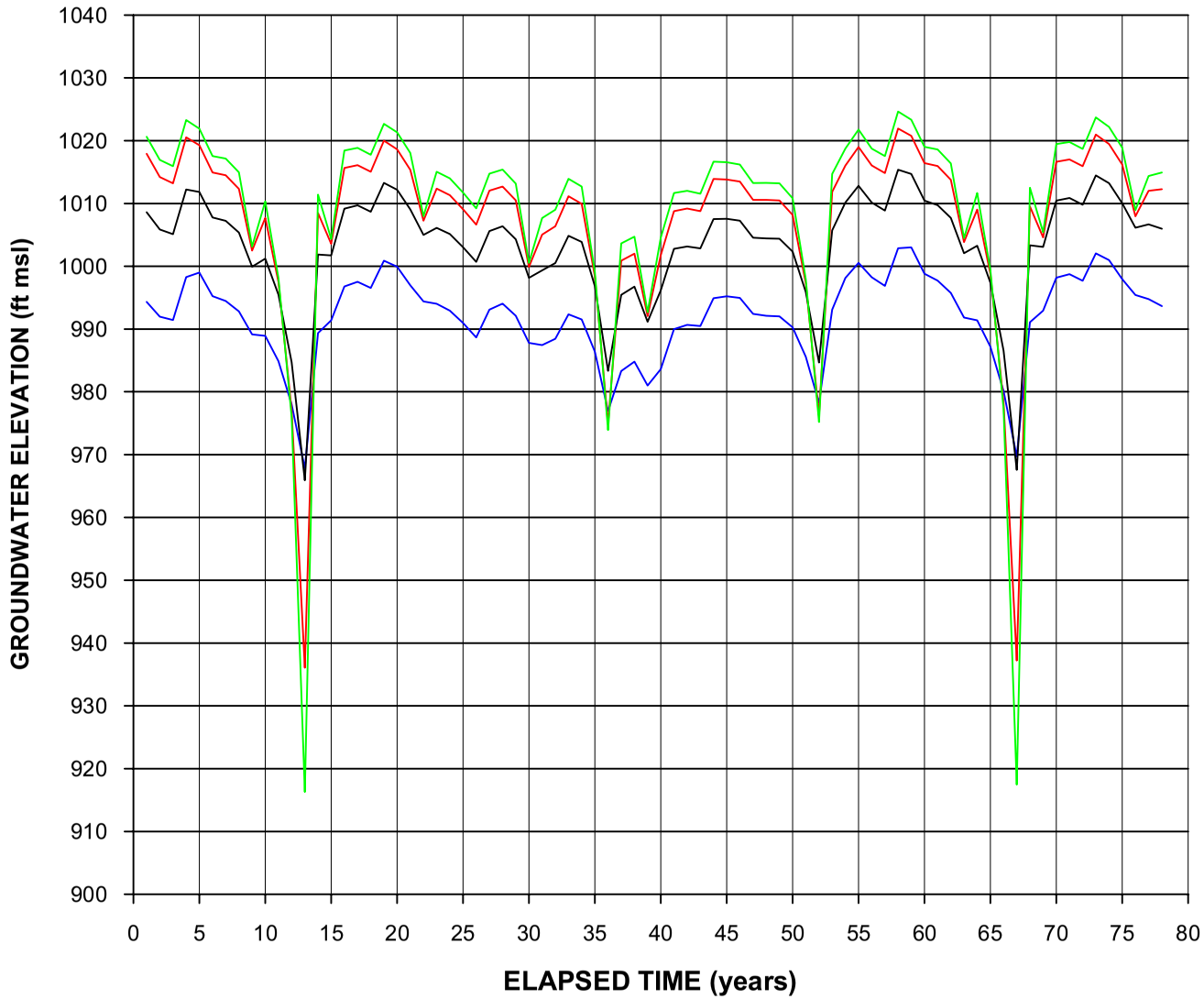

LEGEND

- NLF-C6
- NLF-156
- LACFCD-6968
- FUTURE WELLFIELD

NOTE:

1. SEE FIGURE 2-7 FOR LOCATIONS OF WELLS.

FIGURE 2-15
SIMULATED AVERAGE ANNUAL GROUNDWATER ELEVATIONS IN THE SAUGUS FORMATION WEST OF INTERSTATE 5
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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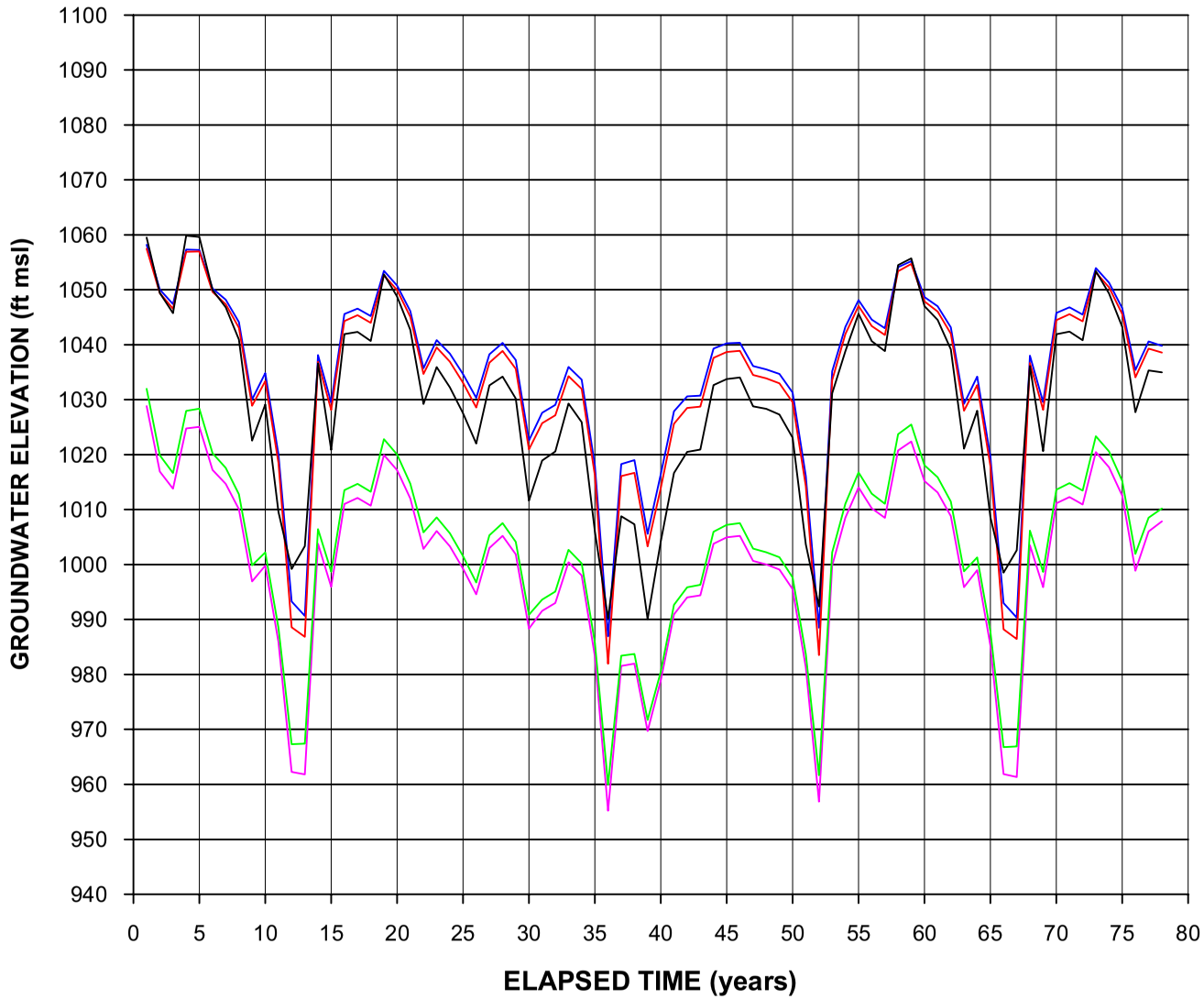

LEGEND

- VCW-157
- MP-5
- NCWD-11
- SCWC-SAUGUS1
- SCWC-SAUGUS2

NOTE:

1. SEE FIGURE 2-7 FOR LOCATIONS OF WELLS.

FIGURE 2-16
SIMULATED AVERAGE ANNUAL GROUNDWATER ELEVATIONS IN THE SAUGUS FORMATION EAST OF INTERSTATE 5
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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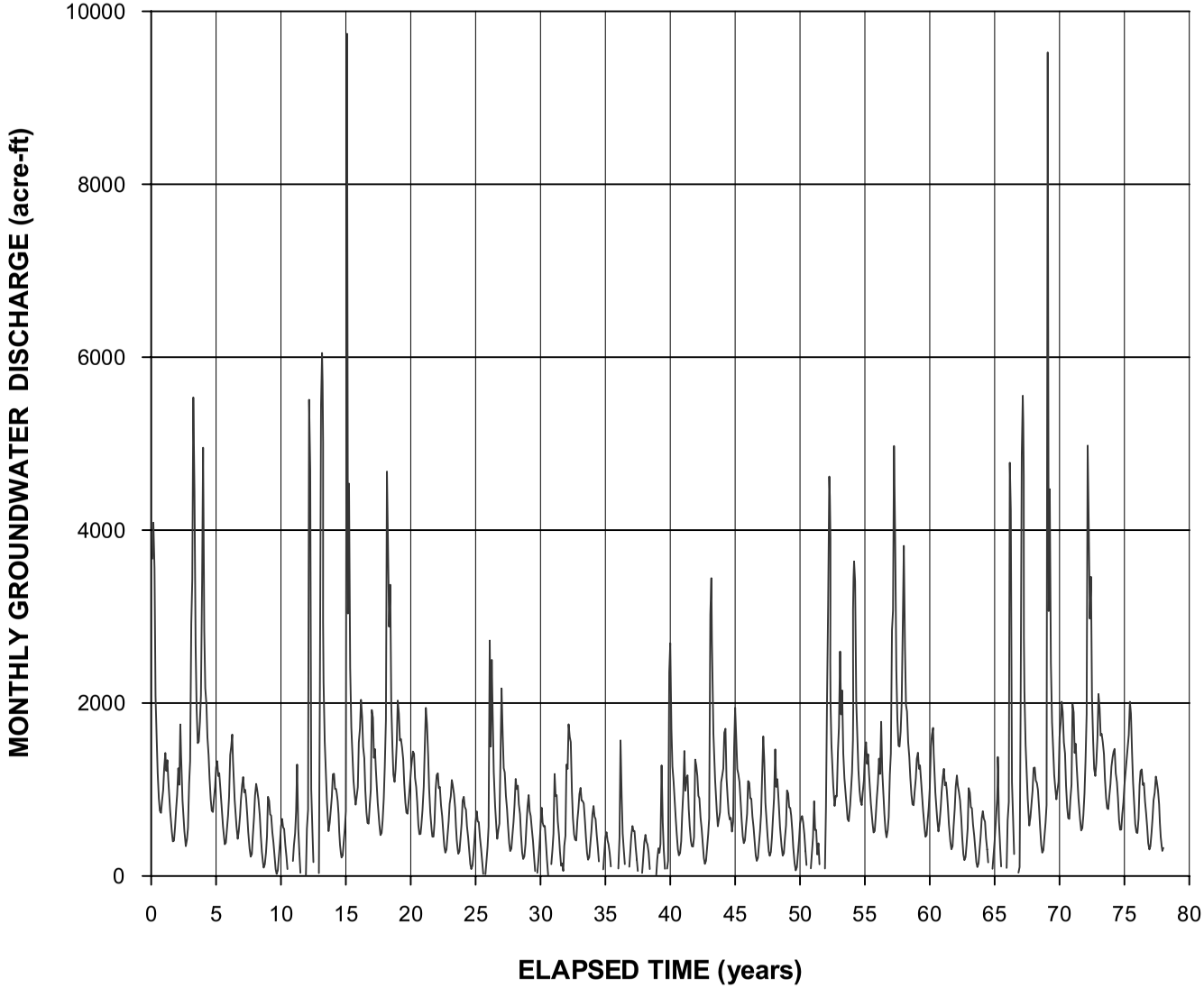

FIGURE 2-18
SIMULATED GROUNDWATER DISCHARGE TO SANTA CLARA RIVER
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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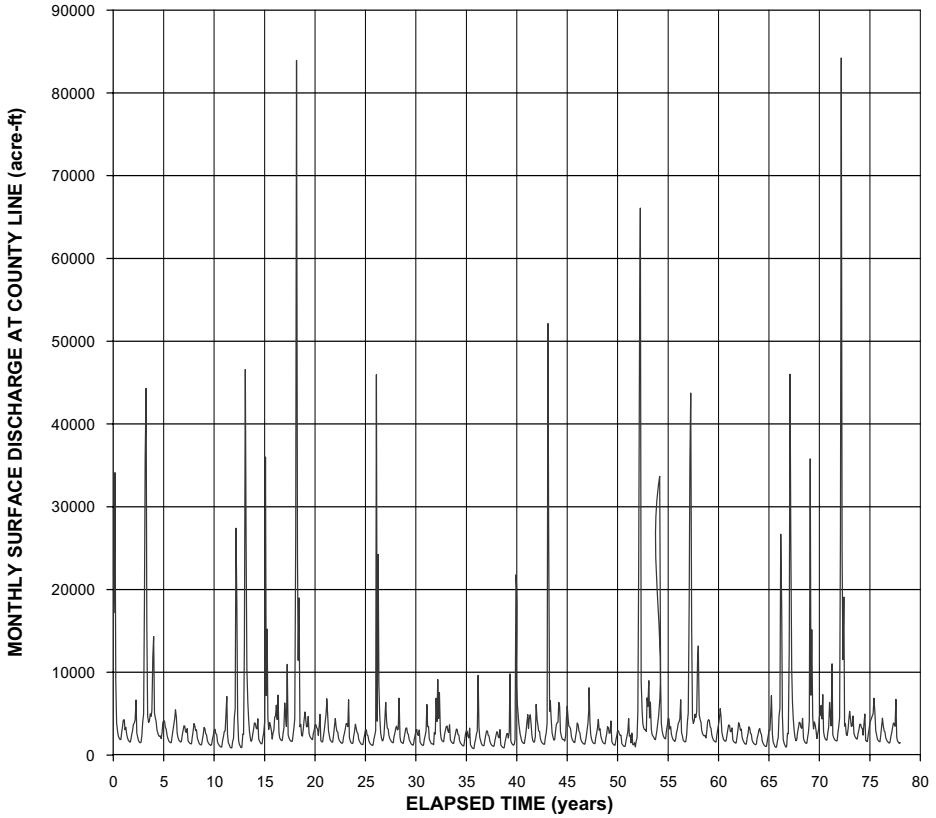

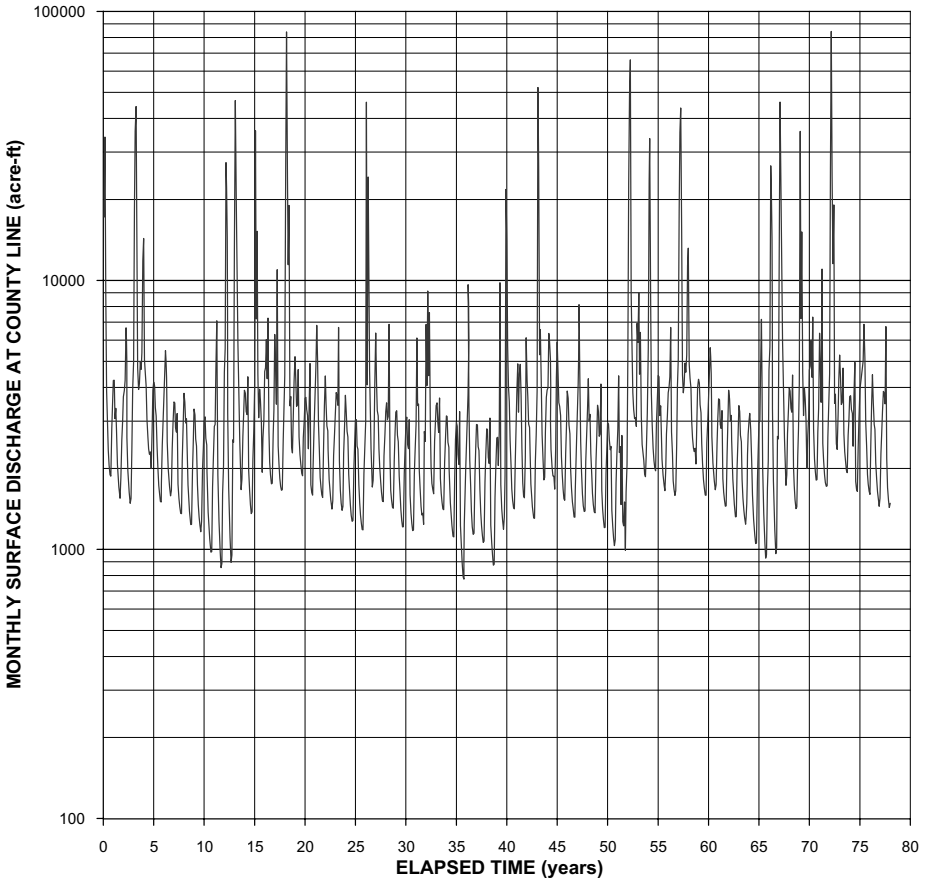

FIGURE 2-17
SIMULATED SANTA CLARA RIVER FLOW AT COUNTY LINE
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

178973-353.GRF

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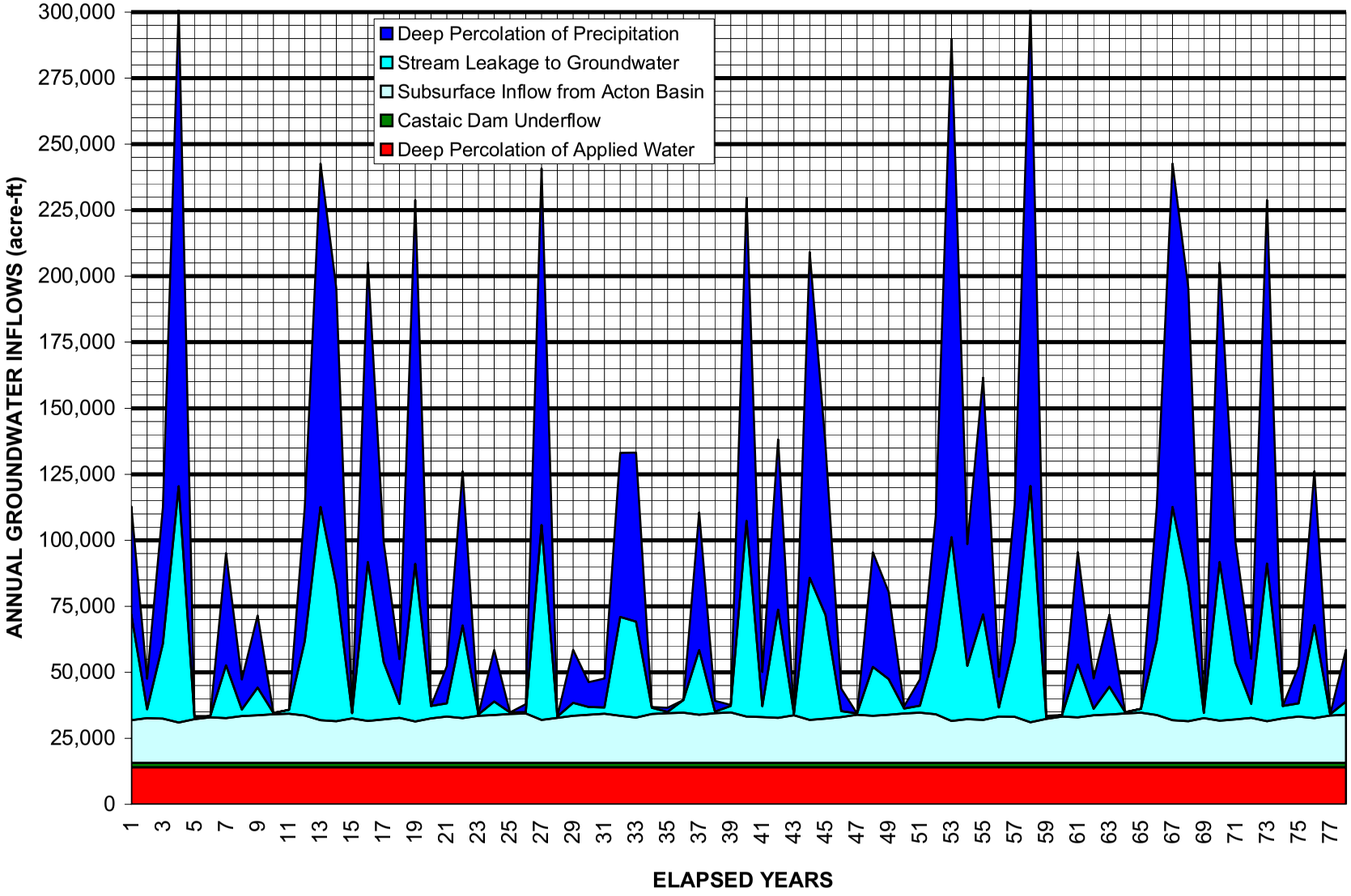

FIGURE 2-19
ANNUAL GROUNDWATER INFLOWS
ANALYSIS OF PERCHLORATE CONTAINMENT IN
GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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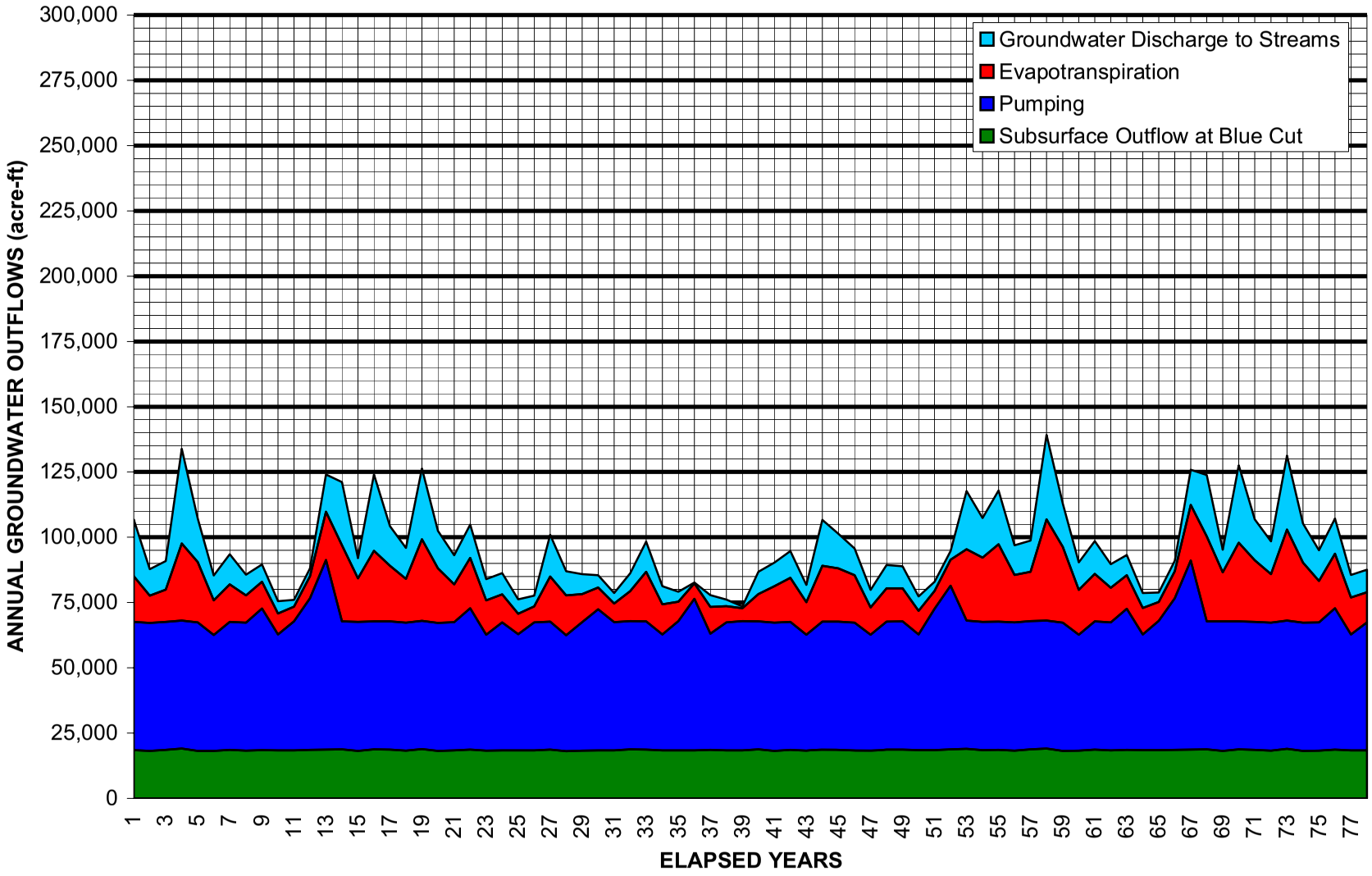

FIGURE 2-20
ANNUAL GROUNDWATER OUTFLOWS
ANALYSIS OF PERCHLORATE CONTAINMENT IN
GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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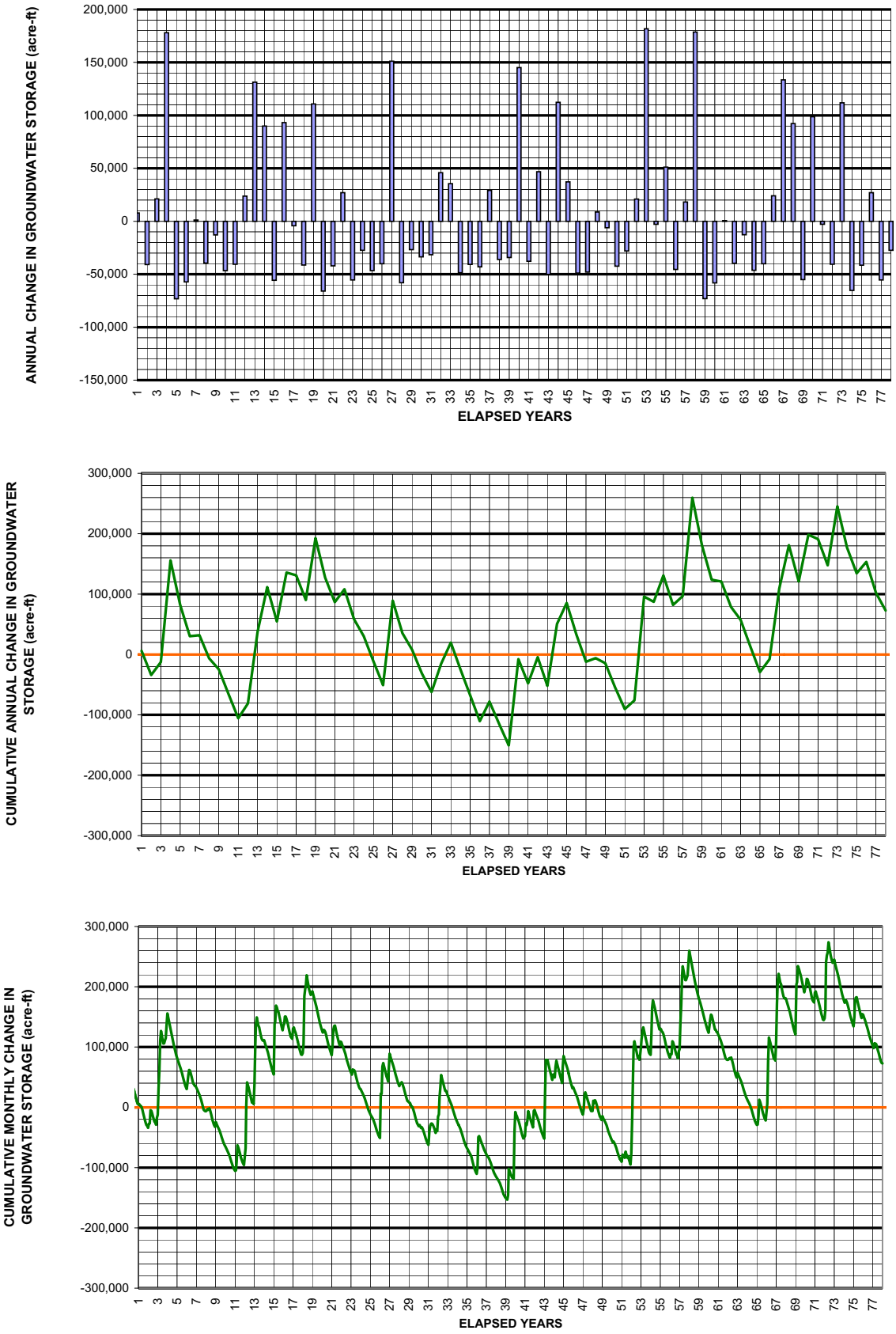
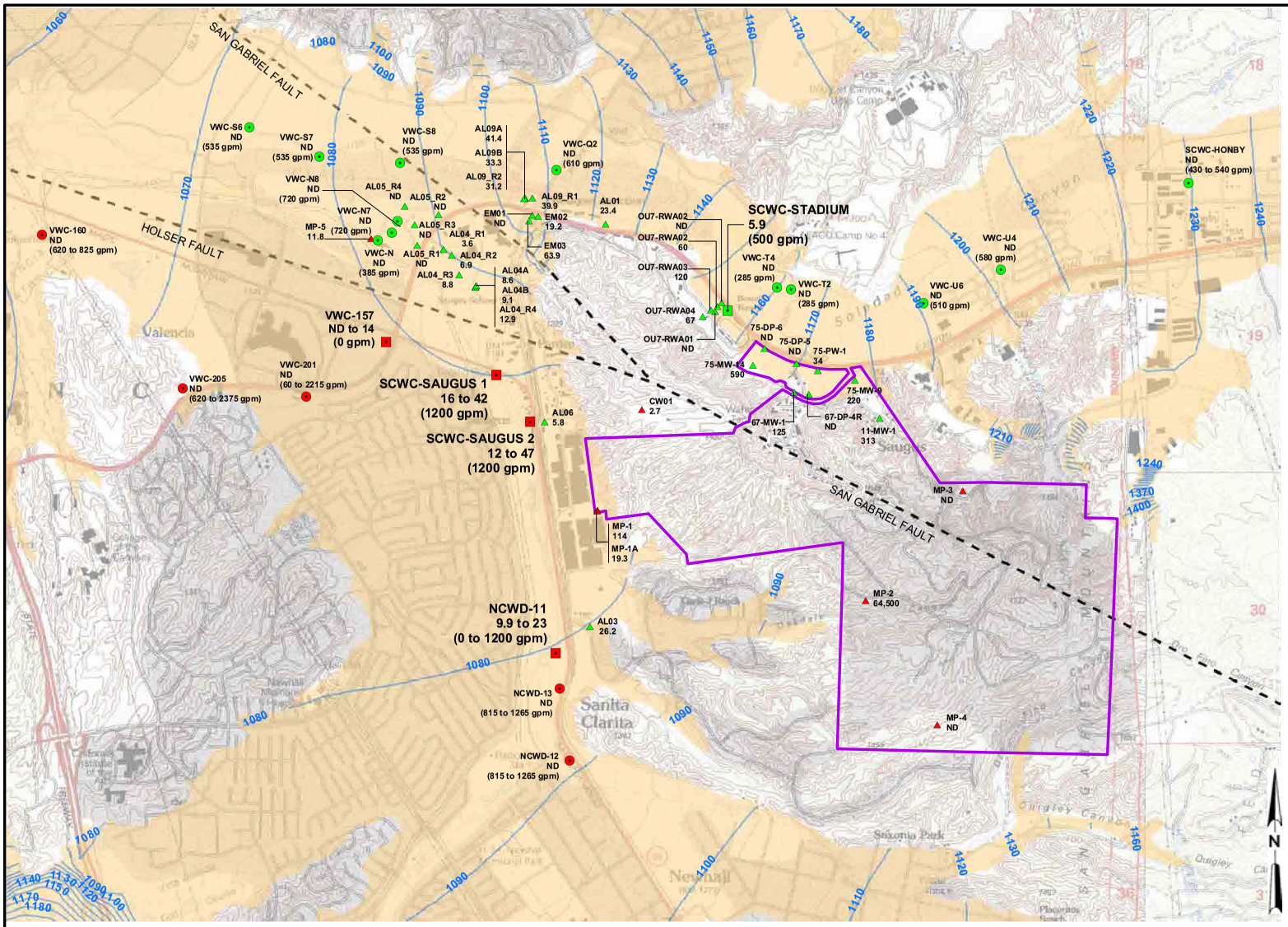


FIGURE 2-21
ANNUAL CHANGE AND CUMULATIVE CHANGE IN GROUNDWATER STORAGE
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA



LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NONIMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS
- SIMULATED GROUNDWATER ELEVATION (ft MSL)
- ALLUVIUM
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE

FIGURE 2-22
SIMULATED AVERAGE GROUNDWATER ELEVATION CONTOURS FOR ALLUVIAL AQUIFER
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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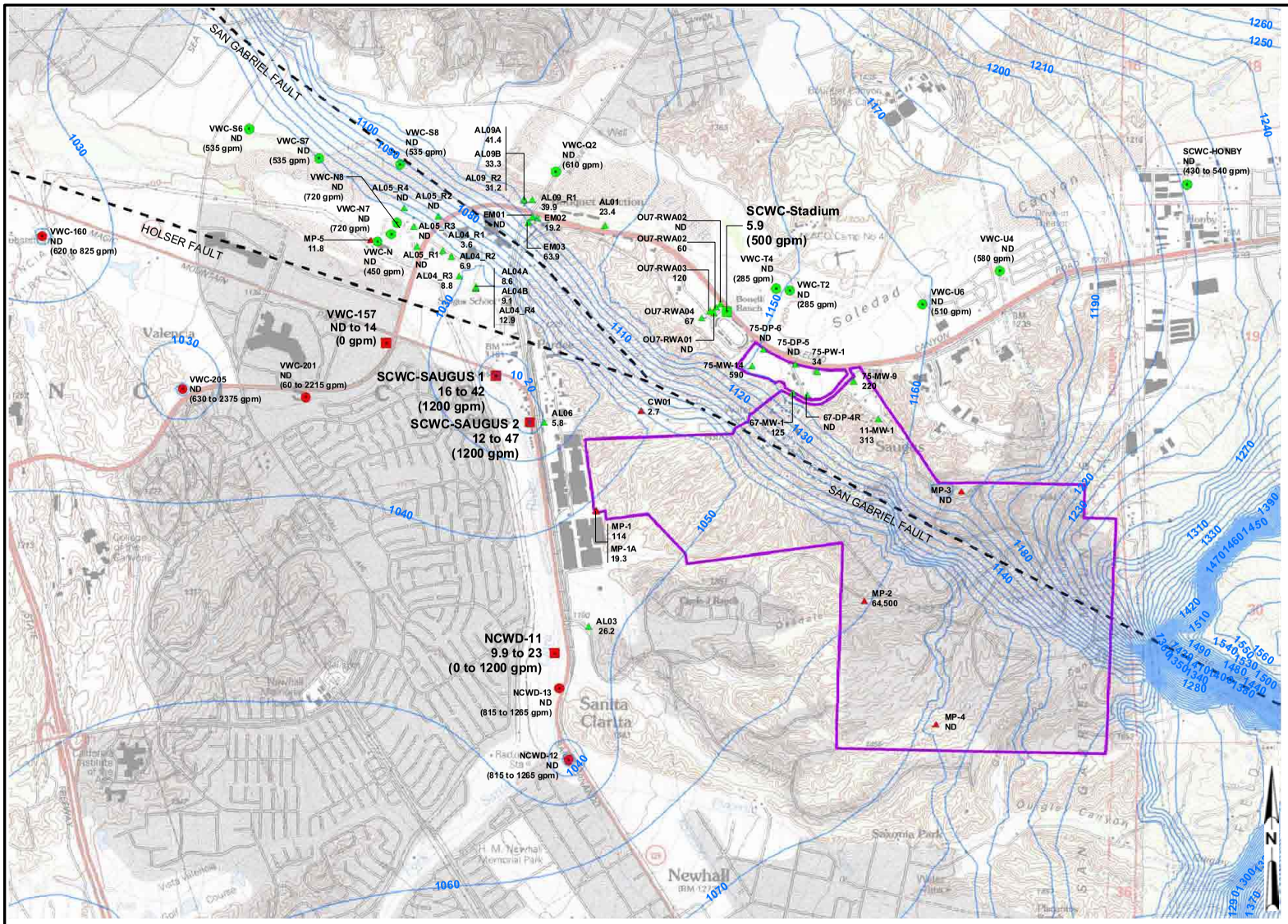
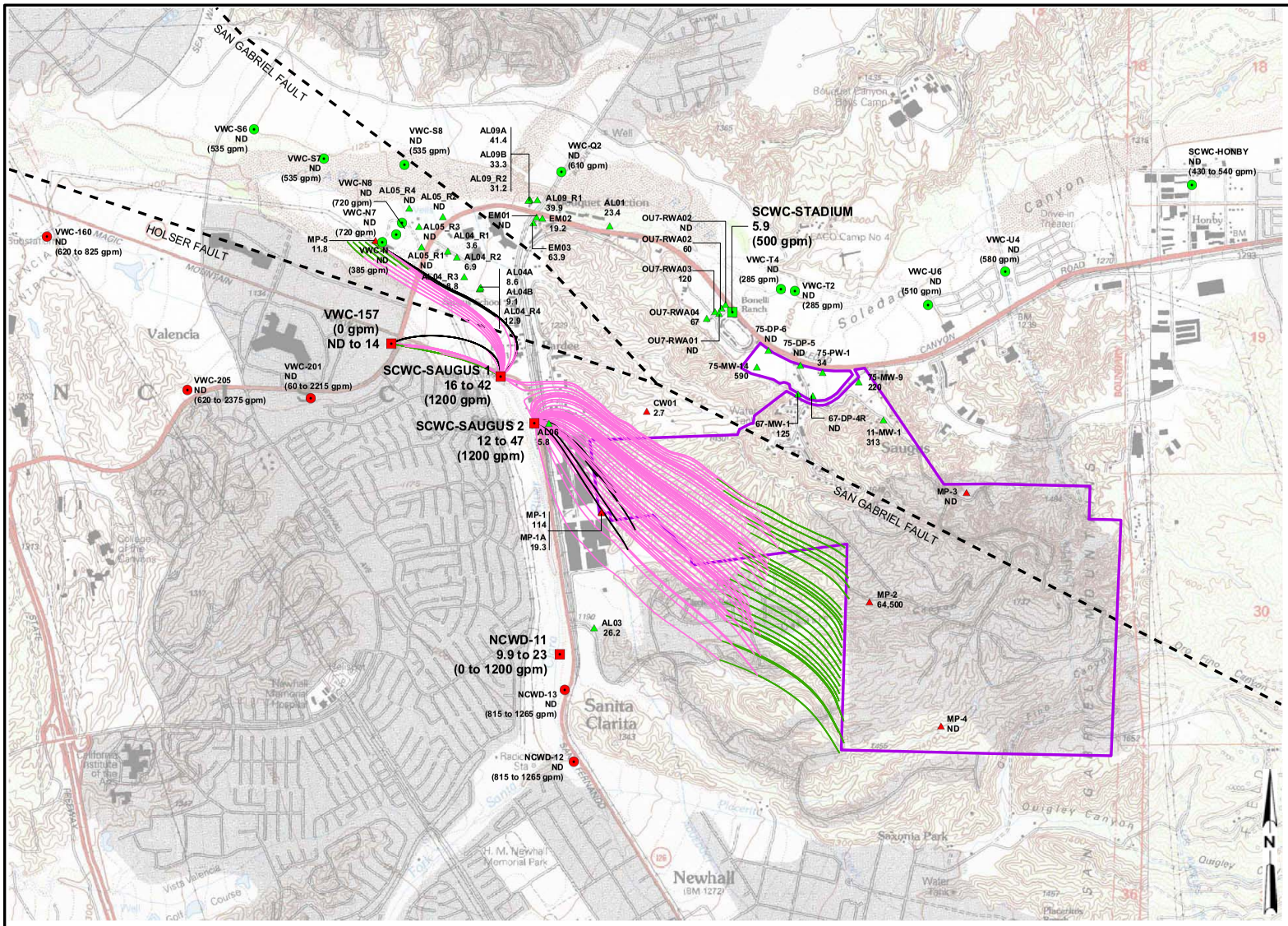

SAN GABRIEL FAULT
HOLSER FAULT
VWC-S6 ND (535 gpm)
VWC-S7 ND (535 gpm)
VWC-S8 ND (535 gpm)
VWC-N8 ND (720 gpm)
VWC-N7 ND (720 gpm)
VWC-N ND (450 gpm)
VWC-160 ND (620 to 825 gpm)
MP-5 11.8
AL05_R4 ND
AL05_R2 ND
AL05_R3 ND
AL05_R1 ND
AL04_R1 3.6
AL04_R2 6.9
AL04_R3 8.8
AL04A 8.6
AL04B 9.1
AL04_R4 12.9
AL09A 41.4
AL09B 33.3
AL09_R2 31.2
AL09_R1 39.9
EM01 ND
EM02 19.2
EM03 63.9
AL01 23.4
VWC-Q2 ND (610 gpm)
VWC-157 ND to 14 (0 gpm)
VWC-205 ND (630 to 2375 gpm)
VWC-201 ND (60 to 2215 gpm)
SCWC-SAUGUS 1 16 to 42 (1200 gpm)
SCWC-SAUGUS 2 12 to 47 (1200 gpm)
AL06 5.8
CW01 2.7
OU7-RWA02 ND
OU7-RWA02 60
OU7-RWA03 120
OU7-RWA04 67
OU7-RWA01 ND
SCWC-Stadium 5.9 (500 gpm)
VWC-T4 ND (285 gpm)
VWC-T2 ND (285 gpm)
75-DP-6 ND
75-DP-5 ND
75-PW-1 34
75-MW-14 590
75-MW-9 220
67-MW-1 125
67-DP-4R ND
11-MW-1 313
MP-1 114
MP-1A 19.3
MP-3 ND
MP-2 64,500
MP-4 ND
AL03 26.2
NCWD-11 9.9 to 23 (0 to 1200 gpm)
NCWD-13 ND (815 to 1265 gpm)
NCWD-12 ND (815 to 1265 gpm)
VWC-U4 ND (580 gpm)
VWC-U6 ND (510 gpm)
SCWC-HONBY ND (430 to 540 gpm)
Valencia
Soledad
Canyon
Saugus
Santa Clarita
Newhall
Honby
Bouquet Canyon
Bouquet Junction
Bouquet Canyon Road
Drewyer Theatre
Bouquet Canyon Road
Bouquet Canyon Road
Bouquet Canyon Road



LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATH

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. FLOWPATHS AT VWC-157 AND MP-5 ARE INITIATED IN MODEL LAYERS 2, 3, 4, AND 5. FLOWPATHS AT THE WHITTAKER-BERMITE PROPERTY BOUNDARY ARE INITIATED IN MODEL LAYER 3.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE 2-24
GROUNDWATER FLOWPATHS IN THE SAUGUS FORMATION FROM VWC-157, MP-5, AND THE WESTERN BOUNDARY OF THE WHITTAKER-BERMITE PROPERTY

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

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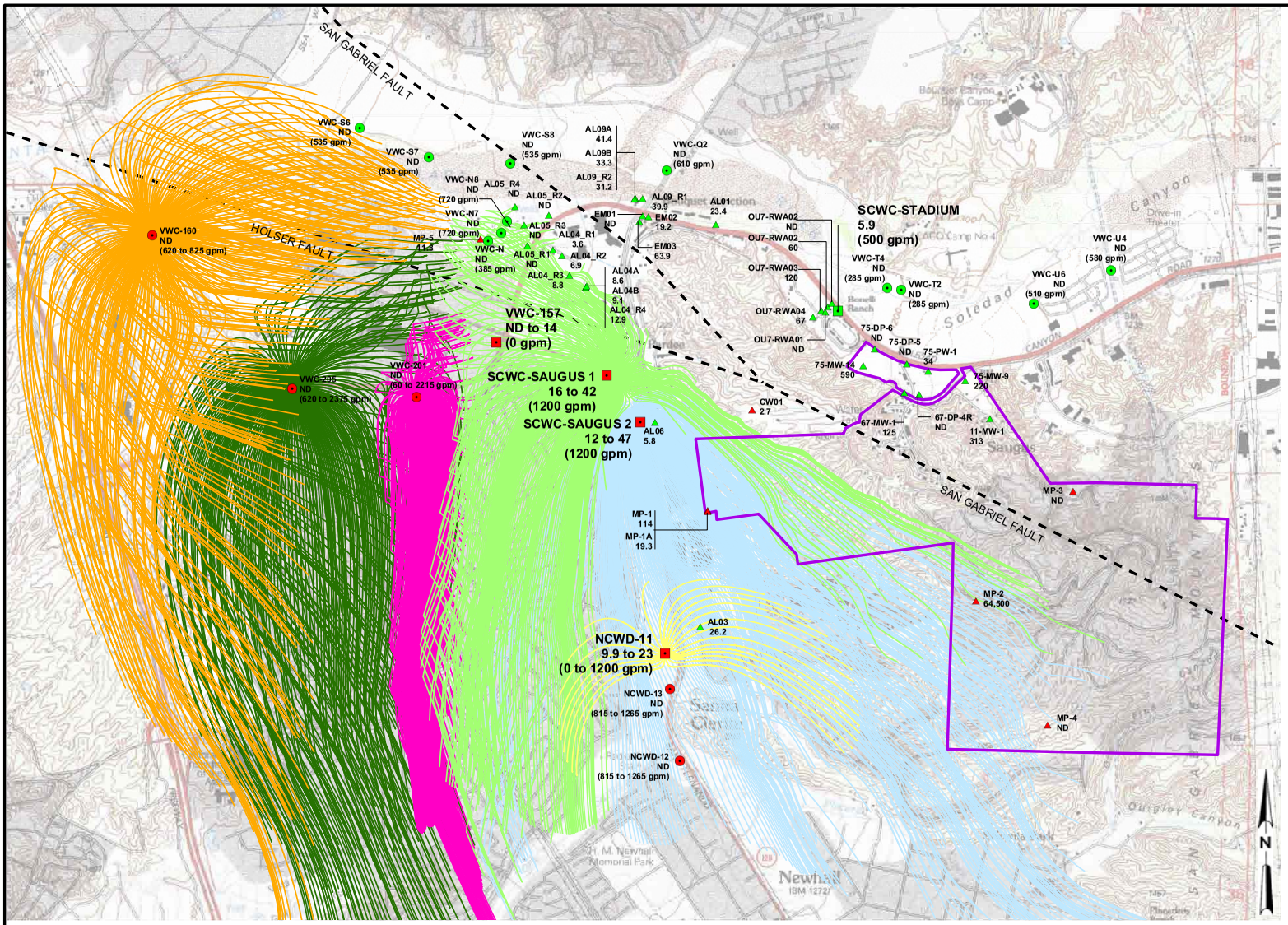

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS
- SCWC-SAUGUS 1
- SCWC-SAUGUS 2
- VWC-160
- VWC-201
- VWC-205
- NCWD-11
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. PARTICLES WERE INITIATED IN LAYERS 3, 4, AND 5. ALTHOUGH EACH WELL MAY DERIVE A PORTION OF ITS WATER FROM THE ALLUVIAL AQUIFER, PARTICLES THAT ARE TRACED INTO THE ALLUVIAL AQUIFER ARE NOT SHOWN ON THIS FIGURE BECAUSE THE INTENT OF THE FIGURE IS TO SHOW AREAS IN THE SAUGUS FORMATION THAT ARE CAPTURED BY EACH WELL.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE 2-25
SAUGUS FORMATION CAPTURE ZONES FOR IMPACTED AND NONIMPACTED PRODUCTION WELLS
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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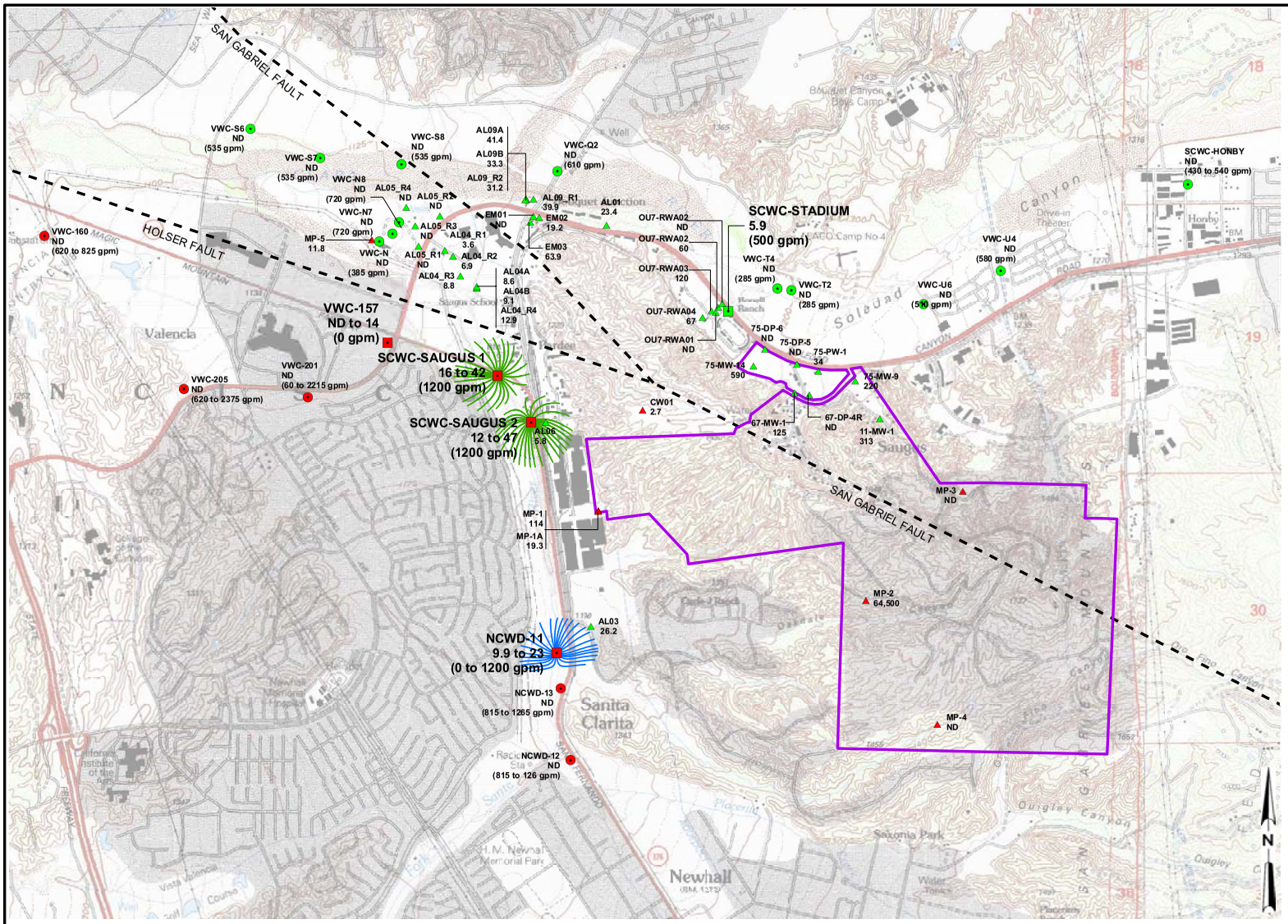

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATH

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. PARTICLES WERE INITIATED IN LAYER 2 AT NCWD-11, AND LAYER 3 AT SCWC-SAUGUS 1 AND SCWC-SAUGUS 2.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE 2-26
TWO-YEAR CAPTURE ZONES FOR WELLS SCWC-SAUGUS 1, SCWC-SAUGUS 2, AND NCWD-11

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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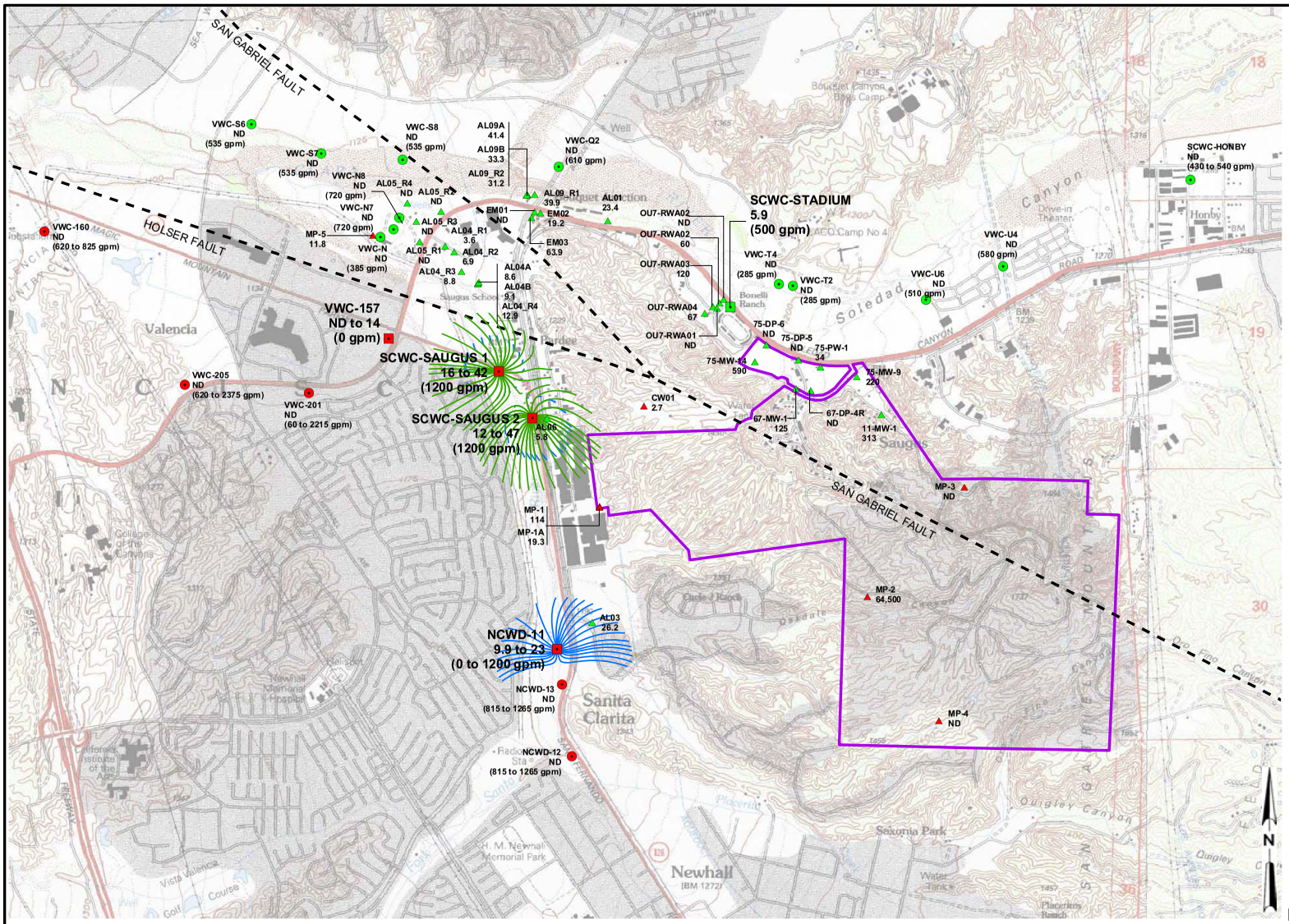

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATHS

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. PARTICLES ARE INITIATED IN LAYER 2 AT NCWD-11, AND LAYER 3 AT SCWC-SAUGUS 1 AND SCWC-SAUGUS 2.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE 2-27
FIVE-YEAR CAPTURE ZONES FOR WELLS SCWC-SAUGUS 1, SCWC-SAUGUS 2, AND NCWD-11

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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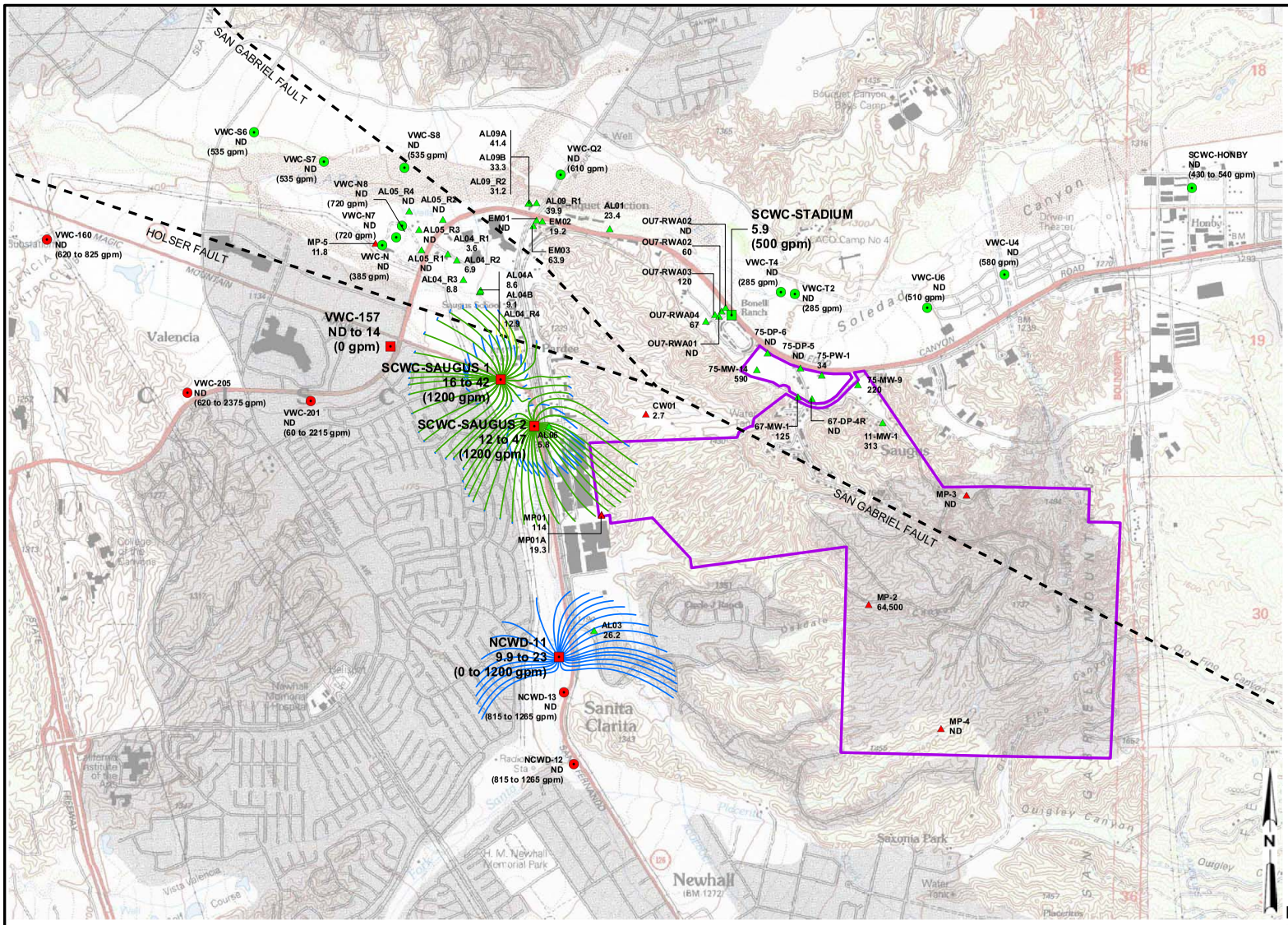

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATHS

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. PARTICLES ARE INITIATED IN LAYER 2 AT NCWD-11, AND LAYER 3 AT SCWC-SAUGUS 1 AND SCWC-SAUGUS 2.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE 2-28
TEN-YEAR CAPTURE ZONES FOR WELLS SCWC-SAUGUS 1, SCWC-SAUGUS 2, AND NCWD-11

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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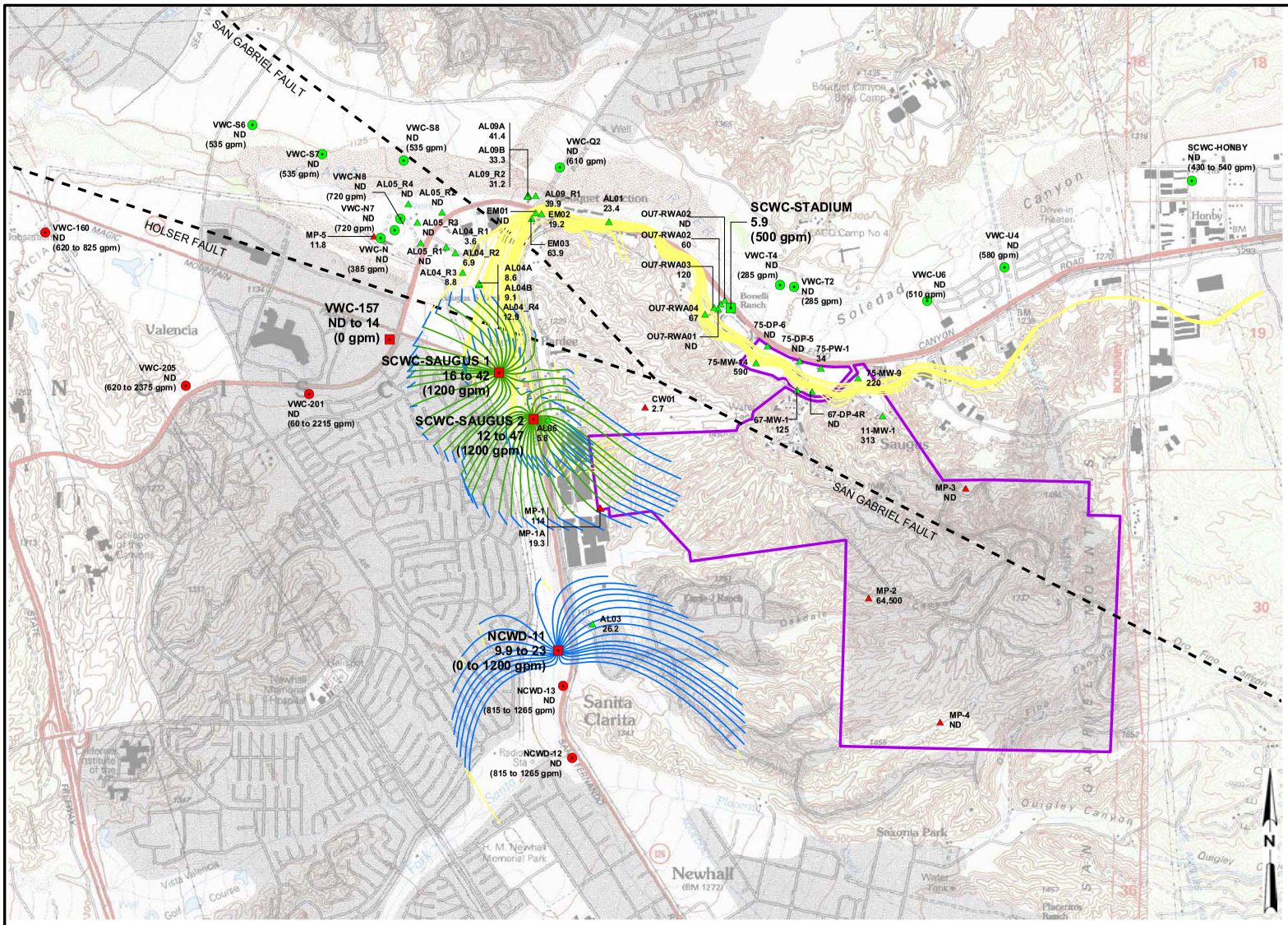

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATHS

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. PARTICLES ARE INITIATED IN LAYER 2 AT NCWD-11, AND LAYER 3 AT SCWC-SAUGUS 1 AND SCWC-SAUGUS 2.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE 2-29
TWENTY-YEAR CAPTURE ZONES FOR WELLS SCWC-SAUGUS 1, SCWC-SAUGUS 2, AND NCWD-11

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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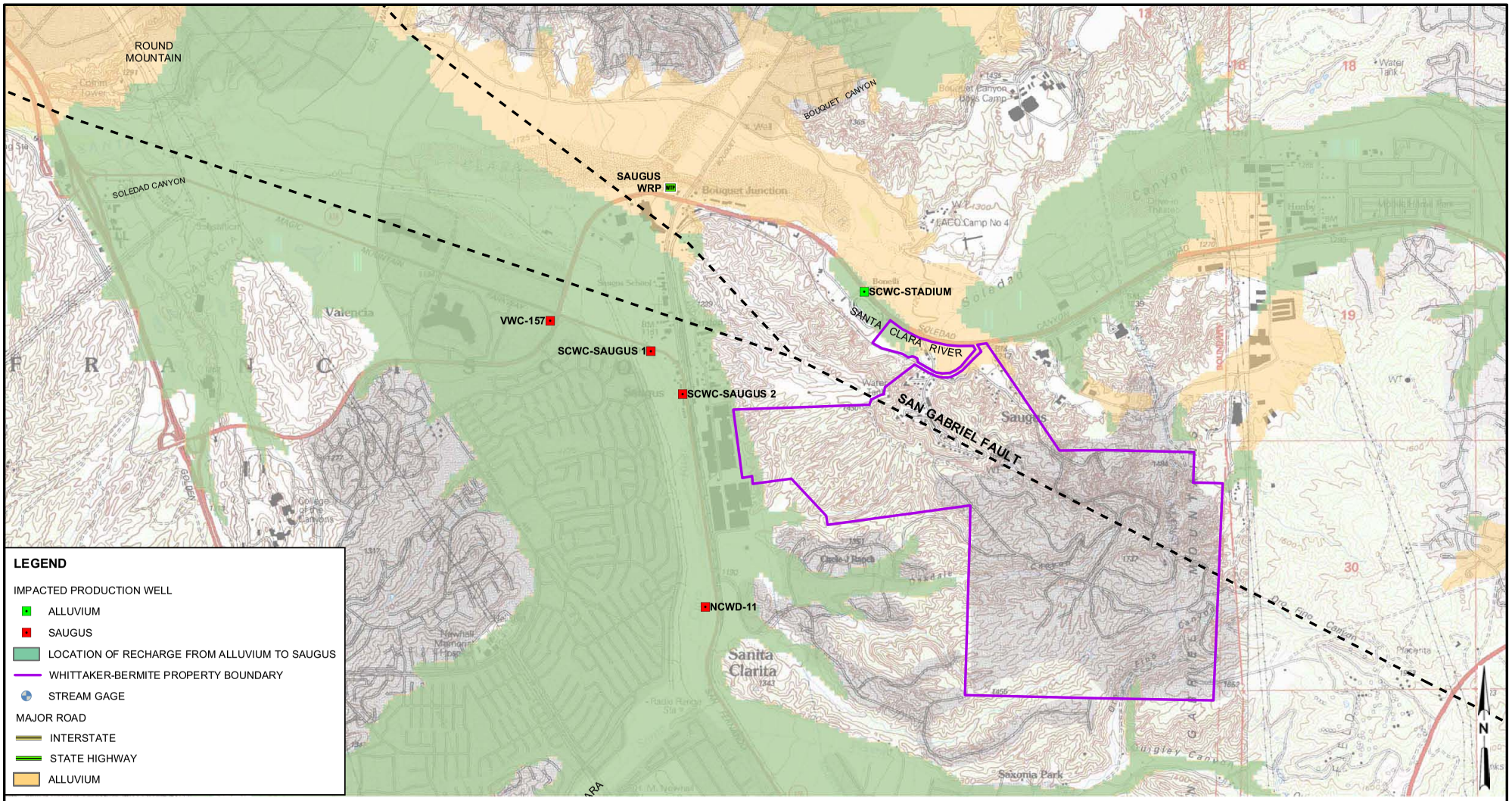

FIGURE 2-30
LOCATIONS OF SAUGUS FORMATION RECHARGE FROM THE ALLUVIAL AQUIFER IN THE VICINITY OF THE WHITTAKER-BERMITE PROPERTY

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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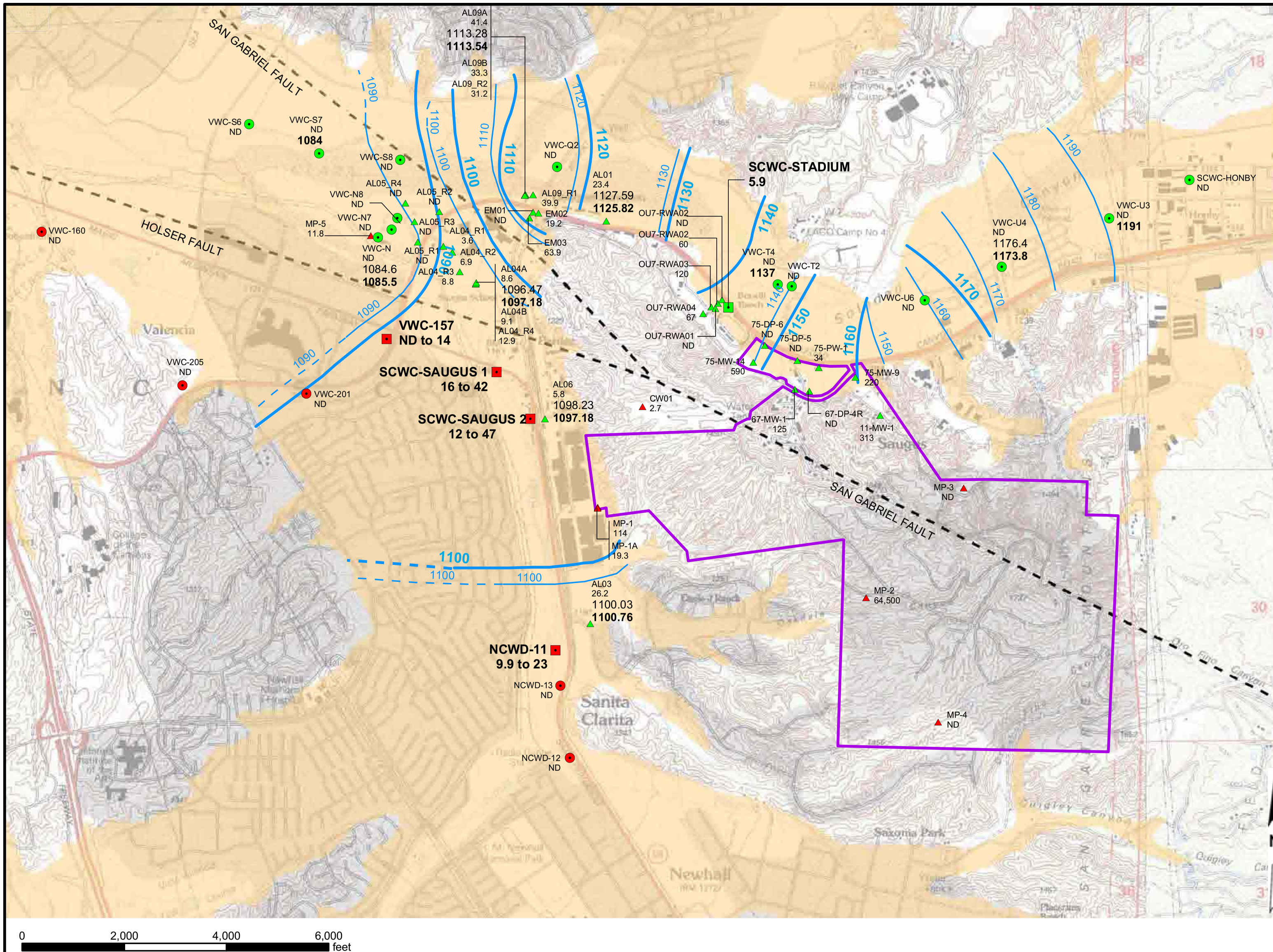

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NONIMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

GROUNDWATER ELEVATION CONTOURS (ft MSL)

- OCTOBER 2003 (DASHED WHERE INFERRED)
- DECEMBER 2003 (DASHED WHERE INFERRED)
- ALLUVIUM
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (μg/L).
2. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. μg/L = MICROGRAMS PER LITER
5. 1100.03 = OCTOBER 2003 GROUNDWATER ELEVATION (ft MSL)
6. **1097.18 = DECEMBER 2003 GROUNDWATER ELEVATION (ft MSL)**

FIGURE 2-31
MEASURED ALLUVIAL AQUIFER GROUNDWATER ELEVATIONS IN THE VICINITY OF THE WHITTAKER-BERMITE PROPERTY
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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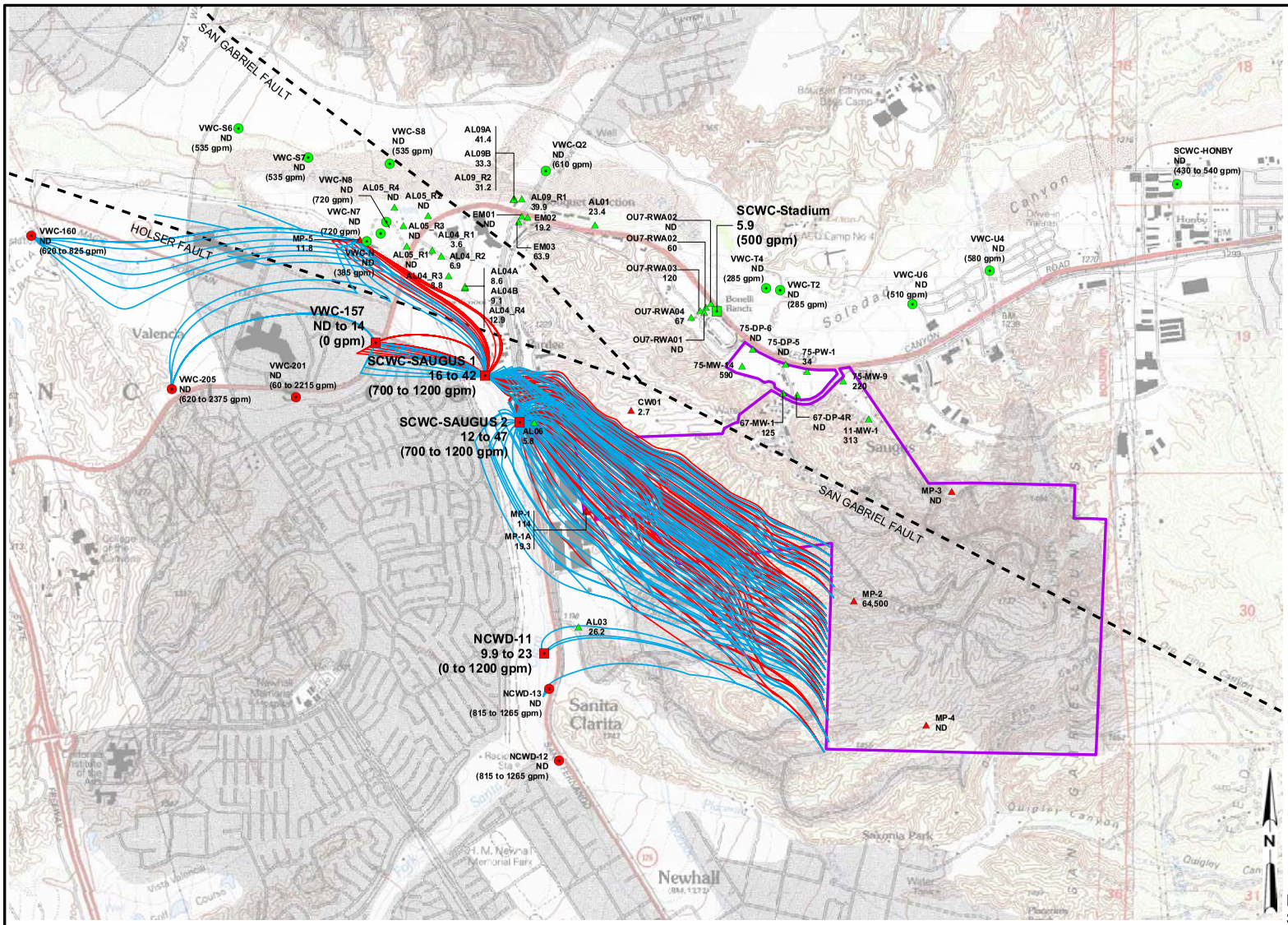

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATHS

- PUMPING RATE 1200 gpm
- PUMPING RATE 700 and 1000 gpm
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. FLOWPATHS AT VWC-157 AND MP-5 ARE INITIATED IN MODEL LAYERS 2, 3, 4, AND 5. FLOWPATHS AT THE WHITTAKER-BERMITE PROPERTY BOUNDARY ARE INITIATED IN MODEL LAYER 3.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE 2-32
SENSITIVITY OF FLOWPATHS IN THE SAUGUS FORMATION TO LOWER PUMPING RATES AT SCWC-SAUGUS1 AND SCWC-SAUGUS2

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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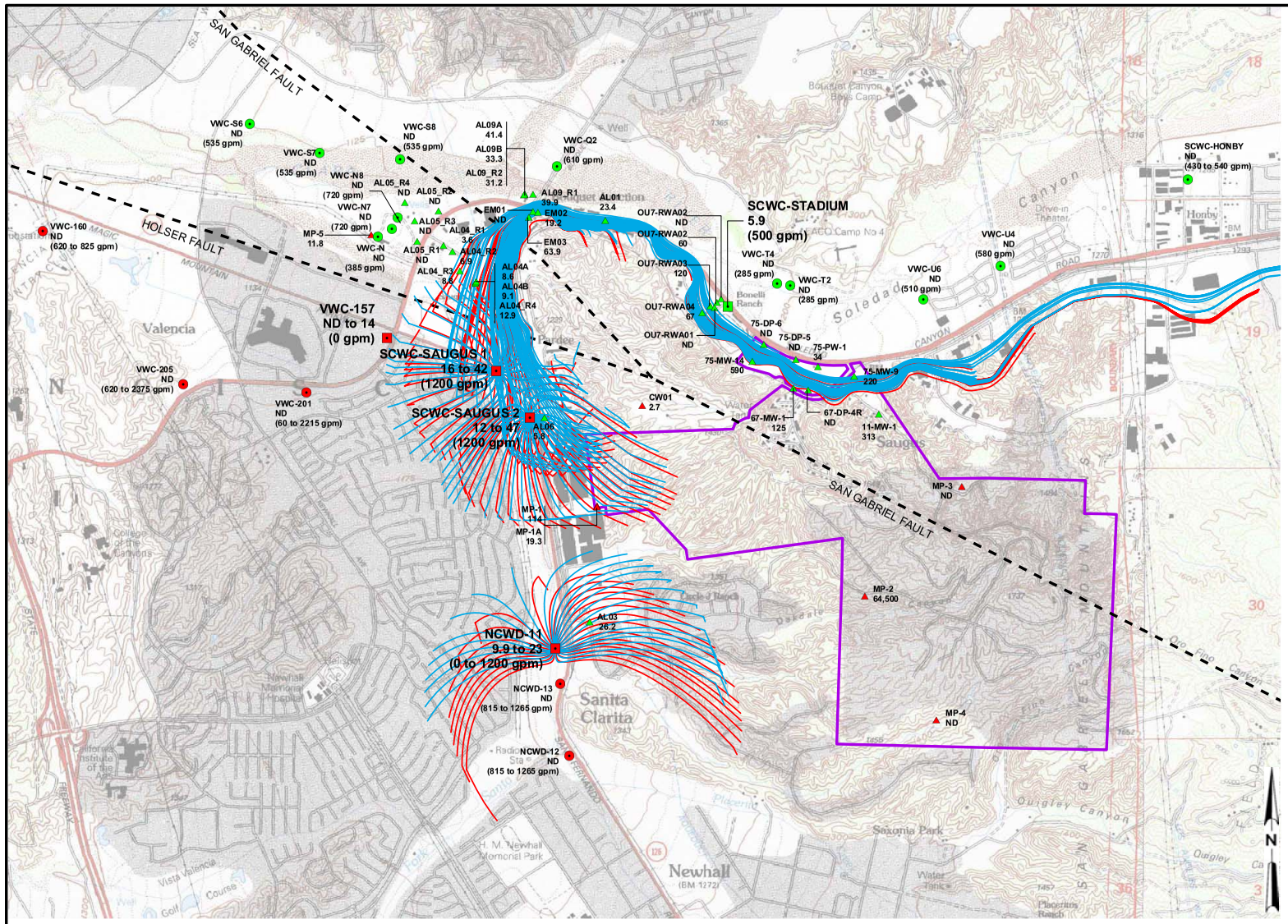

LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATHS

- BASE CASE RUN (Kh:Kv = 50:1)
- SENSITIVITY RUN (Kh:Kv = 200:1)

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. PARTICLES ARE INITIATED IN LAYER 2 AT NC-11, AND LAYER 3 AT SCWC-SAUGUS1 AND SCWC-SAUGUS2.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.
7. Kh:Kv = RATIO OF HORIZONTAL HYDRAULIC CONDUCTIVITY TO VERTICAL HYDRAULIC CONDUCTIVITY.

FIGURE 2-33
SENSITIVITY OF 20-YEAR CAPTURE ZONES FOR WELLS SCWC-SAUGUS1, SCWC-SAUGUS2, AND NCWD-11 TO LOWER SIMULATED HYDRAULIC CONNECTION BETWEEN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION

ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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SECTION 3

Sentinel and Performance Monitoring Programs

This section of the report discusses the objectives and design of the sentinel and performance monitoring programs that will be implemented for the impacted Saugus Formation production wells as part of the permitting process for returning them to service. The sentinel monitoring program is designed to provide early warning of any changes that might occur in groundwater quality. The scope of this discussion is limited to the ambient groundwater quality monitoring that will be performed upgradient of each impacted well (SCWC-Saugus1, SCWC-Saugus2, and NCWD-11). Monitoring of raw and/or treated water produced by the wells will be addressed in separate documents describing the selection and implementation of the planned perchlorate treatment process at each well. The performance monitoring program evaluates whether containment is being achieved by the containment pumping plan.

3.1 Objectives

DHS Policy Memo 97-005 requires the implementation of sentinel monitoring in groundwater upgradient of impacted wells to provide early warning of unanticipated changes in groundwater quality. This monitoring program is described under the source protection element of the evaluation process for returning an impacted well to service. Based on this policy, the sentinel monitoring plan for the impacted Saugus Formation production wells is intended to provide advanced warning of concentration changes or the presence of additional contaminants in groundwater that might affect the perchlorate treatment processes.

Additionally, groundwater elevation and pumping data will be collected under the sentinel monitoring plan to evaluate the effectiveness of the perchlorate containment plan that is described in this report. Specifically, these data will be evaluated to verify that the containment objectives of the containment pumping plan are being achieved and identify any changes to the operations of the containment wells that might be warranted.

3.2 Monitoring Network

As shown on Figure 3-1 and in Table 3-1, the monitoring well network for the sentinel monitoring program will provide access to both the Alluvial Aquifer and the Saugus Formation upgradient of each production well. Monitoring will occur at the following locations:

1. Two new Alluvial Aquifer monitoring wells and four new Saugus Formation monitoring wells (for monitoring upgradient of production well SCWC-Saugus1)
2. One existing Alluvial Aquifer monitoring well and two screens in existing Saugus Formation multi-port monitoring well MP-2 (for monitoring upgradient of production well SCWC-Saugus2)

3. One existing Alluvial Aquifer monitoring well and one new Saugus Formation monitoring well (for monitoring upgradient of production well NCWD-11)

This program will require the installation of seven new monitoring wells (six near SCWC-Saugus1, and one near NCWD-11).

The rationale for the well locations is provided in Table 3-1. Well locations were selected according to the following considerations:

1. Locating sentinel wells sufficient distances from the production well to allow adequate time to respond to significant concentration changes
2. Using existing monitoring wells, to the degree possible
3. Locating new monitoring wells in areas where site access will not cause undue restrictions on drilling, installing, and monitoring new sentinel monitoring wells

The shape of the SCWC-Saugus1 capture zone requires that sentinel wells be located north of SCWC-Saugus1. However, site access restrictions in this area are significant. Consequently, sentinel monitoring wells can only be located just north of SCWC-Saugus1, at locations that might provide only 1 year of warning and response time. At SCWC-Saugus2, the sentinel wells are anticipated to provide as much as 10 years of warning and response time. At NCWD-11, the sentinel wells are anticipated to provide approximately 2 years of warning and response time.

Alluvial Aquifer monitoring is planned near each production well because of the potential for groundwater containing perchlorate to migrate downward into the Saugus Formation and move toward each impacted production well. The *Draft Final Conceptual Hydrogeology Technical Memorandum for the Eastern Santa Clara Sub-basin Groundwater Study* (CH2M HILL, 2004b) has identified a potential pathway for perchlorate migration to production well NCWD-11, consisting of stormwater runoff from Oakdale Canyon that infiltrates into shallow groundwater and migrates vertically into the Saugus Formation due to ambient or induced (by pumping) hydraulic gradients. This pathway has been identified from the hydrogeologic data in this area and the detection of perchlorate in monitoring well AL03, which is located downstream of Oakdale Canyon near production well NCWD-11. In addition, perchlorate detections in Alluvial Aquifer monitoring well AL06, located near SCWC-Saugus2, are consistent with the conceptual pathway involving stormwater runoff influence on the Alluvial Aquifer. This impacted Alluvial Aquifer groundwater is likely to be in direct contact with the upper Saugus Formation, thereby warranting monitoring of the Alluvial Aquifer, and not just the Saugus Formation.

3.3 Chemical Constituents and Monitoring Frequency

Table 3-2 lists the chemical constituents to be monitored, and the frequency at which monitoring will occur as the operational plan for the impacted Saugus Formation production wells is implemented. The following are key aspects of the program's design:

1. The program will focus primarily on monitoring for perchlorate, VOCs, nitrate, and sulfate, which are the constituents most likely to affect the treatment system if present at concentrations greater than those observed to date at the impacted Saugus Formation

production wells. Perchlorate concentrations would need to increase by a factor of approximately 10 or higher above concentrations measured to date before the treatment systems (which will use ion-exchange resins) would be unable to function as necessary.

2. General minerals (anions and cations) will be sampled on a biannual basis to provide geochemical information that may be helpful for evaluating groundwater migration in the vicinity of each impacted production well. However, nitrate and sulfate will be analyzed annually because of their potential influence on the ion-exchange treatment system.
3. The monitoring frequency will be the same for Alluvial Aquifer sentinel wells as for Saugus Formation sentinel wells.
4. Laboratory-quality-assured analytical data will be submitted to DHS after each monitoring event. Additionally, an annual report will be prepared that summarizes the sentinel monitoring results and identifies any recommended changes to the scope of the monitoring program. Proposed changes will also consider treatment operations and analytical data for the production wells being monitored. Changes to the sentinel well monitoring program that are recommended in the annual reports will be implemented after DHS has reviewed and approved the proposed changes.

The sentinel monitoring program will coincide with a long-term groundwater monitoring program occurring at various locations to the east on the Whittaker-Bermite property. That program will consist of monitoring for the constituents above, plus other constituents that can be associated with perchlorate presence, but which have not been detected in groundwater beneath the site to date.

3.4 Evaluating Capture Zone Effectiveness

As discussed in Sections 1.1 and 2.2.5.2 of this report, CLWA will operate SCWC-Saugus1 and SCWC-Saugus2 on a nearly continual basis at a combined rate of 2,400 gpm to provide hydraulic containment of perchlorate that is moving westward in the Saugus Formation from the Whittaker-Bermite property. Groundwater level monitoring and additional groundwater modeling will be conducted to evaluate whether the containment plan is meeting its intended objectives.

Water level monitoring will be conducted at each sentinel well that is completed in the Saugus Formation and at multi-port monitoring well MP-5, which is also completed in the Saugus Formation and is located downgradient of SCWC-Saugus1 and SCWC-Saugus2. Water levels will be measured at these wells during the startup period for the containment system, as well as immediately prior to startup. Additionally, detailed records of groundwater extraction rates, and the timing of those extractions, will be maintained for SCWC-Saugus1 and SCWC-Saugus2 and the other nearby Saugus Formation production wells (VWC-160, VWC-201, VWC-205, NCWD-11, NCWD-12, and NCWD-13).

The water level trends will then be compared with water level trends that are calculated from Regional Model simulations of the pumping at impacted and nonimpacted wells during the initial startup period for the containment pumping plan. If the comparison of simulated and measured water level trends indicates that adjustments are warranted to the

assignment of Saugus Formation aquifer properties in the model, those adjustments will be made and the capture zone evaluations presented on Figure 2-24 of this report will be re-evaluated. Regardless of the need for changes to the model, the information that is obtained from this field data collection program and the subsequent modeling analysis will be used to draw conclusions concerning the effectiveness of the containment plan and whether adjustments to the pumping operations at SCWC-Saugus1 and SCWC-Saugus2 are warranted. These conclusions will be presented in a separate report to DHS.

Tables

TABLE 3-1

Well Network for Sentinel Groundwater Quality Monitoring

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Production Well	Sentinel Monitoring Locations	New Monitoring Well Needed?	Actual or Target Depth Interval for Well Screen (ft bgs)	Well Name	TOT Distance from Production Well	Rationale, Comments
SCWC-Saugus1	Alluvium: New well in Magic Mountain	Yes	40-60	AL-12A	1 year or less	Alluvial and Saugus HSU S-I monitoring is for a possible pathway to SCWC-Saugus1. Access constraints might require installation of these wells in the City of Santa Clarita right of way along Magic Mountain Parkway. There are currently no Saugus Formation monitoring wells within the delineated capture zone of SCWC-Saugus1. The Saugus wells for HSU S-III will be installed near the corner of San Fernando Road and Magic Mountain Parkway on land owned by the Newhall Land & Farming Company.
	Parkway north of Saugus1	Yes	170-180	AL-12B		
	Saugus (S-I unit): Adjacent to new alluvium well	Yes	230-250 (HSU S-I)	SG1-HSU1		
	Saugus (S-III unit): NLF land north of SCWC-Saugus1	Yes	490-520 (HSU S-III)	SG1-HSU3a		
		Yes	580-640 (HSU S-III)	SG1-HSU3b		
		Yes	750-770 (HSU S-III)	SG1-HSU3c		
SCWC-Saugus2	Alluvium: Existing well AL06	No	65-85	AL06	10 years	Alluvial monitoring is recommended to assess perchlorate near the SCWC-Saugus2 well. At MP-1, the port 2 screen correlates with the top of the screened intervals at SCWC-Saugus1 and SCWC-Saugus2. Port 4 is the uppermost port below a depth of 1,000 feet and below the zones containing perchlorate.
	Saugus: MP-1, ports 2 and 4	No	391.4-401.4 (HSU S-III)	MP-1 (port 2)		
		No	747.5-757.5 (HSU S-V)	MP-1 (port 4)		
NCWD-11	Alluvium: Existing well AL03	No	91-111	AL03	2 years	Alluvial monitoring is recommended because of the potential for the Alluvial Aquifer to be a pathway for perchlorate migration from the site to well NCWD-11. Additionally, movement within the Saugus Formation could be occurring from the site, which is the reason to install a Saugus sentinel well near the Alluvial sentinel well.
	Saugus: New well at AL03 location	Yes	280-320 (HSU S-III)	NC11-HSU3		

Notes:

TOT = time-of-travel

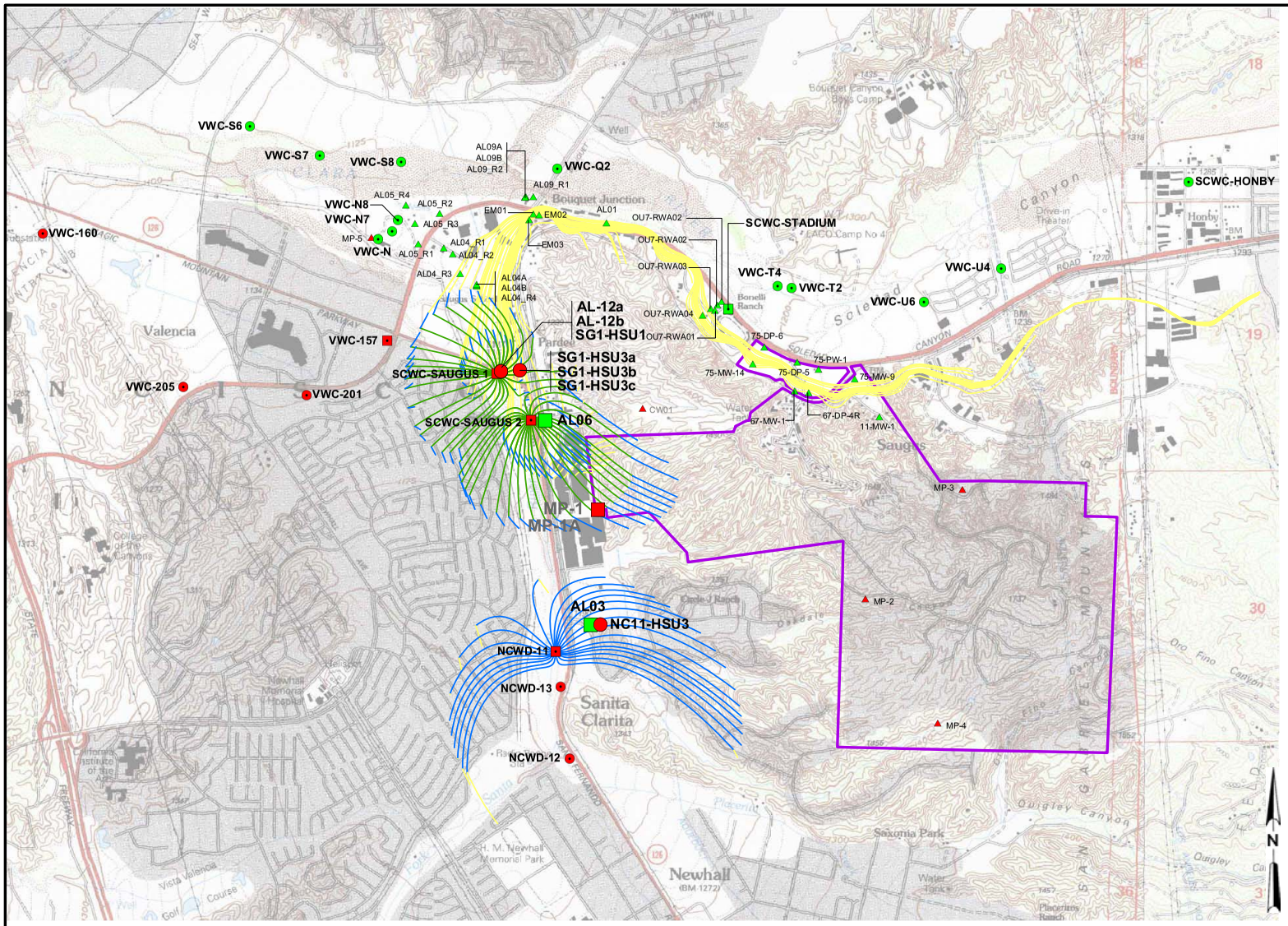
HSU = hydrostratigraphic unit (See *Draft Final Conceptual Hydrogeology Technical Memorandum for the Eastern Santa Clara Sub-basin Groundwater Study* [CH2M HILL, 2004b] for discussions of the locations and characteristics of the HSUs.)

TABLE 3-2
Chemical Constituents and Sampling Frequency for the 97-005 Sentinel Monitoring Program
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

		Frequency			
Analytical Parameters	**EPA Method**	**Initial**	**Semiannual**	**Annual**	**Biannual**
Organic Constituents					
Perchlorate	314.0	X	X		
Volatile Organic Compounds	524.2[a]	X	X		
1,2,4-Trimethyl Benzene		X	X		
Methyl Tertiary Butyl Ether		X	X		
General Minerals (Cations and Anions)					
Aluminum	6010	X			X
Bicarbonate/Alkalinity	310.1	X			X
Calcium	6010	X			X
Chloride	300	X			X
Total Phosphorus	365.3	X			X
Potassium	7610	X			X
Iron	6010	X			X
Magnesium	6010	X			X
Manganese	6010	X			X
Sodium	7770	X			X
Sulfate	300	X		X	
Nitrate	352.1	X		X	
Ammonia	350.3	X			X

[a]Tentatively identified compounds will also be reported.

Figure



LEGEND

SENTINEL WELLS

EXISTING SENTINEL WELL

- ALLUVIUM
- SAUGUS

NEW SENTINEL WELL

- ALLUVIUM
- SAUGUS

PRODUCTION WELL

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

OTHER MONITORING WELL

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATHS

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. FLOWLINES STARTED THROUGHOUT MODEL LAYERS 2 AND 3 AND TRACED BACKWARDS FOR 20 YEARS.
2. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION. .

0 2,000 4,000 6,000 feet

FIGURE 3-1
WELL LOCATIONS FOR SENTINEL MONITORING OF GROUNDWATER QUALITY
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

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SECTION 4

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ITEM NO. 4.1

Castaic Lake Water Agency
Memorandum

October 1, 2008

To: CLWA Board of Directors

From: Brian J. Folsom BJF
Engineering and Operations Manager

Subject: Engineering and Operations Department Report

TREATMENT PLANT OPERATIONS AND MAINTENANCE

Completed Work:

Deliveries to the purveyors in September totaled 4,290 acre-feet (AF), for an average daily flow rate of 47 million gallons per day (MGD). September 2008 deliveries were 11% below September 2007 deliveries. The fiscal-year-to-date (FYTD) deliveries for FY 2008/09 are 14,708 AF, which is 10% below FYTD 2007/08. Monthly flows for 2006, 2007, 2008 and 2009 are presented in the attached table. *(FY 2008/09 Action A2.4: Meet all purveyor water demands and Action B3.3: Meet all applicable water quality regulations.)*

Fiscal-year-to-date electrical use for FY 2008/09 at the Agency's major facilities is shown in the attached "Energy Usage at Major Facilities" table and equals 2,743,683 kWh at a total cost of $320,776.46.

At RVWTP, control strategies for chemical feed pumps were modified to improve control of chemical dosing, preventive maintenance was performed on airwash blower #1, new air compressors were installed, chemical feed meters on the caustic soda and ferric chloride feed systems were installed, and modification and upgrades to the rainwater collection system for the clearwell floating covers was completed.

Preventive maintenance was performed on Pump #1 at the Rio Vista Intake Pump Station.

At ESFP, polymer chemical feed pumps were replaced with automated flow pacing chemical feed pump.

Repairs were completed to Pump #2 at the Earl Schmidt Intake Pump Station.

Inspector Activities

Pitchess Pipeline modification work at Hasley Canyon: Coordinated with Security Paving.

Recycled Water Pipeline Phase I modification work at Magic Mountain/The Old Road: Attended bi-weekly utility coordination meetings with staff from CLWA, City of Santa Clarita and Security Paving; photographed activity at V-9 and coordinated paving work around the AVAR on The Old Road.

Recycled Water Pipeline irrigation service connection: Inspected service connection work and coordinated with Valencia Water Company and Pinnacle Surveying.

Groundwater Production Restoration & Transmission Mains Project: Located Newhall Lateral along South Fork Trail and coordinated with City of Santa Clarita regarding possible tree removal along South Fork Trail.

ESFP Chemical Storage and Delivery Project: Performed inspections, coordinated with Harris & Associates and attended progress meetings.

Sand Canyon Reservoir access road: Attended site visit with potential bidders and participated in bid opening.

Completed 54 Underground Service Alerts.

Work in Progress:

At ESFP, airwash blower #1 is off line for repairs and preventive maintenance. The chemical feed meters for the ferric chloride, caustic soda and cationic polymer feed systems will be replaced and a sludge collection system in the washwater recovery basins will be installed.

Maintenance of air vacs and pump-outs throughout the distribution system continues.

Planned Actions:

At ESFP, pumps at the central pump station will be overhauled.

PERCHLORATE CONTAMINATION PROGRAM MANAGEMENT

(FY 2008/09 Action A4.2: Complete construction of the Groundwater Production Restoration Project; Action A4.3: Complete construction and startup of the Perchlorate Treatment Project; Action A4.5: Develop replacement wells for capacity lost due to perchlorate contamination.)

SUMMARY

Work continues on multiple tasks to address the groundwater contamination stemming from past manufacturing activities on the Whittaker-Bermite site. The Agency and purveyors are proceeding to restore the production capacity of the groundwater supply wells contaminated by perchlorate, while working on the objectives of containing the downgradient migration of perchlorate and recovering costs incurred in responding to the perchlorate contamination.

PERCHLORATE CONTAMINATION PROGRAM MANAGEMENT

The following table provides a status report on the activities and tasks:

Task Group	Tasks	Consultant	Status
Settlement Activities	Project Description	K/J	Complete.
	Final Settlement	K/J, Nossaman	Settlement agreement took effect on 7/13/07 with U.S. District Court approval.
DTSC Approval Activities	Remedial Investigation (RI)	K/J	DTSC approved 8/16/05.
	Feasibility Study (FS)	K/J	DTSC approved 8/16/05.
	Final RAP	K/J	Public hearing held 9/7/05. DTSC approved 1/20/06.

PERCHLORATE CONTAMINATION PROGRAM MANAGEMENT *(Continued from previous page...)*

Task Group	Tasks	Consultant	Status
U.S. Army Corps of Engineers Feasibility Phase Study	Conceptual Hydrogeology Technical Memorandum	CH2MHill	Final distributed 1/19/05. Progress report with model construction calibration distributed 10/11/05.
DPH Approval Activities (97-005)	Source Water Assessment	B&V, CE	Received comments on revised document from DPH 4/27/06.
	Water Quality Investigation	B&V, CE	Received comments on revised document from DPH 4/27/06.
	Human Health Risk	B&V	Received comments on revised document from DPH 4/27/06.
	Source Protection Plan	B&V	Received comments on revised document from DPH 4/27/06.
	Effective Monitoring and Treatment	B&V, CE, CH2MHill	Received comments on revised document from DPH 4/27/06.
	Alternatives Evaluation	B&V, CE	Received comments on revised document from DPH 5/10/06. Revised document will be returned to DPH with Engineer's Report.
	Engineers Report	B&V	Received final draft from B&V 5/23/08.
	CEQA	B&V	Mitigated Negative Declaration certified 9/14/05.
	Permit Application	B&V	Awaiting response from DPH.
	Public Hearing	B&V	Awaiting response from DPH.
	DPH Evaluation and Permit	B&V	Awaiting response from DPH.
Implementation Activities	Easements and Right of Way	K/J	Easement and right-of-way acquisition completed 1/08.
	Treatment Project	K/J	Notice to Proceed issued 11/14/07. Project is 75% complete.
	Pipeline Project	K/J	Notice to Proceed issued 12/14/07. Project is 35% complete.
	Start-up and Monitoring	K/J	Scheduled early 2009.
	Permit Application	B&V	Awaiting response from DPH.
	Public Hearing	B&V	Awaiting response from DPH.

PERCHLORATE CONTAMINATION PROGRAM MANAGEMENT *(Continued from previous page...)*

The monthly Technical Committee Meeting was held on September 9, 2008. The next Technical Committee Meeting is scheduled for October 14, 2008. The next quarterly DTSC meeting will be held on October 14, 2008. The next Whittaker-Bermite Multi-Jurisdictional Task Force meeting will be held on December 10, 2008.

FINANCIAL STATUS

The Settlement Agreement among CLWA, the purveyors, Whittaker-Bermite and insurance carriers is in effect. Payments have been made for most expenses through 4/30/08. Approval of payments will be considered (retroactively) at future Technical Committee meetings.

CAPITAL IMPROVEMENT PROJECTS

Sand Canyon Pipeline and Reservoir

(FY 2008/09 Action B1.5: Complete construction for the Sand Canyon Reservoir Access Road project.)

Completed Work:

Final design of the Sand Canyon Reservoir Access Road Project is complete. The project was advertised for construction bids, the pre-bid conference was held on August 20, 2008 and bids were opened on September 10, 2008.

Prepared Certificate of Acceptance and recorded Notice of Completion for the Storm Drain Modification Project in the County of Los Angeles Recorder's Office.

Work In Progress:

Preparing conformed specifications and drawings.

Planned Actions:

Obtain Board approval to award the construction contract for the Sand Canyon Reservoir Access Road.

Rio Vista Water Treatment Plant Expansion

(FY 2008/09 Action B1.2: Complete design of the RVWTP Expansion Project; Action B1.7: Complete bidding process and start construction of the RVWTP Expansion Project.)

The project scope includes expansion from 30 to 60 mgd at RVWTP and Intake Pump Station, ozone system improvements and washwater system modifications.

Completed Work:

K/J has completed the 90% design.

Work In Progress:

Staff is reviewing the 90% design.

Planned Actions:

Complete design and prepare the final construction contract documents.

Modification to MWDSC Foothill Feeder Connection

(FY 2008/09 Action B1.3: Complete design of the new raw water connection to MWDSC's Foothill Feeder pipeline.)

Completed Work:

Staff has completed review of the connection agreement and has submitted comments to MWDSC. The 30% design plans have also been submitted to MWDSC for review.

Work in Progress:

Staff met with MWDSC on September 15, 2008 to discuss the revised connection agreement.

Planned Actions:

After the agreement is executed, MWDSC will review the submitted 30% design plans.

Honby Parallel Phase II

(FY 2008/09 Action B1.16: Complete construction of the Honby Parallel Phase 2.)

Completed Work:

The final design has been submitted to LADWP for approval.

Work in Progress:

LADWP is reviewing the design. The traffic control plans are being prepared. The permits, license agreements and easements are in the process of being acquired. The Honby Agreement with Newhall Land is being revised.

Planned Actions:

Complete and submit the traffic control plans to the City for approval. Mail notification letters to businesses along the project route to inform them of the project. Acquire permits, license agreement and easements.

RVWTP Relocate Entrance Gate and Security Kiosk

(FY 2008/09 Action B6.2: Complete design of RVWTP entrance gate and security kiosk relocation.)

Completed Work:

Staff has issued Requests for Proposals and has received proposals from several consultants.

Work In Progress:

Staff is evaluating proposals for the planning and preliminary design.

Planned Actions:

Select a consultant to perform the planning and preliminary design.

RVWTP Warehouse and Storage Facilities

(FY 2008/09 Action B1.11: Complete design of the RVWTP Maintenance Facility Expansion Project.)

Completed Work:

The latest floorplan was presented at the March 2008 Planning and Engineering Committee meeting.

On August 28, 2008, staff presented its analysis to the Planning and Engineering Committee of projected water demands for the summer of 2010 and the option of combining the Warehouse and Storage Facilities project with the RVWTP Expansion project, concluding that the two projects should remain segregated for bidding and construction.

Work in Progress:

Staff is preparing a Request for Proposal (RFP) for design services.

Planned Actions:

Select a consultant to perform design services.

ESFP Chemical Storage and Delivery

(FY 2008/09 Action B1.8: Complete construction of the ESFP chemical storage and delivery project.)

Completed Work:

Construction submittals have been completed. The two containment tanks have been installed.

Work in Progress:

Construction of the project is in progress.

Planned Actions:

Complete construction.

ESFP Drainage and Paving Improvements

(FY 2008/09 Action B2.8: Complete construction of the ESFP Drainage and Paving Improvements Project.)

Completed Work:

RFP for professional services for planning and preliminary design was issued and proposals received on August 27, 2008.

Work in Progress:

Staff is reviewing and evaluating submitted proposals.

Planned Actions:

Prepare recommendations to award contract for project planning and preliminary design.

ESFP Railing and Platform Enhancements

(FY 2008/09 Action B2.4: Complete modifications of the ESFP railings and platforms.)

Completed Work:

The topographic survey has been completed. Preliminary drawings for the platform extension have been completed.

Work in Progress:

The design is being finalized for bidding.

Planned Actions:

Advertise the project for construction bids.

Recycled Water Program Phase II

(FY 2008/09 Action B1.14: Complete CEQA compliance and design of the Recycled Water Program Phase II.)

Completed Work:

General area alternatives have been identified and coordinated with the purveyors and the Santa Clarita Valley Sanitation District of the Los Angeles County.

Work in Progress:

Kennedy/Jenks is evaluating and refining the alternatives with the support of IDModeling's hydraulic modeling and mapping services.

Planned Actions:

Complete the evaluation and meet with purveyors and the Sanitation District to coordinate the recycled water plans.

FACILITY CAPACITY FEES

(Goal C1.: Fairness Doctrine - Apply all costs using the Fairness Doctrine by applying costs to those who benefit from an expenditure and ensuring that existing and future users will pay their fair share.)

Completed Work:

During September, 26 new certificates were issued and $117,253 was collected in facility capacity fees, representing approximately 13 acre-feet of water demand. For the fiscal year, 77 new certificates have been issued and $772,108 has been collected in developer impact fees representing 78.5 acre-feet of water demand.

Attachments

BKM

Summary Report Letter from AMEC Geomatrix Regarding the Former Whittaker-Bermite Facility, October 2008

RECEIVED
NOV 21 2008
By

amec

November 17, 2008

Project 9967.000.0

Sayareh Amir
Department of Toxic Substances Control
Site Mitigation Branch
9211 Oakdale Avenue
Chatsworth, CA 91311

Re: Former Whittaker-Bermite Facility, Santa Clarita, CA
Summary Report for Month of October 2008

Dear Ms. Amir:

This letter constitutes a progress report for the month of October 2008, prepared pursuant to Task 4 and Section 6.3 of the "Imminent and Substantial Endangerment Determination and Order and Remedial Action Order" (the Order) that the Department of Toxic Substances Control (DTSC) issued on November 22, 2002, for the former Whittaker-Bermite facility (site) in Santa Clarita, California.

SECTION I – SITE WIDE ISSUES

Specific actions taken on behalf of the respondent, actions expected to be undertaken, and planned activities for site-wide issues are summarized in the following:

PUBLIC PARTICIPATION

Activities for This Report Period

Cerrell Associates Inc. team provided community information assistance when needed.

Anticipated Activities for This Month

Continue supporting DTSC's public outreach activities and assist with updating the DTSC's Web site (www.envirostor.dtsc.ca.gov) as necessary.

SECTION II – SOIL ISSUES

Specific actions taken on behalf of the respondent, actions expected to be undertaken, and planned activities for soil issues are summarized in the following sections:

RI AND RCRA MONITORING

Activities for This Report Period (1)

All Remedial Investigation (RI) activities for characterization of soils have been completed. No additional soil RI work is anticipated.

AMEC Geomatrix, Inc.
510 Superior Avenue, Suite 200
Newport Beach, CA
USA 92663-3627
Tel (949) 642-0245
Fax (949) 642-4474
www.amecgeomatrixinc.com

AMEC Geomatrix

Activities for This Report Period (2)

Geomatrix submitted a letter to DTSC on July 24, 2006, requesting DTSC's agreement to incorporate the current Resource Conservation and Recovery Act (RCRA) groundwater monitoring of the Area 317 into the OU-7 groundwater study and monitoring.

Environ has prepared the scope and the frequency of the monitoring activities to focus the RCRA groundwater monitoring to those areas that will provide meaningful results. The document was submitted for DTSC review and approval on January 30, 2008. DTSC issued a letter on April 10, 2008, approving the revised RCRA groundwater monitoring program. In addition, DTSC requested that the revised RCRA groundwater monitoring plan be included in the Closure Report for Area 317.

Monitoring of the groundwater under the Area 317 continues on schedule. The Third Quarter 2008 groundwater monitoring was performed in September and the report is being prepared.

Anticipated Activities for This Month

Monitoring of the groundwater under the Area 317 continues on schedule. The Fourth Quarter 2008 groundwater monitoring was performed in November 2008.

Long-Term Actions

The current RCRA groundwater monitoring program will be modified to include the proposed wells and frequency and DTSC input to the monitoring plan and the revised plan will be included in the closure report for Area 317. Perform groundwater monitoring per the revised monitoring plan beginning in first quarter 2009 and continue the closure activities.

REMEDIAL ACTION PLAN

Activities for This Report Period

CDM completed the Remedial Action Plan (RAP) for OU2 through OU6 soils (Site-Wide Soils RAP), which was submitted to DTSC on May 15, 2008. DTSC provided comments on the Site-Wide Soils RAP on September 4, 2008. DTSC requested that a revised Site-Wide Soils RAP be prepared and submitted by October 31, 2008. Whittaker submitted a letter to DTSC on October 31, 2008 requesting an extension of the submittal deadline to January 31, 2009 in order to allow the various stakeholders to re-assess the remedial approach in light of SSC's departure.

CDM also prepared pilot study work plans for soil vapor extraction (SVE) and in-situ bioremediation of perchlorate-impact to deep soils via Gaseous Electron Donor Injection Technology (GEDIT). The SVE pilot study work plan and the GEDIT bench-scale and field pilot work plan were submitted to DTSC on August 27 and September 5, 2008, respectively. DTSC provided comments to the SVE pilot study work plan on September 22, 2008. CDM

subsequently prepared a response to comments letter that was submitted to DTSC on October 2, 2008 and a revised work plan on October 15, 2008. DTSC approved the revised work plan in a letter dated October 22, 2008.

Anticipated Activities for This Month

Address DTSC comments to the Site-Wide Soils RAP and prepare revised draft RAP. Continue to work on revisions to pilot study work plans for submittal to DTSC. Secure funding for SVE pilot studies program and schedule field activities.

Long-Term Actions

Work with DTSC to finalize the Site-Wide Soils RAP. Submit revisions to work plans for pilot studies for DTSC review and approval, if warranted.

REMOVAL ACTIONS AND INTERIM REMEDIAL MEASURES

Depleted Uranium (DU) Investigation and Clearance Activities

Activities for this Report Period

A meeting was held with the DTSC, and the Department of Public Health – Radiological Health Branch (DPH-RHB), and LA County to discuss the results of the Supplemental Characterization and Bench Scale Testing activities. In addition, a proposed path forward was introduced for discussion. The proposal is based on the direct removal and off-site disposal of approximately 4,200 yards of the most impacted materials in Areas 57 and 14. The removal would be followed by a comprehensive Final Status Survey. The proposal received a tentative OK from the regulatory agencies. Formal approval will come with their approval of the Removal Action Plan.

Anticipated Activities for this Month

A comprehensive report detailing the Supplemental Characterization and Bench Scale Testing activities and a review of the dose assessment is anticipated to be completed this month.

Long Term Actions

EnergySolutions will prepare a Removal Action Plan for implementation of the proposed DU removal activity. This will be submitted to the regulatory agencies for review and approval. After that approval is received, the DU removal and Final Status Survey will be implemented.

UXO/OE Investigation and Clearance Activities

Activities for This Report Period

EOD Technology, Inc. (EODT) completed the following activities during this reporting period:

Work Plan Addendum (WPA) Further Investigation and No Further Action Areas

EODT updated the WPA and associated Conceptual Site Model (CSM). The WPA will characterize the Further Investigations Areas and confirm the No Further Action status of the potential/Munitions and Explosives of Concerns (MEC) areas referenced in the 2006 Historical Site Assessment (HSA) Report.

Munitions and Explosives of Concern Clearance Activities at Hula Bowl II and III associated Drainage Area, and the Depleted Uranium Impacted Area.

The Work Plan Addendum was approved with comments by DTSC in June 2008. EODT is planning for project execution of Hula Bowl II and III Drainage Clearance in coordination with the DU Impacted Area clearance in Areas 57 and 14. The implementation of the clearances is pending the upcoming Energy Solutions report designating the DU removal areas based on the recent DU impact area characterization. It is anticipated the DU removal design may impact the strategy in the Work Plan Addendum – if so; the plan will be modified in coordination with DTSC.

Anticipated Activities for This Month

Work Plan Addendum Further Investigation and No Further Action Sites

Anticipate 90% of the Work Plan Addendum complete.

Munitions and Explosives of Concern Clearance Activities at Hula Bowl II and III associated Drainage Area, and the Depleted Uranium Impacted Area

Based on the findings of the recent Energy Solutions characterization effort, EODT anticipates scheduling and making any necessary adjustments to the planned clearance activities in the DU Impacted areas.

Long-Term Actions

Complete On-Call UXO Construction Report as required.

Submit and finalize the Work Plan Addendum for Further Investigation and No Further Action Sites. Execute the Work Plan Addendum and provide Remedial Alternative Analysis for the Further Investigation Areas and Confirm the No Further Action area status or assign the areas for further investigation/remedial alternative where warranted.

Implement the Munitions and Explosives of Concern Clearance Activities at Hula Bowl II and III associated Drainage Area, and the Depleted Uranium Impacted Area.

OU1 REMEDIATION

Activities for This Report Period (1)

Operated the secondary SVE system (hi-vacuum system) at the Building 329 area, then moved the system to Area 43 for continued operations in that Area. The primary SVE unit remained at Treatment Pad No. 3 in the event that VOC-impacted soils may be encountered during the Building 329 excavation. However, no VOC-impacted soils needing ex situ treatment were encountered.

Anticipated Activities for This Month

Continue operation and optimization of SVE system at Area 43. Schedule re-installation of deep SVE well at Area 7 and prepare area for re-initiation of SVE operations.

Long-Term Actions

Continue in situ SVE operations until halogenated volatile organic compound levels are eliminated or reduced to appropriate levels or asymptotic levels are reached.

Activities for This Report Period (2)

Backfilling was continued in Area 55/OU1B/OU1C and approximately 71,588 cubic yards of soil was placed into the former excavation and compacted in accordance with the Remedial Design specifications.

Approximately 15,036 cubic yards of soil were excavated from the Building 329 area during this reporting period and the excavation operations were completed.

Full-scale enhanced biological treatment of perchlorate-impacted soils continued during this reporting period using a combination of glycerin, di-ammonium phosphate, and bioaugmentation culture (0.01% when available). During this reporting period, approximately 17,588 tons of soil was processed and placed into treatment cells (24). Sampling results have generally shown consistent and successful reduction of perchlorate to non-detectable levels. The incubation time is generally on the order of 20 to 30 days. A total of 11 treatment cells were approved as "clean" by DTSC during this reporting period and the treated soil was transported to clean soil stockpile areas.

Dust monitoring indicated that, in general, the net dust readings at the downwind monitoring stations were below 50 micrograms per cubic meter ($\mu g/m^3$) during the soil excavation and processing operations. In the few cases when the dust readings exceeded 50 $\mu g/m^3$, the dust was suppressed with water; therefore, the exceedances were insignificant.

Anticipated Activities for This Month

Complete backfilling operations in Area 55 and Building 329 and begin vegetation restoration. Demobilize soil treatment equipment.

Long-Term Actions

Preparation of closure report documenting the soil remediation operations for OU1.

SECTION III – GROUNDWATER AND SURFACE WATER ISSUES

Specific actions taken on behalf of the respondent, action expected to be undertaken and planned activities for groundwater and surface water issues are summarized in the following sections:

REMEDIAL INVESTIGATIONS AND GROUNDWATER/SURFACE WATER MONITORING AND INTERIM ACTIONS

Activities for This Report Period (1)

The Numerical Groundwater Flow Model Development Report, Operable Unit 7 Groundwater Investigations has been submitted to DTSC and comments were provided by DTSC staff on June 4, 2008. The numerical groundwater flow model has since been refined to incorporate the results of the OU-7 RI. The comments received from DTSC, from CH2M Hill on behalf of the USACE, and the model refinements were discussed in a conference call with representatives of DTSC, USACE, CH2M Hill, and Whittaker held on September 26, 2008.

Anticipated Activities for This Month

The numerical groundwater flow model will be further refined for use in the OU-7 FS evaluations. DTSC and CH2M Hill comments on behalf of USACE are being addressed and will be incorporated into the model refinement process.

Long-Term Actions

Groundwater monitoring and sampling data will be used in refining the model which will be utilized in the OU-7 FS.

Activities for This Report Period (2)

A Pilot Remediation Pumping Program was started in Northern Alluvium Areas 11, 67, and 75, in 2006. An alternate extraction well 75-MW-35 for higher groundwater extraction and six hot spot wells were connected to the new higher capacity groundwater treatment system in 2007. Sustained pumping of the extraction well 75-MW-35 that began in mid-October 2007 continues to date, with the exception of a brief period of shut down for treatment system maintenance. As

of November 3, 2008 approximately 13,481,143 gallons of groundwater have been treated and discharged.

Monitoring of the aquifer response to pumping from the alternate extraction well 75-MW-35 was conducted during October. An evaluation of the aquifer response and capture zone development was presented in the Capture Zone Evaluation Report, Northern Alluvium Pilot Remediation Pumping Program dated October 8, 2008.

Anticipated Activities for This Month

Monitoring of the aquifer response to pumping from the alternate extraction well 75-MW-35 and the downgradient site boundary low flow extraction wells will continue.

Long-Term Actions

Continue operating the extraction and treatment system and conduct additional performance monitoring.

Activities for This Report Period (3)

Potential remedial technologies to address Northern Alluvium groundwater hot spots, including evaluation of the Area 75 boundary containment established by sustained operation of the low flow pumping wells that started in early October 2006, were evaluated as part of the OU-7 Technology Screening FS, which was submitted to DTSC on February 19, 2008.

Anticipated Activities for This Month

Evaluation of potential pilot studies for the Northern Alluvium area of the Site will continue.

Long-Term Actions

Additional source control measures in Northern Alluvium will be considered and recommended where determined to be necessary.

Activities for This Report Period (4)

Data review and reporting for the Third Quarter 2008 quarterly monitoring conducted in August 2008 is in progress. Sampling for the Third Quarter 2008 was conducted in August in accordance with the groundwater monitoring plan presented in Technical Memorandum No. 8. A plan to refine and focus the groundwater monitoring program was developed based on the extensive body of groundwater monitoring data that has been collected at the Site since 2003. The plan was presented in the Technical Memorandum No. 8, Groundwater Monitoring Plan, Operable Unit 7, which was submitted to DTSC on January 30, 2008. DTSC issued a letter approving the revised groundwater monitoring program on April 10, 2008.

Anticipated Activities for This Month

Data review and reporting for the Third Quarter 2008 quarterly monitoring conducted in August 2008 is in progress.

Long-Term Actions

Continue monitoring and reporting of the proposed network of monitoring wells on the updated schedule presented in Technical Memorandum No. 8.

NORTHERN ALLUVIUM GROUNDWATER TREATMENT SYSTEM OPERATION

Activities for This Report Period

The October monthly compliance sample was collected on October 6, 2008. All sampling results indicated that the system was in compliance during October. This was the first compliance sample collected under the new NPDES permit. The media in the nitrate vessels were replaced on October 2, 2008, October 10, 2008, and October 28, 2008. In all cases, the vessel containing the new media was brought on-line in the lag position after replacement. .

The system was operated routinely throughout the month. As of November 3, 2008 approximately 13,481,143 gallons of groundwater have been treated and discharged. Approximately 97.5% of the treated volume came from the extraction wells of the Northern Alluvium pumping system; the remaining 2.5 percent is from IDW water collected during the quarterly sampling events, and storm water collected from various areas of the site.

Anticipated Activities for This Month

Continue routine weekly and monthly NPDES sampling and media changeouts as needed.

Develop scope of work to address growth of biofilm occurring at several extraction wells. Notify RWQCB of changes to system operation to mitigate growth of biofilm in extraction wells.

FEASIBILITY STUDIES, INTERIM REMEDIAL MEASURES, STORM WATER POLLUTION PREVENTION PLAN

Activities for This Report Period (1)

The OU-7 Technology Screening FS was submitted to DTSC on February 19, 2008. The Technology Screening FS presented the results of evaluation and screening of feasible technologies to address groundwater and deep soils associated with potential transport of site-related chemicals of potential concern to underlying groundwater. In addition, the report identified preliminary remedial alternatives and specific field-scale pilot testing for the Northern Alluvium area of the Site, the Saugus Aquifer, and perched groundwater zones that will be

needed to refine the remedial alternatives and conduct the detailed FS evaluations for Site groundwater.

The Work Plan, Saugus Aquifer Pilot Remediation Well Network, Operable Unit 7 was submitted to DTSC on September 22, 2008.

Anticipated Activities for This Month

Continue the OU-7 FS evaluations. The pilot groundwater remediation work plan will be revised to incorporate DTSC comments when received.

Long-Term Actions

Implement the Saugus Groundwater Containment Pilot Plan. Prepare Remedial Action Plan for OU7.

Activities for This Report Period (2)

Pursuant to the Site Storm Water Pollution Prevention Plan, Environ continued coordinating the implementation of short-term surface water run-off mitigation measures. Implementation of the short-term mitigation measures is being coordinated with CDM, particularly in the areas of the site where soil remediation activities are in progress.

Anticipated Activities for This Month

Upgrades to the short-term mitigation measures will continue as necessary. CDM is working on a plan for upgrading the short-term mitigation measures.

Long-Term Actions

Long-term mitigation of the drainages and excavations will be conducted in conjunction with the soil remediation.

REMEDIAL ACTION PLAN

Activities for This Report Period

Implementation of the OU1 remediation is approaching its final stages. The revised Remedial Action Plan for OU2 – OU6 will be submitted by January 31, 2009.

SECTION IV – REQUIREMENTS UNDER THE ORDER THAT WERE NOT COMPLETED

All requirements of the Order were completed. Whittaker has met or exceeded all the substantive requirements of the Order.

SECTION V – PROBLEMS OR ANTICIPATED PROBLEMS IN COMPLYING WITH THE ORDER

Following DTSC's agreement with Whittaker's proposed modifications to implementation plans in compliance with the Order reflected in the letter dated September 28, 2004, DTSC's letter dated July 11, 2005, included a schedule for submitting a number of documents. All deadlines have been met and documents have been submitted per requested schedule.

SECTION VI – RESULTS OF SAMPLE ANALYSIS, TESTS, AND OTHER DATA

Whittaker has instructed its contractors to continue to provide DTSC staff with raw data sets for ongoing quarterly groundwater monitoring events and RI/FS work upon receipt from the lab.

Sincerely yours,
AMEC Geomatrix, Inc.

Hassan Amini, PhD, CHG
Project Coordinator

cc: Eric Lardiere, Whittaker Corp; William Weaver, CDM; Jessica Donovan, ENVIRON; Paul Bergstrom, Knight Piésold; Larry Sievers, EODT; Tim Bricker, Santa Clarita L.L.C.; Megan Trend, Chubb Financial Solutions; Cindy Hunter, Stacy Parker, Julie Diebenow, AIG Insurance; Vitthal Hosangadi, MACTEC; John Carty, Zurich North America; Hal Dash, Cerrell Associates; Jeff Hogan, City of Santa Clarita; Yueh Chuang, CH2M Hill; Kathy Stryker Anderson, US Army Corps of Engineers; Robert DiPrimio, Valencia Water Company; Lynn Takaichi, and Meredith Durant, Kennedy Jenks; David Bacharowski, RWQCB; James Leserman, Castaic Lake Water Agency; Steve Cole, Newhall County Water District; Mauricio Guardado, Santa Clarita Water; Neil Elsey, Avion Holdings LLC; Alisa Lacey, Stinson Morrison Hecker LLP; Jeff O'Keefe, Department of Public Health.

Monterey Settlement Agreement

SETTLEMENT AGREEMENT

by and among

Planning and Conservation League, Plumas County Flood Control and Water Conservation District, Citizens Planning Association of Santa Barbara County, Inc.

and

The State of California Department of Water Resources, Central Coast Water Authority, Kern Water Bank Authority and those State Water Project Contractors identified herein.

MAY 0 5 2003
_____, 2003

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SETTLEMENT AGREEMENT

This **SETTLEMENT AGREEMENT** is entered into as of MAY 0 5 2003, 2003, by and among Planning and Conservation League, Plumas County Flood Control and Water Conservation District, Citizens Planning Association of Santa Barbara County, Inc., The State of California Department of Water Resources, Central Coast Water Authority, Kern Water Bank Authority and those SWP Contractors who have executed this Settlement Agreement. Certain terms used herein are defined in Section I.

RECITALS

WHEREAS, in 1951, the State of California Legislature authorized the construction of the State Water Project ("**SWP**");

WHEREAS, eight years later, the Legislature authorized the submission for voter approval of a general obligation bond issue to build the SWP, which voters subsequently approved (California Water Code, Section 12930 et seq.);

WHEREAS, commencing in the early 1960's, DWR, as operator of the SWP, entered into certain SWP Contracts with various water districts throughout California;

WHEREAS, in 1994, as a result of disputes arising from water shortages experienced during an extended drought period, DWR and certain of the SWP Contractors entered into an agreement known as the Monterey Agreement and thereafter implemented the terms of the Monterey Agreement by execution of the so-called Monterey Amendments;

WHEREAS, pursuant to CEQA, the environmental impact report for the Monterey Amendments was prepared in 1995 by CCWA as "lead agency," and adopted by DWR as "responsible agency" (as those terms are defined in CEQA) (the "**1995 EIR**");

WHEREAS, on December 27, 1995, PCL filed the PCL Complaint against DWR and CCWA challenging the sufficiency of the 1995 EIR;

WHEREAS, on February 12, 1996, Plaintiffs filed a First Amended Complaint adding the Validation Cause of Action;

WHEREAS, the trial court ultimately determined that although CCWA was not the appropriate lead agency for the 1995 EIR, such designation of CCWA was not fatal to the EIR, and ruled against Plaintiffs with respect to their challenge to the sufficiency of the 1995 EIR. The trial court also granted summary adjudication in favor of DWR and CCWA on the Validation Cause of Action. Plaintiffs appealed the trial court's rulings;

WHEREAS, in Planning and Conservation League v. Department of Water Resources, 83 Cal. App. 4th 892 (2000), the Court of Appeal held that (i) DWR, not CCWA, had the statutory duty to serve as lead agency, (ii) the trial court erred by finding CCWA's EIR sufficient despite its failure to discuss implementation of Article 18, subdivision (b) of the SWP Contracts, as a no-project alternative, (iii) said errors mandate preparation of a new EIR under the direction of DWR, and (iv) the trial court erroneously dismissed the challenge to DWR's transfer of title to the KWB Lands (the Validation Cause of Action) and execution of amended SWP Contracts for failure to name and serve indispensable parties. The Court of Appeal remanded the case to the trial court, ordering it to take the following five actions: (1) vacate the trial court's grant of the motion for summary adjudication of the Validation Cause

of Action; (2) issue a writ of mandate vacating the certification of the 1995 EIR; (3) determine the amount of attorney fees to be awarded Plaintiffs; (4) consider such orders it deems appropriate under Public Resources Code Section 21168.9(a) consistent with the views expressed in the Appellate Court's opinion; and (5) retain jurisdiction over the action until DWR, as lead agency, certifies an environmental impact report in accordance with CEQA standards and procedures, and the Superior Court determines that such environmental impact report meets the substantive requirements of CEQA;

WHEREAS, since the Court of Appeal ruling, representatives of the Parties to this Settlement Agreement have engaged in extensive settlement negotiations, mediated by retired Judge Daniel Weinstein, with the intent of avoiding further litigation and associated fees and providing for an effective way to cooperate in the preparation of a new environmental impact report and make such other improvements in the operation and responsiveness of the SWP as set forth in this Settlement Agreement;

WHEREAS, on July 22, 2002, an agreement was reached regarding the principles for a settlement; and

WHEREAS, the Parties now desire to formally enter into this Settlement Agreement.

AGREEMENT

NOW, THEREFORE, in exchange for the following covenants and agreements and other valuable and sufficient consideration, the receipt of which is acknowledged, the Parties agree as follows:

I. **Definitions**. Certain terms, as used in this Settlement Agreement, are defined as follows.

A. **"Attachment A Amendments"** means those amendments in the substantive form of Attachment A hereto (conformed to the format of each individual SWP Contract and the parties thereto), to be executed by DWR and the SWP Contractors who are signatories to this Settlement Agreement pursuant to and in accordance with the terms and conditions of this Settlement Agreement.

B. **"Attachment B Principles"** means those principles set forth in Attachment B hereto regarding SWP reliability.

C. **"Attachment C Guidelines"** means the guidelines set forth in Attachment C hereto regarding review of proposed permanent transfers of Annual Table A Amounts (as such latter term is used in the SWP Contracts).

D. **"Attachment D Principles"** means those principles set forth in Attachment D hereto regarding public participation in SWP Contract negotiations.

E. **"Attachment E Transfers"** means those water transfers identified on Attachment E hereto.

F. **"CEQA"** means the California Environmental Quality Act, California Public Resources Code Section 21000 et seq.

G. **"Citizens Planning Association"** means Citizens Planning Association of Santa Barbara County, Inc.

H. **"CCWA"** means Central Coast Water Authority.

I. **"Consent to Entry of Order Discharging Writ"** has the meaning given in Section VII(H)(1).

J. **"DWR"** means The State of California Department of Water Resources.

K. **"EIR Committee"** means a committee of no more than four (4) SWP Contractor representatives, and no more than four (4) Plaintiff representatives, chaired by a DWR representative, which has been formed for the purposes set forth in Section III(B).

L. **"HCP"** means the Habitat Conservation Plan/Natural Community Conservation Plan prepared for the Kern Water Bank Authority and approved through an Implementation Agreement dated October 2, 1997, with the United States Fish and Wildlife Service and California Department of Fish and Game.

M. **"Interim Implementation Order"** has the meaning given in Section VII(C).

N. **"JAMS Trust Account"** means the account established by DWR with, and maintained by, the Mediator for the purpose set forth in Section VI.

O. **"Kern-Castaic Transfer"** means the transfer of 41,000 acre-feet of water from Kern County Water Agency to the Castaic Lake Water Agency approved by DWR on March 31, 1999.

P. **"Kern Environmental Permits"** means the HCP and certain other permits, approvals and agreements relating to the Kern Water Bank, as set forth in and contemplated by the Addendum to the 1995 EIR, including those specified in Exhibit 2 hereto and similar, related permits, approvals and agreements.

Q. **"Kern Fan Element Transaction"** means DWR's transfer of the KWB Lands to Kern County Water Agency, as described in Article 52 of the Monterey

Amendments. Kern County Water Agency subsequently conveyed the KWB Lands to KWBA. Each of the stated conveyances occurred on August 9, 1996, based upon separate agreements dated December 13, 1995.

R. **"KWB Lands"** means the property known as the Kern Fan Element, as more specifically described in that certain Deed, executed by the Kern County Water Agency in favor of KWBA, dated August 9, 1996, and recorded in the Official Records of Kern County as Instrument No. 0196101606.

S. **"KWBA"** means Kern Water Bank Authority.

T. **"Mediator"** means retired Judge Daniel Weinstein, unless Judge Weinstein is unavailable, in which case the Mediator shall be another retired jurist mutually agreed to by DWR and the other members of the EIR Committee with respect to matters referred to the Mediator under Section III(H), and for all other matters another retired jurist approved by agreement of the Parties.

U. **"Mediation Issue"** means any issue relating exclusively to the compliance of the New EIR with any of the following requirements: (a) the requirements of CEQA; (b) the direction of the courts in the underlying litigation; or (c) the terms and conditions of this Settlement Agreement.

V. **"Monterey Agreement"** means the formal agreement, dated as of December 1, 1994, by and among DWR and certain SWP Contractors that memorializes fourteen principles to address the distribution of water during shortages and various other issues under the SWP Contracts.

W. **"Monterey Amendment"** means the amendment to the SWP Contracts entered into by DWR and certain SWP Contractors for purposes of implementing the Monterey Agreement.

X. **"New EIR"** has the meaning given in Section III.

Y. **"Party"** and "**Parties**" mean the signatories, individually and collectively, to this Settlement Agreement.

Z. **"PCL"** means Planning and Conservation League.

AA. **"PCL Complaint"** means the Complaint for Declaratory and Injunctive Relief and Petition for Writ of Mandate filed December 27, 1995, by PCL in the Superior Court, as amended and supplemented by the First Amended Complaint filed February 12, 1996.

BB. **"Plaintiffs"** means PCL, Citizens Planning Association and Plumas.

CC. **"Plaintiffs' Expenses Trust Account"** means the account maintained by JAMS for the purposes set forth in Section III(G).

DD. **"Plumas"** means Plumas County Flood Control and Water Conservation District.

EE. **"Plumas Amendment"** means an amendment to the Plumas SWP Contract to be entered into by DWR and Plumas pursuant to Section IV(C).

FF. **"Plumas Arrearages"** means any amount owed by Plumas to DWR under its SWP Contract that accrued prior to the resumption of payments by Plumas under Section IV(F).

GG. **"Return to Writ"** has the meaning given in Section VII(G).

HH. **"Rossmann"** means the Law Offices of Antonio Rossmann.

II. "**Section VI Trust Account Agreement**" means a trust account agreement regarding the disbursement by JAMS to Plaintiffs of those funds delivered by DWR pursuant to Section VI of this Settlement Agreement, the form of which agreement is attached hereto as Exhibit 4.

JJ. **"Superior Court"** means the Superior Court of the State of California, County of Sacramento.

KK. **"SWP"** means the State Water Project, officially called the State Water Resources Development System, as defined in Water Code Section 12931.

LL. **"SWP Contracts"** means those long-term contracts entered into by and between DWR, as the operator of the SWP, and individual SWP Contractors for the delivery of water from the SWP.

MM. **"SWP Contractors"** for purposes of this Settlement Agreement, means those contracting agencies identified in Table 1-6 of the DWR Bulletin 132-00, dated December 2001. All references to "SWP Contractors who are parties to this Settlement Agreement" are meant to exclude Plumas. Specific issues relating to Plumas are addressed in Section IV.

NN. **"Validation Cause of Action"** means the fifth cause of action of the PCL Complaint.

OO. **"Watershed Forum"** means a newly formed stakeholder group consisting of one or more representatives from each of Plumas, local community-based groups, DWR and the SWP Contractors who are parties to this Settlement Agreement, established for the purposes set forth in Section IV(B).

PP. **"Watershed Programs"** means programs, studies or projects approved by the Watershed Forum and implemented in pursuit of the goals set forth in Section IV, and other such activities approved by the Watershed Forum that are consistent with such purposes and goals.

QQ. **"1995 EIR"** means the Final Programmatic Environmental Impact Report for the Implementation of the Monterey Agreement Statement of Principles by State Water Project Contractors and the State of California Department of Water Resources for Potential Amendments to State Water Supply Contracts, prepared in October, 1995 by CCWA, as lead agency, and reviewed and considered in December 1995, by DWR, as a responsible agency, as each of those terms is defined in CEQA.

II. Administration of the State Water Project Pending New Environmental Impact Report and Discharge of Writ of Mandate.

Pending the Superior Court's issuance of an order discharging the writ of mandate in the underlying litigation, the Parties will jointly request that the Superior Court enter an order approving this Settlement Agreement, and an order, pursuant to California Public Resources Code Section 21168.9, authorizing on an interim basis the administration and operation of the SWP and the Kern Water Bank in accordance with the Monterey Amendments, the terms of this Settlement Agreement and the Attachment A Amendments, as more specifically set forth in Section VII of this Settlement Agreement.

III. New Environmental Impact Report

A. Preparation. As lead agency (as defined in CEQA), DWR shall cause a new environmental impact report to be prepared with respect to the proposed "project" (as that term is defined in Public Resources Code Section 21065 and Section

15378 of the CEQA Guidelines), in accordance with and as further described in Section III(C) below (the "**New EIR**").

B. EIR Committee. To effectuate the desire of the Parties that the New EIR be the product of a cooperative effort and comply with the requirements of CEQA and the direction of the courts in the underlying litigation, the EIR Committee has been formed to provide advice and recommendations to DWR in connection with the preparation of the draft and final versions of the New EIR.

C. New EIR Content. The proposed project to be analyzed in the New EIR will be specifically defined during the scoping process. Under all circumstances, in order to provide DWR, the responsible agencies, and the public with adequate disclosure to consider the potential environmental impacts of the Monterey Amendments, and the additional actions set forth in this Settlement Agreement, the environmental analysis in the New EIR shall evaluate, as components of the proposed project, the Monterey Amendments (including the provisions relating to the transfer of the KWB Lands) and the Attachment A Amendments. DWR shall ensure that the New EIR evaluates all proposed actions that are necessary to implement this Settlement Agreement. The New EIR shall include the following:

1. Information on water deliveries of the SWP over the relevant historical period (at least 1991 -2002), as well as data regarding the deliveries in the last extended drought (1987-1992), to be included in the description of the setting and the background for the proposed project;

2. As part of the CEQA-mandated "no-project" alternative analysis, and in light of the Court of Appeal's opinion, an analysis of the effect of pre-

Monterey Amendment SWP Contracts, including implementation of Article 18 therein. This analysis shall address, at a minimum, (a) the impacts that might result from application of the provisions of Article 18(b) of the SWP Contracts, as such provision existed prior to the Monterey Amendments, and (b) the related water delivery effects that might follow from any other provisions of the SWP Contracts;

3. Analysis of the potential environmental impacts of changes in SWP operations and deliveries resulting from implementation of the proposed project. If the proposed project results in modifications to the water sources relied upon for the SWP, those sources will be identified and the resulting environmental effects will be assessed;

4. Analysis of the potential environmental effects relating to (a) the Attachment E Transfers and (b) the Kern-Castaic Transfer, in each case as actions that relate to the potential environmental impacts of approving the Monterey Amendments; and

5. Analysis of the potential environmental effects relating to the implementation of this Settlement Agreement, including:

    a. Evaluation of the potential environmental impacts arising from the payments to Plumas as described in Section IV; and

    b. Analysis of the potential environmental effects relating to implementation of the provisions of this Settlement Agreement relating to the Kern Water Bank as discussed in Section V.

D. Acknowledgement and Agreement Regarding Attachment E Transfers. With respect to Section III(C)(4)(a), notwithstanding the analysis of the potential impacts of the Attachment E Transfers in the New EIR and without specifically endorsing or opposing those transfers or any prior environmental assessments of them, the Parties recognize that such water transfers are final. Each of the Parties agrees not to, and it shall be a condition to the initial and continuing effectiveness of this Settlement Agreement that Plaintiffs do not, hereafter challenge the effectiveness or validity of such water transfers.

E. Acknowledgement and Agreement Regarding Kern-Castaic Transfer. With respect to Section III(C)(4)(b) regarding the Kern-Castaic Transfer, the Parties recognize that such water transfer is subject to pending litigation in the Los Angeles County Superior Court following remand from the Second District Court of Appeal (*See* Friends of the Santa Clara River v. Castaic Lake Water Agency, 95 Cal. App. 4th 1373, 116 Cal. Rptr. 2d 54 (2002); *review denied* April 17, 2002). The Parties agree that jurisdiction with respect to that litigation should remain in that court and that nothing in this Settlement Agreement is intended to predispose the remedies or other actions that may occur in that pending litigation.

F. Acknowledgement and Agreement Regarding Kern Water Bank. With respect to Section III(C)(5)(b) relating to the Kern Water Bank, the Parties acknowledge that the Kern Water Bank is currently operating under the Kern Environmental Permits, which were entered into based on an Addendum to the 1995 EIR. The Parties recognize that the Addendum has been completed and agree not to challenge it in any manner. KWBA agrees that it will not rely on the Addendum

to the 1995 EIR for any new KWBA project to the extent that such reliance is based on data or analysis incorporated into the Addendum from the 1995 EIR. In addition, the New EIR shall include an independent study by DWR, as the lead agency, and the exercise of its judgment regarding the impacts related to the transfer, development, and operation of the Kern Water Bank in light of the Kern Environmental Permits. Such study shall identify SWP and any non-SWP sources of water deliveries to the Kern Water Bank. The views of the trustee agencies, as evidenced by the requirements of the HCP, will be used to provide guidance to DWR. Finally, the Parties agree that this Settlement Agreement is not intended to and shall not affect the continuing effectiveness of the Kern Environmental Permits.

G. Reimbursement of Plaintiffs' Expenses for Participation in the Preparation of New EIR .

1. *DWR Obligation to Reimburse Plaintiffs*. Subject to and in accordance with clauses (2) and (3), DWR will provide up to $300,000 to Plaintiffs for expenses actually incurred as needed to support Plaintiffs' participation in DWR's preparation of the New EIR, including service on the EIR Committee.

2. *Deposit into Trust Account*. The Parties acknowledge that in accordance with the principles of settlement, DWR caused to be deposited $300,000 into the Plaintiffs' Expenses Trust Account at JAMS on August 22, 2002.

3. *Disbursement of Funds to Plaintiffs*. Funds provided by DWR under this Section III(G) are available for disbursement and will be disbursed to

Plaintiffs by JAMS from the Plaintiffs' Expenses Trust Account in accordance with that certain Plaintiff's Expenses Trust Account Agreement dated August 15, 2002, attached hereto as Exhibit 1 and incorporated herein by this reference.

H. Disputes Regarding Mediation Issues.

1. *Referral to Director of DWR*. If the Plaintiffs' or SWP Contractors' representatives on the EIR Committee, or both, disagree with DWR's proposed approach with respect to a Mediation Issue, such representatives may refer the issue in writing to the Director of DWR.

2. *Referral to Mediator*. If (a) two-thirds of Plaintiffs' representatives or (b) three-fourths of the SWP Contractors' representatives, or both, disagree with the DWR Director's written decision with respect to a Mediation Issue (which issue shall have first been referred to the Director pursuant to Section III(H)(1)), such representative(s) may refer the issue in writing for consideration to the Mediator.

3. *Notices to Other Parties*. DWR shall inform the Parties to this Settlement Agreement of any referrals made pursuant to this Section III(H).

4. *Advisory Opinion by Mediator*. In the event of a referral as described above, the Mediator will consider the views of the representatives of the EIR Committee and the DWR Director, and will provide a written advisory opinion on the issue to the EIR Committee and DWR Director.

5. *Final Decision by DWR*. After receipt of an advisory opinion from the Mediator, the DWR Director shall make a final decision on the issue.

6. *Mediator's Costs and Expenses*.

a. *Referrals by Plaintiffs' Representatives*. On any matter referred to the Mediator by Plaintiffs' representatives on the EIR Committee, the costs of the Mediator's services will be borne one-third (1/3) by the Plaintiffs and two-thirds (2/3) by DWR.

b. *Referrals by SWP Contractors' Representatives*. For any referral by the SWP Contractors who are representatives on the EIR Committee, the SWP Contractors who are signatory to this Settlement Agreement will compensate the Mediator for his services.

c. *Frivolous or Harassing Referrals*. In the event of frivolous or harassing matters referred to him/her, the Mediator shall have the authority to award costs to the prevailing party, as well as reasonable attorney fees in accordance with Section IX of this Settlement Agreement.

I. Filing of New EIR upon Completion. Upon completion of the New EIR, in accordance with the procedure set forth in CEQA, and after final consideration by and good faith consultation with the EIR Committee, DWR shall cause the New EIR to be filed with the Superior Court as a return to the writ of mandate issued by such court in connection with this case.

IV. **Plumas Matters.**

A. Monetary Settlement.

1. *Agreement to Pay*. In accordance with the procedures and subject to the conditions described herein, DWR shall pay to Plumas the sum of $8,000,000.

2. *Schedule of Payments*.

a. *Annual Payments*. A total sum of Four Million Dollars ($4,000,000) shall be paid in accordance with this Section IV(A)(2)(a). DWR shall pay to Plumas One Million Dollars ($1,000,000) within 30 days after approval of this Settlement Agreement by the Superior Court (or the first business day after said 30th day if the 30th day is not a business day).

On each anniversary date of the first $1,000,000 payment until (and inclusive of) the third (3rd) anniversary, DWR shall pay to Plumas One Million Dollars ($1,000,000).

b. *Post Notice-of-Determination Payments*. Subject to Section IV(A)(2)(c), the remaining Four Million Dollars ($4,000,000) shall be paid in four annual installments of $1,000,000 each, beginning on the later to occur of: (1) the date that is seventy days after the Notice of Determination (as defined in CEQA) has been filed for the New EIR (or the first business day after said 70th day if the 70th day is not a business day); or (2) the date that is one year after the last payment made under Section IV(A)(2)(a).

c. *Effects of Litigation on Payment Obligation*.

(1) Suspension of Payment Obligation. If litigation is commenced by anyone challenging CEQA compliance for, or the validity of, any Monterey Amendment (or any portion thereof), including matters pertaining to the Kern Fan Element Transaction, the monetary obligations of DWR under Section IV(A)(2)(b) shall be suspended until the date that is forty-five (45) days after final conclusion of that litigation (without further right of appeal) in a manner that does not invalidate any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction. Within thirty (30) days after final conclusion of any such litigation in said manner, DWR shall pay to Plumas any amounts then owed by DWR under this Section IV.

(2) Termination of Payment Obligation. If any such litigation results in a final judgment (without further right of appeal) that invalidates any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction, the obligation for payments under Section IV(A)(2)(b) shall automatically terminate.

3. *Use of Funds*.

a. *Funding of Watershed Programs*. Plumas shall apply a majority of all funds received each year pursuant to Section IV(A) to Watershed Programs.

b. *Balance of Funds to General Purposes*. Plumas may apply the balance of funds received each year to other district-related purposes, as determined by Plumas with due consideration for the needs of the Watershed Forum.

c. *Annual Carry-Over*. Funds received but not spent in any given year may be carried over to the succeeding year(s), provided, however, that any such funds shall continue to be subject to the restrictions under Sections IV(A)(3)(a) and (b).

B. Watershed Forum and Programs.

1. *Formation of Watershed Forum*. Prior to the date hereof, the Watershed Forum was formed. The Watershed Forum is locally driven but includes the active and committed participation of the SWP Contractor and DWR members of the Forum.

2. *Purpose and Goals*

a. *Generally*. The Watershed Forum's purpose is to implement watershed management and restoration activities for the mutual benefit of Plumas and the SWP. Forum activities include design of, participation in, implementation of, and review of studies and demonstration projects related to watershed restoration.

b. *Specific Goals*. The specific focus of the Watershed Forum's activities is to implement programs designed to achieve the following benefits:

(1) Improved retention (storage) of water for augmented base-flow in streams;

(2) Improved water quality (specifically, reduced sedimentation), and stream bank protection;

(3) Improved upland vegetative management; and

(4) Improved groundwater retention/storage in major aquifers.

c. *Emphasis on Feather River Watershed*. The Watershed Forum specifically promotes and encourages restoration of the Feather River watershed, with particular focus on the drainages of the three SWP Upper Feather River reservoirs. The Watershed Forum seeks to obtain funding and investments in the Feather River watershed in order to facilitate programs that will generate significant local environmental and water supply benefits.

d. *Technical Advisors*. The Watershed Forum will retain a committee of technical advisors to assist the Watershed Forum in identifying activities that can provide timely and practical benefits based on the best scientific and technical information.

3. *General Watershed Forum Issues*

a. *Cooperation*. The Watershed Forum shall seek to foster mutual cooperation and support among Plumas, DWR and other SWP Contractors in achieving local and state-wide goals.

b. *Dispute Resolution*. Any disputes between members of the Watershed Forum, or between Plumas and the Watershed Forum, with respect to Watershed Forum activities and funding will be resolved by retention of a third party neutral expert reasonably acceptable to all members of the Watershed Forum.

c. *Interruption in Funding*. If payments by DWR are interrupted due to litigation challenging any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction, as set forth in Section IV(A)(2)(c), the Parties shall, depending on the success of the watershed work and the litigation situation, give due consideration to the importance of funding watershed work in consecutive years without interruption.

d. *No Limitation on DWR Obligations*. DWR's participation in the Watershed Forum shall not compromise DWR's obligation to be impartial in the distribution of matching funds from public funding sources under its jurisdiction.

C. Plumas Amendment. Upon completion of any necessary environmental review(s), DWR shall offer to Plumas the Plumas Amendment which shall include (1) DWR's agreement that water supplied to Plumas shall be determined

based on availability of water supply from Lake Davis, and (2) DWR's agreement that water deliveries to Plumas will not be reduced during SWP shortages so long as sufficient water is available from Lake Davis. The Plumas Amendment shall apply only to the maximum Table A amount in Plumas' SWP Contract on the date that this Settlement Agreement is executed. The Plumas Amendment shall also contain assurances that Plumas' claim to area-of-origin rights will not be affected by the Amendment. The Plumas Amendment may also contain the Monterey Amendment, as modified to reflect current conditions relating to Plumas, and the Attachment A Amendments.

D. Dialogue between Plumas and DWR. Subject to Plumas' execution of this Settlement Agreement and compliance with the terms herein, DWR agrees to confer with Plumas to develop strategies and actions for the management, operation, and control of SWP facilities in Plumas County in order to increase water supply, recreational, and environmental benefits to Plumas from such facilities. In furtherance thereof, DWR and Plumas agree to evaluate and give due consideration to:

1. the potential re-operation of SWP facilities in Plumas County to increase the water supply available to Plumas;
2. the potential release of water from reservoirs, as part of planned operations, for Plumas' benefit; and
3. the appropriateness of certain charges in Plumas' SWP Contract in light of current circumstances and whether amendments thereto are warranted.

E. Future Relations. Upon the Superior Court's approval of this Settlement Agreement, Plumas agrees to maintain a positive relationship with the SWP Contractors and DWR, and to support the Monterey Amendments and the Attachment A Amendments. Plumas reserves the right to review critically the New EIR.

F. Contract Payments. Plumas shall resume and maintain timely payments under its SWP Contract. Such payments shall begin upon the earlier of (1) the first payment under Section IV(A)(2)(a) or (2) the date that Plumas or its member unit resumes taking water from Lake Davis, and shall cover the period beginning January 1 of that same year. DWR will not seek to collect the amount of any Plumas Arrearages.

V. **Kern Water Bank.**

A. Title. KWBA shall retain title to the KWB Lands. KWBA may continue to operate and administer the KWB Lands including the water bank, subject to the restrictions herein.

B. Restrictions on Use of KWB Lands.

1. *Continued Use as Water Bank.* As noted in Section III(F), the KWB Lands are subject to the HCP, which documents a plan to accomplish, among other things, certain water conservation and environmental objectives. Except as provided in Sections V(B)(2) and (3), the KWB Lands shall continue to be used for the operation of a water bank and other uses authorized by the HCP, so long as such use remains legally and economically feasible.

2. *Use of KWB Lands for other SWP Purposes*. If (a) the use of the KWB Lands as a water bank is determined by KWBA to no longer be economically and/or legally feasible, (b) DWR concurs with such determination, (c) the KWB Lands can be feasibly used for any of the SWP purposes provided in California Water Code §12930 et seq., and (d) DWR and KWBA agree on terms and conditions for such use, then the KWB Lands may be so used.

3. *Use of KWB Lands for other than SWP Purposes*. If (a) the KWB Lands can not feasibly be used for any of the SWP purposes provided in California Water Code §12930 et seq., or (b) KWBA and DWR are unable to agree on terms and conditions for such use, or (c) DWR determines not to use the KWB Lands for such purposes, then KWBA may transfer or develop all or a portion of the KWB Lands for alternative use(s), provided that any alternate use will not result in unmitigated environmental impacts. A finding by KWBA that such impacts will not occur will be subject to DWR's concurrence.

4. *The 490 Acres*. The approximately 490 acres currently subject to restrictions in the HCP, permitting use thereof as Conservation Bank Lands (as defined in the HCP), but which may be developed under the HCP, will continue to be subject to the restrictions in the HCP but may not be developed.

5. *Application of HCP Restrictions*. All of the KWB Lands, including the 490 acres, will remain subject to the restrictions contained in the HCP.

The restrictions will remain in effect regardless of amendment to, or termination of, the HCP, unless, in the event of such amendment or termination, DWR, after consultation with Plaintiffs, finds that such amendment or termination will not result in unmitigated environmental impacts. The provisions of this clause shall not apply to "Minor Amendments" to the HCP as that term is utilized in the HCP.

6. *Land Use Changes Subject to CEQA*. Changes to the allowable uses of the KWB Lands shall be subject to appropriate environmental review under CEQA.

C. Transfer/Development Proceeds. If all of the KWB Lands are transferred or developed by KWBA, the proceeds of such transfer or development (net of transaction or development costs) will be used for water management purposes identified by KWBA, subject to concurrence by DWR that such use is for bona fide water management purposes; provided, however, so long as the KWB Lands continue to be used for operation of a water bank, the proceeds (net of transaction or development costs) resulting from the transfer or development of a portion of the KWB Lands (which must be consistent with Section V(B)(5)) will be used for water management purposes identified by KWBA, subject to concurrence by DWR that the expenditure is consistent with such purposes.

D. Consultation with Plaintiffs.

1. Except as provided in Section V(D)(2), with respect to any matter that requires DWR's concurrence pursuant to Section V(B) and (C), DWR

shall consult with Plaintiffs prior to making any decision with respect thereto.

2. In lieu of consulting with Plaintiffs, following the conclusion of all litigation challenging CEQA compliance for, or the validity of, the Monterey Amendments, DWR may first provide notice and opportunity to comment to Plaintiffs and the public, and then, at Plaintiffs' request, shall consult with Plaintiffs.

E. Scope of Restrictions. The foregoing restrictions shall only apply to the KWB Lands and shall not affect the use or disposition of water stored under or withdrawn from the KWB Lands.

F. Effective Date of Restrictions. The foregoing restrictions in this Section V shall not be effective unless and until the court in the above-referenced litigation issues an order approving this Settlement Agreement and the Interim Implementation Order (as defined in Section VII(c)). The restrictions in this Section V shall become final only upon (1) filing of the Notice of Determination following the completion of New EIR, (2) discharge of the writ of mandate in the underlying litigation as provided below, and (3) conclusion of all litigation in a manner that does not invalidate any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction. The continuing effectiveness of the restrictions in this Section V, and the obligations under this Settlement Agreement to comply with these restrictions, are subject to the terms of Section VII(K) below.

VI. Funding To Plaintiffs

A. Agreement to Pay. In accordance with the procedures and subject to the conditions described herein, DWR shall pay to Plaintiffs, collectively, the sum of $5,500,000 (in addition to the $300,000 paid pursuant to Section III(G)).

B. Schedule of Payments.

1. On or before the date that is thirty (30) days after approval of this Settlement Agreement by the Superior Court and issuance of the Interim Implementation Order under Section VII, DWR shall pay to Plaintiffs One Million Eight Hundred Seventy-Five Thousand Dollars ($1,875,000).

2. On or before the first anniversary after the date upon which delivery of funds are made by DWR pursuant to Section VI(B)(1), DWR shall pay to Plaintiffs One Million Eight Hundred Seventy-Five Thousand Dollars ($1,875,000).

3. Subject to Section VI(C), on or before the seventieth (70th) day after the Notice of Determination has been filed for the New EIR (or the first business day after said 70th day if the 70th day is not a business day), DWR shall pay to Plaintiffs One Million Seven Hundred Fifty Thousand Dollars ($1,750,000).

4. All amounts to be paid by DWR under this Section VI(B) shall be paid by wire transfer, in immediately available funds, to a JAMS Trust Account from which funds are to be disbursed therefrom to Plaintiffs in accordance with the Section VI Trust Account Agreement.

C. Effects of Litigation on Payment Obligations.

1. *Suspension of Payment Obligation*. If litigation is commenced by anyone challenging CEQA compliance for, or the validity of, any Monterey Amendment (or any portion thereof), including matters pertaining to the Kern Fan Element Transaction, the monetary obligations of DWR under Section VI(B)(3) shall be suspended until the date that is forty-five (45) days after conclusion of such litigation (without further right of appeal) in a manner that does not invalidate any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction. Within thirty (30) days after final conclusion of any such litigation in said manner, DWR shall pay to Plaintiffs any amounts then owing under this Section VI.

2. *Termination of Payment Obligation*. If any such litigation results in a final judgment that invalidates any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction, the obligation for payments under Section VI(B)(3) shall automatically terminate.

D. Use of Funds. The funds paid to Plaintiffs under this Section VI shall be used to implement this settlement, as determined by Plaintiffs in their reasonable judgment, including watershed restoration projects, follow-up actions arising from this settlement, and technical studies.

E. Unrelated to Attorney Fees. The payments under this Section VI are exclusive of, and in addition to, any amounts owing by DWR with respect to Plaintiffs' attorney fees, the latter of which are addressed by Section VIII.

VII. Sequence and Process for Implementation of Settlement

This Section VII addresses the process of implementing the terms of this Settlement Agreement to the extent not already addressed in this Settlement Agreement. All issues relating to the implementation of this Settlement Agreement not addressed by this Section VII or elsewhere herein shall be resolved through good faith discussions and mutual agreement among the Parties. If the Parties are unable to agree, the disputed matter shall be referred to and resolved by the Mediator.

A. Non-Reliance on 1995 EIR. DWR and the SWP Contractors who are signatories to this Settlement Agreement agree that they will not approve any new project or activity in reliance on the 1995 EIR, that was not approved, initiated or implemented prior to March 26, 2001, and the approval, initiation or implementation of which would require a separate environmental impact report or negative declaration under CEQA (other than, or in addition to, the 1995 EIR).

B. Attachment A Amendments. Within sixty (60) days after this Settlement Agreement is executed by all of the Parties, each of the SWP Contractors who are parties to this Settlement Agreement shall cause a duly authorized representative to execute an Attachment A Amendment, and deliver the executed Amendment to DWR. Upon approval of this Settlement Agreement by the Superior Court and issuance of the Interim Implementation Order, as discussed in Section VII(C), DWR shall execute the Attachment A Amendments. Thereupon, the Attachment A Amendments shall be deemed effective on an interim basis, and will not thereafter be modified without the written consent of the Plaintiffs, prior to the discharge of the writ of mandate. The Attachment A Amendments shall become

final upon (1) the filing of the Notice of Determination following the completion of the New EIR, (2) discharge of the writ of mandate in the underlying litigation as provided below, and (3) conclusion of all litigation in a manner that does not invalidate any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction.

C. Motion for Order Approving Settlement Agreement and Interim Implementation Order. As soon as practical after the execution of this Settlement Agreement, the Parties shall jointly file with the Superior Court a motion for (1) an order approving this Settlement Agreement, and (2) an order (the "**Interim Implementation Order**") specifically authorizing on an interim basis, pursuant to Public Resources Code Section 21168.9, the administration and operation of the SWP and the KWB Lands, pending discharge of the writ of mandate in the underlying litigation, in accordance with the Monterey Amendments (as limited by Section VII(A) above), as supplemented by the Attachment A Amendments and the other terms and conditions of this Settlement Agreement, including the provisions in Section V(B) regarding the KWB Lands. Said motion shall include the proposed Section 21168.9 order attached hereto as Exhibit 3-A, and the proposed writ of mandate referenced therein and attached hereto as Exhibit 3-B. The parties shall jointly move the Superior Court for approval of said order and writ. Subject to Section VII(J), and except as provided in Section VII(I), Plaintiffs shall not seek any further order or writ concerning the Monterey Amendments or the New EIR.

D. Implementation of New Policies, Procedures and Guidelines. DWR has issued a [draft] Report of State Water Project Supply Reliability in response to paragraph 1 of the Attachment B Principles. Upon the Superior Court's approval of this Settlement Agreement, DWR shall issue Contractors' Memos on (1) the Attachment C Guidelines and (2) the Attachment D Principles. After the Superior Court's approval of this Settlement Agreement, and in no event later than January 1, 2004, DWR shall issue Contractors' Memos on the remainder of the Attachment B Principles (i.e., paragraphs 2 and 3). DWR may rely on DWR publications previously issued to comply with paragraph 2 of the Attachment B Principles, if appropriate.

E. Dismissal of Validation Cause of Action. Upon the execution of this Settlement Agreement by all the Parties and execution of the Attachment A Amendments as set forth in Section VII(B) and issuance by DWR of the Contractor Memos referenced in the second sentence of Section VII(D), Plaintiffs shall file a request for dismissal without prejudice of the Validation Cause of Action. So long as such conditions are timely met, Plaintiffs covenant and agree not to refile the Validation Cause of Action, nor any new cause of action relating thereto, nor a new claim challenging the validity of any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction.

F. Tolling of Statute of Limitations. As between Plaintiffs, DWR and the SWP Contractors who are signatories to this Settlement Agreement, it is agreed that the statute of limitations relating to the Validation Cause of Action shall be tolled as

to Plaintiffs until the date that is forty-five (45) days after the filing of the Notice of Determination for the New EIR.

G. Notice of Determination, Return to Writ and Motion for Order Discharging Writ. Upon completion of the New EIR, DWR will file with the Superior Court (1) a Notice of Determination including a copy of the New EIR, (2) a return to writ of mandate (the "**Return to Writ**"), (3) a request for an order discharging the writ of mandate previously issued by the Superior Court in the underlying case and (4) any other information required by the Superior Court for a discharge of writ.

H. Consent to Entry of Order Discharging Writ.

1. *Obligation to File*. Concurrent with DWR's filings referenced in Section VII(G), subject only to Sections VII(H)(2) and (3), and provided Plaintiffs have not challenged the Return to Writ (under the procedures set forth in Section VII(I)), Plaintiffs shall file with the Superior Court a pleading consenting to entry of an order discharging the writ of mandate (the "**Consent to Entry of Order Discharging Writ**").

2. *Conditions Precedent to Filing*. Plaintiffs' obligation to file the Consent to Entry of Order Discharging Writ shall be subject to, and conditioned upon, satisfaction of the requirement set forth in Section VII(B).

3. *Earliest Effective Date of Discharge of Writ*. The discharge of the writ of mandate shall not be effective until at least forty-five (45) days after the filing of the Notice of Determination for the New EIR.

I. Subsequent CEQA Challenge.

1. *Limited Basis for Challenge*. Plaintiffs may only challenge the Return to Writ if, during the preparation and review of the New EIR, (a) Plaintiffs

objected to the Mediator based on one or more Mediation Issues, (b) the Mediator upheld that objection in a written advisory opinion as described in Section III(H), (c) DWR rejected such written advisory opinion in its final decision, either expressly or as evidenced by the contents of the final New EIR, and (d) the challenge that Plaintiffs file to the Return to Writ is on the same ground(s) as the objection upheld by Mediator in the advisory opinion. Where such an objection was made to the Mediator and Plaintiffs file such a challenge to the Return to Writ, DWR shall maintain the advisory opinion as a public record. With respect to clause (c) of this subsection (I)(1), if the Parties dispute whether DWR has rejected the Mediator's advisory opinion, such matter shall be referred to the Mediator and (s)he shall make a final determination with respect thereto in accordance with Article IX.

2. *Stipulation to Continued Operations*. In the event of such a challenge, the challenging party will stipulate that, pending compliance with such writ as the court may issue, administration and operation of the SWP may continue in accordance with the Interim Implementation Order.

3. *Order for New EIR*. If such a challenge results in an order that DWR must prepare a new or supplemental environmental impact report, the provisions set out in Section III (regarding preparation of New EIR) shall be followed, and at the conclusion of the process, the provisions of Section VII(H) (filing of a Consent to Entry of Order Discharging Writ) and this Section VII(I) shall apply.

J. No Future Challenges. Except as specifically authorized herein, and as a condition to the initial and continuing effectiveness of this Settlement Agreement, Plaintiffs agree not to initiate any future litigation challenging the validity of any Monterey Amendment (or any portion thereof) or the Kern Fan Element Transaction.

K. Mutual Interdependency. On an interim and final basis, the Attachment A Amendments, the Plumas Amendment, the provisions regarding the KWB Lands described in Section V(B), and the continued operations of the SWP based on the Monterey Amendments are mutually interdependent.

L. Implementation Dispute Resolution. Disputes arising in the implementation of this Settlement Agreement shall be addressed in accordance with Section IX.

VIII. Attorney Fees

Within forty-five (45) days after the execution of this Settlement Agreement by all Parties, the Parties shall engage in arbitration to determine the amount of attorney fees and costs to be paid to Rossmann as Plaintiffs' counsel. Such arbitration shall be conducted pursuant to the following terms and conditions:

A. The arbitrator will be selected by mutual agreement of the Parties. If the Parties cannot agree on the arbitrator, the Mediator will designate the arbitrator. JAMS arbitration rules will apply, providing for limited and focused discovery, but the arbitrator may be anyone the Parties select regardless of his/her professional affiliation.

B. Within five (5) business days after commencement of the arbitration, Rossmann shall file with the arbitrator a petition for fees. The petition for fees shall identify, in sufficient detail acceptable to the arbitrator, all fees for: (1) past service in the underlying litigation; (2) fees for participation in the settlement mediation to the

date thereof; and (3) projected fees for services to be rendered in implementing the Settlement Agreement, including fees incurred in advising Plaintiffs in connection with their participation in, and service on, the EIR Committee.

C. Rossmann may apply for a multiplier on fees earned in the underlying litigation. The award for fees relating to mediation and settlement implementation shall be subject to the lodestar amount and shall not include a multiplier.

D. The costs of the arbitration will be borne one-third (1/3) by Plaintiffs and two-thirds (2/3) by DWR.

E. DWR and CCWA reserve all rights and defenses, except the right to challenge Rossmann's entitlement to fees relating to the mediation and settlement implementation stages.

F. The arbitrator shall determine the amount of the award within thirty (30) days after submission of the fee petition to the arbitrator. The arbitrator's determination shall be binding upon the Parties.

G. DWR shall pay the fee award to Rossmann in accordance with the following schedule:

1. Sixty percent (60%) within thirty (30) days after the award;
2. Thirty percent (30%) within thirty (30) days after the filing of the Return to Writ with the Superior Court; and
3. Ten percent (10%) within thirty (30) days after the Plaintiffs' filing of the Consent to Entry of Order Discharging Writ with the Superior Court.

H. The amount of $100,000 previously paid as attorney fees to Rossmann by DWR will be credited toward the amount owed by DWR hereunder as determined by the arbitrator.

IX. **Dispute Resolution**

The Parties agree to cooperate in implementing this Settlement Agreement and to try in good faith to resolve any disputes. In addition, until the conclusion of the underlying litigation, as evidenced by the issuance of an order discharging the writ of mandate, the Mediator will decide all unresolved issues involving the interpretation and implementation of this Settlement Agreement and, to the extent permitted by law, will be authorized to enforce its terms, except for those matters properly reserved to the jurisdiction of the Superior Court. Any party may request a conference before the Mediator on seventy-two (72) hours' advance written notice to the Mediator and the other Parties. The Mediator will have the power to award reasonable attorney fees to the prevailing party in the event of frivolous, harassing or untimely motions. The party who initiates a dispute resolution proceeding with the Mediator pursuant to this Section IX shall be solely responsible for the payment of the Mediator's costs and expenses, except as otherwise provided herein.

X. **Miscellaneous**

A. No Admission. By entering into this Settlement Agreement, the Plaintiffs do not endorse or admit the validity of the Monterey Amendments, and neither DWR, KWBA, nor any of the SWP Contractors who are signatories hereto admit any of the Plaintiffs' allegations in the pending litigation including those concerning the Monterey Amendments and/or the Kern Fan Element Transaction.

B. Compliance with Laws. The Parties agree that nothing in this Settlement Agreement is intended to limit the discretion granted by law, including CEQA, to DWR, as lead agency and as the State agency responsible for administration and operation of the SWP, or the duty of DWR to comply with applicable requirements of law, including those of CEQA and the California Water Code.

C. Authority. Each of the Parties represents that: (1) it has the authority to execute and enter into this Settlement Agreement; (2) the individual executing this Settlement Agreement on behalf of the Party has the authority and has been specifically authorized to execute and deliver this Settlement Agreement on behalf of such Party; (3) upon execution by such person on behalf of the Party, this Settlement Agreement shall be valid and enforceable against such Party in accordance with the terms hereof; (4) the Party is authorized to implement this Settlement Agreement, without further action by the Party or its governing body, board of directors, or any other person or entity, as the case may be; and (5) the execution and entry into this Settlement Agreement and the implementation of its terms by the Party is not in violation of any applicable law or any other contract or agreement by which it is bound or to which it is a party. The Parties acknowledge that although DWR plans to make payments required under this Agreement pursuant to its authority under the State Water Resources Development System (Water Code Sections 12930 et seq.), and that under such authority accruals are continuously appropriated without regard to fiscal years (Water Code Section 12938), any such payments may nevertheless be contingent on the annual Budget Act and, under certain circumstances, payments may be

delayed or halted by non-party government authorities. If any payment under this Settlement Agreement is delayed beyond the date it is due, the amount due shall accrue interest at the rate of the State Pooled Money Investment Fund for the first forty-five (45) days after it is due and at eight percent (8%) per annum thereafter. The foregoing does not limit Plaintiff's rights to seek legal or equitable relief in the event of a breach of this Settlement Agreement.

D. Not a General Appearance or Concession to Jurisdiction. The execution of this Settlement Agreement by the SWP Contractors and KWBA does not constitute a general appearance in the underlying litigation, nor does it constitute a concession to jurisdiction of the Superior Court over the SWP Contractors or KWBA other than for the purpose of enforcing the terms of this settlement.

E. Successors and Assigns. This Settlement Agreement shall be binding upon and inure to the benefit of the Parties and their respective heirs, legal representatives, successors and assigns. No Party may assign their rights under this Settlement Agreement without the prior written consent of the other Parties.

F. Governance. This Agreement shall be construed under and enforced in accordance with the substantive laws of the State of California.

G. Entirety of Agreement; No Amendment. This Settlement Agreement sets forth the entire agreement among the Parties and supersedes all prior oral or written agreements, negotiations, discussions, or understandings concerning the subject matter hereof. The terms of this Settlement Agreement may not be altered, amended, waived or modified, except by a further written agreement signed by all Parties.

H. Mutual Preparation. The Parties each cooperated in the drafting and preparation of this Settlement Agreement. Thus, the language of all parts of this Settlement Agreement shall in all cases be construed as a whole, according to its fair meaning, and not strictly for or against any Party as the drafter thereof.

I. Further Acts. Each Party agrees to make, execute and deliver such other instruments or documents, and to do or cause to be done such further or additional acts, as reasonably may be necessary in order to effectuate the purposes or to implement the terms of this Settlement Agreement.

J. No Waiver. No waiver of any breach of any term or provision of this Settlement Agreement shall be construed to be, nor shall be, a waiver of any other breach of this Settlement Agreement. No waiver shall be binding unless in writing and signed by the Party waiving the breach. With respect to any breach of this Settlement Agreement by Plaintiffs, such breach may only be waived in writing by DWR, KCWA and The Metropolitan Water District of Southern California. With respect to any breach of this Settlement Agreement by the non-Plaintiffs, such breach may only be waived in writing by the Plaintiffs.

K. No Representations or Warranties. Each of Parties represents and declares that in executing this Settlement Agreement, it has relied solely upon its own judgment, belief and knowledge, and on the advice and recommendations of its independently selected counsel, concerning the nature, extent and duration of its rights and claims and that it has not been influenced to any extent whatsoever in executing the same by any representations or statements covering any matters made by any of the Parties or by any person representing them or any of them.

Each Party acknowledges that no other Party nor any of their representatives has made any promise, representation or warranty whatsoever, written or oral, as any inducement to enter into this Settlement Agreement, except as expressly set forth in this Settlement Agreement.

L. Independent Investigations. Each Party has made such investigation of the facts pertaining to this settlement and this Settlement Agreement and of all matters pertaining thereto as it deems necessary.

M. Survival. The representations, warranties and covenants contained in this Settlement Agreement are deemed to and shall survive the execution and delivery of this Settlement Agreement by all of the Parties.

N. Headings. All headings in this Settlement Agreement are included for convenience and reference only and shall not constitute a part of this Settlement Agreement for any purpose.

O. Not Binding on Others. This Settlement Agreement is not intended to, nor shall it (1) bind any non-Party persons or entities as to any claims or defenses they may otherwise now or in the future hold, or (2) waive any claims or defenses any Party hereto may have now or in the future against such non-Party persons or entities.

P. Counterparts. This Settlement Agreement may be executed in counterparts, each of which shall constitute an original, but all of which shall constitute one and the same agreement, provided each signing Party shall have received a copy of the signature page signed by every other Party.

Q. Voluntary and Knowing Execution. EACH PARTY REPRESENTS AND WARRANTS THAT IT HAS THOROUGHLY READ AND CONSIDERED

ALL ASPECTS OF THIS SETTLEMENT AGREEMENT, THAT IT UNDERSTANDS ALL PROVISIONS OF THIS SETTLEMENT AGREEMENT, THAT IT HAS HAD THE OPPORTUNITY TO CONSULT WITH COUNSEL THROUGHOUT THIS PROCESS AND THAT IT IS VOLUNTARILY ENTERING INTO THIS SETTLEMENT AGREEMENT OF ITS OWN FREE WILL, WITHOUT DURESS OR COERCION OF ANY KIND.

R. Obligations Dependent on Validity of Monterey Amendments. With respect to any obligation in this Settlement Agreement that terminates or is suspended upon a challenge to or final judgment that invalidates any portion of any Monterey Amendment, such termination or suspension of such obligation may be avoided if such invalidity is explicitly and irrevocably waived in accordance with the procedures set forth in Paragraph 29 of the Monterey Amendments.

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{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

IN WITNESS WHEREOF, the Parties have executed this Settlement Agreement as of the date first set forth above.

PLANNING AND CONSERVATION LEAGUE

By: Sage Sweetwood
Name: Sage Sweetwood
Title: President

PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: B. J. Pearson
Name: B. J. Pearson
Title: Chair, Board of Supervisors
Ex-officio Chair, District Board of Directors

CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC.

By: Louise Boucher
Name: Louise Boucher
Title: President,
Citizens Planning association of Santa Barbara, Inc.

[Remainder of Page Intentionally Blank – Additional Signatures Follow]

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

STATE OF CALIFORNIA

DEPARTMENT OF WATER RESOURCES

By: _____

Name: Thomas M. Hannigan
Title: Director

Approved as to legal form and sufficiency:

By: _____

Name: Peggy Bernardy
Title: Chief Counsel

ALAMEDA COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT, ZONE 7

By: _____

Name: William R. Stevens

Title: President, Board of Directors

Approved as to Form
RICHARD E. WINNIE, County Counsel

By _____

ALAMEDA COUNTY WATER DISTRICT

By: _____

Name: John H. Weed

Title: President

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

ANTELOPE VALLEY-EAST KERN WATER AGENCY

By: Andy D. Rutledge

Name: Andy D. Rutledge

Title: Board President

CASTAIC LAKE WATER AGENCY

By: Dan Masnada

Name: DAN MASNADA

Title: GENERAL MANAGER

CITY OF YUBA

By: William P. Lewis

Name: WILLIAM P. LEWIS

Title: UTILITIES DIRECTOR

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

COACHELLA VALLEY WATER DISTRICT

By: John W. McFadden

Name: John W. McFadden

Title: President of the Board of Directors

COUNTY OF BUTTE

By: R. J. Beeler

Name: R. J. BEELER

Title: Chairman, Board of Supervisors

COUNTY OF KINGS 3-25-03

By: Joe Neves

Name: JOE NEVES

Title: CHAIRMAN

CRESTLINE-LAKE ARROWHEAD WATER AGENCY

By: James J. McCrory

Name: James J. McCrory

Title: President, Board of Directors

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

DESERT WATER AGENCY

By: _____

Name: Dan M. Ainsworth

Title: General Manager

DUDLEY RIDGE WATER DISTRICT

By: _____

Name: Joe MacIlvaine

Title: President

KERN COUNTY WATER AGENCY

By: _____

Name: Terry Rogers

Title: President

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

LITTLEROCK CREEK IRRIGATION DISTRICT

By: Frances Young

Name: _____

Title: President

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: Ronald R Gastelum

Name: Ronald R Gastelum

Title: CEO

MOJAVE WATER AGENCY

By: K Brill

Name: Kirby Brill

Title: General Manager

NAPA COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT

By: Mike Rippey

Name: Mike Rippey

Title: Vice-Chair

APPROVED 3/18/03
FLOOD CONTROL & WATER
CONSERVATION DISTRICT

~~MARY JEAN MCLAUGHLIN~~
SECRETARY OF THE DISTRICT

BY S. Vattuone Deputy

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

OAK FLAT WATER DISTRICT

By: William D. Harrison

Name: WILLIAM D. HARRISON

Title: MANAGER / SECRETARY

PALMDALE WATER DISTRICT

By: Leslie O. Carter

Name: Leslie O. Carter

Title: President, Board of Directors

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By:

Name: C. Patrick Milligan

Title: President

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

By:

Name: J. C. Reichenberger

Title: President

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

SAN GORGONIO PASS WATER AGENCY

By: _____

Name: Stephen P. Stockton

Title: General Manager/Chief Engineer

SAN LUIS OBISPO COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT

By: _____

Name: MICHAEL P. RYAN

Title: Chairman of the Board of Supervisors

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: _____

Name: _____

Title: _____

APPROVE AS TO ACCOUNTING:
ROBERT W. GEIS, CPA
AUDITOR-CONTROLLER

BY: _____
Deputy

ATTEST:
MICHAEL F. BROWN
CLERK OF THE BOARD

BY: _____
Deputy

APPROVED AS TO FORM:
STEPHEN SHANE STARK
COUNTY COUNSEL

BY: _____
Deputy

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

SANTA CLARA VALLEY WATER DISTRICT

By: _____

Name: Stanley M. Williams

Title: Chief Executive Officer

SOLANO COUNTY WATER AGENCY

By: _____

Name: Don Holdener

Title: Chairman, Board of Directors

TULARE LAKE BASIN WATER STORAGE DISTRICT

By: _____

Name: THOMAS R. HURLBUTT

Title: PRESIDENT

VENTURA COUNTY FLOOD CONTROL DISTRICT

By: _____

Name: Jeff Pratt

Title: Director - Watershed Protection

{SIGNATURES CONSOLIDATED BY THE STATE WATER PROJECT ANALYSIS OFFICE OF THE DEPARTMENT OF WATER RESOURCES}

CENTRAL COAST WATER AUTHORITY

By: _____

Name: William J. Brennan

Title: Executive Director

KERN WATER BANK AUTHORITY

By: _____

Name: **William D. Phillimore, Chairman**

Title: **Chairman**

ATTACHMENT A

AMENDMENT TO STATE WATER PROJECT CONTRACT

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

AMENDMENT NO. ____ TO THE WATER SUPPLY CONTRACT BETWEEN THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND _____

This amendment is made this ____ day of _____, 2003, pursuant to the provisions of the California Water Resources Development Bond Act, the Central Valley Project Act, and other applicable laws of the State of California, between the State of California, acting by and through its Department of Water Resources, hereinafter referred to as the "State", and _____, hereinafter referred to as the "District" [or "Agency"].

RECITALS

WHEREAS, the State and the District entered into and subsequently amended a water supply contract (the "contract") providing that the State shall supply certain quantities of water to the District and providing that the District shall make certain payments to the State, and setting forth the terms and conditions of such supply and such payments; and

WHEREAS, on December 1, 1994, the State and representatives of certain State Water Project contractors executed a document entitled "Monterey Agreement – Statement of Principles – By The State Water Contractors And The State Of California Department Of Water Resources For Potential Amendments To The State Water Supply Contracts" (the "Monterey Agreement"); and

WHEREAS, the State, the Central Coast Water Authority ("CCWA") and those contractors intending to be subject to the Monterey Agreement subsequently negotiated an amendment to their contracts to implement provisions of the Monterey Agreement, and such amendment was named the "Monterey Amendment"; and

WHEREAS, in October 1995, an environmental impact report ("EIR") for the Monterey Amendment was completed and certified by CCWA as the lead agency, and thereafter the District and the State executed the Monterey Amendment; and

WHEREAS, the EIR certified by the CCWA was challenged by several parties (the "Plaintiffs") in the Sacramento County Superior Court and thereafter in the Third District Court of Appeal, resulting in a decision in *Planning and Conservation League, et al. v. Department of*

Water Resources, 83 Cal.App.4th 892 (2000), which case is hereinafter referred to as "PCL v. DWR"; and

WHEREAS, in its decision, the Court of Appeal held that (i) the Department of Water Resources ("DWR"), not CCWA, had the statutory duty to serve as lead agency, (ii) the trial court erred by finding CCWA's EIR sufficient despite its failure to discuss implementation of Article 18, subdivision (b) of the State Water Project contracts, as a no-project alternative, (iii) said errors mandate preparation of a new EIR under the direction of DWR, and (iv) the trial court erroneously dismissed the challenge to DWR's transfer of title to certain lands to Kern County Water Agency (the "Validation Cause of Action") and execution of amended State Water Project contracts for failure to name and serve indispensable parties. The Court of Appeal remanded the case to the trial court, ordering it to take the following five actions: (1) vacate the trial court's grant of the motion for summary adjudication of the Validation Cause of Action; (2) issue a writ of mandate vacating the certification of the EIR; (3) determine the amount of attorney fees to be awarded Plaintiffs; (4) consider such orders it deems appropriate under Public Resources Code Section 21168.9(a) consistent with the views expressed in the Appellate Court's opinion; and (5) retain jurisdiction over the action until DWR, as lead agency, certifies an environmental impact report in accordance with CEQA standards and procedures, and the Superior Court determines that such environmental impact report meets the substantive requirements of CEQA; and

WHEREAS, the State, the contractors, and the Plaintiffs in *PCL v. DWR* reached an agreement to settle *PCL v. DWR*, as documented by that certain Settlement Agreement dated _____, 2003 (the "Settlement Agreement"), and in such Settlement Agreement have agreed that the contracts should be amended, for clarification purposes, to delete terms such as "annual entitlement" and "maximum annual entitlement" so that the public, and particularly land use planning agencies, will better understand the contracts; and

WHEREAS, pursuant to the Settlement Agreement, the State and the District desire to so amend the District's contract, with the understanding and intent that the amendments herein with respect to subsections (m), (n), and (o) of Article 1, subsection (b) of Article 6, and subsection (a) of Article 16, and to Table A of the District's contract are solely for clarification purposes and that such amendments are not intended to and do not in any way change the rights, obligations or limitations on liability of the State or the District established by or set forth in the contract; and

WHEREAS, pursuant to the Settlement Agreement, the State, the contractors and the Plaintiffs in *PCL v. DWR* also agreed that the contracts should be amended to include a new Article 58 addressing the determination of dependable annual supply of State Water Project water to be made available by existing Project facilities, and the State and District desire to so amend the District's contract.

NOW THEREFORE, IT IS MUTUALLY AGREED, as follows:

1. Article 1(n) is amended to read:[1]

(n) **Annual Table A Amount**

"Annual Table A Amount" shall mean the amount of project water set forth in Table A of this contract that the State, pursuant to the obligations of this contract and applicable law, makes available for delivery to the District at the delivery structures provided for the District. The term Annual Table A Amount shall not be interpreted to mean that in each year the State will be able to make that quantity of project water available to the District. The Annual Table A Amounts and the terms of this contract reflect an expectation that under certain conditions the District will receive its full Annual Table A Amount; but that under other conditions only a lesser amount, allocated in accordance with this contract, may be made available to the District. This recognition that full Annual Table A Amounts will not be deliverable under all conditions does not change the obligations of the State under this contract, including but not limited to, the obligations to make all reasonable efforts to complete the project facilities, to perfect and protect water rights, and to allocate among contractors the supply available in any year, as set forth in Articles 6(b), 6(c), 16(b) and 18, in the manner and subject to the terms and conditions of those articles and this contract. Where the term "annual entitlement" appears elsewhere in this contract, it shall mean "Annual Table A Amount." The State agrees that in future amendments to this and other contractor's contracts, in lieu of the term "annual entitlement," the term "Annual Table A Amount" will be used and will have the same meaning as "annual entitlement" wherever that term is used.

2. Article 1(o) is amended to read:

(o) Maximum Annual Table A Amount

"Maximum annual entitlement" shall mean the maximum annual amounts set forth in Table A of this contract, and where the term "maximum annual entitlement" appears elsewhere in this contract it shall mean "Maximum Annual Table A Amounts."

3. Article 1(m) is amended to read:

(m) Minimum Project Yield

"Minimum project yield" shall mean the dependable annual supply of project water to be made available assuming completion of the initial project conservation facilities and additional project conservation facilities. The project's capability of providing the minimum project yield shall be determined by the State on the basis of coordinated operations studies of initial project conservation facilities and additional project conservation facilities, which studies shall be based upon factors including but not limited to: (1) the estimated relative proportion of deliveries for agricultural use to deliveries for municipal use assuming Maximum Annual Table A Amounts

[1] The number of the articles is not the same for all the Water Supply Contractors. Article 1(n) is intended to be the article presently entitled "Annual Entitlement", whatever its number may be in each District's contract. The article numbers may have to be changed for each contractor to reflect the numbers in its contract.

for all contractors and the characteristic distributions of demands for these two uses throughout the year; and (2) agreements now in effect or as hereafter amended or supplemented between the State and the United States and others regarding the division of utilization of waters of the Delta or streams tributary thereto.

4. Article 6(b) is amended to read:

(b) District's Annual Table A Amounts

Commencing with the year of initial water delivery to the District, the State each year shall make available for delivery to the District the amounts of project water designated in Table A of this contract, which amounts shall be subject to change as provided for in Article 7(a) and are referred to in this contract as the District's Annual Table A Amounts.

5. Article 16(a) is amended to read:

(a) Limit on Total of all Maximum Annual Table A Amounts

The District's Maximum Annual Table A Amount hereunder, together with the maximum Table A amounts of all other contractors, shall aggregate no more than 4,185,000 acre-feet of project water.

6 Article 58 is added to read:

58. **Determination of Dependable Annual Supply of Project Water to be Made Available by Existing Project Facilities.**

In order to provide current information regarding the delivery capability of existing project conservation facilities, commencing in 2003 and every two years thereafter the State shall prepare and mail a report to all contractors, and all California city, county, and regional planning departments and agencies within the contractors' project service areas. This report will set forth, under a range of hydrologic conditions, estimates of overall delivery capability of the existing project facilities and of supply availability to each contractor in accordance with other provisions of the contractors' contracts. The range of hydrologic conditions shall include the delivery capability in the driest year of record, the average over the historic extended dry cycle and the average over the long-term. The biennial report will also include, for each of the ten years immediately preceding the report, the total amount of project water delivered to all contractors and the amount of project water delivered to each contractor.

7. Add the following language at the bottom of Table A:

In any year, the amounts designated in this Table A shall not be interpreted to mean that the State is able to deliver those amounts in all years. Article 58 describes the State's process for providing current information for project delivery capability.

8. Except for Article 58, the changes made by this amendment are solely for clarification purposes, and are not intended to nor do they in any way change the rights, obligations or

limitations on liability of the State or the District established by or set forth in the contract, and this amendment shall be interpreted in accordance with this intent.

9. At the time of execution of this Agreement and thereafter, the effectiveness of this Amendment is dependent upon the effectiveness of the District's Monterey Amendment (all provisions therein) and the Kern Fan Element Transaction.

IN WITNESS WHEREOF, the parties hereto have executed this amendment on the date first above written.

STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES

By: _____
Name: _____
Title: Director

Approved as to legal form and sufficiency:

By: _____
Name: _____
Title: Chief Counsel

Attest:

_____ DISTRICT

By: _____
Name: _____
Title: _____

ATTACHMENT B

PRINCIPLES REGARDING STATE WATER PROJECT AVAILABILITY

Note: These principles are prepared in connection with the settlement agreement between PCL and DWR and are only effective pursuant to the terms therein.

1. Commencing in 2003, and every two years thereafter, the Department of Water Resources (DWR) shall prepare and deliver to all State Water Project (SWP) contractors, all city and county planning departments, and all regional and metropolitan planning departments within the project service area a report which accurately sets forth, under a range of hydrologic conditions, the then existing overall delivery capability of the project facilities and the allocation of that capacity to each contractor. The range of hydrologic conditions shall include the historic extended dry cycle and long-term average. The biennial report shall also disclose, for each of the ten years immediately preceding the report, the total amount of project water delivered and the amount of project water delivered to each contractor. The information presented in each report shall be presented in a manner readily understandable by the public.

2. DWR shall develop and, by January 1, 2004, publish guidelines to assist Municipal and Industrial Contractors in providing accurate information to land-use planning agencies with jurisdiction within the Contractors' respective service areas regarding local and regional programs to manage or supplement SWP supplies. DWR shall consult with the plaintiffs and contractors in developing the guidelines.

3. DWR shall provide assistance to enable all Municipal and Industrial Contractors to provide complete and accurate information to relevant land-use planning agencies to assure that local land-use decisions reflect accurate information on the availability of water from state, local, and other sources.

ATTACHMENT C

DWR GUIDELINES FOR REVIEW OF PROPOSED PERMANENT TRANSFERS OF STATE WATER PROJECT ANNUAL TABLE A AMOUNTS

Note: These guidelines are prepared in connection with the settlement agreement between PCL and DWR and are only effective pursuant to the terms therein.

1. Purpose: The purpose of these guidelines is to describe the process for DWR's review of proposed permanent transfers of SWP Annual Table A Amounts and by so doing, provide disclosure to SWP Contractors and to the public of DWR's process and policy on approving permanent transfer of SWP Annual Table A Amounts. Such disclosure should assist contractors in developing their transfer proposals and obtaining DWR review expeditiously, and assist the public in participating in that review.

2. Coverage: These guidelines will apply to DWR's approval of permanent transfers of water among existing SWP Contractors and, if and when appropriate, to permanent transfers of water from an existing SWP Contractor to a new SWP Contractor.

3. Interpretation: These guidelines are in furtherance of the state policy in favor of voluntary water transfers and shall be interpreted consistent with the law, including but not limited to Water Code Section 109, the Burns-Porter Act, the Central Valley Project Act, the California Environmental Quality Act, area of origin laws, the public trust doctrine, and with existing contracts and bond covenants. These guidelines are not intended to change or augment existing law.

4. Format: The guidelines shall be issued by DWR as a "Notice to State Water Contractors."

5. Revisions: Revisions may be made to these guidelines as necessary to meet changed circumstances, changes in the law or long-term water supply contracts, or to address conditions unanticipated when the guidelines are adopted. Revisions shall be in accordance with the settlement agreement reached in *Planning and Conservation League vs. Department of Water Resources*.

6. Distribution: The transfer guidelines shall be published by DWR in the next available edition of Bulletin 132, and also as part of the biennial disclosure of SWP reliability as described in the PCL v. DWR Settlement Agreement.

7. Contract Amendment: Permanent transfers of SWP water are accomplished by amendment of each participating contractor's long-term water supply contract. The amendment consists of amending the Table A upwards for a buying contractor and downwards for a selling contractor. The amendment shall be in conformity with all provisions of the long-term water supply contracts, applicable laws, and bond covenants. Other issues to be addressed in the contract amendment will be subject to negotiation among DWR and the two participating contractors. The negotiations will be conducted in public, pursuant to the settlement agreement in PCL vs. DWR.

8. Financial issues: The purchasing contractor must demonstrate to the DWR's satisfaction that it has the financial ability to assume payments associated with the transferred water. If the purchasing entity was not a SWP Contractor as of 2001, special financial requirements pertain as described below, as well as additional qualifications.

9. Compliance with CEQA: Consistent with CEQA, the State's policy to preserve and enhance environmental quality will guide DWR's consideration of transfer proposals (Public Resources Code Section 21000). Identification of the appropriate lead agency will be based on CEQA, the CEQA Guidelines, and applicable caselaw, including *Planning and Conservation League vs. Department of Water Resources, 83 Cal. App. 4th 892 (2000).* CEQA requires the lead agency at a minimum to address the feasible alternatives to the proposed transfer and its potentially significant environmental impacts (1) in the selling contractor's service area; (2) in the buying contractor's service area; (3) on SWP facilities and operations; and (4) on the Delta and areas of origin and other regions as appropriate. Impacts that may occur outside of the transferring SWP Contractors' service areas and on fish and wildlife shall be included in the environmental analysis. DWR will not approve a transfer proposal until CEQA compliance is completed. The lead agency shall consult with responsible and trustee agencies and affected cities and counties; and when DWR is not the lead agency, shall provide an administrative draft of the draft EIR or Initial Study/Negative Declaration to DWR prior to the public review period. A descriptive narrative must accompany a checklist, if a checklist is used. The lead agency shall conduct a public hearing on the EIR during the public comment period and notify DWR's State Water Project Analysis Office of the time and place of such hearing in addition to other notice required by law.

10. Place of Use: The purchasing contractor must identify the place and purpose of use of the purchased water, including the reasonable and beneficial use of the water. Typically this information would be included in the environmental documentation. If a specific transfer proposal does not fit precisely into any of the alternatives listed below, DWR will use the principles described in these Guidelines to define the process to be followed. The information to be provided under this paragraph is in addition to the CEQA information described in paragraph 9 of these guidelines.

a) If the place of use is within the contractor's service area, the contractor should disclose the purpose of the transferred water, such as whether the water is being acquired for a specific development project, to enhance overall water supply reliability in the contractor's service area, or some other purpose. If the transferred water is for a municipal purpose, the contractor should state whether the transfer is consistent with its own Urban Water Management Plan or that of its member unit(s) receiving the water.

b) If the place of use is outside the contractor's service area, but within the SWP authorized place of use, and service is to be provided by an existing SWP Contractor: In addition to Paragraph 10(a) above, the contractor should provide DWR with copies of LAFCO approval and consent of the water agency with authority to serve that area, if any. In some instances, DWR's separate consent is required for annexations in addition to the approval for the transfer.

c) If the place of use is outside the SWP authorized place of use and service is to be provided by an existing SWP Contractor, the contractor should provide information in Paragraph 10(a) and 10(b). Prior to approving the transfer, DWR will consider project delivery capability, demands for water supply from the SWP, and the impact, if any, of the proposed transfer on such demand. If DWR approves the transfer, DWR will petition State Water Resources Control Board for approval of expansion of authorized place of use. Water will not be delivered until the place of use has been approved by the SWRCB and will be delivered in compliance with any terms imposed by the SWRCB.

d) If the place of use is outside the SWP authorized place of use and service is not to be provided by an existing SWP contractor, DWR will consider the transfer proposal as a proposal to become a new state water contractor. Prior to adding a new SWP Contractor, DWR will consider project delivery capability, demands for water supply from the SWP, and the impact, if any, of the proposed transfer on such demand. DWR will consult with existing SWP Contractors regarding their water supply needs and the proposed transfer. In addition to the information in Paragraph 10(a), 10(b), and 10(c), the new contractor should provide information similar to that provided by the original SWP contractors in the 1960's Bulletin 119 feasibility report addressing hydrology, demand for water supply, population growth, financial feasibility, etc. DWR will evaluate these issues independently and ordinarily will act as lead agency for CEQA purposes. In addition, issues such as area of origin claims, priorities, environmental impacts and use of water will be addressed. The selling contractor may not be released from financial obligations. The contract will be subject to a CCP 860 validation action initiated by the new contractor. If DWR approves the transfer, DWR will petition State Water Resources Control Board for approval of expansion of authorized place of use. Water will not be delivered until the place of use has been approved by the SWRCB and will be delivered in compliance with any terms imposed by the SWRCB.

11, DWR Discretion. Consistent with the long-term water supply contract provisions, CEQA, and other provisions of law, DWR has discretion to approve or deny transfers. DWR's exercise of discretion will incorporate the following principles:

(a) As required by CEQA, DWR as an agency with statewide authority will implement feasible mitigation measures for any significant environmental impacts resulting from a transfer, if such impacts and their mitigation are not addressed by other public agencies and are within DWR's jurisdiction.

(b) DWR will invoke "overriding considerations" in approving a transfer only as authorized by law, including but not limited to CEQA, and, to the extent applicable, the public trust doctrine and area of origin laws.

ATTACHMENT D

PRINCIPLES REGARDING PUBLIC PARTICIPATION PROCESS IN SWP CONTRACT NEGOTIATIONS

Note: These principles are prepared in connection with the settlement agreement between PCL and DWR and are only effective pursuant to the terms therein.

1. Policy: Given the importance of the State Water Project to the State of California, and the key role that the long-term water supply contracts play in the administration of the State Water Project, DWR agrees that public review of significant changes to these contracts is beneficial and in the public interest.

2. Types of activities to be covered: Project-wide contract amendments (i.e., contracts with substantially similar terms intended to be offered to all long-term SWP Contractors) and contract amendments to transfer entitlements between existing SWP Contractors will not be offered to the contractors for execution unless DWR has first complied with the public participation process as described in paragraphs (3), (4), (5) and (6).

3. The Public Participation Process.

1) Negotiations will be conducted in public;

2) The public will be provided with advance notice of the time and place of the negotiations; and

3) The public will be provided the opportunity to observe negotiations and comment in each negotiating session

4. Timing of Public Participation: Public participation ordinarily will precede the formulation of the project description in the CEQA process in order to assure that the public participation is meaningful. When DWR is a responsible agency, (e.g., when existing SWP Contractors agree to transfer entitlement between themselves), the public participation will be scheduled to facilitate coordination with the lead agency's CEQA process.

5. Activities that will not be subject to public participation: Informal discussions prior to exchange of formal drafts and discussion of topics that are authorized to be kept confidential by law will not be subject to the public participation process.

6. Contract amendments resulting from litigation: If litigation has been formally initiated, and settlement negotiations result in a proposal to adopt project-wide amendments to settle the litigation, all proposed contract amendments shall be subject to the public participation process before they are approved by DWR.

ATTACHMENT E

FINAL PERMANENT TABLE A AMOUNT TRANSFERS FROM KERN COUNTY WATER AGENCY SUBSEQUENT TO MONTEREY AMENDMENTS (January 1, 2003)

Note: This Exhibit is prepared in connection with the settlement agreement between PCL and DWR.

From (Kern County Water Agency Member Unit)	To	Amount (afy)	Year Effective
Berrenda Mesa Water District	Mojave Water Agency	25,000	1998
Belridge Water Storage District	Palmdale Water Agency	4,000	2000
Berrenda Mesa Water District	Alameda County Flood Control and Water Conservation District Zone 7	7,000	2000
Lost Hills Water District	Alameda County Flood Control and Water Conservation District Zone 7	15,000	2000
Belridge Water Storage District	Alameda County Flood Control and Water Conservation District Zone 7	10,000	2001
Belridge Water Storage District and Berrenda Mesa Water District	Solano County Water Agency	5,756	2001
Belridge Water Storage District and Berrenda Mesa Water District	Napa County Flood Control and Water Conservation District	4,025	2001

EXHIBIT 1

PLAINTIFFS' EXPENSES TRUST ACCOUNT AGREEMENT

This Agreement is entered into this fifteenth day of August 2002, by JAMS and DWR, for the purpose of transferring $300,000 in trust to JAMS for use in accordance with Principles of Settlement in PCL vs. DWR.

WHEREAS, JAMS has acted as mediator between the Department and other parties to the litigation in PCL v. DWR (Superior Court No. 95CS03216).

WHEREAS, the Principles of Settlement as agreed to by the parties on July 22, 2002, provides for the placement of $300,000 in trust with JAMS.

WHEREAS, the money placed in the trust is to be provided to plaintiffs for expenses actually incurred as needed to support plaintiffs' participation in developing the new EIR to be filed as a return to the writ.

WHEREAS, the Principles of Settlement also provides that the funds will be provided based on a budget and participation plan to be submitted by plaintiffs to the mediator specifying the purposes for which the funds will be expended.

The parties agree as follows:

1. JAMS agrees to accept $300,000 in trust in accordance with the Principles of Settlement.

2. JAMS agrees to maintain the monies in trust, and following receipt of a budget and participation plan from plaintiffs, to disburse funds to plaintiffs for actual expenditures incurred for such purpose and pursuant to such schedule, budget, and participation plan, all in conformance with the Principles of Settlement. The funds will be disbursed to the plaintiffs' attorney, Antonio Rossmann, Law Offices of Antonio Rossmann.

3. Costs incurred by JAMS in providing this service will be paid as part of the mediator services as part of the existing contract between JAMS and the California Department of Justice, Office of the Attorney General.

4. This agreement may be amended in writing by agreement of both parties.

5. Funds not disbursed upon termination of the trust shall be returned to DWR.

6. The trust shall terminate upon notice to JAMS by DWR of termination based on the earlier of (a) failure of the parties to the mediation to execute a settlement agreement by January 1, 2003; (b) notice of termination given by the Director of DWR to JAMS and plaintiffs that this trust is terminated, which notice shall not be given without

defendants' consultation with plaintiffs and the mediator; or c) filing of the Notice of Determination on the new EIR.

7. JAMS will incur no liability to DWR arising from any disbursement made pursuant to this agreement.

8. This agreement is not intended to and shall not create any rights in any third party.

APPROVED:

/s/ Steve Macaulay for	8/10/02	/s/ Julie Sager	8/15/02
Thomas M. Hannigan Director	Date	Vice President & CFO JAMS	Date

EXHIBIT 1

AMENDMENT NO. 1

PLAINTIFFS' EXPENSES TRUST ACCOUNT AGREEMENT

Paragraph 6 of this Agreement is amended to read as follows:

6. The trust shall terminate upon notice to JAMS by DWR of termination based on the earlier of (a) failure of the parties to the mediation to execute a settlement agreement by May 1, 2003, (b) notice of termination given by the Director of DWR to JAMS and plaintiffs that this trust is terminated, which notice shall not be given without defendants' consultation with plaintiffs and the mediator; or (c) filing of the Notice of Determination on the new EIR.

APPROVED:

Thomas M. Hannigan Director	Date	JAMS	Date

EXHIBIT 2

KERN WATER BANK AUTHORITY
AGREEMENTS AND PERMITS
WHICH MAY HAVE RELIED ON THE KWBA ADDENDUM

AGREEMENT/PERMIT	DATE	OTHER PARTIES
Incidental Take Permit - PRT-828086	2-Oct-97	Department of Interior, U.S. Fish & Wildlife Service
Approval/Management Authorization pursuant to California Endangered Species Act for Implementation of Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan	2-Oct-97	Calif. Department of Fish & Game
Natural Community Conservation Plan/Habitat Conservation Plan Implementation Agreement	2-Oct-97	U.S. Fish & Wildlife Service; Calif Dept of Fish & Game; Kern Water Bank Authority
Approval, Cultural Resources Assessment and Plan for the KWBA Project	January, 1997	N/A
Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program	26-Oct-95	Numerous
Approval of Kern Water Bank Authority Mosquito Abatement Program	26-Oct-95	Mosquito Abatement Districts
Service Contracts for Operations and Maintenance	1996 - current	Numerous Vendors
Grazing Leases (Sheep and Cattle)	1997- current	Various Stockmen
Minor Amendment No. 1: Hunting/Research to the KWBA HCP/NCCP and Implementation Agreement	6/30/1998	California Department of Fish and Game and U.S. Fish and Wildlife Service
State of California Standard Agreement for "Improving Wildlife Habitat for Doves" (annual contract)	1998 - current	Calif. Department of Fish and Game
Conservation Credit Certificates	1998 - current	Conservation Credit Buyers
Construction and Service Contracts for Master Plan Construction Project - KWB Canal, Head-works, Aqueduct Turnout, New Wells, Well Rehabilitation, Pipelines	7/1999 - 8/2002	Numerous Contractors and Vendors
KWB Canal and Buena Vista Main Canal Joint Use Agreement	7/20/1999	Buena Vista Water Storage District

AGREEMENT/PERMIT	DATE	OTHER PARTIES
Business Loan Agreement ($21,000,000)	7/23/1999	Bank of America, N.A.
Agreement for Grant of Easement	September 1999	State of California Acting Through the Department of Parks and Recreation
Agreement for Construction, Operation, and Maintenance of the Kern Water Bank Turnout, a Permanent Turnout Within the California Aqueduct Right of Way	11/9/1999	Department of Water Resources
License Agreement for Kern River Canal Crossing	11/17/1999	City of Bakersfield
Loan Contract No. E75002 Under the "Safe, Clean, Reliable Water Supply Act Water Conservation and Ground Water Recharge Sub account ($5,000,000)	March 2000	State of California, Department of Water Resources, Division of Planning and Local Assistance
Reclamation Board Permit No. 17147-A GM Authorizing Construction of Pedestrian Bridge Across the Outlet Canal within the Kern River Designated Floodway	10/16/2000	State of California - The Resources Agency, Department of Water Resources
Reclamation Board Permit No. 16821 GM (Revised) Authorizing Construction of a 20-foot Wide Unlined Canal and Reinforced Concrete Gated Turnout Structure on the Right (North) Bank of the Designated Floodway and Install a 108-Inch Diameter, 700-foot long, Reinforced Concrete Pipe Across (Under the Kern River	2/26/2001	State of California - The Resources Agency, Department of Water Resources
Grant Awarded Under the "Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act (Proposition 13) - Groundwater Storage Program ($3,375,000)	Jun-02	State of California, Department of Water Resources, Division of Planning and Local Assistance
Service Contracts for Well Testing and Rehabilitation Under the SB5X Program	2002	Various Vendors

Exhibit 2-2

EXHIBIT 3-A

PROPOSED 21168.9 ORDER

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SACRAMENTO

PLANNING AND CONSERVATION LEAGUE, a California not for profit corporation, PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, a California public agency; CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC., a California not for profit corporation, Plaintiffs and Petitioners, v. DEPARTMENT OF WATER RESOURCES, a California State Agency, et al., Defendants and Respondents,	Case No: 95CS03216 [PROPOSED] ORDER PURSUANT TO PUBLIC RESOURCES CODE SECTION 21168.9

On remand from the Third District Court of Appeal on January ___, 2003, in Department 53 of the Sacramento Superior Court, the Honorable Loren E. McMaster, presiding, this proceeding came on for a status report and joint motion. Petitioners and Plaintiffs, Planning and Conservation League, Plumas County Flood Control and Water Conservation District, and Citizens Planning Association of Santa Barbara County ("Petitioners"), appeared through Antonio Rossmann and Roger B. Moore. Respondent and Defendant, Central Coast Water Authority (CCWA), appeared through Susan F. Petrovich of the Law Firm of Hatch & Parent. Respondent and Defendant, Department of Water Resources (DWR), appeared through Deputy Attorney General Marian E. Moe. Robert S. Draper of O'Melveny and Myers, LLP and Clifford W. Schulz appeared, respectively, on behalf of the Metropolitan Water District of Southern California and Dudley Ridge Water District, entities that submitted answers to the First

Amended Complaint subsequent to the Court of Appeal's final determination in this action and prior to any further order of this Court on remand.

In light of the direction from the Third District Court of Appeal on remand in Planning and Conservation League v. Department of Water Resources (2000) 83 Cal.App.4th 892, this Court hereby makes the following findings:

1. The parties to this lawsuit and other public agencies have engaged in extensive settlement negotiations, mediated by retired Judge Daniel Weinstein of JAMS Dispute Resolution, with the intent to avoid further litigation and associated expenses, to provide for an effective way to cooperate in the preparation of a new environmental impact report (EIR), and to make other specified improvements in the administration and operation of the State Water Project.

2. The mediation has resulted in an executed Settlement Agreement for approval by this Court, attached to this Order as Exhibit A.

3. DWR as lead agency has commenced the preparation of the new EIR.

4. As part of the Settlement Agreement, DWR and the State Water Project (SWP) contractors who are signatories to the Settlement Agreement have agreed that, pending DWR's filing of a return in satisfaction of the Writ of Mandate and this Court's dismissal of the Writ of Mandate, they will not approve any new project or activity (as defined in section VII.A of the Settlement Agreement) in reliance on the 1995 Environmental Impact Report for the Implementation of the Monterey Agreement.

5. This Order is made pursuant to the provisions of Public Resources Code section 21168.9 and pursuant to this Court's equitable powers. This Court finds that the actions described in this Order, including actions taken in compliance with the Writ of Mandate, comprise the actions necessary to assure DWR's compliance with Division 13 of the Public Resources Code. This Court further finds that this Order includes only those mandates necessary to achieve compliance with Division 13.

THEREFORE, IT IS HEREBY ORDERED as follows:

1. This Court's Final Judgment denying the petition for writ of mandate, entered August 15, 1996, is reversed in accordance with the directive of the Third District Court of Appeal's decision in Planning and Conservation League v. Department of Water Resources (2000) 83 Cal.App.4th 892.

2. This Court's order granting the summary adjudication on the fifth cause of action, entered June 10, 1996, is vacated.

3. The Settlement Agreement attached as Exhibit A is hereby approved.

4. A Peremptory Writ of Mandate directed to Respondents Central Coast Water Authority and DWR shall issue under seal of this Court in the form attached hereto as Exhibit B.

5. In accordance with the Settlement Agreement and this Order, pending DWR's filing of the return in compliance with the Peremptory Writ of Mandate and this Court's Order discharging the Writ of Mandate, DWR and CCWA shall not approve any new project or activity (as defined section VII.A of the Settlement Agreement) in reliance on the 1995 EIR for the Implementation of the Monterey Agreement.

6. In the interim, until DWR files its return in compliance with the Peremptory Writ of Mandate and this Court orders discharge of the Writ of Mandate, the administration and operation of the State Water Project and Kern Water Bank Lands shall be conducted pursuant to the Monterey Amendments to the State Water Contracts, as supplemented by the Attachment A Amendments to the State Water Contracts (as defined in the Settlement Agreement) and the other terms and conditions of the Settlement Agreement.

7. Plaintiffs and petitioners shall recover such costs and attorney's fees as provided in prior court orders and in an amount as determined in the arbitration procedures agreed to in the Settlement Agreement, or as otherwise agreed to by the parties.

8. Except as provided, the Peremptory Writ of Mandate shall not limit or constrain the lawful jurisdiction and discretion of DWR. This Court retains jurisdiction until DWR files a

return that complies with the terms of the Writ of Mandate, and this Court issues an order discharging the Writ of Mandate.

IT IS SO ORDERED.

Dated: _____, 2003 _____ _____

Judge of the Superior Court

EXHIBIT 3-B

PROPOSED WRIT OF MANDATE

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SACRAMENTO

PLANNING AND CONSERVATION LEAGUE, a California not for profit corporation, PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, a California public agency; CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC., a California not for profit corporation, Petitioners, v. DEPARTMENT OF WATER RESOURCES, a California State Agency, and CENTRAL COAST WATER AUTHORITY, A Joint Powers Agency Respondents.	Case No: 95CS03216 PROPOSED PEREMPTORY WRIT OF MANDATE (Public Resources Code § 21168.9)

TO: Respondents California Department of Water Resources and Central Coast Water Authority:

The Third District Court of Appeal, in its decision in Planning and Conservation League v. Department of Water Resources (2000) 83 Cal.App.4th 892, having directed this Court to issue a Peremptory Writ of Mandate,

YOU ARE HEREBY COMMANDED to comply with the following:

1. Respondent Central Coast Water Authority shall set aside its October 26, 1995 certification that the Final Programmatic Environmental Impact Report for Implementation of

the Monterey Agreement (the 1995 Monterey Agreement EIR) was completed in compliance with the California Environmental Quality Act [AR 2183].

2. Respondent Department of Water Resources (DWR) shall:

(a) set aside its December 13, 1995 certification, as responsible agency, that the 1995 Monterey Amendment EIR is adequate under the California Environmental Quality Act [AR 1875]; and

(b) as lead agency, prepare and certify a new EIR. in compliance with the Court of Appeal's decision, the California Environmental Quality Act, and the Settlement Agreement.

3. Upon completion and certification of the new EIR, Respondent DWR shall make written findings and decisions and file a notice of determination identifying the components of the project analyzed in the new EIR**,** all in the manner prescribed by sections 15091 – 15094 of the CEQA Guidelines.

4. Respondent DWR shall, upon the filing of a Notice of Determination, submit the new EIR, the written findings, the Notice of Determination, and such additional documents as this Court may order by way of return to this writ of mandate.

5. This Court shall retain jurisdiction over this proceeding until DWR files a return that complies with this Writ of Mandate, and this Court issues an order discharging this Writ of Mandate. Except as provided, this Writ of Mandate shall not limit or constrain the lawful jurisdiction and discretion of the Department of Water Resources.

Dated: _____, 2003

_____

_____
Clerk of the Superior Court

Let the foregoing writ issue:

_____
Judge of the Superior Court

EXHIBIT 4

SECTION VI TRUST ACCOUNT AGREEMENT

This Section VI Trust Account Agreement (this "Trust Agreement") is entered into this _____ day of _____ 2003, by JAMS and the State of California Department of Water Resources (the "Department"), for the purposes of establishing and describing the trust account in accordance with that certain Settlement Agreement entered into in *Planning & Conservation League v. Department of Water Resources* ("PCL v. DWR").

WHEREAS, Judge Daniel Weinstein (ret.) of JAMS has acted as mediator between the Department and other parties to the litigation in *PCL v. DWR* (Sacramento Superior Court No. 95CS03216).

WHEREAS, the Settlement Agreement provides for the placement over time of $5,500,000 in trust with JAMS at the specific times and under the conditions in the Settlement Agreement.

The parties agree as follows:

1. JAMS will establish a trust account for receipt and disbursal of funds received from the Department for payment pursuant to the Settlement Agreement.

2. All funds deposited with JAMS pursuant to this agreement shall be placed into a trust account and shall be disbursed only in accordance with this Trust Agreement and the Settlement Agreement. Section VI of the Settlement Agreement provides that the funds shall be used to implement the Settlement Agreement, as determined by Plaintiffs in their reasonable judgment, including watershed restoration projects, follow-up actions arising from the Settlement Agreement, and technical studies.

3. JAMS agrees to maintain the monies in trust, and after receipt of a written statement executed by all Plaintiffs (as defined in the Settlement Agreement), to disburse funds to Plaintiffs in conformance with such statement. JAMS will provide a copy of the written statement to: Chief Counsel, The Office of the Chief Counsel, Department of Water Resources, P.O. Box 942836, Sacramento, CA 95814.

4. Costs incurred by JAMS in providing this service will be paid as part of the mediator services as part of the existing contract between JAMS and the California Department of Justice, Office of the Attorney General, or any successor contract.

5. This agreement may be amended only in writing by agreement of both parties.

6. Funds not disbursed before termination of this Trust Agreement shall be returned to DWR immediately upon termination of this Trust Agreement.

7. This Trust Agreement shall terminate if and when DWR notifies JAMS that the agreement is terminated, which notice shall not be given without DWR's consultation with Plaintiffs and the mediator.

8. JAMS will incur no liability to DWR arising from any disbursement made pursuant to this agreement.

9. This Trust Agreement is intended solely for the purposes of establishing and describing the trust account at JAMS and is not intended to and shall not create any rights in any third party.

APPROVED:

Thomas M. Hannigan Director	Date	JAMS	Date

Governor's Press Release, "Gov. Schwarzenegger Directs Immediate Actions to Improve the Deteriorating Delta, California's Water Supply," July 17, 2007

Office of the Governor

ARNOLD SCHWARZENEGGER
THE PEOPLE'S GOVERNOR

PRESS RELEASE

07/17/2007 GAAS:564:07 FOR IMMEDIATE RELEASE

Gov. Schwarzenegger Directs Immediate Actions to Improve the Deteriorating Delta, California's Water Supply

Governor Arnold Schwarzenegger today directed the Department of Water Resources to take immediate action steps to improve conditions in the Sacramento-San Joaquin Delta, to help restore its natural habitat and protect the Delta smelt and other species. The Governor also identified more than $120 million in specific Delta restoration projects to be part of his comprehensive water plan, which he is calling on the Legislature to pass by the end of this year. He made the announcements on Twitchell Island in the Delta.

"Today, I am calling for actions to help restore the Delta, the largest estuary on the West Coast and home to hundreds of native plant and animal species. The Delta is also one of the most vulnerable areas of our state. It faces dangers of contamination from a natural disaster or rising sea levels. And, we saw an example of its vulnerability when we had to shut off the pumps for nine days to protect the threatened Delta smelt," said Governor Schwarzenegger.

"The Delta is one of California's most important resources -- 25 million Californians rely on it for clean water. It also irrigates hundreds of thousands of acres of Central Valley farmland and is the heart of our $32 billion agricultural industry."

Without immediate changes, the Delta will fail as a reliable water source, according to state water experts. Climate models and current weather patterns require that we prepare for more severe floods, droughts and rising sea levels, which the Delta must be able to withstand to protect California's water supply.

Building on his Strategic Growth Plan from last year, the Governor introduced a $5.9 billion comprehensive water plan in January. The Governor's plan invests $4.5 billion to develop additional surface and groundwater storage. The plan also includes $1 billion toward restoration of the Delta, including development of a new conveyance system, $250 million to support restoration projects on the Klamath, San Joaquin and Sacramento rivers and the Salton Sea project and $200 million for grants to California communities to help conserve water for about 400,000 families.

Today, the Governor issued immediate directives to protect the Delta. Using existing resources, the Department of Water Resources will implement these actions:

- Prevent the spread of invasive species. Invasive species like the quagga mussel compete with native species like the smelt.
- Improve research on the Delta Smelt. State and federal agencies will upgrade and continue operation of a smelt culture laboratory.
- Screen Delta agricultural intakes to protect smelt. The state will install fish screens to protect the smelt when water is diverted from the Delta to irrigate state-owned lands on Sherman and Twitchell Islands.
- Restore the North Delta's natural habitat. The state will restore tidal wetlands and aquatic habitats at Cache Slough to provide spawning areas and promote the production of organisms that the smelt and other native fish eat. Dutch Slough is also a candidate for longer-term restoration.
- Improve Central Delta water flow patterns. The state will study and, if feasible, modify water circulation in the Central Delta near Frank's Tract to protect fish and improve water quality.
- Improve our ability to respond to Delta emergencies. The state will enhance Delta emergency response and levee failure plans and stockpile materials to repair damaged levees.

The Governor also called for additional actions to be included as part of a comprehensive water package, negotiated after the budget is passed. Totaling at more than $120 million, these actions could be funded out of the $1 billion proposed in the Governor's comprehensive plan, or by other funding sources:

- Restoring additional Delta habitats such as Dutch Slough. ($48 million)
- Helping local water agencies take actions to conserve and manage limited water supplies.
- Improving emergency planning in the event of an earthquake or flood. ($74 million)
- Assessing the feasibility of additional screening at state facilities to protect Delta smelt and expediting projects to modify water circulation and improve water quality. ($2.25 million)
- Funding subsidence and carbon sequestration projects on Sherman and Twichell Islands and other Delta locations. ($3.5 million)

The actions are not intended to replace recommendations from ongoing Delta planning efforts. Instead, they are to make incremental improvements until long-term plans are in place. They will be compatible with any long-term Delta plan and will not preclude future restoration options.

The Governor has directed the Delta Vision Blue Ribbon Task Force to develop a Delta management plan. The task force will present its findings and recommendations by January 1, 2008 and its Strategic Plan by October 31, 2008. The Bay Delta Conservation Plan is also underway, being developed with broad participation from water agencies, environmental organizations and local representatives. The $1 billion proposed in the Governor's comprehensive plan will be used to fund their recommendations.

United States District Court, Eastern District of California, "*Pacific Coast Federation of Fishermen's Associations, et al. v. Gutierrez, et al.*, No. 06-CV-00245-OWW-GSA (E.D. Cal. 2008)" ("2008 Wanger decision")

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IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF CALIFORNIA

PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS/INSTITUTE FOR FISHERIES RESOURCES, *et al.*, Plaintiffs, v. CARLOS M. GUTIERREZ, in his official capacity as Secretary of Commerce *et al.*, Defendants. SAN LUIS & DELTA-MENDOTA WATER AUTHORITY, *et al.*, Defendant-Intervenors.	Case No. 1:06-CV-0245 OWW GSA ORDER GRANTING IN PART AND DENYING IN PART PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT AND GRANTING IN PART AND DENYING IN PART FEDERAL DEFENDANTS' CROSS-MOTION FOR SUMMARY JUDGMENT

The Court has read and considered the memoranda of points and authorities and other documents in support of and in opposition to Plaintiffs' motion for summary judgment and Federal Defendants' cross-motion for summary judgment, and has heard and considered the arguments of counsel at the hearing on these matters held on October 3, 2007. NOW THEREFORE, good cause appearing, the Court GRANTS IN PART AND DENIES IN PART Plaintiffs' motion for summary judgment, as follows.

1. As to the lawfulness of the National Marine Fisheries Service's ("NMFS") 2004 Biological Opinion on the impacts of the long-term operations of the Central Valley Project and State Water Project on Sacramento River winter-run Chinook, Central Valley spring-run Chinook, Central Valley steelhead ("CV steelhead"), Southern Oregon/Northern California Coast coho, and Central California Coast steelhead ("Biological Opinion") under the Administrative Procedure Act ("APA") and the Endangered Species Act ("ESA"), Plaintiffs' motion for summary judgment is:

(a) GRANTED as to NMFS's record findings and analyses, which fail to explain contradictory evidence as to the survival and recovery of winter-run Chinook, spring-run Chinook, and CV steelhead ("the three species"). Federal Defendants' cross-motion for summary judgment on this issue is DENIED.

(b) GRANTED as to the failure to analyze adverse effects on and modification to the critical habitat of the three species. Federal Defendants' cross-motion for summary judgment on this issue is DENIED.

(c) GRANTED as to whether NMFS failed to conduct an ESA analysis on the three species' life cycles and population dynamics. NMFS is ordered to complete the required ESA analysis on the three species' life cycles and population dynamics in its forthcoming biological opinion. Federal Defendants' cross-motion for summary judgment on this issue is DENIED.

(d) GRANTED as to whether NMFS's focus on incremental Project impacts was arbitrary and capricious. NMFS is ordered to complete the required ESA analysis on incremental Project impacts in relation to baseline conditions in its forthcoming biological opinion. Federal Defendants' cross-motion for summary judgment on this issue is DENIED.

(e) DENIED as to the failure to address "Entire Agency Action." Federal Defendants' cross-motion for summary judgment on this issue is GRANTED.

(f) GRANTED as to the issue of global climate change and effects of the hydrology of northern California rivers. Federal Defendants' cross-motion for summary judgment on this issue is DENIED.

(g) DENIED on the issue of the sufficiency of the Biological Opinion's adaptive management plan and mitigation measures. Federal Defendants' cross-motion for summary judgment on this issue is GRANTED.

2. Plaintiffs' motion for summary judgment against the Bureau of Reclamation ("Bureau") under ESA § 7(a)(2) is:

(a) DENIED as to the issue of the Bureau's political bad faith. Federal Defendants' cross-motion for summary judgment on this issue is GRANTED.

(b) DENIED as to the issue of mitigation standards. Federal Defendants' cross-motion for summary judgment on this issue is GRANTED.

(c) GRANTED as to unexplained internal contradictions about jeopardy and recovery of the species. Federal Defendants' cross-motion for summary judgment on this issue is DENIED.

(d) GRANTED as to the issue of the Bureau's reliance upon a biological opinion that failed to consider all relevant factors, including recovery and critical habitat impacts. Federal Defendants' cross-motion for summary judgment on this issue is DENIED.

(e) DENIED on the issue of global climate change. Federal Defendants' cross-motion on this issue is GRANTED, upon the condition that the Bureau complete a legally sufficient biological assessment that considers global climate change.

(f) DENIED as to the issue of the Temperature Control Point location. Federal Defendants' cross-motion for summary judgment on this issue is GRANTED.

(g) DENIED as to alleged failure to consider 100% of water deliveries. Federal Defendants' cross-motion for summary judgment on this issue is GRANTED.

(h) DENIED as to the issue of the Bureau's continued reliance on the Biological Opinion in the face of post-issuance information. Federal Defendants' cross-motion for summary judgment on this issue is GRANTED.

3. As to the Bureau's obligations under ESA § 7(d), Plaintiffs' Motion is DENIED. The Federal Defendants' cross-motion for summary judgment on this issue is GRANTED, upon the condition that Federal Defendants continue to take no actions during reconsultation that make any irreversible or irretrievable commitment of resources which forecloses the formulation or implementation of any reasonable and prudent alternative measures.

The parties shall comply with the schedule for the June 6, 2008, hearing on interim remedies and on whether the Biological Opinion should be remanded without vacatur.

SO ORDERED.

DATED: June 10, 2008

/s/ OLIVER W. WANGER
Oliver W. Wanger
United States District Judge

Los Angeles County Superior Court, "*Sierra Club, et al. v. City of Santa Clarita*, Case No. BS 098722" (August 14, 2006)

ORIGINAL FILED
AUG 14 2006
LOS ANGELES
SUPERIOR COURT

SUPERIOR COURT OF CALIFORNIA

COUNTY OF LOS ANGELES

SIERRA CLUB, et al., Petitioner, vs. CITY OF SANTA CLARITA, et al., Respondent. NEWHALL LAND AND FARMING, Real Party in Interest.	CASE NO. BS 098 722 DECISION ON SUBMITTED MATTER

Having taken the matter under submission on May 31, 2005, having considered all the evidence admitted and the parties' oral and written arguments, the Court rules as follows:

Petitioners Sierra Club, Center for Biological Diversity, Friends of the Santa Clarita River, and California Water Impact Network ("Petitioners") seek a Writ of Mandate commanding Respondents City of Santa Clarita and Santa Clarita City Council ("City" or "Respondents") to set aside its decision certifying the Final Environmental Impact Report ("FEIR") and approving the Project known as Riverpark in favor of Real Party in Interest Newhall Land and Farming ("Newhall").

The Riverpark project is located on a 695.4-acre site. Originally, Riverpark proposed 1,183 residential units, consisting of 439 single-family homes and 744 apartments, and 40,000 square feet of commercial development, a trail system, a 29-acre active/passive park along the Santa Clara River, and approximately 442 acres of open space area, including most of the Santa Clara River. (2 AR, Tab 4, 340-42 [Draft EIR, § 1.0, Project Description].) Through the public hearing process, the project was revised by converting the apartments to condominiums or townhouses, reducing to 1,123 the residential units and to 16,000 square feet commercial development, and preserving additional areas of the Santa Clara River and its south fork. (10 AR, Tab 12, 11742-44 [FEIR, Project Revisions and Additional Information].) Further hearings in 2005 reduced the residential units to 1,089, consisting of 432 single family homes and 657 condominium/townhouses, and provided for the preservation of more land and river areas, totaling 788 acres (470-acres on-site) for recreation and open space. (10 AR 11742-44; 9 AR, Tab 11, 11418-22.) Included among the 318 off-site acres are the remaining portions of the south fork of the Santa Clara River owned by RPI, and 37 acres of the Santa Clara River significant ecological area ("SEA").

Project approvals included a General Plan Amendment, a Zone Change, a vesting tentative tract map, a conditional use permit to build in excess of two stories and a maximum of 50-feet, Hillside Innovative Application, a permit for vehicular gating, a variance to reduce setback requirements and to build sound walls in excess of 7 feet, Hillside Development Application, and an Oak Tree Permit. (1 AR, Tab 2, 9-114; 2 AR 259.)

The Planning Commission held 9 hearings and on 12/21/04 recommended that the City Council certify the EIR and adopt a Statement of

Overriding Considerations for impacts that could not be mitigated to a less than significant level. (1 AR, Tab 2, 9-22 [App. Reso.]; 7:2 AR, Tab 9, 8079-81 [12/21/04 Hearing Transcript]; 73 AR, Tab 652, 51639-43 [12/21/04 Staff Report].)

The City Council held 3 hearings and certified the EIR on 5/24/05, unanimously approving the project on 6/14/05. (1 AR, Tab 2, 22-26; 1 AR, Tab 3, 115-229.)

Petitioner filed within Petition for Writ of Mandate alleging non-compliance with CEQA.

To establish violation of the California Environmental Quality Act ("CEQA"), Petitioner must show an abuse of discretion in that the County either failed to proceed in the manner required by law or the determination or decision is not supported by substantial evidence. (Code Civ. Proc., § 1094.5(b); Pub. Resources Code, §§ 21168, 21168.5.) When CEQA non-compliance is alleged, the Court reviews the entire record to see if substantial evidence supports the challenged determinations.

"Substantial evidence" is defined as "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." (14 Cal. Code Regs., § 15384(a); Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal.3d 376, 393.) Substantial evidence may include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts, but not argument, speculation, unsubstantiated opinion, or clearly erroneous evidence. (Pub. Resources Code, §§ 21080(e)(1)(2), 21082.2(c).)

"[I]n applying the substantial evidence standard, the reviewing court must resolve reasonable doubt in favor of the administrative

finding and decision. As such, if there are conflicts in the evidence, their resolution is for the agency." (River Valley Preservation Project v. Metropolitan Transit Development Board (1995) 37 Cal. App. 4th 154, 168.) Determinations in an EIR must be upheld if supported by substantial evidence, and the mere presence of conflicting evidence in the administrative record does not invalidate them. (Chaparral Greens v. City of Chula Vista (1996) 50 Cal.App.4th 1134, 1143.) An agency's approval of an EIR may not be set aside on the ground that an opposite conclusion would have been equally or more reasonable. (Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal.3d 376, 393.) The Court's role is not to substitute its judgment for that of the local agency representatives, but to enforce legislatively mandated CEQA requirements. (Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564.) The Court passes only upon the EIR's sufficiency as an informative document, not upon the correctness of its environmental conclusions. (Laurel Heights at 392.)

I. City Properly Relied on the 41,000 AFY Water Transfer for Planning Purposes

Petitioners contend that the City is legally precluded from relying on water from the transfer of 41,000 AFY acre feet per year ("AFY") of State Water Project ("SWP") water to the local SWP wholesaler, Castaic Lake Water Agency ("CLWA") ("41,000 AFY transfer") for planning purposes, and the EIR's reliance on water supplies is not supported by substantial evidence.

The water for the Riverpark project is to be supplied by CLWA.

In 1999, CLWA entered into a contract with the Kern Delta Water District for transfer of 41,000 acre feet per year (AFY) as part of the

"Monterey Agreement."[1] The CLWA certified an EIR for the 41,000 AFY transfer tiered on the earlier program EIR that had been prepared for the Monterey Agreement.

In Planning and Conservation League v. Dept. of Water Resources (2000) 83 Cal.App.4th 892 ("PCL"), the PCL challenged the Monterey Agreement program EIR. The Court of Appeal held that the EIR should have been prepared by DWR as the lead agency, rather than by one of the contractors, and that a new EIR must be prepared and certified by DWR. The Court did not invalidate the Monterey Agreement or enjoin the water transfers effected thereunder, but directed the trial court to consider under CEQA section 21168.9 whether the Monterey Agreement should remain in place pending preparation of DWR's new EIR, and to retain jurisdiction pending certification of DWR's EIR.

In Friends of Santa Clara River v. CLWA (2002) 95 Cal.App.4th 1373 ("Friends I"), the Court of Appeal ordered CLWA's EIR decertified because it had been tiered from the Monterey Agreement EIR, adjudged inadequate: "We have examined all of appellant's other contentions and find them to be without merit. If the PCL/tiering problem had not arisen, we would have affirmed the judgment." (Friends, supra, at 1387.) The Court did not issue any ruling affecting CLWA's ability to continue to use and rely on water supplies from the 41,000 AFY Transfer, leaving it to the trial court's discretion whether to enjoin CLWA's use of the water pending its completion of a new EIR. (Friends, supra, at 1388.)

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[1]An excellent history of the SWP and the role of Department of Water Resources ("DWR") in the management of the SWP, the Monterey Agreement and amendments, and relevant litigation is set forth in Calif. Oak Foundation v. Santa Clarita, 133 Cal.App.4th 1219 (2005).

In September 2002, on remand to the Los Angeles County Superior Court, the Friends petitioners applied under CEQA section 21168.9 to enjoin CLWA from continuing to use and rely on water from the 41,000 AFY Transfer. The trial court rejected that request, and in December 2003, the Court of Appeal affirmed the trial court's ruling allowing CLWA to continue to use and rely on water from the 41,000 AFY Transfer pending completion of its new EIR. (Id.; see also, Friends of the Santa Clara River v. Castaic Lake Water Agency, 2003 WL 22839353 ("Friends II") at Tab 7, 5 AR 4180-97.)

Meanwhile, on 5/5/03, before the trial court acted on remand, the parties to the PCL litigation entered into the Monterey Settlement Agreement.[2] Section II of that agreement provides that SWP would continue to be administered and operated in accord with both the Monterey Amendments and the terms of the Monterey Settlement Agreement. (5:1 AR, Tab 7, 4367.) The Monterey Settlement Agreement did not invalidate or vacate the Monterey Amendments, or any water transfer effected under them.

A. PCL, Friends of the Santa Clara River and California Oak do not preclude reliance on the 41,000 AFY Water Transfer

Petitioners contend that legal uncertainties surrounding the 41,000 AFY transfer due to the PCL and Friends lawsuits preclude the City from relying on water from that transfer for planning purposes. Specifically, Petitioners contend that because PCL requires the Department of Water Resources ("DWR") to prepare an EIR analyzing the

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[2]On 6/6/03, the Sacramento County Superior Court issued its Order under CEQA section 21168.9, approving both the Monterey Settlement Agreement, and the continued operation of the SWP pursuant to the Monterey Amendment and the approved Monterey Settlement Agreement. (See 6 AR, Tab 8, 6557; 8 AR, Tab 10, 9775-78 [Order].)

effects of the eight SWP water transfers completed under the Monterey Agreement, none of those transfers, including the 41,000 AFY transfer, can be relied on for planning purposes until DWR has completed and certified that EIR. Moreover, Petitioners contend that the Court of Appeal so held in California Oak Foundation v. City of Santa Clarita (2005) 133 Cal.App.4th 1219.

PCL, Friends and California Oak (discussed infra) do not preclude reliance on the 41,000 AFY transfer for planning purposes.

While the Courts of Appeal could have simply said that all EIRs requiring reliance on the 41,000 AFY transfer, must await the certification of a new FEIR by DWR (and resolution of any litigation challenging such FEIR), they have not done that.

Although the Court in Friends and California Oak observed that CLWA "may be able to cure the PCL problem by awaiting action by the [DWR] complying with the PCL decision, then issuing a subsequent EIR, supplement to EIR, or addendum . . . tiering upon a newly certified Monterey Agreement EIR" (California Oak, supra, 133 Cal.App.4th at 1230, n.6), neither court said that the CLWA and City of Santa Clarita must await the DWR FEIR.

CLWA certified a new EIR on the 41,000 AFY Transfer on 12/22/04. (Tab 10, 8:2 AR 10441-480 [CLWA Resolution certifying the EIR]; see also Tab 637, 63 AR 43468-44683 [CLWA FEIR]; Tab 12, 10 AR 11750 [Final Riverpark EIR Project Revisions and Additional Information.) This new EIR analyzes the effects of the 41,000 AFY Transfer without tiering from the Monterey Agreement EIR.[3] Although CLWA's EIR is currently being

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[3]The CLWA EIR concludes that the Monterey Settlement Agreement neither requires that DWR's new EIR be certified before CLWA can certify its new EIR for the 41,000 AFY Transfer, nor requires that DWR's new EIR

challenged, CEQA requires that the EIR be conclusively presumed to comply with CEQA, until a court has judged it deficient. (See. e.g., CEQA, § 21167.3(b), CEQA Guidelines, § 15231; see also, Barthelemy v. Chino Basin Water Dist., supra, 38 Cal.App.4th 1609, 1617.)

Since the prior CLWA EIR for the 41,000 AFY Transfer was overturned solely because it tiered from a later-decertified Monterey Agreement EIR, and CLWA has now certified an EIR approving the 41,000 AFY Transfer without tiering from the Monterey Agreement EIR,[4] the City reasonably included water from the 41,000 AFY Transfer in CLWA's supplies, after considering at length the current status of all litigation.[5]

B. The 41,000 AFY transfer is sufficiently certain and the Monterey Settlement Agreement does not preclude Respondents from relying on said transfer in its EIR pending DWR's preparation of its EIR.

As argued by Respondents, three provisions in the Monterey Settlement Agreement, read together, refute Petitioners' argument that the 41,000 AFY Transfer was excluded from Attachment E because it was a non-permanent transfer, which may not be used for planning purposes.

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serve as the EIR for that Transfer. (Tab 637.63 AR 43987-92 [CLWA Master Response to Comments].) These conclusions are consistent with Friends II, that the 41,000 AFY Transfer is *not* legally bound to the PCL litigation or to DWR's new EIR. (Tab 7, 5:1 AR 4195-4196.)

[4]Although DWR is in the process of certifying its own EIR pursuant to PCL and the Monterey Settlement Agreement, DWR approved CLWA's preparation of its EIR in a comment letter on the Draft EIR, and noted that CLWA's Draft EIR "adequately and thoroughly discusses the proposed project and its impacts," and "adequately discusses the reliability of the SWP, pre- and post-Monterey Amendment conditions, future conditions and SWP operations." (Tab 637, 63 AR 43482-83.)

[5]Respondents' Riverpark EIR discusses the prior litigation and devotes 8 pages to discussion of the litigation surrounding CLWA's EIR on the 41,000 AFY Transfer in its response to comments alone. (Tab 8, 6 AR 6551-6559.)

Section III(C)(4) requires DWR to conduct an "[a]nalysis of the potential environmental impacts relating to" all eight of the completed water transfers, not just of the 41,000 AFY Transfer (Tab 7. 5:1 AR 4368-69) and to analyze all of the transfers in the same manner, even though seven of them, defined in the Agreement as the "Attachment E Transfers," were beyond challenge. (Id. [Section III(C)(4)j; Tab 7, 5:1 AR 4370 [Sections III(D), III(E)].) Section III(D) precludes challenges to the Attachment E Transfers, which had been litigated in other forums or had become final without challenge by the expiration of limitation periods. (Tab 7. 5:1 AR 4370.) Section III(E) acknowledges the jurisdiction of Los Angeles Superior Court over the then-ongoing Friends litigation challenging CLWA's EIR on the 41,000 AFY Transfer (Tab 7, 6 5:1 AR 4370) pending completion of CLWA's new EIR, but does not distinguish the 41,000 AFY Transfer from the Attachment E transfers otherwise.

The Monterey Settlement Agreement does not prohibit reliance on the 41,000 AFY Transfer. All of the water transfers were effected as permanent transfers under the Agreement and are to be analyzed in the same way in DWR's new EIR, as required by Section III(C)(4).

Petitioner contends that the continued availability of the 41,000 AFY transfer is uncertain until DWR has concluded its EIR and that under California Oak, the City may not presume that the outcome of DWR's environmental review will be the continued availability of the 41,000 AFY.

DWR, however, has recognized the 41,000 AFY Transfer as a permanent transfer under the Monterey Agreement by entering into Amendment No. 18 to CLWA's agreement, which increases its Table A Amount by 41,000 AFY (Tab 10, 8:1 AR 9212-14), and has since consistently allocated water

supplies to CLWA based on that entitlement (Tab 4, 2:2 AR 1015-17 [DEIR]). Furthermore, as noted supra, DWR also submitted positive comments on CLWA's Draft EIR. (Tab 637, 63 AR 43482-83).

DWR's analysis of the 41,000 AFY Transfer in its new EIR will be part of a broader analysis of past and future permanent transfers of Table A Amounts, and will not constitute the EIR for the 41,000 AFY transfer. (5:1 AR, Tab 7, 4369.) As noted supra, PCL, Friends and the Monterey Settlement Agreement do not prohibit CLWA's preparation of its new EIR addressing the impacts of the 41,000 AFY transfer. (Tab 637, 63 AR 43987-92 [CLWA Master Response to Comments].)

California Oak, being most recent, deserves further discussion. In California Oak, the Court struck down the City's certification of an earlier EIR for an industrial project because it did not address the legal uncertainties surrounding the 41,000 AFY Transfer. California Oak did not bar the use of water from the 41,000 AFY transfer for all planning purposes. It criticized the City's failure to explain its reasoning for relying on the 41,000 AFY transfer, but held that it was up to the City to determine whether or not to rely on the 41,000 AFY transfer in its planning. The Court stated: "*[T]he question is whether the entitlement should be used for purposes of planning future development*, since its prospective availability is legally uncertain. *Although this decision must be made by the City*, the EIR is intended to serve as an informative document to make government action transparent. Transparency is impossible without a clear and complete explanation of the circumstances surrounding the reliability of the water supply." (Id. at 1237-38; emphasis supplied.) Before relying on water from the 41,000 AFY transfer for planning purposes, the City must "present a reasoned analysis of the significance . . . [or insignificance] of the

decertification of the EIR for the Castaic purchase; how demand for water would be met without the 41,000 AFY entitlement; or why it is appropriate to rely on the 41,000 AFY transfer in any event." (Id. at 1244.)

The Court in California Oak ruled that the EIR contained an inadequate discussion, in fact no discussion at all, of the uncertainty regarding the 41,000 AFY transfer in the EIR itself, but only references to it in the appendices, and responses to comments. The text of the EIR did not mention the decertification of the CLWA EIR, or that "entitlements are not really entitlements, but only 'paper' water." (California Oak, supra, 133 Cal.App.4th at 1236.) From the EIR, the Court could only assume that City concluded the 41,000 AFY would continue to be available, but found that the lack of a forthright discussion of a significant factor that could affect water supplies was antithetical to the purpose of an EIR to reveal to the public the basis on which officials approve or reject environmental action. (Id. at 1237-38). Thus, the Court held that the EIR failed to inform the public of the litigation uncertainties surrounding the 41,000 AFY transfer, and substantial evidence did not support the City's decision to rely on water from that transfer for planning purposes.

Here, by contrast, the City discussed the 41,000 AFY transfer and its uncertainties at considerable length, both in the EIR and throughout the review process. (See infra, pp. 12-16.) The PCL, Friends, Friends II, and California Oak decisions were all discussed. The City concluded that it was likely that the 41,000 AFY would be available for the project. By the time the City Council held it first Riverpark hearing on 1/25/05, the City also had before it CLWA's certified new EIR for the 41,000 AFY transfer, which was not the case in California Oak.

The Riverpark EIR adequately discloses the uncertainties regarding the 41,000 AFY transfer and discusses them forthrightly.

C. Substantial evidence supports reliance on 41,000 AFY water transfer and the EIR's analysis of the transfer is not flawed

Petitioners contend that substantial evidence does not support the City's decision to rely on water from the 41,000 AFY Transfer.

As noted, California Oak held that, as long as the city has analyzed the uncertainties surrounding this water supply, it is within the City's province to decide whether to rely on the 41,000 AFY Transfer for planning purposes.

The EIR and the Administrative Record contain substantial evidence supporting the City's decision that water from the 41,000 AFY Transfer can be relied on as part of CLWA's supplies.

CLWA, the SWP and the reliability of its water supplies, the Monterey Agreement, the PCL litigation, the Monterey Settlement Agreement, CLWA's Table A Amounts, and the Friends litigation are all extensively discussed in the EIR. The City specifically discloses that a future adverse judgment invalidating the Monterey Agreement could affect CLWA's ability to use water from the 41,000 AFY transfer and adversely affect CLWA's water supplies over the long term, but that, based on the information discussed, CLWA (the experts concerning water supply) believed that such a result "is unlikely to >unwind' executed and completed agreements with respect to the permanent transfer of SWP Water Amounts." (Tab 4,2:2 AR 1014-15; see also, Tab 8,6:2 AR 6551-59 [TR-3].) Further, the EIR notes the 41,000 AFY Transfer was completed in 1999, CLWA has paid approximately $47 million for the additional Table A Amount, the monies have been delivered, the sales price has been financed through CLWA by tax-exempt bonds, and DWR has increased CLWA's

SWP maximum Table A Amount and delivered or made available to CLWA the 95,200 AFY because it was a permanent transfer/reallocation of SWP Table A entitlement between SWP contractors." (Tab 4, 2:2 AR 1013.) Included in the EIR's Appendices and referenced in the EIR, are the 19 documents supporting the EIR's analyses, including the PCL decision, the Monterey Settlement Agreement, the Sacramento County Superior Court's "Order Pursuant to Public Resources Code Section 21168.9," the Friends decision, the Los Angeles County Superior Court's Judgment on remand in the Friends litigation, CLWA's final EIR for the 41,000 AFY Transfer, and CLWA's Resolution certifying that EIR.

The City responded to numerous comments challenging the EIR's conclusion that CLWA could rely on the 41,000 AFY Transfer for planning purposes. Due to the number of comments, and the amount of information required to respond, the City prepared a "master" response on this subject, TR-3 (Tab 8, 6:2 AR 6551-59). TR-3 reviews the information disclosed in the EIR's Water Services section regarding the 41,000 AFY Transfer and the Friends litigation, then responds to comments asserting that: (i) the PCL litigation and Monterey Settlement Agreement preclude CLWA from using or relying on that water transfer, and (ii) because the Monterey Settlement Agreement requires DWR to prepare a new EIR on the Monterey Agreement, CLWA cannot rely on the water transfer until that new EIR is completed. The City also prepared responses to individual comment letters on the 41,000 AFY Transfer[6] All of these comments and

[6]See, for example, responses to comments from the Santa Clarita Organization for Planning and the Environment (Tab 8, 6 AR 5962-66, 6689-6717), Petitioners Sierra Club (Tab 8, 6 AR 6194-6201, 6370, 6737-66, 6829-30), California Water Impact Network (Tab 8, 6 AR 6273-74, 6767-75), Friends (Tab 8, 6 AR 6387, 6835-36), and from a law firm involved in the PCL litigation (Tab 8, 6 AR 6275-78, 6776-83).

responses are included in the Riverpark Final EIR.

The City's Planning Commission also held a study session on the subject of the reliability of available water supplies. (Tab 9, 7 AR 7480-92.)

Ultimately, the City reviewed all of this information, and the views expressed in the EIR, by CLWA, and by commentators opposed to the City considering the 41,000 AFY Transfer, and determined it was appropriate for the City to rely on those SWP supplies. (Tab 2, 1 AR 9-114 [App. Reso]; Tab 3. 1 AR 174-220 [CEQA Findings].) The City explained that its determination to allow Riverpark to rely on the 41,000 AFY Transfer was supported by the information in the EIR for four main reasons: (i) nothing in the Monterey Settlement Agreement or in any court decision precludes that reliance; (ii) nothing in the Monterey Settlement Agreement precludes CLWA from preparing and certifying its revised EIR for that transfer as instructed by the Court of Appeal in the Friends decision and, in fact, the Settlement Agreement was carefully crafted to leave that EIR and any required remedies to the Los Angeles County Superior Court; (iii) the fact that DWR is preparing an EIR that will analyze all of the water transfers under the Monterey Agreement does not preclude CLWA from preparing and certifying its revised EIR, as instructed by Friends; and (iv) CLWA's Final EIR re-approving the transfer had been certified without tiering from the Monterey Agreement EIR. (Tab 8, 6:2 AR 6558-59 [TR-3]; Tab 10, 8:2 AR 10441-10480; Tab 12, 10 AR 11750.)

As directed by California Oak, the City here has analyzed in considerable detail the uncertainties surrounding the AFY water transfer and explained the basis for its reliance on that transfer. The City's

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determinations are not an abuse of discretion, but supported by substantial evidence.

Petitioners' contention that the City makes false statements about the transfer (OB 7-9) is not borne out by the record.

The City's statement reads: "Because the 41,000 AF was a permanent water transfer, because DWR includes the 41,000 AF in calculating CLWA's share of SWP Table A Amount, and because the courts have not prohibited CLWA from using or relying on those additional SWP supplies, the City has determined that it remains appropriate for the Riverpark project to include those water supplies in its water supply and demand analysis, while acknowledging and disclosing uncertainty created by litigation." (Tab 8, 6:2 AR 6768-69.)

This statement is qualified and explained by the City's extensive discussion of the legal uncertainties arising from litigation, supra, and is not misleading. The statement cannot be taken out of context and must be read in light of other statements and evidence in the record. As regards "reliance on the fact that DWR counts the 41,000 AFY in Table A amounts, DWR has acknowledged the 41,000 AFY Transfer by continuously delivering SWP water, including water from the Transfer, to CLWA for many years. The Monterey Settlement Agreement treats the 41,000 AFY Transfer identically to the Appendix E Transfers. The City's discussion of the reliability of SWP water supplies, including the 41,000 AFY Transfer water, is a discussion relating to the ability of the SWP to deliver only such supplies as are available on a year-to-year basis. (See, e.g., Tab 4, 2:2 AR 1022-30.) The City discussed the reliability of available SWP supplies under average, dry and critical dry years, and that there would be sufficient supplies to meet Riverpark's demand and cumulative demand. (Id. at 1051-70.)

Unlike California Oak, the record shows that the City considered the 41,000 AFY transfer in the EIR, including the legal uncertainties, the reliability of available supplies of SWP water in general, and concluded, based on substantial evidence, that it was appropriate to rely on those supplies for planning purposes. The City also considered and responded to numerous comments. After 12 hearings before the Planning Commission and City Council, the City certified the EIR and approved Riverpark, knowing that water supplies from the 41,000 AFY Transfer were to some degree uncertain, but explaining the reasoning for its determinations and the evidence that supported it. That is all that CEQA and California Oak require.

II. Impacts on Biological Resources were Appropriately Evaluated

Petitioner contends that the project's impact on three special-status species, the western spadefoot toad ("Toad"), the San Diego back-tailed jackrabbit ("Jackrabbit") and the holly-leaf cherry woodlands ("Holly-Leaf") must be considered significant because they are "rare" within the meaning of CEQA, the EIR's responses to comments by Department of Fish and Game ("DFG") were inadequate, as were mitigation measures for the Toad and Jackrabbit.

CEQA Guidelines section 15065(a) provides: "A lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared for the project where there is substantial evidence, in light of the whole record, that . . . : (1) The project has the potential to . . . substantially reduce the number or restrict the range of an endangered, rare or threatened species . . . ." (Guidelines, § 15065(a); 51 AR 33996.)

Here, an EIR was prepared and the impacts on the Toad, Jackrabbit, and Holly-Leaf considered. Petitioner contends that, to assess the

significance of the project impacts on the Toad, Holly-Leaf, and Jackrabbit, the EIR was required to determine whether the species are "rare" under Guidelines section 15380(b)(2)(A), which defines "rare" as "[a]lthough not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens."

The EIR's conclusions with regard to these species are supported by substantial evidence.

Toad

The EIR concluded that impacts on the Toad would be significant and unavoidable (Tab 7, 5:2 AR 5774, 5827).

The EIR describes the Toad as a special-status species (Tab 7, 5:2 AR 5720-5730, 5737, 5831-36; see also Tab 9, 7:2 AR 8572 [Revised Draft EIR ("RDEIR")]), and defines "special-status wildlife" to include rare species, that is, State Species of Special Concern and Federal Species of Concern. (Tab 7, 5:2 AR 5728.) The EIR notes that Toads were found in three seasonal rainpools created by human disturbances in the middle of areas planned for development: in the right-of-way for the extension of Newhall Ranch Road, in the middle of Planning Area A-1, and in the middle of Planning Area B (Tab 7, 5:2 AR 5832-34). The potential impacts on the Toad were analyzed in accordance with CEQA and City thresholds and found to be significant (id. at 5750-53, 5774). Mitigation was recommended in the form of pre-construction surveys, preparation of a Resource Management and Monitoring Plan ("RMMP"), design and construction of new enhanced Toad habitat and implementation of a capture and relocation and monitoring program. Ultimately the EIR concluded that the impacts would remain significant and unavoidable, because such measures have not yet been proven to he highly effective,

and because of the possibility that not all of the individual Toads could be successfully captured and relocated (id. at 5811).

The City's responses to comments and its actions addressed DFG's concerns (Tab 8, 6:1 AR 5880-86 [DFG letter], Tab 8, 6:2 AR 6621-30 [response]), and those of other commentators (see, e.g., Tab 8, 6:1 AR 5876-77 [Santa Monica Mountains Conservancy letter], Tab 8, 6:2 AR 6610-14 [response]). The City followed DFG's recommendations, the City's "Western Spadefoot Toad Habitat Enhancement and Mitigation Plan" ("Toad Plan") was created by the City's expert biologist in consultation with DFG and was ultimately approved by DFG.

Substantial evidence in the record supports the City's decision to mitigate the impacts on the Toad rather than reconfigure the Project. Such evidence included opinion of City's expert biologist that the Toad Plan was likely to succeed, and DFG's approval of that Plan. It properly exercised its discretion to consider the remaining impacts on the Toad to be significant and unavoidable, and adopted a Statement of Overriding Considerations for the Toad. (Tab 3, 1 AR 145-150, 155-163, esp. 159 [SOC].) Arguments similar to Petitioners' arguments here were rejected in Defend the Bay v. City of Irvine (2004) 119 Cal.App.4th 1261, 1276-77.

Jackrabbit

For the Jackrabbit, the Revised DEIR determined that "[b]ecause this species is not state or federally listed as Endangered or Threatened, because it is considered relatively abundant in suitable habitat areas within its range, and because the direct loss of individual jackrabbits is expected to be low, it is expected that the regional population would not drop below a self-sustaining level with the implementation of this project," the loss of any individual

jackrabbits would not be considered a significant impact. (Tab 7, 5:2 AR 5775.)

The EIR identifies the Jackrabbit as a State and federal special-status species, and determined the significance of impacts on that species based on CEQA and City thresholds that recognize substantial adverse effects on special-status species and substantial reduction of habitat as being significant impacts (Tab 7. 5:2 AR 5750-53). Based on field surveys (see, e.g., Tab 7, 5:2 AR 5707-08 [RDEIR, § 4.6; Tab 6, 4 AR 4153-54), the EIR reported that Jackrabbits. which occur in a variety of habitats, had been sighted on-site in the riverbed, open terraces and disked fields, but that because those areas are disturbed, the overall quality of the habitat on site suitable for Jackrabbits was only moderate. (Tab 7, 5:2 AR 5735, 5739, 5775; Tab 9, 7:2 AR 8572 [RDEIR].) The EIR noted that the Project had been designed to include all NRMP applicable mitigation measures for the areas in and adjacent to the Santa Clara River (Tab 7. 5:2 AR 5754-61, and 5789-5800 [RDEIR, § 4.61; Tab 9, 7:2 AR 8576 [RDEIR]), including preconstruction surveys, capture and relocation, and riparian habitat creation enhancement. (Id. at 5757-5759, and 5793-95 [RDEIR, § 4.6]; see also, Tab 9, 7:2 AR 8541-42 [RDEIR]).

The EIR concluded that project-level impacts would be less than significant, not just because Jackrabbit is not a listed species and does not require heightened protection, but also because the species is abundant where it occurs, and, since it is mobile and would likely disperse to nearby better habitat rather than be killed as the site is developed, few individuals would be lost due to development of the site. (Tab 7, 5:2 AR 5775.) Nevertheless mitigation including preparation of an RMMP and preconstruction surveys of areas outside the NRMP areas for

the potential capture and relocation of special-status species was recommended. (Tab 7, 5:2 AR 5800-01, 5809-10; Tab 9,7:2 AR 8543-45, 8584-85 [RDEIR pages].) The EIR also concluded that the project-level and cumulative impacts on an aggregate of 280 acres of habitat, in general, necessarily including that for Jackrabbits, would be significant and unavoidable even after mitigation (Tab 7, 5:2 AR 5761-62, 5811, 5825-26, 5827). A Statement of Overriding Considerations was adopted for these impacts. (Tab 3, 1 AR 145-163.)

The City did not ignore DFG's comments, but in response to DFG, stated that it had considered the NRMP and its EIS/EIR, which had earlier analyzed impacts on the Jackrabbit within the NRMP area (in and adjacent to the Santa Clara River), and found those impacts to be significant and imposed mitigation to reduce them to a less than significant level. (Tab 8, 6:2 AR 6622-23.) Those mitigation measures, the City explained, had been incorporated into the Project as design features, and that Riverpark scaled back the activities permitted by the NRMP, so that the activities within the NRMP area would have even less of an impact on the Jackrabbit than the NRMP EIS/EIR had determined. (Tab 8, 6:2 AR 6622-24.)

Development was moved further back from the Santa Clara River to protect riparian resources, including Jackrabbit habitat (including bank stabilization in a portion of the site). A public trail that had been proposed in the riverbed was moved out to join the pedestrian/bike bridge over the Aqueduct. (Tab 8, AR 6623-24; see also Tab 2, Tab 4, Tab 12 [FEIR, Final Project Revisions]; Tab 11) The City also explained that the mitigation requiring preconstruction surveys and capture and relocation was more definitive than DFG described B more than simply forcing individuals to disperse. As to cumulative impacts, the City

noted that because the NRMP's mitigation measures had been imposed on all of the land between the eastern border of Riverpark vest to Castaic Creek, and because Riverpark had been revised to preserve even more upland, the EIR had concluded that cumulative impacts on the species would be less than significant. (Tab 8, AR 6624.)

DFG disputed the EIR's conclusions without challenging the City's survey methodology. (Tab 8, AR 5882.) As the City's response to DFG's comment letter shows, the City considered DFG's comments, but disagreed with them. The City's response did not assert that the EIR relied solely upon the NRMP EIS/EIR's analysis of impacts on the Jackrabbit. (Tab 8, AR 6622-24.) Rather, the EIR conducted its own independent analysis. (Tab 7 [RDEIR, § 4.6]; Tab 6 [survey report]; Tab 9 [RDEIR].) The City's responses to DFG contained a reasoned explanation based on scientific information. (See CEQA Guideline ' 15088.) The City was not required to accept DFG's opinions over those of its own expert. (Assn. of Irritated Residents, supra, at 1394-97; Laurel Heights I, supra, 47 Cal.3d at 393-93.)

Substantial evidence supports the EIR's conclusions on the Jackrabbit. The evidence shows the EIR conducted its own analysis of the impacts on the Jackrabbit, and did not rely solely upon the NRMP EIS/EIR for that analysis.

Holly-Leaf Cherry Scrub

The surveys conducted by the Project's expert botanist concluded that the plant community identified was not "holly-leaf cherry woodlands," but "holly-leaf cherry scrub" ("HLCS"), which is different and one not specified in DFG's List of California Terrestrial Natural Communities recognized by the California Natural Diversity Data Base (i.e. without any State or federal protection). (Tab 7, AR 5716-17; Tab

416, 53 AR 37223, 37247 and Tab 6, 4 AR 3363, 3387 [DEIR appendices, 2003 and 2002 rare plant surveys Tab 8, 6:2 AR 6627 [response to DFG comments].)

Based on the evidence, including the rare plant surveys conducted in 2002 and 2003, and supporting evidence (Tab 6, AR 3359-82, 3383-95), the EIR reported the expert botanist's identification of the plant community on-site as HLCS (Tab 7, 5:2 AR 57 16-17). The EIR properly defined the class of plants that were considered to be "special status plants" (Tab 7, 5.2 AR 5722), and did not include HLCS within that class based on the botanist's expert opinion. Based on CEQA and City thresholds, the EIR concluded that the permanent disturbance of 3.6 acres of HLCS, which did not support special-status plant or wildlife species and is not considered to be sensitive by the resource agencies, was not significant (Tab 7. 5.2 AR 5767). As noted before, the EIR concluded that the project-level and cumulative impacts from disturbing an aggregate of 280 acres of habitat, in general, necessarily including HLCS, would be a significant impact, and unavoidable even after mitigation, and, a Statement of Overriding Considerations was adopted as to this impact (Tab 3, AR 145-163).

The City's response to DFG's comments on the HLCS was not "dismissive." The City responded that based on scientific and other information the identified plant community was not "holly-leafed cherry woodland," but HLCS, because the canopy did not amount to a woodland canopy, and that DFG does not include HLCS within its list of special status plant communities. Also because only 3.6 acres of habitat would be permanently impacted by the Project, and HLCS "stand of trees" was not considered a sensitive plant community as identified by the DFG, the

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loss of the 3.6 acres would be less than significant under CEQA. (Tab 8, AR 6627.)

Substantial evidence supports the conclusions that the HLCS on site was not a special status species, and that impacts to it alone would not be significant.

III. Description of the Project and Mitigation Measures

Petitioners contend that the EIR fails as an informational document to adequately describe the project or the mitigation measures, misstates the public and agency concerns raised in comment letters, and fails to meaningfully respond to them.

The EIR adequately describes impact on the Santa Clara River and is not misleading

Petitioners contend the project will damage the river and the EIR and the City's staff reports mislead by "perpetuat[ing] the myth that the project will improve the condition of the river," (OB 16-17) and by the statement in Final EIR that the project "has been designed to preserve the Santa Clara River corridor." (AR 28.)

A review of the record discloses extensive discussion in the EIR and staff reports concerning the encroachment into the Santa Clara River and the impacts to it. Among other things, the EIR discloses that the Project would install buried bank stabilization in the western portion of the site, but not the eastern portion where the river corridor would remain substantially undisturbed up to the eastern boundary where the Newhall Ranch Road Golden Valley Road Bridge would be built. (See Tabs 4, 5, 7, 11, 12.) There is evidence that buried bank stabilization is less harmful to the river and its resources than traditional cement stabilization, yet protects adjacent development adequately (Tab 11, 9 AR 10739-47 [FEIR, App. C. Functional AssessmentC Summary], 10877-90

[id., Hybrid Functional Assessment/Riverpark], 11180-97 [FEIR, App. G, Additional Hydrology and Water Quality Analyses], 11202-19 [id., Addendum No. 1], 11405-17 [id., App. J, Additional Flood and Floodplain Modifications data]). Furthermore, revisions to the Project would lessen intrusion into the SEA and protect mature riparian resources that serve as habitat (id., esp. Tab 11, 9 AR 11419-22, 11516 [FEIR App. K. Project Revisions and Additional Information]; Tab 12, 10 AR 11741-61 [FEIR Final Project Revisions]; Tab 11, 9 AR 11224-35 [FEIR App. 1. 7/20/04 Staff Report]). Other evidence shows that the overall (temporary and permanent) intrusion into the SEA was reduced from the original 37 acres to 32.1 acres, and the permanent intrusion from 24 to 16.9 acres. (Tabs 11, 12.) The Project was also revised to dedicate approximately 318 off-site acres, including the approximately 141-acre "Round Mountain" site containing 37 acres of Santa Clara River SEA, which will in part further offset the Project's impacts on biological resources and the floodplain (Tab 12). The City nevertheless still considered the Project's intrusion into the Santa Clara River SEA to be a significant and unavoidable impact, and included it in the Statement of Overriding Considerations (Tab 7.)

Thus, the City did not "ignore Riverpark's encroachment into the river." It considered at great length the Project's impacts on the river and adjacent areas and required changes in the Project to reduce those impacts.

The EIR adequately describes the project setting and is not misleading

The City found that "the proposed project is appropriate for the subject property," "proposes considerably lower densities than existing nearby developments," and that "[b]y proposing a maximum of 1,089

residential units and approximately 16,000 square feet of commercial space, the project proposes development that would be substantially less dense and less intense than those that both the current and the proposed land use classifications would allow." (1 AR 30.)

Petitioners contend the finding is incorrect, because the City "never actually calculated the number of residential units that can actually be built on the site," and the site's physical characteristics, such as topography, constrain the number of units that can be built on any given parcel.

The findings relating to the project setting are adequate under CEQA and not misleading. Prior to the approval of the General Plan Amendment and Zone Change proposed by the Project, the City's General Plan designations for the site permitted development more dense and intense than the now-approved designations. (See, e.g., Tab 4, 2:1 AR 346-48 [DEIR, § 1.0, Project Description], 830-837 [Id., § 4.7, Land Use]; Tab 4, 18 2:2 AR 947-52.)

There is no requirement the City must calculate exact number of units which actually can be built.

The EIR adequately describes on-site and off-site dedications to the City

Petitioners contend the EIR does not "adequately describe both the on-and off-site [land] dedications, which the City considers a significant benefit, and has identified as one main bases [sic] for over-riding the project's significant adverse impacts," and City staff and the EIR do not discuss in an Agenda Report to the City Council a Planning Commissioner's comments during a debate on whether the Commission would consider the Project's proposed dedication of portions of the South Fork of the Santa Clara River to be a benefit under the

City's Ridgeline Preservation and Hillside Development Ordinance (OB 24-28.)

Preliminarily, these issues were not raised during the administrative process and, consequently, are now barred. (CEQA, § 21177(a); see Park Area Neighbors v. Town of Fairfax (1994) 29 Cal.App.4th 1442, 1447-48.) Moreover, the dedications were not offered as mitigation measures, but as benefits in connection with the City's issuance of a Statement of Overriding Considerations and the Hillside Development Application. (Tab 3. 1 AR 147-1 50.)

In any case, CEQA requires that an EIR analyze a project's adverse environmental impacts, not its benefits. (See, e.g., CEQA, § 21002.1(a).) Dedication of on-site and off-site open space to the City to be preserved in perpetuity does not create adverse environmental impacts. Even so, the EIR does discuss the attributes of these land dedications. The on-site land to be dedicated was discussed extensively in the Draft EIR (see. e.g., Tab 4, AR 367 [DEIR, § 1.0, Project Description]; Tab 4, 2:2 AR 1214-44 [id., § 4.12, Parks and Recreation]; Tab 7, 5:2 AR 5689-5827 [RDEIR, § 4.6, Biological Resources]), as well as in City staff reports (Tab 604,61 AR 42947-42953; Tab 652, 73 AR 51639-51650; Tab 652, 73 AR 51651-51811; Tab 666, 74 AR 51913-51925; Tab 674, 74 AR 52073-52085; Tab 2-3, 1 AR 9-227) and in Planning Commission hearings (Tab 3, 1 AR 147-150). The attributes and benefits of the off-site land dedications are discussed in the Final EIR (see, e.g., Tab 12. 10 AR 11742-61 [FEIR. Final Project Revisions]; Tab 11, 9 AR 11419-22, 11516 [FEIR. App. K, map, land use table, new SEA chart]).

Failure to discuss comments in the agenda report is not fatal here. The Planning Commission debated which Project attributes should be considered as benefits in connection with their decision whether to

recommend approval of the Hillside Development Application, for which Newhall had submitted its Innovative Application Compliance Report. The EIR analyzed the land being dedicated to the extent necessary to inform the City and the public, and based on that information, the Planning Commission ultimately voted on which Project benefits it viewed as supporting the Hillside Development Application, including, without limitation, the on- and off-site land dedications (Tab 9,7:2 AR 8079-81 [12/21/04 HT]; Tab 652, 73 AR 51639-45, esp. 51643 [12/21/04 Staff Report]; Tab 2, 1 AR 15-18 [App. Reso.]). All of this information was before the City Council.

The EIR adequately describes on and off-site dedications and does not fail as an informational document in other respects.

IV. Alternatives Were Considered as Required by CEQA

An EIR's alternatives analysis must include a reasonable range of alternatives to the project that would feasibly obtain the basic objectives of the project and evaluate the comparative merits of the alternatives. (Guidelines, § 15126.6(a).)

Petitioners contend that the City's rejection of Alternative 2, the Santa Clara River Reduced Bank Stabilization Alternative, in the EIR and in its Findings was "disingenuous and pretextual, and therefore contrary to the mandates of CEQA" and not supported by substantial evidence.

Substantial evidence supports the determinations made by the City in rejecting Alternative 2 and finding that, due to the revisions to the Project, that alternative was no longer environmentally superior.

The City rejected Alternative 2 for multiple reasons.

After analyzing Alternative 2's impacts as compared to those of the Project as originally proposed, the EIR concluded that, while this alternative would reduce impacts in certain environmental areas

(including biological resources) and create similar impacts in other areas, it would create greater impacts on population/housing/employment and parks and recreation, and would not meet five of the project objectives. (Tab 4, 2:2 AR 1490-1500.) The EIR noted that the project objectives of (1) providing a substantial number of new housing units adjacent to existing and planned infrastructure, service, transit and transportation corridors and employment areas to accommodate projected growth, and (2) developing a range of housing types accommodating a range of incomes and commercial opportunities, would not be met due to the reduction in residential units (all of which were single-family units). (Tab 4, AR 1499.) The objective of providing adequate flood protection, including bank stabilization where necessary, would not he met because the alternative does not provide for bank stabilization. The objectives of providing sufficient parks to satisfy park dedication requirements and meet regional needs, and of providing a range of active/passive recreational opportunities, would not be met due to the reduction in the size of the flatter, active portion of the proposed 29-acre park. (Id.; see also 1497.)

As noted above, the original Project was substantially revised over the course of the 24 public hearings. The Project as revised and approved: (1) Moved all development back to the resource line established by the Planning Commission, which reduced the Project's intrusion into the SEA and protected mature riparian resources that serve as habitat (Id.. esp. Tab 11, 9 AR 11419-22, 11516 [FEIR App. K, Project Revisions and Additional Information]; Tab 12, 10 AR 11741-61 [FEIR, Final Project Revisions]; Tab 11,9 AR 11224-35 IFEIR App. 1,7/20/04 Staff Report]), (2) Moved the equestrian trail out of the river (Id. esp. Tab 12, 10 AR 11741-61 [FEIR, Final Project Revisions]),

(3) Reduced the Project's overall (temporary and permanent) intrusion into the SEA from the original 37 acres to 32.1 acres, and its permanent intrusion from 24 to 16.9 acres, 7.5 of which are attributable to the construction of Newhall Ranch Road and one of which is attributable to the Santa Clara River Trail (Id. esp. Tab 11, 9 AR 11516 [FEIR App. K, new SEA chart]; Tab 12, 10 AR 11741-61 [FEIR. Final Project Revisions]), (4) Was conditioned on an absolute prohibition of construction of any lots within the new FEMA floodplain boundaries (Tab 11, 9 AR 11406-09 [CLOMR]: Tab 12, 10 AR 11756, 11757-58 [FEIR, Final Project Revisions].) (5) Relocated the Newhall Ranch Road/Golden Valley Road Bridge abutments farther out of the active channel of the river, resulting in reduced impacts to biological resources in those riparian areas (Tab 11, 9 AR 11410-17 [FEIR App. J, Technical Memorandum Hydraulic Design and Analysis]; Tab 12, 10 AR 11758 [FEIR, Final Project Revisions]) and (6) Dedicated approximately 318 off-site acres, including, inter alia, the ARound Mountain" site containing 37 acres of Santa Clara River SEA, which further offset the Project's impacts on biota and the floodplain (Tab 12, 10 AR 11741-58 [FEIR, Final Project Revisions]).

Based on the evidence as regards the revised project, the City Council found that, as compared with the Project as approved, Alternative 2 was no longer environmentally superior because the new Project design reduced development, and thus impacts, in areas not affected by the revisions contemplated by Alternative 2, that although the approved Project would afford the City 94 fewer residential units, it still preserved a greater mix of housing opportunities than did Alternative 2, which reduced the number of single-family lots, and that

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the approved Project would donate substantial off-site acreage. (Tab 3, AR 139-140 [Alternatives Findings]; see also 156 & 3,156-159.)

The findings as to Alternative 2 are supported by substantial evidence and the record shows that the City Council considered and balanced all of the competing factors, and chose to approve the Project with those factors in mind.

V. City Properly Found that the Project is Consistent with General Plan Goals and Policies of Protecting Significant Natural Resources

Government Code section 66473.5 provides that "[n]o local agency shall approve a tentative tract map . . . unless . . . [it] is consistent with the general plan."

It is within the City's province, to balance the competing interests reflected in its General Plan policies, and the City has broad discretion to construe those policies in light of the plan's purposes. (San Franciscans Upholding the Downtown Plan, supra, at 678.) A reviewing court, therefore, may only ascertain whether the lead agency "considered the applicable policies and the extent to which the proposed project conforms with those policies" (id.) by considering whether, as a whole, the "'project is compatible with, and does not frustrate, the general plan's goals and policies" (Napa Citizens for Honest Government v. Napa County Board of Supervisors (2001) 91 Cal.App.4th 342, 355.) A project must be in agreement or in harmony with the applicable General Plan, "not in rigid conformity with every detail thereof." (San Franciscans Upholding the Downtown Plan, supra.)

A lead agency's determination that a project is consistent with its general plan "can be reversed only if based on evidence from which no reasonable person could have reached the same conclusion." (A Local and Regional Monitor v. City of Los Angeles (1993)16 Cal.App.4th 630, 648;

see also San Franciscans Upholding the Downtown Plan v. City and County of San Francisco (2002) 102 Cal.App.4th 656, 6771.) In approving the Project, the City considered its General Plan policies and the Project conformance to them.

Petitioners contend that the Project is inconsistent with the City's General Plan goals and policies to protect significant natural resources because its intrusions into the SEA and the floodplain are inconsistent with the General Plan requiring the developer to "enhance and preserve the SEA," and the EIR's conclusion that the project is consistent with Land Use Policy Element 5.3 by "not proposing development within the river" (2 AR 891) is not supported by the evidence in the record.

The EIR analyzes the original Project's consistency with the City's General Plan and concludes that the Project as originally proposed was consistent with Policy 1.1 of Goal I of the City's Open Space and Conservation Element because the Project preserves the Santa Clara River and much of its significant vegetation as open space (Tab 4, 2:2 AR 859-60) as shown by evidence noted above as to other issues. Furthermore, as discussed supra, the Project was later revised, further reducing the Project's overall intrusion into the SEA from 37 to 32.1 acres, and dedicating 37 undeveloped acres of SEA in the Round Mountain property.

The EIR also concludes that the Project as originally proposed was consistent with Policies 3.3 and 3.7 of Goal 3 of the City's Open Space and Conservation Element, because the EIR identifies areas of significant ecological value and natural riparian habitat and mitigates impacts to the extent possible (Tab 4, 2:2 AR 861-62: see also Tab 7. 5:2 AR 5689-5827 [RDEIR, § 4.6, Biological Resources]). Also, as

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discussed supra, the Project as approved further reduces impacts to the SEA and other sensitive resources.

The original Project was also found to be consistent with Policy 5.3 of Goal 5 to require new development to be sensitive to SEAs through creative planning techniques that avoid and minimize disturbance in these areas for these same reasons (Tab 4, 2:2 AR 890-91), a conclusion supported by the same substantial evidence that supports consistency with Goal 1, Policy 1.1 of the Open Space and Conservation Element.

Petitioners' arguments that the Project impermissibly intrudes into the SEA restate their CEQA arguments. The same evidence in the record supports the consistency findings. The Project was revised to limit intrusion into the SEA. The City's decision after circulation of the Draft EIR to protect the riparian resources and habitat by setting the resource line in the western portion of the site and moving the equestrian trail out of the river bed further ensured that the Project as approved was consistent with the General Plan policies. The Project always proposed placing 15 lots within the already disturbed SEA area next to Planning Area A-2. (See, e.g., Tab 7, 5:2 AR 5785.) Also, as revised Section 4.6 explains, even the permanent loss of 24 acres of habitat, now reduced to 16.9, is not expected to detract from the overall integrity and value of the SEA, and the Project will preserve and enhance various amounts of upland habitat in Planning Area B to serve as a buffer between the riparian habitat and development and to mitigate adverse impacts to riparian plant communities within the SEA. (Id.) The benefits of the Project's enhancements to the banks of the Santa Clara River and to its main drainage in the 29-acre park are confirmed by the Final EIR's Hybrid Functional Assessment for Riverpark (Tab 11, 9 AR 10877-90).

Substantial evidence supports the finding of consistency with the City's General Plan.

The Petition for Writ of Mandate is denied.

Counsel for Respondent is ordered to prepare, serve and lodge in Department 85 a proposed Judgment Denying the Petition for Writ of Mandate on or before August 21, 2006.

DATED: August 14, 2006

DZINTRA I. JANAVS

Dzintra I. Janavs
Judge of the Superior Court

CLWA Letter to the Los Angeles County Department of Regional Planning Regarding Availability of Future Water Supplies in the Santa Clarita Valley, February 5, 2008

CASTAIC LAKE WATER AGENCY

February 5, 2008

Mr. Bruce W. McClendon, FAICP
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SECRETARY
APRIL JACOBS

Subject: Availability of Future Water Supply in the Santa Clarita Valley

Dear Mr. ~~McClendon~~ BRUCE:

In your September 21, 2007 letter (copy attached), you noted that reductions in local water supplies "...may invalidate portions..." of environmental impact reports for pending and future developments. This is the result of the reliability of water supply from the State Water Project (SWP) having been impacted by an injunction issued by a federal court. As a result, deliveries of SWP water were reduced starting last year.

On May 25, 2007, the court had ruled that a biological opinion (BO) supporting the "incidental take" of Delta smelt by SWP pumping operations was not in compliance with the federal Endangered Species Act. Accordingly, the court ordered the preparation of a new BO so that a permit could be granted to the SWP for the incidental take of the fish by the pumps. The injunction will be in effect until the new BO is completed. The same federal court issued a written court order on December 14, 2007 setting forth the "interim remedies" to protect the Delta smelt. It is the implementation of these interim remedies that reduces the availability and reliability of the SWP water supply.

In the meantime, CLWA and the four local water retailer staffs have been meeting with County and City of Santa Clarita planning staff over the last three months to coordinate water supply and land use planning activities for the Santa Clarita Valley. On January 28, 2008, the California Department of Water Resources (DWR) issued its "Draft State Water Project Delivery Reliability Report 2007" (Reliability Report), an assessment of the SWP supply availability and reliability. *Based on this new information, CLWA has determined that, while the injunction is in effect, there are sufficient water supplies available for pending and future residential and commercial developments within the CLWA service area for the foreseeable future through 2030 as set forth in the Santa Clarita Valley (SCV) Urban Water Management Plan (2005 UWMP).*

The Reliability Report addresses the effect that the injunction will have on SWP water availability. The purpose of the Reliability Report, which is updated and issued biennially, is to indicate how much SWP water is available for various hydrologic scenarios (i.e., normal, dry and critically dry years). This report is used by water agencies that have contracted for SWP water to determine SWP water supply availability and reliability as part of their determinations of *overall* water supply availability and reliability.

The Reliability Report includes additional and updated information that was not available in earlier Reliability Reports, along with an assessment of the impact of climate change on the SWP supply. This additional data, in conjunction with a more exact analysis of the operational impacts of the federal court injunction, will reduce the available water to CLWA from the SWP, but not as much as had been previously estimated.

The 2005 UWMP uses a 77% reliability factor for the SWP supply, which is taken from DWR's 2005 Reliability Report. In other words, CLWA's available SWP supply in the 2005 UWMP is equal to 77% of CLWA's SWP contract amount.

The Reliability Report, factoring in the effects of the injunction and using the most conservative of four climate change scenarios modeled by DWR, reduces that reliability to 66%. Using this lower figure (and certain changes and updated information regarding other sources of supply) to update the water supply figures in the 2005 UWMP, CLWA and the local purveyors believe there will be adequate supplies to meet demand as forecast in the 2005 UWMP through the year 2030. Therefore, while the injunction is in place, proposed projects can once again cite the 2005 UWMP, with the additional information provided by the Reliability Report, in their environmental documents as evidence of adequate water supplies to serve the projects under consideration.

The discussion of water supply in environmental documents should be tempered, though, by noting that the Reliability Report represents a reasonable scenario as required by the California Environmental Quality Act (CEQA), and would close the gap between the available supply and the demand in the future, thereby making the CLWA service area more subject to shortages in certain dry years. Accordingly, the reduction in SWP supply reinforces the need to continue diligent efforts to conserve potable water and increase the use of recycled water, both to meet the goals in the 2005 UWMP and to maximize utilization of our potable water supplies. CLWA and the purveyors will continue to work diligently with the County and City in preparing a Water Conservation Ordinance and the enforcement mechanisms to aggressively implement water conservation in the CLWA service area.

The injunction will be in force until the BO is issued, which is currently anticipated at the end of 2008. At that time, long-term reductions in SWP water availability will probably result from the mitigation requirements for the take permit that DWR is required to obtain to comply with the Endangered Species Act. These long-term reductions will likely require another update of the Reliability Report and water supply planning documents that affect land use planning decisions in the Santa Clarita Valley. It is expected that the mitigation requirements in the BO will be no greater than the operational restrictions of the injunction (i.e., the interim remedies); as such,

the reductions in SWP water supply as a result of the granting of the Endangered Species Act permit should also be no greater than those required by the injunction.

After the long-term water supply reliability has been reassessed based on the mitigation requirements of the BO, CLWA will confirm that DWR's current estimate of SWP reliability is still applicable or if it needs to be updated, presumably by another Reliability Report. CLWA would then use this information to amend its 2005 UWMP, which would include identification of potential additional supplies to replace any necessary portion of CLWA's SWP supply that would have been lost as a result of the BO mitigation requirements.

In the meantime (i.e., during 2008 and part of 2009), based on the revised Reliability Report, local water retailers should be able to provide affirmative responses to requests for SB 610 Water Supply Assessments (WSAs) and SB 221 Water Verifications (WVs) for proposed projects. CEQA Lead Agencies may also rely on the 2005 UWMP, with the additional information provided by the Reliability Report, for the analysis of water supply impacts in CEQA documents, and in making a determination as to the adequacy of water supply for land use projects.

CLWA and the local water retailers – CLWA Santa Clarita Water Division, Los Angeles County Water Works District #36, Newhall County Water District and Valencia Water Company – look forward to working with the County in allocating water to proposed development in a consistent and equitable manner while at the same time ensuring that no water supply disruptions occur to our existing customers.

Sincerely,

Dan Masnada
General Manager

Attachment

cc: Mr. Paul Brotzman, Planning and Economic Development Director
City of Santa Clarita, Department of Regional Planning
Mr. Steve Cole, General Manager, Newhall County Water District
Mr. Robert DiPrimio, President, Valencia Water Company
Mr. Dean Efstathiou, Chief Deputy Director, Los Angeles County Department of Public Works
Mr. Mauricio Guardado, Retail Manager, Santa Clarita Water Division
Mr. Paul Novak, Planning Deputy, Los Angeles County Board of Supervisors

Los Angeles County
Department of Regional Planning

Planning for the Challenges Ahead

Bruce W. McClendon FAICP
Director of Planning

September 13, 2007

Castaic Lake Water Agency
Dan Masnada, General Manager
27234 Bouquet Canyon Road
Santa Clarita, CA 91350-2173

REC'D SEP 21 2007

Subject: Availability of Future Water Supply

Dear Mr. Masnada:

The recent decision handed down by U.S. District Judge Oliver Wanger appears to have significantly reduced the amount of water that Southern California will receive from the State Water Project. The Department of Regional Planning is requesting that your agency inform this Department of impacts that may affect pending and future residential and commercial developments within your agency's service area.

Possible reductions in local water supplies may invalidate portions of environmental impact reports related to development proposals currently awaiting public hearing. Therefore, it is urgent that your agency respond as soon as a reasonably accurate determination can be made.

Should you have any questions, please feel free to contact Mr. Paul McCarthy of my staff at (213) 974-6461 between 7:30 a.m. to 5:30 p.m., Monday through Thursday. Our offices are closed on Friday.

Sincerely,

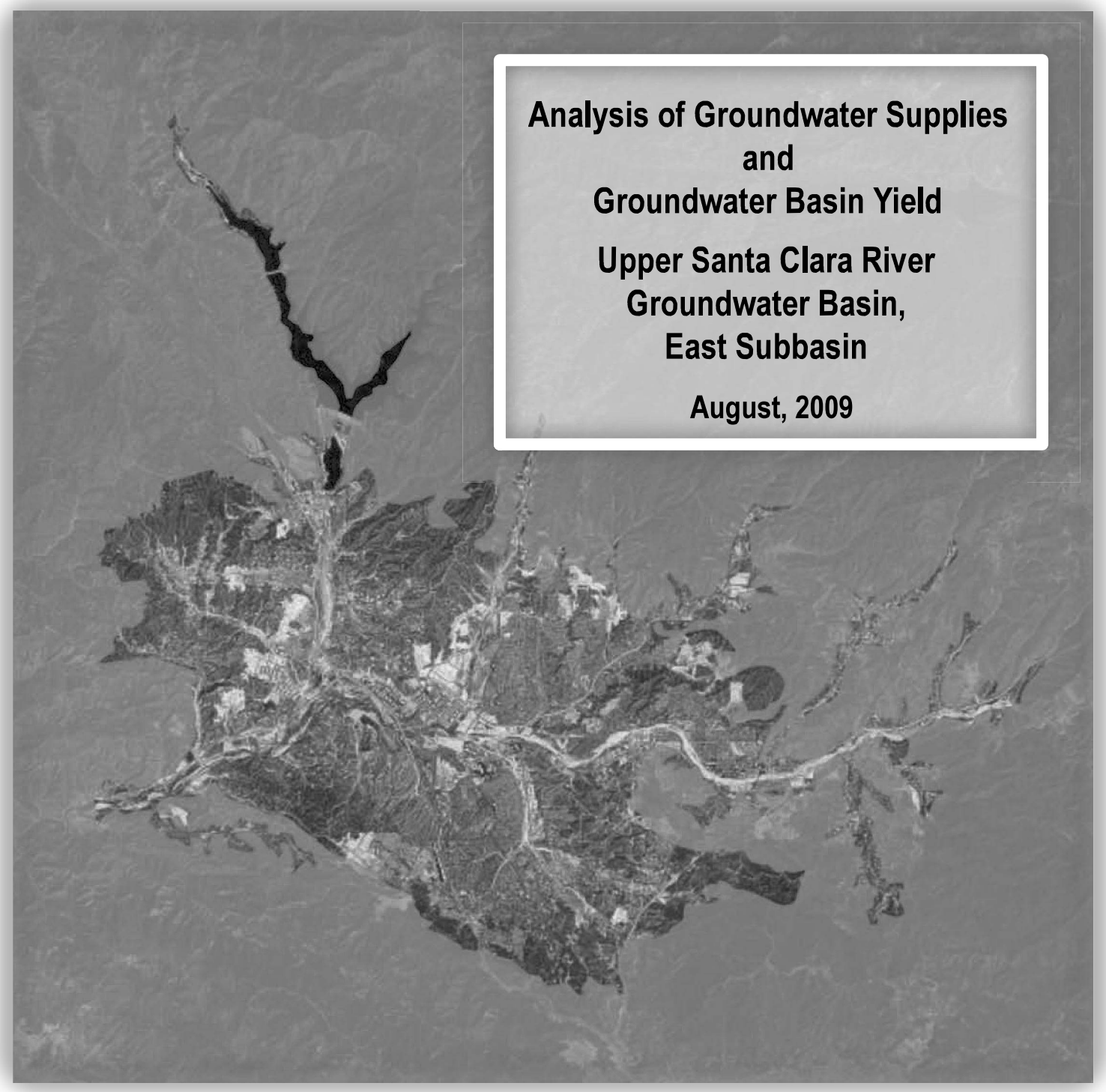
DEPARTMENT OF REGIONAL PLANNING

Bruce W. McClendon, FAICP
Director of Planning

BWM:JS:FM:PM:rs

Attachment

C: County Counsel
Department of Public Works



Analysis of Groundwater Supplies and Groundwater Basin Yield

Upper Santa Clara River Groundwater Basin, East Subbasin

August, 2009

prepared for

Santa Clarita Valley Municipal Water Purveyors

prepared by

LUHDORFF & SCALMANINI CONSULTING ENGINEERS

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Acronyms and Abbreviations

afy	acre-feet per year
AWRM	Alternative Water Resources Management program
CCCC	California Climate Change Center
CLWA	Castaic Lake Water Agency
CMIP3	Climate Model Intercomparison Project 3
DPH	California Department of Health Services
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
ET	evapotranspiration
GCM	global climate model
GFDL	Geophysical Fluid Dynamics Laboratory
gpm	gallons per minute
in/yr	inches per year
IPCC	Intergovernmental Panel on Climate Change
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation District
LARWQCB	Los Angeles Regional Water Quality Control Board
LLNL	Lawrence Livermore National Laboratory
LSCE	Luhdorff & Scalmanini Consulting Engineers
mg/L	milligrams per liter
mgd	million gallons per day
MOU	Memorandum of Understanding
NCAR	National Center for Atmospheric Research
NCWD	Newhall County Water District
NLF	Newhall Land & Farming Company
PCM1	Parallel Climate Model
Purveyors	Upper Basin Water Purveyors
RCS	Richard C. Slade and Associates, LLC
SCVSD	Santa Clarita Valley Sanitation District of Los Angeles County

SCWD	Santa Clarita Water Division of CLWA
SRES	Special Report on Emissions Scenarios
SWP	State Water Project
SWRM	Surface Water Routing Model
TMDL	Total Maximum Daily Loads
UWMP	Urban Water Management Plan
VWC	Valencia Water Company
WCRP	World Climate Research Programme
WHR	Wayside Honor Rancho
WRP	water reclamation plant
UCAR	University Corporation for Atmospheric Research
WRP	water reclamation plant

I. Introduction

In 2003, the retail water Purveyors in the Santa Clarita Valley (herein the Purveyors[1]) commissioned efforts to develop, calibrate and utilize a numerical groundwater model for purposes of analyzing the sustainability of local groundwater as a component of overall water supply in the Valley. At that time, the question of groundwater sustainability was complemented by a question about whether part of overall groundwater pumping could be employed to achieve containment and removal of perchlorate contamination in the deeper aquifer, the Saugus Formation, beneath the Valley. The results of those modeling efforts concluded that a certain groundwater operating plan (rates and distributions of groundwater pumping under varying local hydrologic conditions) would be expected to produce long-term sustainable groundwater conditions, and that a certain focused part of overall pumping would be expected to both extract perchlorate-contaminated groundwater (for use after treatment) and contain the migration of perchlorate-impacted groundwater. The development and calibration of the numerical groundwater flow model is described in *Regional Groundwater Flow Model for the Santa Clarita Valley, Model Development and Calibration* (CH2M Hill, April 2004). Application of the model for extraction and containment of perchlorate-impacted groundwater is described in *Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property* (CH2M Hill, December 2004). And application of the model for analysis of basin yield, including sustainability of groundwater pumping consistent with that employed in the perchlorate containment analysis, is documented in *Analysis of Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin, Los Angeles County, California* (CH2M Hill and LSCE, August 2005).

The groundwater system in the Santa Clarita Valley, located in northwestern Los Angeles County, is identified by the California Department of Water Resources (DWR) as the Santa Clara River Valley Groundwater Basin, East Subbasin (Basin No. 4-4.07) and lies within the DWR-designated Upper Santa Clara River Hydrologic Area [Figure 1-1]. Groundwater in the basin is pumped from a shallow Alluvial Aquifer and from deeper groundwater resources that are present in an older, underlying unit called the Saugus Formation. Most groundwater pumping is by the Purveyors for municipal uses (in the range of approximately 23,000 to 33,000 acre-feet per year (afy) in recent years), with some continuing pumping by private landowners, primarily for irrigation uses (approximately 13,000 to 17,000 afy in recent years). The Purveyors also have access to other sources of water to supplement groundwater for municipal supply, including imported State Water Project (SWP) water, groundwater banking outside the basin, recycled water, short-term water exchanges, and dry-year water purchase programs. Those sources are described in the Purveyors' current *2005 Urban Water Management Plan* (Black & Veatch, et al., November 2005) and in a series of annual *Santa Clarita Valley Water Reports*, most recently for 2007 (LSCE, April 2008).

The water supply and water resource management practices of the Purveyors call for maximizing the use of Alluvial Aquifer and imported water during years of normal or above-normal

[1] The Santa Clarita Valley Purveyors are comprised of Los Angeles County Waterworks District 36, Newhall County Water District, Santa Clarita Water Division of the Castaic Lake Water Agency (formerly Santa Clarita Water Company, acquired by CLWA in 1999), and Valencia Water Company.

availability of these supplies, and limiting the use of the Saugus Formation during these periods, then temporarily increasing Saugus Formation pumping during years when supplemental imported water supplies are significantly reduced because of drought conditions. These local management practices have been called the local groundwater operating plan; that term has been adopted in this report to identify the previously analyzed operating plan (the 2004 Operating Plan) and subsequent iterations analyzed herein (the 2008 Operating Plan, the 2008 Operating Plan with Pumping Redistribution, and a Potential Operating Plan).

1.1 Background

The numerical groundwater model was originally developed as part of the work scope contained in an August 2001 Memorandum of Understanding (MOU) that was adopted by the Purveyors and the United Water Conservation District, located downstream in Ventura County. That MOU was a commitment by the Purveyors to expand on previous analyses of groundwater conditions such that the adequacy of the local groundwater supply could be better understood and questions about surface water and groundwater resources could be more readily addressed. The MOU initiated a collaborative and integrated approach to data collection; database management; evaluating groundwater conditions and the sustainability of the Purveyors' operating plan; groundwater flow modeling; annual reporting on basin conditions; and technical reporting focused on geologic and hydrologic aspects of the overall stream-aquifer system.

In 2003, subsequent to the MOU, Castaic Lake Water Agency (CLWA) prepared and adopted a formal Groundwater Management Plan (CLWA, 2003), which includes 14 elements intended to achieve four management objectives, or goals, for the groundwater basin. Those four management objectives include development of local groundwater for water supply; avoidance of overdraft and associated undesirable effects; preservation of groundwater quality; and preservation of interrelated surface water resources. The intent of the Groundwater Management Plan is to ensure that ongoing utilization of local groundwater continues to result in acceptable aquifer conditions, specifically avoidance of overdraft (Element 3 of the Plan), no degradation of quality (Element 6 of the Plan), and no adverse impacts to surface waters (Element 2 of the Plan). The Plan identified these objectives and elements as being accomplished via continued conjunctive use operations that have been ongoing since the initial importation of supplemental surface water in 1980 (Element 5 of the Plan) and via monitoring and interpretation of surface water and groundwater conditions on an ongoing basis (Elements 1 and 2 of the Plan).

The Purveyors initially agreed in the MOU, and the Purveyors subsequently committed in the Groundwater Management Plan, to develop and use a numerical groundwater flow model for the sustainability evaluation of the local groundwater operating plan. Prior to that, the available data showed that no long-term lowering of the water table or degradation of water quality had occurred during the 50 to 60 years of recorded historical groundwater development in the valley, and the various studies and water planning efforts performed up to that time had resulted in a local groundwater operating plan that placed future pumping of the Alluvial Aquifer in the same range as historical pumping. However, although the MOU recognized a need to formally analyze the Alluvial Aquifer, it identified that the primary question to be evaluated with the model would be the operational yield of the Saugus Formation, given that the Purveyors' operating plan called for dry-year pumping from that aquifer at rates higher than had historically

been pumped. For that reason, the MOU identified that the model would evaluate the effect of the current groundwater operating plan on groundwater conditions in both the Alluvial Aquifer and the Saugus Formation over a multi-year wet/dry cycle. The operational yield was defined in the MOU as an operating plan for the local groundwater basin that would allow continued pumping from the Alluvial Aquifer and Saugus Formation while assuring that groundwater supplies would be adequately replenished from one wet/dry cycle to the next.

As introduced above, a groundwater operating plan was formally analyzed with the groundwater model as part of the perchlorate containment analysis in 2004, and then specifically as the focus of basin yield analysis in 2005. In summary, that plan was as follows:

- Pumping from the Alluvial Aquifer in a given year is governed by local hydrologic conditions in the basin. Under the operating plan, pumping ranges between 30,000 and 40,000 afy during normal and above-normal rainfall years but, because of operational constraints in the eastern part of the basin, is reduced to between 30,000 and 35,000 afy during locally dry years.

- Pumping from the Saugus Formation in a given year is tied directly to the availability of other water supplies, particularly imported water from the SWP system. For the Saugus Formation, the operating plan consists of pumping between 7,500 and 15,000 afy during average-year to wet-year conditions within the SWP system. Planned dry-year pumping from the Saugus Formation ranges between 15,000 and 25,000 afy during a dry year, and increases to between 21,000 and 25,000 afy if SWP deliveries are reduced for two consecutive years, and between 21,000 and 35,000 afy if SWP deliveries are reduced for three consecutive years. Such high pumping would be followed by periods of reduced (average-year) pumping, at rates between 7,500 and 15,000 afy, to further enhance the effectiveness of natural recharge processes that would recover water levels and groundwater storage volumes in the Saugus Formation, as has been historically experienced.

Simulated groundwater basin response to groundwater pumping in accordance with the 2004 Operating Plan, over a long-term period of varying hydrologic conditions, was concluded to be sustainable based on a two-part definition of sustainability, which is continued in the updated analysis reported herein, as follows:

- lack of chronic, or sustained, depletion of groundwater storage, as indicated by projected groundwater levels, over a reasonable range of wet, normal, and dry hydrologic conditions

- maintenance of surface water flows in the western portion of the basin (which are partially maintained by groundwater discharge) and surface water outflow to downstream basins over the same range of hydrologic conditions

The primary conclusion from the modeling analysis of the 2004 Operating Plan was that it would not cause detrimental short-or long-term effects to the groundwater and surface water resources in the Valley and was, therefore, sustainable. In summary, the groundwater basin could be

expected to respond to the 2004 Operating Plan in a manner similar to what had been experienced over approximately the preceding 50 years: Use of water from the Alluvium, slightly decreased during locally drier periods, was projected to result in small to large fluctuations in Alluvial Aquifer groundwater levels from the middle to the eastern part of the basin, followed by full to near-full recovery in wet years or periods of years. Different from historically experienced conditions is in the Saugus Formation, where greater Saugus pumping during periods of significantly reduced imported water supplies was projected to cause larger fluctuations in groundwater levels during such pumping, with full to near-full recovery of Saugus water levels in subsequent years when the availability of imported water supplies was expected to return to normal.

After completion of the sustainability analysis, the 2004 Operating Plan was incorporated in the Purveyors' collective 2005 Urban Water Management Plan (UWMP) to reflect the groundwater component of overall water supplies available to meet current and projected water requirements over the planning horizon of the UWMP.

1.2 Scope of Updated Analysis

In 2008, partly in preparation for the next UWMP in 2010, and in part because of recent events that are expected to impact the future reliability of the principal supplemental water supply for Santa Clarita Valley, i.e., from the State Water Project, the Purveyors concluded that an updated analysis was needed to further assess groundwater development potential and possible augmentation of the groundwater operating plan. Near-term reductions in SWP water deliveries to CLWA are possible because of an August 2007 court ruling that is expected to reduce exports from the Bay-Delta by approximately 30 percent in the immediate future. Additionally, the National Marine Fisheries Service (NMFS) released its Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project on June 4, 2009. The proposed regulatory actions will further restrict Delta export operations of the State Water Project, however, studies have not been completed quantifying impacts on SWP reliability. The duration of reductions are unknown and depend on a number of factors, including whether DWR can construct alternative facilities in the future to make up for reductions. Additionally, DWR is evaluating the potential magnitude of longer-term future reductions in SWP deliveries because of potential effects of global climate change.

A second consideration in conducting an updated analysis of the basin is that global climate change could alter local rainfall and associated recharge patterns, thus affecting local groundwater supplies, i.e. the yield of the basin. Finally, the Los Angeles County Flood Control District (LACFCD) is planning a number of small flood control projects in the Santa Clarita Valley; estimated amounts of conservation/groundwater recharge potential are being included for each of the individual projects in the overall LACFCD planning, and the Purveyors have interest in whether that potential could appreciably augment the yield of the basin.

In light of the above, the scope of the updated basin yield analysis, reported herein, includes the following:

- consider potential increased utilization of groundwater for regular (wet/normal) and/or dry-year water supply, including distribution of the yield by reach of the Santa Clara River alluvium and its various tributaries;

- consider potential augmentation of basin yield via initiation of artificial groundwater recharge using stormwater runoff in selected areas of the basin as being planned by LACFCD; and

- quantitatively or qualitatively, depending on the availability of technical reference material, describe general impacts of climate change on the groundwater basin and its yield.

1.3 Report Organization

To address the scope of the updated basin yield analysis outlined above, the remainder of this report is organized as follows:

Chapter 2 discusses the extension of the numerical groundwater flow model from its previous calibration period of 1980 through 2004 to add three years and thus extend calibration through 2007; this section also describes some limited model recalibration after extension of the model through 2007.

Chapter 3 describes the operating plans that were developed for updated analysis of basin yield, and the process that was used to simulate basin response to those plans and to evaluate the results.

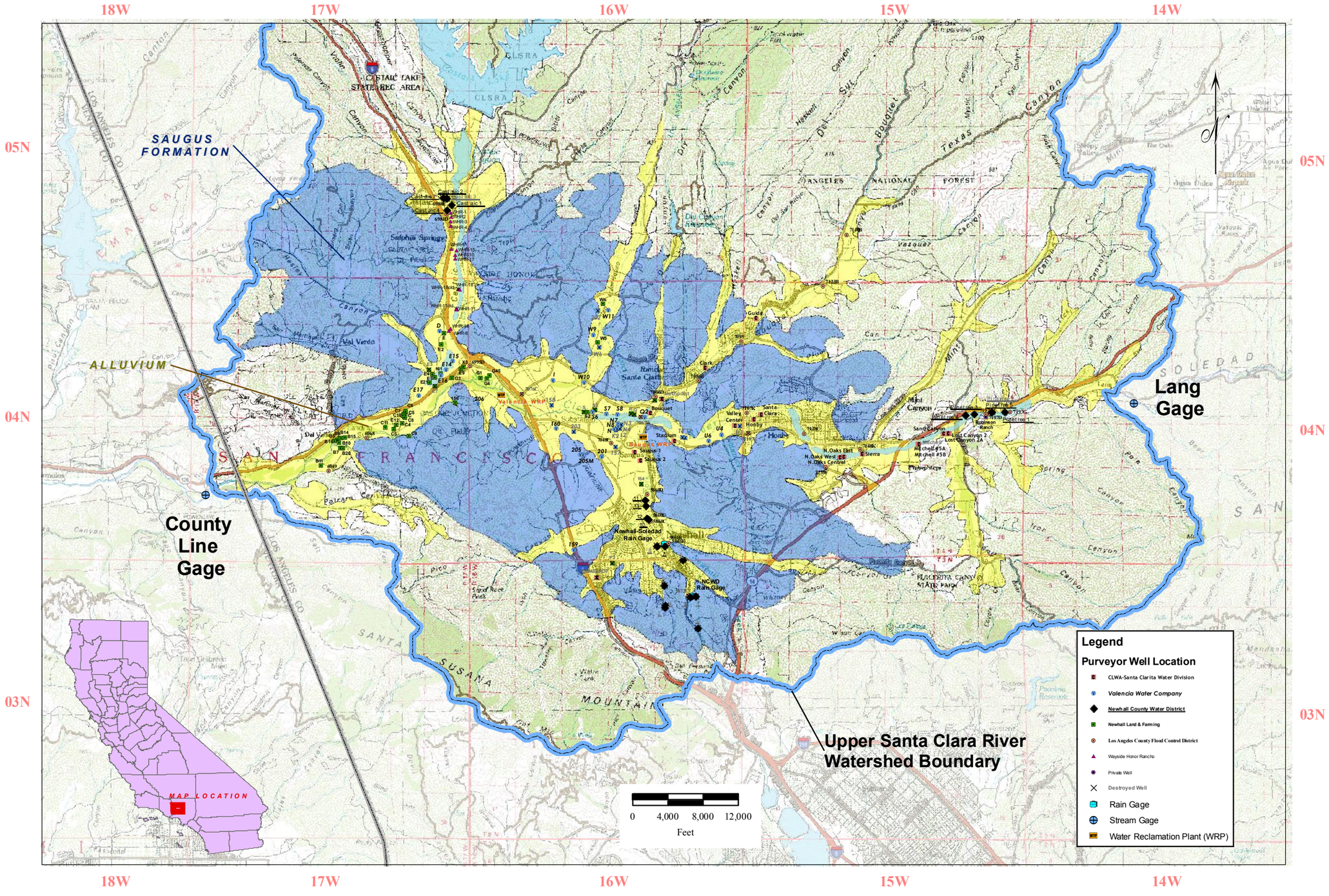
Chapter 4 discusses the results of the simulated basin response to the 2008 and Potential groundwater operating plans, including the sustainability and achievability of the plans.

Chapter 5 describes climate change considerations, the selection of a range of potential climate change impacts on local hydrologic conditions, and the simulated effects of those resultant hydrologic conditions on the sustainability and achievability of the 2008 groundwater operating plan.

Chapter 6 describes the potential groundwater recharge projects being planned by LACFCD and discusses the potential benefit to the yield of the basin.

Chapter 7 summarizes the conclusions derived from the overall updated basin yield analysis, and the implications of those conclusions for long-term groundwater supply and groundwater management in the Santa Clarita Valley.

References and Appendices follow Section 7. The Appendices include a description of the Santa Clarita Valley numerical groundwater flow model, description of the updated model calibration, hydrographs to illustrate simulated basin response to the operating plans, and discussion of climate projections and their incorporation in the analyses reported herein.



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CONSULTING ENGINEERS

Figure 1-1
Basin Location Map
Upper Santa Clara River Valley Groundwater Basin, East Subbasin

II. Updated Model Calibration

2.1 Model Description

The Santa Clarita Valley groundwater flow model is a three-dimensional, numerical model that uses the MicroFEM® finite-element software (Hemker and de Boer, 2003). The model covers the entire area underlain by the Saugus Formation, plus the portions of the Alluvial Aquifer that lie beyond the limits of the Saugus Formation (Figure 3-1). The model's construction and calibration are summarized in Appendix A and discussed in detail in *Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration* (CH2M HILL, 2004a).

The model simulates groundwater conditions within an area that largely coincides with the Santa Clara River Valley Groundwater Basin, East Subbasin, delineated by DWR. This area extends from the Lang stream gage at the eastern end of the valley to the County Line stream gage area in the west. The model is based on a finite-element mesh consisting of seven layers, with 17,103 nodes and 32,496 elements in each layer (Figure 2-1). The upper model layer simulates the Alluvial Aquifer and also the upper portion of the Saugus Formation where the Alluvial Aquifer is not present. The underlying layers simulate the underlying freshwater Saugus Formation and its Sunshine Ranch Member. Figure 2-2 shows the model layering in three cross-sectional views.

The boundary conditions in the model consist of the following:

- Specified flux boundaries for the following:
  - precipitation
  - irrigation
  - recharge from ephemeral streams
  - pumping
  - underflow from beneath Castaic Dam

- Head-dependent flux boundaries for the following:
  - groundwater discharges to the perennial reach of the Santa Clara River
  - residual drainage of groundwater to the Santa Clara River in the ephemeral reach under high water table conditions
  - evapotranspiration (ET) by phreatophyte plants, which extract groundwater from the shallow water table that lies along riparian river corridors

- Constant-head boundaries for the following:
  - subsurface inflow in the Alluvial Aquifer at the eastern end of the valley, at the Lang gage[1]

[1] A constant-head boundary was established in the groundwater model at this location using recent field conditions that were observed after the model calibration report (CH2M HILL, 2004a) was published. This change improved the groundwater model's calibration in the Alluvial Aquifer in the upper reaches of Soledad Canyon and did not appreciably change the calibration quality elsewhere. See CH2M HILL (2005) for further details.

- subsurface outflow in the Alluvial Aquifer at the western end of the valley, at the County Line gage

Groundwater recharge rates are estimated using precipitation records, streamflow records, watershed maps, topographic maps, and aerial photography. These recharge rates are calculated using a detailed Surface Water Routing Model (SWRM), which was written specifically to provide time-dependent, spatially varying recharge rates as input to the groundwater model. The SWRM relies on streamflow records at the Lang and County Line gages; historical records of rainfall data from the NCWD rain gage (see Figure 1-1), spatial variations in rainfall across the basin, the rates and locations of future WRP discharges to the Santa Clara River, and irrigation from agricultural and urban water uses.

The depths from which production wells obtain water are defined in the groundwater model from well construction records. The rates and locations of pumping are based on the Purveyors' operating plan for the basin and on the surveyed location of each production well.

2.2 Calibration Update Approach

The calibration update process consisted of transient modeling that simulated monthly variations in pumping from, and recharge to, the Alluvial Aquifer and the Saugus Formation during the period January 2005 through December 2007. As with the original calibration effort, simulation results were compared to measured fluctuations in groundwater elevations and streamflows in the Santa Clara River.

Hydrologic input data for the calibration update simulation are tabulated in Appendix B and were as follows:

- Groundwater pumping data were provided by the Purveyors for each production well. Appendix Tables B-1 and B-2 show annual pumping for the Alluvial Aquifer and Saugus Formation, respectively, from 1980 through 2007. As with the initial model calibration effort, the monthly distribution of pumping was defined from information on the monthly distribution of urban and agricultural water demands, as listed in Appendix Table B-3.
- Groundwater recharge was defined using the SWRM, which was written specifically for the groundwater model during the original model development effort (see Appendix C of CH2M HILL, 2004a). The SWRM defined recharge from applied water use (i.e., irrigation)[2]; direct precipitation within the model domain (see Appendix Table B-4); Santa Clara River flows into the valley as measured at the Lang stream gage (see Appendix Table B-5); SWRM-estimated stormwater inflows into the model domain along ephemeral streams that are tributaries to the Santa Clara River; measured volumes of treated water discharge into the Santa Clara River from two Los Angeles County Sanitation District (LACSD) water reclamation plants (WRPs) (see Appendix Tables B-6

[2] Infiltration of applied water was simulated in the same locations as in the original model calibration effort, and at the 1999 rates described in the model development report (CH2M HILL, 2004a). These rates were 24.7 inches per year (in/yr) for irrigated agricultural land, 2.2 in/yr for residential areas, and 1.0 in/yr for retail/industrial lands and golf courses.

and B-7); and water released from Castaic Lagoon into Castaic Creek by DWR (see Appendix Table B-8).

- Coefficients for the riverbed leakage term at each river node vary over time in the model. For the years 2005 through 2007, the calibration update process initially used the same values as used for 1992, 1996, and 1989, respectively. These values were then adjusted as necessary during the calibration update process.

The quality of the model's calibration was evaluated as follows:

- Simulated groundwater elevation trends were compared with data collected at production wells where long-term records of groundwater elevations are available. These wells are referred to herein as target wells. As discussed in the model development report (CH2M HILL, 2004a), the calibration goal at target wells was to simulate groundwater elevations that were higher than the pumping elevations and as close as possible to the static elevations. Therefore, the hydrographs show the model-simulated groundwater elevations, the measured static groundwater elevations, and, for production wells, the measured pumping groundwater elevations. Additionally, the comparison of time-varying simulated and measured groundwater elevations was equally focused on the slopes of the hydrographs, not just the absolute values of the groundwater elevations at any given time.

- The groundwater budget was evaluated to compare simulation results with measured flows in the Santa Clara River at the west end of the basin (at the County Line gage; see Appendix Table B-9); and estimated volumes of groundwater discharge to the Santa Clara River (see Appendix Table B-10).

2.3 Results from the Calibration Update Process

The initial simulation of conditions during 2005 through 2007 produced findings that were deemed to require adjustments to the model's calibration of portions of the Alluvial Aquifer prior to conducting the predictive modeling necessary for the basin yield update analysis. Specifically, the results from the initial calibration update indicated that, from 2005 through 2007, the model simulated:

- too much groundwater level recovery in Castaic Valley at NCWD's Castaic wellfield during the high streamflow event of early 2005

- too much decline in groundwater levels in lower San Francisquito Canyon (at VWC's W9 and W11 wells)

- groundwater levels that were too high in lower Bouquet Canyon (at SCWD's Clark well) and below the mouth of Bouquet Canyon (at VWC's S6, S7, and S8 wells)

It was also noted that, the model simulated too little groundwater level decline immediately prior to 2005 in the eastern-most portions of the Alluvial Aquifer along the Santa Clara River (at and east of the mouth of Mint Canyon). Additionally, it was determined that, for NCWD's Pinetree wellfield, the groundwater level database contained incorrect reference elevations, which are

used to convert groundwater depths to groundwater elevations. As a result, it was concluded that the original calibration effort (during 2004) had compared simulation results with database-derived groundwater elevation values that were lower than the actual elevations of the water table throughout the entire simulation period (January 1980 to the present).

As a result of these findings, efforts were undertaken to improve the model's calibration quality in the eastern-most portion of the Alluvial Aquifer and in the tributary canyons noted above. This focused re-calibration process resulted in changes to the hydraulic conductivity in certain areas and riverbed leakage coefficients along certain reaches of Castaic Creek and the eastern reaches of the Santa Clara River. These changes were:

- increasing the hydraulic conductivity from 105 feet/day to between 250 and 500 feet/day in San Francisquito Canyon

- increasing the hydraulic conductivity from 245 feet/day to 300 feet/day in lower Bouquet Canyon

- introducing a zone of reduced hydraulic conductivity (250 feet/day) along the Santa Clara River at the mouth of Mint Canyon, to better simulate the hydraulic gradient between SCWD's Sierra and Mitchell wells

- reducing the hydraulic conductivity by 50 percent along the Santa Clara River from just east of NCWD's Pinetree wellfield upstream to the Lang gage at the eastern end of the valley (from 300 to 150 feet/day) and also in two nearby tributaries (Tick Canyon and Bee Canyon, from 150 to 75 feet/day)

- raising the Castaic Creek riverbed leakage coefficients during the high-flow events of 2001 and late 2004/early 2005

- raising the riverbed leakage coefficients in San Francisquito and Bouquet Canyons during and after the high-flow event of late 2004/early 2005

- raising the riverbed leakage coefficients for the reach of the Santa Clara River near SCWD's North Oaks and Sierra wells during the high-flow event of late 2004/early 2005

- revising the rainfall-runoff-recharge relationship for the basin. This relationship is based on a power-function equation developed by Turner (1986). As shown in Figure 2-3, the coefficients were revised slightly in a manner that, when compared with the original calibration (CH2M HILL, 2004a), generates slightly more recharge when annual precipitation is above normal. This increase in recharge ranges from about 0.25 inches to 1 inch for annual rainfall between 21 and 40 inches at the NCWD gage. For the wettest year on record at the NCWD gage (48.33 inches in calendar year 1983), annual recharge is 22.5 and 23.8 inches in the 2004 and 2008 calibrations, respectively, which is a difference of about 1.3 inches.

Appendix B contains groundwater elevation hydrographs comparing the model-simulated groundwater elevations with static and pumping groundwater elevations at the many production wells in the valley. Model simulation results are shown both for the original calibration (CH2M HILL, 2004a) and the updated calibration. The hydrographs are organized according to the primary subareas for the Alluvial Aquifer (see Figure 2-4 for the locations of these subareas) and by Purveyor for the Saugus Formation. The hydrographs show notable improvements in calibration quality in Castaic Valley, San Francisquito Canyon, and Bouquet Canyon. However, little improvement could be achieved at VWC's S-series wells without degrading the calibration quality in nearby wells (such as VWC's N-series wells). Along the Santa Clara River, substantial improvements to the model's simulation of drought periods in the Alluvial Aquifer were achieved at NCWD's Pinetree wellfield, and to a lesser extent at other wells further west (for example, SCWD's North Oaks, Sierra, and Honby wells).

In the Saugus Formation, the model simulates the trends in groundwater elevations quite well at each Saugus production well. The trends (hydrograph slopes) are particularly close in the NCWD wellfield (NCWD production wells 11, 12, and 13). Farther downgradient, the model tends to slightly over-predict groundwater elevations in SCWD's two production wells. However, the model closely simulates the groundwater elevation trends at these two wells, which is the primary consideration for evaluating the quality of the transient calibration process in the Saugus Formation. Groundwater elevations and trends are well-simulated at VWC's Saugus production wells (including the recently constructed VWC-206).

Appendix B also contains hydrographs comparing the simulated and measured values of 1) total river flow and 2) groundwater discharge to the river for the Santa Clara River at the County Line gage, where the river exits the valley and flows into Ventura County.[3] The hydrographs show that the model adequately replicates seasonal and year-to-year cycles of low and high river flows. Additionally, the model simulates temporal cycles in groundwater discharge to the river in a manner that is generally consistent with the cycles reflected in the estimates made from available stream gage data. As discussed in prior model development reports (CH2M HILL, 2004a and 2005), it is likely that differences between modeled and measured hydrographs for total river flow and groundwater discharges result from uncertainties in both the model and the County Line gage data, particularly during periods of low river flows.

[3] The "measured" groundwater discharges to the river are estimates that were derived from a hydrograph separation process, described by CH2M HILL (2004). This process estimated the monthly groundwater discharge to the river by examining the daily streamflow data at the County Line gage, the daily and monthly precipitation at local rain gages, monthly flows into Castaic Creek from Castaic Lagoon, and monthly flows into the Santa Clara River from the Saugus and Valencia WRPs.

III. Modeling Approach for Analyzing Basin Yield

3.1 Modeling Approach

The process of designing the modeling analysis to evaluate the sustainability and achievability of a given operating plan consisted of the following five activities:

- Selecting a period over which to simulate groundwater conditions under each operating plan, including:
    - defining a sequence of varying local hydrology (rainfall, streamflows, and groundwater recharge) on a month-to-month basis throughout the simulation period
    - defining a sequence of varying availability of imported water supplies, as defined from availability studies of the State Water Project (SWP), on a month-to-month basis throughout the simulation period
- Defining pumping rates and schedules for each production well in the valley, including consideration of the varying local hydrology and SWP water availability
- Running the model to calculate time-varying (monthly) groundwater elevations and groundwater discharge terms throughout the multi-year simulation period
- Evaluating the modeling results by examining forecasted time-series plots (hydrographs) of water budget terms and groundwater elevations to evaluate the effects of the operating plan in the Alluvial Aquifer, the Saugus Formation, and the Santa Clara River

These activities are described in further detail below.

3.2 Simulation Period

The locations and temporal variation in pumping from the Alluvial Aquifer were defined in the model from the operating plan and from historical records of the year-to-year variability in local hydrology. Simulated pumping from the Saugus Formation was defined from the operating plan, historical pumping records, and operational constraints and historical patterns of SWP water supply availability.

3.2.1 Original Simulation Period

Because the operating plan for the Saugus Formation is linked to the hydrology and operational constraints for the SWP system, the year-to-year variability in Saugus Formation pumping is, to a great extent, dependent on the hydrology outside the valley (i.e., in northern California). As discussed in the original basin yield analysis report (CH2M HILL and LSCE, 2005), local hydrology affects the availability of Alluvial Aquifer groundwater, but is not always a good

indicator of local pumping conditions in the Saugus Formation, because local droughts and SWP droughts do not necessarily coincide with each other. Consequently, it was decided that the model would need to be run over several decades to capture the year-to-year differences between local hydrology and SWP hydrology and water availability, as well as the less frequent times when both systems experience similar hydrologic conditions (as occurred periodically during the 1960s and in 1994). Historical records were then analyzed to identify a simulation period that would be long enough to capture the variety of year-to-year and longer-term trends in local hydrology and imported water availability.

The original basin yield analysis was conducted using a synthetic 78-year period that replicated the historical hydrology from 1980 through 2003, followed by a replication of historical hydrology from 1950 through 2003. This synthetic time period simulated 24 years of reduced pumping from the Alluvial Aquifer, including two 3-year periods and one 4-year period of reduced pumping. For the Saugus Formation, this synthetic time period contained 18 "drought years" in which imported water volumes were sufficiently low to result in increased pumping from the Saugus Formation. These 18 years included two droughts lasting 2 years and two droughts lasting 3 years.

3.2.2 Current Simulation Period and Associated Hydrology

As introduced in Section 1.2, the update of the basin yield analysis was conducted in part because of the possibility of near-term reductions in SWP water deliveries to CLWA. The most recent analysis of the SWP's delivery reliability (DWR, 2008) includes year-to-year projections of delivery volumes under various development conditions, assuming both a repeat of historical climate and the potential effects of climate change. The analyses that are based on historical climate are reported for the climate that occurred from 1922 through 2003. These year-to-year projections had not been completed and published at the time of the original basin yield analysis in 2004 and 2005. Because these new analyses are now available, the basin yield update analysis simulated the historical record of climate and corresponding SWP delivery volumes for an 86-year period beginning in 1922 and ending in 2007, rather than using a synthetic time period. This 86-year period is characterized by:

- 14 years when deliveries are 35 percent or less of maximum Table A amounts, including 3 years when the deliveries do not exceed 10 percent of the Table A amounts

- Two droughts lasting 6 years (1929 through 1934, and 1987 through 1992)

Under the groundwater operating plan for the Santa Clarita Valley, the SWP delivery volume in any given year affects the amount of groundwater pumping that occurs from the Saugus Formation during that year. The amount of groundwater pumping from the Alluvial Aquifer is controlled by local hydrology, as determined by the amount of rainfall that occurs within the watershed during a given year. Figure 3-1 shows the historical pattern of annual rainfall on a calendar year basis from 1922 through 2007 at the Newhall-Soledad rain gage, which has the longest rainfall record of any location within the watershed. Values for 1922 through 1930 are estimated from RCS (2002). RCS personnel have since indicated that the source of data to 1931 is an unofficial record obtained in 2001 from a former California State Climatologist. The figure

also shows the average and median values of rainfall for the period 1931 through 2007 (18.16 and 15.82 inches per year, respectively). The estimated rainfall values from 1922 through 1930 were not included in the calculations of the average and median values. The figure shows that annual rainfall at the Newhall-Soledad rain gage since 1922 has ranged from about 4.1 inches in the driest years (in 1947 and 1972) to as much as 42.1 inches in the wettest years (1941 and 1978). 52 of the 86 years of record were characterized by below-average rainfall, and 36 years were particularly dry years characterized by rainfall values below 13.5 inches/year, which is 85 percent of the long-term median rainfall.

For annual rainfall at the Newhall-Soledad rain gage, Figure 3-2 shows the cumulative departure since 1922 from the 1931-2007 average rainfall. The cumulative departure refers to the cumulative (accumulated) amount of rainfall deficit or rainfall surplus over time, compared with long-term average rainfall. The slope of the cumulative departure plot is indicative of whether a given time period is characterized by generally dry conditions (downward slope), near-normal conditions (flat), or wetter-than-normal conditions (upward slope). The figure shows the following patterns in the local rainfall cycle:

- Generally dry conditions (downward-trending slope) after 1922 and continuing through 1935

- Generally wet conditions (upward-trending slope) from 1938 through 1944

- Thirty years of generally dry conditions (downward-trending slope) from 1947 through 1976, except for modestly wet conditions from 1965 through 1970

- Generally wet conditions (upward-trending slope) from 1977 through 2005, interrupted by drought conditions from 1984 through 1991 and from 1999 through 2004

An additional noteworthy feature of the cumulative departure plot is the 48-inch rainfall deficit that occurred from 1947 through 1951, which was not fully captured in the original basin yield analysis, but is modeled in its entirety in this updated analysis. The total rainfall deficit from 1947 through 1976 was approximately 86 inches (from a cumulative 31 inches above average in 1946 to a cumulative 55 inches below average in 1976). After 1976, the cumulative departure returned to a slightly positive value because of significant rainfall events in 1978, 1980, and 1983.

Table 3-1 shows the sequence of normal-year versus dry-year pumping conditions for the Alluvial Aquifer, as derived from the local rainfall records, and for the Saugus Formation as derived from the availability of SWP water. For the Alluvial Aquifer, the pumping year type is assumed to lag the local hydrology by one year. An examination of historical rainfall data and Alluvial Aquifer pumping patterns shows such a lag occurred in several years during the past two decades. The table shows dry-year pumping occurring in 55 years from the Alluvial Aquifer and 15 years from the Saugus Formation. During the 86-year simulation period, there are nine periods when dry-year pumping from the Alluvial Aquifer lasts more than two consecutive years, and two periods have dry-year Saugus pumping lasting more than one year. The longest dry-year pumping periods last for 7 years in the Alluvial Aquifer and 4 years in the Saugus Formation.

During the predominantly dry period from 1922 through 1978, only 16 of these 57 years (28 percent) were years in which normal pumping would have occurred from the Alluvial Aquifer.

3.3 2008 Operating Plan

Following are a general description of the 2008 Operating Plan and discussions of how pumping is distributed spatially and over time in the Alluvial Aquifer and the Saugus Formation under this plan. This plan was analyzed for its long-term sustainability by using the groundwater flow model to simulate the plan under the historical hydrology dating back to 1922. Actual historical pumping at the operating plan rates and for the current basin-wide network of production wells dates back only to the mid-1990s. Prior to that time, less pumping occurred in some years, while in other years pumping was limited to the western portion of the valley. Consequently, the modeling analysis was conducted in a manner to allow evaluation of how the basin might respond to the current operating plan and the current network of production wells, as might occur if past multi-decadal cycles of local and SWP hydrology (such as those measured as far back as 1922) were to repeat themselves in the future.

3.3.1 General Description of 2008 Operating Plan

As discussed in Section 1.1, the 2008 Operating Plan for the local groundwater basin is as follows:

- Pumping from the Alluvial Aquifer ranges between 30,000 and 40,000 afy during normal and above-normal rainfall years but, because of operational constraints in the eastern part of the basin, is reduced to between 30,000 and 35,000 afy during locally dry years. Table 3-2 shows the sequence of historical rainfall cycles and associated pumping from the Alluvial Aquifer, based on this operating plan and the 86-year simulation period that reflects historical rainfall in the valley from 1922 through 2007.

- Pumping from the Saugus Formation ranges between 7,500 and 15,000 afy during average-year to wet-year conditions within the SWP system. Planned dry-year pumping from the Saugus Formation ranges between 15,000 and 25,000 afy during a dry year, and increases to between 21,000 and 25,000 afy if SWP allocation is reduced to about 35 percent or less of the maximum Table A amount for two consecutive years, and between 21,000 and 35,000 afy if SWP allocation is reduced to about 35 percent or less of the maximum Table A amount for three consecutive years. Table 3-3 shows the sequence of SWP water availability and associated pumping from the Saugus Formation, based on this operating plan and the 86-year simulation period that reflects historical hydrology in the SWP system from 1922 through 2007.

Pumping rates for Purveyor-owned wells were assigned in accordance with the groundwater operating plan for the Santa Clarita Valley, which defines ranges of valley-wide annual pumping, given the water supply needs of the Purveyors. Pumping rates at individual wells were also assigned using the recent and planned production schedules for each well, information on the depths and lengths of the intake sections (open intervals) of each well, and by incorporating current plans addressing two other specific issues affecting Purveyor pumping:

- The presence of ammonium perchlorate in parts of the Saugus Formation and the Alluvial Aquifer

- Intermittent planned pumping from the Saugus Formation for the purpose of meeting regulatory objectives for chloride concentrations in the Santa Clara River.

These two issues and the details of how pumping was specified in the modeling analysis of the current operating plan are discussed further in Sections 3.3.2 and 3.3.3 below.

3.3.2 Alluvial Aquifer Pumping

Simulated pumping rates under the 2008 Operating Plan for production wells completed in the Alluvial Aquifer are listed in Table 3-4. The table provides this information for 8 wells owned by NCWD, 13 wells owned by SCWD, 15 wells owned by VWC, 16 wells owned by NLF, and private wells owned by Robinson Ranch and Wayside Honor Rancho. Most Alluvial Aquifer wells were specified to operate at similar rates regardless of year type, except in the eastern portion of the basin. Wells in this area (the Robinson Ranch well, the four Pinetree wells owned by NCWD, and 11 wells owned by SCWD) were assumed to have lower pumping capacities during dry years than non-drought years because of historically experienced lower groundwater elevations during dry periods.

The 2008 Operating Plan for the Alluvial Aquifer accounts for historical perchlorate detections in two alluvial wells, as the result of contamination emanating from the former Whittaker-Bermite property.

- In 2002, an Alluvial production well owned by SCWD (SCWD-Stadium) was shut down because of the detection of perchlorate. SCWD has recently drilled a replacement well (Valley Center) further to the east, north-northeast of the Whittaker-Bermite property.

- In March 2005, an Alluvial production well owned by VWC (VWC-Q2) was shut down because of perchlorate detection. After returning the well to service with wellhead treatment in October 2005, followed by nearly two years of operation with wellhead treatment, during which there was no detection of perchlorate, Valencia was authorized by the California Department of Public Health (DPH) to discontinue treatment. Well Q2 has since been operated without treatment and there has been no detection of perchlorate since discontinuation of wellhead treatment. Consequently, Well Q2 is included in the 2008 Operating Plan.

The 2008 Operating Plan for the Alluvial Aquifer also accounts for known private pumping at wells owned by the Newhall Land & Farming Company (NLF) for agricultural water supply; wells owned by Los Angeles County Water District No. 36 that provide potable water to the Wayside Honor Rancho; and a well in eastern Soledad Canyon owned by Robinson Ranch that is used for golf course irrigation. In the future, portions of the current pumping by NLF are planned to be converted to pumping by Valencia Water Company to supply potable water to the future Newhall Ranch development. However, for the purposes of the groundwater modeling analysis,

this pumping volume is indicated in Table 3-4 as continuing to be conducted by NLF, to reflect current ownership and current operating conditions. The planned change from agricultural to municipal supply is expected to result in only locally small changes in pumping locations (new municipal wells in close proximity to existing agricultural wells that will then be abandoned), resulting in practically similar spatial distribution of pumping and thus similar conditions as simulated in the 2008 Operating Plan.

The water management practices of the Purveyors also recognize ongoing Alluvial Aquifer pumping for other smaller private domestic and related pumping. For the last ten years of formal annual water report preparation in the Santa Clarita Valley, those reports have included estimates of the latter private pumping. Based on limited data provided by private well owners as part of the overall Groundwater Management Plan effort, it is estimated that small private pumping is within 500 afy, or approximately one percent of typical Alluvial Aquifer pumping by the Purveyors and other known private well owners (including agricultural pumpers) combined. However, the small private wells are not explicitly modeled in the basin yield analysis described herein because their locations and operations are not known, and their operation creates a pumping stress that is essentially negligible at the scale of the overall groundwater model. Ultimately, as discussed throughout this report, the intent is to maintain overall pumping, including private pumping, within the operating plan to result in sustainable groundwater conditions to support the combination of municipal (Purveyor), agricultural, and private groundwater use on an ongoing basis. Thus, private well owners in the basin, like the large municipal and agricultural pumpers, can expect groundwater supplies to continue to be available as they have been in the past, with some fluctuations in water levels through wet and dry periods, but no long-term depletion of supply.

3.3.3 Saugus Aquifer Pumping

Simulated pumping rates under the 2008 Operating Plan for production wells completed in the Saugus Formation are listed in Table 3-5. The table provides this information for two wells owned by NCWD, two wells owned by SCWD, six wells owned by VWC, and a private well at the Palmer golf course, located just north of Hasley Canyon. Pumping rates at specific Saugus Formation production wells were assigned for each type of year (normal, dry year 1, dry year 2, and dry year 3) using information on the capacity, recent and planned use, and location of each well[1]. Significant aspects of the pumping rate selection at each well are as follows:

- Pumping from most existing Saugus Formation production wells was based on recent and planned use of these wells, as defined by the Purveyors. The simulation included increased dry-year pumping from the Saugus Formation in the western portion of the basin, where it is anticipated that future wells will be installed.

- Each Saugus Formation production well has an intake section (open interval) that is significantly longer in vertical extent than the thicknesses of the individual layers that represent the Saugus Formation in the groundwater flow model. Consequently, the

[1] Table 3-5 only lists wells that are anticipated to be operating in the future. Existing wells that are not listed in this table (such as NCWD-7, NCWD-10, and NCWD-11) are currently not in service and, therefore, are not expected to provide significant quantities of water in the future.

Saugus pumping rates were assigned to multiple layers in the model by considering the depths of the intake section of each well and the transmissivity of each model layer. Table 3-6 shows the allocation of pumping in each model layer for each Saugus Formation production well, along with the intake sections of each well and the model-simulated transmissivity in each layer at each well location.

The 2008 Operating Plan for the Saugus Formation accounts for historical perchlorate detections and the resulting containment and remedial response activities that are being constructed at this time. In 1997, two Saugus Formation production wells owned by SCWD (wells SCWD-Saugus1 and SCWD-Saugus2), one Saugus Formation production well owned by NCWD (well NCWD-11), and one former Saugus Formation production well owned by VWC (well VWC-157) were removed from service because perchlorate was detected in groundwater at these wells[2]. Under oversight by the California Department of Toxic Substances Control (DTSC), and with ultimate approval by DPH, in accordance with its Policy 97-005 (for restoration of water supply from "severely impaired" water sources), the Purveyors developed a remedial strategy that will entail pumping of two impacted wells for containment of perchlorate migration; treatment and subsequent use of the pumped water for water supply; and installation of replacement wells in non-impacted portions of the basin to restore the remainder of groundwater supply impacted by perchlorate. A noteworthy detail of these activities is that the groundwater flow model was used to identify the design of a pumping scheme that would meet the Purveyors' objectives for perchlorate containment in the Saugus Formation (CH2M HILL, 2004b). The final containment plan specifies that wells SCWD-Saugus1 and SCWD-Saugus 2 operate at an instantaneous pumping rate of 1,200 gallons per minute (gpm) at each well (for a combined total of 2,400 gpm from the two wells). The annual pumping volume of 1,772 afy per well shown in Table 3-5 is based on this rate and also on the assumption that pumping will occur continuously, except for up to four weeks per year for maintenance purposes. Construction of facilities and pipelines necessary to implement the containment program and to restore inactivated well capacity, to be followed by operational start-up, are currently scheduled to occur in 2009.

The 2008 Operating Plan for the Saugus Formation also accounts for intermittent pumping from the Saugus Formation that is expected to occur for the purpose of meeting regulatory objectives for chloride in the Santa Clara River. This pumping program is one component of an Alternative Water Resources Management (AWRM) program to be implemented by the Santa Clarita Valley Sanitation District of Los Angeles County (SCVSD, a division of the Los Angeles County Sanitation District [LACSD]), the Purveyors, and other parties for the purpose of meeting Total Maximum Daily Loads (TMDLs) for chloride in the Santa Clara River in western Los Angeles County and eastern Ventura County. The AWRM program was finalized in the form of a Memorandum of Understanding (MOU) dated October 2008. Under the AWRM program, CLWA will develop a plan to provide imported water to replace Saugus Formation groundwater that will be pumped to provide supplemental water for the AWRM program. The supplemental pumped groundwater from the Saugus Formation will be released to the Santa Clara River near the Los Angeles County / Ventura County line to improve water quality conditions in the river

[2]As part of the ongoing implementation of perchlorate containment and restoration of impacted capacity, well VWC-157 was abandoned in January 2005 and replaced by new well VWC-206. Thus, this analysis includes planned pumping from replacement well VWC-206.

and to allow for attainment of the AWRM's stated water quality objectives for the river. Under the AWRM, the supplemental water will be directed to the river during years of extreme drought conditions in the SWP, defined as time periods when chloride concentrations equal or exceed 80 milligrams per liter (mg/L) in SWP water (Geomatrix, 2008; LARWQCB, 2008). Pumping under this program is planned to occur from well VWC-206 and from two future wells that will be drilled near VWC-206. This supplemental pumping is factored into the annual pumping volumes listed in Table 3-5. The pumping rates listed in Table 3-5 for the individual Saugus Formation wells will occur regardless of whether a portion of a given year's pumping is being directed to the AWRM program. Any volume of pumping directed to the AWRM program in a given year will be made up with imported water supplies, rather than from increased pumping of Alluvial or other Saugus groundwater. Technical analyses indicate that this pumping could occur in about 24 percent of all years, with total pumping occurring at rates ranging from less than 1 million gallons per day (mgd) to as much as 8 mgd (Geomatrix, 2008).

3.3.4 Monthly Allocation of Pumping

The model simulations that evaluated the operating plan were conducted by modeling groundwater recharge and pumping on a monthly basis. Consequently, the annual pumping volumes specified in the groundwater operating plan were converted to monthly values at each well for modeling purposes. The allocation of pumping, by month, for agricultural and urban production wells in both the Alluvial Aquifer and the Saugus Formation is listed in Table 3-7. Separate monthly distributions were used because agricultural demands are for exclusively outdoor uses, whereas urban demands are for both indoor and outdoor uses. As discussed in the model development report (CH2M HILL, 2004a), the monthly distribution of agricultural pumping was derived from crop consumptive use requirements published by the California Irrigation Management Information Service. The monthly distribution of urban demand was determined by examining historical monthly flow records for the two water reclamation plants (WRPs) that are present in the valley, and also by examining the distributions of monthly water consumption recorded by the Purveyors within their service areas during the past several years.

3.3.5 Total Available Potable Water Supply Under the 2008 Operating Plan

For the 2008 Operating Plan and the 1922-2007 simulation period, Table 3-8 lists the annual volumes of water available from each potable water source (Alluvial Aquifer, Saugus groundwater, and SWP imports), along with their combined total. The combined pumping from the Alluvial Aquifer and the Saugus Formation averages 51,400 afy and ranges between 47,335 and 73,577 under the 2008 Operating Plan. Year-by-year pumping from each aquifer is shown in Figure 3-3, along with total groundwater pumping.

Figure 3-4 compares total groundwater pumping with SWP water supply availability and the resulting total volume of water from a combination of local groundwater and imported SWP water (not including other water supplies, for example, purchased water, water banked in other groundwater basins, etc.). The total water supply from those two sources is as low as 64,858 afy during the driest years in the SWP system, when SWP deliveries are below 10,000 afy. For the 86-year simulation period, the total available supply from local groundwater and imported SWP water averages about 110,000 afy and can exceed 140,000 afy in the wettest years.

3.4 2008 Operating Plan with Pumping Redistribution

The 2008 Operating Plan with Pumping Redistribution was developed in response to model simulation results (discussed in Section 4 of this report) that identified a potential lack of achievability in maintaining alluvial pumping in the eastern portion of the basin, due to decline in groundwater levels below the intake sections of wells. The model simulations of the 2008 operating plan indicated that such declines, and the associated potential lack of achievability, could occur during periods which experience prolonged dry conditions, such as occurred from the mid-1940s through the mid-1970s, when there were few years of significantly greater-than-average rainfall. For this three-decade period, the model simulation found the 2008 Operating Plan to not be achievable in the most eastern part of the basin, the "Above Mint Canyon" subarea. However, it was also recognized that achievability might be accomplished by redistributing some pumping to other areas, specifically to reduce pumping stress in the far east and replace it with increased pumping farther west in the basin. This redistribution may not be necessary during other historical periods that were characterized by intermittent years of significant rainfall, streamflow, and associated groundwater recharge (such as occurred periodically from the late 1970s through 2005).

This variation of the 2008 Operating Plan was examined as follows. Recognizing that SCWD is in the midst of constructing new or replacement wells (e.g. to replace its perchlorate-impacted Stadium well) to the west of the "Above Mint Canyon" subarea, a redistribution of some SCWD pumping, as analyzed in the 2008 Operating Plan, was crafted whereby 1,600 afy of pumping was moved from three SCWD wells in the "Above Mint Canyon" subarea (near the mouth of Sand Canyon) to the replacement SCWD Santa Clara and Bouquet wells, located in the "Above Saugus WRP" and "Bouquet Canyon" subareas, respectively. Table 3-9 shows the resulting pumping plan for each Alluvial well under this redistribution scheme.

Besides the pumping redistribution in these Alluvial wells, all other aspects of Alluvial and Saugus pumping remains unchanged from the 2008 Operating Plan.

3.5 Potential Future Operating Plan

A third operating plan was analyzed at the request of the Purveyors. This plan is referred to herein as the Potential Operating Plan and contemplates increased utilization of groundwater during both regular (wet/normal) years and dry years. Target pumping volumes and locations under this plan were provided by the Purveyors and are summarized in Table 3-10 for the Alluvial Aquifer and Table 3-11 for the Saugus Formation. Under this plan, Alluvial Aquifer pumping would be on the order of 47,500 afy in normal/wet years and would be reduced to about 41,500 afy following two or more years of below-normal rainfall locally. Saugus Formation pumping would be on the order of 16,350 afy during years of normal SWP water availability and would increase to over 39,500 afy in the third year of reduced SWP water availability.

Consequently, total groundwater pumping under this plan would be almost 64,000 afy during normal years (compared with about 51,000 afy in the 2008 Operating Plan) and could be as high as about 87,000 afy during the highest pumping years (compared with about 73,500 afy in the 2008 Operating Plan). Figure 3-5 shows the fluctuation during the 86-year simulation period in

total groundwater pumping under this Potential Operating Plan, as well as the fluctuations in total Alluvial pumping and total Saugus pumping. Figure 3-6 compares the year-to-year pumping volumes, as well as the 86-year total pumping, for the potential plan and the 2008 plan. Total groundwater pumping during the 86-year simulation period would be about 1 million acre-feet, or about 80 percent, higher under the Potential Operating Plan.

The Potential Operating Plan differs from the 2008 Operating Plan only in the amount of groundwater being extracted. Both plans assume the same amount of SWP water availability. As shown in Table 3-12 and Figure 3-7, under the Potential Operating Plan, the total contemplated volume of available potable water supply from a combination of local groundwater and imported SWP water (not including other water supplies, for example, purchased water, water banked in other groundwater basins, etc.) ranges between about 77,000 afy and 156,000 afy, and averages nearly 122,000 afy for the 86-year simulation period. This represents an approximate 10 percent increase in water supply from those two sources during average and wet years, compared with the 2008 Operating Plan. During years of reduced SWP imports, the Potential Operating Plan contemplates almost 20 percent more potable water availability from local groundwater and imported SWP water during the driest years, compared with the 2008 Operating Plan.

3.6 Simulation of Other Local Hydrologic Processes

In addition to groundwater pumping, infiltration from irrigation (from urban and agricultural lands), precipitation, and streamflows (stormwater and WRP discharges) were also modeled. These other local hydrologic processes were defined using the Surface Water Routing Model (SWRM), which is described in Appendix C to the model development and calibration report (CH2M HILL, 2004a). The procedures used to derive these terms were the same as in the original basin yield analysis (CH2M HILL and LSCE, 2005) and are described in the following sections.

3.6.1 Recharge from Urban Irrigation

Under existing land use and water use conditions, the estimated long-term infiltration rates of applied irrigation water beneath urban areas, under full build-out conditions in the valley, were estimated to be 1.0 in/yr for industrial and retail lands, 2.2 in/yr for residential developments and parks, and 4.6 in/yr for golf courses (CH2M HILL, 2004a; CH2M HILL and LSCE, 2005). These rates were applied during each year (and each month) of the 86-year simulation period. The areas over which these rates were applied were larger than under current conditions. The areas were defined from recent land use data and LACSD mapping of projected future land uses in the rest of the Santa Clarita Valley under full build-out conditions[3] (CH2M HILL and LSCE, 2005).

[3]LACSD land use mapping indicates that, including Newhall Ranch, approximately 14,000 acres of currently undeveloped land will be urbanized in the future within the model simulation area. Additional urbanization will also occur in areas that are within the watershed, but outside the model's boundaries.

3.6.2 Recharge from Agricultural Irrigation

As discussed in the *Newhall Ranch Updated Water Resources Impact Evaluation* (CH2M HILL, 2002), irrigation of lands owned by NLF results in existing agricultural return flows. The source of most irrigation water is groundwater pumping from the Alluvial Aquifer, with some limited pumping occurring from one Saugus Formation well (NLF-156) prior to 2008, when this well was taken out of service. Under full Valley build-out conditions, the currently irrigated lands will no longer be irrigated because their water source will be used as part of the water supply for Newhall Ranch. Therefore, under full build-out conditions, no agricultural irrigation will occur within the area simulated by the model.

3.6.3 Precipitation Recharge

Infiltration from direct precipitation within the model domain was defined using data from the Newhall-Soledad and NCWD rain gages, an isohyet map of rainfall throughout the watershed, and the Turner (1986) power-function equation that describes the relationship between annual rainfall and annual groundwater recharge within the valley. Details concerning the derivation of precipitation infiltration rates from these data are contained in Appendix C to the model development and calibration report (CH2M HILL, 2004a). Table 3-13 lists the simulated monthly precipitation at the NCWD rain gage for the 86-year model period[4].

3.6.4 Stormwater Flows and Recharge from Streams

For each month of the simulation, the SWRM calculated the amounts of stormwater flow and groundwater recharge in all streams, plus the amount of flow and groundwater recharge arising from projected future WRP discharges to the Santa Clara River (including from the future Newhall WRP, which will service the planned Newhall Ranch development). For the Santa Clara River, the volume of streamflow was defined from measured and estimated streamflow data at the Lang gage (Table 3-14). For Castaic Creek, the volume of streamflow was defined from historical DWR operations and consideration of the hydrologic year type (Table 3-15). For the remaining Santa Clara River tributaries, streamflow volumes were defined by the SWRM using monthly rainfall data and the Turner (1986) relationship between rainfall, ET, and the subsequent yield from each watershed.

3.6.5 WRP Discharges to the Santa Clara River

Treated water is discharged to the Santa Clara River from the two WRPs that are present in the Valley. The Saugus WRP discharges to the river immediately above the mouth of the South Fork Santa Clara River, and the Valencia WRP discharges to the river just west of Interstate 5. The planned Newhall WRP will discharge to the river just east of the Los Angeles / Ventura County line for limited durations in the winter months.

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[4]The simulated monthly precipitation was defined from measurements at the NCWD rain gage from 1979 through 2003, as well as by combining the isohyet map with measurements at the Newhall-Soledad rain gage from prior to 1979.

Under full Valley build-out conditions, future flows into and from WRPs will be higher than historical flows because of increased development and the associated increase in indoor water use volumes. Additionally, a portion of the future treated water will be reclaimed, as described in CLWA's recycled water master plan (Kennedy/Jenks Consultants, 2002). In the original basin yield analysis work (CH2M HILL and LSCE, 2005), future inflows to the Saugus and Valencia WRPs were estimated from projected future water demands and from comparisons of historical water use and measured inflows to both WRPs. Table 3-16 shows the derivation of urban water demands outside the Newhall Ranch development (which will be served by a new, separate WRP). Table 3-17 shows the total amount of treated water generated by the Saugus and Valencia WRPs, and the amount of this water that is reclaimed and discharged to the river, by month. These values are the same as were used in the original basin yield analysis work. The values in Table 3-17 assume that the reclaimed water volume will be no more than 16,000 afy, to maintain existing flow volumes in the Santa Clara River. For the Newhall Ranch WRP, discharges to the river will be 286 afy, occurring primarily in December and January, when demands for reclaimed water are at their seasonal low. The total combined volumes of treated water discharged to the Santa Clara River under full Valley build-out conditions (including Newhall Ranch) are summarized, by month, in Table 3-18. These rates, which were used in the original basin yield analysis, were carried forward and used in each year of the 86-year simulation for the basin yield update analysis.

3.6.6 Monthly Assignment and Tracking of Surface Water Budget

The month-by-month assignment of the rates and locations of surface water infiltration to the underlying Alluvial Aquifer system was performed by the SWRM using the procedures described in Section C.8.5 of Appendix C to the model development and calibration report (CH2M HILL, 2004a). Streambed infiltration capacities for the last 28 years of the 86-year simulation period (calendar years 1980 through 2007) were the same as those used in the calibrated model. For the prior 58 years (1922 through 1979), the monthly streambed infiltration capacity values for a given year were selected by using one of the calibration years as a prototype year. Rainfall and streamflow records were used to identify the best prototype year and to subsequently specify the corresponding streambed infiltration rates.

For each month of the 86-year simulation period, the SWRM also tracked the volume of surface water that does not infiltrate to groundwater from a given stream because of gaining stream conditions (i.e., rejected stream leakage). This rejected stream leakage was calculated to remain as surface water in the Santa Clara River and to eventually exit the model domain at the west end of the Valley, at the County Line gage.

3.7 Running the Model and Evaluating Results

As discussed in the previous sections, the modeling evaluations were performed by simulating conditions on a monthly basis for the 86-year simulation period. The first step in this process consisted of running the SWRM to calculate the monthly distribution of recharge to the Alluvial Aquifer system (from rainfall, streamflow, irrigation, and WRP discharges) and recharge to the Saugus Formation (from rainfall and irrigation) in areas where the Alluvial Aquifer is not

present. The output from the SWRM consisted of monthly files that assigned recharge to each node in the model grid.

The model was then run using monthly time steps, in which pumping and recharge terms were varied each month. For each sub-interval of time, the model was run by solving the groundwater flow equations for a given month, using a convergence criterion of 0.005 foot for groundwater elevations and a water budget convergence criterion of 2 cubic feet per day. The model results were then evaluated by generating time-series plots (hydrographs) of water budget terms and groundwater elevations to evaluate the potential effects of the groundwater operating plan across the basin. The hydrographs were used to evaluate whether the operating plan is consistent with the objective of operating the basin in a manner that maintains long-term stability in groundwater levels and river flows. This analysis and its findings are presented in the following Chapter 4.

Table 3-1

Alluvial and Saugus Formation Pumping Patterns for the Simulation of 1922-2007 Historical Hydrology

Calendar Year	Local Rainfall (inches)[a]	SWP Water Availability[b]	Simulated Pumping Conditions	
			Alluvium	Saugus
1922	~ 32	89%	Normal	Normal
1923	~ 14	76%	Normal	Normal
1924	~ 8	10%	Dry Year 1	Dry Year 1
1925	~ 7	40%	Dry Year 2	Normal
1926	~ 26	53%	Dry Year 3	Normal
1927	~ 24	89%	Normal	Normal
1928	~ 10	50%	Normal	Normal
1929	~ 12	18%	Dry Year 1	Dry Year 1
1930	~ 12	49%	Dry Year 2	Normal
1931	24.41	27%	Dry Year 3	Dry Year 2
1932	13.73	32%	Normal	Dry Year 3
1933	20.52	48%	Dry Year 1	Dry Year 4
1934	18.05	32%	Dry Year 2	Dry Year 5
1935	12.21	81%	Dry Year 3	Normal
1936	20.47	76%	Dry Year 4	Normal
1937	17.92	78%	Dry Year 5	Normal
1938	32.75	82%	Dry Year 6	Normal
1939	11.27	79%	Normal	Normal
1940	21.37	77%	Dry Year 1	Normal
1941	42.14	61%	Dry Year 2	Normal
1942	7.10	77%	Normal	Normal
1943	37.03	76%	Dry Year 1	Normal
1944	24.63	71%	Normal	Normal
1945	14.56	75%	Normal	Normal
1946	21.71	77%	Normal	Normal
1947	4.16	56%	Normal	Normal
1948	9.13	63%	Dry Year 1	Normal
1949	9.93	31%	Dry Year 2	Dry Year 1
1950	6.84	60%	Dry Year 3	Normal
1951	12.42	85%	Dry Year 4	Normal
1952	34.19	63%	Dry Year 5	Normal
1953	4.88	80%	Normal	Normal
1954	15.82	77%	Dry Year 1	Normal
1955	13.91	28%	Dry Year 2	Dry Year 1
1956	14.21	87%	Dry Year 3	Normal
1957	22.85	62%	Dry Year 4	Normal
1958	23.14	73%	Dry Year 5	Normal
1959	9.81	84%	Normal	Normal
1960	11.64	35%	Dry Year 1	Dry Year 1
1961	8.82	57%	Dry Year 2	Normal
1962	21.22	72%	Dry Year 3	Normal
1963	12.79	82%	Dry Year 4	Normal
1964	10.09	53%	Dry Year 5	Normal
1965	32.28	69%	Dry Year 6	Normal
1966	14.57	79%	Normal	Normal
1967	23.23	72%	Dry Year 1	Normal
1968	6.90	80%	Dry Year 2	Normal
1969	32.42	64%	Dry Year 3	Normal
1970	23.19	79%	Normal	Normal
1971	13.75	80%	Normal	Normal
1972	4.15	41%	Dry Year 1	Normal
1973	19.79	75%	Dry Year 2	Normal
1974	18.04	77%	Dry Year 3	Normal
1975	10.92	78%	Dry Year 4	Normal
1976	14.02	63%	Dry Year 5	Normal
1977	20.87	6%	Dry Year 6	Dry Year 3
1978	42.17	87%	Dry Year 7	Normal
1979	21.47	76%	Normal	Normal
1980	27.00	66%	Normal	Normal
1981	13.42	76%	Normal	Normal
1982	20.20	71%	Dry Year 1	Normal
1983	39.07	60%	Normal	Normal
1984	12.86	78%	Normal	Normal
1985	8.37	77%	Dry Year 1	Normal
1986	18.02	56%	Dry Year 2	Normal
1987	14.45	68%	Normal	Normal
1988	16.92	12%	Dry Year 1	Dry Year 1
1989	7.56	76%	Dry Year 2	Normal
1990	6.98	9%	Dry Year 3	Dry Year 2
1991	17.21	18%	Dry Year 4	Dry Year 3
1992	32.03	26%	Dry Year 5	Dry Year 4
1993	32.72	90%	Normal	Normal
1994	10.27	51%	Normal	Normal
1995	29.15	72%	Dry Year 1	Normal
1996	15.88	83%	Normal	Normal
1997	13.35	75%	Normal	Normal
1998	30.73	73%	Normal	Normal
1999	8.96	83%	Normal	Normal
2000	14.04	84%	Normal	Normal
2001	22.24	28%	Dry Year 1	Dry Year 1
2002	7.90	52%	Dry Year 2	Normal
2003	15.70	71%	Dry Year 3	Normal
2004	22.79	65%	Dry Year 4	Normal
2005	37.15	90%	Normal	Normal
2006	13.89	100%	Normal	Normal
2007	5.78	60%	Dry Year 1	Normal

aFrom records at Newhall-Soledad rain gage (Station No. FC32CE). Pumping year type lags local rainfall by one year. Dry year pumping occurs when rainfall in prior year is 12.5 inches or less, and may continue until after a year with high rainfall (well above normal) has occurred.

[b]Values for 1922-2003 are from Table B.3 in DWR (2008) and are for SWP Table A Deliveries under current (2007) conditions. Values in 2004 through 2007 are actual historical deliveries during those years.

TABLE 3-2

Local Hydrology and 2008 Operating Plan for the Alluvial Aquifer

Calendar Year	Local Rainfall (inches)[a]	Year Type	Alluvial Aquifer Pumping under the Groundwater Operating Plan (afy)
1922	~ 32	Normal	35,000-40,000
1923	~ 14	Normal	35,000-40,000
1924	~ 8	Dry Year 1	30,000-35,000
1925	~ 7	Dry Year 2	30,000-35,000
1926	~ 26	Dry Year 3	30,000-35,000
1927	~ 24	Normal	35,000-40,000
1928	~ 10	Normal	35,000-40,000
1929	~ 12	Dry Year 1	30,000-35,000
1930	~ 12	Dry Year 2	30,000-35,000
1931	24.41	Dry Year 3	30,000-35,000
1932	13.73	Normal	35,000-40,000
1933	20.52	Dry Year 1	30,000-35,000
1934	18.05	Dry Year 2	30,000-35,000
1935	12.21	Dry Year 3	30,000-35,000
1936	20.47	Dry Year 4	30,000-35,000
1937	17.92	Dry Year 5	30,000-35,000
1938	32.75	Dry Year 6	30,000-35,000
1939	11.27	Normal	35,000-40,000
1940	21.37	Dry Year 1	30,000-35,000
1941	42.14	Dry Year 2	30,000-35,000
1942	7.10	Normal	35,000-40,000
1943	37.03	Dry Year 1	30,000-35,000
1944	24.63	Normal	35,000-40,000
1945	14.56	Normal	35,000-40,000
1946	21.71	Normal	35,000-40,000
1947	4.16	Normal	35,000-40,000
1948	9.13	Dry Year 1	30,000-35,000
1949	9.93	Dry Year 2	30,000-35,000
1950	6.84	Dry Year 3	30,000-35,000
1951	12.42	Dry Year 4	30,000-35,000
1952	34.19	Dry Year 5	30,000-35,000
1953	4.88	Normal	35,000-40,000
1954	15.82	Dry Year 1	30,000-35,000
1955	13.91	Dry Year 2	30,000-35,000
1956	14.21	Dry Year 3	30,000-35,000
1957	22.85	Dry Year 4	30,000-35,000
1958	23.14	Dry Year 5	30,000-35,000
1959	9.81	Normal	35,000-40,000
1960	11.64	Dry Year 1	30,000-35,000
1961	8.82	Dry Year 2	30,000-35,000
1962	21.22	Dry Year 3	30,000-35,000
1963	12.79	Dry Year 4	30,000-35,000
1964	10.09	Dry Year 5	30,000-35,000
1965	32.28	Dry Year 6	30,000-35,000
1966	14.57	Normal	35,000-40,000
1967	23.23	Dry Year 1	30,000-35,000
1968	6.90	Dry Year 2	30,000-35,000
1969	32.42	Dry Year 3	30,000-35,000
1970	23.19	Normal	35,000-40,000
1971	13.75	Normal	35,000-40,000
1972	4.15	Dry Year 1	30,000-35,000
1973	19.79	Dry Year 2	30,000-35,000
1974	18.04	Dry Year 3	30,000-35,000
1975	10.92	Dry Year 4	30,000-35,000
1976	14.02	Dry Year 5	30,000-35,000
1977	20.87	Dry Year 6	30,000-35,000
1978	42.17	Dry Year 7	30,000-35,000
1979	21.47	Normal	35,000-40,000
1980	27.00	Normal	35,000-40,000
1981	13.42	Normal	35,000-40,000
1982	20.20	Dry Year 1	30,000-35,000
1983	39.07	Normal	35,000-40,000
1984	12.86	Normal	35,000-40,000
1985	8.37	Dry Year 1	30,000-35,000
1986	18.02	Dry Year 2	30,000-35,000
1987	14.45	Normal	35,000-40,000
1988	16.92	Dry Year 1	30,000-35,000
1989	7.56	Dry Year 2	30,000-35,000
1990	6.98	Dry Year 3	30,000-35,000
1991	17.21	Dry Year 4	30,000-35,000
1992	32.03	Dry Year 5	30,000-35,000
1993	32.72	Normal	35,000-40,000
1994	10.27	Normal	35,000-40,000
1995	29.15	Dry Year 1	30,000-35,000
1996	15.88	Normal	35,000-40,000
1997	13.35	Normal	35,000-40,000
1998	30.73	Normal	35,000-40,000
1999	8.96	Normal	35,000-40,000
2000	14.04	Normal	35,000-40,000
2001	22.24	Dry Year 1	30,000-35,000
2002	7.90	Dry Year 2	30,000-35,000
2003	15.70	Dry Year 3	30,000-35,000
2004	22.79	Dry Year 4	30,000-35,000
2005	37.15	Normal	35,000-40,000
2006	13.89	Normal	35,000-40,000
2007	5.78	Dry Year 1	30,000-35,000

aFrom records at Newhall-Soledad rain gage (Station No. FC32CE). Pumping year type lags local rainfall by one year. Dry year pumping occurs when rainfall in prior year is 12.5 inches or less, and may continue until after a year with high rainfall (well above normal) has occurred.

afy = acre-feet per year

TABLE 3-3

SWP Deliveries and 2008 Operating Plan for the Saugus Formation

Calendar Year	Historical SWP Hydrology	SWP Water Delivery from the California Bay-Delta: Percent of Maximum Table A Deliveries (Current Conditions)	Design of Updated Basin Analysis: Saugus Pumping: Year Type	Design of Updated Basin Analysis: Saugus Operating Plan Pumping Volume (afy)	
1922	Above Normal	89%	Normal	11,000	
1923	Below Normal	76%	Normal	11,000	
1924	Critical	10%	Dry Year 1	15,000	Mild Single Dry Year
1925	Dry	40%	Normal	11,000	
1926	Dry	53%	Normal	11,000	
1927	Wet	89%	Normal	11,000	
1928	Above Normal	50%	Normal	11,000	
1929	Critical	18%	Dry Year 1	15,000	6-Year Drought (1929-1934) and 4-Year Drought (1931-1934)
1930	Dry	49%	Normal	11,000	
1931	Critical	27%	Dry Year 2	25,000	
1932	Dry	32%	Dry Year 3	35,000	
1933	Critical	48%	Dry Year 4	35,000	
1934	Critical	32%	Dry Year 5	35,000	
1935	Below Normal	81%	Normal	11,000	
1936	Below Normal	76%	Normal	11,000	
1937	Below Normal	78%	Normal	11,000	
1938	Wet	82%	Normal	11,000	
1939	Dry	79%	Normal	11,000	
1940	Above Normal	77%	Normal	11,000	
1941	Wet	61%	Normal	11,000	
1942	Wet	77%	Normal	11,000	
1943	Wet	76%	Normal	11,000	
1944	Dry	71%	Normal	11,000	
1945	Below Normal	75%	Normal	11,000	
1946	Below Normal	77%	Normal	11,000	
1947	Dry	56%	Normal	11,000	
1948	Below Normal	63%	Normal	11,000	
1949	Dry	31%	Dry Year 1	15,000	Mild Single Dry Year
1950	Below Normal	60%	Normal	11,000	
1951	Above Normal	85%	Normal	11,000	
1952	Wet	63%	Normal	11,000	
1953	Wet	80%	Normal	11,000	
1954	Above Normal	77%	Normal	11,000	
1955	Dry	28%	Dry Year 1	15,000	Mild Single Dry Year
1956	Wet	87%	Normal	11,000	
1957	Above Normal	62%	Normal	11,000	
1958	Wet	73%	Normal	11,000	
1959	Below Normal	84%	Normal	11,000	
1960	Dry	35%	Dry Year 1	15,000	Mild Single Dry Year
1961	Dry	57%	Normal	11,000	
1962	Below Normal	72%	Normal	11,000	
1963	Wet	82%	Normal	11,000	
1964	Dry	53%	Normal	11,000	
1965	Wet	69%	Normal	11,000	
1966	Below Normal	79%	Normal	11,000	
1967	Wet	72%	Normal	11,000	
1968	Below Normal	80%	Normal	11,000	
1969	Wet	64%	Normal	11,000	
1970	Wet	79%	Normal	11,000	
1971	Wet	80%	Normal	11,000	
1972	Below Normal	41%	Normal	11,000	
1973	Above Normal	75%	Normal	11,000	
1974	Wet	77%	Normal	11,000	
1975	Wet	78%	Normal	11,000	
1976	Critical	63%	Normal	11,000	2-year Drought (1976-1977); Single Critical Dry Year (1977)
1977	Critical	6%	Dry Year 3	35,000	
1978	Above Normal	87%	Normal	11,000	
1979	Below Normal	76%	Normal	11,000	
1980	Above Normal	66%	Normal	11,000	
1981	Dry	76%	Normal	11,000	
1982	Wet	71%	Normal	11,000	
1983	Wet	60%	Normal	11,000	
1984	Wet	78%	Normal	11,000	
1985	Dry	77%	Normal	11,000	
1986	Wet	56%	Normal	11,000	
1987	Dry	68%	Normal	11,000	6-Year Drought (1987-1992)
1988	Critical	12%	Dry Year 1	15,000	
1989	Dry	76%	Normal	11,000	
1990	Critical	9%	Dry Year 2	25,000	
1991	Critical	18%	Dry Year 3	35,000	
1992	Critical	26%	Dry Year 4	35,000	
1993	Above Normal	90%	Normal	11,000	
1994	Critical	51%	Normal	11,000	
1995	Wet	72%	Normal	11,000	
1996	Wet	83%	Normal	11,000	
1997	Wet	75%	Normal	11,000	
1998	Wet	73%	Normal	11,000	
1999	Wet	83%	Normal	11,000	
2000	Above Normal	84%	Normal	11,000	
2001	Dry	28%	Dry Year 1	15,000	Mild Single Dry Year
2002	Dry	52%	Normal	11,000	
2003	Above Normal	71%	Normal	11,000	
2004	Below Normal / Dry	65%	Normal	11,000	
2005	Wet / Above Normal	90%	Normal	11,000	
2006	Wet / Wet	100%	Normal	11,000	
2007	Dry / Critical	60%	Normal	11,000	

[a]Values for 1922-2003 are from Table B.3 in DWR (2008) and are for SWP Table A Deliveries under current (2007) conditions.
Values in 2004 through 2007 are actual historical deliveries during those years. afy = acre-feet per year

TABLE 3-4
Pumping Rates Simulated for Individual Alluvial Aquifer Wells under the 2008 Groundwater Operating Plan

Well Name	Alluvial Subarea	2005 Operating Plan		2008 Operating Plan			Comments
		Normal	Dry	Normal	Dry Yr 1	Dry Yr 2+	
NCWD-Castaic 1	Castaic Valley	385	345	350	300	250	
NCWD-Castaic 2	Castaic Valley	166	125	100	100	100	
NCWD-Castaic 4	Castaic Valley	100	45	100	0	0	
NCWD-Castaic 7	Castaic Valley			300	200	200	Assume similar pumping as at NCWD-Castaic3 during early 1980s
NCWD-Pinetree 1	Above Mint Canyon	164	0	150	0	0	
NCWD-Pinetree 3	Above Mint Canyon	545	525	350	300	300	
NCWD-Pinetree 4	Above Mint Canyon	300	0	300	200	200	
NCWD-Pinetree 5	Above Mint Canyon			300	200	200	
NCWD Total		**1,660**	**1,040**	**1,950**	**1,300**	**1,250**	
NLF-161	Below Valencia WRP	485	485	1,000	1,000	1,000	
NLF-B10	Below Valencia WRP	344	344	500	350	350	
NLF-B11	Below Valencia WRP	232	232	100	200	200	
NLF-B14	Below Valencia WRP			300	1,000	1,000	
NLF-B20	Below Valencia WRP	584	584	350	500	500	Pumping was assigned to former B7 well in 2005 analysis.
NLF-B5	Below Valencia WRP	1,582	1,582	2,400	1,900	1,900	
NLF-B6	Below Valencia WRP	1,766	1,766	1,100	1,100	1,100	
NLF-C	Below Valencia WRP	1,373	1,373	1,100	1,000	1,000	
NLF-C3	Below Valencia WRP	192	192	100	200	200	
NLF-C4	Below Valencia WRP	809	809	200	450	450	
NLF-C5	Below Valencia WRP	850	850	900	850	850	
NLF-C7	Below Valencia WRP	1,107	1,107	350	300	300	
NLF-C8	Below Valencia WRP	594	594	400	400	400	
NLF-E5	Below Valencia WRP	750	750	100	150	150	
NLF-E9	Below Valencia WRP	814	814	900	350	350	
NLF-G45	Below Valencia WRP	390	390	350	400	400	
NLF Total		**11,872**	**11,872**	**10,150**	**10,150**	**10,150**	
SCWD-Clark	Bouquet Canyon	782	700	700	700	700	
SCWD-Guida	Bouquet Canyon	1,320	1,230	1,300	1,250	1,200	
SCWD-Honby	Above Saugus WRP	696	870	1,000	850	700	
SCWD-Lost Canyon 2	Above Mint Canyon	741	640	700	700	650	
SCWD-Lost Canyon 2A	Above Mint Canyon	1,034	590	700	650	600	
SCWD-Mitchell #5A	Above Mint Canyon	0	0	500	350	200	
SCWD-Mitchell #5B	Above Mint Canyon	557	0	800	550	300	
SCWD-N. Oaks Central	Above Mint Canyon	822	1,640	850	800	700	
SCWD-N. Oaks East	Above Mint Canyon	1,234	485	800	750	700	
SCWD-N. Oaks West	Above Mint Canyon	898	0	800	750	700	
SCWD-Sand Canyon	Above Mint Canyon	930	195	1,000	600	200	
SCWD-Sierra	Above Mint Canyon	846	0	1,100	900	700	
SCWD-Valley Center	Above Saugus WRP	800	800	800	800	800	Pumping transferred from former well SCWD-Stadium
SCWD Total		**10,660**	**7,150**	**11,050**	**9,650**	**8,150**	
VWC-D	Castaic Valley	690	690	880	880	880	
VWC-E15	Below Valencia WRP			800	800	800	
VWC-N	Below Saugus WRP	620	620	650	650	650	
VWC-N7	Below Saugus WRP	1,160	1,160	1,160	1,160	1,160	
VWC-N8	Below Saugus WRP	1,160	1,160	1,160	1,160	1,160	
VWC-Q2	Below Saugus WRP	985	985	1,100	1,100	1,100	
VWC-S6	Below Saugus WRP	865	865	1,000	1,000	1,000	
VWC-S7	Below Saugus WRP	865	865	500	500	500	
VWC-S8	Below Saugus WRP	865	865	500	500	500	
VWC-T7	Above Saugus WRP	920	920	750	750	750	Pumping transferred from former wells VWC-T2 and VWC-T4
VWC-U4	Above Saugus WRP	935	935	800	800	800	
VWC-U6	Above Saugus WRP	825	825	800	800	800	Pumping transferred from former well VWC-U3
VWC-W10	San Francisquito Canyon	865	865	1,000	1,000	1,000	Pumping was assigned to former W6 well in 2005 analysis.
VWC-W11	San Francisquito Canyon	600	600	800	800	800	
VWC-W9	San Francisquito Canyon	350	350	950	950	950	
VWC Total		**11,705**	**11,705**	**12,850**	**12,850**	**12,850**	
Robinson Ranch	Above Mint Canyon	932	400	600	550	450	
WHR	Castaic Valley	1,600	1,600	2,000	2,000	2,000	
Purveyor Alluvial Usage		**24,025**	**19,895**	**25,850**	**23,800**	**22,250**	**2008 Operating Plan:**
Other Alluvial Usage		**14,404**	**13,872**	**12,750**	**12,700**	**12,600**	**35,000 to 40,000 AF/yr in normal and wet years**
Total Alluvial Pumping		**38,429**	**33,767**	**38,600**	**36,500**	**34,850**	**30,000 to 35,000 AF/yr in dry years**

Notes:
All pumping volumes are listed in units of acre-feet per year (afy).
Wells that are not listed are assumed to not be pumping in the future.
NLF = Newhall Land & Farming Company
NCWD = Newhall County Water District
SCWD = Santa Clarita Division of Castaic Lake Water Agency
VWC = Valencia Water Company
WHR = Wayside Honor Rancho, whose wells are owned by the Los Angeles County Waterworks District No. 36
"Other Alluvial Usage" consists of pumping by NLF, WHR, and Robinson Ranch. An additional 500 afy of pumping by other private well owners is not included in this table.

TABLE 3-5

Pumping Rates Simulated for Individual Saugus Formation Wells under the 2008 Groundwater Operating Plan

Owner	Well Name	Non-Drought Years	Drought Year 1	Drought Year 2	Drought Year 3
NCWD	12	1,765	2,494	2,494	2,494
	13	1,765	2,494	2,494	2,494
Total Pumping (NCWD Wells)		**3,530**	**4,988**	**4,988**	**4,988**
SCWD	Saugus1	1,772	1,772	1,772	1,772
	Saugus2	1,772	1,772	1,772	1,772
Total Pumping (SCWD Wells)		**3,544**	**3,544**	**3,544**	**3,544**
Private	Palmer Golf Course	500	500	500	500
Total Pumping (Future Golf)		**500**	**500**	**500**	**500**
VWC	159	50	50	50	50
	160 (Municipal)	500	830	830	830
	160 (Val. Ctry Club)	500	500	500	500
	201	300	300	3,777	3,777
	205	1,211	2,945	4,038	4,038
	206	1,175	2,734	3,500	3,500
	207	1,175	2,734	3,500	3,500
Total Pumping (VWC Wells)		**4,911**	**10,093**	**16,195**	**16,195**
	Future #1	0	0	0	3,250
	Future #2	0	0	0	3,250
	Future #3	0	0	0	3,250
Total Pumping (Future Wells)		**0**	**0**	**0**	**9,750**
Total Pumping (All Saugus Wells)		**12,485**	**19,125**	**25,227**	**34,977**

Notes:

All pumping volumes are listed in units of acre-feet per year (afy).

Wells that are not listed are assumed to not be pumping in the future.

NLF = Newhall Land & Farming Company

SCWD = Santa Clarita Division of Castaic Lake Water Agency

NCWD = Newhall County Water District

VWC = Valencia Water Company

TABLE 3-6

Allocation of Pumping by Layer for Wells Completed in the Saugus Formation

Well Owner - Well Name	Model Layer	Depth to Open Interval (feet) Top	Bottom	Length of Open Interval in Model Layer (feet)	Kh (ft/day)	T in Open Interval (ft^2/day)	Percentage of Yield from Model Layer
NCWD-12	2	485	1,280	15	10	150	8.8
	3			500	2	1,000	58.5
	4			280	2	560	32.7
NCWD-13	2	420	750	80	10	800	61.5
	3			250	2	500	38.5
SCWD-Saugus1	2	490	1,620	10	10	100	1.8
	3			500	6.5	3,250	59.9
	4			500	4	2,000	36.8
	5			20	4	80	1.5
SCWD-Saugus2	2	490	1,591	10	10	100	1.7
	3			500	6.5	3,250	56.9
	4			500	4	2,000	35.0
	5			91	4	364	6.4
Palmer Golf Course	2			250	1	250	20.0
	3			500	1	500	40.0
	4			500	1	500	40.0
VWC-159	3	662	1,900	338	0.025	8.45	27.3
	4			500	0.025	12.5	40.4
	5			400	0.025	10	32.3
VWC-160	3	950	2,000	50	6.5	325	7.6
	4			500	4	2,000	46.2
	5			500	4	2,000	46.2
VWC-201	3	540	1,670	460	6.5	2,990	52.7
	4			500	4	2,000	35.3
	5			170	4	680	12.0
VWC-205	3	820	1,930	180	6.5	1,170	23.9
	4			500	4	2,000	40.9
	5			430	4	1,720	35.2
VWC-206	3	500	2,000	500	6.5	3,250	44.8
	4			500	4	2,000	27.6
	5			500	4	2,000	27.6
VWC-207*	3	500	2,000	500	6.5	3,250	44.8
	4			500	4	2,000	27.6
	5			500	4	2,000	27.6
Future Wells	3	500	2,000	500	6.5	3,250	44.8
Near VWC-206	4			500	4	2,000	27.6
(Assumed)	5			500	4	2,000	27.6

Notes:

* VWC-207 well construction information was not available at the time of this investigation and therefore the allocation of pumping was assumed to be similar to VWC-206.

Existing wells NCWD-7, NCWD-10, and NCWD-11 are assumed to no longer operate in the future.

Kh = horizontal hydraulic conductivity
ft/day = feet per day

T = transmissivity
ft^2/day = square feet per day

Table 3-7

Allocation of Pumping, by Month, for Agricultural and Urban Production Wells

Month	Percent of Annual Water Use, Agricultural	Percent of Annual Water Use, Urban	Percent of May through October Water Use, Urban
January	3.75	5.2	
February	5.1	3.7	
March	6.6	5.2	
April	9.1	6.6	
May	10.55	8.7	13.2
June	11.4	10.4	15.8
July	14.1	13	19.7
August	12.95	13.6	20.6
September	10.2	10.9	16.6
October	7.5	9.3	14.1
November	5	7.1	
December	3.75	6.3	
Total	**100**	**100**	**100**

TABLE 3-8

Total Groundwater and SWP Supplies for 2008 Groundwater Operating Plan (Not Including Recycled Water and Other Water Supplies, e.g. Purchased or Banked Water)

Model Year	Based on Historical Year	SWP Hydrology [a]	SWP Allocations [b] (%)	SWP Deliveries (afy)	Simulated Pumping From Alluvial Aquifer (afy)	Simulated Pumping From Saugus Formation (afy)	Total Groundwater Pumping (afy)	SWP + Groundwater (afy)
1	1922	Above Normal	89%	82,227	38,600	12,485	51,085	133,312
2	1923	Below Normal	76%	70,699	38,600	12,485	51,085	121,784
3	1924	Critical	10%	8,960	36,500	19,125	55,625	64,585
4	1925	Dry	40%	36,784	34,850	12,485	47,335	84,119
5	1926	Dry	53%	48,929	34,850	12,485	47,335	96,264
6	1927	Wet	89%	82,786	38,600	12,485	51,085	133,871
7	1928	Above Normal	50%	46,079	38,600	12,485	51,085	97,164
8	1929	Critical	18%	16,858	36,500	19,125	55,625	72,483
9	1930	Dry	49%	45,379	34,850	12,485	47,335	92,714
10	1931	Critical	27%	24,732	34,850	25,227	60,077	84,809
11	1932	Dry	32%	29,204	38,600	34,977	73,577	102,781
12	1933	Critical	48%	44,339	36,500	34,977	71,477	115,816
13	1934	Critical	32%	29,424	34,850	34,977	69,827	99,251
14	1935	Below Normal	81%	74,625	34,850	12,485	47,335	121,960
15	1936	Below Normal	76%	69,911	34,850	12,485	47,335	117,246
16	1937	Below Normal	78%	72,037	34,850	12,485	47,335	119,372
17	1938	Wet	82%	75,970	34,850	12,485	47,335	123,305
18	1939	Dry	79%	72,883	38,600	12,485	51,085	123,968
19	1940	Above Normal	77%	70,837	36,500	12,485	48,985	119,822
20	1941	Wet	61%	56,535	34,850	12,485	47,335	103,870
21	1942	Wet	77%	70,890	38,600	12,485	51,085	121,975
22	1943	Wet	76%	70,599	36,500	12,485	48,985	119,584
23	1944	Dry	71%	65,569	38,600	12,485	51,085	116,654
24	1945	Below Normal	75%	69,041	38,600	12,485	51,085	120,126
25	1946	Below Normal	77%	71,596	38,600	12,485	51,085	122,681
26	1947	Dry	56%	51,794	38,600	12,485	51,085	102,879
27	1948	Below Normal	63%	58,403	36,500	12,485	48,985	107,388
28	1949	Dry	31%	28,443	34,850	19,125	53,975	82,418
29	1950	Below Normal	60%	55,099	34,850	12,485	47,335	102,434
30	1951	Above Normal	85%	78,272	34,850	12,485	47,335	125,607
31	1952	Wet	63%	57,855	34,850	12,485	47,335	105,190
32	1953	Wet	80%	74,381	38,600	12,485	51,085	125,466
33	1954	Above Normal	77%	71,652	36,500	12,485	48,985	120,637
34	1955	Dry	28%	25,439	34,850	19,125	53,975	79,414
35	1956	Wet	87%	80,155	34,850	12,485	47,335	127,490
36	1957	Above Normal	62%	56,957	34,850	12,485	47,335	104,292
37	1958	Wet	73%	67,806	34,850	12,485	47,335	115,141
38	1959	Below Normal	84%	77,554	38,600	12,485	51,085	128,639
39	1960	Dry	35%	32,679	36,500	19,125	55,625	88,304
40	1961	Dry	57%	52,756	34,850	12,485	47,335	100,091
41	1962	Below Normal	72%	66,287	34,850	12,485	47,335	113,622
42	1963	Wet	82%	76,230	34,850	12,485	47,335	123,565
43	1964	Dry	53%	49,474	34,850	12,485	47,335	96,809
44	1965	Wet	69%	64,021	34,850	12,485	47,335	111,356
45	1966	Below Normal	79%	73,083	38,600	12,485	51,085	124,168
46	1967	Wet	72%	66,920	36,500	12,485	48,985	115,905
47	1968	Below Normal	80%	73,794	34,850	12,485	47,335	121,129
48	1969	Wet	64%	58,766	34,850	12,485	47,335	106,101
49	1970	Wet	79%	72,904	38,600	12,485	51,085	123,989
50	1971	Wet	80%	74,236	38,600	12,485	51,085	125,321
51	1972	Below Normal	41%	38,213	36,500	12,485	48,985	87,198
52	1973	Above Normal	75%	69,052	34,850	12,485	47,335	116,387
53	1974	Wet	77%	71,257	34,850	12,485	47,335	118,592
54	1975	Wet	78%	72,018	34,850	12,485	47,335	119,353
55	1976	Critical	63%	58,273	34,850	12,485	47,335	105,608
56	1977	Critical	6%	5,428	34,850	34,977	69,827	75,255
57	1978	Above Normal	87%	80,556	34,850	12,485	47,335	127,891
58	1979	Below Normal	76%	70,013	38,600	12,485	51,085	121,098
59	1980	Above Normal	66%	60,652	38,600	12,485	51,085	111,737
60	1981	Dry	76%	69,997	38,600	12,485	51,085	121,082
61	1982	Wet	71%	65,809	36,500	12,485	48,985	114,794
62	1983	Wet	60%	55,886	38,600	12,485	51,085	106,971
63	1984	Wet	78%	72,233	38,600	12,485	51,085	123,318
64	1985	Dry	77%	71,579	36,500	12,485	48,985	120,564
65	1986	Wet	56%	51,344	34,850	12,485	47,335	98,679
66	1987	Dry	68%	63,232	38,600	12,485	51,085	114,317
67	1988	Critical	12%	10,665	36,500	19,125	55,625	66,290
68	1989	Dry	76%	70,061	34,850	12,485	47,335	117,396
69	1990	Critical	9%	8,056	34,850	25,227	60,077	68,133
70	1991	Critical	18%	16,313	34,850	34,977	69,827	86,140
71	1992	Critical	26%	24,330	34,850	34,977	69,827	94,157
72	1993	Above Normal	90%	83,055	38,600	12,485	51,085	134,140
73	1994	Critical	51%	47,101	38,600	12,485	51,085	98,186
74	1995	Wet	72%	66,992	36,500	12,485	48,985	115,977
75	1996	Wet	83%	76,979	38,600	12,485	51,085	128,064
76	1997	Wet	75%	69,401	38,600	12,485	51,085	120,486
77	1998	Wet	73%	67,316	38,600	12,485	51,085	118,401
78	1999	Wet	83%	76,976	38,600	12,485	51,085	128,061
79	2000	Above Normal	84%	77,238	38,600	12,485	51,085	128,323
80	2001	Dry	28%	26,050	36,500	19,125	55,625	81,675
81	2002	Dry	52%	48,382	34,850	12,485	47,335	95,717
82	2003	Above Normal	71%	65,873	34,850	12,485	47,335	113,208
83	2004	Below Normal / Dry	Actual was 65%	60,125	34,850	12,485	47,335	107,460
84	2005	Wet / Above Normal	Actual was 90%	83,250	38,600	12,485	51,085	134,335
85	2006	Wet / Wet	Actual was 100%	92,500	38,600	12,485	51,085	143,585
86	2007	Dry / Critical	Actual was 60%	55,500	36,500	12,485	48,985	104,485

[a]Defined by water year, using DWR's Sacramento Valley Unimpaired Runoff Index: wet = wettest; critical = driest

[b]From Table B.3 in *The State Water Project Delivery Reliability Report 2007* (DWR, August 2008). This is for current (2007) conditions as defined in the DWR report. In any given year, the allocation may be made up, in part, of carryover water from the prior year.

afy = acre-feet per year SWP = State Water Project

Table 3-9

Pumping Rates Simulated for Individual Alluvial Aquifer Wells Under the Redistributed 2008 Groundwater Operating Plan (Listed By Alluvial Subarea)

		Original 2008 Operating Plan			Redistributed 2008 Operating Plan			
Well Name	**Alluvial Subarea**	**Normal**	**Dry Yr 1**	**Dry Yr 2+**	**Normal**	**Dry Yr 1**	**Dry Yr 2+**	**Comments**
NCWD-Pinetree 1	Above Mint Canyon	150	0	0	150	0	0	
NCWD-Pinetree 3	Above Mint Canyon	350	300	300	350	300	300	
NCWD-Pinetree 4	Above Mint Canyon	300	200	200	300	200	200	
NCWD-Pinetree 5	Above Mint Canyon	300	200	200	300	200	200	
Robinson Ranch	Above Mint Canyon	600	550	450	600	550	450	
SCWD-Sand Canyon	**Above Mint Canyon**	**1,000**	**600**	**200**	**200**	**150**	**0**	**Reduce these three wells by 1,600 afy in order to**
SCWD-Lost Canyon 2	**Above Mint Canyon**	**700**	**700**	**650**	**300**	**150**	**0**	**offset increased pumping at the SCWD-Santa Clara and**
SCWD-Lost Canyon 2A	**Above Mint Canyon**	**700**	**650**	**600**	**300**	**150**	**0**	**SCWD-Bouquet wells in the "Above Saugus WRP" area.**
SCWD-Mitchell #5A	Above Mint Canyon	500	350	200	500	350	200	
SCWD-Mitchell #5B	Above Mint Canyon	800	550	300	800	550	300	
SCWD-N. Oaks Central	Above Mint Canyon	850	800	700	850	800	700	
SCWD-N. Oaks East	Above Mint Canyon	800	750	700	800	750	700	
SCWD-N. Oaks West	Above Mint Canyon	800	750	700	800	750	700	
SCWD-Sierra	Above Mint Canyon	1,100	900	700	1,100	900	700	
Mint Canyon Total		**8,950**	**7,300**	**5,900**	**7,350**	**5,800**	**4,450**	
SCWD-Honby	Above Saugus WRP	1,000	850	700	1,000	850	700	
SCWD-Santa Clara	Above Saugus WRP	800	800	800	800	800	800	
SCWD-Valley Center	**Above Saugus WRP**	**0**	**0**	**0**	**800**	**800**	**800**	**Pumps 800 afy moved from the "Above Mint Canyon" area.**
SCWD-Bouquet	**Above Saugus WRP**	**0**	**0**	**0**	**800**	**800**	**800**	**Pumps 800 afy moved from the "Above Mint Canyon" area.**
VWC-T7	Above Saugus WRP	750	750	750	750	750	750	
VWC-U4	Above Saugus WRP	800	800	800	800	800	800	
VWC-U6	Above Saugus WRP	800	800	800	800	800	800	
Above Saugus WRP Total		**4,150**	**4,000**	**3,850**	**5,750**	**5,600**	**5,450**	
VWC-N	Below Saugus WRP	650	650	650	650	650	650	
VWC-N7	Below Saugus WRP	1,160	1,160	1,160	1,160	1,160	1,160	
VWC-N8	Below Saugus WRP	1,160	1,160	1,160	1,160	1,160	1,160	
VWC-Q2	Below Saugus WRP	1,100	1,100	1,100	1,100	1,100	1,100	
VWC-S6	Below Saugus WRP	1,000	1,000	1,000	1,000	1,000	1,000	
VWC-S7	Below Saugus WRP	500	500	500	500	500	500	
VWC-S8	Below Saugus WRP	500	500	500	500	500	500	
Below Saugus WRP Total		**6,070**	**6,070**	**6,070**	**6,070**	**6,070**	**6,070**	
NLF-161	Below Valencia WRP	1,000	1,000	1,000	1,000	1,000	1,000	
NLF-B10	Below Valencia WRP	500	350	350	500	350	350	
NLF-B11	Below Valencia WRP	100	200	200	100	200	200	
NLF-B14	Below Valencia WRP	300	1,000	1,000	300	1,000	1,000	
NLF-B20	Below Valencia WRP	350	500	500	350	500	500	
NLF-B5	Below Valencia WRP	2,400	1,900	1,900	2,400	1,900	1,900	
NLF-B6	Below Valencia WRP	1,100	1,100	1,100	1,100	1,100	1,100	
NLF-C	Below Valencia WRP	1,100	1,000	1,000	1,100	1,000	1,000	
NLF-C3	Below Valencia WRP	100	200	200	100	200	200	
NLF-C4	Below Valencia WRP	200	450	450	200	450	450	
NLF-C5	Below Valencia WRP	900	850	850	900	850	850	
NLF-C7	Below Valencia WRP	350	300	300	350	300	300	
NLF-C8	Below Valencia WRP	400	400	400	400	400	400	
NLF-E5	Below Valencia WRP	100	150	150	100	150	150	
NLF-E9	Below Valencia WRP	900	350	350	900	350	350	
NLF-G45	Below Valencia WRP	350	400	400	350	400	400	
VWC-E15	Below Valencia WRP	800	800	800	800	800	800	
Below Valencia WRP Total		**10,950**	**10,950**	**10,950**	**10,950**	**10,950**	**10,950**	
SCWD-Clark	Bouquet Canyon	700	700	700	700	700	700	
SCWD-Guida	Bouquet Canyon	1,300	1,250	1,200	1,300	1,250	1,200	
Bouquet Canyon Total		**2,000**	**1,950**	**1,900**	**2,000**	**1,950**	**1,900**	
VWC-W10	San Francisquito Canyon	1,000	1,000	1,000	1,000	1,000	1,000	
VWC-W11	San Francisquito Canyon	800	800	800	800	800	800	
VWC-W9	San Francisquito Canyon	950	950	950	950	950	950	
San Francisquito Canyon Total		**2,750**	**2,750**	**2,750**	**2,750**	**2,750**	**2,750**	
NCWD-Castaic 1	Castaic Valley	350	300	250	350	300	250	
NCWD-Castaic 2	Castaic Valley	100	100	100	100	100	100	
NCWD-Castaic 4	Castaic Valley	100	0	0	100	0	0	
NCWD-Castaic 7	Castaic Valley	300	200	200	300	200	200	
VWC-D	Castaic Valley	880	880	880	880	880	880	
WHR	Castaic Valley	2,000	2,000	2,000	2,000	2,000	2,000	
Castaic Valley Total:		**3,730**	**3,480**	**3,430**	**3,730**	**3,480**	**3,430**	
Total Alluvial Pumping		**38,600**	**36,500**	**34,850**	**38,600**	**36,600**	**35,000**	**Current Operating Plan:**
								35,000 to 40,000 AF/yr in normal and wet years
								30,000 to 35,000 AF/yr in dry years

Notes:

All pumping volumes are listed in acre-feet per year (afy).

Wells that are not listed are assumed to not be pumping in the future.

NLF = Newhall Land & Farming Company

NCWD = Newhall County Water District

SCWD = Santa Clarita Division of Castaic Lake Water Agency

VWC = Valencia Water Company

WHR = Wayside Honor Rancho, whose wells are owned by the Los Angeles County Waterworks District No. 36

TABLE 3- 0

Pumping Rates Simulated for Individual Alluvial Aquifer Wells under the Potential Groundwater Operating Plan

Well Name	Alluvial Subarea	Potential Operating Plan Normal	Dry Yr 1	Dry Yr 2+	Comments
NCWD-Castaic 1	Castaic Valley	450	400	400	100 to 150 afy more than 2008 operating plan.
NCWD-Castaic 2	Castaic Valley	300	200	100	0 to 200 afy more than 2008 operating plan.
NCWD-Castaic 4	Castaic Valley	150	100	50	50 to 100 afy more than 2008 operating plan.
NCWD-Castaic 7	Castaic Valley	1,800	1,800	1,800	1500 to 1600 afy more than 2008 operating plan.
NCWD-Pinetree 1	Above Mint Canyon	200	200	200	50 to 200 afy more than 2008 operating plan.
NCWD-Pinetree 3	Above Mint Canyon	450	450	450	100 to 150 afy more than 2008 operating plan.
NCWD-Pinetree 4	Above Mint Canyon	300	300	200	0 to 100 afy more than 2008 operating plan.
NCWD-Pinetree 5	Above Mint Canyon	300	300	200	0 to 100 afy more than 2008 operating plan.
NCWD Total		**3,950**	**3,750**	**3,400**	**Total is 2,000 to 2,450 afy more than in the 2008 operating plan.**
NLF-B14	Below Valencia WRP	650	650	650	Future agricultural supply for Newhall Land & Farming Co.
NLF-B15	Below Valencia WRP	650	650	650	Future agricultural supply for Newhall Land & Farming Co.
NLF-B16	Below Valencia WRP	650	650	650	Future agricultural supply for Newhall Land & Farming Co.
NLF-C10	Below Valencia WRP	650	650	650	Future agricultural supply for Newhall Land & Farming Co.
NLF-C11	Below Valencia WRP	650	650	650	Future agricultural supply for Newhall Land & Farming Co.
NLF-C12	Below Valencia WRP	650	650	650	Future agricultural supply for Newhall Land & Farming Co.
NLF-E21	Castaic Valley	650	650	650	Future agricultural supply for Newhall Land & Farming Co.
NLF Total		**4,550**	**4,550**	**4,550**	**Total is 5,600 afy less than in the 2008 operating plan.**
SCWD-Clark	Bouquet Canyon	800	750	700	0 to 100 afy more than 2008 operating plan.
SCWD-Guida	Bouquet Canyon	1,500	1,400	1,300	100 to 200 afy more than 2008 operating plan.
SCWD-Honby	Above Saugus WRP	1,200	1,000	700	0 to 200 afy more than 2008 operating plan.
SCWD-Lost Canyon 2	Above Mint Canyon	850	800	700	50 to 150 afy more than 2008 operating plan.
SCWD-Lost Canyon 2A	Above Mint Canyon	800	700	600	0 to 100 afy more than 2008 operating plan.
SCWD-Mitchell #5A	Above Mint Canyon	900	550	200	0 to 400 afy more than 2008 operating plan.
SCWD-Mitchell #5B	Above Mint Canyon	1,000	900	800	200 to 500 afy more than 2008 operating plan.
SCWD-N. Oaks Central	Above Mint Canyon	1,400	800	800	0 to 550 afy more than 2008 operating plan.
SCWD-N. Oaks East	Above Mint Canyon	1,000	800	600	50 to 200 afy more than 2008 operating plan.
SCWD-N. Oaks West	Above Mint Canyon	1,000	800	600	50 to 200 afy more than 2008 operating plan.
SCWD-Sand Canyon	Above Mint Canyon	1,300	1,000	600	300 to 400 afy more than 2008 operating plan.
SCWD-Sierra	Above Mint Canyon	1,400	1,100	800	100 to 300 afy more than 2008 operating plan.
SCWD-Santa Clara	Above Saugus WRP	950	950	950	Future well.
SCWD-Valley Center	Above Saugus WRP	1,200	1,000	800	800 gpm (2008 plan) + 0 to 400 afy additional pumping.
SCWD-Bouquet	Above Saugus WRP	1,200	1,100	1,100	Future well.
SCWD Total		**16,500**	**13,650**	**11,250**	**Total is 3,100 to 5,450 afy more than in the 2008 operating plan.**
VWC-D	Castaic Valley	880	880	880	Same as 2008 operating plan.
VWC-E14	Castaic Valley	1,175	1,175	1,175	Future operations for Newhall Ranch.
VWC-E15	Castaic Valley	800	800	800	Same as 2008 operating plan.
VWC-E16	Castaic Valley	1,175	1,175	1,175	Future operations for Newhall Ranch.
VWC-E17	Castaic Valley	1,175	1,175	1,175	Future operations for Newhall Ranch.
VWC-G1	Below Valencia WRP	1,175	1,175	1,175	Future operations for Newhall Ranch.
VWC-G3	Below Valencia WRP	1,175	1,175	1,175	Future operations for Newhall Ranch.
VWC-G4	Below Valencia WRP	1,175	1,175	1,175	Future operations for Newhall Ranch.
VWC-N	Below Saugus WRP	650	650	650	Same as 2008 operating plan.
VWC-N7	Below Saugus WRP	1,160	1,160	1,160	Same as 2008 operating plan.
VWC-N8	Below Saugus WRP	1,160	1,160	1,160	Same as 2008 operating plan.
VWC-Q2	Below Saugus WRP	1,100	1,100	1,100	Same as 2008 operating plan.
VWC-S6	Below Saugus WRP	1,000	1,000	1,000	Same as 2008 operating plan.
VWC-S7	Below Saugus WRP	500	500	500	Same as 2008 operating plan.
VWC-S8	Below Saugus WRP	500	500	500	Same as 2008 operating plan.
VWC-T7	Above Saugus WRP	750	750	750	Same as 2008 operating plan.
VWC-U4	Above Saugus WRP	800	800	800	Same as 2008 operating plan.
VWC-U6	Above Saugus WRP	800	800	800	Same as 2008 operating plan.
VWC-W10	San Francisquito Canyon	1,000	1,000	1,000	Same as 2008 operating plan.
VWC-W11	San Francisquito Canyon	800	800	800	Same as 2008 operating plan.
VWC-W9	San Francisquito Canyon	950	950	950	Same as 2008 operating plan.
VWC Total		**19,900**	**19,900**	**19,900**	**VWC and NLF total is 1,450 afy more than in the 2008 operating plan.**
Robinson Ranch	Above Mint Canyon	600	550	450	Same as 2008 operating plan.
WHR	Castaic Valley	2,000	2,000	2,000	Same as 2008 operating plan.
Purveyor Alluvial Usage		**40,350**	**37,300**	**34,550**	**2008 Operating Plan:**
Other Alluvial Usage		**7,150**	**7,100**	**7,000**	**35,000 to 40,000 afy in normal and wet years**
Total Alluvial Pumping		**47,500**	**44,400**	**41,550**	**30,000 to 35,000 afy in dry years**

Notes:

All pumping volumes are listed in units of acre-feet per year (afy).

Wells that are not listed are assumed to not be pumping in the future.

NLF = Newhall Land & Farming Company

NCWD = Newhall County Water District

SCWD = Santa Clarita Division of Castaic Lake Water Agency

VWC = Valencia Water Company

WHR = Wayside Honor Rancho, whose wells are owned by the Los Angeles County Waterworks District No. 36

"Other Alluvial Usage" consists of pumping by NLF, WHR, and Robinson Ranch. An additional 500 afy of pumping by other private well owners is not included in this table.

TABLE 3-11

Pumping Rates Simulated for Individual Saugus Formation Wells under the Potential Groundwater Operating Plan

Owner	Well Name	Non-Drought Years	Drought Year 1	Drought Year 2	Drought Year 3
NCWD	12	1,765	2,494	2,494	2,494
	13	1,765	2,494	2,494	2,494
	Future well	1,765	2,494	2,494	2,494
Total Pumping (NCWD Wells)		**5,295**	**7,482**	**7,482**	**7,482**
SCWD	Saugus1	1,772	1,772	1,772	1,772
	Saugus2	1,772	1,772	1,772	1,772
	Future well	1,800	1,800	1,800	1,800
Total Pumping (SCWD Wells)		**5,344**	**5,344**	**5,344**	**5,344**
LA County Water District #36	Future well	300	300	300	300
Total Pumping (LACWD #36)		**300**	**300**	**300**	**300**
Private (Palmer)	Future Golf Course	500	500	500	500
Total Pumping (Future Golf)		**500**	**500**	**500**	**500**
VWC	159	50	50	50	50
	160 (Municipal)	500	830	830	830
	160 (Val. Ctry Club)	500	500	500	500
	201	300	300	3,777	3,777
	205	1,211	2,945	4,038	4,038
	206	1,175	2,734	3,500	3,500
	207	1,175	2,734	3,500	3,500
Total Pumping (VWC Wells)		**4,911**	**10,093**	**16,195**	**16,195**
	Future #1	0	0	0	3,250
	Future #2	0	0	0	3,250
	Future #3	0	0	0	3,250
Total Pumping (Future Wells)		**0**	**0**	**0**	**9,750**
Total Pumping (All Saugus Wells)		**16,350**	**23,719**	**29,821**	**39,571**

Notes:

All pumping volumes are listed in units of acre-feet per year (afy).

Wells that are not listed are assumed to not be pumping in the future.

NLF = Newhall Land & Farming Company

SCWD = Santa Clarita Division of Castaic Lake Water Agency

NCWD = Newhall County Water District

VWC = Valencia Water Company

TABLE 3-12

Total Groundwater and SWP Supplies for Potential Groundwater Operating Plan (Not Including Recycled Water and Other Water Supplies, e.g. Purchased or Banked Water)

Model Year	Based on Historical Year	SWP Hydrology [a]	SWP Allocations [b] (%)	SWP Deliveries (afy)	Simulated Pumping From Alluvial Aquifer (afy)	Simulated Pumping From Saugus Formation (afy)	Total Groundwater Pumping (afy)	SWP + Groundwater (afy)
1	1922	Above Normal	89%	82,227	47,500	16,350	63,850	146,077
2	1923	Below Normal	76%	70,699	47,500	16,350	63,850	134,549
3	1924	Critical	10%	8,960	44,400	23,719	68,119	77,079
4	1925	Dry	40%	36,784	41,550	16,350	57,900	94,684
5	1926	Dry	53%	48,929	41,550	16,350	57,900	106,829
6	1927	Wet	89%	82,786	47,500	16,350	63,850	146,636
7	1928	Above Normal	50%	46,079	47,500	16,350	63,850	109,929
8	1929	Critical	18%	16,858	44,400	23,719	68,119	84,977
9	1930	Dry	49%	45,379	41,550	16,350	57,900	103,279
10	1931	Critical	27%	24,732	41,550	29,821	71,371	96,103
11	1932	Dry	32%	29,204	47,500	39,571	87,071	116,275
12	1933	Critical	48%	44,339	44,400	39,571	83,971	128,310
13	1934	Critical	32%	29,424	41,550	39,571	81,121	110,545
14	1935	Below Normal	81%	74,625	41,550	16,350	57,900	132,525
15	1936	Below Normal	76%	69,911	41,550	16,350	57,900	127,811
16	1937	Below Normal	78%	72,037	41,550	16,350	57,900	129,937
17	1938	Wet	82%	75,970	41,550	16,350	57,900	133,870
18	1939	Dry	79%	72,883	47,500	16,350	63,850	136,733
19	1940	Above Normal	77%	70,837	44,400	16,350	60,750	131,587
20	1941	Wet	61%	56,535	41,550	16,350	57,900	114,435
21	1942	Wet	77%	70,890	47,500	16,350	63,850	134,740
22	1943	Wet	76%	70,599	44,400	16,350	60,750	131,349
23	1944	Dry	71%	65,569	47,500	16,350	63,850	129,419
24	1945	Below Normal	75%	69,041	47,500	16,350	63,850	132,891
25	1946	Below Normal	77%	71,596	47,500	16,350	63,850	135,446
26	1947	Dry	56%	51,794	47,500	16,350	63,850	115,644
27	1948	Below Normal	63%	58,403	44,400	16,350	60,750	119,153
28	1949	Dry	31%	28,443	41,550	23,719	65,269	93,712
29	1950	Below Normal	60%	55,099	41,550	16,350	57,900	112,999
30	1951	Above Normal	85%	78,272	41,550	16,350	57,900	136,172
31	1952	Wet	63%	57,855	41,550	16,350	57,900	115,755
32	1953	Wet	80%	74,381	47,500	16,350	63,850	138,231
33	1954	Above Normal	77%	71,652	44,400	16,350	60,750	132,402
34	1955	Dry	28%	25,439	41,550	23,719	65,269	90,708
35	1956	Wet	87%	80,155	41,550	16,350	57,900	138,055
36	1957	Above Normal	62%	56,957	41,550	16,350	57,900	114,857
37	1958	Wet	73%	67,806	41,550	16,350	57,900	125,706
38	1959	Below Normal	84%	77,554	47,500	16,350	63,850	141,404
39	1960	Dry	35%	32,679	44,400	23,719	68,119	100,798
40	1961	Dry	57%	52,756	41,550	16,350	57,900	110,656
41	1962	Below Normal	72%	66,287	41,550	16,350	57,900	124,187
42	1963	Wet	82%	76,230	41,550	16,350	57,900	134,130
43	1964	Dry	53%	49,474	41,550	16,350	57,900	107,374
44	1965	Wet	69%	64,021	41,550	16,350	57,900	121,921
45	1966	Below Normal	79%	73,083	47,500	16,350	63,850	136,933
46	1967	Wet	72%	66,920	44,400	16,350	60,750	127,670
47	1968	Below Normal	80%	73,794	41,550	16,350	57,900	131,694
48	1969	Wet	64%	58,766	41,550	16,350	57,900	116,666
49	1970	Wet	79%	72,904	47,500	16,350	63,850	136,754
50	1971	Wet	80%	74,236	47,500	16,350	63,850	138,086
51	1972	Below Normal	41%	38,213	44,400	16,350	60,750	98,963
52	1973	Above Normal	75%	69,052	41,550	16,350	57,900	126,952
53	1974	Wet	77%	71,257	41,550	16,350	57,900	129,157
54	1975	Wet	78%	72,018	41,550	16,350	57,900	129,918
55	1976	Critical	63%	58,273	41,550	16,350	57,900	116,173
56	1977	Critical	6%	5,428	41,550	39,571	81,121	86,549
57	1978	Above Normal	87%	80,556	41,550	16,350	57,900	138,456
58	1979	Below Normal	76%	70,013	47,500	16,350	63,850	133,863
59	1980	Above Normal	66%	60,652	47,500	16,350	63,850	124,502
60	1981	Dry	76%	69,997	47,500	16,350	63,850	133,847
61	1982	Wet	71%	65,809	44,400	16,350	60,750	126,559
62	1983	Wet	60%	55,886	47,500	16,350	63,850	119,736
63	1984	Wet	78%	72,233	47,500	16,350	63,850	136,083
64	1985	Dry	77%	71,579	44,400	16,350	60,750	132,329
65	1986	Wet	56%	51,344	41,550	16,350	57,900	109,244
66	1987	Dry	68%	63,232	47,500	16,350	63,850	127,082
67	1988	Critical	12%	10,665	44,400	23,719	68,119	78,784
68	1989	Dry	76%	70,061	41,550	16,350	57,900	127,961
69	1990	Critical	9%	8,056	41,550	29,821	71,371	79,427
70	1991	Critical	18%	16,313	41,550	39,571	81,121	97,434
71	1992	Critical	26%	24,330	41,550	39,571	81,121	105,451
72	1993	Above Normal	90%	83,055	47,500	16,350	63,850	146,905
73	1994	Critical	51%	47,101	47,500	16,350	63,850	110,951
74	1995	Wet	72%	66,992	44,400	16,350	60,750	127,742
75	1996	Wet	83%	76,979	47,500	16,350	63,850	140,829
76	1997	Wet	75%	69,401	47,500	16,350	63,850	133,251
77	1998	Wet	73%	67,316	47,500	16,350	63,850	131,166
78	1999	Wet	83%	76,976	47,500	16,350	63,850	140,826
79	2000	Above Normal	84%	77,238	47,500	16,350	63,850	141,088
80	2001	Dry	28%	26,050	44,400	23,719	68,119	94,169
81	2002	Dry	52%	48,382	41,550	16,350	57,900	106,282
82	2003	Above Normal	71%	65,873	41,550	16,350	57,900	123,773
83	2004	Below Normal / Dry	Actual was 65%	60,125	41,550	16,350	57,900	118,025
84	2005	Wet / Above Normal	Actual was 90%	83,250	47,500	16,350	63,850	147,100
85	2006	Wet / Wet	Actual was 100%	92,500	47,500	16,350	63,850	156,350
86	2007	Dry / Critical	Actual was 60%	55,500	44,400	16,350	60,750	116,250

[a]Defined by water year, using DWR's Sacramento Valley Unimpaired Runoff Index: wet = wettest; critical = driest

[b]From Table B.3 in *The State Water Project Delivery Reliability Report 2007* (DWR, August 2008). This is for current (2007) conditions as defined in the DWR report. In any given year, the allocation may be made up, in part, of carryover water from the prior year.

afy = acre-feet per year SWP = State Water Project

TABLE 3-13

Simulated Monthly Precipitation at the Newhall County Water District Rain Gage for the 86-year Simulation

Model Year	Historical Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1922	3.28	16.64	9.73	0.15	0.34	0.00	0.30	0.00	0.00	1.55	0.00	7.25	39.24
2	1923	1.21	9.43	3.15	2.10	0.00	0.00	0.00	0.31	0.00	1.13	0.00	0.00	17.33
3	1924	2.89	4.23	0.22	0.48	0.88	0.00	0.00	0.00	0.00	0.00	0.63	0.01	9.34
4	1925	0.89	4.13	1.30	0.30	0.00	0.00	0.00	0.00	0.62	0.86	0.37	0.00	8.47
5	1926	10.36	14.63	4.84	0.36	0.40	0.00	0.00	0.00	0.00	0.00	0.00	1.36	31.95
6	1927	5.84	10.76	3.38	2.56	0.00	0.00	0.00	0.00	0.00	0.22	3.18	1.30	27.24
7	1928	1.55	0.51	0.38	0.05	0.12	0.01	0.00	0.00	0.02	0.00	3.01	5.85	11.50
8	1929	4.17	2.21	0.20	2.05	0.00	0.00	0.00	0.00	0.00	0.00	4.96	0.07	13.66
9	1930	4.17	2.21	0.20	2.05	0.00	0.00	0.00	0.00	0.00	0.00	4.96	0.07	13.66
10	1931	4.10	6.45	0.00	2.29	0.97	0.02	0.00	3.78	0.06	0.14	3.30	7.53	28.65
11	1932	4.81	9.42	0.18	0.46	0.21	0.00	0.00	0.00	0.08	0.06	0.00	0.89	16.11
12	1933	16.04	0.00	0.05	0.34	1.04	0.31	0.00	0.08	0.00	0.22	0.05	5.95	24.08
13	1934	6.54	2.93	0.11	0.00	0.02	0.59	0.00	0.00	0.01	2.17	2.25	6.56	21.18
14	1935	4.45	2.50	3.41	1.95	0.00	0.00	0.00	0.06	0.08	0.12	0.95	0.81	14.33
15	1936	0.06	8.40	1.84	0.36	0.00	0.00	0.06	0.00	0.01	2.45	0.01	10.82	24.02
16	1937	3.34	6.79	6.16	0.21	0.33	0.00	0.00	0.00	0.00	0.00	0.00	4.19	21.03
17	1938	0.62	12.79	11.37	0.84	0.05	0.12	0.00	0.00	0.15	0.07	0.01	12.40	38.43
18	1939	3.80	1.91	2.05	0.27	0.12	0.00	0.00	0.00	3.60	0.22	0.34	0.90	13.23
19	1940	3.29	6.25	1.43	2.12	0.00	0.00	0.00	0.00	0.00	1.29	0.07	10.62	25.08
20	1941	3.92	19.84	10.82	5.82	0.00	0.00	0.00	0.01	0.00	2.45	0.35	6.23	49.45
21	1942	0.14	0.88	1.64	2.73	0.00	0.00	0.00	0.68	0.00	0.93	0.23	1.09	8.33
22	1943	19.90	4.59	7.80	1.04	0.00	0.00	0.00	0.00	0.00	0.15	0.33	9.63	43.45
23	1944	1.20	16.38	3.76	0.54	0.01	0.00	0.00	0.00	0.00	0.00	5.82	1.20	28.90
24	1945	0.14	4.11	3.13	0.19	0.00	0.00	0.00	0.00	0.00	1.33	0.45	7.75	17.09
25	1946	0.19	2.42	5.95	0.61	0.00	0.00	0.00	0.00	0.00	0.75	10.87	4.69	25.48
26	1947	0.47	0.42	1.28	0.56	0.14	0.00	0.00	0.08	0.05	0.04	0.00	1.84	4.88
27	1948	0.00	1.87	3.49	1.56	0.00	0.09	0.00	0.00	0.00	0.14	0.00	3.57	10.71
28	1949	2.83	1.06	2.18	0.02	1.35	0.00	0.00	0.00	0.00	0.00	1.36	2.85	11.65
29	1950	2.58	1.69	1.27	0.86	0.01	0.00	0.00	0.00	0.32	0.36	0.73	0.21	8.03
30	1951	2.96	0.93	1.16	1.69	0.09	0.00	0.00	0.05	0.00	0.49	1.33	5.88	14.57
31	1952	17.68	0.61	10.30	1.80	0.00	0.00	0.00	0.00	0.12	0.00	4.52	5.09	40.12
32	1953	0.80	0.02	0.21	1.64	0.69	0.00	0.00	0.00	0.00	0.00	2.32	0.04	5.73
33	1954	6.38	3.36	4.86	0.12	0.00	0.00	0.00	0.00	0.00	0.00	2.38	1.47	18.56
34	1955	5.69	1.69	0.21	3.38	1.91	0.00	0.00	0.00	0.00	0.00	1.43	2.01	16.32
35	1956	7.55	1.00	0.00	5.90	1.82	0.00	0.11	0.00	0.00	0.15	0.00	0.15	16.68
36	1957	7.22	2.71	3.05	1.16	1.06	0.25	0.00	0.00	0.00	2.68	0.40	8.30	26.81
37	1958	2.11	10.42	5.82	7.18	0.00	0.00	0.00	0.00	0.04	1.35	0.23	0.00	27.15
38	1959	3.70	5.47	0.00	0.59	0.00	0.00	0.00	0.00	0.08	0.00	0.00	1.68	11.51
39	1960	4.17	2.21	0.20	2.05	0.00	0.00	0.00	0.00	0.00	0.00	4.96	0.07	13.66
40	1961	1.88	0.00	0.76	0.33	0.09	0.00	0.07	0.00	0.11	0.00	4.12	2.99	10.35
41	1962	3.86	19.44	1.53	0.00	0.02	0.00	0.00	0.00	0.00	0.05	0.00	0.00	24.90
42	1963	0.99	3.63	4.10	2.23	0.06	0.43	0.00	0.00	0.77	0.50	2.29	0.01	15.01
43	1964	2.95	0.00	1.88	2.41	0.04	0.12	0.00	0.00	0.00	0.52	1.47	2.48	11.84
44	1965	0.25	0.07	1.65	9.14	0.00	0.02	0.26	0.16	0.95	0.00	17.49	7.89	37.88
45	1966	1.42	1.55	0.33	0.00	0.09	0.00	0.00	0.00	0.09	0.11	7.56	5.95	17.10

TABLE 3-13

Simulated Monthly Precipitation at the Newhall County Water District Rain Gage for the 86-year Simulation

Model Year	Historical Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
46	1967	6.76	0.22	3.23	5.41	0.19	0.00	0.00	0.00	0.50	0.00	9.36	1.58	27.26
47	1968	0.86	0.93	2.91	0.97	0.07	0.00	0.00	0.38	0.00	0.39	0.35	1.24	8.10
48	1969	19.53	13.89	0.82	1.16	0.05	0.05	0.18	0.00	0.00	0.00	2.32	0.05	38.04
49	1970	0.94	6.63	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.13	8.86	6.33	27.21
50	1971	1.23	1.41	0.48	0.94	0.15	0.00	0.00	0.00	0.47	0.50	0.38	10.57	16.14
51	1972	0.00	0.12	0.00	0.02	0.05	0.05	0.00	0.06	0.00	0.05	3.45	1.08	4.87
52	1973	5.19	11.74	3.29	0.00	0.00	0.00	0.00	0.00	0.00	0.15	1.83	1.03	23.22
53	1974	10.58	0.02	4.30	0.06	0.00	0.00	0.02	0.00	0.00	1.17	0.12	4.89	21.17
54	1975	0.28	3.02	6.04	2.96	0.00	0.00	0.00	0.00	0.00	0.39	0.04	0.09	12.81
55	1976	0.00	7.39	1.47	0.46	0.15	0.35	0.01	0.00	3.40	0.22	2.09	0.90	16.45
56	1977	5.75	0.12	2.15	0.00	5.27	0.00	0.00	2.68	0.02	0.05	0.06	8.40	24.49
57	1978	10.74	13.23	17.10	2.72	0.00	0.00	0.00	0.00	1.23	0.01	2.70	1.76	49.49
58	1979	12.44	3.20	6.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.89	1.19	23.75
59	1980	10.36	14.63	4.84	0.36	0.40	0.00	0.00	0.00	0.00	0.00	0.00	1.36	31.95
60	1981	4.76	1.66	5.50	0.46	0.00	0.00	0.00	0.00	0.00	0.58	3.62	0.22	16.80
61	1982	3.33	1.21	9.50	1.09	0.13	0.00	0.00	0.00	1.02	0.25	5.34	2.95	24.82
62	1983	8.67	6.85	13.07	4.61	0.20	0.00	0.00	1.17	1.85	1.74	5.04	5.13	48.33
63	1984	0.00	0.00	0.27	0.07	0.00	0.00	0.00	0.00	0.05	0.16	3.87	8.13	12.55
64	1985	0.78	1.20	1.04	0.14	0.07	0.00	0.06	0.00	0.12	0.54	5.11	0.70	9.76
65	1986	5.84	6.65	5.39	0.88	0.00	0.00	0.05	0.00	1.78	0.68	1.55	0.24	23.06
66	1987	2.10	0.61	1.69	0.14	0.00	0.00	0.09	0.02	0.00	3.47	3.84	4.80	16.76
67	1988	3.27	3.39	1.16	3.98	0.09	0.00	0.00	0.00	0.10	0.00	0.92	7.14	20.05
68	1989	0.89	4.13	1.30	0.30	0.00	0.00	0.00	0.00	0.62	0.86	0.37	0.00	8.47
69	1990	2.89	4.23	0.22	0.48	0.88	0.00	0.00	0.00	0.00	0.00	0.63	0.01	9.34
70	1991	1.11	5.72	11.33	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	5.95	24.61
71	1992	3.28	16.64	9.73	0.15	0.34	0.00	0.30	0.00	0.00	1.55	0.00	7.25	39.24
72	1993	17.11	11.73	4.27	0.00	0.00	0.65	0.00	0.00	0.00	0.57	0.75	1.00	36.08
73	1994	0.48	5.31	2.33	0.42	0.00	0.00	0.00	0.00	0.00	0.78	0.71	1.94	11.97
74	1995	21.98	1.93	8.30	0.72	0.26	0.76	0.00	0.00	0.00	0.00	0.00	2.33	36.28
75	1996	2.97	6.73	2.08	0.13	0.68	0.00	0.00	0.00	0.00	1.30	1.06	8.70	23.65
76	1997	6.67	0.23	0.00	0.00	0.00	0.00	0.05	0.00	0.53	0.00	3.73	6.72	17.93
77	1998	3.49	22.00	3.98	2.28	5.50	0.06	0.00	0.00	0.21	0.33	1.36	1.39	40.60
78	1999	2.08	0.65	3.00	3.78	0.00	0.48	0.00	0.00	0.01	0.00	0.00	0.05	10.05
79	2000	1.21	9.43	3.15	2.10	0.00	0.00	0.00	0.31	0.00	1.13	0.00	0.00	17.33
80	2001	5.84	10.76	3.38	2.56	0.00	0.00	0.00	0.00	0.00	0.22	3.18	1.30	27.24
81	2002	1.55	0.51	0.38	0.05	0.12	0.01	0.00	0.00	0.02	0.00	3.01	5.85	11.50
82	2003	0.00	9.03	2.38	2.35	1.70	0.00	0.02	0.00	0.00	1.10	0.63	2.57	19.78
83	2004	0.65	8.07	0.37	0.20	0.00	0.00	0.00	0.00	0.00	4.79	0.64	8.54	23.26
84	2005	17.06	16.69	2.70	1.42	0.45	0.00	0.00	0.00	0.17	1.91	0.59	0.14	41.13
85	2006	3.27	3.78	5.68	4.22	0.99	0.00	0.00	0.00	0.00	0.42	0.05	0.83	19.24
86	2007	1.66	1.38	0.17	0.71	0.00	0.00	0.00	0.00	1.32	0.25	0.50	2.67	8.66

All precipitation values are listed in units of inches.

TABLE 3-14

Simulated Monthly Streamflows in the Santa Clara River at the Lang Gage for the 86-year Simulation

Model Year	Historical Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Prototype Year
1	1922	336	534	429	398	117	84	16	5	108	144	498	1,446	4,115	1992
2	1923	117	117	65	31	12	0	0	0	0	0	258	516	1,116	2000
3	1924	212	276	230	46	46	5	0	0	0	27	36	147	1,025	1990
4	1925	50	111	60	25	6	0	0	0	102	94	34	18	499	1989
5	1926	1,310	7,449	1,213	568	218	78	6	0	37	274	467	553	12,175	1980
6	1927	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188	2001
7	1928	50	111	60	25	6	0	0	0	102	94	34	18	499	2002
8	1929	68	67	70	69	70	68	65	65	60	58	316	164	1,140	1960
9	1930	68	67	70	69	70	68	65	65	60	58	316	164	1,140	1960
10	1931	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188	2001
11	1932	117	117	65	31	12	0	0	0	0	0	258	516	1,116	1987
12	1933	0	30	0	0	0	0	0	0	0	25	0	1,652	1,707	2004
13	1934	222	209	506	117	77	68	0	0	0	0	12	25	1,236	1988
14	1935	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104	1995
15	1936	0	30	0	0	0	0	0	0	0	25	0	1,652	1,707	2004
16	1937	222	209	506	117	77	68	0	0	0	0	12	25	1,236	1988
17	1938	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104	1995
18	1939	7,355	2,668	597	265	120	55	27	5	32	73	132	141	11,468	Half of 1993
19	1940	0	30	0	0	0	0	0	0	0	25	0	1,652	1,707	2004
20	1941	13,686	11,359	11,699	2,378	1,458	721	322	120	77	128	179	206	42,333	2005
21	1942	50	111	60	25	6	0	0	0	102	94	34	18	499	1989
22	1943	18,997	8,508	3,837	961	667	347	81	91	70	139	190	186	34,074	1998
23	1944	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104	1995
24	1945	517	346	140	85	33	5	4	50	66	240	566	809	2,859	1997
25	1946	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104	1995
26	1947	332	250	131	90	50	22	32	6	0	0	11	58	983	1972
27	1948	50	111	60	25	6	0	0	0	102	94	34	18	499	2002
28	1949	50	111	60	25	6	0	0	0	102	94	34	18	499	2002
29	1950	83	198	184	126	105	83	51	54	56	53	43	42	1,078	1950
30	1951	49	40	66	91	98	84	79	72	57	71	47	53	807	1951
31	1952	9,629	636	7,091	2,114	895	326	153	138	86	97	178	313	21,656	1952
32	1953	300	282	271	237	165	134	102	86	85	83	74	68	1,888	1953
33	1954	145	278	404	356	181	108	110	99	91	90	80	75	2,017	1954
34	1955	103	156	157	128	153	99	78	76	74	68	66	62	1,220	1955
35	1956	69	85	130	137	139	98	86	80	77	76	67	69	1,113	1956
36	1957	67	55	78	90	93	80	78	78	76	79	66	71	910	1957
37	1958	66	329	743	4,550	825	283	130	108	95	145	146	116	7,536	1958
38	1959	246	351	189	127	111	92	84	86	83	69	68	68	1,575	1959
39	1960	68	67	70	69	70	68	65	65	60	58	316	164	1,140	1960
40	1961	124	91	38	38	36	32	28	33	22	19	19	119	597	1961
41	1962	139	1,904	791	449	329	169	97	82	80	84	82	82	4,287	1962
42	1963	85	142	145	131	104	86	79	74	66	65	62	58	1,096	1963
43	1964	69	50	51	62	66	54	53	53	54	45	43	41	640	1964
44	1965	30	23	25	46	43	36	31	34	37	35	1,305	3,300	4,944	1965
45	1966	1,765	1,014	778	450	308	115	68	54	45	63	91	523	5,274	1966

TABLE 3-14

Simulated Monthly Streamflows in the Santa Clara River at the Lang Gage for the 86-year Simulation

Model Year	Historical Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Prototype Year
46	1967	757	489	1,028	2,295	1,880	729	212	104	89	73	255	487	8,397	1967
47	1968	300	247	276	180	72	32	32	30	25	133	208	851	2,384	1968
48	1969	13,797	2,856	1,005	489	320	147	98	98	46	318	392	399	19,966	1969
49	1970	461	550	1,168	465	290	169	74	60	58	27	501	1,338	5,161	1970
50	1971	614	524	556	397	262	167	70	25	5	30	200	420	3,270	1971
51	1972	332	250	131	90	50	22	32	6	0	0	11	58	983	1972
52	1973	153	1,717	950	471	226	71	18	12	8	3	8	44	3,679	1973
53	1974	608	229	392	190	129	49	17	6	0	3	19	87	1,728	1974
54	1975	53	90	228	181	104	31	15	3	0	0	0	0	704	1975
55	1976	0	110	63	39	33	12	0	0	1	0	0	0	258	1976
56	1977	28	7	28	19	60	5	0	0	0	0	0	0	147	1977
57	1978	744	9,486	11,412	1,696	2,736	1,154	418	209	101	264	422	86	28,730	1978
58	1979	1,254	433	1,113	506	246	190	178	111	125	90	120	558	4,925	1979
59	1980	1,310	7,449	1,213	568	218	78	6	0	37	274	467	553	12,175	1980
60	1981	594	98	339	240	107	18	18	12	338	321	258	394	2,739	1981
61	1982	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188	1982
62	1983	1,922	16,971	2,755	2,576	958	523	639	512	0	0	0	0	26,855	1983
63	1984	0	596	405	240	143	166	228	411	154	220	904	578	4,044	1984
64	1985	483	461	274	215	77	0	0	0	12	179	221	301	2,224	1985
65	1986	483	1,138	488	283	107	6	0	12	6	12	80	129	2,744	1986
66	1987	117	117	65	31	12	0	0	0	0	0	258	516	1,116	1987
67	1988	222	209	506	117	77	68	0	0	0	0	12	25	1,236	1988
68	1989	50	111	60	25	6	0	0	0	102	94	34	18	499	1989
69	1990	212	276	230	46	46	5	0	0	0	27	36	147	1,025	1990
70	1991	162	775	879	736	145	142	14	0	45	69	62	263	3,291	1991
71	1992	336	534	429	398	117	84	16	5	108	144	498	1,446	4,115	1992
72	1993	14,709	5,336	1,194	530	239	110	54	10	64	145	264	281	22,937	1993
73	1994	388	493	497	319	163	80	20	7	37	102	193	941	3,239	1994
74	1995	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104	1995
75	1996	666	896	730	315	151	46	7	0	54	154	307	510	3,836	1996
76	1997	517	346	140	85	33	5	4	50	66	240	566	809	2,859	1997
77	1998	18,997	8,508	3,837	961	667	347	81	91	70	139	190	186	34,074	1998
78	1999	92	85	204	224	197	107	80	46	52	54	31	80	1,252	1999
79	2000	117	117	65	31	12	0	0	0	0	0	258	516	1,116	1987
80	2001	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188	1982
81	2002	50	111	60	25	6	0	0	0	102	94	34	18	499	1989
82	2003	666	896	730	315	109	0	0	0	0	0	0	0	2,715	1996 and 2003
83	2004	0	30	0	0	0	0	0	0	0	25	0	1,652	1,707	2004
84	2005	13,686	11,359	11,699	2,378	1,458	721	322	120	77	128	179	206	42,333	2005
85	2006	418	352	510	920	381	69	0	0	0	0	0	0	2,650	2006
86	2007	1	57	30	20	0	0	0	0	0	3	8	6	125	2007

All simulated streamflow volumes are listed in units of acre-feet (af).

TABLE 3-15

Simulated Monthly Water Releases from Castaic Lagoon to Castaic Creek for the 86-year Simulation

Model Year	Historical Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Prototype Year
1	1922	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450	1992
2	1923	0	660	855	0	2,087	3,484	0	0	0	0	0	0	7,086	2000
3	1924	0	0	0	0	0	0	0	0	0	0	0	0	0	1990
4	1925	0	0	0	0	0	0	0	0	0	0	0	0	0	1989
5	1926	0	0	0	0	0	834	1,052	919	0	0	0	0	2,805	1980
6	1927	0	389	1,218	0	0	0	0	0	0	0	0	0	1,607	2001
7	1928	0	0	0	0	0	0	0	0	0	0	0	0	0	2002
8	1929	0	0	0	0	0	0	0	0	0	0	0	0	0	2002
9	1930	0	0	0	0	0	0	0	0	0	0	0	0	0	1984
10	1931	0	389	1,218	0	0	0	0	0	0	0	0	0	1,607	2001
11	1932	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641	1986
12	1933	0	59	1,004	0	0	0	0	0	0	0	0	60	1,123	2004
13	1934	0	0	809	341	900	0	0	0	0	0	0	0	2,050	1988
14	1935	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611	1995
15	1936	0	59	1,004	0	0	0	0	0	0	0	0	60	1,123	2004
16	1937	0	0	809	341	900	0	0	0	0	0	0	0	2,050	1988
17	1938	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611	1995
18	1939	0	70	93	1,516	951	318	171	169	407	0	0	171	3,863	Half of 1993
19	1940	0	59	1,004	0	0	0	0	0	0	0	0	60	1,123	2004
20	1941	32,391	37,514	12,993	3,613	2,891	90	1,657	32	0	0	0	0	91,181	2005
21	1942	0	0	0	0	0	0	0	0	0	0	0	0	0	1989
22	1943	1,186	19,545	10,747	4,566	7,561	47	1,370	436	464	302	652	926	47,802	1998
23	1944	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611	1995
24	1945	0	0	8,701	873	0	0	0	0	0	0	0	310	9,884	1997
25	1946	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611	1995
26	1947	0	0	0	0	0	0	0	0	0	0	0	0	0	1989
27	1948	0	0	0	0	0	0	0	0	0	0	0	0	0	2002
28	1949	0	0	0	0	0	0	0	0	0	0	0	0	0	2002
29	1950	0	0	0	0	0	0	0	0	0	0	0	0	0	2007
30	1951	0	0	0	0	0	0	0	0	0	0	0	0	0	1984
31	1952	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725	1993
32	1953	0	0	0	0	0	0	0	0	0	0	0	0	0	1989
33	1954	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632	1996
34	1955	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641	1986
35	1956	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853	1987
36	1957	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
37	1958	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
38	1959	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282	1994
39	1960	0	0	0	0	0	0	0	0	0	0	0	0	0	1984
40	1961	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830	1999
41	1962	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
42	1963	0	0	0	0	0	0	0	0	0	0	0	0	0	1984
43	1964	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282	1994
44	1965	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450	1992
45	1966	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853	1987

TABLE 3-15

Simulated Monthly Water Releases from Castaic Lagoon to Castaic Creek for the 86-year Simulation

Model Year	Historical Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Prototype Year
46	1967	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
47	1968	0	0	0	0	0	0	0	0	0	0	0	0	0	2007
48	1969	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725	1993
49	1970	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
50	1971	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641	1986
51	1972	0	0	0	0	0	0	0	0	0	0	0	0	0	1989
52	1973	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
53	1974	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641	1986
54	1975	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282	1994
55	1976	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853	1987
56	1977	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
57	1978	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928	1983
58	1979	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
59	1980	0	0	0	0	0	834	1,052	919	0	0	0	0	2,805	1980
60	1981	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641	1986
61	1982	0	0	0	0	0	667	842	735	0	0	0	0	2,244	1982
62	1983	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928	1983
63	1984	0	0	0	0	0	0	0	0	0	0	0	0	0	1984
64	1985	0	0	0	0	0	0	0	0	0	0	0	0	0	1985
65	1986	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641	1986
66	1987	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853	1987
67	1988	0	0	809	341	900	0	0	0	0	0	0	0	2,050	1988
68	1989	0	0	0	0	0	0	0	0	0	0	0	0	0	1989
69	1990	0	0	0	0	0	0	0	0	0	0	0	0	0	1990
70	1991	0	0	0	0	0	0	0	0	0	0	0	66	66	1991
71	1992	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450	1992
72	1993	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725	1993
73	1994	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282	1994
74	1995	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611	1995
75	1996	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632	1996
76	1997	0	0	8,701	873	0	0	0	0	0	0	0	310	9,884	1997
77	1998	1,186	19,545	10,747	4,566	7,561	47	1,370	436	464	302	652	926	47,802	1998
78	1999	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830	1999
79	2000	0	660	855	0	2,087	3,484	0	0	0	0	0	0	7,086	2000
80	2001	0	389	1,218	0	0	0	0	0	0	0	0	0	1,607	2001
81	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	2002
82	2003	0	0	0	2,286	418	315	0	0	0	0	0	0	3,019	2003
83	2004	0	59	1,004	0	0	0	0	0	0	0	0	60	1,123	2004
84	2005	32,391	37,514	12,993	3,613	2,891	90	1,657	32	0	0	0	0	91,181	2005
85	2006	1,403	2,185	2,648	5,906	3,395	2,307	0	0	0	0	0	0	17,844	2006
86	2007	0	0	0	0	0	0	0	0	0	0	0	0	0	2007

All simulated water releases are listed in units of acre-feet (af).

Table 3-16

Water Demands and Indoor Water Use under Full Build-out Conditions (Excluding Newhall Ranch)

Year 2000 Actual (afy)	Full Build-out Conditions (afy)	Comments
Annual Urban Water Use Outside Newhall Ranch		
60,988	123,038	Year 2000 value is retail purveyor demand plus other demands in Table II-6 of the *2004 Santa Clarita Valley Water Report* (LSCE, 2005a). Year 2045 value is from Table 2.5-4 of the *Newhall Ranch Draft Additional Analysis* (Impact Sciences, Inc., 2001). Consists of 89,805 AF/yr Development Monitoring System[a] demand, plus 55,995 AF/yr additional urban demand, minus 14,480 AF/yr conservation, minus 5,193 AF/yr agricultural uses and 3,089 AF/yr "other" uses. Does not include 4,500 AF/yr for aquifer storage and recovery or 17,680 AF/yr of demand for the Newhall Ranch Specific Plan.
Annual Indoor Water Use Outside Newhall Ranch (Equal to LACSD WRP Influent Volumes)		
18,723	40,313 (average year)	The year 2000 volume is from the Saugus and Valencia WRPs for the period January 2000 through December 2000. The long-term current generated effluent volume is based on the influent volume estimated from water balance calculations performed for the chloride mass balance analysis. The effluent volume is 32.8 percent of the total urban water production of 123,038 AF/yr, which includes other uses.

[a]Development Monitoring System water demands are demands associated with future build-out of developments identified in Los Angeles County's Development Monitoring System for the Santa Clarita Valley.

Table 3-17

Treated Water Discharges from the Saugus and Valencia WRPs to the Santa Clara River under Full Build-out Conditions

Month	Treated Water Volume (2000)[a]	Treated Water Volume (Full Build-out Conditions)[b]	Percent of Annual Outdoor Demand	Reclaimed Volume under Full Build-out Conditions (Before Maintaining Existing Streamflows)	Reclaimed Volume under Full Build-out Conditions (After Maintaining Existing Streamflows)	WRP Discharges to River under Full Build-out Conditions[c]	Month
January	1,503	3,237	3.75	637	637	2,600	January
February	1,443	3,106	5.1	867	867	2,239	February
March	1,528	3,290	6.6	1,122	1,122	2,168	March
April	1,505	3,240	9.1	1,547	1,547	1,693	April
May	1,569	3,379	10.55	1,794	1,794	1,585	May
June	1,543	3,322	11.4	1,938	1,781	1,541	June
July	1,606	3,459	14.1	2,397	1,854	1,605	July
August	1,649	3,550	12.95	2,202	1,902	1,648	August
September	1,593	3,430	10.2	1,734	1,734	1,696	September
October	1,631	3,512	7.5	1,275	1,275	2,237	October
November	1,546	3,329	5	850	850	2,479	November
December	1,607	3,459	3.75	637	637	2,822	December
Total Annual	**18,723**	**40,313**	**100**	**17,000**	**16,000**	**24,313**	**Total Annual**

[a]Values shown are the actual volumes of treated water discharged to the Santa Clara River from the Saugus and Valencia WRPs during calendar year 2000. (See also Table 3-16.)

[b]Values shown are the combined treated water volumes estimated to be produced by the Saugus and Valencia WRPs for full build-out conditions in the Santa Clarita Valley. These values do not include the future Newhall Ranch WRP, which will be operated by LACSD.

[c]Values shown do not include discharges of treated water to the river from the future Newhall Ranch WRP. These volumes are 10 acre-feet in November, 138 acre-feet in December, and 138 acre-feet in January. During the other nine months of the year, this WRP will not discharge treated water to the river (see the *Newhall Ranch Draft Additional Analysis* [Impact Sciences, Inc., 2001] for further details). The combined total discharge from the Saugus, Valencia, and Newhall Ranch WRPs is summarized in Table 3-18.

Note: All volumes are in acre-feet.

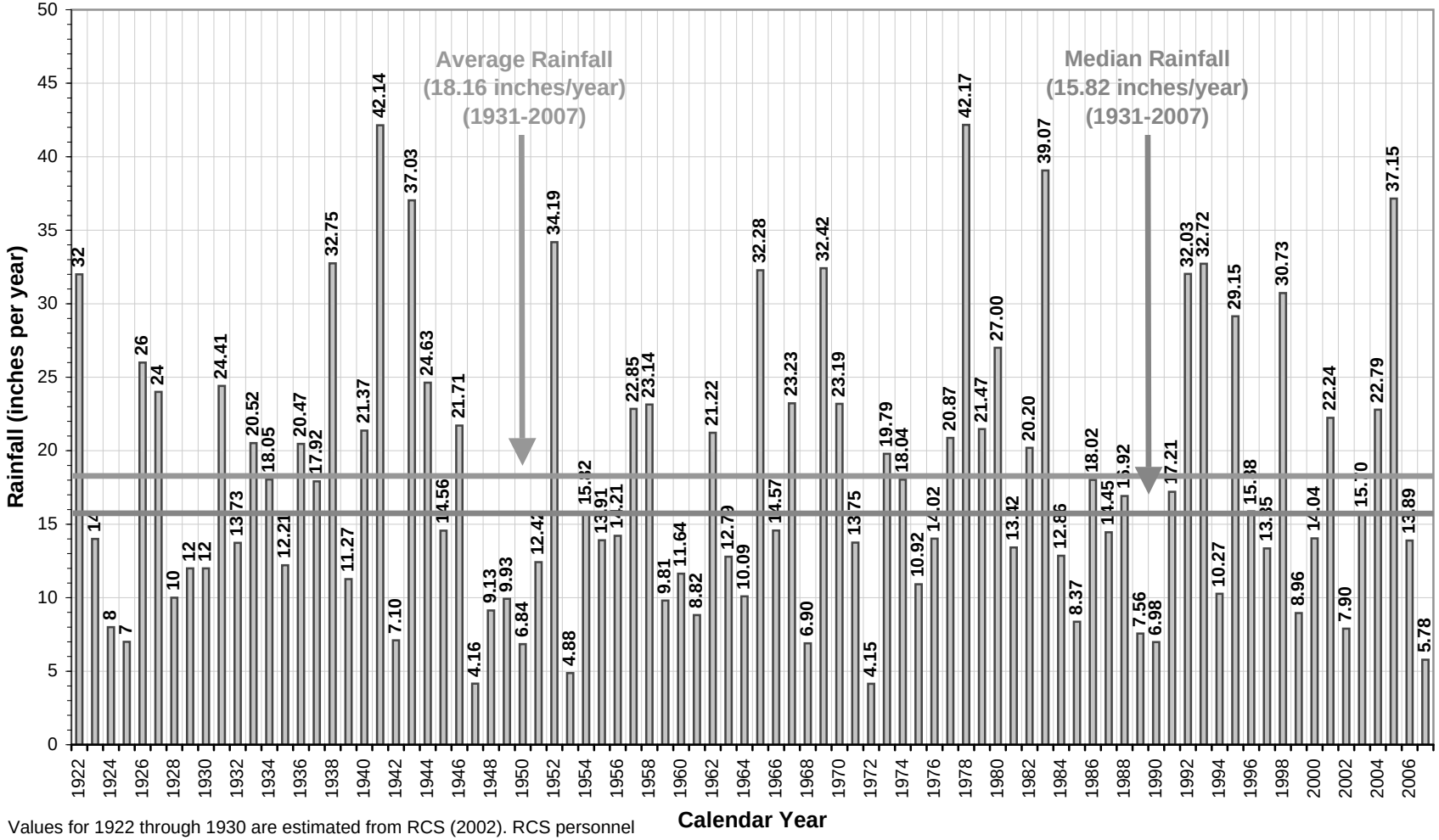
Table 3-18

Simulated Monthly Treated Wastewater Discharges from Santa Clarita Valley WRPs under Full Build-out Conditions

WRP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Saugus	493	487	500	490	503	466	457	508	586	555	514	596	**6,155**
Valencia	2,107	1,752	1,668	1,203	1,082	1,075	1,148	1,140	1,110	1,682	1,965	2,226	**18,158**
Newhall	138	0	0	0	0	0	0	0	0	0	10	138	**286**
Total	**2,738**	**2,239**	**2,168**	**1,693**	**1,585**	**1,541**	**1,605**	**1,648**	**1,696**	**2,237**	**2,489**	**2,960**	**24,599**

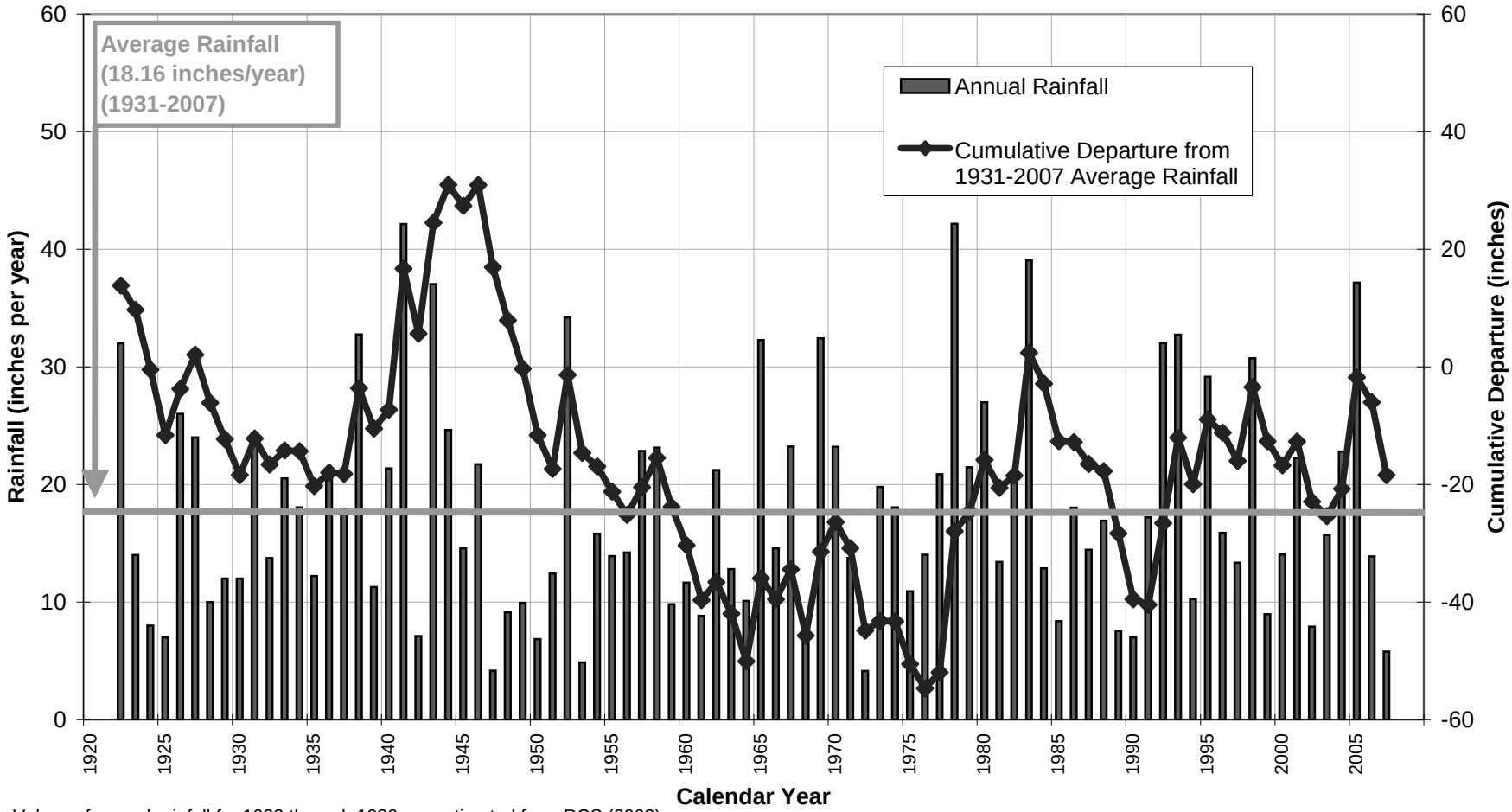
Note: All volumes are in acre-feet.

Figure 3-1
Annual Rainfall
(Newhall-Soledad Rain Gage)



Values for 1922 through 1930 are estimated from RCS (2002). RCS personnel have since indicated that the source of data to 1931 is an unofficial record obtained in 2001 from a former California State Climatologist.

Figure 3-2
Annual Rainfall and Cumulative Departure from Average Rainfall
(Newhall-Soledad Rain Gage)



Values of annual rainfall for 1922 through 1930 are estimated from RCS (2002). RCS personnel have since indicated that the source of data to 1931 is an unofficial record obtained in 2001 from a former California State Climatologist.

Figure 3-3
Simulated Groundwater Pumping for 2008 Groundwater Operating Plan

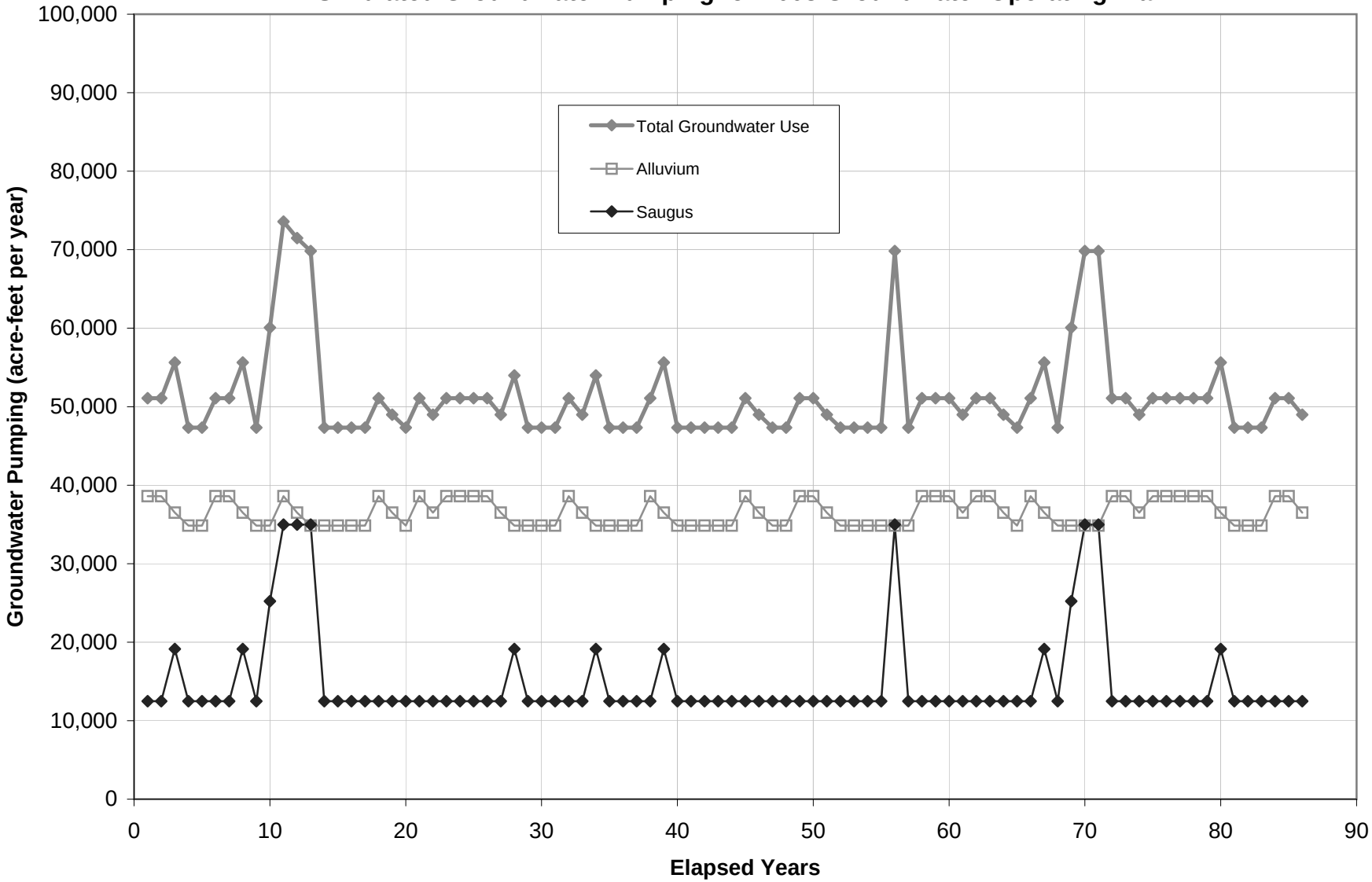


Figure 3-4
Simulated Water Supplies For 2008 Groundwater Operating Plan (Excluding Recycled Water)

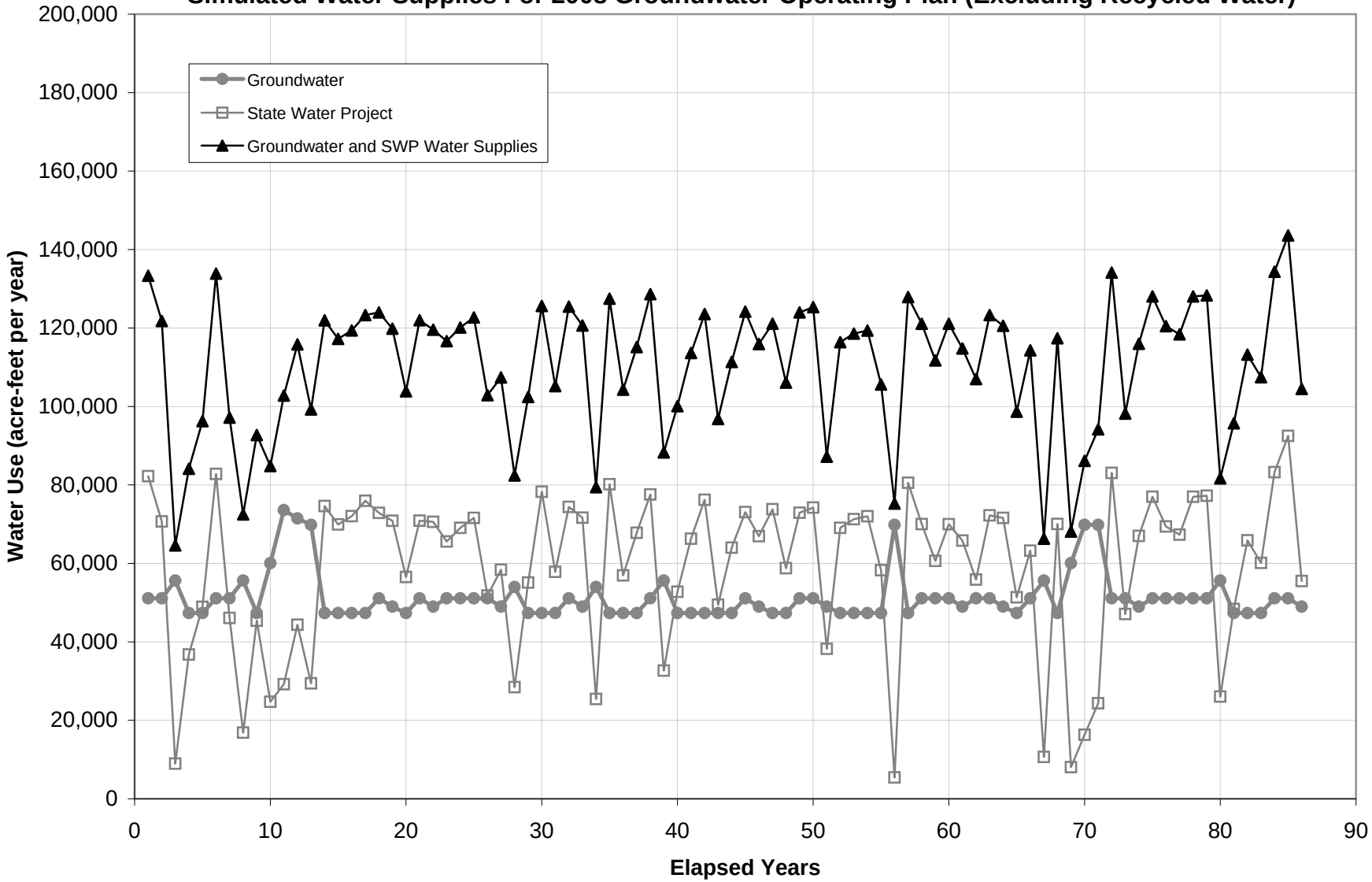


Figure 3-5
Simulated Groundwater Pumping For Potential Groundwater Operating Plan

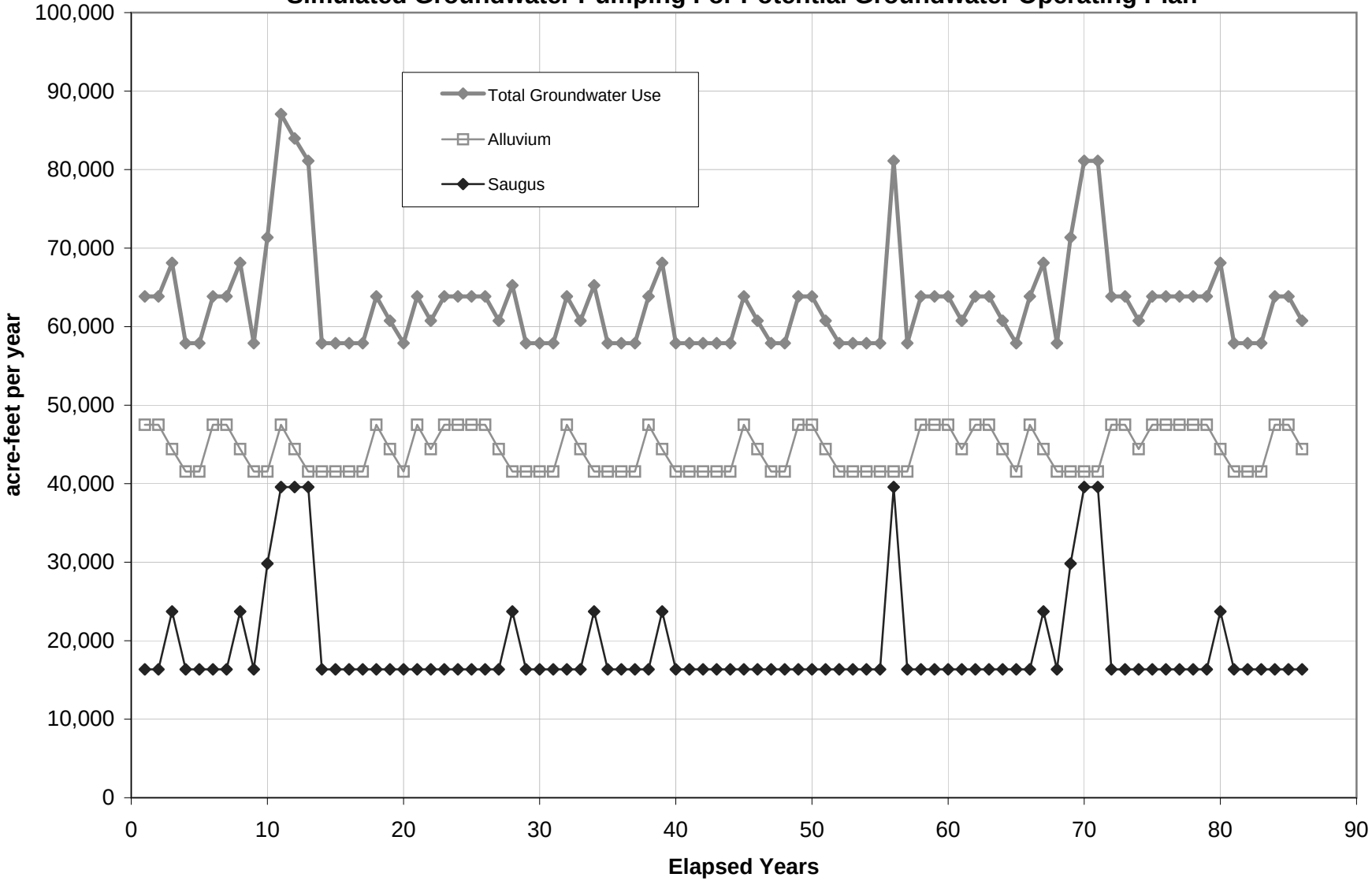


Figure 3-6
Simulated Groundwater Pumping For 2008 and Potential Groundwater Operating Plans

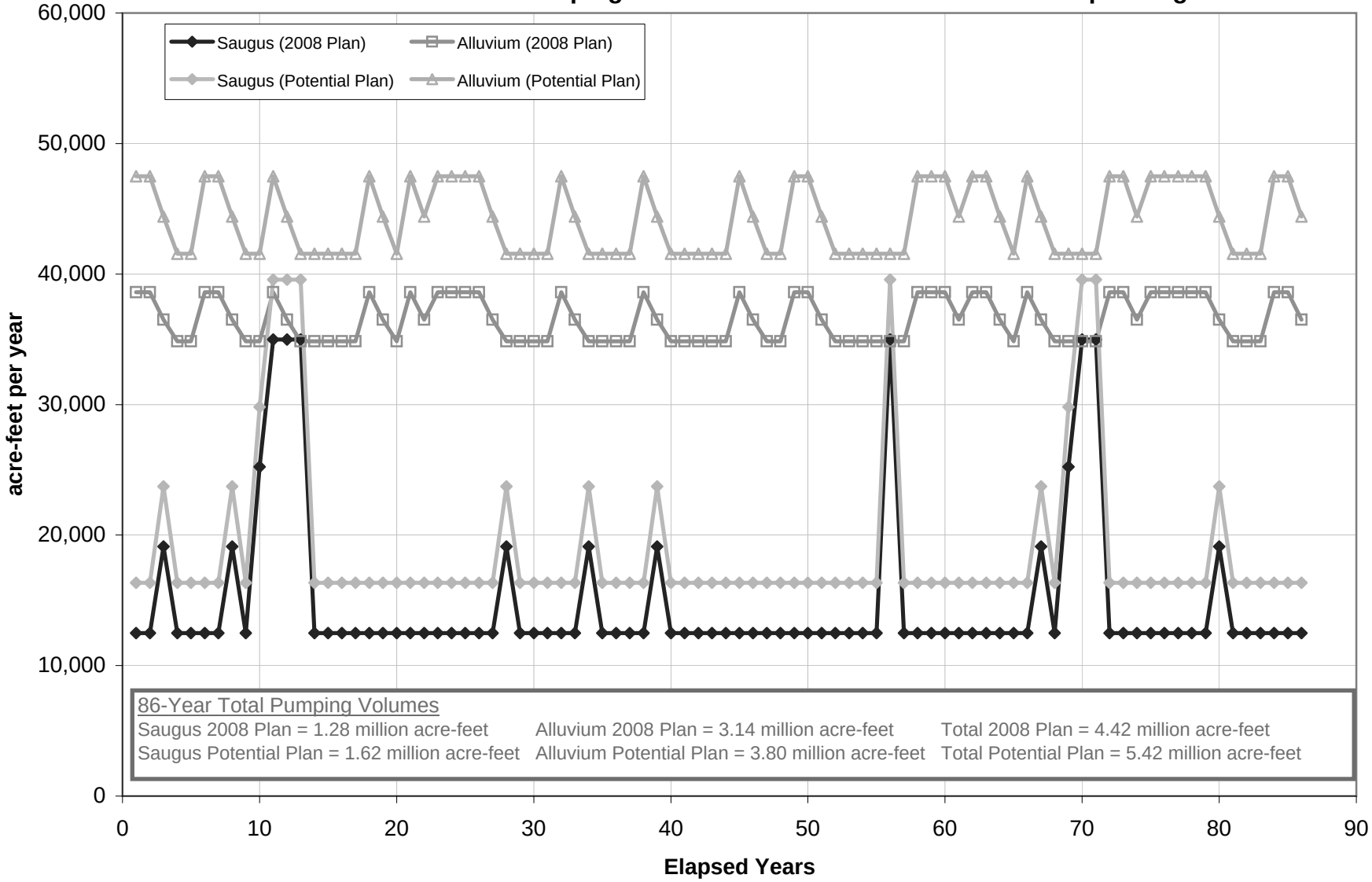
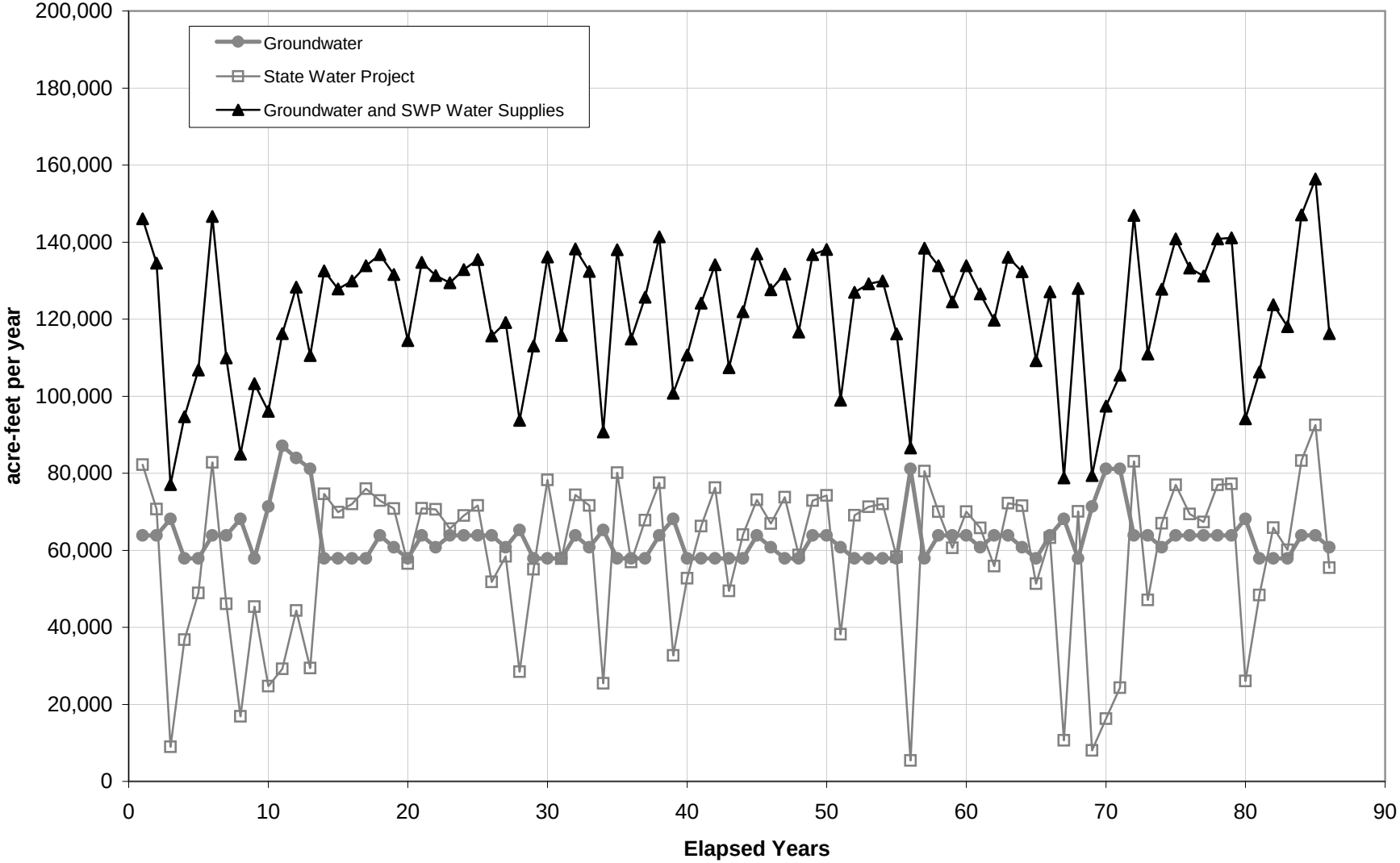


Figure 3-7
Simulated Water Supplies For Potential Groundwater Operating Plan
(Excluding Recycled Water)



IV. Sustainability of Operating Plans

This section of the report presents and discusses time-series plots (hydrographs) of simulated groundwater elevations, groundwater budget terms, and Santa Clara River flows for the 86-year modeling period. The results for the 2008 Operating Plan, the 2008 Operating Plan with Pumping Redistribution, and the future Potential Operating Plan are presented and discussed together.

4.1 Groundwater Elevations

As introduced above, groundwater elevation trends are considered to be the key indicator of long-term sustainability of an operating plan. A sustainable plan is characterized by the absence of long-term declines in groundwater levels or, if declines occur initially, subsequent long-term stabilization of groundwater levels. Concurrent with sustainability considerations, i.e. groundwater resource response to a certain level of pumping, is whether an operating plan is physically achievable. An achievable plan is one in which target pumping capacities and long-term (monthly and/or annual) target pumping volumes can be expected to be pumped without exceeding practical well and pump performance. Achievability of the plan at a given well can be evaluated by comparing groundwater elevations and trends against historical levels and against the depths in the aquifer to which the well is open (i.e., the depth interval for the well screen or the perforated steel casing).

Sections 4.1.1 through 4.1.3 discuss sustainability and achievability of the 2008 Operating Plan, the 2008 Operating Plan with Pumping Redistribution, and the Potential Operating Plan, respectively. Hydrographs illustrating basin response to each operating plan at each production well location in the Valley are contained in Appendix C.

4.1.1 2008 Operating Plan

Selected groundwater elevation hydrographs for different portions of the Alluvial Aquifer are presented on Figures 4-1 through 4-8. Each figure presents hydrographs for wells that are considered representative of conditions in the following alluvial subareas:

- Along the Santa Clara River, below the Valencia WRP (well VWC-E15)
- Along the Santa Clara River, below the Saugus WRP (well VWC-S8)
- Along the Santa Clara River, above the Saugus WRP (well VWC-T7)
- Along the Santa Clara River, at and above Mint Canyon (wells SCWD-Sierra and NCWD-Pinetree1)
- Castaic Valley (well NCWD-Castaic7)
- San Francisquito Canyon (well VWC-W11)
- Bouquet Canyon (well SCWD-Clark)

Each set of hydrographs in Figures 4-1 through 4-8 shows the simulated monthly groundwater elevations for both operating plans, as well as three sets of historical groundwater elevations

from 1980-2007 (static [non-pumping] groundwater elevations, groundwater elevations measured during pumping, and the model's simulation of historical conditions from 1980-2007).

Key findings from the simulated hydrographs for the 2008 Operating Plan are as follows:

The model simulates distinct multi-year periods of overall declining or overall increasing groundwater elevations resulting from cycles of below-normal and above-normal rainfall periods. This variation is consistent with historical observations of the relationship between rainfall and groundwater level fluctuations (CH2M HILL, 2004a; CH2M HILL and LSCE, 2005) and is particularly pronounced in much of the Alluvial Aquifer.

The 2008 Operating Plan is sustainable, but not fully achievable, in the Alluvial Aquifer as configured. Specifically:

- Alluvial Aquifer wells in each subarea do not show sustained long-term declines in groundwater elevations. Groundwater elevations decline notably in some areas during drought periods, but eventually recover in response to significant rainfall/recharge events that occur periodically, marking the end of a given drought cycle.

- The 2008 plan is achievable in most Alluvial Aquifer subareas in that the groundwater elevations remain similar to historical groundwater elevations, do not drop appreciably into the open intervals of the wells or, at wells such as SCWD-Clark, where groundwater levels are already within the open interval, are only modestly below levels observed in recent years. This means that groundwater levels in most areas are not expected to pose operational difficulties that would significantly reduce the pumping capacities of individual wells.

- However, a notable exception is in the "Above Mint Canyon" subarea, where groundwater elevations are simulated to be within the open intervals of wells during most of the simulation period. In some instances, the simulated groundwater elevations are predicted to drop below the bottom of the well, meaning that the pumping rates programmed into the model at, and prior to, that time are not expected to be physically achievable. As shown by the hydrographs, the 2008 Operating Plan is predicted to not be fully achievable in the "Above Mint Canyon" subarea under the types of drought cycles such as were observed from the mid-1920s through the late 1930s and from the mid-1940s through the mid-1970s.

- It is important to note that, because the model simulates more pumping than can physically be achieved in the "Above Mint Canyon" alluvial subarea during drought periods, actual groundwater elevations will be higher at the ends of the drought cycles than predicted by the model (because actual pumping will have to be less than what is simulated by the model). This in turn means that the relatively low groundwater elevations depicted on the hydrographs between 1976 and the early 1990s are lower than will actually occur. It also means that, while pumping at the rates contemplated in the 2008 Operating Plan may not be achievable, some lower extraction rates can likely be achieved in the "Above Mint Canyon" area, with the possibility that reductions in this

area could be offset by increased pumping in other parts of the basin. This idea is supported by a group of focused test simulations that were conducted during the course of evaluating the 2008 Operating Plan. Results are discussed in the following Section 4.1.2.

Figures 4-9 through 4-11 contain groundwater elevation hydrographs for three representative wells in the Saugus Formation (SCWD-Saugus1 just south of Bouquet Junction; NCWD-13 further to the south, along the South Fork Santa Clara River; and VWC-206 near the Valencia WRP). The principal observations from these hydrographs are:

- Groundwater elevations show long-term stability under the 2008 Operating Plan, with no sustained declines being evident. At each well, the groundwater elevations under this operating plan are slightly below the historical static elevations that were observed from 1980 through 2007, reflecting greater use of Saugus wells under the 2008 Operating Plan than has occurred historically (in particular, greater use of SCWD-Saugus1 and SCWD-Saugus2, which will begin pumping under the perchlorate containment plan described in Section 3.3.3). Nonetheless, the groundwater elevations are at or above historically recorded pumping elevations, and notably above the top of the open interval of each well, indicating that the 2008 Operating Plan should be achievable at each well and sustainable in the long-run.

4.1.2 2008 Operating Plan with Pumping Redistribution

During the prolonged dry period from the mid-1940s through the mid-1970s, when there were few years of significantly greater-than-average rainfall, the 2008 Operating Plan might have been achievable if pumping in the “Above Mint Canyon” alluvial subarea had been lower than the pumping volume contemplated in the 2008 Operating Plan. This reduction would not have been necessary during other historical periods that were characterized by intermittent years of significant rainfall, streamflow, and associated groundwater recharge (such as occurred periodically from the late 1970s through 2005).

This possibility was examined as follows. Recognizing that SCWD is in the midst of constructing new or replacement wells (e.g. to replace its perchlorate-impacted Stadium well) to the west of the “Above Mint Canyon” subarea, a potential redistribution of some SCWD pumping, as analyzed in the 2008 Operating Plan, was crafted whereby 1,600 afy of pumping was moved from three SCWD wells in the “Above Mint Canyon” subarea (near the mouth of Sand Canyon) to the replacement SCWD Santa Clara and Bouquet wells, located in the “Above Saugus WRP” and “Bouquet Canyon” subareas, respectively (Table 3-9). The resultant impact on groundwater levels to the west was nearly insignificant, indicating no adverse effect on either sustainability or achievability of groundwater at a higher pumping rate in those subareas (Figures 4-12 through 4-15). However, in the “Above Mint Canyon” area to the east, while there was appreciable improvement, in places up to 20 feet of higher groundwater levels through prolonged dry periods, the redistribution of 1,600 afy from this alluvial subarea is not predicted to significantly improve operating conditions at most of the production wells in this area, as groundwater levels are still predicted to decline close to, or below, the open intervals of many of the existing production wells under the historical hydrologic conditions observed from the mid-1940s through the mid-1970s (see Figures 4-12 through 4-15).

The preceding "redistribution" analysis suggests that the Purveyors can expect that the "Above Mint Canyon" subarea will suffer from significantly depressed groundwater levels through extended dry periods that will, in turn, physically limit the amount of groundwater pumping in that area, most notably from the SCWD wells in that subarea. The "redistribution" analysis indicates that increased pumping to the west, to offset reduced pumping in the "Above Mint Canyon" area, is both sustainable and achievable. The residual "Above Mint Canyon" pumping (a total of 4,450 afy in multiple dry years; 3,300 afy by SCWD, 700 afy by NCWD, and 450 afy by Robinson Ranch) in the 2008 Operating Plan does not appear to be fully achievable through those dry periods. Implications are likely to be in the following range of possibilities. One possibility is that additional redistribution can be achieved by further increasing pumping to the west; that would tend to keep the total groundwater supply near the upper end (35,000 afy) of the dry-year range in the Operating Plan (Section 3.3.1). Model results of limited redistribution above indicate the probability that such can be accomplished with small decreases in groundwater levels that will not have an adverse effect on overall sustainability and achievability. A second possibility is that pumping is not increased to the west, even if pumping is reduced in the "Above Mint Canyon" area; in that case, the total achievable pumping in dry periods would be near the lower end (30,000 afy) of the dry-year range in the Operating Plan. Additionally, in this second case, because of the absence of episodic recharge events during such a prolonged period, pumping during or after years of near-normal rainfall may also require reduction to this same low end of the range in the Operating Plan (30,000 afy).

In summary, the 2008 Operating Plan, as originally crafted, would utilize groundwater in a sustainable manner, but is not expected to be fully achievable due to depressed groundwater levels at the eastern end of the basin, i.e. in the "Above Mint Canyon" area, through extended dry periods. As pumping in that area declines due to depressed groundwater levels, total Alluvial pumping can be expected to remain within the overall dry-period range in the 2008 Operating Plan (30,000 to 35,000 afy). With redistribution of pumping to the west, Alluvial pumping can be achieved toward the upper end of that range. However, without pumping redistribution to the west, Alluvial pumping can be expected to decrease toward the lower end of that range during most years until an episodic rainfall and recharge event occurs that substantially recharges the aquifer in the "Above Mint Canyon" area.

4.1.3 Potential Operating Plan

The Potential Operating Plan is not sustainable or achievable in the Alluvial Aquifer as configured. Although there are local areas where groundwater conditions would appear sustainable, overall the Potential Operating Plan is not sustainable or achievable because several of the Alluvial Aquifer subareas show groundwater elevations that are distinctly lower during most of the 86-year simulation period than under the 2008 Operating Plan, and show a continued decline over time (Figures 4-1 through 4-8).

The Potential Operating Plan shows modest long-term declines in Saugus Formation groundwater elevations at each Saugus production well, as indicated by comparing the relatively high groundwater elevations in the mid-1940s (following the drought of the mid-1920s through late 1930s) with the relatively high, but slightly lower, groundwater elevations of the mid-1980s

(following the drought of the mid-1940s through mid-1970s). The hydrographs in Figures 4-9 through 4-11 indicate that pumping during the next several decades from the Saugus Formation under the Potential Operating Plan would likely be achievable, but the long-term decline indicates that the Potential Operating Plan may not be sustainable beyond the next several decades.

4.2 Groundwater Recharge, Discharge, and Storage

The sustainability of each operating plan can also be evaluated by examining trends in groundwater recharge and groundwater discharge during the 86-year simulation period. The magnitudes of individual groundwater recharge mechanisms at any given time are the same for the 2008 Operating Plan and the Potential Operating Plan, because recharge is an input to the model and is not affected by groundwater pumping. However, the groundwater discharge terms are different for the two plans because of the different groundwater pumping rates and the corresponding differences between the two plans in how they affect groundwater levels and, therefore, the magnitudes of the various components of groundwater discharge.

Figure 4-16 compares the magnitudes and trends in groundwater recharge and groundwater discharge for the 2008 Operating Plan. The figure shows that groundwater recharge rates vary greatly from year to year because of year-to-year variations in precipitation and stormwater generation within the groundwater basin and in the contiguous upstream watersheds. In contrast, total groundwater discharge is much less variable from year to year, with variations arising from increased pumping during drought years and increased evapotranspiration and groundwater discharge to the Santa Clara River during wet years. The groundwater discharge plot shows no obvious downward trend over time in groundwater discharges to streams or other discharge terms, and total discharges are do not show a continued downward trend over time. This indicates that the 2008 Operating Plan is sustainable in the long-term, a conclusion that is consistent with the examination of the groundwater elevation hydrographs discussed previously in Section 4.1.1.

Figure 4-17 compares the groundwater discharge terms for the 2008 and Potential Operating Plans. The figure shows that total groundwater discharges and discharges to streams are lower under the Potential Operating Plan than under the 2008 Operating Plan. The discharges to streams appear to decline gradually over time under the Potential Operating Plan, whereas these discharges appear more stable under the 2008 plan after the 1940s and early 1950s. This difference in groundwater discharge trends between the two operating plans is also evident in a plot showing the cumulative change in groundwater storage over time during the 86-year simulation period (Figure 4-18). The cumulative change in groundwater storage is a measure of the longer-term trends in the amount of groundwater in storage, and is plotted on a monthly basis. The 2008 Operating Plan shows a recovery of groundwater storage volumes beginning in the late 1970s, after the droughts of prior years. While the Potential Operating Plan also shows some recovery in the late 1970s, the curve as a whole remains lower in value after the 1940s than during the first two decades of the simulation.

In summary, the differences between the two operating plans' groundwater discharge trends and groundwater storage trends during the 86-year simulation period is consistent with the observed

trends in groundwater elevations and the associated conclusions about sustainability discussed above.

4.3 River Flows

Figure 4-19 shows the total flows estimated by the model for the Santa Clara River at the County Line gage, which is located at the western end of the Valley. The figure contains both a linear plot and a semi-logarithmic plot, to better illustrate the flows during low-flow periods. As shown by both plots, total flow in the river at the County Line varies considerably over time. This variation occurs because of temporal variations in rainfall, streamflow, and groundwater discharges to the river.

The influences of the local hydrology and the groundwater operating plans on the Santa Clara River are also shown by Figure 4-20, which displays the model-calculated volumes of monthly groundwater discharge to the river. Groundwater discharges to the river occur along the river reach lying downstream of the mouth of San Francisquito Canyon. The figure shows that the groundwater discharge rates to the river also vary over time, both seasonally and over multi-year periods. For the 2008 Operating Plan, the model simulates no groundwater discharge to the river at certain times during the droughts of the mid-1930s and the mid-1940s to mid-1970s. In contrast, the Potential Operating Plan not only results in smaller discharges to the river at most times, but also results in many more months of no groundwater discharge to the river compared with the 2008 Operating Plan.

As discussed by CH2M HILL (2004a), the river baseflow (flow other than from stormwater runoff) gage has increased at the County Line since water imports into the Valley began in 1980. Figure 4-21 shows the historically recorded monthly flow during the driest month of each year since 1950 and compares this flow with the driest-month flow predicted to occur each year under the 2008 and Potential Operating Plans. The plot shows that under the local, ambient hydrologic conditions observed from 1922 through 1979, the 2008 Operating Plan would have maintained river flows at levels higher than were actually recorded during those years (prior to the importation of water). The Potential Operating Plan also would have maintained higher river flow in most years, with a few years (1969, 1972, and 1975) showing similar driest-month river flows as were historically recorded. This indicates that both operating plans, and in particular the 2008 Operating Plan, will maintain river flows at higher levels than occurred prior to urbanization of the Valley.

4.4 Relationship of Simulation Results to Future Conditions

The curves presented on Figures 4-1 through 4-21 provide a general indication of the types of fluctuations in groundwater conditions that could be expected to occur in the future in the Santa Clarita Valley over a period of many years under the two operating plans. However, these curves have been derived using an assumed sequence of local hydrologic conditions that is based on the sequence of rainfall and streamflow volumes that were measured during the past several decades. In the future, the year-to-year volumes and trends in rainfall and streamflow could vary from those observed in the past because of 1) changes in the timing and magnitude of multi-decadal cycles of drought and wetter-than-normal conditions such as those that have been observed in the

past; and/or 2) because of global-scale changes in climate. The latter topic and its potential effect on the sustainability of the 2008 Operating Plan are discussed in the following Chapter 5 of this report.

Ta le 4-

Pumping Rates Simulated for Individual Alluvial Aquifer Wells nder the Re- istri uted 2008 Groundwater Operating Plan Listed B Alluvial Su area
er Santa lara i er roun ater asin, ast Subbasin, os ngeles ount , alifornia

Well Name	Alluvial Subarea	Original 2008 Operating Plan			Re-Distributed 2008 Operating Plan			Comments
		Normal	Dry Yr 1	Dry Yr 2+	Normal	Dry Yr 1	Dry Yr 2+	
NCWD-Pinetree 1	Above Mint Canyon	150	0	0	150	0	0	
NCWD-Pinetree 3	Above Mint Canyon	350	300	300	350	300	300	
NCWD-Pinetree 4	Above Mint Canyon	300	200	200	300	200	200	
NCWD-Pinetree 5	Above Mint Canyon	300	200	200	300	200	200	
Robinson Ranch	Above Mint Canyon	600	550	450	600	550	450	
SCWD-Sand Canyon	**Above Mint Canyon**	**1,000**	**600**	**200**	**200**	**150**	**0**	**Reduce these three wells by 1,600 afy in order to**
SCWD-Lost Canyon 2	**Above Mint Canyon**	**700**	**700**	**650**	**300**	**150**	**0**	**offset increased pumping at the SCWD-Santa Clara and**
SCWD-Lost Canyon 2A	**Above Mint Canyon**	**700**	**650**	**600**	**300**	**150**	**0**	**SCWD-Bouquet wells in the "Above Saugus WRP" area.**
SCWD-Mitchell #5A	Above Mint Canyon	500	350	200	500	350	200	
SCWD-Mitchell #5B	Above Mint Canyon	800	550	300	800	550	300	
SCWD-N. Oaks Central	Above Mint Canyon	850	800	700	850	800	700	
SCWD-N. Oaks East	Above Mint Canyon	800	750	700	800	750	700	
SCWD-N. Oaks West	Above Mint Canyon	800	750	700	800	750	700	
SCWD-Sierra	Above Mint Canyon	1,100	900	700	1,100	900	700	
Mint Canyon Total		**8,950**	**7,300**	**5,900**	**7,350**	**5,800**	**4,450**	
SCWD-Honby	Above Saugus WRP	1,000	850	700	1,000	850	700	
SCWD-Santa Clara	Above Saugus WRP	800	800	800	800	800	800	
SCWD-Valley Center	**Above Saugus WRP**	**0**	**0**	**0**	**800**	**800**	**800**	**Pumps 800 afy moved from the "Above Mint Canyon" area.**
SCWD-Bouquet	**Above Saugus WRP**	**0**	**0**	**0**	**800**	**800**	**800**	**Pumps 800 afy moved from the "Above Mint Canyon" area.**
VWC-T7	Above Saugus WRP	750	750	750	750	750	750	
VWC-U4	Above Saugus WRP	800	800	800	800	800	800	
VWC-U6	Above Saugus WRP	800	800	800	800	800	800	
Above Saugus WRP Total		**4,150**	**4,000**	**3,850**	**5,750**	**5,600**	**5,450**	
VWC-N	Below Saugus WRP	650	650	650	650	650	650	
VWC-N7	Below Saugus WRP	1,160	1,160	1,160	1,160	1,160	1,160	
VWC-N8	Below Saugus WRP	1,160	1,160	1,160	1,160	1,160	1,160	
VWC-Q2	Below Saugus WRP	1,100	1,100	1,100	1,100	1,100	1,100	
VWC-S6	Below Saugus WRP	1,000	1,000	1,000	1,000	1,000	1,000	
VWC-S7	Below Saugus WRP	500	500	500	500	500	500	
VWC-S8	Below Saugus WRP	500	500	500	500	500	500	
Below Saugus WRP Total		**6,070**	**6,070**	**6,070**	**6,070**	**6,070**	**6,070**	
NLF-161	Below Valencia WRP	1,000	1,000	1,000	1,000	1,000	1,000	
NLF-B10	Below Valencia WRP	500	350	350	500	350	350	
NLF-B11	Below Valencia WRP	100	200	200	100	200	200	
NLF-B14	Below Valencia WRP	300	1,000	1,000	300	1,000	1,000	
NLF-B20	Below Valencia WRP	350	500	500	350	500	500	
NLF-B5	Below Valencia WRP	2,400	1,900	1,900	2,400	1,900	1,900	
NLF-B6	Below Valencia WRP	1,100	1,100	1,100	1,100	1,100	1,100	
NLF-C	Below Valencia WRP	1,100	1,000	1,000	1,100	1,000	1,000	
NLF-C3	Below Valencia WRP	100	200	200	100	200	200	
NLF-C4	Below Valencia WRP	200	450	450	200	450	450	
NLF-C5	Below Valencia WRP	900	850	850	900	850	850	
NLF-C7	Below Valencia WRP	350	300	300	350	300	300	
NLF-C8	Below Valencia WRP	400	400	400	400	400	400	
NLF-E5	Below Valencia WRP	100	150	150	100	150	150	
NLF-E9	Below Valencia WRP	900	350	350	900	350	350	
NLF-G45	Below Valencia WRP	350	400	400	350	400	400	
VWC-E15	Below Valencia WRP	800	800	800	800	800	800	
Below Valencia WRP Total		**10,950**	**10,950**	**10,950**	**10,950**	**10,950**	**10,950**	
SCWD-Clark	Bouquet Canyon	700	700	700	700	700	700	
SCWD-Guida	Bouquet Canyon	1,300	1,250	1,200	1,300	1,250	1,200	
Bouquet Canyon Total		**2,000**	**1,950**	**1,900**	**2,000**	**1,950**	**1,900**	
VWC-W10	San Francisquito Canyon	1,000	1,000	1,000	1,000	1,000	1,000	
VWC-W11	San Francisquito Canyon	800	800	800	800	800	800	
VWC-W9	San Francisquito Canyon	950	950	950	950	950	950	
San Francisquito Canyon Total		**2,750**	**2,750**	**2,750**	**2,750**	**2,750**	**2,750**	
NCWD-Castaic 1	Castaic Valley	350	300	250	350	300	250	
NCWD-Castaic 2	Castaic Valley	100	100	100	100	100	100	
NCWD-Castaic 4	Castaic Valley	100	0	0	100	0	0	
NCWD-Castaic 7	Castaic Valley	300	200	200	300	200	200	
VWC-D	Castaic Valley	880	880	880	880	880	880	
WHR	Castaic Valley	2,000	2,000	2,000	2,000	2,000	2,000	
Castaic Valley Total:		**3,730**	**3,480**	**3,430**	**3,730**	**3,480**	**3,430**	
Total Alluvial Pumping		**38,600**	**36,500**	**34,850**	**38,600**	**36,600**	**35,000**	**Current Operating Plan:** **35,000 to 40,000 AF/yr in normal and wet years** **30,000 to 35,000 AF/yr in dry years**

Notes:

All pumping volumes are listed in acre-feet per year (afy).

Wells that are not listed are assumed to not be pumping in the future.

NLF = Newhall Land & Farming Company

NCWD = Newhall County Water District

SCWD = Santa Clarita Division of Castaic Lake Water Agency

VWC = Valencia Water Company

WHR = Wayside Honor Rancho, whose wells are owned by the Los Angeles County Waterworks District No. 36

Figure 4-1: VWC-E15 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer Below Valencia WRP)

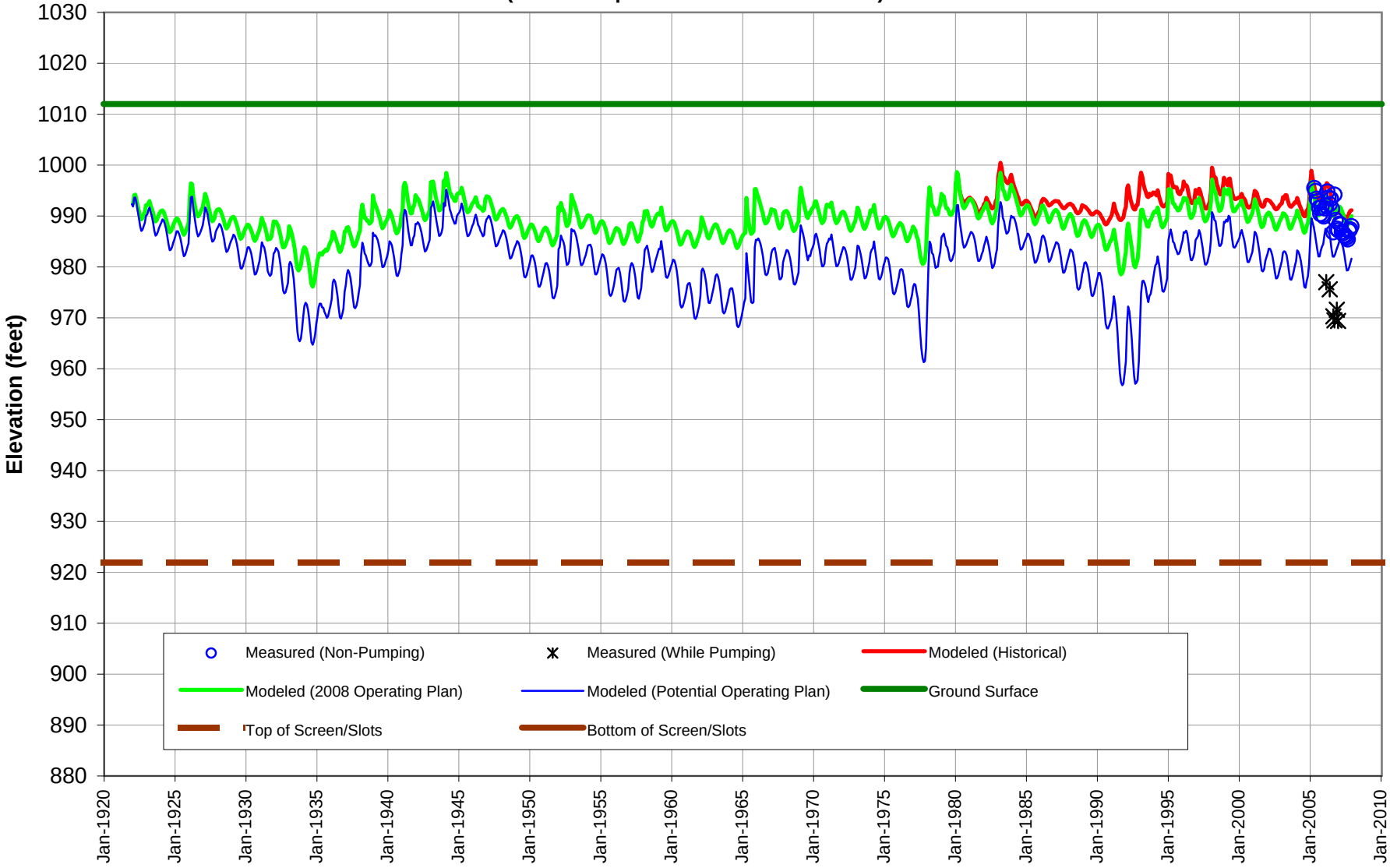


Figure 4-2: VWC-S8 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer Below Saugus WRP)

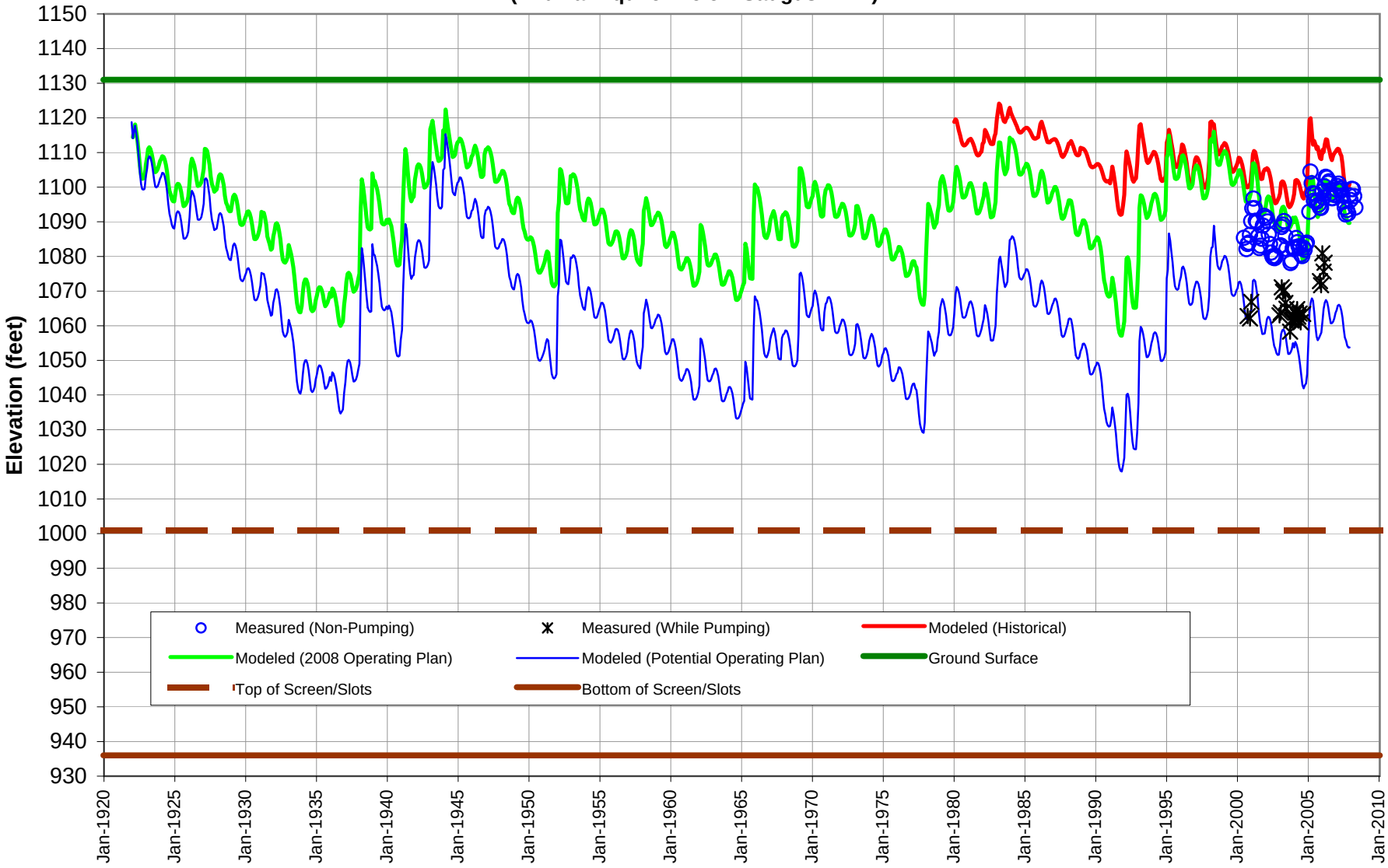


Figure 4-3: VWC-T7 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer Above Saugus WRP)

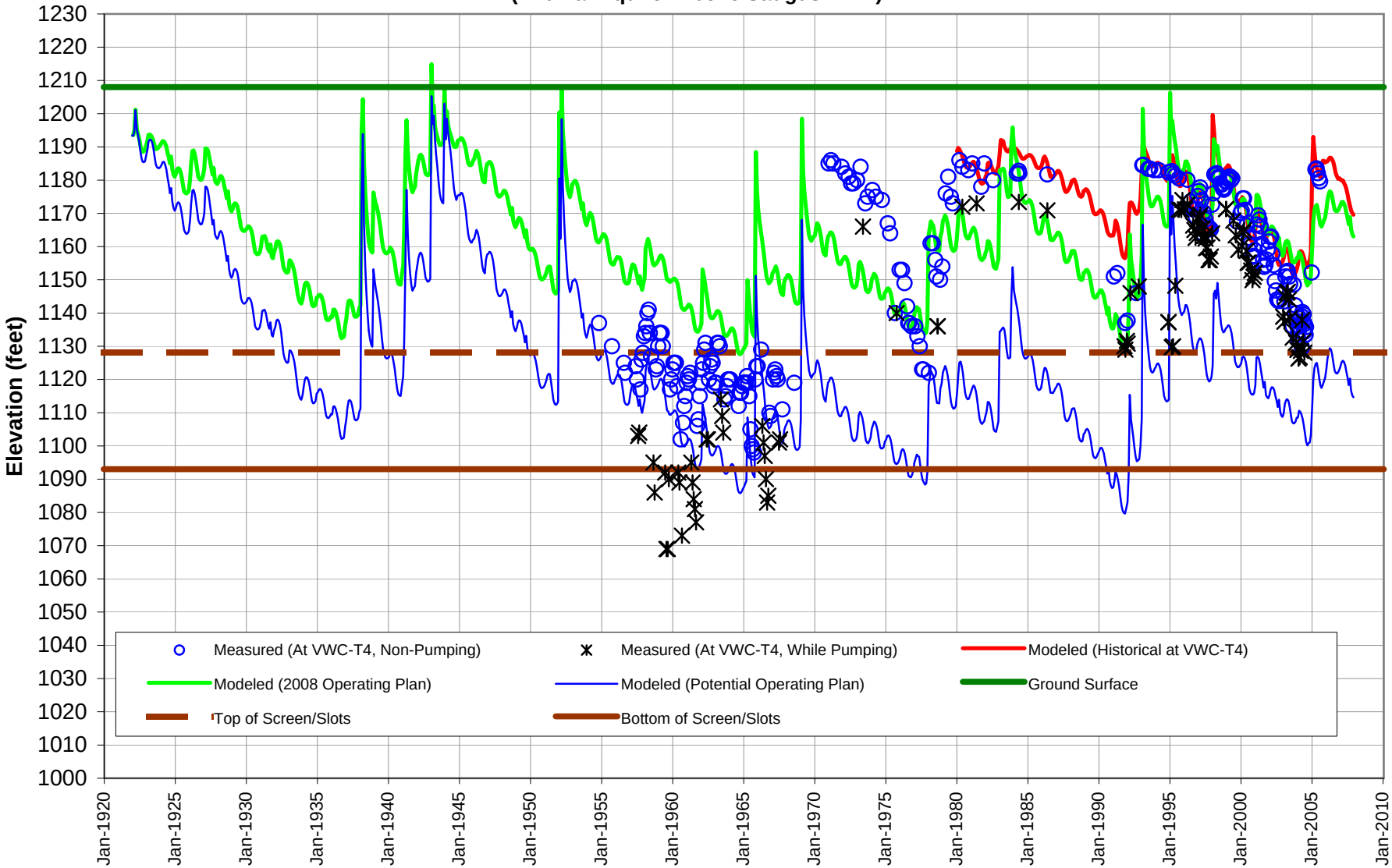


Figure 4-4: SCWD - Sierra Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer Along Santa Clara River, At and Above Mint Canyon)

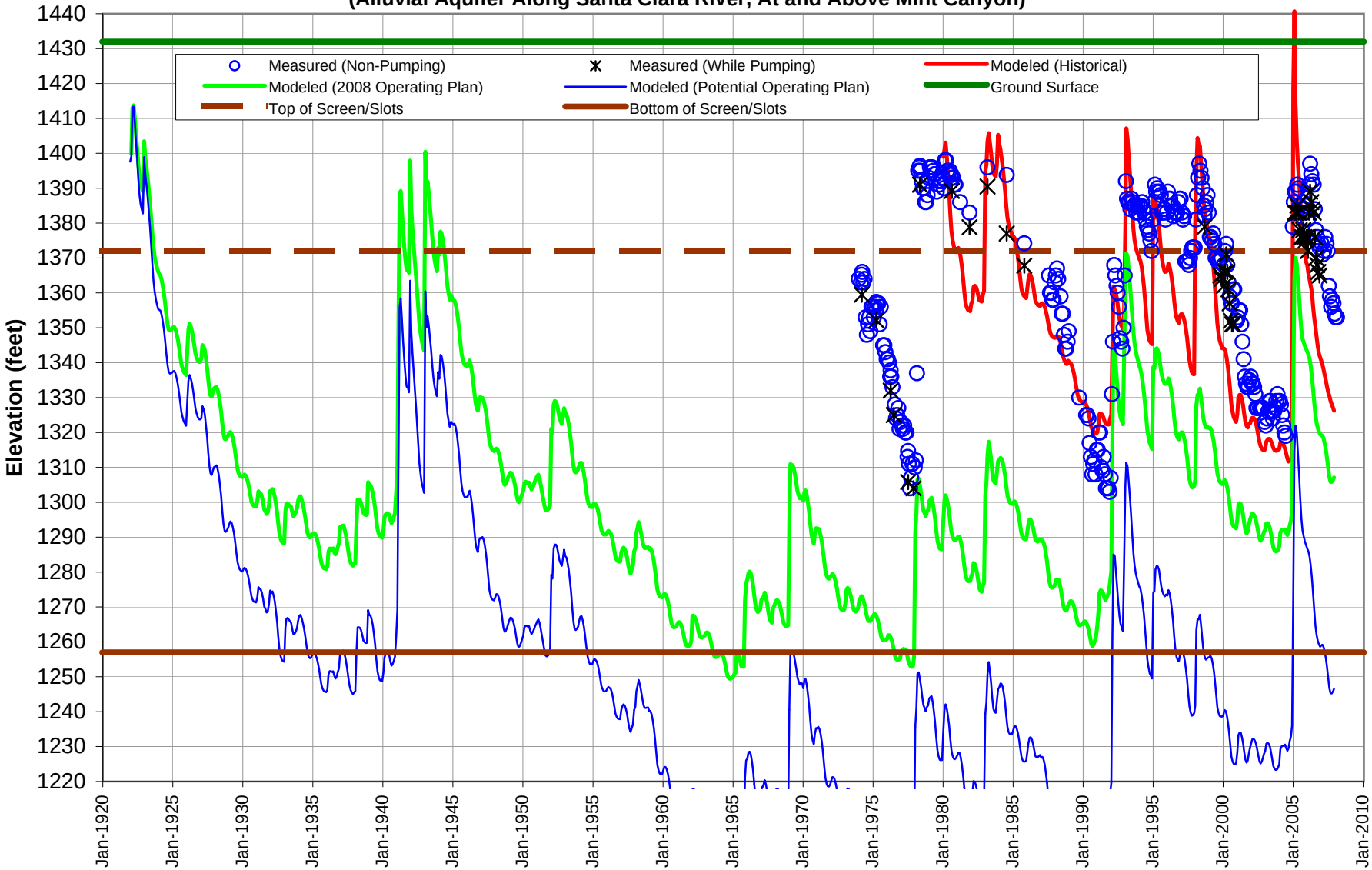


Figure 4-5: NCWD - Pinetree 1 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer Along Santa Clara River, At and Above Mint Canyon)

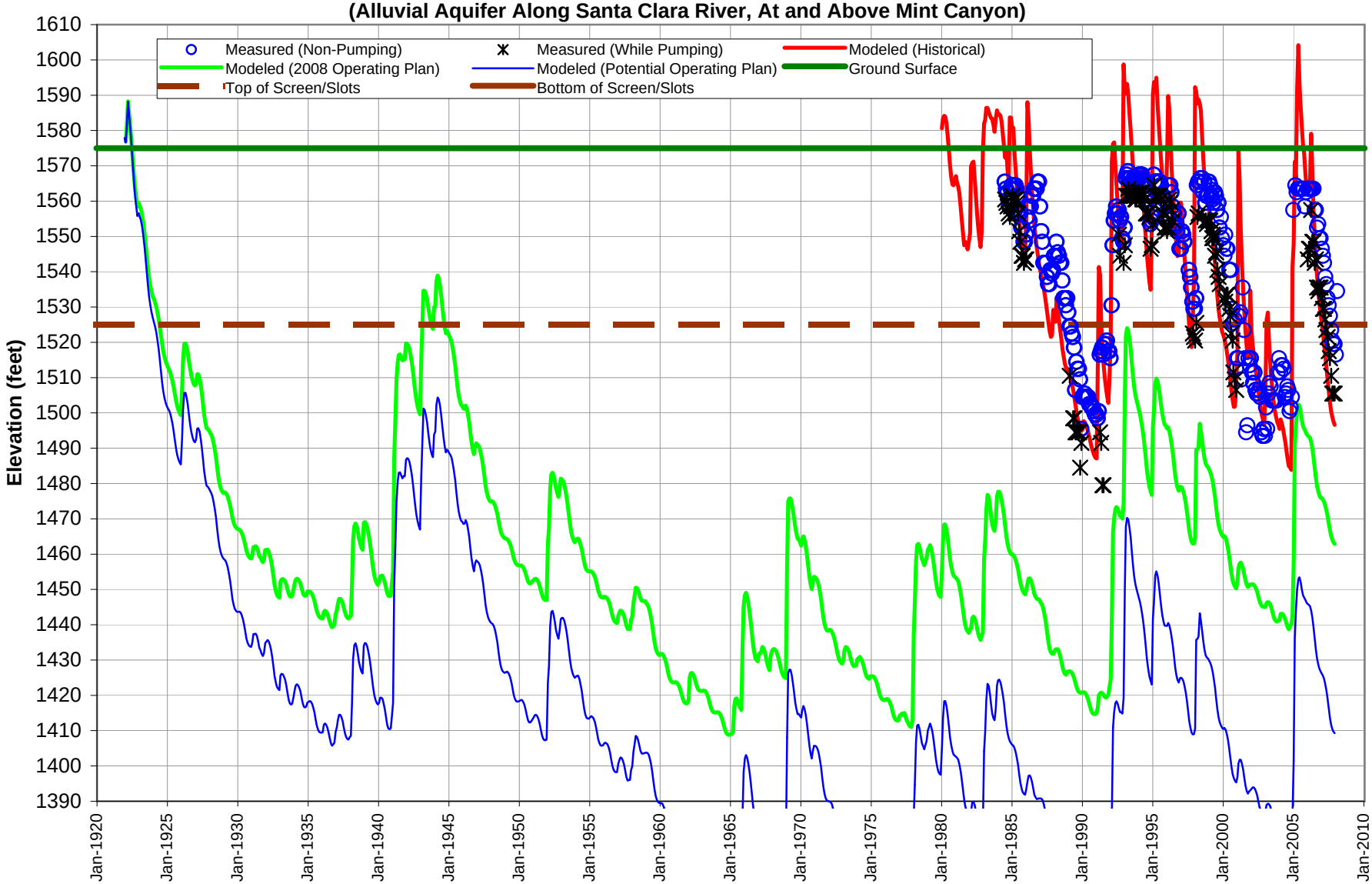


Figure 4-6: NCWD - Castaic 7 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer in Castaic Valley)

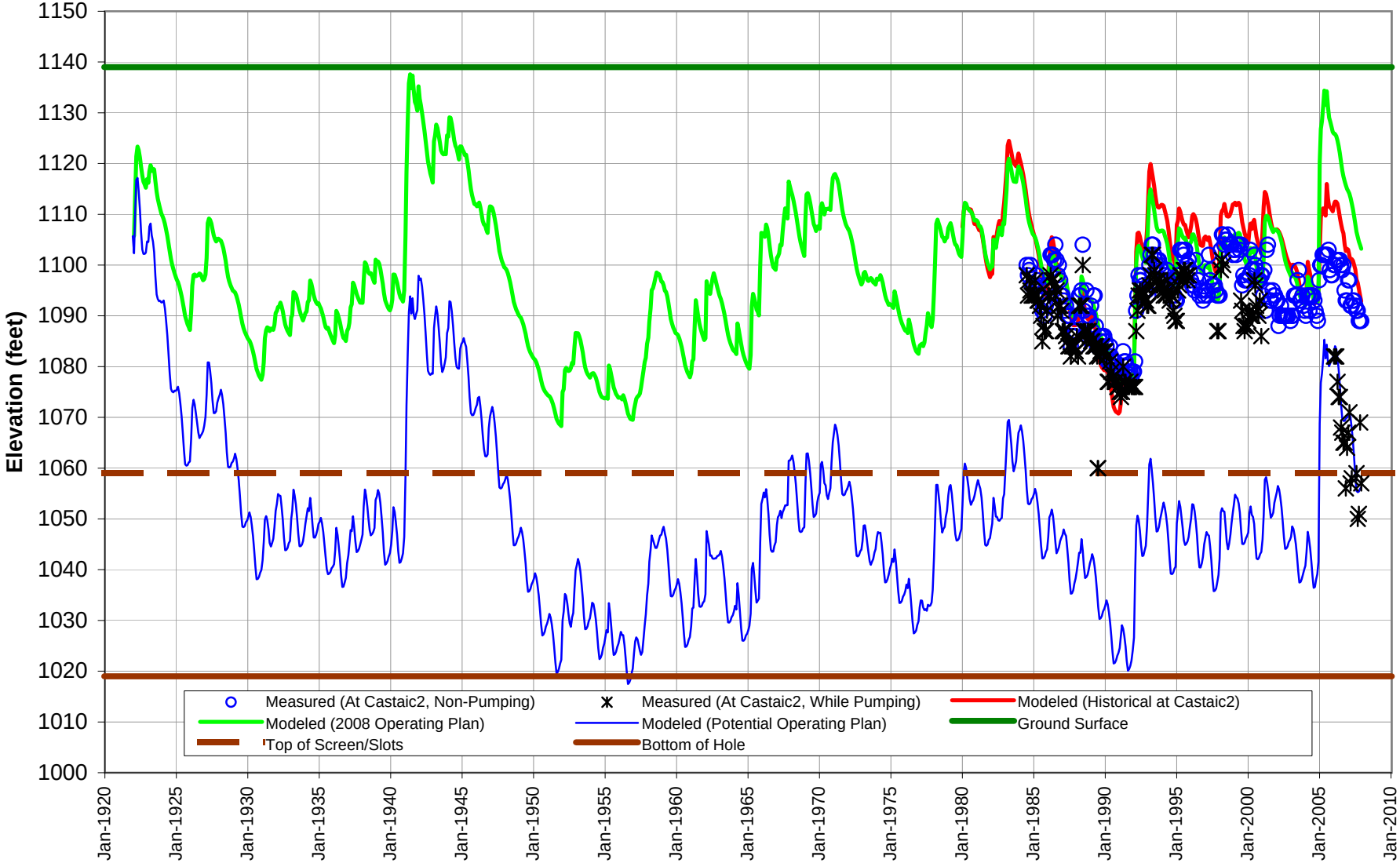


Figure 4-7: VWC-W11 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer in San Francisquito Canyon)

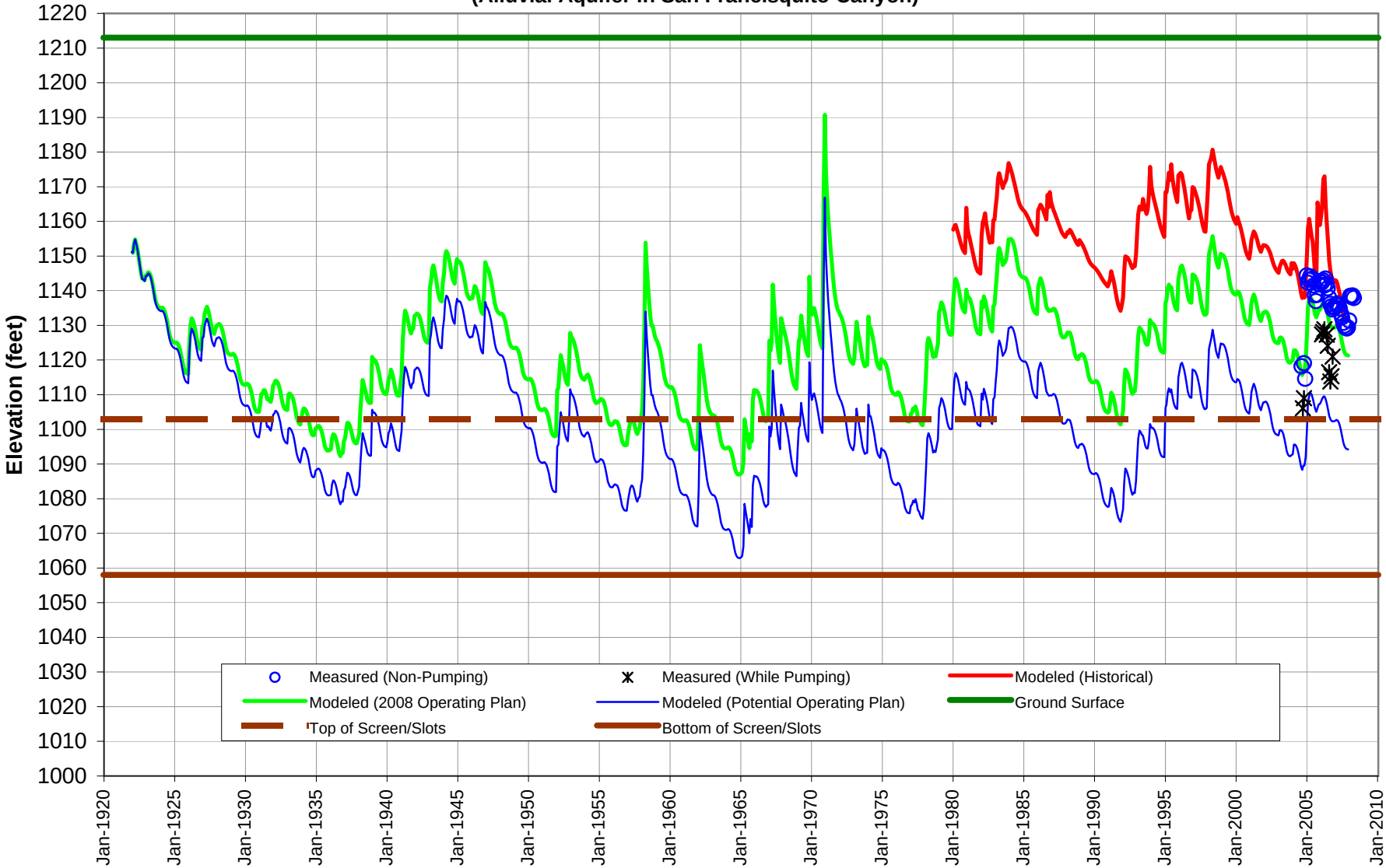


Figure 4-8: SCWD - Clark Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Alluvial Aquifer in Bouquet Canyon)

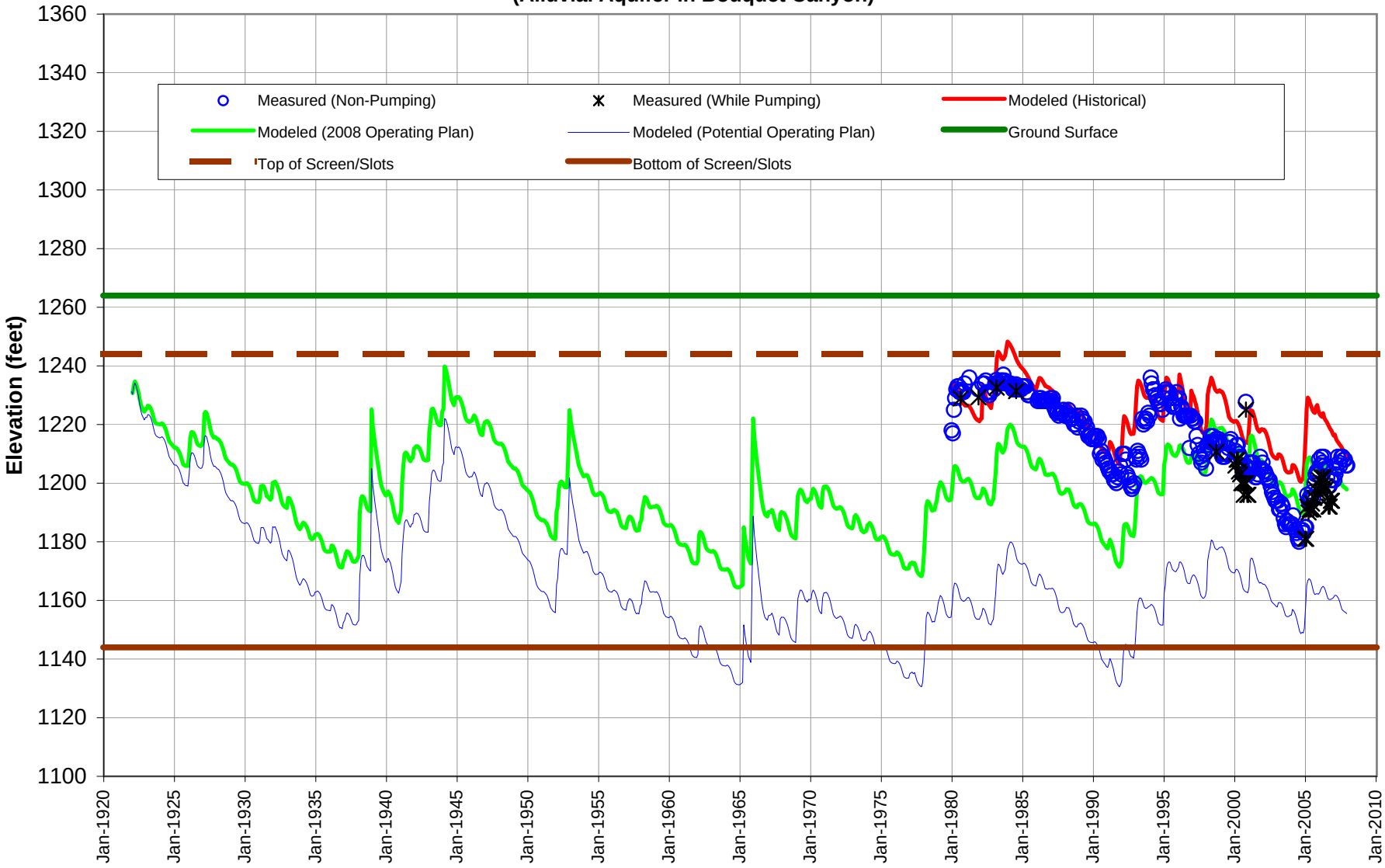


Figure 4-9: SCWD-Saugus1 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Saugus Formation)

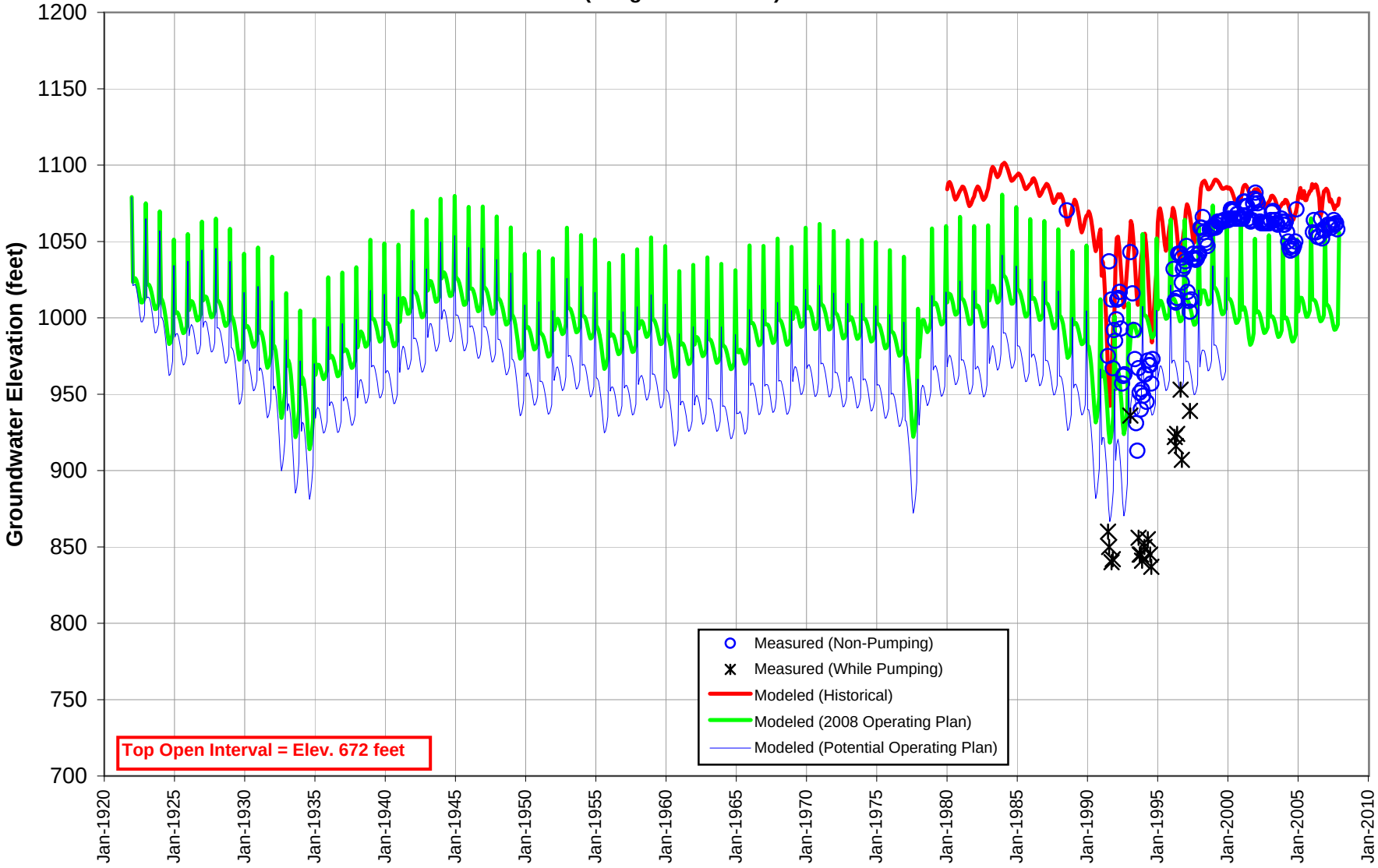


Figure 4-10: VWC-206 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Saugus Formation)

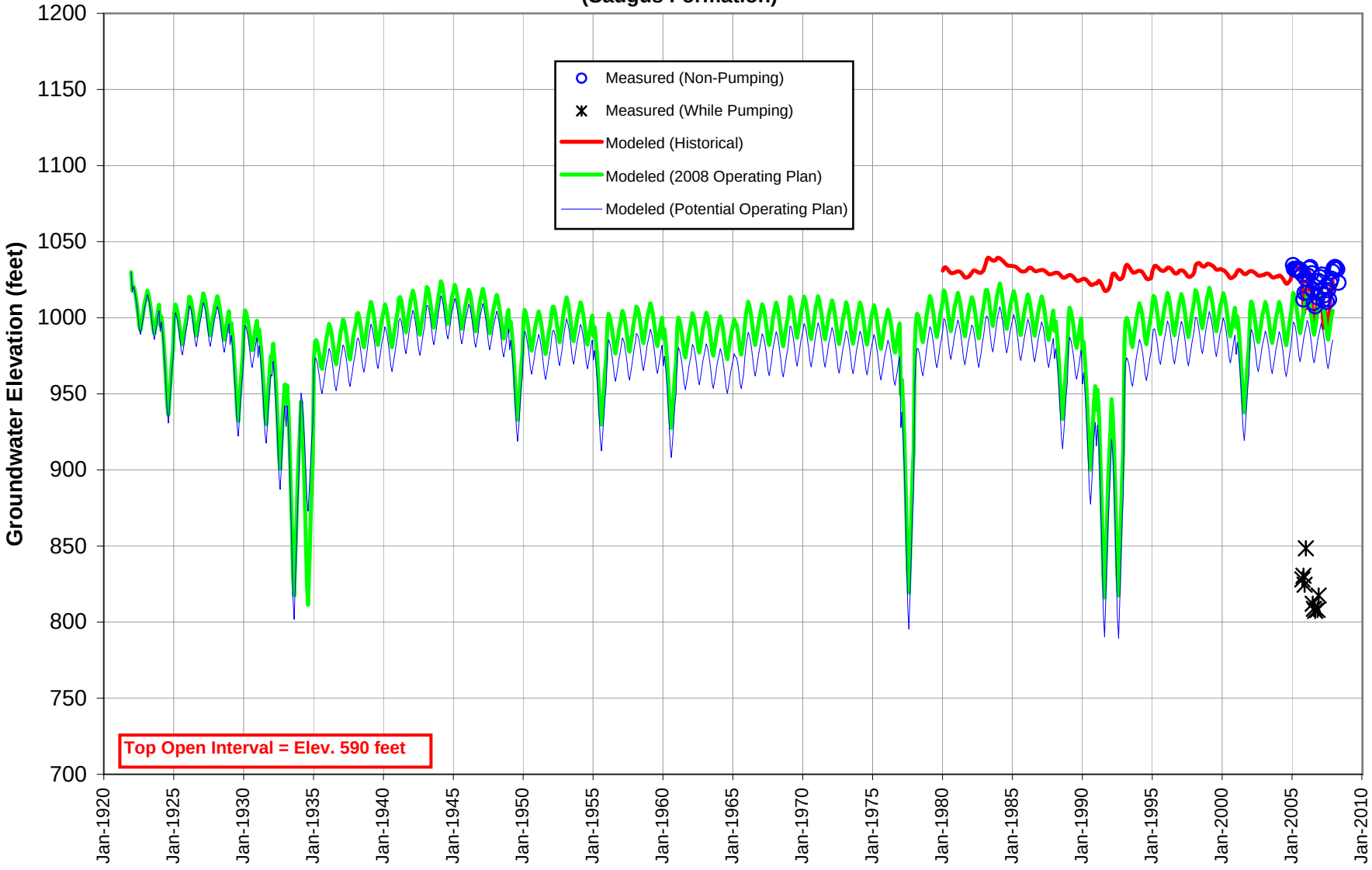


Figure 4-11: NCWD-13 Modeled Groundwater Elevations for 2008 and Potential Operating Plans (Saugus Formation)

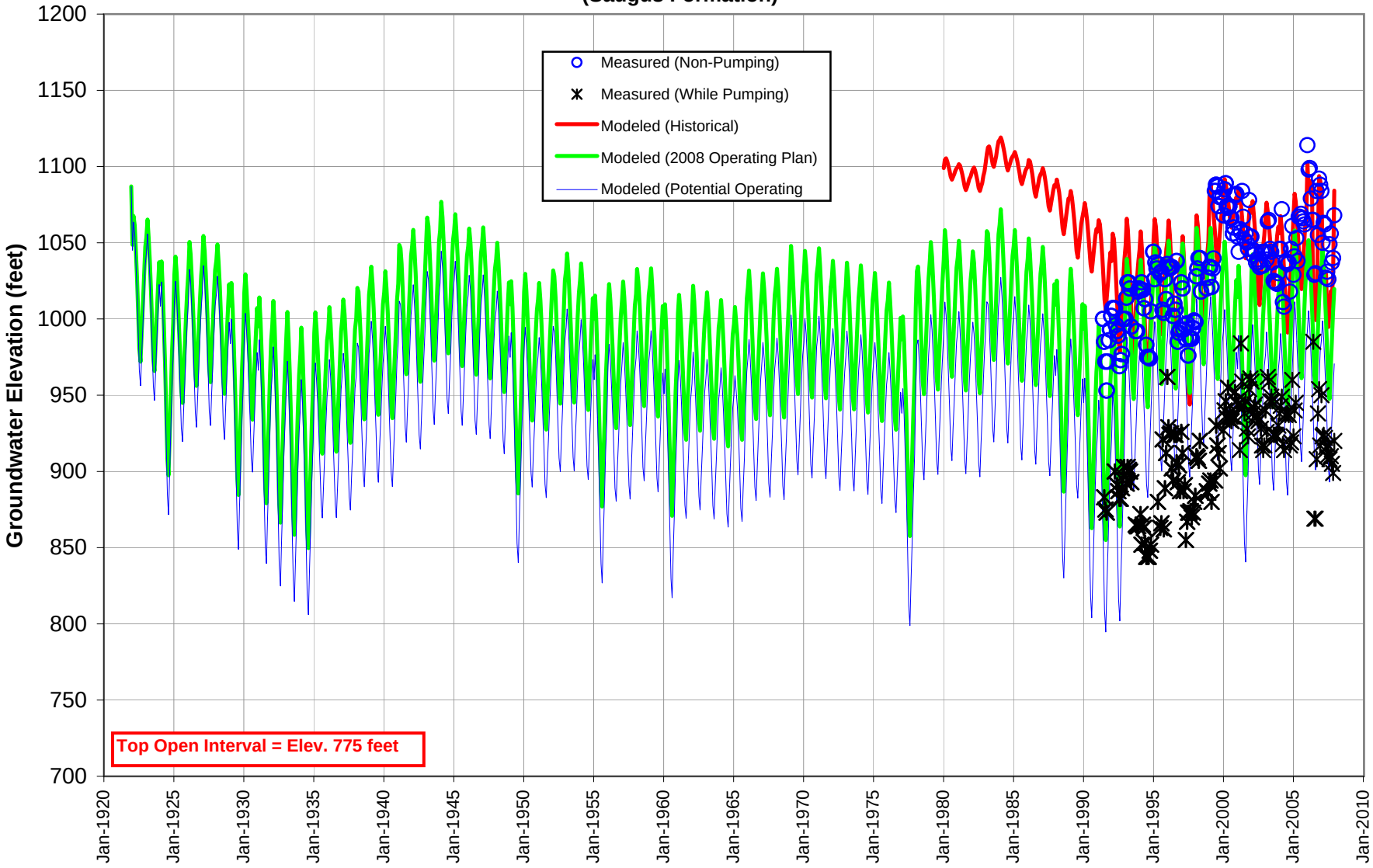


Figure 4-12: VWC-T7 Modeled Groundwater Elevations for Initial and Modified 2008 Operating Plans (Alluvial Aquifer Above Saugus WRP)

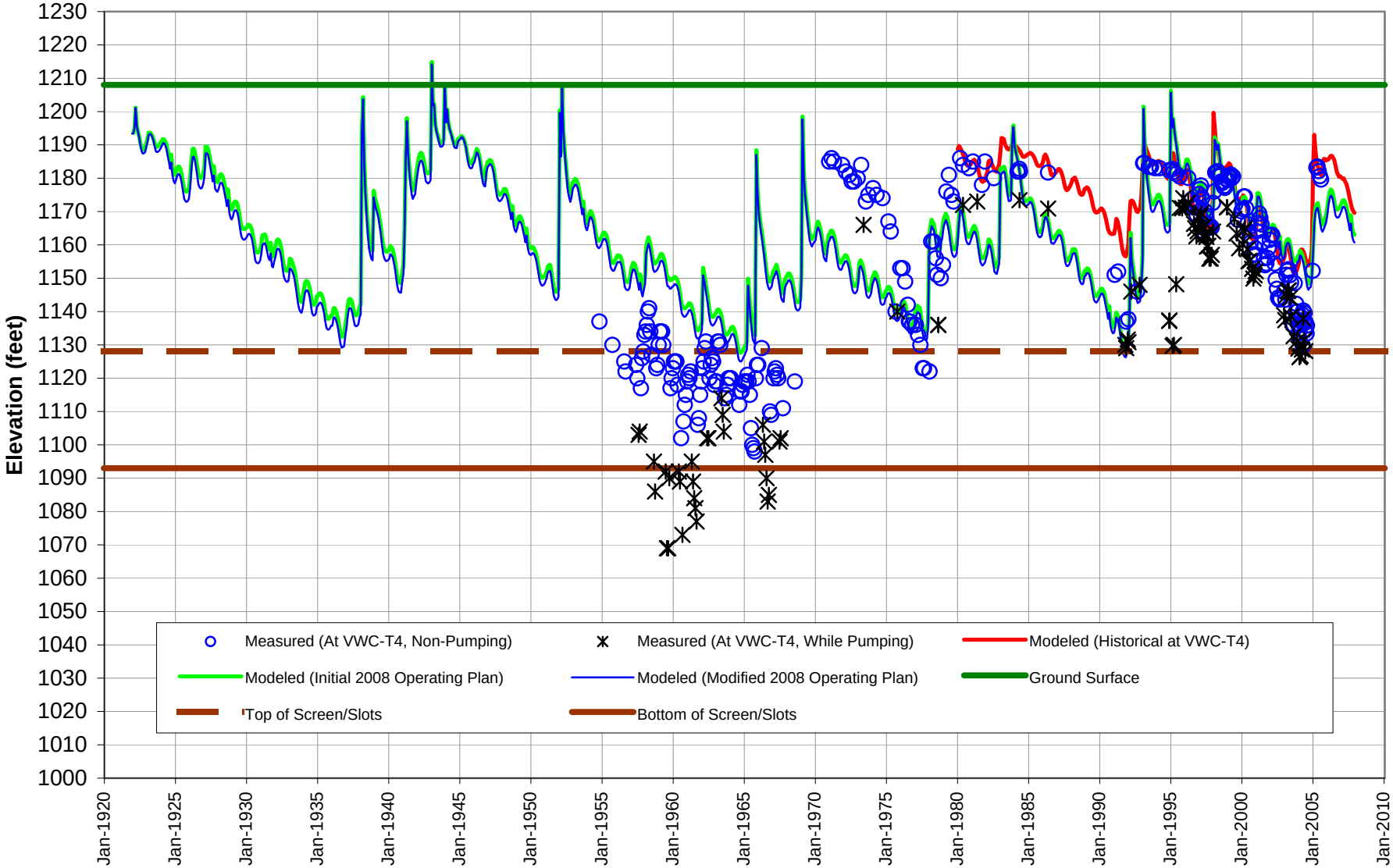


Figure 4-13: SCWD-Clark Modeled Groundwater Elevations for Initial and Modified 2008 Operating Plans (Alluvial Aquifer in Bouquet Canyon)

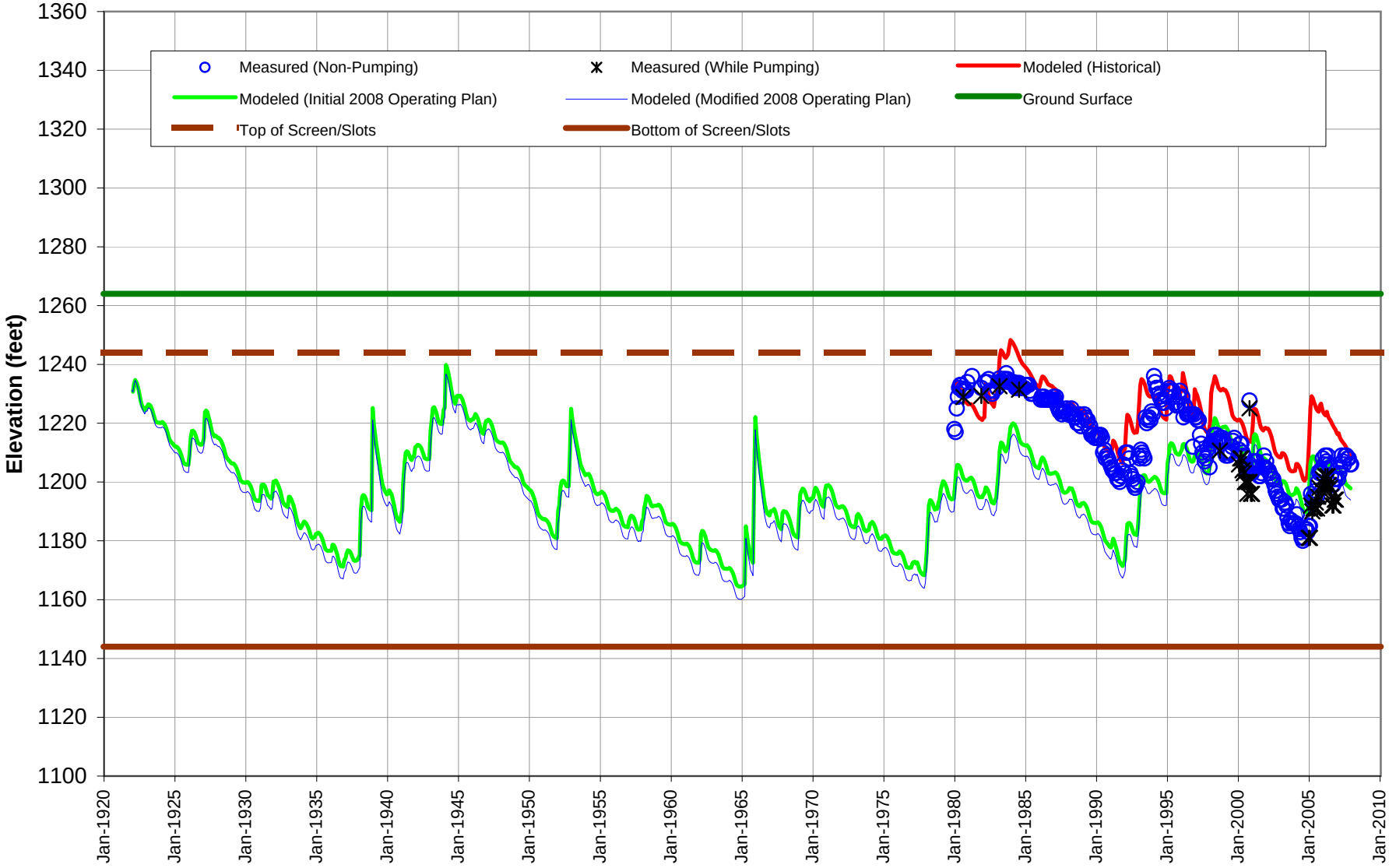


Figure 4-14: SCWD-Sierra Modeled Groundwater Elevations for Initial and Modified 2008 Operating Plans (Alluvial Aquifer Along Santa Clara River, At and Above Mint Canyon)

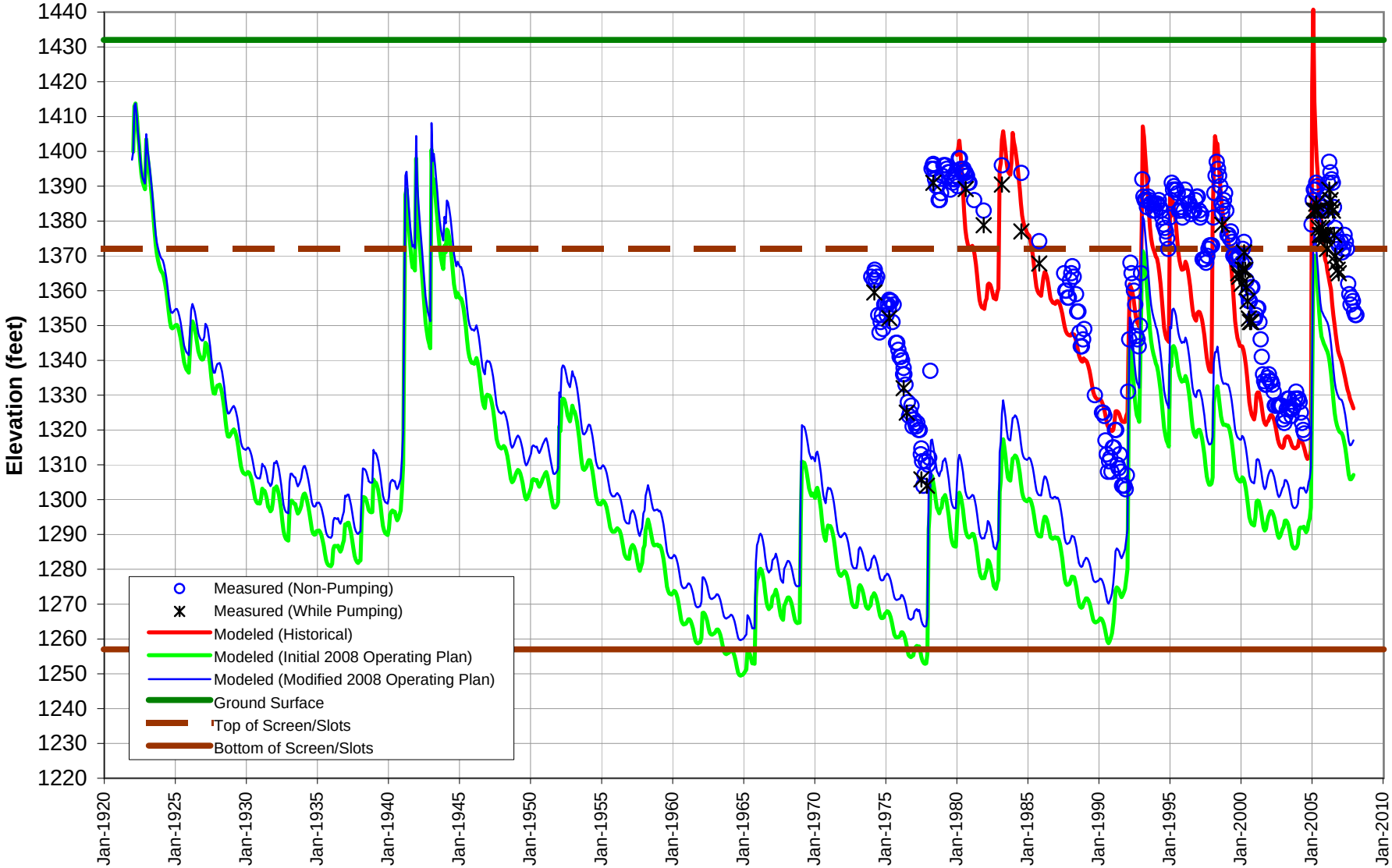


Figure 4-15: NCWD-Pinetree3 Modeled Groundwater Elevations for Initial and Modified 2008 Operating Plans (Alluvial Aquifer Along Santa Clara River, At and Above Mint Canyon)

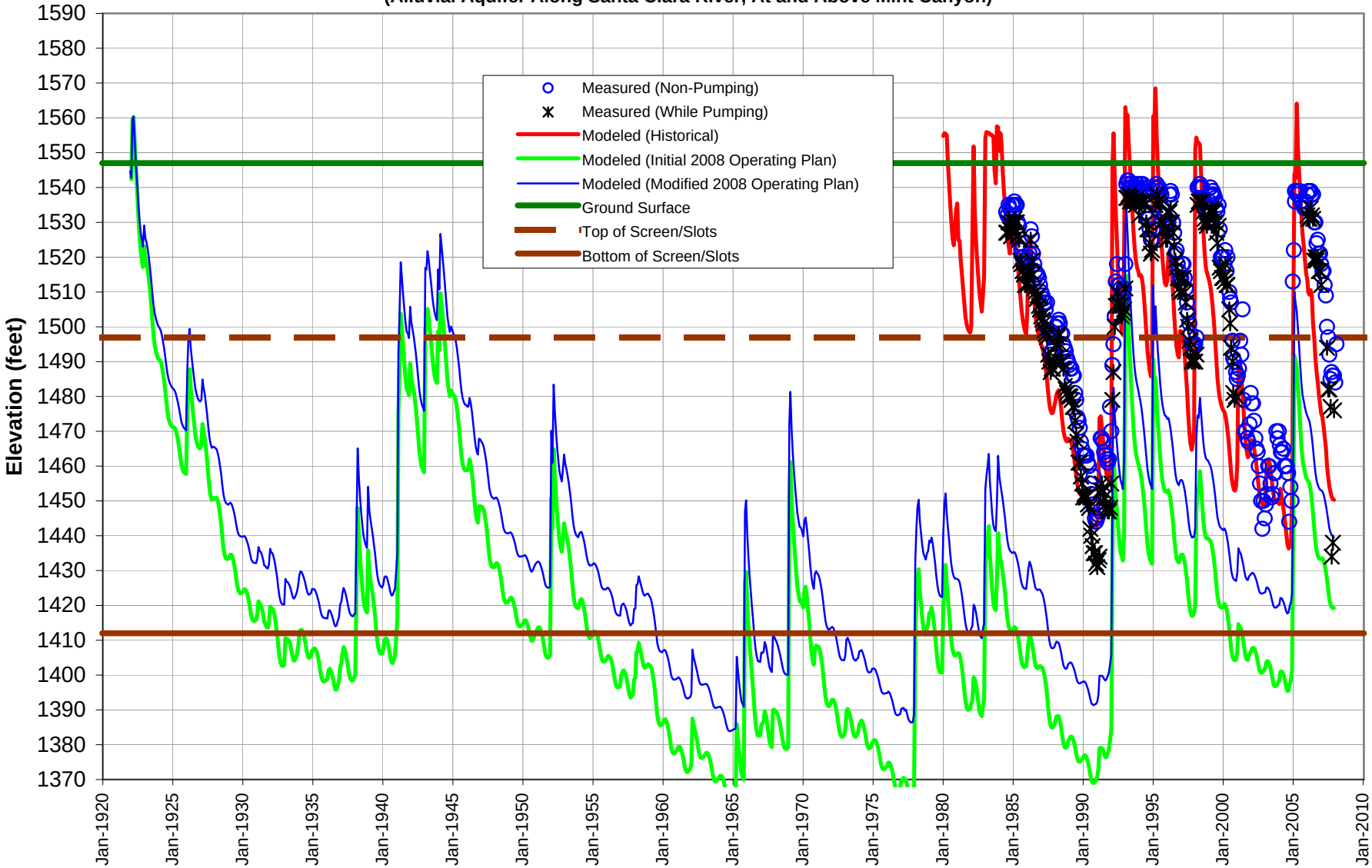
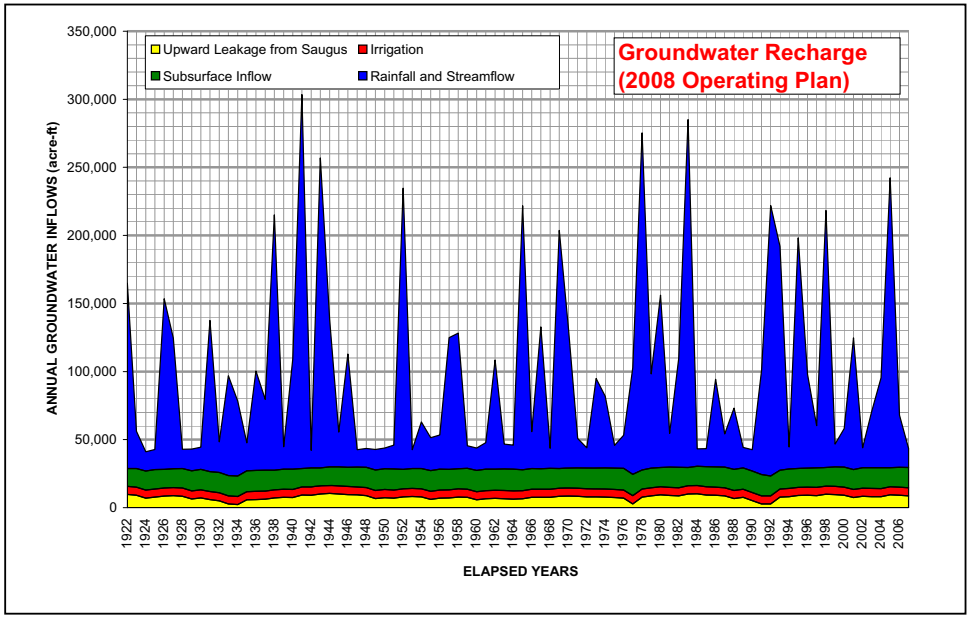
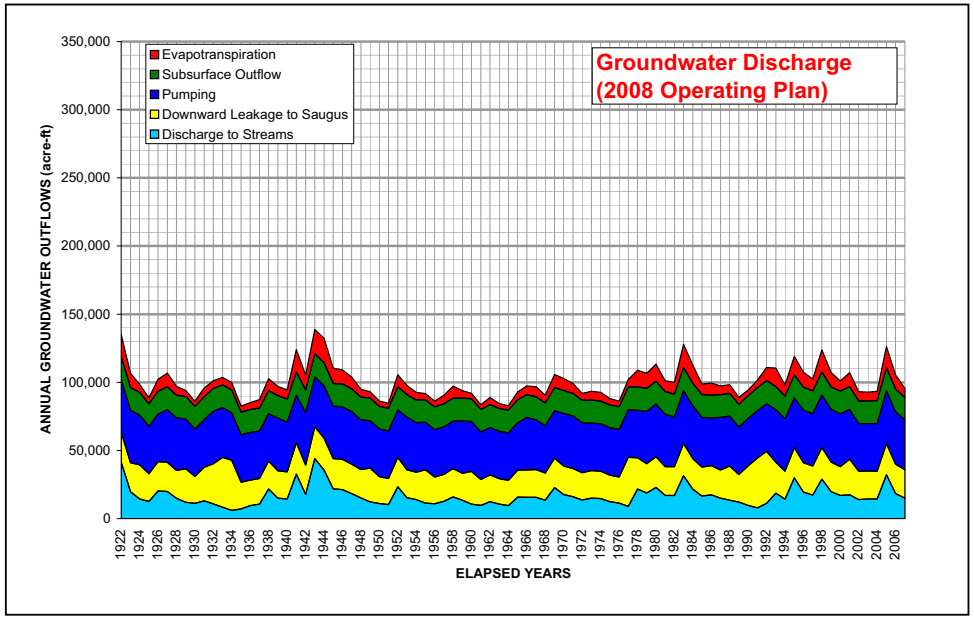


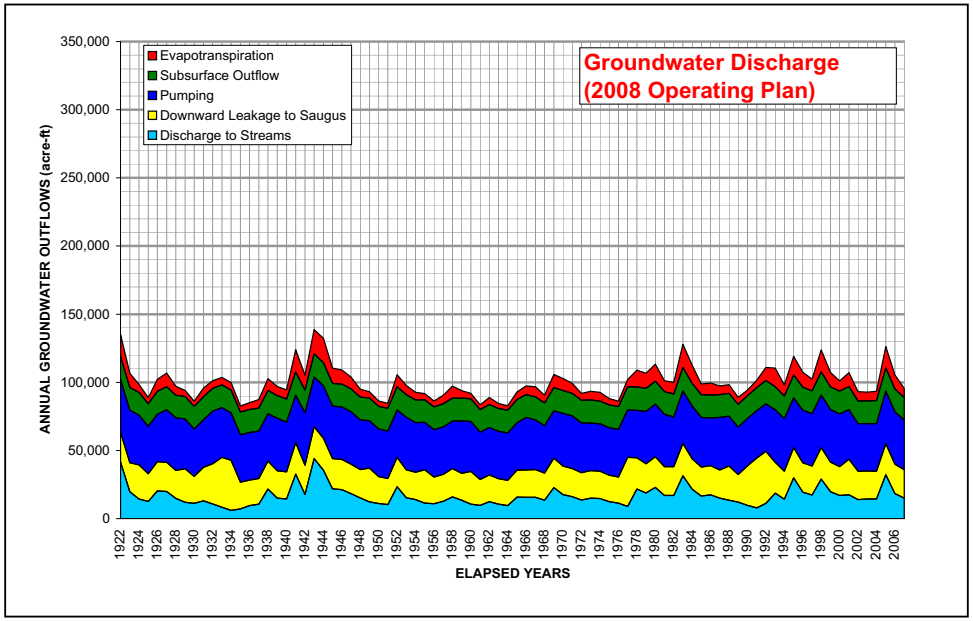
Figure 4-16: Comparison of Simulated Trends in Groundwater Recharge and Discharge Terms for the 2008 Operating Plan Under Historical Hydrology

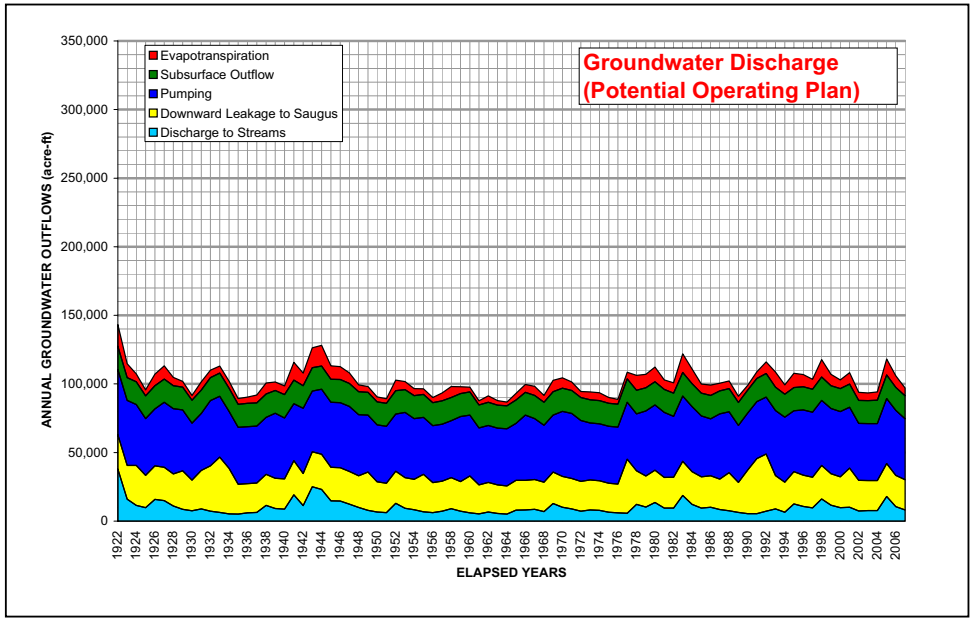




Figures_Section4_Part3_WaterBudget.xls/Figure4-16

Figure 4-17: Comparison of Simulated Trends in Groundwater Discharge Terms for the 2008 and Potential Operating Plans Under Historical Hydrology





Figures_Section4_Part3_WaterBudget.xls/Figure4-17

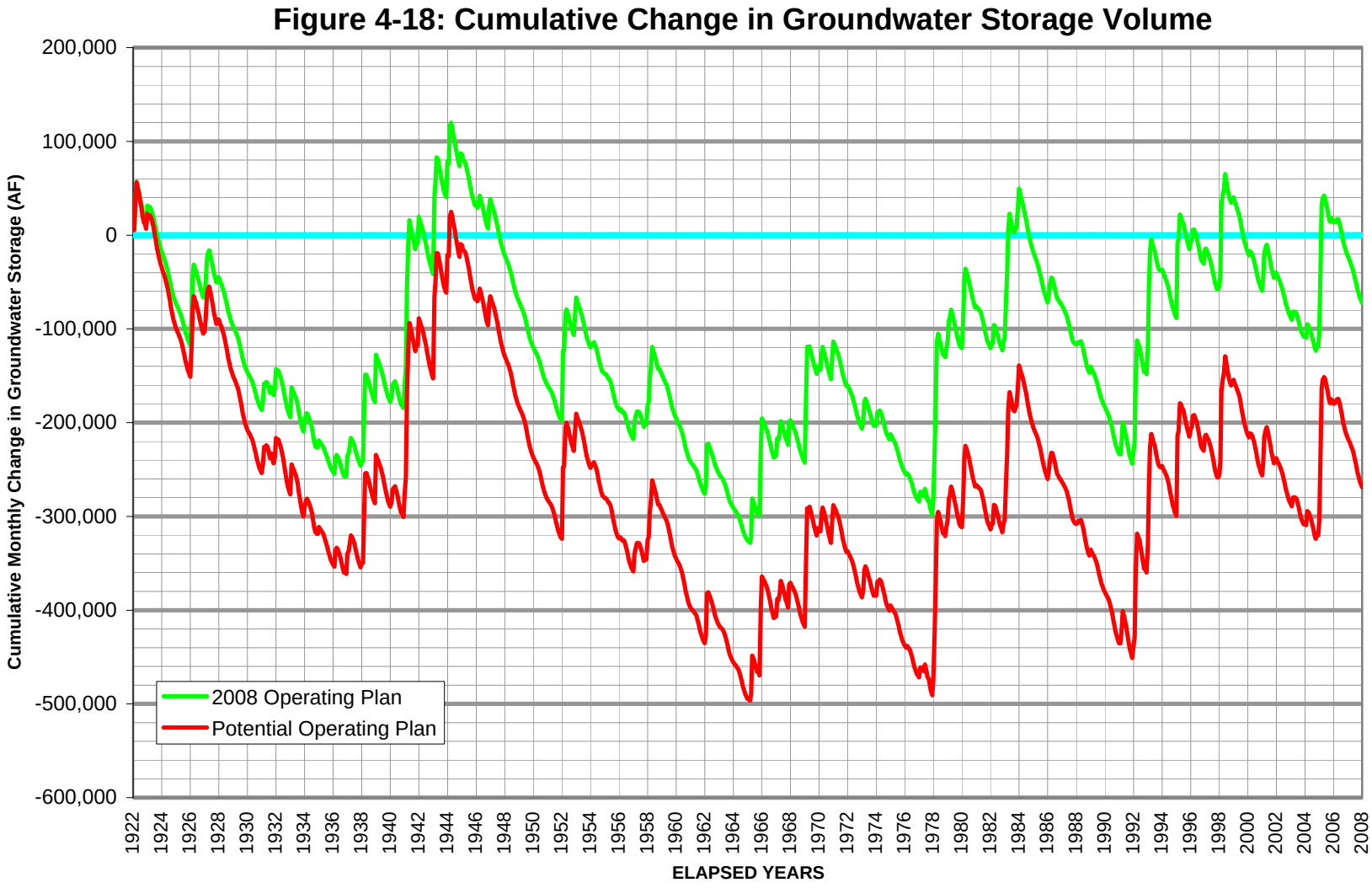
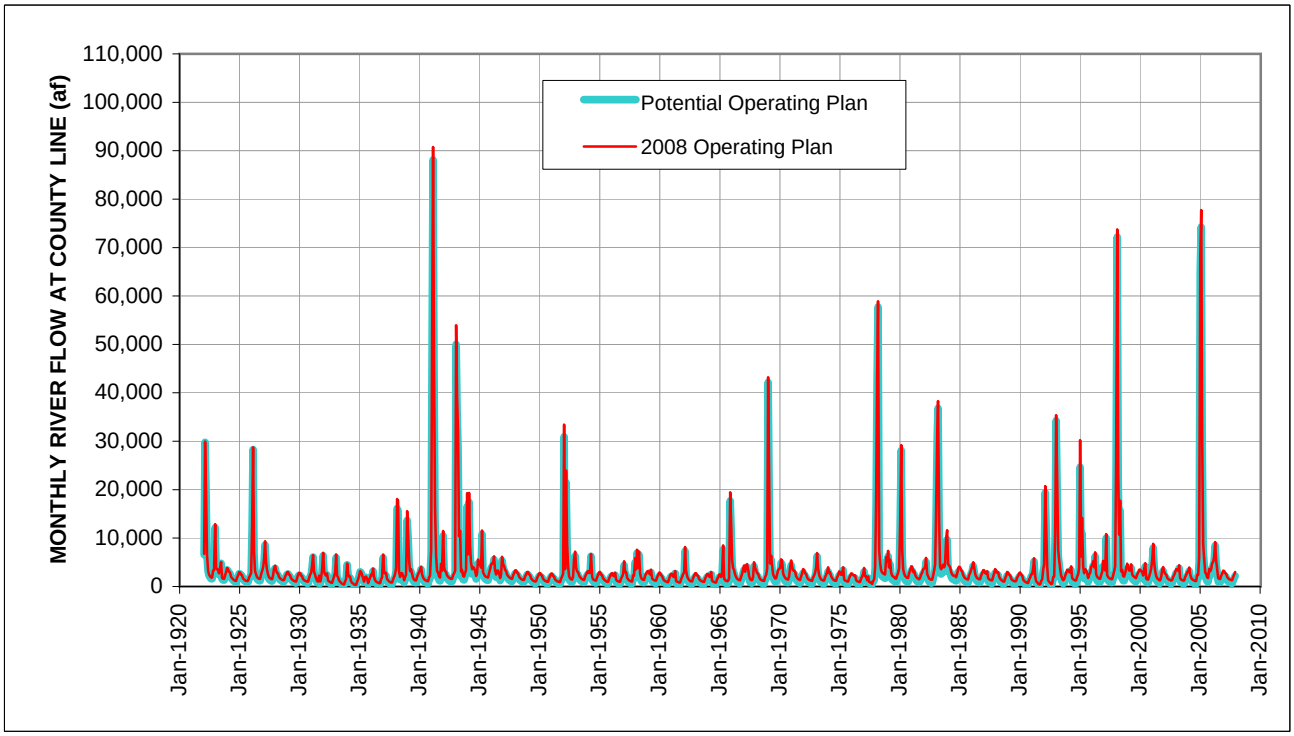


Figure 4-18: Cumulative Change in Groundwater Storage Volume
Cumulative Monthly Change in Groundwater Storage (AF)
200,000
100,000
0
-100,000
-200,000
-300,000
-400,000
-500,000
-600,000
1922
1924
1926
1928
1930
1932
1934
1936
1938
1940
1942
1944
1946
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
ELAPSED YEARS
2008 Operating Plan
Potential Operating Plan

Figure 4-19
Simulated Monthly Flow in the Santa Clara River at the County Line
For the 2008 and Potential Operating Plans Under Historical Hydrology



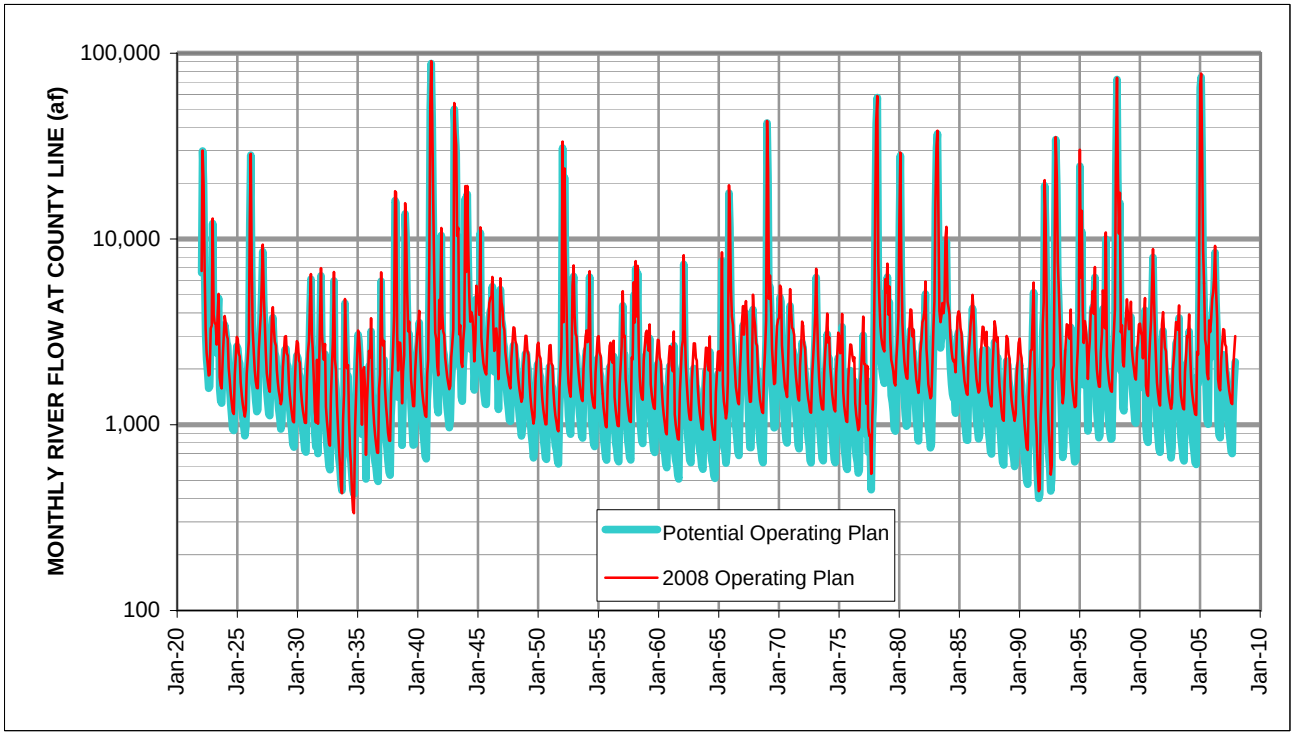


Figure 4-20
Modeled and Estimated Monthly Groundwater Discharges to the Perennial Reach of the Santa Clara River (from Round Mountain to Blue Cut)

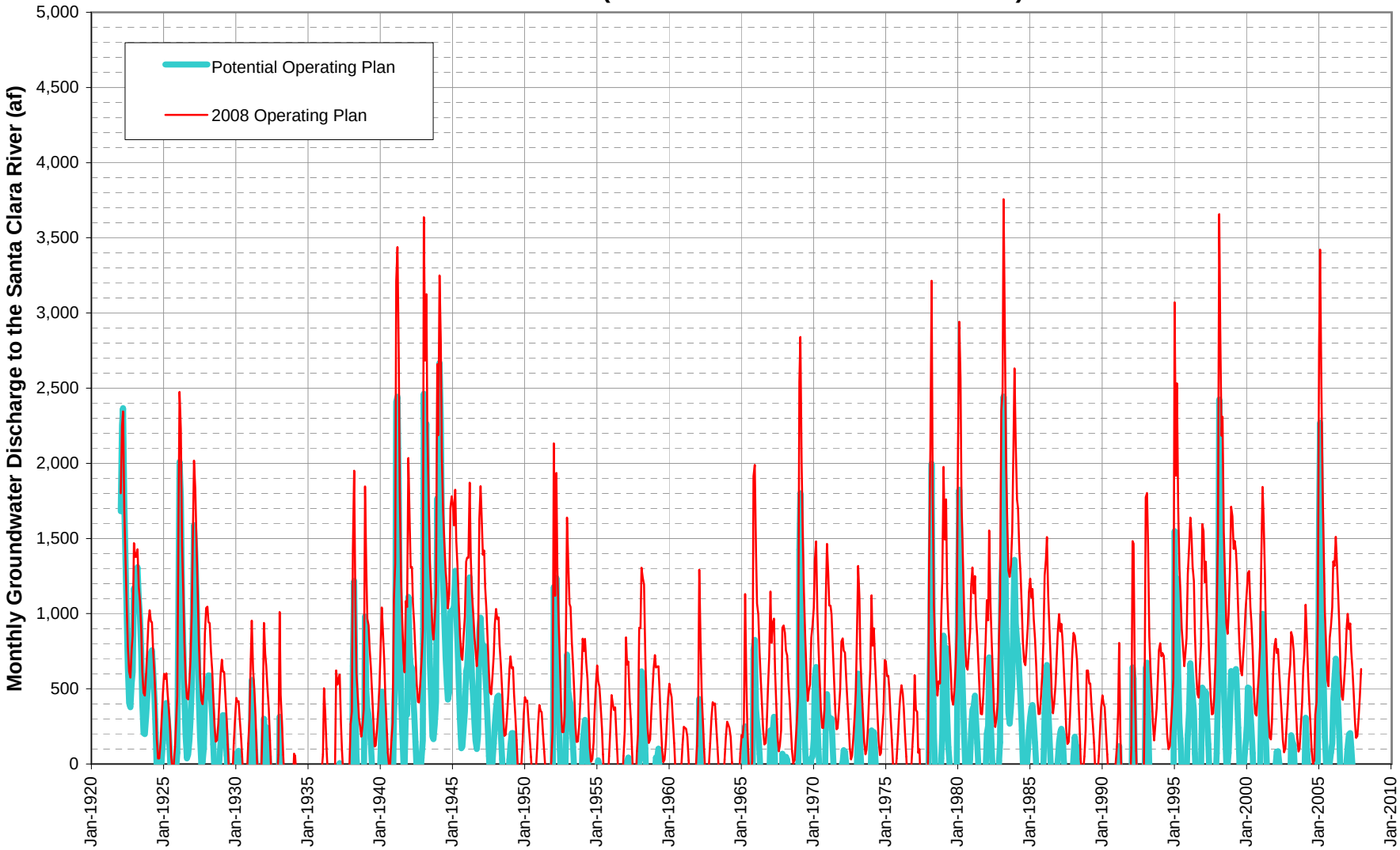
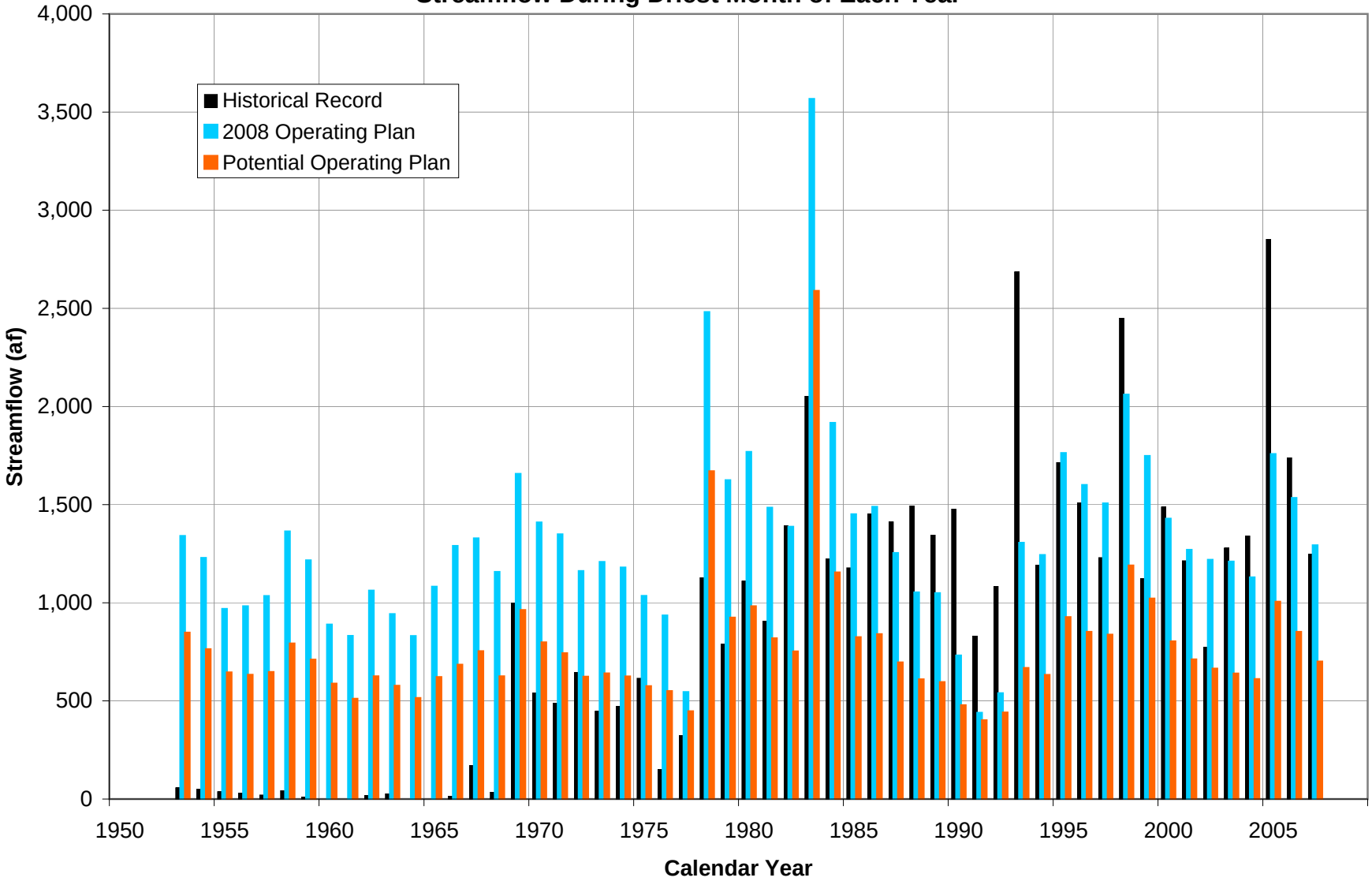


Figure 4-21
Streamflow During Driest Month of Each Year



V. Climate Change Considerations

This section of the report describes an analysis of the potential impacts of climate change on the 2008 Operating Plan for the Santa Clarita Valley. The analysis simulates a group of different potential future groundwater recharge events arising from a suite of published spatial-temporal distributions of future rainfall, as derived from global climate models that in turn have been scaled to watershed scales throughout California, including at the scale of the Santa Clarita Valley. The rainfall distributions, which are also known as rainfall projections, account for a variety of possible changes in global climate and have been published by climatologists conducting research and modeling of possible changes in climate arising from historic and potential future greenhouse gas emissions.

Following are discussions of the objectives of the analysis, a description of the technical approach that was used to simulate potential climate change effects on the local groundwater system in the Santa Clarita Valley, and the results of the modeling evaluation as they pertain to the 2008 Operating Plan. An overview of the current understanding regarding potential climate change in southern California is contained in Appendix D, along with details regarding the projections of future rainfall that were used in the groundwater model to evaluate potential climate change effects on local groundwater.

5.1 Objectives

As recently noted by California's state climatologist (Anderson, 2009), the scientific community's research on global climate processes "includes the expectation that climate will be changing over the course of the next century to an extent that these changes must be accounted for in the water resources planning process". The need to understand and plan for climate change was recognized in 2007 by the Purveyors who, in commissioning the updated basin yield analysis specified that this study should include an evaluation of the potential significance of climate change on local groundwater supplies.

As discussed below in Section 5.2, there are many different climate models, each with its own strengths and limitations. Additionally, the international scientific community has formally identified multiple scenarios for future greenhouse gas emissions. Each scenario has different assumptions about the magnitude and timing of these emissions. Consequently, absolute predictions regarding future climatic conditions and subsequent effect on local groundwater are not possible. Instead, the primary objective of the analysis reported herein is to quantitatively, or qualitatively, describe general impacts of climate change on the groundwater basin and its yield. As the work has progressed, this general objective has focused on understanding whether the yield of the basin, operated in accordance with the 2008 Operating Plan, might be different for future climate change scenarios than for the historical rainfall patterns under which the 2008 Operating Plan was evaluated in Chapter 4. The general objective and the more specific objective together seek to understand the sensitivity of the aquifer and the 2008 Operating Plan to climate change, rather than to make predictions about future climate and groundwater conditions.

5.2 Approach

The analysis was conducted by selecting a small number of published projections regarding possible future patterns of monthly rainfall over time between now and the year 2099. An 86-year time period from 2010 through 2095 was then simulated with the groundwater model, using monthly variations in groundwater recharge that were derived from the monthly projections of future rainfall patterns under a given climate change scenario. Details regarding this process are summarized below and described in greater detail in Appendix D.

5.2.1 Evaluation and Selection of Climate Change Scenarios

Nine of 112 published climate projections were studied for potential use in the Santa Clarita groundwater model. The nine projections that were studied are the same group of projections (models) that were evaluated by DWR in its most recent report on the reliability of State Water Project water deliveries (DWR, 2008).

The nine rainfall projections were studied for their ability to reasonably replicate recent historical rainfall at the Newhall-Soledad rain gage. More importantly, the projections were studied to ascertain the degree to which they show different or similar trends and magnitudes of rainfall at various times (during the Purveyor's UWMP planning time frame [20 to 25 years], and beyond that time frame); and the degree to which they project generally dry, wet, or average conditions over the long-term (through the next 86-year period). This trend evaluation was conducted by examining the cumulative departure of rainfall on a monthly basis for each projection, compared with the 1931-2007 long-term average rainfall. Figure 5-1 displays the cumulative departure from mean precipitation, beginning in 2010, for the nine projections that were studied and for the three projections that were selected for evaluating potential climate-change impacts on groundwater in the Santa Clarita Valley. The figure shows that the nine projections exhibit a broad range in the cumulative departure over time, with an increase in the range of predicted values as time goes on. This increase with time arises in part from differences between the emissions scenarios beginning in about the year 2030, as well as from the general increase in predictive uncertainty that exists in each climate model as it projects into the future the many physical processes that affect climate.

The three projections that were evaluated using the groundwater model were selected because they display a variety of rainfall cycles during the UWMP planning horizon and beyond. In particular:

- Over the course of the UWMP planning horizon, projection #1 shows considerable fluctuation and is generally wetter than normal, while projections #6 and #9 show less fluctuation and are generally drier than normal.

- Afterwards, the three projections show a variety of trends. Projection #1 shows a sustained long-term progressive drying of the climate, with rainfall generally below the historical average. Projection #9 shows the opposite trend: sustained long-term progressive wetting of the climate with more rainfall than the historical average.

Projection #6 shows wet conditions immediately after the UWMP planning horizon, then fluctuating cycles of below-normal and above-normal rainfall, with no net departure from historical average rainfall by the end of the projection time frame.

5.2.2 Simulation Period

An 86-year period beginning in 2010 and continuing through the year 2095 was evaluated with the model, using the local monthly rainfall projections specific to each of these years to define groundwater recharge terms and Alluvial Aquifer pumping patterns. The same pattern of Saugus Formation pumping that was used for the 2008 Operating Plan (representing SWP water availability from 1922 through 2007) was utilized in conjunction with the 2010-2095 simulation of conditions in the Alluvial Aquifer to assess the basin's response to a combination of pumping dictated by local and SWP hydrologic conditions plus runoff/recharge in the Valley resulting from local rainfall conditions.

5.2.3 Hydrologic Processes for Climate Change Scenarios

Four separate hydrologic processes were varied in the groundwater flow model for each climate change scenario. The four processes and the methods by which they were varied were as follows.

- **Groundwater pumping pattern -** Different approaches were taken for the Alluvium versus the Saugus.

  The sequence of normal-year versus dry-year pumping from the alluvium was defined from the prior year's rainfall, as contained in the particular climate projection being evaluated. Tables 5-1 through 5-3 list the alluvial year types for each of the three climate runs that were evaluated.

  The Saugus pumping pattern and pumping rates were specified to be the same as for the 1922-2007 period that was evaluated for the 2008 Operating Plan. Tables 5-4 through 5-6 compare the Saugus pumping pattern with the pumping pattern for the Alluvial Aquifer.

- **Infiltration of direct precipitation -** The month-by-month rainfall from a given climate projection was used by the SWRM to calculate this term for the uppermost layer in the model grid. This is calculated at each node in the grid.

- **Infiltration from stormwater generated within the watershed and from Santa Clara River flows entering the eastern end of the Valley (at the Lang gage) -** For a given future year, these terms were estimated by first identifying one or more similar rainfall years in the historic record, which were treated as prototypical years for the purpose of defining annual and monthly streamflow at each stream node. If more than one year was identified as a possible prototype for a given future year, then the prototypical year was selected by further considering whether hydrologic conditions were generally dry or generally wet. Infiltration from streamflow during a given year was then calculated by the SWRM model from the prototypical year's monthly flow rates and monthly riverbed infiltration rates.

- **Infiltration from water released by DWR from Castaic Lagoon to Castaic Creek -** The prototype-year method was used to identify this term, using the same general procedure as described above for Santa Clara River flows at the Lang gage.

5.3 2008 Operating Plan under Climate Change Scenarios

Hydrographs of simulated groundwater levels, at the locations of each production well, are included in Appendix E to show the simulated response of the groundwater system to the three modeled rainfall projections. Extracted from the complete set in Appendix E, Figures 5-2 through 5-9 are illustrative groundwater elevation hydrographs for each Alluvial Aquifer subarea, using the same set of representative wells as shown for the sustainability discussions in Chapter 4. Figures 5-10 through 5-12 are groundwater elevation hydrographs for the three representative Saugus Formation production wells discussed in Chapter 4.

Based on simulated aquifer response to a combination of pumping in accordance with the 2008 Operating Plan and the range of climate change hydrology, the potential effects of climate change on the yield of the local groundwater basin and the associated availability of groundwater as part of the Valley's overall water supply can be summarized as follows. In all cases, it should be noted that specific short-term patterns of precipitation, as projected by the climate models, significantly influence the potential sustainability of overall groundwater yield and/or the achievability, i.e. the physical ability to extract groundwater at the operating plan rates, of the operating plan in certain subareas of the overall basin.

5.3.1 Drying Climate Trend (Climate Scenario 1)

In the short term, i.e. through the horizon of current UWMP planning, a long-term drying trend in the local climate would not be expected to result in unsustainable groundwater conditions, but could result in unachievable pumping in the "Above Mint Canyon" area at the rates specified in the 2008 Operating Plan. Beyond that planning horizon, the prevailing trend of drier climate would be expected to result in a general long-term lowering of groundwater levels in most of the basin, indicative that pumping in accordance with the 2008 Operating Plan would not be considered sustainable. Directly related to the latter long-term lowering of groundwater levels, the prevailing trend of drier climate would be expected to result in groundwater levels sufficiently lowered in several parts of the basin (e.g. at and above Mint Canyon, below the Saugus WRP, and in Bouquet and San Francisquito Canyon) that the wells in those areas would no longer support the pumping rates in the 2008 Operating Plan. On a long-term basis, then, the drying climate trend analyzed herein would be expected to result in a smaller local groundwater supply over time.

5.3.2 Wetter Climate Trend (Climate Scenario 9)

A tendency toward wetter local hydrologic conditions would logically suggest that the 2008 Operating Plan, considered sustainable through historical hydrologic conditions, would continue to be sustainable. Simulated basin response supports that expectation. Ironically, however, primarily as a result of the specific patterns of precipitation as projected by this climate model,

near-term conditions through the UWMP planning horizon, could appear to be unsustainable, i.e. general declining trend in groundwater levels. Subsequent wetter conditions ultimately lead to the long-term appearance of groundwater sustainability at the pumping rates in the 2008 Operating Plan.

Over both the short term (UWMP planning horizon) and the long term simulated herein, the wetter climate trend appears to result in local issues with regard to achievability of 2008 Operating Plan pumping, commonly in the eastern part of the basin at and above Mint Canyon, and also in San Francisquito Canyon in the near term.

For the most part, the wetter climate trend analyzed herein would be expected to result in a sustainable local groundwater supply at the rates in the 2008 Operating Plan, albeit with some short-term challenges to physically extracting full pumping rates in the eastern part of the basin.

5.3.3 Average Climate Trend (Climate Scenario 6)

A climate tendency toward general continuation of a climate similar, on average, to historically experienced conditions would logically suggest that the 2008 Operating Plan, considered sustainable through historical hydrologic conditions, would continue to be sustainable. Simulated basin response supports that expectation. Similar also to expected response under historical hydrologic conditions, there would be expected challenges to the achievability of the 2008 Operating Plan, notably in the near-term UWMP planning horizon, under a climate "change" that continues long-term average historical precipitation. In summary, a "climate change" that results in essential continuation of long-term average precipitation would be expected to result in a sustainable local groundwater supply at the rates in the 2008 Operating Plan, with basically the same local issues relative to actual pumping capability as derived from the analysis of that operating plan through historical hydrologic conditions.

5.4 Climate Change Summary

Examination of the three simulated climate change scenarios was undertaken to provide a level of quantification to the possible impact of climate change on local groundwater basin yield and availability of groundwater as part of overall water supply to the Valley. In light of the range of global climate model output that was considered for development of the local scenarios analyzed herein, it is obvious that there is neither a unique result that can be expected to become a representative hydrologic condition in the Valley, nor is there a unique result that can be expected in terms of basin yield and associated sustainable groundwater supply as an outcome of climate change. Obviously, the Valley does not get to "choose" a future climate scenario, but rather will have to manage within whatever future patterns of rainfall actually occur over time, whether the future rainfall exhibit wet-dry cycles that are similar to or different from historically recorded conditions. Perhaps most useful in the consideration of climate change effects analyzed herein is with respect to results over the UWMP planning horizon of 20 to 25 years. For the range of relatively wet to relatively dry conditions analyzed herein, all three scenarios suggest that the 2008 Operating Plan can be considered sustainable and, with the same local exceptions as simulated through a repetition of historical hydrology (e.g. mainly at and above Mint Canyon), achievable over the UWMP planning horizon. Beyond that horizon, greater uncertainty

exists because the global climate models use different emissions scenarios and also become increasingly uncertain over time because of predictive uncertainty pertaining to the forward-looking representation of the many physical processes that affect climate into the future. As a result, for time periods beyond the UWMP planning horizon, some models predict long-term drying and subsequent sustained declines in groundwater levels, which would result in a smaller local groundwater supply over time, while other models predict hydrologic conditions similar to or wetter than those that have been historically observed, in which case the 2008 Operating Plan can be considered sustainable, albeit with some local issues relative to actual pumping capability at certain times (mainly in the Alluvium at the eastern end of the Valley).

Table 5-1

Climate Projection #1 (Global Climate Model GFDL_cm2_0.1_sresB1)

Local Hydrology and Corresponding Pumping from the Alluvial Aquifer for the 86-year Simulation

Model Year	Calendar Year	Local Rainfall (inches)[a]	Year Type	Alluvial Aquifer Pumping under the Groundwater Operating Plan (AF/yr)
1	2010	18.27	Normal	35,000-40,000
2	2011	19.17	Normal	35,000-40,000
3	2012	43.26	Normal	35,000-40,000
4	2013	20.63	Normal	35,000-40,000
5	2014	13.96	Normal	35,000-40,000
6	2015	11.24	Normal	35,000-40,000
7	2016	13.80	Dry Year 1	30,000-35,000
8	2017	22.80	Dry Year 2	30,000-35,000
9	2018	15.37	Normal	35,000-40,000
10	2019	23.75	Normal	35,000-40,000
11	2020	45.78	Normal	35,000-40,000
12	2021	38.53	Normal	35,000-40,000
13	2022	43.23	Normal	35,000-40,000
14	2023	25.37	Normal	35,000-40,000
15	2024	24.15	Normal	35,000-40,000
16	2025	9.65	Normal	35,000-40,000
17	2026	20.35	Dry Year 1	30,000-35,000
18	2027	15.10	Normal	35,000-40,000
19	2028	17.37	Normal	35,000-40,000
20	2029	22.37	Normal	35,000-40,000
21	2030	14.77	Normal	35,000-40,000
22	2031	14.56	Normal	35,000-40,000
23	2032	9.17	Dry Year 1	30,000-35,000
24	2033	31.25	Dry Year 2	30,000-35,000
25	2034	31.80	Normal	35,000-40,000
26	2035	10.36	Normal	35,000-40,000
27	2036	12.98	Dry Year 1	30,000-35,000
28	2037	13.51	Dry Year 2	30,000-35,000
29	2038	28.59	Dry Year 3	30,000-35,000
30	2039	16.63	Normal	35,000-40,000
31	2040	12.83	Normal	35,000-40,000
32	2041	20.67	Dry Year 1	30,000-35,000
33	2042	16.41	Normal	35,000-40,000
34	2043	9.38	Normal	35,000-40,000
35	2044	24.67	Dry Year 1	30,000-35,000
36	2045	29.24	Normal	35,000-40,000
37	2046	17.91	Normal	35,000-40,000
38	2047	10.47	Normal	35,000-40,000
39	2048	15.97	Dry Year 1	30,000-35,000
40	2049	19.69	Dry Year 2	30,000-35,000
41	2050	27.84	Dry Year 3	30,000-35,000
42	2051	12.19	Normal	35,000-40,000
43	2052	20.08	Dry Year 1	30,000-35,000
44	2053	14.02	Normal	35,000-40,000
45	2054	33.91	Dry Year 1	30,000-35,000
46	2055	19.94	Normal	35,000-40,000
47	2056	14.32	Normal	35,000-40,000
48	2057	14.01	Normal	35,000-40,000
49	2058	28.83	Dry Year 1	30,000-35,000
50	2059	35.10	Normal	35,000-40,000
51	2060	11.01	Normal	35,000-40,000
52	2061	9.40	Dry Year 1	30,000-35,000
53	2062	20.34	Dry Year 2	30,000-35,000
54	2063	10.66	Dry Year 3	30,000-35,000
55	2064	9.63	Dry Year 4	30,000-35,000
56	2065	17.94	Dry Year 5	30,000-35,000
57	2066	18.07	Dry Year 6	30,000-35,000
58	2067	13.68	Dry Year 7	30,000-35,000
59	2068	7.10	Dry Year 8	30,000-35,000
60	2069	20.97	Dry Year 9	30,000-35,000
61	2070	14.49	Dry Year 10	30,000-35,000
62	2071	17.87	Dry Year 11	30,000-35,000
63	2072	20.27	Dry Year 12	30,000-35,000
64	2073	11.02	Dry Year 13	30,000-35,000
65	2074	23.74	Dry Year 14	30,000-35,000
66	2075	20.98	Normal	35,000-40,000
67	2076	8.79	Normal	35,000-40,000
68	2077	12.56	Dry Year 1	30,000-35,000
69	2078	21.59	Dry Year 2	30,000-35,000
70	2079	30.22	Dry Year 3	30,000-35,000
71	2080	12.53	Normal	35,000-40,000
72	2081	21.67	Dry Year 1	30,000-35,000
73	2082	17.97	Normal	35,000-40,000
74	2083	36.13	Normal	35,000-40,000
75	2084	32.25	Normal	35,000-40,000
76	2085	18.51	Normal	35,000-40,000
77	2086	20.78	Normal	35,000-40,000
78	2087	30.97	Normal	35,000-40,000
79	2088	8.45	Normal	35,000-40,000
80	2089	32.79	Dry Year 1	30,000-35,000
81	2090	34.48	Normal	35,000-40,000
82	2091	18.49	Normal	35,000-40,000
83	2092	7.60	Normal	35,000-40,000
84	2093	21.56	Dry Year 1	30,000-35,000
85	2094	16.99	Normal	35,000-40,000
86	2095	21.56	Normal	35,000-40,000

aThe values from the global climate model were extrapolated to the location of the Newhall County Water District Rain Gage.

Table 5-2

Climate Projection #6 (Global Climate Model NCAR_PCM1.3_sresA2)

Local Hydrology and Corresponding Pumping from the Alluvial Aquifer for the 86-year Simulation

Model Year	Calendar Year	Local Rainfall (inches)[a]	Year Type	Alluvial Aquifer Pumping under the Groundwater Operating Plan (AF/yr)
1	2010	17.22	Normal	35,000-40,000
2	2011	13.37	Normal	35,000-40,000
3	2012	16.14	Dry Year 1	30,000-35,000
4	2013	16.53	Dry Year 2	30,000-35,000
5	2014	15.33	Dry Year 3	30,000-35,000
6	2015	40.92	Dry Year 4	30,000-35,000
7	2016	20.24	Normal	35,000-40,000
8	2017	19.50	Normal	35,000-40,000
9	2018	10.68	Normal	35,000-40,000
10	2019	15.15	Dry Year 1	30,000-35,000
11	2020	24.58	Dry Year 2	30,000-35,000
12	2021	16.38	Normal	35,000-40,000
13	2022	22.64	Normal	35,000-40,000
14	2023	21.29	Normal	35,000-40,000
15	2024	13.37	Normal	35,000-40,000
16	2025	19.50	Dry Year 1	30,000-35,000
17	2026	12.05	Dry Year 2	30,000-35,000
18	2027	18.89	Dry Year 3	30,000-35,000
19	2028	11.56	Dry Year 4	30,000-35,000
20	2029	8.46	Dry Year 5	30,000-35,000
21	2030	16.41	Dry Year 6	30,000-35,000
22	2031	19.44	Dry Year 7	30,000-35,000
23	2032	18.66	Dry Year 8	30,000-35,000
24	2033	30.29	Dry Year 9	30,000-35,000
25	2034	42.86	Normal	35,000-40,000
26	2035	16.39	Normal	35,000-40,000
27	2036	17.74	Dry Year 1	30,000-35,000
28	2037	50.04	Dry Year 2	30,000-35,000
29	2038	35.50	Normal	35,000-40,000
30	2039	39.98	Normal	35,000-40,000
31	2040	28.83	Normal	35,000-40,000
32	2041	23.15	Normal	35,000-40,000
33	2042	22.57	Normal	35,000-40,000
34	2043	22.20	Normal	35,000-40,000
35	2044	16.25	Normal	35,000-40,000
36	2045	34.88	Normal	35,000-40,000
37	2046	20.82	Normal	35,000-40,000
38	2047	14.35	Normal	35,000-40,000
39	2048	12.06	Dry Year 1	30,000-35,000
40	2049	12.16	Dry Year 2	30,000-35,000
41	2050	11.37	Dry Year 3	30,000-35,000
42	2051	28.47	Dry Year 4	30,000-35,000
43	2052	26.84	Normal	35,000-40,000
44	2053	25.59	Normal	35,000-40,000
45	2054	15.97	Normal	35,000-40,000
46	2055	21.26	Normal	35,000-40,000
47	2056	23.32	Normal	35,000-40,000
48	2057	13.55	Normal	35,000-40,000
49	2058	23.32	Dry Year 1	30,000-35,000
50	2059	13.04	Normal	35,000-40,000
51	2060	22.71	Dry Year 1	30,000-35,000
52	2061	10.15	Normal	35,000-40,000
53	2062	20.52	Dry Year 1	30,000-35,000
54	2063	71.95	Dry Year 2	30,000-35,000
55	2064	33.61	Normal	35,000-40,000
56	2065	13.39	Normal	35,000-40,000
57	2066	25.96	Dry Year 1	30,000-35,000
58	2067	28.69	Normal	35,000-40,000
59	2068	18.22	Normal	35,000-40,000
60	2069	11.17	Normal	35,000-40,000
61	2070	18.25	Dry Year 1	30,000-35,000
62	2071	17.85	Dry Year 2	30,000-35,000
63	2072	19.30	Dry Year 3	30,000-35,000
64	2073	14.70	Normal	35,000-40,000
65	2074	9.82	Dry Year 1	30,000-35,000
66	2075	14.96	Dry Year 2	30,000-35,000
67	2076	29.84	Dry Year 3	30,000-35,000
68	2077	19.05	Normal	35,000-40,000
69	2078	45.70	Normal	35,000-40,000
70	2079	25.20	Normal	35,000-40,000
71	2080	31.12	Normal	35,000-40,000
72	2081	29.50	Normal	35,000-40,000
73	2082	27.59	Normal	35,000-40,000
74	2083	15.50	Normal	35,000-40,000
75	2084	8.74	Normal	35,000-40,000
76	2085	18.76	Dry Year 1	30,000-35,000
77	2086	13.07	Dry Year 2	30,000-35,000
78	2087	22.89	Dry Year 3	30,000-35,000
79	2088	50.06	Normal	35,000-40,000
80	2089	27.24	Normal	35,000-40,000
81	2090	12.53	Normal	35,000-40,000
82	2091	9.14	Dry Year 1	30,000-35,000
83	2092	10.81	Dry Year 2	30,000-35,000
84	2093	23.07	Dry Year 3	30,000-35,000
85	2094	12.91	Dry Year 4	30,000-35,000
86	2095	26.47	Dry Year 5	30,000-35,000

aThe values from the global climate model were extrapolated to the location of the Newhall County Water District Rain Gage.

Table 5-3

Climate Projection #9 (Global Climate Model NCAR_PCM1.3_sresB1)

Local Hydrology and Corresponding Pumping from the Alluvial Aquifer for the 86-year Simulation

Model Year	Calendar Year	Local Rainfall (inches)[a]	Year Type	Alluvial Aquifer Pumping under the Groundwater Operating Plan (AF/yr)
1	2010	22.14	Normal	35,000-40,000
2	2011	28.62	Normal	35,000-40,000
3	2012	18.21	Normal	35,000-40,000
4	2013	18.42	Normal	35,000-40,000
5	2014	17.85	Normal	35,000-40,000
6	2015	22.34	Normal	35,000-40,000
7	2016	17.51	Normal	35,000-40,000
8	2017	16.21	Normal	35,000-40,000
9	2018	11.56	Dry Year 1	30,000-35,000
10	2019	11.83	Dry Year 2	30,000-35,000
11	2020	37.62	Dry Year 3	30,000-35,000
12	2021	16.56	Normal	35,000-40,000
13	2022	15.17	Normal	35,000-40,000
14	2023	22.88	Normal	35,000-40,000
15	2024	13.18	Normal	35,000-40,000
16	2025	20.34	Dry Year 1	30,000-35,000
17	2026	26.96	Dry Year 2	30,000-35,000
18	2027	26.47	Normal	35,000-40,000
19	2028	18.04	Normal	35,000-40,000
20	2029	18.04	Normal	35,000-40,000
21	2030	16.49	Normal	35,000-40,000
22	2031	22.51	Dry Year 1	30,000-35,000
23	2032	22.84	Normal	35,000-40,000
24	2033	15.01	Normal	35,000-40,000
25	2034	13.40	Dry Year 1	30,000-35,000
26	2035	18.72	Dry Year 2	30,000-35,000
27	2036	26.43	Dry Year 3	30,000-35,000
28	2037	11.11	Normal	35,000-40,000
29	2038	12.97	Dry Year 1	30,000-35,000
30	2039	41.47	Dry Year 2	30,000-35,000
31	2040	18.62	Normal	35,000-40,000
32	2041	39.65	Normal	35,000-40,000
33	2042	33.75	Normal	35,000-40,000
34	2043	57.56	Normal	35,000-40,000
35	2044	14.63	Normal	35,000-40,000
36	2045	15.63	Dry Year 1	30,000-35,000
37	2046	15.41	Dry Year 2	30,000-35,000
38	2047	24.66	Dry Year 3	30,000-35,000
39	2048	53.80	Normal	35,000-40,000
40	2049	14.70	Normal	35,000-40,000
41	2050	9.79	Dry Year 1	30,000-35,000
42	2051	38.49	Dry Year 2	30,000-35,000
43	2052	19.57	Normal	35,000-40,000
44	2053	20.65	Normal	35,000-40,000
45	2054	10.40	Normal	35,000-40,000
46	2055	12.58	Dry Year 1	30,000-35,000
47	2056	17.80	Dry Year 2	30,000-35,000
48	2057	15.56	Dry Year 3	30,000-35,000
49	2058	45.18	Dry Year 4	30,000-35,000
50	2059	26.78	Normal	35,000-40,000
51	2060	23.78	Normal	35,000-40,000
52	2061	47.61	Normal	35,000-40,000
53	2062	28.90	Normal	35,000-40,000
54	2063	30.43	Normal	35,000-40,000
55	2064	18.15	Normal	35,000-40,000
56	2065	30.15	Normal	35,000-40,000
57	2066	13.65	Normal	35,000-40,000
58	2067	16.34	Dry Year 1	30,000-35,000
59	2068	10.60	Dry Year 2	30,000-35,000
60	2069	60.56	Dry Year 3	30,000-35,000
61	2070	20.56	Normal	35,000-40,000
62	2071	15.31	Normal	35,000-40,000
63	2072	33.67	Normal	35,000-40,000
64	2073	46.34	Normal	35,000-40,000
65	2074	33.69	Normal	35,000-40,000
66	2075	15.71	Normal	35,000-40,000
67	2076	14.36	Normal	35,000-40,000
68	2077	21.25	Dry Year 1	30,000-35,000
69	2078	37.14	Normal	35,000-40,000
70	2079	31.87	Normal	35,000-40,000
71	2080	8.14	Normal	35,000-40,000
72	2081	25.22	Dry Year 1	30,000-35,000
73	2082	32.82	Normal	35,000-40,000
74	2083	28.25	Normal	35,000-40,000
75	2084	7.23	Normal	35,000-40,000
76	2085	11.37	Dry Year 1	30,000-35,000
77	2086	27.47	Dry Year 2	30,000-35,000
78	2087	20.97	Normal	35,000-40,000
79	2088	16.12	Normal	35,000-40,000
80	2089	64.70	Normal	35,000-40,000
81	2090	21.30	Normal	35,000-40,000
82	2091	12.38	Normal	35,000-40,000
83	2092	22.06	Dry Year 1	30,000-35,000
84	2093	19.32	Normal	35,000-40,000
85	2094	20.91	Normal	35,000-40,000
86	2095	21.05	Normal	35,000-40,000

aThe values from the global climate model were extrapolated to the location of the Newhall County Water District Rain Gage.

Ta le -4

Climate Projection #1 (Global Climate Model GFDL_cm2_0.1_sresB1)

llu ial an Saugus For ation Pu ing for t e Si ulation of 1 22-2 istorical rolog

Model Year	Alluvium Year	Saugus Year	Year Name for Model Run	Simulated Pumping Conditions	
				Alluvium	Saugus
1	2010	1922	1922	Normal	Normal
2	2011	1923	1923	Normal	Normal
3	2012	1924	1924	Normal	Dry Year 1
4	2013	1925	1925	Normal	Normal
5	2014	1926	1926	Normal	Normal
6	2015	1927	1927	Normal	Normal
7	2016	1928	1928	Dry Year 1	Normal
8	2017	1929	1929	Dry Year 2	Dry Year 1
9	2018	1930	1930	Normal	Normal
10	2019	1931	1931	Normal	Dry Year 1
11	2020	1932	1932	Normal	Dry Year 2
12	2021	1933	1933	Normal	Dry Year 3
13	2022	1934	1934	Normal	Dry Year 4
14	2023	1935	1935	Normal	Normal
15	2024	1936	1936	Normal	Normal
16	2025	1937	1937	Normal	Normal
17	2026	1938	1938	Dry Year 1	Normal
18	2027	1939	1939	Normal	Normal
19	2028	1940	1940	Normal	Normal
20	2029	1941	1941	Normal	Normal
21	2030	1942	1942	Normal	Normal
22	2031	1943	1943	Normal	Normal
23	2032	1944	1944	Dry Year 1	Normal
24	2033	1945	1945	Dry Year 2	Normal
25	2034	1946	1946	Normal	Normal
26	2035	1947	1947	Normal	Normal
27	2036	1948	1948	Dry Year 1	Normal
28	2037	1949	1949	Dry Year 2	Dry Year 1
29	2038	1950	1950	Dry Year 3	Normal
30	2039	1951	1951	Normal	Normal
31	2040	1952	1952	Normal	Normal
32	2041	1953	1953	Dry Year 1	Normal
33	2042	1954	1954	Normal	Normal
34	2043	1955	1955	Normal	Dry Year 1
35	2044	1956	1956	Dry Year 1	Normal
36	2045	1957	1957	Normal	Normal
37	2046	1958	1958	Normal	Normal
38	2047	1959	1959	Normal	Normal
39	2048	1960	1960	Dry Year 1	Dry Year 1
40	2049	1961	1961	Dry Year 2	Normal
41	2050	1962	1962	Dry Year 3	Normal
42	2051	1963	1963	Normal	Normal
43	2052	1964	1964	Dry Year 1	Normal
44	2053	1965	1965	Normal	Normal
45	2054	1966	1966	Dry Year 1	Normal
46	2055	1967	1967	Normal	Normal
47	2056	1968	1968	Normal	Normal
48	2057	1969	1969	Normal	Normal
49	2058	1970	1970	Dry Year 1	Normal
50	2059	1971	1971	Normal	Normal
51	2060	1972	1972	Normal	Normal
52	2061	1973	1973	Dry Year 1	Normal
53	2062	1974	1974	Dry Year 2	Normal
54	2063	1975	1975	Dry Year 3	Normal
55	2064	1976	1976	Dry Year 4	Normal
56	2065	1977	1977	Dry Year 5	Dry Year 1
57	2066	1978	1978	Dry Year 6	Normal
58	2067	1979	1979	Dry Year 7	Normal
59	2068	1980	1980	Dry Year 8	Normal
60	2069	1981	1981	Dry Year 9	Normal
61	2070	1982	1982	Dry Year 10	Normal
62	2071	1983	1983	Dry Year 11	Normal
63	2072	1984	1984	Dry Year 12	Normal
64	2073	1985	1985	Dry Year 13	Normal
65	2074	1986	1986	Dry Year 14	Normal
66	2075	1987	1987	Normal	Normal
67	2076	1988	1988	Normal	Dry Year 1
68	2077	1989	1989	Dry Year 1	Normal
69	2078	1990	1990	Dry Year 2	Dry Year 2
70	2079	1991	1991	Dry Year 3	Dry Year 3
71	2080	1992	1992	Normal	Dry Year 4
72	2081	1993	1993	Dry Year 1	Normal
73	2082	1994	1994	Normal	Normal
74	2083	1995	1995	Normal	Normal
75	2084	1996	1996	Normal	Normal
76	2085	1997	1997	Normal	Normal
77	2086	1998	1998	Normal	Normal
78	2087	1999	1999	Normal	Normal
79	2088	2000	2000	Normal	Normal
80	2089	2001	2001	Dry Year 1	Dry Year 1
81	2090	2002	2002	Normal	Normal
82	2091	2003	2003	Normal	Normal
83	2092	2004	2004	Normal	Normal
84	2093	2005	2005	Dry Year 1	Normal
85	2094	2006	2006	Normal	Normal
86	2095	2007	2007	Normal	Normal

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Climate Projection #6 (Global Climate Model NCAR_PCM1.3_sresA2)

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Model Year	Alluvium Year	Saugus Year	Year Name for Model Run	Simulated Pumping Conditions	
				Alluvium	Saugus
1	2010	1922	1922	Normal	Normal
2	2011	1923	1923	Normal	Normal
3	2012	1924	1924	Dry Year 1	Dry Year 1
4	2013	1925	1925	Dry Year 2	Normal
5	2014	1926	1926	Dry Year 3	Normal
6	2015	1927	1927	Dry Year 4	Normal
7	2016	1928	1928	Normal	Normal
8	2017	1929	1929	Normal	Dry Year 1
9	2018	1930	1930	Normal	Normal
10	2019	1931	1931	Dry Year 1	Dry Year 1
11	2020	1932	1932	Dry Year 2	Dry Year 2
12	2021	1933	1933	Normal	Dry Year 3
13	2022	1934	1934	Normal	Dry Year 4
14	2023	1935	1935	Normal	Normal
15	2024	1936	1936	Normal	Normal
16	2025	1937	1937	Dry Year 1	Normal
17	2026	1938	1938	Dry Year 2	Normal
18	2027	1939	1939	Dry Year 3	Normal
19	2028	1940	1940	Dry Year 4	Normal
20	2029	1941	1941	Dry Year 5	Normal
21	2030	1942	1942	Dry Year 6	Normal
22	2031	1943	1943	Dry Year 7	Normal
23	2032	1944	1944	Dry Year 8	Normal
24	2033	1945	1945	Dry Year 9	Normal
25	2034	1946	1946	Normal	Normal
26	2035	1947	1947	Normal	Normal
27	2036	1948	1948	Dry Year 1	Normal
28	2037	1949	1949	Dry Year 2	Dry Year 1
29	2038	1950	1950	Normal	Normal
30	2039	1951	1951	Normal	Normal
31	2040	1952	1952	Normal	Normal
32	2041	1953	1953	Normal	Normal
33	2042	1954	1954	Normal	Normal
34	2043	1955	1955	Normal	Dry Year 1
35	2044	1956	1956	Normal	Normal
36	2045	1957	1957	Normal	Normal
37	2046	1958	1958	Normal	Normal
38	2047	1959	1959	Normal	Normal
39	2048	1960	1960	Dry Year 1	Dry Year 1
40	2049	1961	1961	Dry Year 2	Normal
41	2050	1962	1962	Dry Year 3	Normal
42	2051	1963	1963	Dry Year 4	Normal
43	2052	1964	1964	Normal	Normal
44	2053	1965	1965	Normal	Normal
45	2054	1966	1966	Normal	Normal
46	2055	1967	1967	Normal	Normal
47	2056	1968	1968	Normal	Normal
48	2057	1969	1969	Normal	Normal
49	2058	1970	1970	Dry Year 1	Normal
50	2059	1971	1971	Normal	Normal
51	2060	1972	1972	Dry Year 1	Normal
52	2061	1973	1973	Normal	Normal
53	2062	1974	1974	Dry Year 1	Normal
54	2063	1975	1975	Dry Year 2	Normal
55	2064	1976	1976	Normal	Normal
56	2065	1977	1977	Normal	Dry Year 1
57	2066	1978	1978	Dry Year 1	Normal
58	2067	1979	1979	Normal	Normal
59	2068	1980	1980	Normal	Normal
60	2069	1981	1981	Normal	Normal
61	2070	1982	1982	Dry Year 1	Normal
62	2071	1983	1983	Dry Year 2	Normal
63	2072	1984	1984	Dry Year 3	Normal
64	2073	1985	1985	Normal	Normal
65	2074	1986	1986	Dry Year 1	Normal
66	2075	1987	1987	Dry Year 2	Normal
67	2076	1988	1988	Dry Year 3	Dry Year 1
68	2077	1989	1989	Normal	Normal
69	2078	1990	1990	Normal	Dry Year 2
70	2079	1991	1991	Normal	Dry Year 3
71	2080	1992	1992	Normal	Dry Year 4
72	2081	1993	1993	Normal	Normal
73	2082	1994	1994	Normal	Normal
74	2083	1995	1995	Normal	Normal
75	2084	1996	1996	Normal	Normal
76	2085	1997	1997	Dry Year 1	Normal
77	2086	1998	1998	Dry Year 2	Normal
78	2087	1999	1999	Dry Year 3	Normal
79	2088	2000	2000	Normal	Normal
80	2089	2001	2001	Normal	Dry Year 1
81	2090	2002	2002	Normal	Normal
82	2091	2003	2003	Dry Year 1	Normal
83	2092	2004	2004	Dry Year 2	Normal
84	2093	2005	2005	Dry Year 3	Normal
85	2094	2006	2006	Dry Year 4	Normal
86	2095	2007	2007	Dry Year 5	Normal

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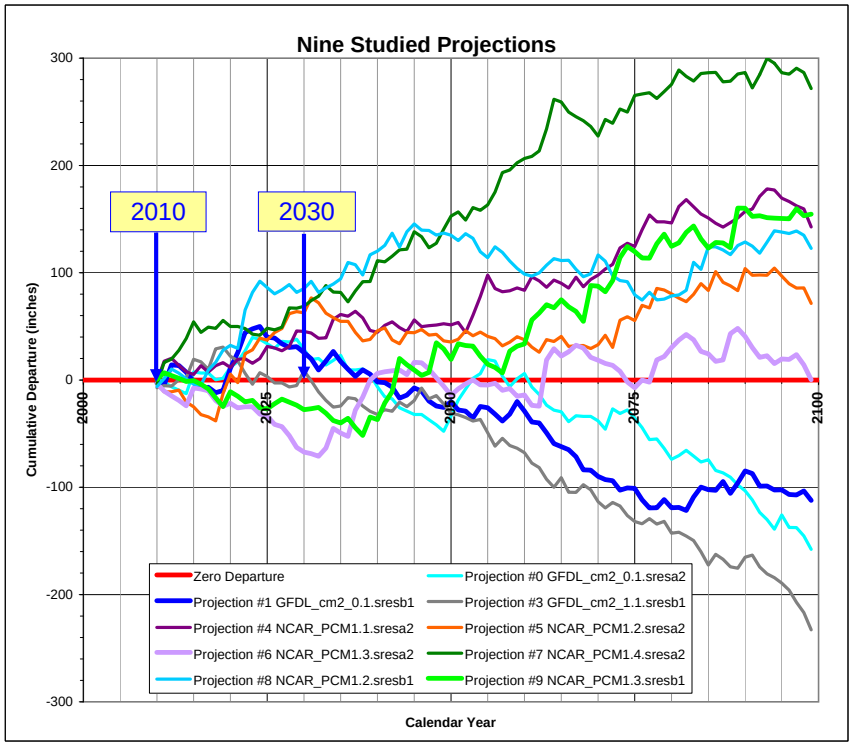
Climate Projection #9 (Global Climate Model NCAR_PCM1.3_sresB1)

llu ial an Saugus For ation Pu ing for t e Si ulation of 1 22-2 istorical rolog

Model Year	Alluvium Year	Saugus Year	Year Name for Model Run	Simulated Pumping Conditions	
				Alluvium	Saugus
1	2010	1922	1922	Normal	Normal
2	2011	1923	1923	Normal	Normal
3	2012	1924	1924	Normal	Dry Year 1
4	2013	1925	1925	Normal	Normal
5	2014	1926	1926	Normal	Normal
6	2015	1927	1927	Normal	Normal
7	2016	1928	1928	Normal	Normal
8	2017	1929	1929	Normal	Dry Year 1
9	2018	1930	1930	Dry Year 1	Normal
10	2019	1931	1931	Dry Year 2	Dry Year 1
11	2020	1932	1932	Dry Year 3	Dry Year 2
12	2021	1933	1933	Normal	Dry Year 3
13	2022	1934	1934	Normal	Dry Year 4
14	2023	1935	1935	Normal	Normal
15	2024	1936	1936	Normal	Normal
16	2025	1937	1937	Dry Year 1	Normal
17	2026	1938	1938	Dry Year 2	Normal
18	2027	1939	1939	Normal	Normal
19	2028	1940	1940	Normal	Normal
20	2029	1941	1941	Normal	Normal
21	2030	1942	1942	Normal	Normal
22	2031	1943	1943	Dry Year 1	Normal
23	2032	1944	1944	Normal	Normal
24	2033	1945	1945	Normal	Normal
25	2034	1946	1946	Dry Year 1	Normal
26	2035	1947	1947	Dry Year 2	Normal
27	2036	1948	1948	Dry Year 3	Normal
28	2037	1949	1949	Normal	Dry Year 1
29	2038	1950	1950	Dry Year 1	Normal
30	2039	1951	1951	Dry Year 2	Normal
31	2040	1952	1952	Normal	Normal
32	2041	1953	1953	Normal	Normal
33	2042	1954	1954	Normal	Normal
34	2043	1955	1955	Normal	Dry Year 1
35	2044	1956	1956	Normal	Normal
36	2045	1957	1957	Dry Year 1	Normal
37	2046	1958	1958	Dry Year 2	Normal
38	2047	1959	1959	Dry Year 3	Normal
39	2048	1960	1960	Normal	Dry Year 1
40	2049	1961	1961	Normal	Normal
41	2050	1962	1962	Dry Year 1	Normal
42	2051	1963	1963	Dry Year 2	Normal
43	2052	1964	1964	Normal	Normal
44	2053	1965	1965	Normal	Normal
45	2054	1966	1966	Normal	Normal
46	2055	1967	1967	Dry Year 1	Normal
47	2056	1968	1968	Dry Year 2	Normal
48	2057	1969	1969	Dry Year 3	Normal
49	2058	1970	1970	Dry Year 4	Normal
50	2059	1971	1971	Normal	Normal
51	2060	1972	1972	Normal	Normal
52	2061	1973	1973	Normal	Normal
53	2062	1974	1974	Normal	Normal
54	2063	1975	1975	Normal	Normal
55	2064	1976	1976	Normal	Normal
56	2065	1977	1977	Normal	Dry Year 1
57	2066	1978	1978	Normal	Normal
58	2067	1979	1979	Dry Year 1	Normal
59	2068	1980	1980	Dry Year 2	Normal
60	2069	1981	1981	Dry Year 3	Normal
61	2070	1982	1982	Normal	Normal
62	2071	1983	1983	Normal	Normal
63	2072	1984	1984	Normal	Normal
64	2073	1985	1985	Normal	Normal
65	2074	1986	1986	Normal	Normal
66	2075	1987	1987	Normal	Normal
67	2076	1988	1988	Normal	Dry Year 1
68	2077	1989	1989	Dry Year 1	Normal
69	2078	1990	1990	Normal	Dry Year 2
70	2079	1991	1991	Normal	Dry Year 3
71	2080	1992	1992	Normal	Dry Year 4
72	2081	1993	1993	Dry Year 1	Normal
73	2082	1994	1994	Normal	Normal
74	2083	1995	1995	Normal	Normal
75	2084	1996	1996	Normal	Normal
76	2085	1997	1997	Dry Year 1	Normal
77	2086	1998	1998	Dry Year 2	Normal
78	2087	1999	1999	Normal	Normal
79	2088	2000	2000	Normal	Normal
80	2089	2001	2001	Normal	Dry Year 1
81	2090	2002	2002	Normal	Normal
82	2091	2003	2003	Normal	Normal
83	2092	2004	2004	Dry Year 1	Normal
84	2093	2005	2005	Normal	Normal
85	2094	2006	2006	Normal	Normal
86	2095	2007	2007	Normal	Normal

Figure 5-1: 2010-2098 Cumulative Departure from Average Annual Rainfall at Newhall-Soledad Rain Gage



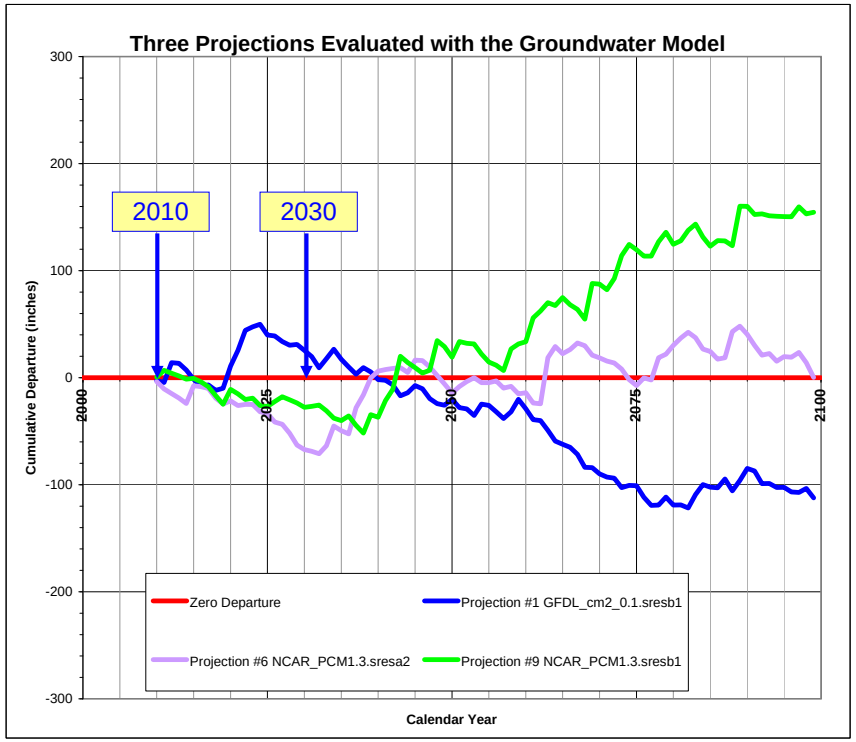


Figure 5-2: VWC-E15 Modeled Groundwater Elevations For Various Climate Projections (Alluvial Aquifer Below Valencia WRP)

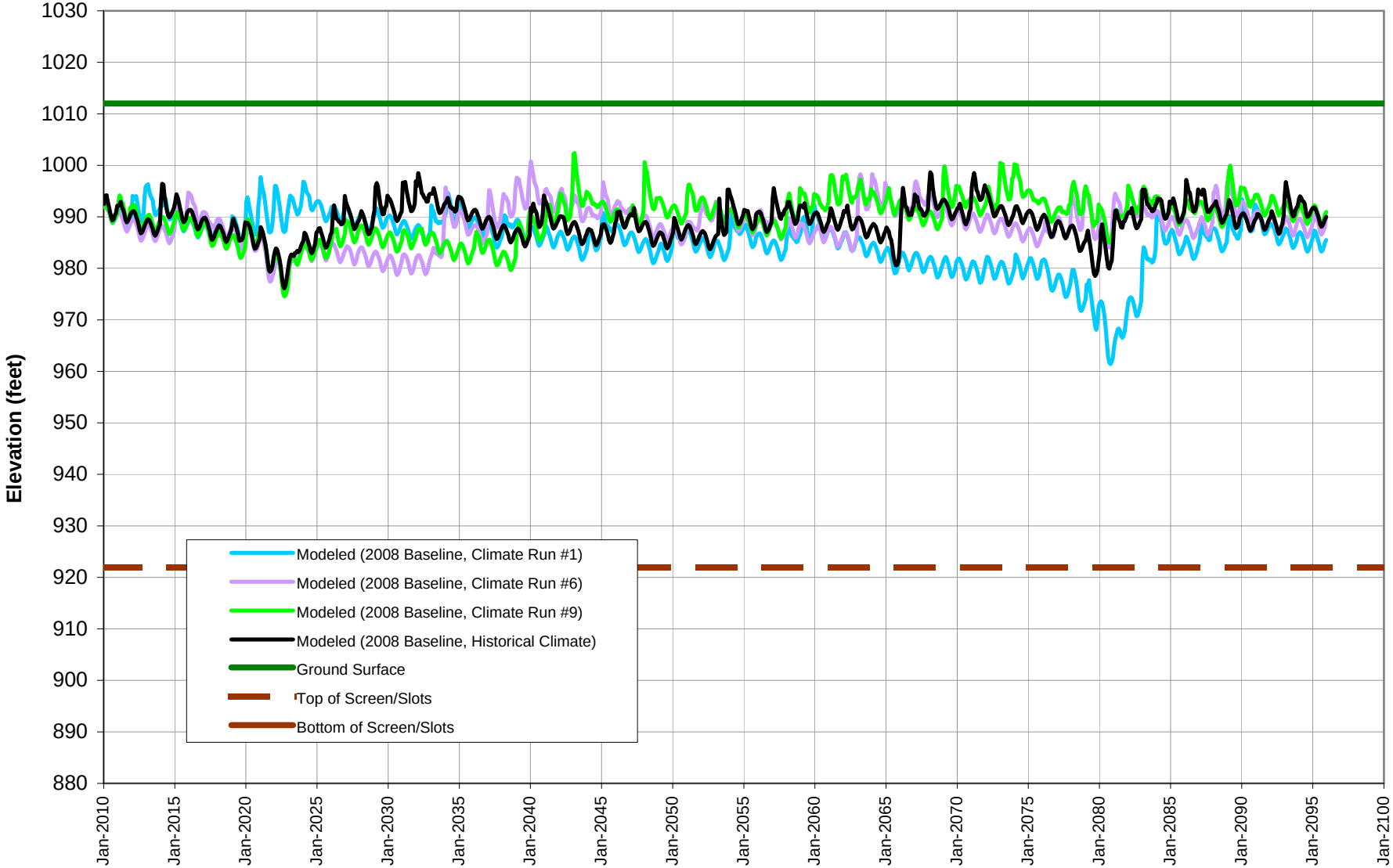


Figure 5-3: VWC-S8 Modeled Groundwater Elevations For Various Climate Projections (Alluvial Aquifer Below Saugus WRP)

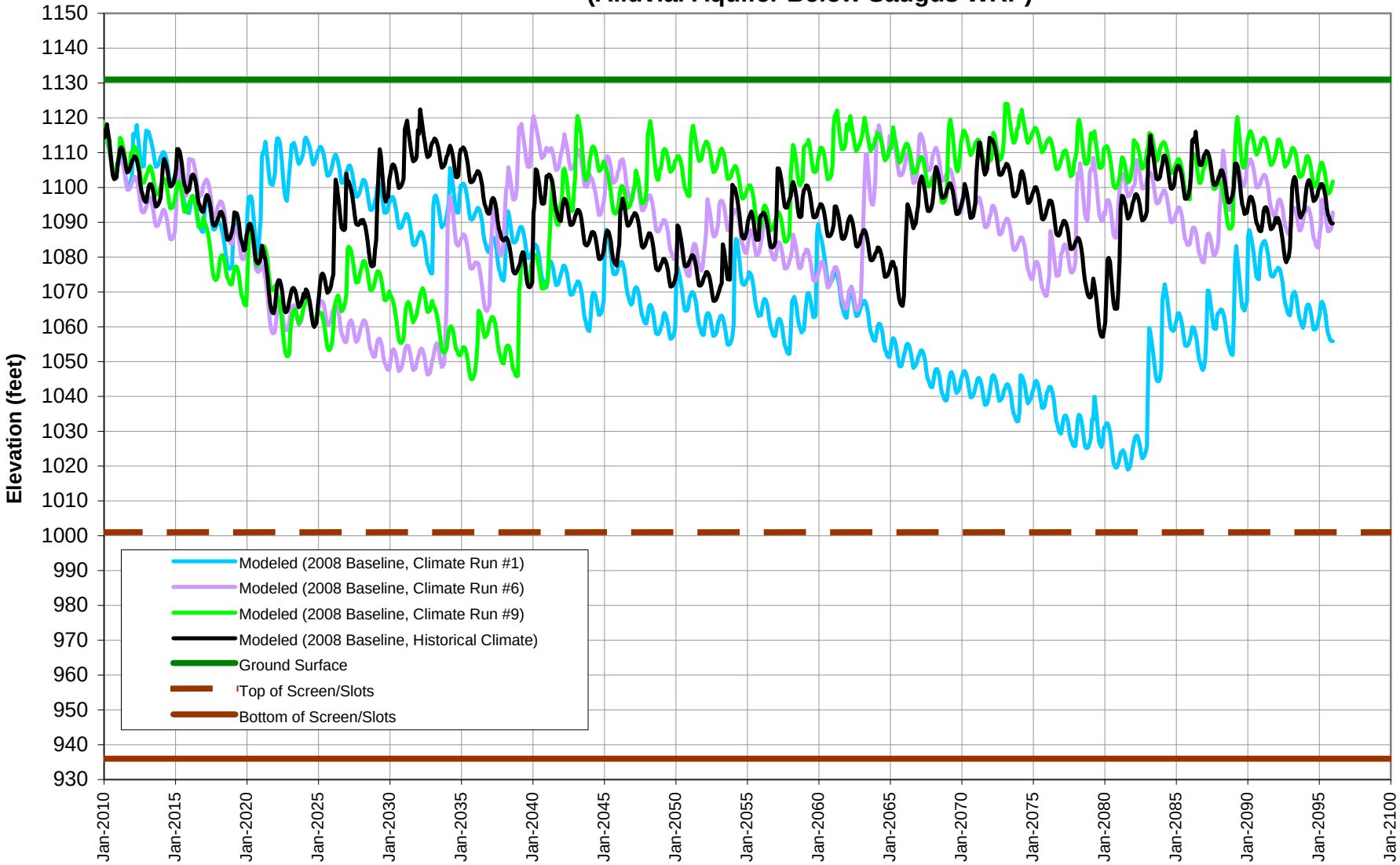


Figure 5-4: VWC-T7 Modeled Groundwater Elevations For Various Climate Projections (Alluvial Aquifer Below Saugus WRP)

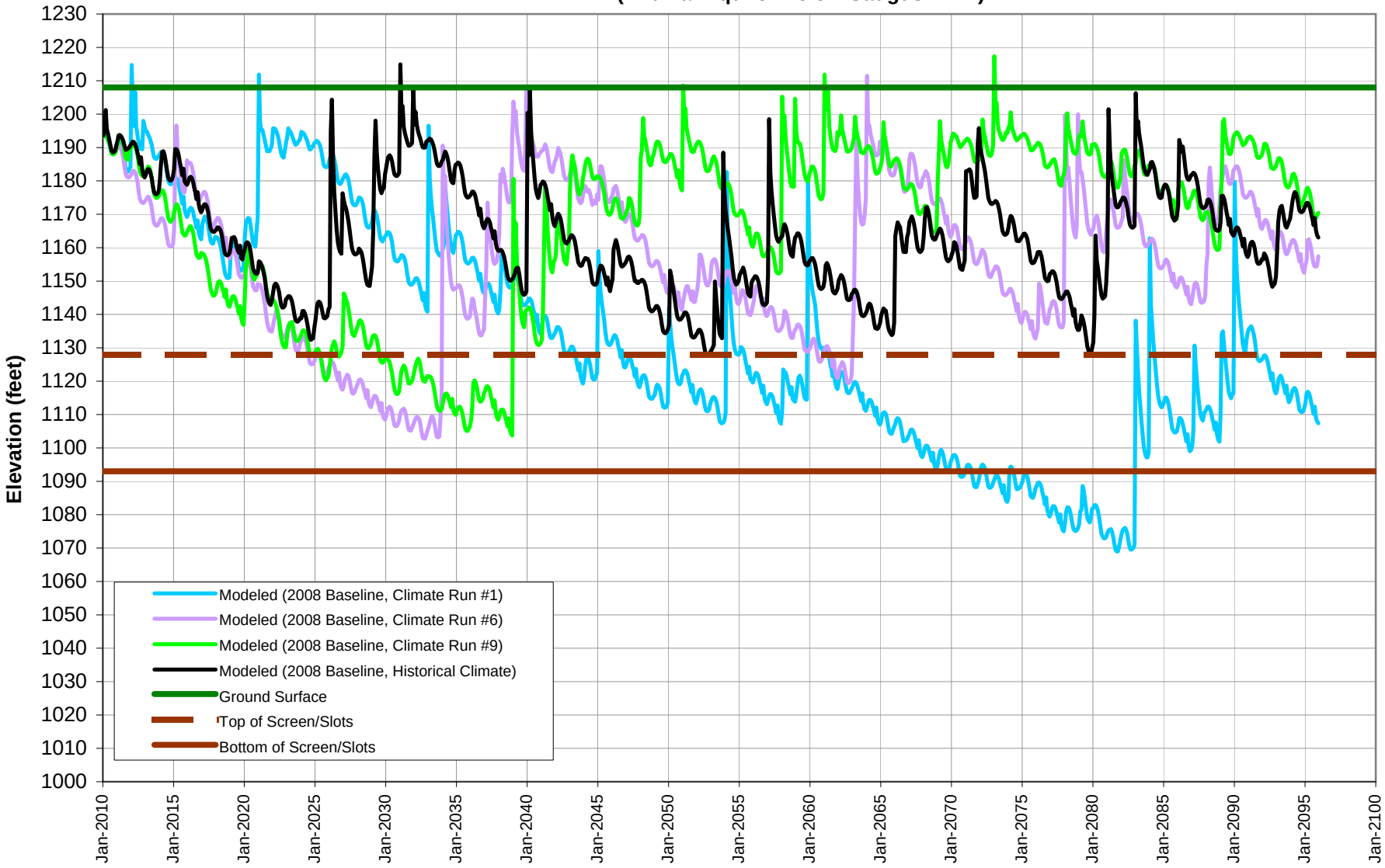


Figure 5-5: SCWD-Sierra Modeled Groundwater Elevations for Various Climate Projections (Alluvial Aquifer along Santa Clara River, At and Above Mint Canyon)

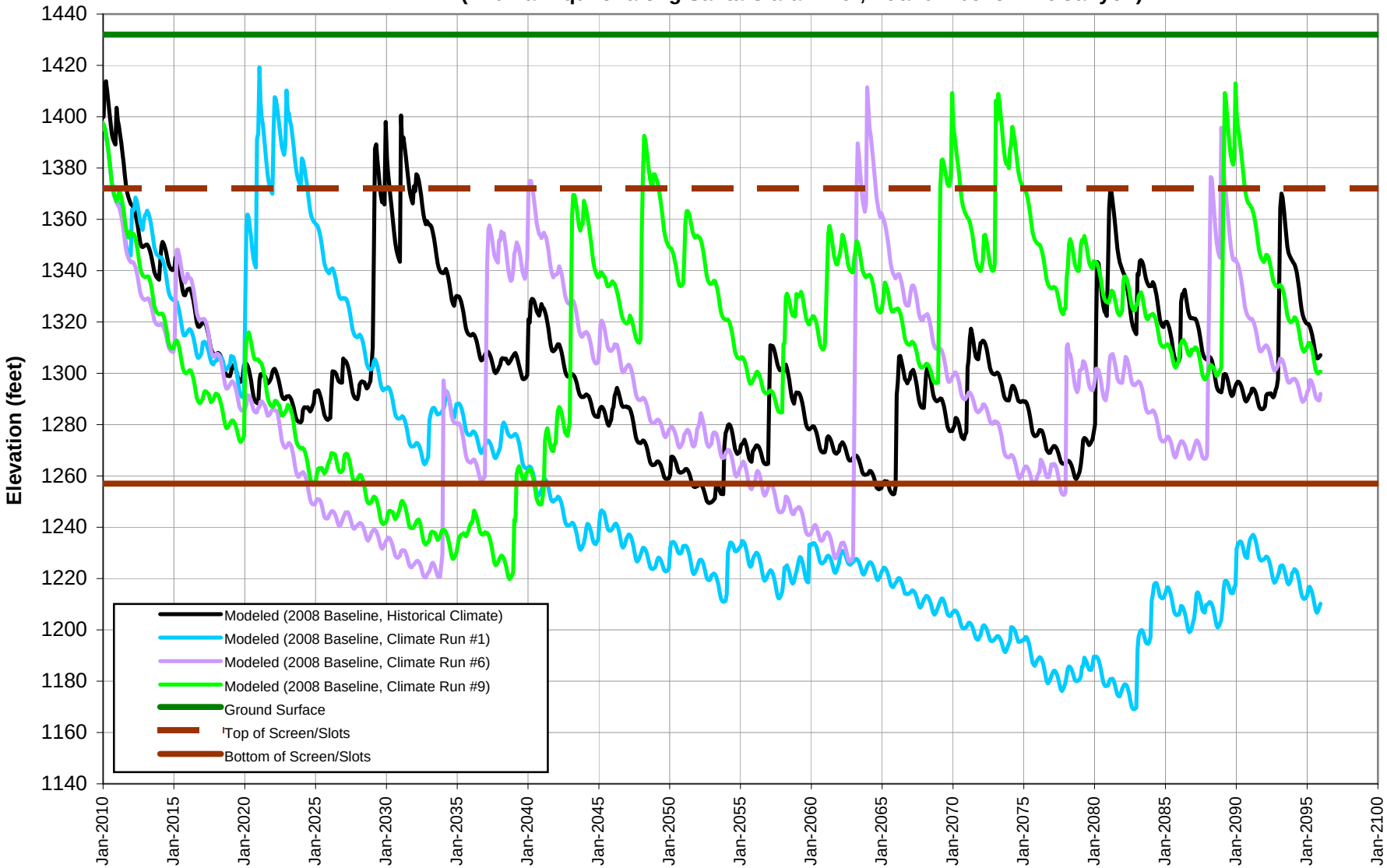


Figure 5-6: NCWD-Pinetree1 Modeled Groundwater Elevations For Various Climate Projections (Alluvial Aquifer Along Santa Clara River, At and Above Mint Canyon)

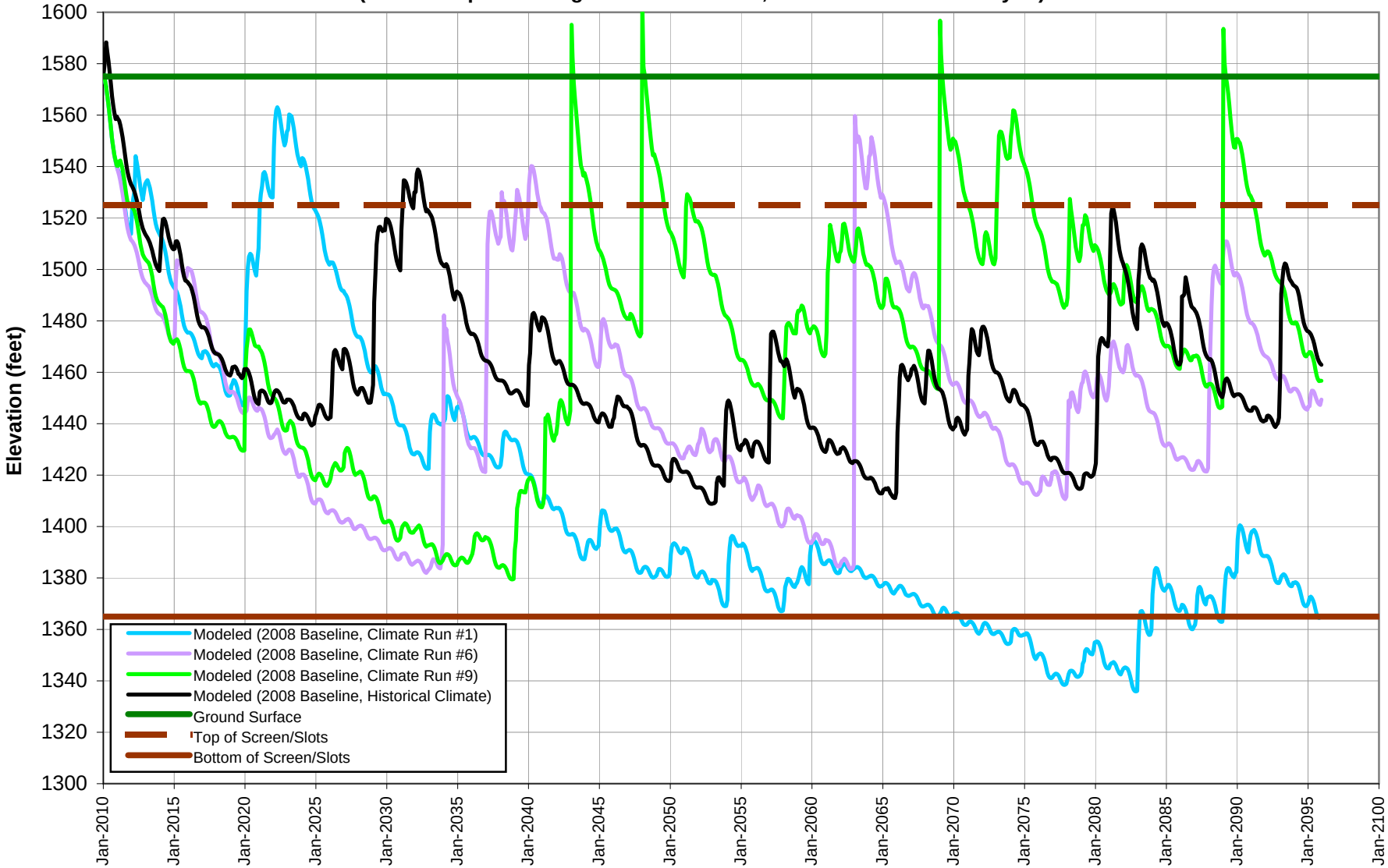


Figure 5-7: NCWD-Castaic7 Modeled Groundwater Elevations For Various Climate Projections (Alluvial Aquifer in Castaic Valley)

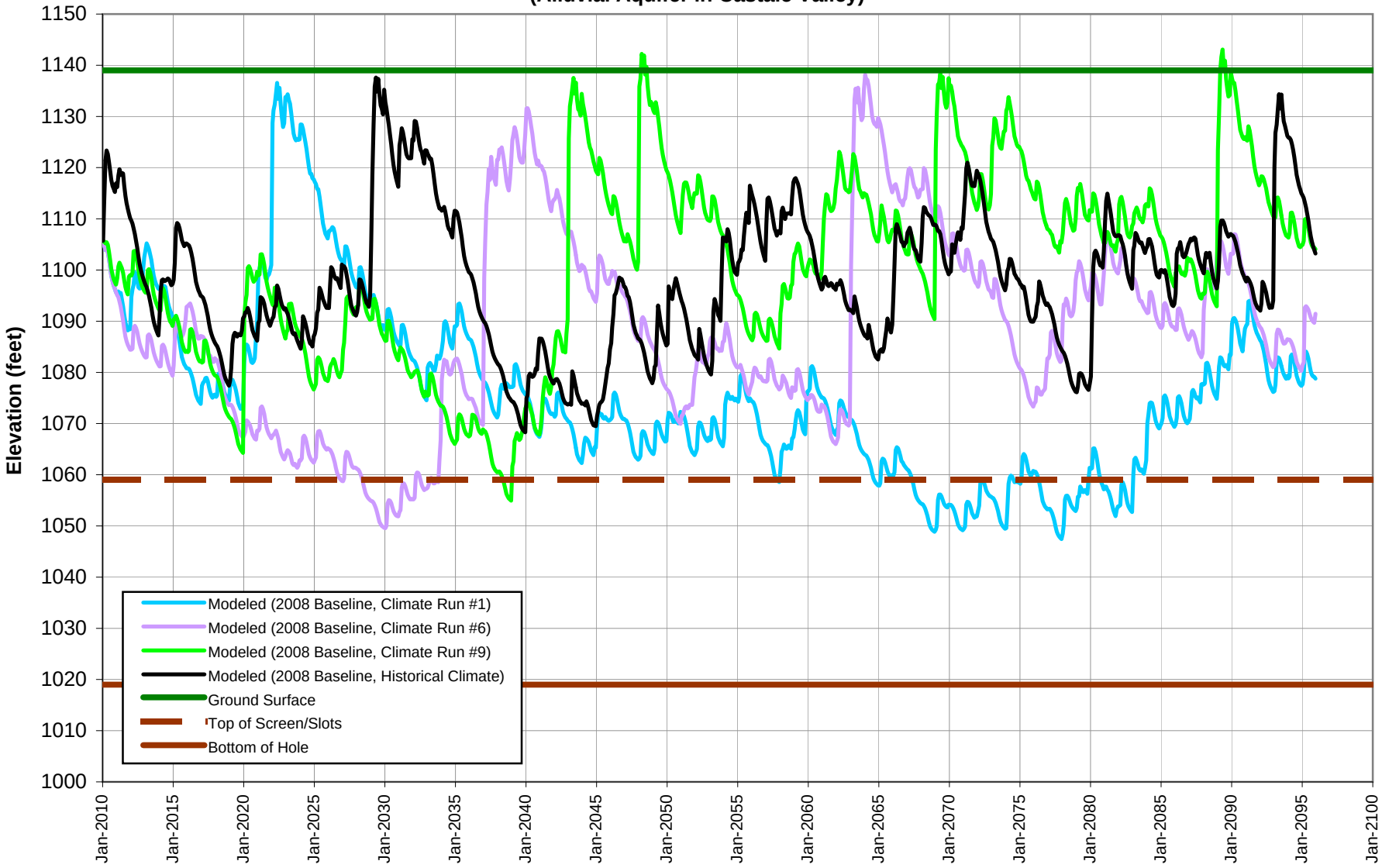


Figure 5-8: VWC-W11 Modeled Groundwater Elevations For Various Climate Projections (Alluvial Aquifer in San Francisquito Canyon)

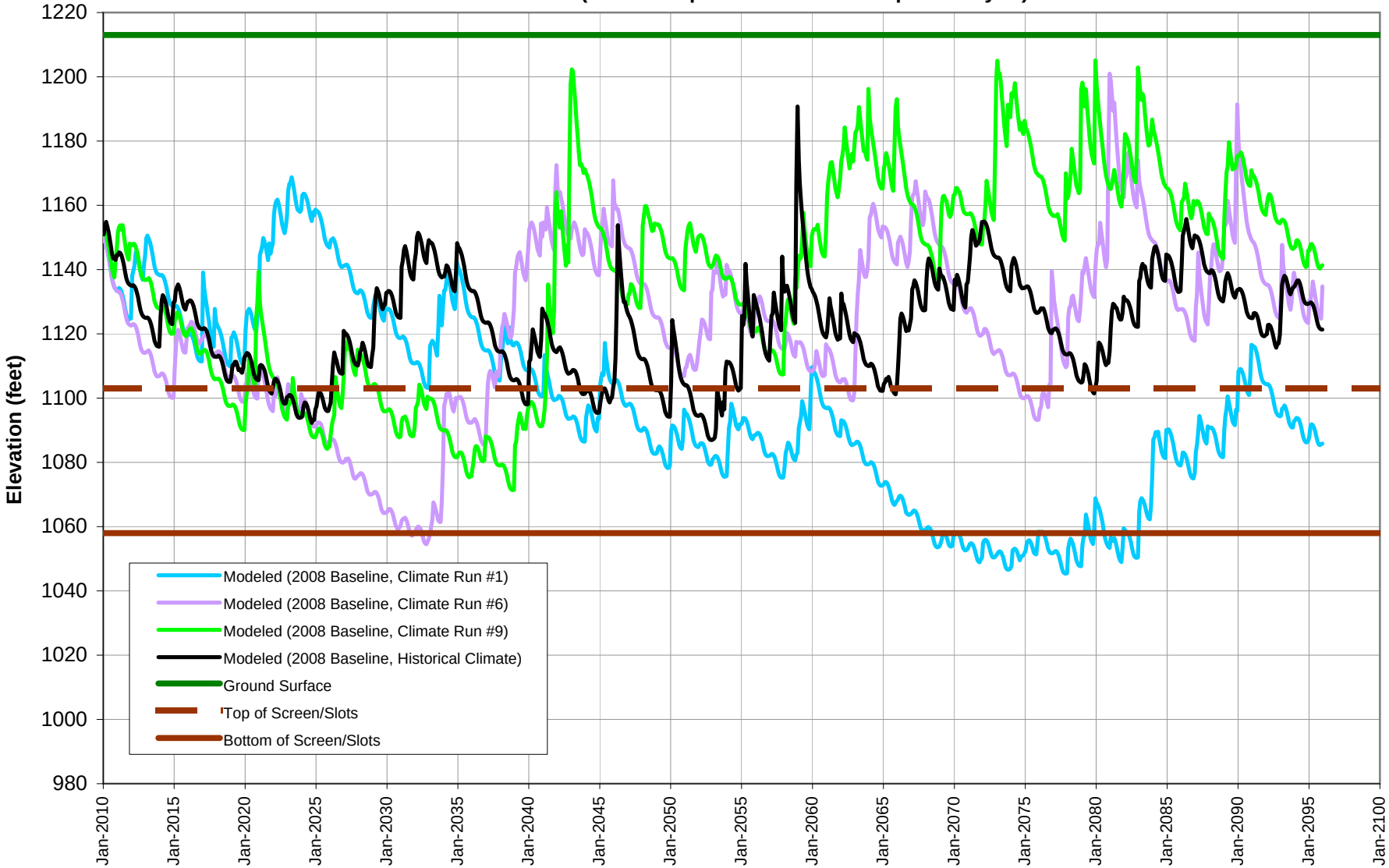


Figure 5-9: SCWD-Clark Modeled Groundwater Elevations for Various Climate Projections (Alluvial Aquifer in Bouquet Canyon)

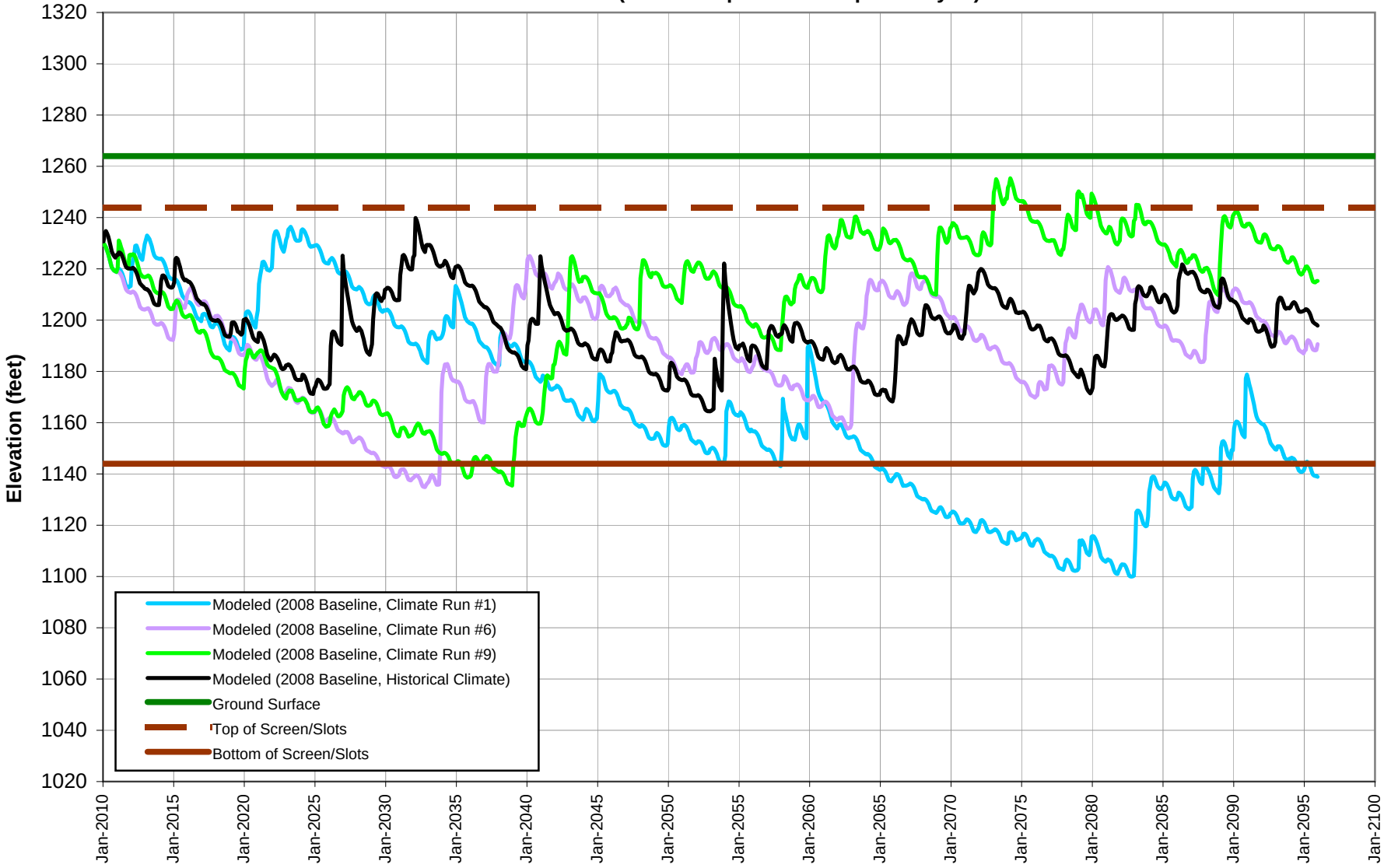
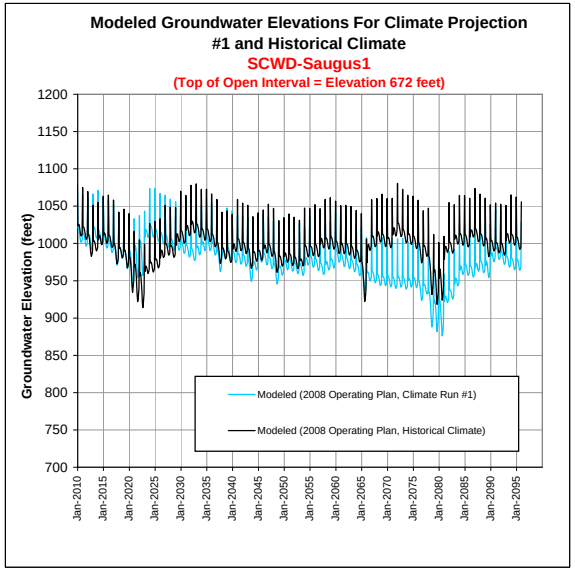
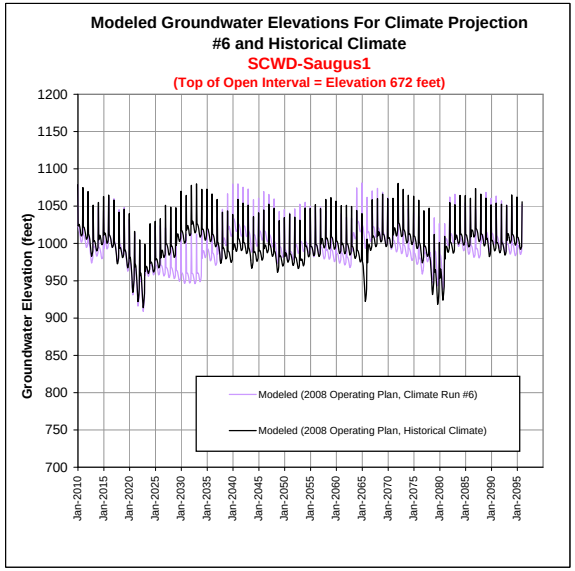


Figure 5-10: Groundwater Elevation Trends at SCWD-Saugus1 for the 2008 Operating Plan Under Historical Climate and Climate Projections #1, #6, and #9





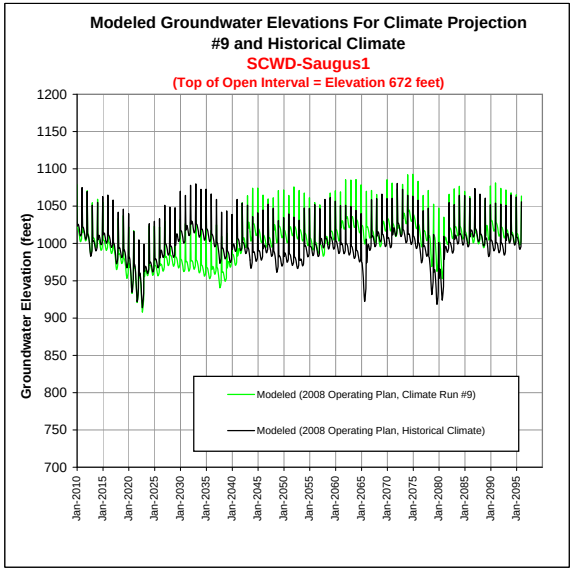
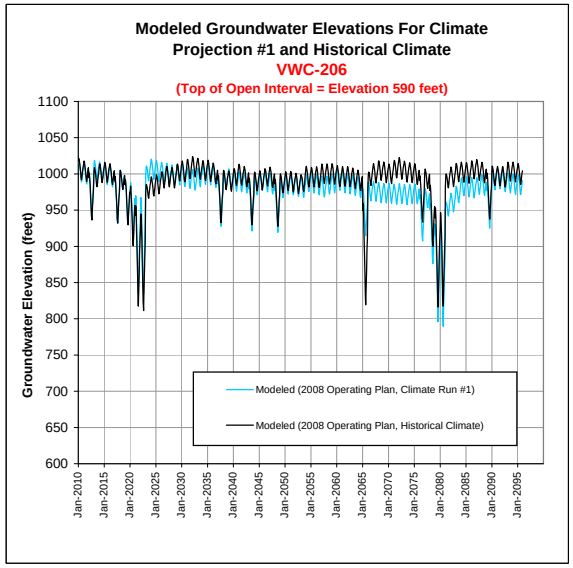
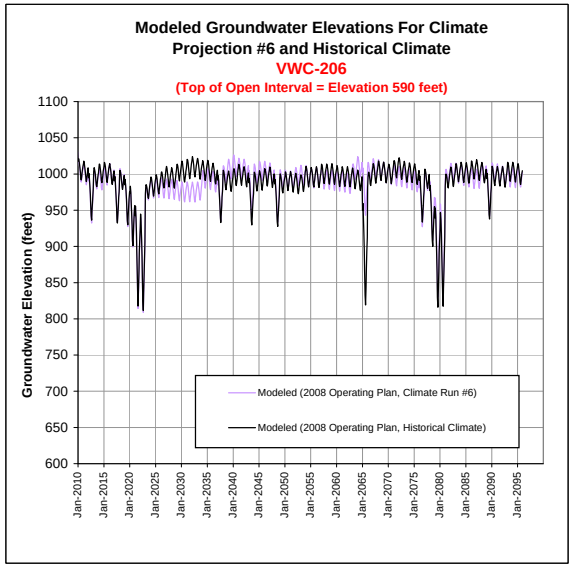


Figure 5-11: Groundwater Elevation Trends at VWC-206 for the 2008 Operating Plan Under Historical Climate and Climate Projections #1, #6, and #9





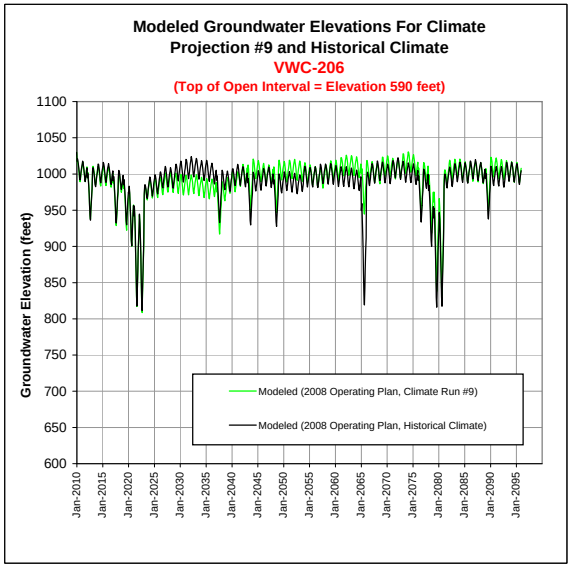
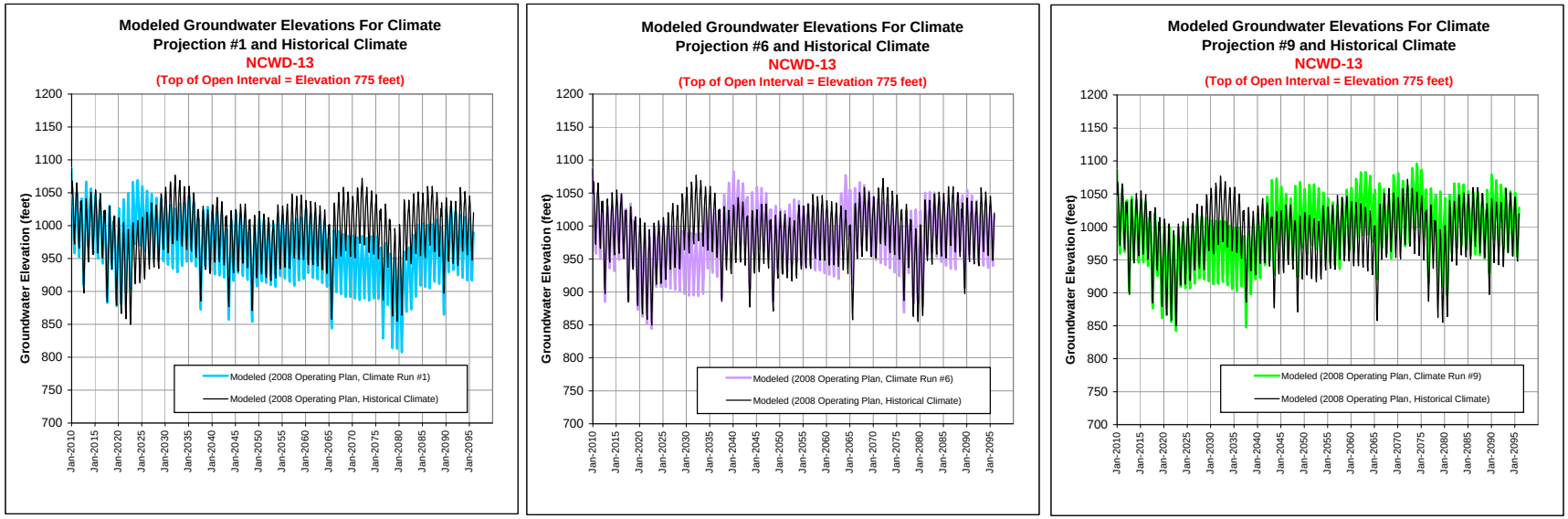


Figure 5-12: Groundwater Elevation Trends at NCWD-13 for the 2008 Operating Plan Under Historical Climate and Climate Projections #1, #6, and #9



VI. Local Artificial Recharge Projects

6.1 Los Angeles County Flood Control District Study

The Los Angeles County Flood Control District (LACFCD) prepared an unpublished water conservation plan that proposes constructing thirteen separate artificial recharge projects in the upper Santa Clara River Watershed. The focus of the plan is to capture or impede stormwater runoff to promote percolation to groundwater, specifically to the Alluvium located along the Santa Clara River. Although the plan acknowledged that there is a lack of runoff data to accurately predict the water conservation benefits of the projects, LACFCD estimated that, on average, a given year could be expected to have three storms that would be capable of producing enough stormwater runoff to fill the estimated storage capacities of each of the thirteen proposed projects. Therefore, to estimate the total water conservation benefit, LACFCD multiplied the total storage capacity of the thirteen projects by three. The total storage capacity and water conservation benefit of the thirteen projects combined were thus estimated to be 1,816 acre feet and 5,455 acre feet per year, respectively.

The plan subdivided the thirteen projects into three separate areas of the basin (Figure 6-1):

- six projects on the south fork of the Santa Clara River
- two projects in San Francisquito Canyon
- five projects on the main Santa Clara River System

Table 6-1 lists each project by subarea along with the LACFCD estimate of project capacity and water conservation benefit. The project locations relative to the Alluvial aquifer system by subarea are described below.

6.2 Project Locations Relative to Aquifer System

The six projects that would be located along the south fork of the Santa Clara River, as illustrated in Figure 6-1, consist of three rubber dam projects; two projects that divert water into spreading grounds; and a project that backs up flows behind a rubber dam for diversion into adjoining spreading grounds. The total capacity and estimated water conservation benefit of these six facilities are 496 acre feet and 1,475 acre feet per year, respectively. The riverbed of the south fork of the Santa Clara River lies along the eastern margin of the alluvial valley that the river occupies. In this area, the alluvium is thin and the Saugus Formation outcrops in the hills adjoining the river valley. Projects 1 through 5 are located in areas where groundwater pumping occurs from the Saugus Formation, but no Alluvial production wells are present because of the limited saturated thickness of the alluvium throughout this area. Project no. 6 is the furthest north (or downgradient) of the south fork projects and is located south of VWC's N7 and N8 Alluvial production wells in an area where the saturated thickness of the alluvium is much greater than further upstream where the other projects are located.

The two projects (no. 7 and 8 on Figure 6-1) proposed by LACFCD in San Francisquito Canyon would consist of spreading grounds along the unnamed ephemeral stream, tributary to the Santa

Clara River. The total capacity of the spreading grounds would be about 420 acre feet with a combined estimated water conservation benefit of 1,270 acre feet per year. The locations of the two spreading grounds are along the margins of the Alluvium north of Decoro Drive and Cooper Hill Drive where the alluvium is thin.

The five projects (no. 9 through 13 on Figure 6-1) proposed by LACFCD along the Santa Clara River extend from near the Saugus wastewater treatment plant eastward to areas just east of Newhall County Water District's Pinetree wells. These projects would include one rubber dam and four spreading grounds that are located along the margins of the Alluvium near outcrops of Saugus and bedrock formations in the hills adjoining the alluvial river valley. The five projects would have combined capacity of about 900 acre feet and an estimated total annual water conservation benefit of about 2,710 acre feet per year.

6.3 Conceptual Project Operation and Impacts

The purpose of the planned projects would be to capture stormwater runoff using inflatable rubber dams and to divert excess runoff into spreading grounds in order to recharge groundwater in the Alluvium in the immediate vicinity of each project site. The ability and related impact of the projects to effectively increase groundwater recharge in the Alluvium rather than to simply redistribute groundwater recharge is discussed in further detail below.

- **South Fork of the Santa Clara River.** Recharge projects in the South Fork of the Santa Clara River would be located primarily along the margins of the river valley where the Alluvium where this unit is thin. These project locations (nos. 1 through 5 on Figure 6-1) may not have sufficient alluvial thickness and available storage capacity during storm events to allow excess runoff captured by these projects to recharge groundwater at each project location. As a result, the excess stormwater runoff may not readily recharge groundwater and may be rejected due to the lack of available storage capacity in the vicinity of each project. Excess runoff captured by these projects would likely recharge groundwater elsewhere in the south fork of the Santa Clara River or near its mouth. Project locations 1 through 5 are proposed to be located in areas where groundwater production wells pump groundwater from the underlying Saugus Formation, rather than from the Alluvium. Consequently, even if some additional water were introduced to storage, little if any of the benefit would be able to be pumped at those project locations (again, there are no existing Alluvial production wells in the area and there is no likelihood of new production wells being constructed, all due to the lack of sufficient thickness of the Alluvium). Project location no. 6, the northernmost project in this area may have the potential to provide additional recharge to groundwater. However, due to the low storage capacity and estimated water conservation benefit, it would be difficult to differentiate between recharge from this project as compared to recharge under existing conditions, which already maintains sustainable groundwater conditions.

- **San Francisquito Canyon.** Project locations in San Francisquito Canyon would intercept stormwater runoff that would likely continue to recharge the Alluvium further downstream of the project locations; in essence, the projects would potentially

only redistribute stormwater recharge that currently has recharged the Alluvial aquifer in areas upstream of the Valencia waste water treatment plant (again, existing recharge already supports sustainable groundwater conditions in San Francisquito Canyon and immediately downstream in the main River area).

- **Santa Clara River** The project locations in the Santa Clara River area are very spread out with the easternmost project (no. 12) having the largest estimated capacity. However, Project no. 12 is located more than a mile east of Newhall County Water Districts Pinetree wells, and any stormwater runoff captured by this project would likely result in two different outcomes. One outcome is that the project would likely recharge groundwater in an area which currently has no production wells, and the water that is recharged would likely have recharged groundwater further downstream in the absence of the project. The second outcome is that the available storage in the alluvium in the area of the project would fill rapidly during a large stormwater runoff event, thereby limiting the amount of infiltration that can occur afterwards from the stormwater runoff captured by the project's spreading grounds. Three of the other four remaining projects (no. 10, 11, and 13) will likely encounter similar obstacles to Project no. 12 because of the similar surface and groundwater conditions that are present along the Santa Clara River between the Bouquet Canyon Bridge and the Lang gage (the eastern margin of the watershed). Project no. 9 (at the Bouquet Canyon Bridge) is similar in nature to Project no. 6 described above in that any benefit derived from the project might not be discernible from the conditions that would otherwise occur naturally in the absence of this and the other projects that are proposed along the Santa Clara River.

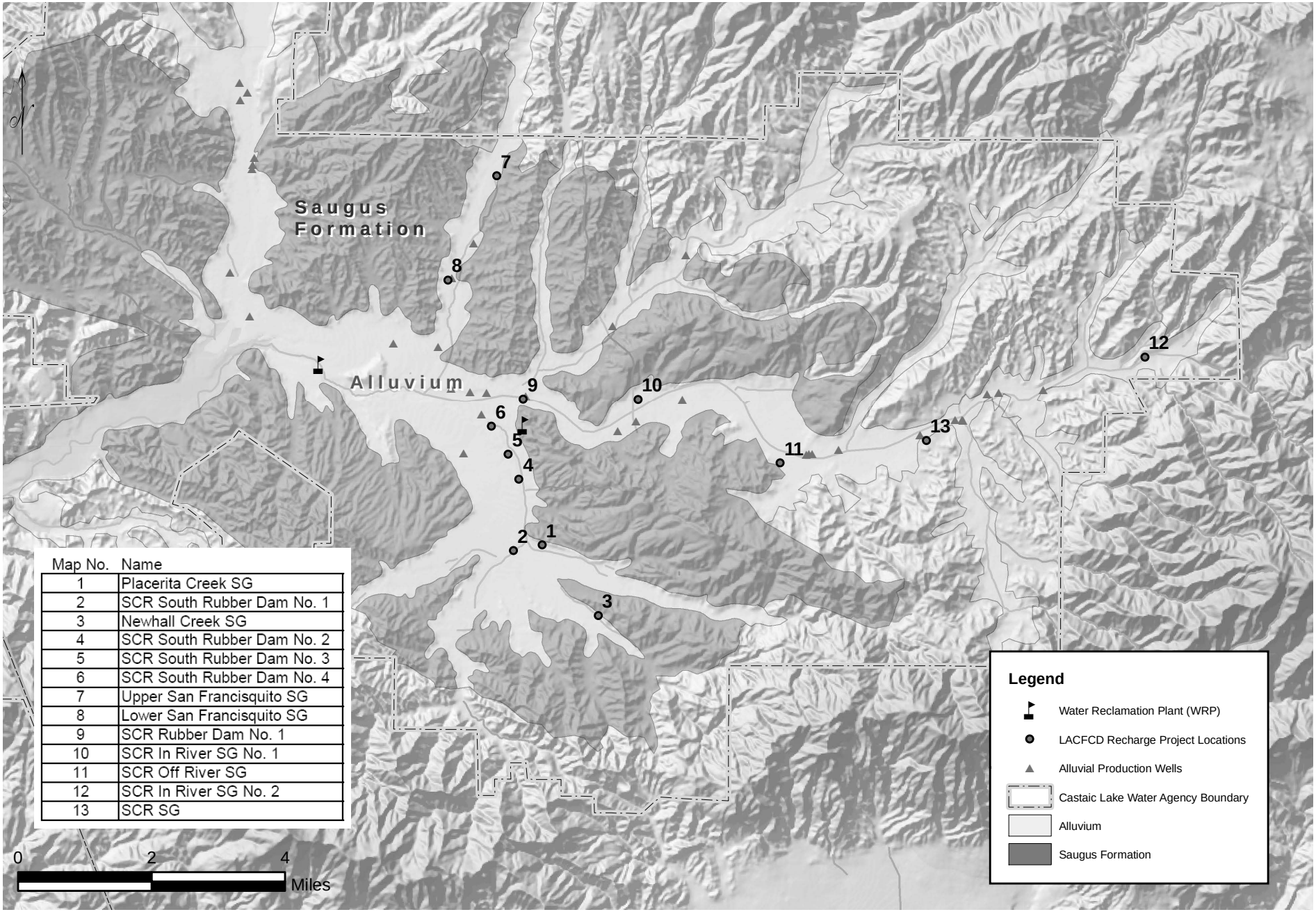
The overarching consideration with regard to the planned artificial recharge projects is that they might capture and "artificially recharge" water that already recharges the Alluvial aquifer system where it is of sufficient thickness to be developed as a groundwater supply. As evident from empirical observations and the simulations reported herein, the system "naturally" recharges to the point of sustaining groundwater pumping and, in the westerly end of the basin, to the point that stream recharge is rejected (and groundwater discharges to the stream). The small volumes of the various planned artificial recharge projects, and the arbitrarily estimated filling of those three times per year, do not represent "new" recharge; they likely represent some potential minor relocation of existing recharge.

Even if it were desirable to purposely relocate some existing recharge to one or more of the planned (LACFCD) locations, it would be difficult (possible but challenging) to redistribute the small amount of stream recharge and to then track the corresponding small effect of intercepting that water and removing it as a source of recharge as now occurs downstream. The results of the rest of the work reported herein, most notably that dealing with achievability of the 2008 Operating Plan, clearly suggest that artificial recharge could locally benefit certain areas, notably at and above Mint Canyon. However, such benefits would more logically develop from other water sources that would supplement natural recharge rather than simply redistribute it. The model used to simulate the basin response to the operating plans, under historic and potential climate change conditions, can readily simulate the effects and benefits of artificial recharge at selected locations using supplemental water.

Table 6-1

Los Angeles County Flood Control District
Stormwater Runoff Recharge Projects

Recharge Project	Storage Capacity (acre-feet)	Annual Water Conservation Benefit (acre-feet/year)
Santa Clara River South Fork		
1	109	330
2	75	220
3	5	75
4	112	330
5	60	180
6	115	340
Subtotal	496	1,475
San Francisquito Canyon		
7	230	700
8	190	570
Subtotal	420	1,270
Santa Clara River		
9	80	230
10	180	550
11	220	670
12	70	220
13	350	1040
Subtotal	900	2,710
Grand Total	1,816	5,455



LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Figure 6-1
Locations of LACFCD Planned Recharge Projects
Upper Santa Clara River Valley Groundwater Basin, East Subbasin

VII. Conclusions

The primary objective of the updated analysis of groundwater basin yield in the Santa Clarita Valley was to evaluate the planned utilization of groundwater by the Purveyors, after their consideration of potential impacts on traditional supplemental water supplies from the State Water Project (SWP), and with recognition of ongoing pumping by others for agricultural and other private water supply, for sustainability of the groundwater resource and for physical ability to extract groundwater at desired rates. As has previously been utilized in this basin, consistent with groundwater management in other settings, sustainability is defined in terms of renewability (recharge) of groundwater as reflected by the following indicators:

- lack of chronic, or sustained, depletion of groundwater storage, as indicated by projected groundwater levels, over a reasonable range of wet, normal, and dry hydrologic conditions

- maintenance of surface water flows in the western portion of the basin (which are partially maintained by groundwater discharge) and surface water outflow to downstream basins over the same range of hydrologic conditions

Regarding maintenance of surface water flows, although the development and use of groundwater in a sustainable manner necessitates the inducement of recharge from surface water, sustainability in this case does not rely on inducing groundwater recharge by eliminating surface water flows. Rather, sustainability retains surface water outflows and may even increase them with the importation of supplemental water when contrasted to pre-SWP conditions. Regarding both indicators of sustainability, the range of analyzed hydrologic conditions is a long-term period that includes anticipated occurrences of the types of years and groups of year types that have historically occurred in the basin.

A second objective of the updated groundwater basin yield analysis was to investigate and describe potential impacts of expected climate change on the groundwater basin and its yield. A third objective was to consider potential augmentation of basin yield via potential artificial groundwater recharge using storm water runoff in selected areas of the basin as being planned by the Los Angeles County Flood Control District.

The primary objective was investigated by analyzing, with the numerical groundwater flow model of the basin, two groundwater operating plans: a 2008 Operating Plan to reflect currently envisioned pumping rates and distribution throughout the Valley, including fluctuations through wet/normal and dry years, to achieve a desired amount of water supply that, in combination with anticipated supplemental water supplies, can meet existing and projected water requirements in the Valley; and a Potential Operating Plan that envisions potentially increased utilization of groundwater during both wet/normal and dry years.

With regard to the respective operating plans, a first conclusion is that the 2008 Operating Plan will not cause detrimental short- or long-term effects to the groundwater and surface water resources in the Valley and is, therefore, sustainable. Consistent with actual operating experience and empirical observations of historical basin response to groundwater pumping, the

2008 Operating Plan can be expected to have local difficulty, in the Alluvium at the eastern end of the basin during locally dry periods, with achievement of all the Alluvial pumping in the 2008 Operating Plan. This condition is particularly evident if several decades of predominantly below-normal rainfall years were to occur in the future such as occurred during much of the five decades from the mid-1920s through the mid-1970s. In other words, while the basin as a whole can sustain the pumping embedded in the 2008 Operating Plan, local conditions in the Alluvium in the eastern end of the basin can be expected to repeat historical groundwater level declines during dry periods, necessitating a reduction in desired Alluvial aquifer pumping due to decreased well yield and associated actual pumping capacity. The modeling analysis conducted to date suggests that those reductions in pumping from the Alluvial aquifer can be made up by an equivalent amount of increased pumping in other parts of the basin without disrupting basin-wide sustainability or local pumping capacity in those other areas. For the Saugus Formation, the modeling analysis indicates that this aquifer can sustain the pumping from this unit that is imbedded the 2008 Operating Plan.

Simulation of the 2008 Operating Plan with Pumping Redistribution indicates that westerly redistribution of 1,600 afy of alluvial pumping from the eastern end of the basin would help, but not eliminate, the lack of achievability. The residual unachievable pumping in the east end of the basin, about 4,500 afy, could be redistributed to other areas of the basin with minimal impact on groundwater levels. In this case, total Alluvial pumping in the basin could remain near the upper end of the 2008 Operating Plan range of 30,000 to 35,000 afy. Conversely, absent any additional efforts to redistribute pumping, the total Alluvial pumping capacity during extended dry periods would likely shrink toward the lower end of the 2008 Operating Plan range, toward 30,000 afy.

Another conclusion with regard to the respective operating plans is that the Potential Operating Plan would result in lower groundwater levels, failure of the basin to fully recover (during wet hydrologic cycles) from depressed storage that occurs during dry periods, and generally declining trends in groundwater levels and storage. This conclusion is strongly suggested for the Alluvial aquifer by the modeling results, but the model also indicates that long-term lowering of groundwater levels could also occur in the Saugus Formation, with only partial water level recovery occurring in the Saugus. Thus, the Potential Operating Plan would not be sustainable over a long-term period. The simulated combination of lower and declining groundwater levels under the Potential Operating Plan also leads to a conclusion that such an operating plan could not be physically achieved in several areas within the basin.

Conclusions with regard to another of the objectives of the updated groundwater basin yield analysis include a recognition that the runoff conservation/groundwater recharge projects being planned by the Los Angeles County Flood Control District are a combination of individually small projects that are not yet fully analyzed in terms of potential new yield, are but unlikely to provide any substantial recharge that does not already occur. Additionally, these proposed projects are mostly located in areas of the basin where the alluvial aquifer is of insufficient thickness and storage (and is thus not developed for water supply) or where the alluvial aquifer already fully recharges when stream flows are naturally present.

Final conclusions related to the overall objectives of the updated groundwater basin yield analysis all relate to the potential impacts of climate change on the yield of the basin and the

related groundwater supply from the basin. While “conclusions” would probably be an inappropriate term to describe future conditions that cannot be projected with any degree of certainty, the results of simulating basin response to the 2008 Operating Plan, under a range of potential climate change result in two important observations.

- for the broad range of climate change possibilities that was analyzed, the 2008 Operating Plan would appear to be both sustainable and, with the same physical constraints to full pumping in the eastern part of the basin as have otherwise been experienced, achievable through the shorter term horizon associated with UWMP planning.

- the range of potential climate change impacts extends from a possible wet trend to a possible dry trend over the long term. The trends that range from an approximate continuation of historical average precipitation, to something wetter than that, would appear to result in continued sustainability of the 2008 Operating Plan, again with intermittent constraints on full pumping in the eastern part of the basin. The potential long-term dry trend arising out of climate change would be expected to decrease local recharge to the point that lower and declining groundwater levels would render the 2008 Operating Plan unsustainable.

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California Court of Appeal, Second District, Division Five, ***California Water Impact Network, Inc., v. Castaic Lake Water Agency*****,**
Case No. B205622

Filed 4/20/09 California Water Impact Networkv. Castaic Lake Water Agency CA2/5

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

California Rules of Court, rule 8.1115(a), prohibits courts and parties from citing or relying on opinions not certified for publication or ordered published, except as specified by rule 8.1115(b). This opinion has not been certified for publication or ordered published for purposes of rule 8.1115.

IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

SECOND APPELLATE DISTRICT

DIVISION FIVE

CALIFORNIA WATER IMPACT NETWORK, INC. et al., Plaintiffs and Appellants, v. CASTAIC LAKE WATER AGENCY, Defendant and Respondent.	B205622 (Los Angeles County Super. Ct. No. BS106546)

APPEAL from an order of the Superior Court of Los Angeles County, Dzintra I. Janavs, Judge. Affirmed.

Law Offices of Babak Naficy and Babak Naficy for Plaintiffs and Appellants.

Hortvitz & Levy, Barry R. Levy and Felix Shafir; McCormick, Kidman & Behrens, Russell G. Behrens and David Boyer for Defendant and Respondent.

I. INTRODUCTION

Plaintiffs, California Water Impact Network and the Friends of the Santa Clara River, appeal from a judgment denying their amended mandate petition which sought to set aside the certification of an environmental impact report and approval for a 2006 Water Acquisition Project ("the project") by defendant, Castaic Lake Water Agency. The 2006 project consists of a plan by defendant to purchase a minimum of 11,000 acre feet per year of water from the Buena Vista Water Storage District ("Buena Vista district") and the Rosedale-Rio Bravo Water Storage District ("Rosedale-Rio Bravo district"). The two districts operate the Buena Vista Water Storage District/Rosedale-Rio Bravo Water Storage District Water Banking and Recovery Program ("Buena Vista/Rosedale-Rio Bravo water banking program"). The Buena Vista/Rosedale-Rio Bravo water banking program, which was subject to full environmental review in 2002, sells water to third parties such as defendant. Defendant's 2006 project also allows for the additional purchase of 9,000 acre feet per year of water that may be available from time to time depending upon hydrologic and operational conditions affecting the Buena Vista/Rosedale-Rio Bravo water banking program.

Plaintiffs argue defendant's 2006 environmental impact report does not comply with the environmental review requirements of the California Environmental Quality Act. (Pub. Resources Code,[1] § 21000 et seq.) Plaintiffs argue the 2006 environmental impact report: does not properly describe the project; does not adequately analyze the growth inducing impacts of the 2006 project; was not prepared by the proper lead agency; and calls for the acquisition of water supplies for developments that are inconsistent with and unaccounted for in the Los Angeles County General Plan. We disagree the asserted grounds provide a basis for setting aside defendant's certification of the 2006

[1] All further statutory references are to the Public Resources Code unless otherwise indicated.

environmental impact report and affirm the judgment denying the amended mandate petition.

II. FACTUAL AND PROCEDURAL MATTERS

A. The 2002 Environmental Impact Report And Buena Vista/Rosedale-Rio Bravo Water Banking Program

The Buena Vista and Rosedale-Rio Bravo districts are adjacent water districts that jointly serve approximately 92,000 acres of primarily agricultural land in southern San Joaquin Valley, west of the City of Bakersfield. The Buena Vista district, which was organized in 1924, has a gross area of approximately 49,000 acres. The Rosedale-Rio Bravo district, which was formed in 1959, has a gross area of approximately 44,000 acres of land developed primarily for irrigated agriculture and urban users. Both water districts are engaged in groundwater recharge, banking, and recovery programs. Both are member units of the Kern County Water Agency ("Kern County agency") which is a water wholesaler. The Kern County agency was created in 1961 by the Legislature to secure and supply adequate water to its local member units in Kern County. Both the districts have rights to Kern River waters. Both the Buena Vista and Rosedale-Rio Bravo districts also have rights to a water supply from the State Water Project through the Kern County agency.

Water Code section 43001 allows a water district to "sell, distribute, or otherwise dispose" of water and water rights.[2] In September 2002, the Buena Vista and Rosedale-Rio Bravo districts certified an environmental impact report which evaluated the impacts of operating their water banking and recovery program including the sale of water to third-party users such as defendant. The 2002 environmental impact report expressly

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[2] Water Code section 43001 states in its entirety, "The board may sell, distribute, or otherwise dispose of water and water rights not necessary for the uses and purposes of the district."

states that third party customers such as defendant will be required to conduct appropriate environmental review as a condition of any sales. The Buena Vista/Rosedale-Rio Bravo water banking and recovery program environmental impact report was certified on October 11, 2002.

The 2002 Buena Vista/Rosedale-Rio Bravo water banking environmental impact report states that approximately 25 percent of groundwater banking would be accomplished using existing accounts in the Buena Vista district. An additional 75 percent of water banking will be accomplished by using accounts to be developed primarily through recharge of Buena Vista Kern River high flow water within the Rosedale-Rio Bravo district. Defendant's 2006 environmental impact report defines "groundwater recharge" as follows, "Refers to the addition to the water within the earth that occurs naturally from infiltration of rainfall and from water flowing over the earth materials that allow water to infiltrate below the land surface." According to the 2002 Buena Vista/Rosedale-Rio Bravo water banking program environmental impact report, recovery from the groundwater banking accounts will be accomplished by: using direct and in-lieu methods; via groundwater pumping; and exchanges of State Water Project supplies. The Buena Vista and Rosedale-Rio Bravo districts were to jointly recover the groundwater. The groundwater was to be recovered by means of accounts to be developed through recharge within the Rosedale-Rio Bravo district. More than 80,000 acre feet of Buena Vista Kern River wet year water were to be captured and recharged within the Rosedale-Rio Bravo district service area in a given year. The recharged waters were to be included in the groundwater bank account. Also, the account would include groundwater which had been previously recharged within the Kern River area by the Buena Vista district. The Buena Vista district committed to the program 150,000 acre feet of previously recharged exportable groundwater which it currently stored. It was estimated that more than 20,000 acre feet of banked water could be recovered or withdrawn from the groundwater bank account in order to supply water demands created by the Buena Vista/Rosedale-Rio Bravo water banking program. The water recovered under the Buena Vista/Rosedale-Rio Bravo water banking program could be delivered to

third-party buyers such as defendant. The primary method of recovery or delivery would be through an "in-lieu" exchange of State Water Project Table A supplies. (Table A, an attachment to long-term water contracts, will be fully discussed later in this opinion.) When the Table A supplies were insufficient for an "in-lieu" exchange, the banked groundwater will be pumped into the California Aqueduct of the State Water Project for delivery to a buyer such as defendant. The 2002 Buena Vista/Rosedale-Rio Bravo water banking program "in-lieu" exchange process was approved by the Department of Water Resources prior to its implementation. The Department of Water Resources monitors all exchanges and deliveries.

B. The 2006 Project

The California Department of Water Resources is responsible for overall water planning for the State of California. Defendant is located in Los Angeles and Ventura Counties and was created by the Legislature in 1962. (Stats.1962, 1st Ex. Sess., ch. 28, p. 208, § 1. Amended by Stats.1970, ch. 443, p. 873, § 1; Wat. Code App. § 103-1.) Defendant is 1 of 29 State Water Project Contractors who enter into agreements with the Department of Water Resources. The 29 contractors have long-term water supply contracts for water service from the State Water Project. The 29 contractors obtain deliveries from the Department of Water Resources in accordance with the long-term contracts. The acre feet of water that may be delivered under an individual contractor's agreement with the Department of Water Resources is set forth in an attachment to the long-term contract. The attachment which sets forth the acre feet of water is referred to as Table A. The Table A attachment establishes the total amount of State Water Project that a contractor may request and potentially receive each year under the terms of the long-term water supply contract. In exchange, the contractors pay the Department of Water Resources any fees and costs related to the operation and maintenance of the State Water Project. The yearly fees are calculated by reference to the Table A amount. The Department of Water Resources is not always able to deliver the quantity of requested

water because of certain factors such as hydrologic conditions, current reservoir storage, and total water contractor requests.

Defendant's service area is approximately 195 square miles (124,800 acres) in incorporated and unincorporated areas in, or adjacent to, the Santa Clarita Valley. Defendant's purpose, at its formation, was to contract through the Department of Water Resources to acquire and distribute State Water Project water to four local purveyors. Defendant's purpose was subsequently expanded by legislation to: acquisition of water from the Department of Water Resources; distribution of water wholesale; water reclamation; retail water sale; and exercise of other related powers. Defendant has a fundamental duty to plan for and procure a reliable water supply. (Cal. Wat. Code-App. § 103-15.) Defendant principally obtains its water supply from the State Water Project.

In February 1984, the Los Angeles County Board of Supervisors adopted the Santa Clarita Valley Areawide General Plan. The 1984 general plan projected that 165,000 residents would inhabit defendant's area by the year 2000. In August 1987, the Los Angeles County Department of Regional Planning prepared a draft amendment to the 1984 general plan forecasting that the population would be 210,000 rather than 165,000 by the year 2000. The 1987 document forecast a population of 270,000 by 2010 in defendant's area. To address water supply and demand forecasts, defendant completed the Capital Program and Water Plan in 1988. The 1988 Capital Program involves a long-term plan for financing purchases, construction, and improvements to meet future needs. The 1988 plan is currently being implemented. In 2003, defendant issued a Water Supply Reliability Plan for the Santa Clarita Valley. The purpose of the 2003 plan is to develop a protocol to evaluate the technical, environmental, and economic issues surrounding a water supply reliability project. The goal is to have in the future only the most effective and cost-efficient projects.

The California Urban Water Planning Act (Wat. Code, § 10631 et seq.) requires contractors, such as defendant, to assess water supply reliability that compares total projected usage with the expected supply over a 20-year period in 5-year increments. (Wat. Code, § 10621, subd. (a), 10631, subd. (a); see *Friends of Santa Clara River v.*

Castaic Lake Water Agency (2004) 123 Cal.App.4th 1, 8.) In accordance with statutory requirements, defendant adopted the 2005 Urban Water Management Plan. However, defendant's 2005 Urban Water Management Plan exceeds the minimum 20-year period and covers a 25-year period. Defendant's 2005 Urban Water Management Plan built upon its 2000 Urban Water Management Plan, as amended. Defendant evaluated the long-term water needs within its service area and compared these requirements against existing potential water supplies. The United States Census indicates defendant's service area had a population of approximately 190,000 with 63,000 households. Defendant projects a population growth from 249,343 in 2005 to 428,209 in 2030. The 2005 Urban Water Management Plant was identified as a potential source to meet future demands for water.

On January 31, 2006, pursuant to section 21092, subdivision (a) defendant issued a notice of preparation of the draft environmental impact report for the 2006 project. The 2006 project consists of the contractual right to annually purchase water from the Buena Vista/Rosedale-Rio Bravo water banking program in the amount of 11,000 acre feet through the year 2035. Defendant further has the right to extend the contract with the Buena Vista and Rosedale-Rio Bravo districts subject to compliance with applicable law. The 2006 project environmental impact report states the 11,000 acre feet of water per year purchase from the Buena Vista/Rosedale-Rio Bravo water banking program "is to be used primarily for annexations" to defendant's service area. But until "any such annexations are likely approved," the supply would be available to meet existing demands. Defendant also has the right to purchase an additional 9,000 acre feet in any given year from the Buena Vista/Rosedale-Rio Bravo water banking program. The Buena Vista/Rosedale-Rio Bravo water banking program delivers water to customers such as defendant in two ways. The first way is the so-called "in lieu" exchange. Under the in lieu exchange method, the Buena Vista and Rosedale-Rio Bravo districts, rather than use their banked groundwater, transfers water to which they have rights under their contracts with the State Water Project. The groundwater could be sold to local customers or it can remain in the ground. In other words, in lieu of pumping groundwater, the

Buena Vista and Rosedale-Rio Bravo districts could ship other water to which they have rights to customers such as defendant. Hence, the terminology in lieu exchange describes this first method of delivering water to defendant under the 2006 project. The second way to deliver the contracted for water is to pump it out of the ground in the Buena Vista and Rosedale-Rio Bravo districts and deliver it via the California Aqueduct to defendant. The principal method of recovery and delivery would be from State Water Project water delivered to the Buena Vista and Rosedale-Rio Bravo districts for recharging or irrigation purposes. Resort to groundwater pumping would occur only in years when the State Water Project undergoes shortages—1 to 5 years in every 35-year period. Under either delivery system, all deliveries were required to comply with State Water Project standards.

Defendant determined its projected demands required supplemental water sources beyond the amounts specified in Table A attached to its long-term water contract with the Department of Water Resources. In addition, banking was needed to improve water supply especially in drought years. In some years, the full amount of contracted water due from the State Water Project may not be available for delivery to its long-term contractors due to: hydrology; the amount of water in storage; the operational constraints and environmental regulations; the amounts of water requested by other contractors; climatic conditions; and other factors. The 2006 environmental impact report states the project consists of an action by defendant to augment its supply to meet the demands of its service area. Further, the 2006 environmental impact report states defendant desired to augment its water supply to meet future demands in the event its service area is enlarged by reason of annexation; or transfer of water from the Buena Vista/Rosedale-Rio Bravo water banking program. Defendant's purchase of water from the Buena Vista/Rosedale-Rio Bravo water banking program guaranteed a firm water supply which is not subject to the variations in the State Water Project supply. The 2006 project is also identified in defendant's 2005 Urban Water Management Program as a source to meet projected demand in the Santa Clarita Valley.

The 2006 environmental impact report indicates that there were no significant direct impacts from the project. The 2006 environmental impact report states that less significant impacts included increased electrical power demand and air emissions from moving water to defendant's service area. This impact removed obstacles to growth in defendant's service area. As a result, defendant identified population growth or development as potential indirect impacts. However, defendant notes that its responsibility is to provide water in the service area and not to approve locations of any new development. To the extent that there were visual or aesthetic effects caused by water purchase programs, the 2006 environmental impact report states that such impact could be mitigated by the county and city agencies approving such developments in the project-specific environmental review process. The 2006 environmental impact report identifies three alternatives to the project: reduced water supply; purchase of desalinated water; and no project. The 2006 environmental impact report concludes the project was the environmentally superior alternative. This is because, under the reduced water supply and no project alternatives, defendant would be required to obtain additional water supplies to meet the projected needs of the service area. The 2006 environmental impact report notes that the desalination project could actually cause more direct impacts to the environment than the project. This is because the construction and operation of new desalination facilities would be required. These activities would have significant impacts on: air quality; aesthetic and visual resources; agricultural resources; biological resources; marine resources; geology and soils; hydrology and water quality; land use and planning; noise levels; and recreation.

The 2006 environmental impact report identifies five possible annexation sites within the service area. The 2006 environmental impact report states that whether the sites were actually annexed was not within the defendant's authority but that water availability was a factor in the annexation process. The potential annexations would result in a 4,375 acre feet of water per year increase in demand for water. The 2006 environmental impact report states that 11,000 acre feet of water per year of water would

be able to serve between approximately 11,340 and 11,830 households, which translates into approximately 36,290 and 37,850 persons.

Pursuant to section 21092, subdivisions (a) and (b)(i) and California Code of Regulations, title 14, section 15087, subdivision (c)(2),[3] the public was provided with the opportunity to comment on the draft 2006 environmental report. Among the issues raised during the comment period was whether the 2006 environmental impact report adequately disclosed whether the project was being pursued under the so-called Monterey Amendment to State Water Project long-term contracts. In the 1990's, disagreements arose between contractors and others with the Department of Water Resources concerning the distribution of State Water Project supplies. State Water Project contractors and the Department of Water Resources negotiated a settlement which provided for an overhaul of long term water contracts and a new approach to managing State Water Project supplies. The dispute arose under article 18 of the long-term contracts. The principles developed as part of the 1994 settlement are known as the "Monterey Agreement." The 1994 "Monterey Agreement" amended water contracts and those changes are known as the "Monterey Amendment." The Monterey Amendment was approved in 1995 and went into effect in August 1996. (See *Friends of Santa Clara River v. Castaic Lake Water Agency* (2002) 95 Cal.App.4th 1373, 1375; *Planning & Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 897-902.) One principle of the Monterey Amendment called for the transfer of about 130,000 acre feet of water per year from agriculture to urban users. (*Friends of the Santa Clara River v. Castaic Lake Water Agency*, *supra*, 95 Cal.App.4th at pp. 1376-1377; *Planning & Conservation League v. Department of Water Resources*, *supra*, 83 Cal.App.4th at pp. 901-902.)

The comments to the 2006 draft environmental impact report state: it did not fully disclose whether the transfers were permanent; a permanent transfer implicated the

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[3] All future reference to the Guidelines are to the provisions of California Code of Regulations, title 14.

Monterey Amendment; and the project was the "functional equivalent" of a permanent transfer of water requiring the Department of Water Resources prepare an environmental impact report as the lead agency under the standards set forth in *Planning & Conservation League v. Department of Water Resources*, *supra*, 83 Cal.App.4 at page 920. Defendant responded to the comments by noting the water purchased from the Buena Vista Rosedale-Rio Bravo districts under the 2006 project did not involve the State Water Project Table A supplies. According to defendant, the Monterey Agreement applied to two types of water transfers—permanent transfers of Table A amounts and annual transfers of allocated Table A supplies. Defendant further stated that the Monterey Agreement did not address transfers of non-State Water Project supplies. Citing section 2.4 of the draft environmental impact report, defendant explained no purchase of water subject to Table A had occurred. Instead, defendant pointed out: the Table A supplies for it, as well as Buena Vista and Rosedale-Rio Bravo districts, would remain the same under the 2006 project; the purchased water originated from local and other supplies that will be recharged and banked in groundwater basins; and the supplies included Kern River wet year water and other acquired waters. Defendant also noted that all of the information about the program water supplies was set forth in the 2002 Buena Vista/Rosedale-Rio Bravo water banking environmental impact report.

Defendant denied that there was a functional equivalent of a permanent transfer of Table A waters subject to the Monterey Agreement. Defendant stated the State Water Project Table A supplies attributed to the long-term contract with the Department of Water Recovery constitute but one mechanism for the purchased water to be delivered to defendant through an in-lieu exchange. Thus, defendant argued the Department of Water Resources did not have to be the lead agency. The only role of the Department of Water Resources in the project is to approve the change in place of use and point of delivery of exchange water delivered from to another State Water Project long-term contractor and for the direct delivery of groundwater into the California Aqueduct.

Defendant's Board of Directors adopted Resolution No. 2492 on October 25, 2006, certifying the final 2006 environmental impact report for the project and adopting:

findings; a mitigation monitoring and reporting program; and a statement of overriding considerations. Resolution No. 2492 approved the project. The board determined: the 2006 project's benefits outweighed any significant and unavoidable environmental impacts; substantially all of the 2006 project's indirect impacts consist of growth inducement which is outside of its jurisdiction and control; the 2006 project will bring substantial benefits to the defendant's service area by improving the its ability to meet the present and projected water demands; and the 2006 project will bring substantial benefit to defendant's service area by preparing for projected growth.

C. The Amended Mandate Petition And Its Denial

On November 26, 2006, plaintiffs filed their mandate petition. The first amended petition alleged that plaintiffs are non-profit organizations. Plaintiffs sought to set aside the certification of the 2006 environmental impact report for the project and a declaration defendant's actions were unlawful. The amended petition further alleged: the 2006 environmental impact report fails to clearly identify and describe the likely source of water that will be acquired by defendant because it does not accurately describe the "in-lieu" method; the method employed by the 2006 project is really a transfer of State Water Project Table A water; the 2006 environmental impact report fails to forecast the project's potential impacts on marine life including some sensitive species which would be caused by additional winter pumping; defendant was not the proper lead agency to conduct environmental review of the 2006 project; and the 2006 environmental impact report fails to properly evaluate the use of State Water Project facilities to deliver the exchange of water to the service area which must be done by the Department of Water Resources. Plaintiffs requested issuance of alternative and peremptory writs of mandate commanding defendant to set aside, invalidate, and void the certification of the 2006 environmental impact report. Plaintiffs also requested declaratory and injunctive relief. The trial court denied the first amended petition after briefing and a hearing. Judgment

was entered on all of plaintiffs' causes of action in favor of defendant. This timely appeal followed.

III. DISCUSSION

A. Standard of Review

Our Supreme Court in *Citizens of Goleta Valley* v. *Board of Supervisors* (1990) 52 Cal.3d 553, 563-564, summarized the purposes of the California Environmental Quality Act: "As we recently observed in *Laurel Heights Improvement Assn.* v. *Regents of University of California* (1988) 47 Cal.3d 376, (*Laurel Heights*): 'The foremost principle under [the California Environmental Quality Act] is that the Legislature intended the act "to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language."' [Citation.] [¶] The EIR has been aptly described as the 'heart of CEQA.' (Guidelines, § 15003, subd. (a); *Laurel Heights, supra,* 47 Cal.3d at p. 392; *County of Inyo* v. *Yorty* (1973) 32 Cal.App.3d 795, 810.) Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made. Thus, the EIR 'protects not only the environment but also informed self-government.' (*Laurel Heights, supra*, 47 Cal.3d at p. 392.) [Fn. omitted.]"

Whether defendant's certification of the 2006 environmental impact report complies with the relevant provisions of law is reviewed for a prejudicial abuse of discretion. (§ 21168.5; *In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1161; *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435; *Citizens of Goleta Valley* v. *Board of Supervisors, supra,* 52 Cal.3d at pp. 563-564.) Section 21168.5 states, ". . . Abuse of discretion is established if the agency has not proceeded in a manner required by law or if the determination or decision is not supported by substantial evidence." In deciding whether a prejudicial abuse of discretion has occurred

our Supreme Court has stated: "As a result of this standard, 'The court does not pass upon the correctness of the EIR's environmental conclusions, but only upon its sufficiency as an informative document.' [Citation.] [¶] . . . [¶] A court may not set aside an agency's approval of an EIR on the ground that an opposite conclusion would have been equally or more reasonable. [Citation.] A court's task is not to weigh conflicting evidence and determine who has the better argument when the dispute is whether adverse effects have been mitigated or could be better mitigated. We have neither the resources nor scientific expertise to engage in such analysis, even if the statutorily prescribed standard of review permitted us to do so. Our limited function is consistent with the principle that 'The purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind. . . . ' [Citation.]" (*Laurel Heights Improvement Assn. v. Regents of University of California, supra,* 47 Cal.3d at pp. 392-393; see also *Western States Petroleum Assn. v. Superior Court* (1995) 9 Cal.4th 559, 573-574; *Citizens of Goleta Valley v. Board of Supervisors, supra,* 52 Cal.3d at p. 564.) We review defendant's actions de novo determining whether the administrative record demonstrates any legal error and it contains substantial evidence to support the factual determinations. (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova, supra,* 40 Cal.4th at p. 427; *Citizens of Goleta Valley* v. *Board of Supervisors, supra,* 52 Cal.3d at pp. 563-564.)

B. Compliance With The California Environmental Quality Act

1. The environmental impact report adequately describes the project.

There is no merit to plaintiff's argument the 2006 project environmental impact report fails to include an adequate and consistent description of the water source. The absence of information from an environmental impact report does not establish a

violation of Guidelines, section 15124,[4] the controlling provision, as a matter of law. (*Berkeley Keep Jets Over the Bay Committee v. Board of Port Comrs.* (2001) 91 Cal.App.4th 1344, 1355; *Al Larson Boat Shop, Inc. v. Board of Harbor Commissioners* (1993) 18 Cal.App.4th 729, 749.) Rather, judicial review under the prejudicial abuse of discretion standard set forth in section 21168.5 focuses on the sufficiency of the environmental impact report as an informative document. (*Laurel Heights Improvement Assn. v. Regents of University of California, supra,* 47 Cal.3d at p. 392; accord *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova, supra,* 40 Cal.4th at p. 445; *Western States Petroleum Assn. v. Superior Court, supra,* 9 Cal.4th at pp. 573-574.) A prejudicial abuse of discretion occurs when the failure to include information in the environmental impact report prevents informed decisions and public participation, which thwarts the goals of the evaluative process. (*Anderson First Coalition v. City of*

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[4] Guidelines, section 15124 states: "The description of the project shall contain the following information but should not supply extensive detail beyond that needed for evaluation and review of the environmental impact. [¶] (a) The precise location and boundaries of the proposed project shall be shown on a detailed map, preferably topographic. The location of the project shall also appear on a regional map. [¶] (b) A statement of the objectives sought by the proposed project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project. [¶] (c) A general description of the project's technical, economic, and environmental characteristics, considering the principal engineering proposals if any and supporting public service facilities. [¶] (d) A statement briefly describing the intended uses of the EIR. [¶] (1) This statement shall include, to the extent that the information is known to the lead agency, [¶] (A) A list of the agencies that are expected to use the EIR in their decision-making, and [¶] (B) A list of permits and other approvals required to implement the project. [¶] (C) A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies. To the fullest extent possible, the lead agency should integrate CEQA review with these related environmental review and consultation requirements. [¶] (2) If a public agency must make more than one decision on a project, all its decisions subject to CEQA should be listed, preferably in the order in which they will occur. On request, the Office of Planning and Research will provide assistance in identifying state permits for a project."

Anderson (2005) 130 Cal.App.4th 1173, 1178; *Galante Vineyards v. Monterey Peninsula Water Management Dist.* (1997) 60 Cal.App.4th 1109, 1117.) Guidelines section 15151 provides: "An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. . . . The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure." (See *Anderson First Coalition v. City of Anderson*, *supra*, 130 Cal.App.4th at p. 1178; *Berkeley Keep Jets Over the Bay Committee v. Board of Port Comrs.*, *supra*, 91 Cal.App.4th at p. 1355; *Rio Vista Farm Bureau Center v. County of Solana* (1992) 5 Cal.App.4th 351, 368.)

Plaintiffs argue the 2006 environmental impact report omits or mischaracterizes information about the sources for the water supply. To the extent plaintiffs are criticizing the ambiguity of the Buena Vista/Rosedale-Rio Bravo water banking program, they cannot raise that contention. The 2002 environmental impact report is conclusively presumed valid and it is not subject to challenge in this action. (§ 21167.2; *Laurel Heights Improvement Assn. v. Regents of University of California* (1993) 6 Cal.4th 1112, 1130.) Thus, plaintiffs cannot challenge the Buena Vista/Rosedale-Rio Bravo water banking and recovery program under the guise of litigating the 2006 environmental impact report. This action must be limited to whether the 2006 environmental impact report sufficiently informs the decisionmakers and the public about impacts from the project. Plaintiffs may not litigate the impact of the Buena Vista/Rosedale Rio Bravo water banking program. The aforementioned conclusive 2002 environmental impact report repeatedly states that the primary method of delivery will be through "in-lieu" exchange of State Water Project supplies. The 2002 environmental impact report sets forth: the environmental effects of operating the program which included the sale of water to third-parties; discussions of delivery through banked underground water; and analysis of delivery through "in-lieu" exchange of Table A supplies. The 2002 program

environmental impact report fully disclosed that the primary method of delivery would be "in-lieu" exchange but that in some years the delivery might vary depending upon State Water Project supplies.

In any event, the 2006 environmental impact report adequately describes the project. The 2006 environmental report: identifies the sources of the water that will be delivered; describes the growth related effects of the purchase in defendants' service area; and identifies the effects of additional water pumping. The 2006 environmental impact report explains that the primary source of water provided by the Buena Vista/Rosedale-Rio water banking program will be water provided to them by the State Water Project. There is no merit to plaintiffs' contention the discussion in that regard is incomplete or misleading.

Furthermore, we disagree with plaintiffs the "in-lieu" exchange delivery amounts to a permanent transfer of Table A water or the functional equivalent thereof. Before proceeding to a discussion of the merits of plaintiffs' environmental analysis, it bears emphasis that the Buena Vista and Rosedale-Rio Bravo Districts have the statutory authority to sell their water and water rights pursuant to Water Code section 43001. (See fn. 2, *infra*.) At oral argument, plaintiffs' counsel admitted there is no statutory bar to the sale of water rights by the Buena Vista and Rosedale-Rio Bravo Districts. Rather, as fleshed out at oral argument, plaintiffs argue that the proposed transfer of waters violate attachment C to the Monterey Agreement which are Department of Water Resources guidelines for review of proposed permanent transfers of Table A waters. The attachment C guidelines are in furtherance of the state policy favoring voluntary water transfers which includes a preference for use of water for non-irrigation purposes; i.e., for the sustenance of human beings, household conveniences, and the care of livestock. (Wat. Code, § 106; *Prather v. Hoberg* (1944) 24 Cal.2d 549, 562.) Further, paragraph 3 of attachment C states, "These guidelines are not intended to change or augment existing law."

In any event, as discussed above, all information concerning the environmental impacts from the two delivery methods was discussed and analyzed in the *conclusive*

2002 environmental impact report. Nevertheless, there is no merit to the contention that there is a permanent transfer of Table A amounts. Both the Buena Vista and Rosedale-Rio Bravo districts have contractual rights with the State Water Project which allow them to receive a maximum amount of water supply in a given year. The water supply from the State Water Project varies depending on the conditions such as: hydrologic conditions; current reservoir storage; and total water contractor requests. However, the actual amount of water delivered under the 2006 project is not contingent upon Table A supplies distributed by the State Water Project to the Buena Vista and Rosedale-Rio Bravo districts. It is undisputed that the Table A supplies can vary yearly. Rather, under the program, defendant has a contractual right to receive 11,000 acre feet of water per year regardless of whether the Buena Vista and Rosedale-Rio Bravo districts receive Table A supplies. Thus, use of Table A water is neither the actual nor the functional equivalent of a permanent transfer because it may not occur. The "in-lieu" exchange is simply one method to meet the contractual obligation to deliver 11,000 acre feet of water to defendant. It is not a permanent transfer of Table A supplies. And even if the project were such a transfer, it is sufficiently described along with its effects in the 2006 environmental impact report. The 2006 environmental impact report expressly states that the water purchased would come from two sources. The first source is the Buena Vista and Rosedale-Rio Bravo Districts State Water Project waters. The second source is the banked groundwater whose rights are owned by Buena Vista and Rosedale-Rio Bravo Districts. In an unusually dry year, groundwater supplies may be the sole source of waters sold to third parties such as defendant. And the 2006 environmental impact report states that 2006 project does not involve the purchase of Table A amounts. Contrary to plaintiffs' counsel's assertion at oral argument, the 2006 environmental impact report does not mask the source of the waters.

2. The 2006 environmental impact report adequately reviewed growth inducing impacts.

Plaintiffs contend that the 2006 environmental impact report fails to adequately review the growth inducing impacts generated by the purchase of the water. We disagree. In *Muzzy Ranch Co. v. Solano County Airport Land Use Com.* (2007) 41 Cal.4th 372, 388-389, our Supreme Court articulated an agency's responsibility to analyze growth inducing impacts as follows: "Under CEQA, a public agency is not always 'required to make a *detailed* analysis of the impacts of a project on [future] housing and growth.' [Citation.] 'Nothing in the [CEQA] Guidelines, or in the cases, requires more than a general analysis of projected growth. The detail required in any particular case necessarily depends on a multitude of factors, including, but not limited to, the nature of the project, the directness or indirectness of the contemplated impact and the ability to forecast the actual effects the project will have on the physical environment.' [Citation.] [¶] 'In addition, it is relevant, although by no means determinative, that future effects will themselves require analysis under CEQA.' [Citation.] And '[t]hat the effects will be felt outside of the project area . . . is one of the factors that determines the amount of detail required in any discussion. Less detail, for example, would be required where those effects are more indirect than effects felt within the project area, or where it [would] be difficult to predict them with any accuracy.' [Citations].) Most significantly, the CEQA Guidelines provide for streamlined review of projects that are consistent with existing general plans and zoning. [Citation.] When approving a project that is consistent with a community plan, general plan, or zoning ordinance for which an environmental impact report already has been certified, a public agency need examine only those environmental effects that are peculiar to the project and were not analyzed or were insufficiently analyzed in the prior environmental impact report. [Citation.]" (See also *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 369.)

The 2006 environmental impact report complies with the statutorily imposed informational requirements. Chapter 4.0 of the 2006 environmental impact report discusses growth inducing impacts and potential indirect impacts on resources from growth. Furthermore, there is no evidence the additional water will induce any growth that is unaccounted for in the general plan of the area. Rather, chapter 5.0 of the 2006 environmental impact report contains a discussion of the project's consistency with general and regional plans. The 2006 environmental impact report assumes that the entire 11,000 acre feet of water per year would be for new growth. The project also assumes that approximately 37,850 people would be served by the water supply from the project. The growth potential was within the general plan forecasts of 270,000 by 2010 and 428,209 by 2030 for the Santa Clarita Valley. Moreover, the 2006 project is a part of a process to meet defendant's obligation to provide water to its service area in accordance with projected population increases. Thus, the 2006 environmental impact report contains a detailed analysis of growth inducing impacts. The 2006 project is also consistent with existent general and community plans projecting growth increases in the service area. The 2006 environmental impact report adequately discusses growth related issues. (*Muzzy Ranch Co. v. Solano County Airport Land Use Com.*, *supra*, 41 Cal.4th at pp. 388-389; *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors*, *supra*, 91 Cal.App.4th at p. 369; see also Guidelines, § 15126.2, subd. (d); *Sierra Club v. West Side Irrigation Dist.* (2005) 128 Cal.App.4th 690, 702-703.)

Finally, we disagree with plaintiffs that there was something amiss in the 2006 environmental impact report because defendant included five proposed annexation sites in the discussion. Plaintiffs interpret defendant's inclusion of the five potential sites identified in chapter 3.0 as evidence of a plan to grow the area. Because of the pending applications, defendant was required to include the sites in the environmental impact report. (Guidelines, § 15125; *Muzzy Ranch Co. v. Solano County Airport Land Use Com.*, *supra*, 41 Cal.4th at pp. 387-388 [§ 21060.5 obligates an defendant to consider environmental impact of project outside the project area when it will have effect on geographically distant area].)

3. Defendant is the correct lead agency.

Plaintiffs assert that defendant's imprecise discussion is an attempt to mask what is the "functional equivalent" of a permanent transfer of surplus Table A supplies belonging to the Buena Vista and Rosedale-Rio Bravo districts. Relying on *Planning & Conservation League v. Department of Water Resources*, *supra*, 83 Cal.App.4th at pages 903-907, plaintiffs argue the proper lead agency should have been the Department of Water Resources. The *Planning & Conservation League* decision held the Department of Water Resources was the proper lead agency for conducting environmental review of the Monterey Agreement. (*Ibid*.; see *Santa Clarita Organization for Planning the Environment v. County of Los Angeles* (2007) 157 Cal.App.4th 149, 153.) The *Planning & Conservation League* decision had statewide implications and involved a number of urban and agricultural contractors. The issues also involved rights under the long-term water supply contracts which governed the entire State of California.

In this case, defendant is the correct lead agency. Section 21067 defines a lead agency, '"Lead agency' means the public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment." Defendant argues it is the proper lead agency because: it is the lead proponent of the water acquisition plan; a substantial portion of the 2006 project occurs within its geographic area; and it alone decides whether to accept any water. We agree. Defendant has the principal responsibility for approving and carrying out a project to acquire a water supply for its service area. (§§ 21005, 21080, subd. (c), 21165; Guidelines, §§ 15051-15053.) The 2006 project also affects defendant's duties and obligations to provide water to its service area. In addition, the 2006 project occurs within defendant's jurisdiction. The transfer of water applies to only three agencies, albeit that the transfer will take place within State Water Project facilities. The three agencies are the primary ones affected by the 2006 project. Thus, defendant was the proper lead agency. In any event, plaintiffs conceded in the trial court in their reply brief, and at hearing on the petition that its lead agency analysis rests on the conclusion the

2006 project is in effect a Table A transfer. We have concluded no disguised permanent nor functional equivalent transfer of Table A water has occurred. As a result, the Department of Water Resources was not required to be the lead agency such that it should have prepared the environmental impact report. (*Eller Media Co. v. Community Redevelopment Agency* (2003) 108 Cal.App.4th 25, 46; *Friends of Cuyamaca Valley v. Lake Cuyamaca Recreation & Park Dist*. (1994) 28 Cal.App.4th 419, 426-428; *City of Sacramento v. State Water Resources Control Bd*. (1992) 2 Cal.App.4th 960, 970-973; *City of Redding v. Shasta County Local Agency Formation Com.* (1989) 209 Cal.App.3d 1169, 1173-1177.)

4. The project does not impermissively rely on a draft of general plan.

Relying on *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 941-951, plaintiffs argue the 2006 project improperly appropriated water supplies for development that had not already been included in the Los Angeles County General Plan. In *County of Amador*, the environmental impact report was based on population projections contained in a draft general plan prepared by El Dorado County. (*Id*. at pp. 941, 947.) The *County of Amador* opinion concluded, "We hold only that, in this case, an [environmental impact report] predicated on a draft general plan is fundamentally flawed and cannot pass CEQA muster." (*Id.* at p. 951.)

The *County of Amador* decision is not controlling. Here, there is no draft general plan at issue. In other words, defendant did not predicate the project on a draft general plan which has been judicially determined to be inadequate. Rather, the water planning in this case for the project was based on projections from a number of sources including: the United States Census; defendant's 2005 Urban Water Management Plan; and the existing Santa Clarita Valley Area Plan of the County of Los Angeles General Plan. The existing Los Angeles County General Plan had projections of a population growth of 270,000 by the year 2010. The 2005 Urban Water Management Plan predicted the future need for water to meet the demand for population growth that had been projected by Los

Angeles County and the City of Santa Clarita. Defendant has a duty to plan for long term needs in the service area. The California Urban Water Planning Act (Wat. Code, § 10631 et seq.) requires water contractors, such as defendant, to assess water supply reliability that compares total projected water use with the expected water supply over a 20-year period in 5-year increments. (See *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova, supra,* 40 Cal.4th at pp. 434-435; *Friends of Santa Clara River v. Castaic Lake Water Agency, supra,* 123 Cal.App.4th at p. 8.) The proposed water purchase from the Buena Vista and Rosedale-Rio Bravo districts is one of several measures taken by defendant in order to meet the forecasts of population growth contained in county, city, and federal documents. The *County of Amador* opinion does not require reversal.

IV. DISPOSITION

The judgment is affirmed. Defendant, Castaic Lake Water Agency, is to recover its costs on appeal from plaintiffs, California Water Impact Network and Friends of the Santa Clara River.

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

TURNER, P. J.

We concur:

MOSK, J. KRIEGLER, J.

California Court of Appeal, Second District, Division Five, ***California Water Impact Network, Inc., v. Castaic Lake Water Agency*****,**
Case No. B205622

Filed 4/20/09 California Water Impact Networkv. Castaic Lake Water Agency CA2/5

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

California Rules of Court, rule 8.1115(a), prohibits courts and parties from citing or relying on opinions not certified for publication or ordered published, except as specified by rule 8.1115(b). This opinion has not been certified for publication or ordered published for purposes of rule 8.1115.

IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

SECOND APPELLATE DISTRICT

DIVISION FIVE

CALIFORNIA WATER IMPACT NETWORK, INC. et al., Plaintiffs and Appellants, v. CASTAIC LAKE WATER AGENCY, Defendant and Respondent.	B205622 (Los Angeles County Super. Ct. No. BS106546)

APPEAL from an order of the Superior Court of Los Angeles County, Dzintra I. Janavs, Judge. Affirmed.

Law Offices of Babak Naficy and Babak Naficy for Plaintiffs and Appellants.

Hortvitz & Levy, Barry R. Levy and Felix Shafir; McCormick, Kidman & Behrens, Russell G. Behrens and David Boyer for Defendant and Respondent.

I. INTRODUCTION

Plaintiffs, California Water Impact Network and the Friends of the Santa Clara River, appeal from a judgment denying their amended mandate petition which sought to set aside the certification of an environmental impact report and approval for a 2006 Water Acquisition Project ("the project") by defendant, Castaic Lake Water Agency. The 2006 project consists of a plan by defendant to purchase a minimum of 11,000 acre feet per year of water from the Buena Vista Water Storage District ("Buena Vista district") and the Rosedale-Rio Bravo Water Storage District ("Rosedale-Rio Bravo district"). The two districts operate the Buena Vista Water Storage District/Rosedale-Rio Bravo Water Storage District Water Banking and Recovery Program ("Buena Vista/Rosedale-Rio Bravo water banking program"). The Buena Vista/Rosedale-Rio Bravo water banking program, which was subject to full environmental review in 2002, sells water to third parties such as defendant. Defendant's 2006 project also allows for the additional purchase of 9,000 acre feet per year of water that may be available from time to time depending upon hydrologic and operational conditions affecting the Buena Vista/Rosedale-Rio Bravo water banking program.

Plaintiffs argue defendant's 2006 environmental impact report does not comply with the environmental review requirements of the California Environmental Quality Act. (Pub. Resources Code,[1] § 21000 et seq.) Plaintiffs argue the 2006 environmental impact report: does not properly describe the project; does not adequately analyze the growth inducing impacts of the 2006 project; was not prepared by the proper lead agency; and calls for the acquisition of water supplies for developments that are inconsistent with and unaccounted for in the Los Angeles County General Plan. We disagree the asserted grounds provide a basis for setting aside defendant's certification of the 2006

[1] All further statutory references are to the Public Resources Code unless otherwise indicated.

environmental impact report and affirm the judgment denying the amended mandate petition.

II. FACTUAL AND PROCEDURAL MATTERS

A. The 2002 Environmental Impact Report And Buena Vista/Rosedale-Rio Bravo Water Banking Program

The Buena Vista and Rosedale-Rio Bravo districts are adjacent water districts that jointly serve approximately 92,000 acres of primarily agricultural land in southern San Joaquin Valley, west of the City of Bakersfield. The Buena Vista district, which was organized in 1924, has a gross area of approximately 49,000 acres. The Rosedale-Rio Bravo district, which was formed in 1959, has a gross area of approximately 44,000 acres of land developed primarily for irrigated agriculture and urban users. Both water districts are engaged in groundwater recharge, banking, and recovery programs. Both are member units of the Kern County Water Agency ("Kern County agency") which is a water wholesaler. The Kern County agency was created in 1961 by the Legislature to secure and supply adequate water to its local member units in Kern County. Both the districts have rights to Kern River waters. Both the Buena Vista and Rosedale-Rio Bravo districts also have rights to a water supply from the State Water Project through the Kern County agency.

Water Code section 43001 allows a water district to "sell, distribute, or otherwise dispose" of water and water rights.[2] In September 2002, the Buena Vista and Rosedale-Rio Bravo districts certified an environmental impact report which evaluated the impacts of operating their water banking and recovery program including the sale of water to third-party users such as defendant. The 2002 environmental impact report expressly

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[2] Water Code section 43001 states in its entirety, "The board may sell, distribute, or otherwise dispose of water and water rights not necessary for the uses and purposes of the district."

states that third party customers such as defendant will be required to conduct appropriate environmental review as a condition of any sales. The Buena Vista/Rosedale-Rio Bravo water banking and recovery program environmental impact report was certified on October 11, 2002.

The 2002 Buena Vista/Rosedale-Rio Bravo water banking environmental impact report states that approximately 25 percent of groundwater banking would be accomplished using existing accounts in the Buena Vista district. An additional 75 percent of water banking will be accomplished by using accounts to be developed primarily through recharge of Buena Vista Kern River high flow water within the Rosedale-Rio Bravo district. Defendant's 2006 environmental impact report defines "groundwater recharge" as follows, "Refers to the addition to the water within the earth that occurs naturally from infiltration of rainfall and from water flowing over the earth materials that allow water to infiltrate below the land surface." According to the 2002 Buena Vista/Rosedale-Rio Bravo water banking program environmental impact report, recovery from the groundwater banking accounts will be accomplished by: using direct and in-lieu methods; via groundwater pumping; and exchanges of State Water Project supplies. The Buena Vista and Rosedale-Rio Bravo districts were to jointly recover the groundwater. The groundwater was to be recovered by means of accounts to be developed through recharge within the Rosedale-Rio Bravo district. More than 80,000 acre feet of Buena Vista Kern River wet year water were to be captured and recharged within the Rosedale-Rio Bravo district service area in a given year. The recharged waters were to be included in the groundwater bank account. Also, the account would include groundwater which had been previously recharged within the Kern River area by the Buena Vista district. The Buena Vista district committed to the program 150,000 acre feet of previously recharged exportable groundwater which it currently stored. It was estimated that more than 20,000 acre feet of banked water could be recovered or withdrawn from the groundwater bank account in order to supply water demands created by the Buena Vista/Rosedale-Rio Bravo water banking program. The water recovered under the Buena Vista/Rosedale-Rio Bravo water banking program could be delivered to

third-party buyers such as defendant. The primary method of recovery or delivery would be through an "in-lieu" exchange of State Water Project Table A supplies. (Table A, an attachment to long-term water contracts, will be fully discussed later in this opinion.) When the Table A supplies were insufficient for an "in-lieu" exchange, the banked groundwater will be pumped into the California Aqueduct of the State Water Project for delivery to a buyer such as defendant. The 2002 Buena Vista/Rosedale-Rio Bravo water banking program "in-lieu" exchange process was approved by the Department of Water Resources prior to its implementation. The Department of Water Resources monitors all exchanges and deliveries.

B. The 2006 Project

The California Department of Water Resources is responsible for overall water planning for the State of California. Defendant is located in Los Angeles and Ventura Counties and was created by the Legislature in 1962. (Stats.1962, 1st Ex. Sess., ch. 28, p. 208, § 1. Amended by Stats.1970, ch. 443, p. 873, § 1; Wat. Code App. § 103-1.) Defendant is 1 of 29 State Water Project Contractors who enter into agreements with the Department of Water Resources. The 29 contractors have long-term water supply contracts for water service from the State Water Project. The 29 contractors obtain deliveries from the Department of Water Resources in accordance with the long-term contracts. The acre feet of water that may be delivered under an individual contractor's agreement with the Department of Water Resources is set forth in an attachment to the long-term contract. The attachment which sets forth the acre feet of water is referred to as Table A. The Table A attachment establishes the total amount of State Water Project that a contractor may request and potentially receive each year under the terms of the long-term water supply contract. In exchange, the contractors pay the Department of Water Resources any fees and costs related to the operation and maintenance of the State Water Project. The yearly fees are calculated by reference to the Table A amount. The Department of Water Resources is not always able to deliver the quantity of requested

water because of certain factors such as hydrologic conditions, current reservoir storage, and total water contractor requests.

Defendant's service area is approximately 195 square miles (124,800 acres) in incorporated and unincorporated areas in, or adjacent to, the Santa Clarita Valley. Defendant's purpose, at its formation, was to contract through the Department of Water Resources to acquire and distribute State Water Project water to four local purveyors. Defendant's purpose was subsequently expanded by legislation to: acquisition of water from the Department of Water Resources; distribution of water wholesale; water reclamation; retail water sale; and exercise of other related powers. Defendant has a fundamental duty to plan for and procure a reliable water supply. (Cal. Wat. Code-App. § 103-15.) Defendant principally obtains its water supply from the State Water Project.

In February 1984, the Los Angeles County Board of Supervisors adopted the Santa Clarita Valley Areawide General Plan. The 1984 general plan projected that 165,000 residents would inhabit defendant's area by the year 2000. In August 1987, the Los Angeles County Department of Regional Planning prepared a draft amendment to the 1984 general plan forecasting that the population would be 210,000 rather than 165,000 by the year 2000. The 1987 document forecast a population of 270,000 by 2010 in defendant's area. To address water supply and demand forecasts, defendant completed the Capital Program and Water Plan in 1988. The 1988 Capital Program involves a long-term plan for financing purchases, construction, and improvements to meet future needs. The 1988 plan is currently being implemented. In 2003, defendant issued a Water Supply Reliability Plan for the Santa Clarita Valley. The purpose of the 2003 plan is to develop a protocol to evaluate the technical, environmental, and economic issues surrounding a water supply reliability project. The goal is to have in the future only the most effective and cost-efficient projects.

The California Urban Water Planning Act (Wat. Code, § 10631 et seq.) requires contractors, such as defendant, to assess water supply reliability that compares total projected usage with the expected supply over a 20-year period in 5-year increments. (Wat. Code, § 10621, subd. (a), 10631, subd. (a); see *Friends of Santa Clara River v.*

Castaic Lake Water Agency (2004) 123 Cal.App.4th 1, 8.) In accordance with statutory requirements, defendant adopted the 2005 Urban Water Management Plan. However, defendant's 2005 Urban Water Management Plan exceeds the minimum 20-year period and covers a 25-year period. Defendant's 2005 Urban Water Management Plan built upon its 2000 Urban Water Management Plan, as amended. Defendant evaluated the long-term water needs within its service area and compared these requirements against existing potential water supplies. The United States Census indicates defendant's service area had a population of approximately 190,000 with 63,000 households. Defendant projects a population growth from 249,343 in 2005 to 428,209 in 2030. The 2005 Urban Water Management Plant was identified as a potential source to meet future demands for water.

On January 31, 2006, pursuant to section 21092, subdivision (a) defendant issued a notice of preparation of the draft environmental impact report for the 2006 project. The 2006 project consists of the contractual right to annually purchase water from the Buena Vista/Rosedale-Rio Bravo water banking program in the amount of 11,000 acre feet through the year 2035. Defendant further has the right to extend the contract with the Buena Vista and Rosedale-Rio Bravo districts subject to compliance with applicable law. The 2006 project environmental impact report states the 11,000 acre feet of water per year purchase from the Buena Vista/Rosedale-Rio Bravo water banking program "is to be used primarily for annexations" to defendant's service area. But until "any such annexations are likely approved," the supply would be available to meet existing demands. Defendant also has the right to purchase an additional 9,000 acre feet in any given year from the Buena Vista/Rosedale-Rio Bravo water banking program. The Buena Vista/Rosedale-Rio Bravo water banking program delivers water to customers such as defendant in two ways. The first way is the so-called "in lieu" exchange. Under the in lieu exchange method, the Buena Vista and Rosedale-Rio Bravo districts, rather than use their banked groundwater, transfers water to which they have rights under their contracts with the State Water Project. The groundwater could be sold to local customers or it can remain in the ground. In other words, in lieu of pumping groundwater, the

Buena Vista and Rosedale-Rio Bravo districts could ship other water to which they have rights to customers such as defendant. Hence, the terminology in lieu exchange describes this first method of delivering water to defendant under the 2006 project. The second way to deliver the contracted for water is to pump it out of the ground in the Buena Vista and Rosedale-Rio Bravo districts and deliver it via the California Aqueduct to defendant. The principal method of recovery and delivery would be from State Water Project water delivered to the Buena Vista and Rosedale-Rio Bravo districts for recharging or irrigation purposes. Resort to groundwater pumping would occur only in years when the State Water Project undergoes shortages—1 to 5 years in every 35-year period. Under either delivery system, all deliveries were required to comply with State Water Project standards.

Defendant determined its projected demands required supplemental water sources beyond the amounts specified in Table A attached to its long-term water contract with the Department of Water Resources. In addition, banking was needed to improve water supply especially in drought years. In some years, the full amount of contracted water due from the State Water Project may not be available for delivery to its long-term contractors due to: hydrology; the amount of water in storage; the operational constraints and environmental regulations; the amounts of water requested by other contractors; climatic conditions; and other factors. The 2006 environmental impact report states the project consists of an action by defendant to augment its supply to meet the demands of its service area. Further, the 2006 environmental impact report states defendant desired to augment its water supply to meet future demands in the event its service area is enlarged by reason of annexation; or transfer of water from the Buena Vista/Rosedale-Rio Bravo water banking program. Defendant's purchase of water from the Buena Vista/Rosedale-Rio Bravo water banking program guaranteed a firm water supply which is not subject to the variations in the State Water Project supply. The 2006 project is also identified in defendant's 2005 Urban Water Management Program as a source to meet projected demand in the Santa Clarita Valley.

The 2006 environmental impact report indicates that there were no significant direct impacts from the project. The 2006 environmental impact report states that less significant impacts included increased electrical power demand and air emissions from moving water to defendant's service area. This impact removed obstacles to growth in defendant's service area. As a result, defendant identified population growth or development as potential indirect impacts. However, defendant notes that its responsibility is to provide water in the service area and not to approve locations of any new development. To the extent that there were visual or aesthetic effects caused by water purchase programs, the 2006 environmental impact report states that such impact could be mitigated by the county and city agencies approving such developments in the project-specific environmental review process. The 2006 environmental impact report identifies three alternatives to the project: reduced water supply; purchase of desalinated water; and no project. The 2006 environmental impact report concludes the project was the environmentally superior alternative. This is because, under the reduced water supply and no project alternatives, defendant would be required to obtain additional water supplies to meet the projected needs of the service area. The 2006 environmental impact report notes that the desalination project could actually cause more direct impacts to the environment than the project. This is because the construction and operation of new desalination facilities would be required. These activities would have significant impacts on: air quality; aesthetic and visual resources; agricultural resources; biological resources; marine resources; geology and soils; hydrology and water quality; land use and planning; noise levels; and recreation.

The 2006 environmental impact report identifies five possible annexation sites within the service area. The 2006 environmental impact report states that whether the sites were actually annexed was not within the defendant's authority but that water availability was a factor in the annexation process. The potential annexations would result in a 4,375 acre feet of water per year increase in demand for water. The 2006 environmental impact report states that 11,000 acre feet of water per year of water would

be able to serve between approximately 11,340 and 11,830 households, which translates into approximately 36,290 and 37,850 persons.

Pursuant to section 21092, subdivisions (a) and (b)(i) and California Code of Regulations, title 14, section 15087, subdivision (c)(2),[3] the public was provided with the opportunity to comment on the draft 2006 environmental report. Among the issues raised during the comment period was whether the 2006 environmental impact report adequately disclosed whether the project was being pursued under the so-called Monterey Amendment to State Water Project long-term contracts. In the 1990's, disagreements arose between contractors and others with the Department of Water Resources concerning the distribution of State Water Project supplies. State Water Project contractors and the Department of Water Resources negotiated a settlement which provided for an overhaul of long term water contracts and a new approach to managing State Water Project supplies. The dispute arose under article 18 of the long-term contracts. The principles developed as part of the 1994 settlement are known as the "Monterey Agreement." The 1994 "Monterey Agreement" amended water contracts and those changes are known as the "Monterey Amendment." The Monterey Amendment was approved in 1995 and went into effect in August 1996. (See *Friends of Santa Clara River v. Castaic Lake Water Agency* (2002) 95 Cal.App.4th 1373, 1375; *Planning & Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 897-902.) One principle of the Monterey Amendment called for the transfer of about 130,000 acre feet of water per year from agriculture to urban users. (*Friends of the Santa Clara River v. Castaic Lake Water Agency*, *supra*, 95 Cal.App.4th at pp. 1376-1377; *Planning & Conservation League v. Department of Water Resources*, *supra*, 83 Cal.App.4th at pp. 901-902.)

The comments to the 2006 draft environmental impact report state: it did not fully disclose whether the transfers were permanent; a permanent transfer implicated the

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[3] All future reference to the Guidelines are to the provisions of California Code of Regulations, title 14.

Monterey Amendment; and the project was the "functional equivalent" of a permanent transfer of water requiring the Department of Water Resources prepare an environmental impact report as the lead agency under the standards set forth in *Planning & Conservation League v. Department of Water Resources*, *supra*, 83 Cal.App.4 at page 920. Defendant responded to the comments by noting the water purchased from the Buena Vista Rosedale-Rio Bravo districts under the 2006 project did not involve the State Water Project Table A supplies. According to defendant, the Monterey Agreement applied to two types of water transfers—permanent transfers of Table A amounts and annual transfers of allocated Table A supplies. Defendant further stated that the Monterey Agreement did not address transfers of non-State Water Project supplies. Citing section 2.4 of the draft environmental impact report, defendant explained no purchase of water subject to Table A had occurred. Instead, defendant pointed out: the Table A supplies for it, as well as Buena Vista and Rosedale-Rio Bravo districts, would remain the same under the 2006 project; the purchased water originated from local and other supplies that will be recharged and banked in groundwater basins; and the supplies included Kern River wet year water and other acquired waters. Defendant also noted that all of the information about the program water supplies was set forth in the 2002 Buena Vista/Rosedale-Rio Bravo water banking environmental impact report.

Defendant denied that there was a functional equivalent of a permanent transfer of Table A waters subject to the Monterey Agreement. Defendant stated the State Water Project Table A supplies attributed to the long-term contract with the Department of Water Recovery constitute but one mechanism for the purchased water to be delivered to defendant through an in-lieu exchange. Thus, defendant argued the Department of Water Resources did not have to be the lead agency. The only role of the Department of Water Resources in the project is to approve the change in place of use and point of delivery of exchange water delivered from to another State Water Project long-term contractor and for the direct delivery of groundwater into the California Aqueduct.

Defendant's Board of Directors adopted Resolution No. 2492 on October 25, 2006, certifying the final 2006 environmental impact report for the project and adopting:

findings; a mitigation monitoring and reporting program; and a statement of overriding considerations. Resolution No. 2492 approved the project. The board determined: the 2006 project's benefits outweighed any significant and unavoidable environmental impacts; substantially all of the 2006 project's indirect impacts consist of growth inducement which is outside of its jurisdiction and control; the 2006 project will bring substantial benefits to the defendant's service area by improving the its ability to meet the present and projected water demands; and the 2006 project will bring substantial benefit to defendant's service area by preparing for projected growth.

C. The Amended Mandate Petition And Its Denial

On November 26, 2006, plaintiffs filed their mandate petition. The first amended petition alleged that plaintiffs are non-profit organizations. Plaintiffs sought to set aside the certification of the 2006 environmental impact report for the project and a declaration defendant's actions were unlawful. The amended petition further alleged: the 2006 environmental impact report fails to clearly identify and describe the likely source of water that will be acquired by defendant because it does not accurately describe the "in-lieu" method; the method employed by the 2006 project is really a transfer of State Water Project Table A water; the 2006 environmental impact report fails to forecast the project's potential impacts on marine life including some sensitive species which would be caused by additional winter pumping; defendant was not the proper lead agency to conduct environmental review of the 2006 project; and the 2006 environmental impact report fails to properly evaluate the use of State Water Project facilities to deliver the exchange of water to the service area which must be done by the Department of Water Resources. Plaintiffs requested issuance of alternative and peremptory writs of mandate commanding defendant to set aside, invalidate, and void the certification of the 2006 environmental impact report. Plaintiffs also requested declaratory and injunctive relief. The trial court denied the first amended petition after briefing and a hearing. Judgment

was entered on all of plaintiffs' causes of action in favor of defendant. This timely appeal followed.

III. DISCUSSION

A. Standard of Review

Our Supreme Court in *Citizens of Goleta Valley* v. *Board of Supervisors* (1990) 52 Cal.3d 553, 563-564, summarized the purposes of the California Environmental Quality Act: "As we recently observed in *Laurel Heights Improvement Assn.* v. *Regents of University of California* (1988) 47 Cal.3d 376, (*Laurel Heights*): 'The foremost principle under [the California Environmental Quality Act] is that the Legislature intended the act "to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language."' [Citation.] [¶] The EIR has been aptly described as the 'heart of CEQA.' (Guidelines, § 15003, subd. (a); *Laurel Heights, supra,* 47 Cal.3d at p. 392; *County of Inyo* v. *Yorty* (1973) 32 Cal.App.3d 795, 810.) Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made. Thus, the EIR 'protects not only the environment but also informed self-government.' (*Laurel Heights, supra*, 47 Cal.3d at p. 392.) [Fn. omitted.]"

Whether defendant's certification of the 2006 environmental impact report complies with the relevant provisions of law is reviewed for a prejudicial abuse of discretion. (§ 21168.5; *In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1161; *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435; *Citizens of Goleta Valley* v. *Board of Supervisors, supra,* 52 Cal.3d at pp. 563-564.) Section 21168.5 states, ". . . Abuse of discretion is established if the agency has not proceeded in a manner required by law or if the determination or decision is not supported by substantial evidence." In deciding whether a prejudicial abuse of discretion has occurred

our Supreme Court has stated: "As a result of this standard, 'The court does not pass upon the correctness of the EIR's environmental conclusions, but only upon its sufficiency as an informative document.' [Citation.] [¶] . . . [¶] A court may not set aside an agency's approval of an EIR on the ground that an opposite conclusion would have been equally or more reasonable. [Citation.] A court's task is not to weigh conflicting evidence and determine who has the better argument when the dispute is whether adverse effects have been mitigated or could be better mitigated. We have neither the resources nor scientific expertise to engage in such analysis, even if the statutorily prescribed standard of review permitted us to do so. Our limited function is consistent with the principle that 'The purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind. . . . ' [Citation.]" (*Laurel Heights Improvement Assn. v. Regents of University of California, supra,* 47 Cal.3d at pp. 392-393; see also *Western States Petroleum Assn. v. Superior Court* (1995) 9 Cal.4th 559, 573-574; *Citizens of Goleta Valley v. Board of Supervisors, supra,* 52 Cal.3d at p. 564.) We review defendant's actions de novo determining whether the administrative record demonstrates any legal error and it contains substantial evidence to support the factual determinations. (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova, supra,* 40 Cal.4th at p. 427; *Citizens of Goleta Valley* v. *Board of Supervisors, supra,* 52 Cal.3d at pp. 563-564.)

B. Compliance With The California Environmental Quality Act

1. The environmental impact report adequately describes the project.

There is no merit to plaintiff's argument the 2006 project environmental impact report fails to include an adequate and consistent description of the water source. The absence of information from an environmental impact report does not establish a

violation of Guidelines, section 15124,[4] the controlling provision, as a matter of law. (*Berkeley Keep Jets Over the Bay Committee v. Board of Port Comrs.* (2001) 91 Cal.App.4th 1344, 1355; *Al Larson Boat Shop, Inc. v. Board of Harbor Commissioners* (1993) 18 Cal.App.4th 729, 749.) Rather, judicial review under the prejudicial abuse of discretion standard set forth in section 21168.5 focuses on the sufficiency of the environmental impact report as an informative document. (*Laurel Heights Improvement Assn. v. Regents of University of California, supra,* 47 Cal.3d at p. 392; accord *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova, supra,* 40 Cal.4th at p. 445; *Western States Petroleum Assn. v. Superior Court, supra,* 9 Cal.4th at pp. 573-574.) A prejudicial abuse of discretion occurs when the failure to include information in the environmental impact report prevents informed decisions and public participation, which thwarts the goals of the evaluative process. (*Anderson First Coalition v. City of*

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[4] Guidelines, section 15124 states: "The description of the project shall contain the following information but should not supply extensive detail beyond that needed for evaluation and review of the environmental impact. [¶] (a) The precise location and boundaries of the proposed project shall be shown on a detailed map, preferably topographic. The location of the project shall also appear on a regional map. [¶] (b) A statement of the objectives sought by the proposed project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project. [¶] (c) A general description of the project's technical, economic, and environmental characteristics, considering the principal engineering proposals if any and supporting public service facilities. [¶] (d) A statement briefly describing the intended uses of the EIR. [¶] (1) This statement shall include, to the extent that the information is known to the lead agency, [¶] (A) A list of the agencies that are expected to use the EIR in their decision-making, and [¶] (B) A list of permits and other approvals required to implement the project. [¶] (C) A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies. To the fullest extent possible, the lead agency should integrate CEQA review with these related environmental review and consultation requirements. [¶] (2) If a public agency must make more than one decision on a project, all its decisions subject to CEQA should be listed, preferably in the order in which they will occur. On request, the Office of Planning and Research will provide assistance in identifying state permits for a project."

Anderson (2005) 130 Cal.App.4th 1173, 1178; *Galante Vineyards v. Monterey Peninsula Water Management Dist.* (1997) 60 Cal.App.4th 1109, 1117.) Guidelines section 15151 provides: "An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. . . . The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure." (See *Anderson First Coalition v. City of Anderson*, *supra*, 130 Cal.App.4th at p. 1178; *Berkeley Keep Jets Over the Bay Committee v. Board of Port Comrs.*, *supra*, 91 Cal.App.4th at p. 1355; *Rio Vista Farm Bureau Center v. County of Solana* (1992) 5 Cal.App.4th 351, 368.)

Plaintiffs argue the 2006 environmental impact report omits or mischaracterizes information about the sources for the water supply. To the extent plaintiffs are criticizing the ambiguity of the Buena Vista/Rosedale-Rio Bravo water banking program, they cannot raise that contention. The 2002 environmental impact report is conclusively presumed valid and it is not subject to challenge in this action. (§ 21167.2; *Laurel Heights Improvement Assn. v. Regents of University of California* (1993) 6 Cal.4th 1112, 1130.) Thus, plaintiffs cannot challenge the Buena Vista/Rosedale-Rio Bravo water banking and recovery program under the guise of litigating the 2006 environmental impact report. This action must be limited to whether the 2006 environmental impact report sufficiently informs the decisionmakers and the public about impacts from the project. Plaintiffs may not litigate the impact of the Buena Vista/Rosedale Rio Bravo water banking program. The aforementioned conclusive 2002 environmental impact report repeatedly states that the primary method of delivery will be through "in-lieu" exchange of State Water Project supplies. The 2002 environmental impact report sets forth: the environmental effects of operating the program which included the sale of water to third-parties; discussions of delivery through banked underground water; and analysis of delivery through "in-lieu" exchange of Table A supplies. The 2002 program

environmental impact report fully disclosed that the primary method of delivery would be "in-lieu" exchange but that in some years the delivery might vary depending upon State Water Project supplies.

In any event, the 2006 environmental impact report adequately describes the project. The 2006 environmental report: identifies the sources of the water that will be delivered; describes the growth related effects of the purchase in defendants' service area; and identifies the effects of additional water pumping. The 2006 environmental impact report explains that the primary source of water provided by the Buena Vista/Rosedale-Rio water banking program will be water provided to them by the State Water Project. There is no merit to plaintiffs' contention the discussion in that regard is incomplete or misleading.

Furthermore, we disagree with plaintiffs the "in-lieu" exchange delivery amounts to a permanent transfer of Table A water or the functional equivalent thereof. Before proceeding to a discussion of the merits of plaintiffs' environmental analysis, it bears emphasis that the Buena Vista and Rosedale-Rio Bravo Districts have the statutory authority to sell their water and water rights pursuant to Water Code section 43001. (See fn. 2, *infra*.) At oral argument, plaintiffs' counsel admitted there is no statutory bar to the sale of water rights by the Buena Vista and Rosedale-Rio Bravo Districts. Rather, as fleshed out at oral argument, plaintiffs argue that the proposed transfer of waters violate attachment C to the Monterey Agreement which are Department of Water Resources guidelines for review of proposed permanent transfers of Table A waters. The attachment C guidelines are in furtherance of the state policy favoring voluntary water transfers which includes a preference for use of water for non-irrigation purposes; i.e., for the sustenance of human beings, household conveniences, and the care of livestock. (Wat. Code, § 106; *Prather v. Hoberg* (1944) 24 Cal.2d 549, 562.) Further, paragraph 3 of attachment C states, "These guidelines are not intended to change or augment existing law."

In any event, as discussed above, all information concerning the environmental impacts from the two delivery methods was discussed and analyzed in the *conclusive*

2002 environmental impact report. Nevertheless, there is no merit to the contention that there is a permanent transfer of Table A amounts. Both the Buena Vista and Rosedale-Rio Bravo districts have contractual rights with the State Water Project which allow them to receive a maximum amount of water supply in a given year. The water supply from the State Water Project varies depending on the conditions such as: hydrologic conditions; current reservoir storage; and total water contractor requests. However, the actual amount of water delivered under the 2006 project is not contingent upon Table A supplies distributed by the State Water Project to the Buena Vista and Rosedale-Rio Bravo districts. It is undisputed that the Table A supplies can vary yearly. Rather, under the program, defendant has a contractual right to receive 11,000 acre feet of water per year regardless of whether the Buena Vista and Rosedale-Rio Bravo districts receive Table A supplies. Thus, use of Table A water is neither the actual nor the functional equivalent of a permanent transfer because it may not occur. The "in-lieu" exchange is simply one method to meet the contractual obligation to deliver 11,000 acre feet of water to defendant. It is not a permanent transfer of Table A supplies. And even if the project were such a transfer, it is sufficiently described along with its effects in the 2006 environmental impact report. The 2006 environmental impact report expressly states that the water purchased would come from two sources. The first source is the Buena Vista and Rosedale-Rio Bravo Districts State Water Project waters. The second source is the banked groundwater whose rights are owned by Buena Vista and Rosedale-Rio Bravo Districts. In an unusually dry year, groundwater supplies may be the sole source of waters sold to third parties such as defendant. And the 2006 environmental impact report states that 2006 project does not involve the purchase of Table A amounts. Contrary to plaintiffs' counsel's assertion at oral argument, the 2006 environmental impact report does not mask the source of the waters.

2. The 2006 environmental impact report adequately reviewed growth inducing impacts.

Plaintiffs contend that the 2006 environmental impact report fails to adequately review the growth inducing impacts generated by the purchase of the water. We disagree. In *Muzzy Ranch Co. v. Solano County Airport Land Use Com.* (2007) 41 Cal.4th 372, 388-389, our Supreme Court articulated an agency's responsibility to analyze growth inducing impacts as follows: "Under CEQA, a public agency is not always 'required to make a *detailed* analysis of the impacts of a project on [future] housing and growth.' [Citation.] 'Nothing in the [CEQA] Guidelines, or in the cases, requires more than a general analysis of projected growth. The detail required in any particular case necessarily depends on a multitude of factors, including, but not limited to, the nature of the project, the directness or indirectness of the contemplated impact and the ability to forecast the actual effects the project will have on the physical environment.' [Citation.] [¶] 'In addition, it is relevant, although by no means determinative, that future effects will themselves require analysis under CEQA.' [Citation.] And '[t]hat the effects will be felt outside of the project area . . . is one of the factors that determines the amount of detail required in any discussion. Less detail, for example, would be required where those effects are more indirect than effects felt within the project area, or where it [would] be difficult to predict them with any accuracy.' [Citations].) Most significantly, the CEQA Guidelines provide for streamlined review of projects that are consistent with existing general plans and zoning. [Citation.] When approving a project that is consistent with a community plan, general plan, or zoning ordinance for which an environmental impact report already has been certified, a public agency need examine only those environmental effects that are peculiar to the project and were not analyzed or were insufficiently analyzed in the prior environmental impact report. [Citation.]" (See also *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 369.)

The 2006 environmental impact report complies with the statutorily imposed informational requirements. Chapter 4.0 of the 2006 environmental impact report discusses growth inducing impacts and potential indirect impacts on resources from growth. Furthermore, there is no evidence the additional water will induce any growth that is unaccounted for in the general plan of the area. Rather, chapter 5.0 of the 2006 environmental impact report contains a discussion of the project's consistency with general and regional plans. The 2006 environmental impact report assumes that the entire 11,000 acre feet of water per year would be for new growth. The project also assumes that approximately 37,850 people would be served by the water supply from the project. The growth potential was within the general plan forecasts of 270,000 by 2010 and 428,209 by 2030 for the Santa Clarita Valley. Moreover, the 2006 project is a part of a process to meet defendant's obligation to provide water to its service area in accordance with projected population increases. Thus, the 2006 environmental impact report contains a detailed analysis of growth inducing impacts. The 2006 project is also consistent with existent general and community plans projecting growth increases in the service area. The 2006 environmental impact report adequately discusses growth related issues. (*Muzzy Ranch Co. v. Solano County Airport Land Use Com.*, *supra*, 41 Cal.4th at pp. 388-389; *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors*, *supra*, 91 Cal.App.4th at p. 369; see also Guidelines, § 15126.2, subd. (d); *Sierra Club v. West Side Irrigation Dist.* (2005) 128 Cal.App.4th 690, 702-703.)

Finally, we disagree with plaintiffs that there was something amiss in the 2006 environmental impact report because defendant included five proposed annexation sites in the discussion. Plaintiffs interpret defendant's inclusion of the five potential sites identified in chapter 3.0 as evidence of a plan to grow the area. Because of the pending applications, defendant was required to include the sites in the environmental impact report. (Guidelines, § 15125; *Muzzy Ranch Co. v. Solano County Airport Land Use Com.*, *supra*, 41 Cal.4th at pp. 387-388 [§ 21060.5 obligates an defendant to consider environmental impact of project outside the project area when it will have effect on geographically distant area].)

3. Defendant is the correct lead agency.

Plaintiffs assert that defendant's imprecise discussion is an attempt to mask what is the "functional equivalent" of a permanent transfer of surplus Table A supplies belonging to the Buena Vista and Rosedale-Rio Bravo districts. Relying on *Planning & Conservation League v. Department of Water Resources*, *supra*, 83 Cal.App.4th at pages 903-907, plaintiffs argue the proper lead agency should have been the Department of Water Resources. The *Planning & Conservation League* decision held the Department of Water Resources was the proper lead agency for conducting environmental review of the Monterey Agreement. (*Ibid*.; see *Santa Clarita Organization for Planning the Environment v. County of Los Angeles* (2007) 157 Cal.App.4th 149, 153.) The *Planning & Conservation League* decision had statewide implications and involved a number of urban and agricultural contractors. The issues also involved rights under the long-term water supply contracts which governed the entire State of California.

In this case, defendant is the correct lead agency. Section 21067 defines a lead agency, '"Lead agency' means the public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment." Defendant argues it is the proper lead agency because: it is the lead proponent of the water acquisition plan; a substantial portion of the 2006 project occurs within its geographic area; and it alone decides whether to accept any water. We agree. Defendant has the principal responsibility for approving and carrying out a project to acquire a water supply for its service area. (§§ 21005, 21080, subd. (c), 21165; Guidelines, §§ 15051-15053.) The 2006 project also affects defendant's duties and obligations to provide water to its service area. In addition, the 2006 project occurs within defendant's jurisdiction. The transfer of water applies to only three agencies, albeit that the transfer will take place within State Water Project facilities. The three agencies are the primary ones affected by the 2006 project. Thus, defendant was the proper lead agency. In any event, plaintiffs conceded in the trial court in their reply brief, and at hearing on the petition that its lead agency analysis rests on the conclusion the

2006 project is in effect a Table A transfer. We have concluded no disguised permanent nor functional equivalent transfer of Table A water has occurred. As a result, the Department of Water Resources was not required to be the lead agency such that it should have prepared the environmental impact report. (*Eller Media Co. v. Community Redevelopment Agency* (2003) 108 Cal.App.4th 25, 46; *Friends of Cuyamaca Valley v. Lake Cuyamaca Recreation & Park Dist*. (1994) 28 Cal.App.4th 419, 426-428; *City of Sacramento v. State Water Resources Control Bd*. (1992) 2 Cal.App.4th 960, 970-973; *City of Redding v. Shasta County Local Agency Formation Com.* (1989) 209 Cal.App.3d 1169, 1173-1177.)

4. The project does not impermissively rely on a draft of general plan.

Relying on *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 941-951, plaintiffs argue the 2006 project improperly appropriated water supplies for development that had not already been included in the Los Angeles County General Plan. In *County of Amador*, the environmental impact report was based on population projections contained in a draft general plan prepared by El Dorado County. (*Id*. at pp. 941, 947.) The *County of Amador* opinion concluded, "We hold only that, in this case, an [environmental impact report] predicated on a draft general plan is fundamentally flawed and cannot pass CEQA muster." (*Id.* at p. 951.)

The *County of Amador* decision is not controlling. Here, there is no draft general plan at issue. In other words, defendant did not predicate the project on a draft general plan which has been judicially determined to be inadequate. Rather, the water planning in this case for the project was based on projections from a number of sources including: the United States Census; defendant's 2005 Urban Water Management Plan; and the existing Santa Clarita Valley Area Plan of the County of Los Angeles General Plan. The existing Los Angeles County General Plan had projections of a population growth of 270,000 by the year 2010. The 2005 Urban Water Management Plan predicted the future need for water to meet the demand for population growth that had been projected by Los

Angeles County and the City of Santa Clarita. Defendant has a duty to plan for long term needs in the service area. The California Urban Water Planning Act (Wat. Code, § 10631 et seq.) requires water contractors, such as defendant, to assess water supply reliability that compares total projected water use with the expected water supply over a 20-year period in 5-year increments. (See *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova, supra,* 40 Cal.4th at pp. 434-435; *Friends of Santa Clara River v. Castaic Lake Water Agency, supra,* 123 Cal.App.4th at p. 8.) The proposed water purchase from the Buena Vista and Rosedale-Rio Bravo districts is one of several measures taken by defendant in order to meet the forecasts of population growth contained in county, city, and federal documents. The *County of Amador* opinion does not require reversal.

IV. DISPOSITION

The judgment is affirmed. Defendant, Castaic Lake Water Agency, is to recover its costs on appeal from plaintiffs, California Water Impact Network and Friends of the Santa Clara River.

NOT TO BE PUBLISHED IN THE OFFICIAL REPORTS

TURNER, P. J.

We concur:

MOSK, J. KRIEGLER, J.

CASTAIC LAKE WATER AGENCY LITIGATION

SETTLEMENT AGREEMENT

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CASTAIC LAKE WATER AGENCY LITIGATION

SETTLEMENT AGREEMENT

This Castaic Lake Water Agency Litigation Settlement Agreement (the **"Agreement")** is dated as of April 6, 2007 **("Agreement Date"),** by and between the Castaic Lake Water Agency (**"CLWA"**), Santa Clarita Water Company (**"SCWC"**), Newhall County Water District (**"NCWD"**) and Valencia Water Company (**"VWC"**) (collectively, **"Plaintiffs"**), on the one hand, and Whittaker Corporation (**"Whittaker"**), Santa Clarita L.L.C. (**"SCLLC"**), Remediation Financial, Inc. (**"RFI"**), and American International Specialty Lines Insurance Company (**"AISLIC"**), on the other hand. Hereinafter, Whittaker, SCLLC and RFI are collectively referred to as **"Defendants,"** the Plaintiffs and Defendants and AISLIC are collectively referred to as the **"Parties,"** each Plaintiff, each Defendant, and AISLIC is individually referred to as a **"Party,"** and SCLLC and RFI are collectively referred to as the **"RFI Parties"** or **"Debtors."**

RECITALS

A. SCLLC is the owner of approximately 964.79 acres of real property located in the City of Santa Clarita, County of Los Angeles, State of California, described more fully in Exhibit A hereto (the "**SCLLC Property**"). Bermite Recovery, LLC ("**BRLLC**") is the owner of approximately 23.6 acres of real property located in the City of Santa Clarita, County of Los Angeles, State of California, described more fully in Exhibit B hereto (the "**BRLLC Property**"). The SCLLC Property and the BRLLC Property are hereinafter referred to collectively as the "**Site**."

B. SCWC is the operator of water wells commonly designated as Saugus 1, Saugus 2 and the Stadium Well. NCWD is the owner and operator of water wells commonly designated as NC11 and NC13. VWC is the owner and operator of water wells commonly designated as V157 and Q2. Saugus 1, Saugus 2, the Stadium Well, NC11, V157 and Q2 are collectively referred to at all times as the "**Subject Wells**". As set forth in Section 9.1.7 hereof, NC13 shall be deemed a "Subject Well" in the event and only in the event it is treated as a Project Modification pursuant to Section 9.1.7 and only prospectively from that date it is so treated.

C. Plaintiffs and Defendants are parties to a civil action pending in the United States District Court for the Central District of California, Case No. CV 00-12613 AHM (RZx) (the "**Underlying Action**"). In the Underlying Action, Plaintiffs allege, among other things, that (1) groundwater in the vicinity of the Site has been contaminated by perchlorate and other hazardous materials and that such contamination is continuing with releases to the groundwater; (2) perchlorate has been found in the Subject Wells, and Plaintiffs have incurred and will continue to incur costs in responding to the contamination; and (3) Defendants caused and/or permitted (and are continuing to cause and/or permit) the contamination found on, above, under, or released to the environment at and near the Site and in the Subject Wells. Plaintiffs further allege that they have incurred "response costs" in addressing this contamination, including the costs of engaging consultants to undertake environmental assessment, water treatment studies, groundwater analysis and characterization work in connection with the alleged perchlorate contamination. Plaintiffs are seeking recovery of their alleged response costs and other damages, as well as injunctive and declaratory relief. Defendants deny Plaintiffs' allegations and, further, contend in their Counter-Claims that Plaintiffs are liable, in whole or in part, for Plaintiffs' alleged costs and damages **("the Counter-Claims").**

D. Plaintiffs have entered into that certain Environmental Oversight Agreement ("**EOA**") with the California Environmental Protection Agency, Department of Toxic Substances Control ("**DTSC**"). Plaintiffs are designated as "Proponents" under the EOA.

E. Whittaker and DTSC are parties to that certain 1994 Consent Order, Docket HAS 94/95-012 (the "**Consent Order**"), and the DTSC issued to Whittaker that certain Imminent and Substantial Endangerment Determination and Order and Remedial Action Order (the "**Order**") in 2002. SCLLC and DTSC are parties to that certain 2001 Enforceable Agreement (the "**Enforceable Agreement**").

F. Plaintiffs and Defendants entered into that certain Interim Settlement and Funding Agreement dated as of July 28, 2003 (the "**Interim Agreement**") and that certain First Amendment to Interim Settlement and Funding Agreement dated as of October 11, 2004 (the "**First Amendment**") which, among other things, extended the term of the Interim Agreement through January 2005.

G. Plaintiffs and Defendants mutually agree on the "Project and Associated Facilities" (as hereinafter defined) that shall be implemented by the Plaintiffs. The Project and Associated Facilities are intended to provide containment of perchlorate in off-site groundwater in portions of the Saugus Formation and to restore Plaintiffs' groundwater production capacity diminished by perchlorate contamination in the Subject Wells.

H. The Project fulfills some of Defendants' obligations under and resolves some of Defendants' alleged liabilities to DTSC under the Consent Order, the Order, and the Enforceable Agreement with respect to the remediation of groundwater, and Defendants' remaining responsibility for addressing groundwater remediation will be determined in compliance with the lawful requirements of the regulatory agencies.

I. This Agreement provides for certain funds to be available rapidly to address any future perchlorate contamination of Plaintiffs' presently existing **"Threatened Wells"** (as defined herein) during the period defined herein without prejudice to other rights and remedies of the Plaintiffs or the defenses of the Defendants. This Agreement also provides for arbitration to be available to Plaintiffs to resolve certain future disputes, if any, between or among the Parties involving possible future perchlorate contamination of Plaintiffs' **"Presently Existing Saugus Production Wells and Alluvial Production Wells"**, other than the Subject Wells, as hereinafter defined.

J. This Agreement contemplates that the Defendants (or any **"Buyer"** (as defined below) of the Site that assumes certain liabilities of Defendants) will be in compliance with their remediation responsibilities under law with respect to the Site and the associated groundwater, as reflected in the applicable requirements of the Consent Order, Order and the Enforceable Agreement, and that Defendants will conduct their remediation activities in a reasonably expedient, efficient and cost-effective manner as reasonably determined by Defendants and the regulatory authorities. In particular, the Defendants' (and/or any Buyer of the Site that assumes certain liabilities of Defendants) remedial activities within the Site are important to addressing the contamination within the Saugus and **"Alluvial Aquifers"** (as defined below). The Parties acknowledge that payments and expenditures under this Agreement are deemed reasonable and necessary for addressing offsite groundwater contamination emanating from the Site and are consistent with the National Contingency Plan, and are deemed **"Response Costs"** (as defined below) as that term is used and contemplated in CERCLA.

K. VWC reported detecting perchlorate in its alluvial well Q2 in connection with its regular monitoring of active municipal supply wells operating near the site in April 2005

(although a more recent sampling did not detect perchlorate above the current California Department of Health Services ("DHS") limit for reporting perchlorate). VWC temporarily removed the well from active service and installed wellhead treatment to remove perchlorate. The Q2 treatment system started operating in October 2005. The Defendants have funded five hundred thousand dollars ($500,000) for reasonable and necessary and approved capital costs and two hundred twenty three thousand and two hundred ten dollars ($223,210) for reasonable and necessary and approved operations and maintenance costs of the Q2 Treatment System in a Q2 Escrow Account. The Defendants have agreed to pay certain additional reasonable and necessary operating and maintenance costs of that system in accordance with the terms of this Agreement.

L. On July 7, 2004, SCLLC, and RFI filed voluntary Chapter 11 bankruptcy petitions, and the cases thereby commenced are pending in the United States Bankruptcy Court for the District of Arizona ("**Bankruptcy Court**"), denominated Cases Nos. 2-04-BK-11910 CGC, and 2-04-BK-11911 CGC. BRLLC filed a voluntary Chapter 11 bankruptcy petition on September 30, 2004, denominated Case No. 2-04-BK-17294 CGC, also pending in the Bankruptcy Court. Case Nos. 2-04-BK-11910 CGC, 2-04-BK 11911 CGC and 2-04-BK-17294 CGC are hereinafter referred to collectively as the "**Bankruptcy Cases.**" RFI Realty, Inc. filed a voluntary Chapter 11 bankruptcy petition on June 15, 2004 denominated as Case No. 2-04-BK-10486 CGC; the Bankruptcy Cases are jointly administered with RFI Realty, Inc.'s bankruptcy case under Case No. 2-04-BK-10486 CGC. SCLLC and BRLLC have filed a motion seeking Bankruptcy Court Approvals to sell the Site. The term "**Buyer**," as used herein, means the entity to which title to the Site is conveyed after Bankruptcy Court approval; provided, however, that if either the Bankruptcy Court does not approve a sale or a sale approved by the Bankruptcy Court

in the Bankruptcy Cases does not close pursuant to Bankruptcy Court approval, and consequently there is no Buyer, then this Agreement shall not be impacted in any way whatsoever.

M. Plaintiffs have prepared and submitted to DTSC for approval and DTSC has approved a Remedial Investigation ("RI") consisting of a technical memorandum prepared on behalf of the United States Army Corps of Engineers, a Feasibility Study ("FS") and an Interim Remedial Action Plan ("IRAP") for a containment and treatment system for perchlorate contamination in portions of the Saugus Formation. Such containment and treatment system is consistent with the discussions and understandings between the Plaintiffs and Defendants.

N. The Parties are entering into this Agreement in order to effectuate a settlement of the Underlying Action and to resolve certain disputes between Plaintiffs and Defendants that have arisen between them, as well as to provide the Parties with expedited alternative dispute resolution mechanisms for resolving certain disputes which may arise between Plaintiffs and Defendants in the future, to the extent provided and in accordance with the terms and conditions set forth in this Agreement. The Plaintiffs and Defendants have reached a separate settlement concerning the Defendants' Counter-Claims which will be the subject of a separate settlement agreement to be executed by certain of the Parties simultaneously with the execution of this Agreement, (the "Related Settlement") and which is part of the consideration for and a condition precedent to this Agreement.

O. Certain funds from the **"Steadfast PLC Policy"** (defined below), in accordance with and subject to the Coverage and Claims Settlement Agreement and the Bankruptcy Court's December 22, 2005 Order approving same, and the Joint Escrow 1 Agreement and Instructions, are being made available to settle the matters described and released herein. AISLIC shall

request the SF Escrow 1 Account Escrow Agent (Wells Fargo Bank or any successor) to release funds from the SF Escrow 1 Account to satisfy certain of Defendants' payment obligations and obligations to fund escrow accounts hereunder.

P. The Defendants and AISLIC represent that this Agreement is a settlement in the CLWA Case that meets all "Approved CLWA Settlement Parameters" set forth in Exhibit 16 to the Coverage and Claims Settlement Agreement.

Q. The Defendants and AISLIC represent that the payment obligations pursuant to this Agreement will be funded on behalf of Defendants as provided by Section VIII ("Funding Settlement of CLWA Case") of the Coverage and Claims Settlement Agreement and as provided herein.

R. Nothing in this Agreement is intended to alter any rights or obligations existing under the Coverage and Claims Settlement Agreement.

NOW, THEREFORE, in consideration of the execution of this Agreement and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby agree as follows:

AGREEMENT

ARTICLE 1. DEFINITIONS

In addition to terms defined elsewhere in this Agreement, the following terms shall have the following meanings:

1.1 "**Administrator**" means AISLIC or such successor entity designated as the Administrator of the "SF Escrow 1" in the "Coverage and Claims Settlement Agreement."

1.2 **"Agreement"** means this "Castaic Lake Water Agency Litigation Settlement Agreement."

1.3 **"Agreement Date"** means April 6, 2007.

1.4 "**AISLIC**" means American International Specialty Lines Insurance Company, which issued Pollution Legal Liability Select/Cleanup Cost Cap, policy no. PLS 267-9186 (the "AISLIC Policy") to Defendant Whittaker Corporation and is the entity presently designated as the Administrator of the "SF Escrow 1" in the "Coverage and Claims Settlement Agreement."

1.5 "**AISLIC Future Perchlorate Determination of Coverage**" means a coverage determination by AISLIC satisfactory to Whittaker, at its discretion exercised in good faith, agreeing to provide coverage with respect to a "**Non-Subject Well Future Perchlorate Circumstance"** in response to the demand for coverage delivered by Whittaker as set forth in Section 10.1.1 below.

1.6 **"Allowed Claim"** has the meaning set forth in Section 12.1.5, below.

1.7 **"Alluvial Aquifer**" means the shallow (typically, 50 to 200 feet of saturated thickness), generally unconfined aquifer consisting of unconsolidated fluvial sand and gravel within the valleys and canyons of the Santa Clarita Valley. The Alluvial Aquifer unconformably overlies the Saugus Formation.

1.8 **"Annual Project O&M Deposit"** has the meaning set forth in Section 5.2.1.

1.9 **"Approved Capital Costs"** has the meaning set forth in Section 6.2.1, below.

1.10 **"Approved O&M Costs"** has the meaning set forth in Section 6.4.1, below.

1.11 **"Approved Q2 O&M Costs"** has the meaning set forth in Section 6.3.1, below.

1.12 **"Associated Facilities"** means the "Distribution Pipelines" and the "Replacement Wells & Associated Pipelines" (as defined below).

1.13 **"Bankruptcy Court"** has the meaning described in Recital L.

1.14 **"Bankruptcy Court Determinations"** has the meaning set forth in Section 2.4, below.

1.15 **"Bankruptcy Cases"** has the meaning described in Recital L.

1.16 **"BRLLC"** means Bermite Recovery, LLC the owner of approximately 23.6 acres of real property located in the City of Santa Clarita, County of Los Angeles, State of California and as more fully described in Exhibit B.

1.17 **"BRLLC Property"** has the meaning fully described in Exhibit B.

1.18 **"Buyer"** has the meaning fully described in Recital L.

1.19 **"CGL Policy"** has the meaning set forth in Section 11.1.1.

1.20 **"CLWA"** means Castaic Lake Water Agency.

1.21 **"Commencement of Operations"** means commencement of the operation to purvey water to the public from the Project or **"Q2 Treatment System" (as defined below)**, as the case may be. The Parties agree that Commencement of Operations for the Q2 Treatment System was October 12, 2005 ("Q2 Commencement Date").

1.22 **"Consent Order"** has the meaning fully described in Recital E.

1.23 **"Counter-Claims"** has the meaning fully described in Recital C

1.24 **"Coverage and Claims Settlement Agreement"** means the Settlement Agreement by and between the "RFI Parties", the "Zurich Companies", the "AISLIC Parties", and "Whittaker" (as those terms are defined in the Coverage and Claims Settlement Agreement) that provides for certain funding for this Agreement, and that was filed in the Bankruptcy Cases on November 15, 2005 and approved as modified by the Bankruptcy Court's Order Approving Coverage and Claims Settlement Agreement dated December 22, 2005 (the "Coverage Order").

1.25 **"Day"** or **"day"** means a calendar day unless expressly stated to be a Working Day.

1.26 **"Debtors"** means SCLLC and RFI.

1.27 **"Defendants"** means Whittaker, SCLLC and RFI, collectively.

1.28 **"Distribution Pipelines"** means construction of certain new distribution pipelines as described in Exhibit C.

1.29 **"DTSC"** means the California Environmental Protection Agency, Department of Toxic Substances Control as referred to in Recital D.

1.30 **"Earthquake Policy"** has the meaning set forth in Section 11.1.1.

1.31 **"EIL Policy"** has the meaning set forth in Section 11.1.1.

1.32 **"Effective Date"** has the meaning set forth in Section 2.1

1.33 **"Enforceable Agreement"** refers to that certain 2001 Enforceable Agreement made by SCLLC and DTSC, as described in Recital E, above.

1.34 **"EOA"** means the Environmental Oversight Agreement as referred to in Recital D.

1.35 "**Escrow Accounts**" means the "Project Capital Costs Escrow Account", the "Project O&M Escrow Account", the "Replacement Wells/Distribution Pipelines Escrow Account", and the "Q2 Escrow Account," (all as hereinafter defined.)

1.36 **"Final Approval Order"** has the meaning set forth in Section 2.1.

1.37 **"First Amendment"** has the meaning described in Recital F.

1.38 **"Good Faith Certifications"** has the meaning set forth in Section 2.1.1.

1.39 **"Initial Project Capital Costs Deposit"** has the meaning set forth in Section 4.4.

1.40 **"Interim Agreement"** has the meaning described in Recital F.

1.41 **"JAMS"** means Judicial Arbitration and Mediation Service.

1.42 **"Lump Sum Determination"** has the meaning set forth in Section 5.2.6.

1.43 **"MCL"** means Maximum Contaminant Level as set forth in Section 9.1.1.

1.44 **"NCWD"** means Newhall County Water District.

1.45 **"Order"** refers to that certain Imminent and Substantial Endangerment Determination and Order and Remedial Action Order described in Recital E.

1.46 **"Parties"** means Plaintiffs and Defendants and AISLIC, collectively.

1.47 **"Plaintiffs"** means Castaic Lake Water Agency ("CLWA"), Santa Clarita Water Company ("SCWC"), Newhall County Water District ("NCWD") and Valencia Water Company ("VWC"), collectively.

1.48 **"Plaintiffs' Past Environmental Claims"** means any claim for costs, including response costs, damages, attorneys and consultant fees, replacement water costs, and costs for remedial investigations, monitoring and litigation incurred by Plaintiffs prior to the Effective Date of this Agreement due to contamination of the Subject Wells or contamination of or threatened releases to groundwater at and in the vicinity of the Site; provided, however, that certain costs associated with Saugus 1 & 2 Treatment System, Replacement Wells and Associated Pipelines, and Distribution Pipelines, incurred prior to February 1, 2007, as set forth in Exhibit E to this Agreement (**"Plaintiffs' Past Design Costs"**) or incurred after January 31, 2007 and included within Project Capital Costs pursuant to Section 1.54, are excluded from Plaintiffs' Past Environmental Claims.

1.49 **"Plaintiffs' Past Design Costs"** means certain costs associated with Saugus 1 & 2 Treatment System, Replacement Wells and Associated Pipelines, and Distribution Pipelines, incurred by Plaintiffs prior to February 1, 2007, as set forth in Exhibit E to this Agreement.

1.50 **"Presently Existing Saugus Production and Alluvial Production Wells"** means the wells identified in Exhibit U, including wells replaced in the normal course of system operations in the immediate vicinity of the respective Presently Existing Saugus Production and Alluvial Wells.

1.51 **"Pro Forma Estimate of Project O&M"** has the meaning as set forth in Section 5.1.1 and is attached hereto as Exhibit D. **"Joint Estimate of Project O & M"** has the meaning as set forth in Section 5.2.1.

1.52 **"Project"** means:

1.52.1 The planning, development, design, permitting, construction, operation and maintenance of a system to be installed at the existing Rio Vista Intake Pump Station site for treatment of (i.e., removal of perchlorate from) water pumped from Saugus 1 and 2, so that the water will be available for potable purposes; any necessary operational modifications at the Saugus 1 and 2 Wells; any necessary "Sentry Wells" (as defined below) and/or monitoring wells, to the extent not paid for by other sources and to the extent consistent with applicable regulatory requirements; associated piping at the pump station; and the pipeline from Saugus 1 to Saugus 2 to the treatment plant, described more fully in Exhibit F hereto (the "Saugus 1 & 2 Treatment System"). The Parties through the monthly technical meetings will determine what Sentry Wells and/or monitoring wells may be required, provided that if the technical committee is unable to reach agreement on the number of or need for such wells, and if additional wells are required by DHS or other regulators, the number of and/or need for such wells will be determined by the Cost Consultant in accordance with Article 7.

1.52.2 The **"Q2 Treatment System"** (as defined below), when it has been relocated and incorporated into the Project pursuant to a Q2 Treatment System Relocation as provided in Section 4.2.1 herein.

1.53 **"Project Modification Notice"** has the meaning set forth in Section 9.1.2.

1.54 "**Project Capital Costs**" means the reasonable and necessary costs associated with the planning, development, design, permitting, construction, installation and/or closure of the Project, including such costs incurred after January 31, 2007, but prior to the Effective Date.

1.55 **"Estimate of Project Capital Costs"** means the estimate of the capital costs for the Project as set forth in Exhibit G.

1.56 **"Project Capital Costs Escrow Account"** means the escrow account into which Defendants shall deposit or cause to be deposited the initial amount of five million dollars ($5,000,000), to be used for the purposes described in Section 1.52 of this Agreement. Additional deposits by Defendants into the Project Capital Costs Escrow, up to a maximum additional amount of five million dollars ($5,000,000), may be required as described in Section 4.4 of this Agreement for the purposes set forth in Section 1.52 of this Agreement. Within thirty (30) days after Bankruptcy Court approval of this Agreement, Whittaker, on behalf of all Defendants shall open the "Project Capital Costs Escrow Account" by signing and delivering to City National Bank or other agreed bank escrow instructions substantially in the form of Exhibit H-1 hereto, and depositing the amount of five million dollars ($5,000,000) into said account as described above.

1.57 "**Project Costs**" means Project Capital Costs and Project O&M Costs, including costs arising from a Project Modification, to the extent provided in this Agreement.

1.58 **"Project Modification"** has the meaning set forth in Article 9.

1.59 "**Project O&M Costs**" means the identifiable reasonable and necessary costs actually incurred in operating and maintaining the Project to perform its intended function of providing containment of perchlorate as defined in Section 9.1 of this Agreement and restoring impacted groundwater production capacity, which shall be estimated in an annual estimate to be prepared

by CLWA and agreed to by Whittaker and AISLIC or confirmed by the Cost Consultant, unless and until all Lump Sum determinations are made pursuant to Sections 5.2.6 and 9.1.7 or the applicable regulatory authorities determine that treatment is no longer necessary. Costs of operations and maintenance of the Project incurred by Plaintiffs, limited to such reasonable and necessary additional costs directly related to the perchlorate contamination, shall include (based upon the Project as currently contemplated):

Saugus 1 and 2 Treatment Plant Operations and Maintenance

- Vendor Resin Service Contract(s) – (Replacement Resin, Labor, Transportation, Disposal, Disposal Certification, Insurance)-to be negotiated with Vendor jointly by Plaintiffs, Defendants, and AISLIC

- Power – Treatment Plant Operations, including the costs to pump water from Saugus 1 and 2 and, if applicable, Q2 (after relocation) through the treatment system, but excluding the power costs to pump water to the ground surface and the power costs to pump treated water into the CLWA's or VWC's water system. These power costs shall be based on an allocation calculated by CLWA and approved by Whittaker and AISLIC, and subject to Cost Consultant determination in the event that agreement cannot be reached.

- Materials/Supplies
  - Disinfection (Ammonia) and acid
  - Filters
  - Miscellaneous

- Spare Parts
  - Treatment Equipment
  - Pumping and Piping Systems at Treatment Plant
  - Miscellaneous

- Plaintiffs' Labor, if not performed by outside contractor – salary plus actual benefit load (but not-to-exceed 42%) imposition above his/her normal salary:
  - District Employee, Operations Monitoring/Sampling
  - District Employee, Treatment Equipment Maintenance

- Expenses
  - Water Testing (Directly Related to 97-005 Compliance or process monitoring at Purveyor's Rate Schedule)
  - DHS and POTW Fees
  - Miscellaneous Directly Related to Treatment System Maintenance

- Outside Consultants
  - Permits/Renewals
  - Services in addition to those of the Plaintiffs' employee(s) required to meet obligations under Section 8.3.1.1, 8.3.2.3, 8.3.2.4, and 8.4.1, to the extent such employee(s) are not able to meet such obligations
  - Reports/Compliance
  - Engineering
  - Modeling (Directly Related to 97-005 Compliance)
  - Legal (Directly Related to 97-005 Compliance and Plant Operations), limited to the services provided by law firm(s) employed by Plaintiffs for such DHS compliance and plant operations matters, and at the rates such firm(s) normally charge for such work.
  - Insurance – (Insurance as provided in Article 11)

- Arbitrator (per Section 13.2) and Cost Consultant Costs and Fees (per Article 7)
- Project O&M Escrow Costs and Fees

Project O&M costs shall also include an annual flat payment of twenty thousand dollars ($20,000) (to be adjusted after five years as necessary to account for inflation) in lieu of the following activities and costs: Plaintiffs' Employee(s) to provide services under Sections 8.3.1.1, 8.3.2.3, 8.3.2.4, and 8.4.1; any wages or salaries related to the perchlorate contamination plus all benefit load imposition above his/her normal salary; any additional costs for such employee(s) associated with the monitoring, reporting and record-keeping activities described in Section 8.3.1.1, 8.3.2.3, and 8.3.2.4 of this Agreement that are related to the perchlorate contamination; and any Plaintiffs' Employee(s) costs incurred by Plaintiffs in connection with the Monthly Technical Meetings described in Section 8.4.1 of this Agreement.

Project O&M Costs shall also include the identifiable reasonable and necessary costs of operating and maintaining the Q2 Treatment System when it is relocated from Well Q2 and incorporated into the Project as provided for in Section 4.2.1, monitoring and laboratory services for necessary Sentry Wells and monitoring wells encompassed within the Project to the extent not paid for by other sources and to the extent consistent with applicable regulatory requirements**,** and Project Modification O&M costs, including any costs of evaluating containment for purposes of determining whether a Project Modification is appropriate. The costs and approach of evaluating containment shall be discussed and agreed upon by representatives of Plaintiffs, Whittaker and AISLIC at the monthly Technical Meetings, or determined by Cost Consultant. Prior to determination of the Lump Sum pursuant to Section 5.2.6, Project O&M Costs will also include the reasonable and necessary outside fees and costs

incurred by Plaintiffs and Whittaker that are directly related to the perchlorate contamination and to obtaining funding from Public Funding Sources, subject to an annual cap of two hundred thousand dollars ($200,000) on Plaintiffs' outside fees and costs and one hundred thousand dollars ($100,000) on Whittaker's outside fees and costs, subject to such other restrictions as are found in Section 14.2, below. Fees and costs incurred by Plaintiffs or to be incurred by Plaintiffs in the future that are associated with obtaining funding from **"Public Funding Sources"** (as defined below) will not be considered in the determination of the Lump Sum pursuant to Section 5.2.6 and 9.1.7.

1.60 **"Project O&M Escrow Account"** means the escrow account established and funded by Defendants for payment of Project O&M Costs as described in Section 6.4 of this Agreement.

1.61 **"Property Policy"** has the meaning set forth in Section 11.1.1.

1.62 **"Proofs of Claim"** has the meaning set forth in Section 12.1.5.

1.63 **"Public Funding Sources"** has the meaning set forth in Article 15.

1.64 **"Q2 Capital Costs"** means the costs set forth in Exhibit I which were incurred by VWC for the design and installation of the Q2 Treatment System, all of which have been approved and reimbursed by Defendants.

1.65 **"Q2 Escrow Account"** has the meaning set forth in Section 4.1.

1.66 **"Q2 Escrow Account Instructions**" means the Escrow Instructions for the Q2 Capital Costs Escrow Account attached as Exhibit J hereto, as amended as reflected in Exhibits K-1 and K-2.

1.67 **"Q2 O&M Costs"** means the reasonable and necessary costs actually incurred in operating and maintaining the Q2 Treatment System prior to relocation and incorporation into the Project as provided in Section 4.2.1, as set forth in the Estimate of Q2 O&M Costs, and not

to exceed nine thousand and three hundred dollars ($9,300) on average per month for the first 2 years following Commencement of Operations, except in the event of a **"Q2 Resin Exchange,"** (as defined below). Costs of operation and maintenance of the Q2 Treatment System shall include, but not be limited to, equipment rental, service fees, chemicals, monitoring, laboratory services, and resin replacement related to the treatment of perchlorate and flow rates currently permitted by DHS for the Q2 Treatment System.

1.68 "**Estimate of Q2 O&M Costs**" means the approved monthly operations and maintenance estimate for Q2 O&M Costs for the first two years after Commencement of Operations prior to relocation and incorporation into the Project, set forth in Exhibit L.

1.69 **"Q2 Resin Exchange"** means the removal of ion exchange resin which VWC determines is no longer capable of performing its intended function from the ion exchange vessels and replacement with new resin, and includes but is not limited to, transportation of the spent and new resin, and proper destruction of the spent resin in accordance with applicable regulations.

1.70 **"Q2 Semi-Annual O&M Statement"** has the meaning set forth in Section 6.3.2.

1.71 **"Q2 Treatment System**" means the construction, operation and maintenance of a system installed in October 2005 for treatment of (i.e., removal of perchlorate from) water pumped from Valencia's well Q2.

1.72 **"Q2 Treatment System Relocation"** means the relocation of the Q2 Treatment System as described in Section 4.2.1.

1.73 **"Rapid Response Funds"** means the funds, limited to ten million dollars ($10,000,000), available to Plaintiffs for the period of time set forth in Section 11.2.1 of this Agreement, which the Defendants shall cause to be paid to Plaintiffs on a demand basis in accordance with Section

11.2 of this Agreement, as a result of specified perchlorate impacts to “Threatened Wells” (as defined herein).

1.74 **“Related Settlement”** has the meaning set forth in Recital N.

1.75 **“Remedial Action Plan”** means a technical report prepared in accordance with Section 25356.1 of the California Health and Safety Code and which, at a minimum, addresses the remedial investigation, risk assessment, and evaluation of remedial alternatives and proposes a remedial alternative.

1.76 **“Remedy Stoppage”** means a cessation of Project operations under circumstances requiring a Project Modification.

1.77 **“Replacement Wells & Associated Pipelines”** means:

1.77.1 Two new wells capable of producing water at the combined rate of 4200 gpm (**“Replacement Wells**”) and associated pipeline to convey the water pumped from the Replacement Wells to a nearby reservoir and associated disinfection facility (**“Associated Pipelines”**). As currently contemplated, the Replacement Wells will be constructed in the vicinity of Magic Mountain Amusement Park and the Associated Pipelines will consist of approximately 1000 feet of a 12 inch pipeline and 2500 feet of 18 inch pipeline, as described more fully in Exhibit M hereto (the **“Magic Mountain Wells”)**;

1.77.2 Potential closure and abandonment of the Stadium Well, in SCWC’s reasonable discretion, and NC11, in NCWD’s reasonable discretion, described more fully in Exhibit N hereto (the "Well Closures");

1.77.3 Construction of a new alluvial well (the **"Stadium Replacement Well"**), to be located northeast of the Site in an alluvial area where perchlorate is not present in groundwater, and associated pipeline(s), described more fully in Exhibit O hereto.

1.78 **"Replacement Wells/Distribution Pipelines Capital Costs Escrow Account**" means the escrow account into which Defendants shall make an initial deposit of four million seven hundred and fifty thousand dollars ($4,750,000), to be used for the purposes described in Section 4.3 of this Agreement. Additional deposits by Defendants into the Replacement Wells/Distribution Pipelines Capital Costs Escrow Account may be required for Replacement Wells/Distribution Pipelines Capital Cost additional costs as described in Section 4.3 of this Agreement and for the purposes set forth therein. These additional deposit(s) shall be paid as described in Section 4.3.3. Within thirty (30) business days after Bankruptcy Court approval of this Agreement, Whittaker, on behalf of all Defendants, shall open the "Replacement Wells/Distribution Pipelines Capital Costs Escrow Account" by signing and delivering to City National Bank or other agreed bank escrow instructions substantially in the form of Exhibit P hereto, and depositing the amount of $4,750,000 into said account as described above.

1.79 **"Response Costs"** means "response costs" as defined under CERCLA.

1.80 **"RFI"** means Remediation Financial, Inc.

1.81 **"RFI Parties"** means Santa Clarita L.L.C. ("SCLLC") and Remediation Financial, Inc. ("RFI"), collectively.

1.82 **"Saugus Formation"** means the generally deeper (up to 8,500 feet thick) formation of aquifers consisting of semi-consolidated sandstone, siltstone and conglomerate of Pleistocene age and occurs under confined, semi-confined and unconfined conditions.

1.83 **"SCLLC"** means Santa Clarita L.L.C.

1.84 **"SCLLC Property"** has the meaning described in Exhibit A.

1.85 **"SCWC"** means Santa Clarita Water Company.

1.86 **"Sentry Wells"** means groundwater monitoring wells located upgradient of the Subject Wells.

1.87 **"Site"** means the SCLLC Property and the BRLLC Property collectively

1.88 **"Steadfast PLC Policy"** means the Property Transfer Liability Policy Number PLC 3598792-00 issued by Steadfast Insurance Company ("Steadfast") to the Defendants.

1.89 **"Subject Wells"** has the meaning referred to in Recital B of this Agreement.

1.90 The "**SF Escrow 1 Account**" and the "SF Escrow 1" means the "SF Escrow 1" or "SF Escrow 1 Account" as defined in, established, and governed by the Coverage and Claims Settlement Agreement and the "Joint Escrow 1 Agreement and Instructions (Steadfast Escrow 1 Account)" filed in the Bankruptcy Cases on March 31, 2006.

1.91 The "**SF Escrow 2 Account**" means the "SF Escrow 2" or "SF Escrow 2 Account" as defined in, established, and governed by the Coverage and Claims Settlement Agreement and the "Joint Escrow 2 Agreement and Instructions (Steadfast Escrow 2 Account)" filed in the Bankruptcy Cases on March 31, 2006.

1.92 **"Steadfast"** means Steadfast Insurance Company.

1.93 **"SSCH"** means Steadfast Santa Clarita Holdings, LLC.

1.94 **"Estimate of Supplemental Project O&M"** has the meaning set forth in Section 5.2.3.

1.95 **"Third Party Claims"** has the meaning set forth in Section 12.1.1.

1.96 **"Threatened Wells"** has the meaning set forth in Section 11.2.1.

1.97 **"Underlying Action"** has the meaning referred to in Recital C of this Agreement.

1.98 "**V-206 Replacement Well"** means construction and installation of VWC's well V206 and associated pipelines, and permanent closure and abandonment of VWC's well V157 as described in Exhibit Q.

1.99 **"VWC"** means Valencia Water Company.

1.100 **"Whittaker"** means Whittaker Corporation.

1.101 "**Working Day**" means a day other than a Saturday, Sunday, or federal or California state holiday.

ARTICLE 2. COURT APPROVALS AND RELATED SETTLEMENTS

2.1 Final Bankruptcy Court Approval Order and Good Faith Certifications Required

Except for this Section which is effective upon execution of this Agreement by all Parties, this Agreement, including the Parties' promises, obligations, releases, representations and warranties under this Agreement, shall take effect on the later of the date of the Final Approval Order (as defined below) or the date of the "Good Faith Certifications" (as defined below) ("the **Effective Date**") and is absolutely contingent upon the entry of an order of the Bankruptcy Court that approves this Agreement in its entirety without any modifications and contains the Bankruptcy Court Determinations referenced below, and that has become effective and as to which no stay pending appeal has been issued ("**Final Approval Order**") and such order not being subject to any stay.

2.1.1 This Agreement, and the settlement of claims reflected herein, is absolutely contingent upon (i) court certification that such settlement is made in good faith, and (ii) a settlement of, or the dismissal with prejudice of, all of the claims asserted in the Counter-Claims (the "**Related Settlement**") and court certification of the Related Settlement as being made in good faith (collectively, the "**Good Faith Certifications**"). The court's order(s) setting forth the Good Faith Certifications shall at a minimum provide that "any and all claims against the settling Defendants and the settling counter-defendants, arising out of the matters addressed in the Underlying Action or addressed in the Related Settlement, regardless of when asserted or by whom, are barred; such claims are barred regardless of whether they are brought pursuant to

CERCLA, or pursuant to common law or other federal or state laws," or language substantially to the same effect.

2.1.2 This Agreement shall be null and void *ab initio*, and the Parties shall be returned to their respective positions in all aspects, if either (a) the Related Settlement, Good Faith Certifications and Final Approval Order have not all been obtained before October 31, 2007 for any reason; or (b) the Bankruptcy Court denies a motion to approve this Agreement as written or (c) a court denies a motion for good faith certification of either this Agreement, the Related Settlement or both, as written. RFI Parties, at their sole cost and expense, shall prepare and file a motion with the Bankruptcy Court in a form satisfactory to all Parties seeking the Final Approval Order promptly after the Agreement's execution by all Parties. RFI Parties' motion for a Final Approval Order shall include a request that the Bankruptcy Court in its Final Approval Order make the Bankruptcy Court Determinations in accordance with the requirements set forth in Section 2.4 of this Agreement.

2.1.3 All other Parties shall support the entry of the Final Approval Order and shall cooperate with RFI Parties in presenting the motion seeking approval. The Parties shall cooperate in preparing and filing motions with the District Court seeking the Good Faith Certifications. To the extent required under CERCLA or applicable federal law, the Parties agree to cooperate in obtaining approval of a United States District Court having appropriate jurisdiction (the "**District Court**") as necessary to ensure enforceability of the terms and intent of this Agreement (including but not limited to asking the Bankruptcy Court to certify its findings and/or conclusions regarding certain issues to such District Court).

2.2 Plaintiffs' Reservation of Rights Against Buyer

Plaintiffs specifically reserve all rights against Buyer with regard to Buyer's compliance with all environmental laws and performance of any applicable remediation obligations, subject only to the terms of Section 12.1 hereof.

2.3 Plan Filed by Debtors

If a Final Approval Order is entered by the Bankruptcy Court in the Bankruptcy Cases, then any plan filed by the Debtors in the Bankruptcy Cases ("**Plan**") shall not be materially inconsistent with the terms of this Agreement and the Final Approval Order.

2.4 Final Approval Order Provisions

Debtors and all other Parties hereto acknowledge and agree, and the Final Approval Order shall provide that (a) funds in SF Escrow 1 Account were, pursuant to the Coverage Order, already earmarked for the purposes of satisfying Defendants' obligations pursuant to this Agreement; (b) the requirement that the funds in SF Escrow 1 Account be used exclusively for the purposes for which they are agreed to be used pursuant to the Coverage and Claims Settlement Agreement as modified by the Coverage Order (which are consistent with the purposes for which those funds are to be used pursuant to this Agreement) is res judicata in the Debtors' Bankruptcy Cases; (c) payment of obligations under this Agreement, upon entry of the Final Approval Order, constitutes the permitted use of SF Escrow 1 funds to "fund settlement or a stipulated judgment pursuant to a settlement in the CLWA Case" that meets all of the "Approved CLWA Settlement Parameters" as provided in paragraph IV.F.5.a.(i) of the Coverage and Claims Settlement Agreement as modified by the Coverage Order and as described in Exhibit 16 thereto and such payments pursuant to this Agreement shall constitute, and shall be deemed to be consistent with the requirements for the administration of the SF Escrow 1 funds

by AISLIC pursuant to Section IV.F.5.d. of the Coverage and Claims Settlement Agreement as modified by the Coverage Order; (d) any payment or transfers of funds to or for the benefit of Plaintiffs from SF Escrow 1 Account that are consistent with this Agreement are free and clear of all other adverse claims, rights, title, interest, liens or encumbrances of any kind whatsoever that could be asserted against any property or interest of the Debtors; and (e) the Agreement is a complex agreement resolving numerous disputes and pending legal proceedings among numerous parties and that following the Effective Date, it will be practically and legally impossible to unwind this Agreement or restore the parties to their status quo based upon any reversal or modification on appeal or rehearing or other review; (f) upon entry of the Final Approval Order, the Defendants' payment obligations under this Agreement including any sum awarded pursuant to arbitration hereunder, may be made from the SF Escrow 1 Account; and (g) either i) the terms of the Agreement and Related Settlement are fully consistent with the terms of the SunCal Purchase and Sale Agreement and Joint Escrow Instructions dated July 6, 2006, or ii) that the Buyer consents to the Agreement and the Related Settlement to the extent there is any inconsistency. (Subparagraphs (a) through (g) above required to be included in the Final Approval Order are referred to herein as the "Bankruptcy Court Determinations.") The Final Approval Order shall also provide that the Order applies to any successor Administrator of the "SF Escrow 1" in the "Coverage and Claims Settlement Agreement."

2.5 Plaintiffs' Recourse Against Debtors

Plaintiffs' recourse to (i) enforce all of Debtors' obligations under this Agreement and (ii) for any and all actions, causes of action, claims, demands, liabilities, damages, penalties, debts, losses, costs, expenses and fees (including, without limitation, litigation costs and attorney and consultant fees) of every kind and nature whatsoever, past or future, in law and in equity against

the Debtors and BRLLC arising from or in any way related to releases or threatened releases, or other environmental conditions, past or future, at or around the Site is expressly and completely limited to Debtors' rights to use, and title and interest in, the SF Escrow 1 Account established pursuant to the Coverage and Claims Settlement Agreement and the "Joint Escrow 1 Agreement and Instructions (Steadfast Escrow 1 Account)". Plaintiffs' rights against Debtors are not waived in the Bankruptcy Cases to the extent of Debtors' rights, title and interest in the SF Escrow 1 Account.

ARTICLE 3. PAYMENTS DIRECTLY TO PLAINTIFFS

3.1 Payment for Plaintiffs' Past Environmental Claims

Within thirty (30) Days after the Effective Date, Defendants shall pay the amount of ten million dollars ($10,000,000) by payment of the amount of two million five hundred thousand dollars ($2,500,000) to each of the four Plaintiffs. The obligation to make such payments shall be joint and several, subject to Section 2.5. This payment is in full and complete satisfaction and resolution of Plaintiffs' Past Environmental Claims.

3.2 Payment for Plaintiffs' Past Design Costs

Within thirty (30) Days after the Effective Date, Defendants shall pay the amount of one million seven hundred fifty three thousand one hundred fourteen dollars and fifty-eight cents ($1,753,114.58) to CLWA. The obligation to make such payment shall be joint and several, subject to Section 2.5. This payment is in full and complete satisfaction and resolution of Plaintiffs' Past Design Costs, as set forth in Exhibit E to this Agreement.

3.3 Payment to VWC

Within thirty (30) Days after the Effective Date, Defendants shall pay to VWC one million dollars ($1,000,000). The obligation to make such payment shall be joint and several, subject to Section 2.5. This payment is in full and complete satisfaction and resolution of

Plaintiffs' claims in the Underlying Action for V-206 Replacement Well, including, but not limited to, construction and installation of VWC's well V206 and associated pipelines, and permanent closure and abandonment of VWC's well V157, as described in Exhibit Q.

ARTICLE 4. FUNDING OF Q2 COSTS, REPLACEMENT WELL/DISTRIBUTION PIPELINE CAPITAL COSTS AND PROJECT CAPITAL COSTS

4.1 Funding of Q2 Capital Costs and Q2 O&M Costs

Plaintiffs acknowledge that Defendants previously have caused to be deposited into the "**Q2 Escrow Account**" five hundred thousand dollars ($500,000) for reasonable and necessary and approved Q2 Capital Costs. This payment is in full and complete satisfaction and resolution of Plaintiffs' claims for the capital costs associated with the Q2 Treatment System. Plaintiffs acknowledge that Defendants previously have caused to be deposited into the "Q2 Escrow Account" two hundred twenty three thousand and two hundred ten dollars ($223,210) for certain reasonable and necessary and approved Q2 O&M Costs. This payment is in partial satisfaction and resolution of Plaintiffs' claims for the operations and maintenance costs associated with the Q2 Treatment System. Construction of the Q2 Treatment System has been completed and all Q2 Capital Costs associated with the Q2 Treatment System have been approved and paid by or on behalf of Defendants as of the Effective Date.

A copy of the Q2 Escrow Account Instructions is attached hereto as Exhibit J and incorporated herein by this reference. Copies of Amendments No. 1 and No. 2 to the Q2 Escrow Account Instructions are attached hereto as Exhibit K-1 and Exhibit K-2, respectively and incorporated herein by this reference. Any amounts, including interest, remaining in the Q2 Escrow Account as of the Effective Date shall be used by Plaintiffs for Q2 O&M Costs, and credited against Defendants' obligations for funding Q2 O&M Costs as set forth in Section 4.1.1 below.

4.1.1 The Q2 Treatment System commenced operations on October 12, 2005 ("Q2 Commencement Date"), and VWC has been incurring Q2 O&M Costs for the Q2 Treatment System since that date.

4.1.1.1 During the period prior to October 12, 2007, VWC's withdrawal of funds for Q2 O&M Costs shall not exceed nine thousand and three hundred dollars ($9300) on average per month except in the event of a Q2 Resin Exchange and except for reimbursement of any Q2 O&M Costs that have been incurred prior to the Effective Date and not previously paid out of the Q2 Escrow Account.

4.1.1.2 In the event Commencement of Operation of the Project has not occurred as of October 12, 2007, and the Q2 Treatment System must still be operated pursuant to applicable regulatory requirements, Defendants shall pay or cause to be paid an additional deposit of one hundred eleven thousand and six hundred dollars ($111,600) on or before October 12, 2007, to be used for Q2 O&M Costs. In the event Commencement of Operation of the Project has not occurred as of October 12, 2007, and the Q2 Treatment System must still be operated pursuant to applicable regulatory requirements, Defendants shall pay or cause to be paid additional reasonable and necessary Q2 O&M Costs until the Q2 Treatment System is relocated as provided in Section 4.2.1. After October 12, 2007, VWC may withdraw funds on a monthly basis as is reasonably necessary.

4.1.1.3 Defendants shall pay or cause to be paid into the existing Q2 Escrow Account an additional amount of one hundred sixty seven thousand and five hundred dollars ($167,500), or such other amount as may be agreed by the Defendants or determined by the Cost Consultant in accordance with Article 7, in the event a determination is made by VWC in accordance with its operating permit and upon agreement by Whittaker and AISLIC, that

replacement of the treatment resins used in the Q2 Treatment System is necessary. Such deposit shall be made within 10 days after VWC's written notice of determination and request for funding has been delivered to Defendants. Any dispute regarding such determination by VWC shall be resolved by the Cost Consultant in accordance with Article 7.

4.1.2 Defendants' obligations hereunder for deposits required to be made into the Q2 Escrow Account shall be on a joint and several basis subject to Section 2.5.

4.1.3 Any amounts, including interest, remaining in the Q2 Escrow Account upon Q2 Treatment System Relocation to the location of the Project shall be refunded into the SF Escrow 1 Account (as defined in the Coverage and Claims Settlement Agreement.).

4.1.4 Payments from the Q2 Escrow Account shall be made on a monthly basis in accordance with the procedures set forth in Article 6 and the applicable Q2 Escrow Account instructions.

4.1.5 Defendants and AISLIC shall not be entitled to withdraw any funds from the Q2 Escrow Account or to direct or control the payment of such funds, and shall have no rights with respect to such funds, except as provided in this Agreement.

4.1.6 Payments for Q2 O&M Costs shall continue until the date that VWC and CLWA are required to relocate and integrate the Q2 Treatment System into the Project pursuant to Section 4.2.1 or until treatment of Well Q2 is no longer required by DHS, whichever occurs first. The Q2 Escrow Account shall terminate following written notification from Plaintiffs that the Q2 Treatment System has been integrated into the Project or written notification from Plaintiffs or Cost Consultant or arbitrator determination that treatment of Well Q2 is no longer required by DHS, provided that payment has been made for all Q2 Capital Costs and Q2 O&M

Costs permitted to paid from the Q2 Escrow Account in accordance with the procedures set forth in this Agreement.

4.2 Termination of the Q2 Treatment System Operations

4.2.1 VWC shall undertake to terminate operation of the Q2 Treatment System as soon as reasonably feasible, in accordance with requirements of the California Department of Health Services (DHS). In connection with the construction of the Project, Plaintiffs shall incorporate the Q2 Well and the Q2 Treatment System into the Project, notwithstanding any prior determination that the treatment at Q2 Well is no longer required, so as to enable the Saugus 1&2 Treatment System to treat Q2 water in case the Q2 Well subsequently becomes recontaminated. In connection with the construction of the Project, VWC and CLWA shall incorporate the Q2 Well and the Q2 Treatment System into the operation of the Project not later than (i) two (2) years after the Q2 Commencement Date or (ii) the Commencement of Operations of the Project, whichever is later. Upon relocating operation of the Q2 Treatment System, VWC and CLWA shall transfer the treatment vessels used as part of the Q2 Treatment System to the location of the Project and incorporate the use of those vessels into that system. Upon terminating or relocating operation of the Q2 Treatment System, VWC and CLWA shall transfer the remaining resin used as part of the Q2 Treatment System to the location of the Project and incorporate the unused resin into that system.

4.2.2 The obligation to pay Q2 O&M Costs for the Q2 Treatment System pursuant to Section 4.1.1 of this Agreement shall cease either (i) upon written notification from Plaintiffs or Cost Consultant or arbitrator determination that treatment of Well Q2 is no longer required by DHS; or (ii) upon written notification from Plaintiffs that the Q2 Treatment System has been integrated with the Project and that the Q2 O&M Costs will be included in the Project

O&M Costs and handled in accordance with Article 5, which notice shall not occur later than (i) two (2) years after the Q2 Commencement Date or (ii) the Commencement of Operations of the Project, whichever occurs later. If, after a determination that treatment at well Q2 is no longer required, well Q2 becomes re-contaminated so as to require treatment, said treatment will be handled by means of the Project, and the costs thereof shall be Project O&M Costs.

4.2.3 Any dispute as to whether treatment of water pumped from Q2 can be discontinued or should be recommenced shall be resolved through binding Cost Consultant arbitration, as provided in Article 7 of this Agreement, provided that the arbitration decision must be consistent with the requirements of all regulatory agencies with jurisdiction regarding perchlorate.

4.3 Replacement Wells/Distribution Pipeline Capital Costs Escrow Account

Defendants shall be jointly and severally obligated subject to Section 2.5 to pay for their proportional share of the capital costs associated with the installation of new Distribution Pipelines and Replacement Wells & Associated Pipelines pursuant to this Section 4.3. CLWA, on behalf of all Plaintiffs, and Whittaker, on behalf of all Defendants, concurrently with execution of this Agreement, shall execute and, thereafter, promptly deliver to City National Bank or other agreed bank instructions for an escrow (the "**Replacement Wells/Distribution Pipeline Capital Costs Escrow Account**") substantially in the form of Exhibit P hereto. Within thirty (30) Days after the Effective Date, Defendants shall make an initial deposit into the Replacement Wells/Distribution Pipeline Capital Costs Escrow Account of four million seven hundred and fifty thousand dollars ($4,750,000) to be used for Distribution Pipelines, and Replacement Wells & Associated Pipelines. The Replacement Wells & Associated Pipelines will provide new Saugus Formation production capacity to replace lost well capacity not

provided by the Project or V-206. The Distribution Pipelines will be connected to various turnouts within the Plaintiffs' system.

4.3.1 The Defendants' initial proportional share of the capital costs associated with the Distribution Pipelines and the Replacement Wells & Associated Pipelines will be based on the Percentage Cost Allocation for Distribution Pipelines and Replacement Wells & Associated Pipelines set forth in Exhibit R and the bid items submitted by the bidder selected through a competitive bidding process in accordance with CLWA bid procedures and applicable law. Whittaker's and AISLIC's technical representatives shall be provided reasonable opportunity to advise and consult on design, engineering, location of well replacement and other technical aspects of the contractor selection and construction process. For bid items that do not have specific cost allocations, the weighted cost allocation of the other bid items shall be applied. During construction, the Plaintiffs and Defendants shall provide the funds necessary to pay the selected contractors in the proportion provided for by the determination of the initial proportional share. Upon completion and Plaintiffs' acceptance of the construction, a true-up of the cost allocation shall be performed. To the extent feasible, the true-up shall apply the cost allocation of Distribution Pipelines and Replacement Wells presented in Exhibit R to the actual costs of the Distribution Pipelines and Replacement Wells, including approved change orders.

4.3.2 The Parties acknowledge that construction of the Replacement Wells and Associated Pipelines, except the drilling of the Replacement Wells, will be deferred until the construction of the extension of Magic Mountain Parkway is initiated.

4.3.3 In the event Defendants' proportional share of capital costs associated with Distribution Pipelines and Replacement Wells & Associated Pipelines exceeds four million and seven hundred fifty thousand dollars ($4,750,000), including all costs of redrilling

Replacement Wells that are not capable of producing water at the required rate, Defendants shall be obligated, on a joint and several basis subject to Section 2.5, to deposit in the Replacement Wells/Distribution Pipeline Capital Costs Escrow Account additional funds sufficient to cover such excess, as reasonably determined by Plaintiffs, subject to approval by Whittaker and AISLIC or determination by the Cost Consultant. Such deposits shall be made by Defendants in a timely manner. The Estimate of Replacement Wells/Distribution Pipeline Capital Costs attached hereto as Exhibit S reflects that Defendants' proportional share of the Replacement Wells/Distribution Pipeline Capital Costs exceeds $4,750,000. However, in the event that cost savings are achieved such that Defendants' proportional share of capital costs associated with Distribution Pipelines and Replacement Wells & Associated Pipelines is less than the amounts deposited by Defendants into the Replacement Wells/Distribution Pipeline Capital Costs Escrow Account, any amounts remaining in the Replacement Wells/Distribution Pipeline Capital Costs Escrow Account shall be refunded into the SF Escrow 1 Account (as defined in the Coverage and Claims Settlement Agreement).

4.3.4 Any dispute regarding the reasonableness, timing or necessity of Replacement Wells/Distribution Pipeline Capital Costs, the selection of the lowest responsive and responsible bid in the competitive bidding process, or the Defendants' appropriate proportional share shall be resolved through Cost Consultant arbitration in accordance with Article 7.

4.4 Project Capital Costs Escrow Account

CLWA, on behalf of all Plaintiffs, and Whittaker, on behalf of all Defendants, concurrently with execution of this Agreement, shall execute and, thereafter, promptly deliver to City National Bank or other agreed bank instructions for an escrow (the **"Project Capital Costs**

Escrow Account") substantially in the form of Exhibit H-1 hereto. Within thirty (30) Days after the Effective Date, Defendants shall, jointly and severally, be obligated to make a deposit into the Project Capital Costs Escrow Account of five million dollars ($5,000,000) (**"Initial Project Capital Costs Deposit"**) to pay Project Capital Costs.

4.4.1 In the event Project Capital Costs exceed the amount of the Initial Project Capital Costs Deposit, Defendants shall deposit in the Project Capital Costs Escrow Account additional funds sufficient to cover such excess, as determined by Plaintiffs, subject to AISLIC and Whittaker approval or determination by the Cost Consultant; but such total additional funds shall not exceed five million dollars ($5,000,000). Defendants shall deposit the additional funds in a timely manner after approval by AISLIC and Whittaker or by the Cost Consultant. The Estimate of Project Capital Costs attached hereto as Exhibit G reflects that Project Capital Costs are projected to exceed five million ($5,000,000). However, in the event that cost savings are achieved such that Project Capital Costs are less than the amounts deposited by Defendants into the Project Capital Costs Escrow Account, any amounts remaining in the Project Capital Costs Escrow Account shall be refunded into the SF Escrow 1 Account (as defined in the Coverage and Claims Settlement Agreement.).

4.4.2 Any dispute regarding the reasonableness, timing or necessity of Project Capital Costs shall be resolved through arbitration in accordance with Article 7.

ARTICLE 5. PAYMENT OF PROJECT O&M COSTS

5.1 Project O&M Escrow Account

5.1.1 Defendants shall be jointly and severally obligated subject to Section 2.5 to pay Project O&M Costs in accordance with the terms of this Agreement. The "*pro forma*" Estimate of Project O&M ("**Pro Forma Estimate of Project O&M**") as of the date of execution of this Agreement is attached hereto as Exhibit D.

5.1.2 CLWA, on behalf of all Plaintiffs, and Whittaker, on behalf of all Defendants, and AISLIC shall, within thirty (30) days after Whittaker and AISLIC's receipt of Plaintiffs' written notice of anticipated commencement of Project operations execute and thereafter, promptly deliver to City National Bank or other agreed bank instructions for an escrow for funds to be used for payment of Project O&M Costs substantially in the form of Exhibit H-2 hereto.

5.1.3 Payments from the Project O&M Escrow Account shall be made on a monthly basis in accordance with the procedures set forth in this Article 5, Article 6, and the applicable escrow instructions, which instructions are subject to approval by Plaintiffs, Whittaker, and AISLIC and shall be consistent with the terms of this Agreement.

5.1.4 Upon termination of the Project O&M Escrow Account in accordance with this Agreement, any balance in that account shall be refunded into the SF Escrow 1 Account. The Project O&M Escrow Account shall terminate upon termination of this Agreement or earlier payment of all Lump Sum awards, provided that payment has been made for all Project O&M Costs in accordance with the procedures set forth in this Agreement.

5.2 Project O&M Costs

5.2.1 Defendants shall fund Project O&M Costs by depositing annually in the Project O&M Escrow Account the annual O&M amounts reasonably estimated by CLWA and modified as reasonably estimated by Defendants and AISLIC, or modified as determined by the Cost Consultant, and reflected in the Joint Estimate of Project O&M jointly prepared by the Parties (which may include determinations of the Cost Consultant). The first annual deposit ("**Initial Project O&M Deposit**") shall be due thirty (30) days after Whittaker's, and AISLIC's receipt of Plaintiffs' written notice of anticipated commencement of Project operations and a

Joint Estimate of Project O&M has been agreed between the Parties or determined by the Cost Consultant for the first year of operations. The initial "Joint Estimate of Project O&M" shall be based upon the Pro Forma Estimate of Project O&M attached as Exhibit D hereto, as modified by CLWA and approved by Defendants and AISLIC or determined by the Cost Consultant. ("**Joint Estimate of Project O&M**") Defendants will reasonably consider and respond to CLWA's proposed modifications to the attached Pro Forma Estimate of Project O&M as provided in this Article 5. The Parties will meet and confer concerning any disputes in preparing the initial Joint Estimate of Project O&M . Subsequent annual O&M deposits (each an **"Annual Project O&M Deposit"**) in the amount of the Joint Estimate of Project O&M for the upcoming year (each a "Joint Estimate of Project O&M") as agreed between the Parties or determined by the Cost Consultant, shall be due on or before the anniversary of the Initial Project O&M Deposit. CLWA will provide Whittaker, AISLIC, and Steadfast with a copy of each of Plaintiffs' proposed Joint Estimate of Annual Project O&M at least seventy-five (75) days prior to the anniversary date of the prior year's Annual Project O&M Deposit.

5.2.2 In the event of Defendants' or AISLIC's objection to any item included or excluded on any of the Plaintiffs' proposed Joint Estimates of Project O&M, Defendants or AISLIC shall notify Plaintiffs of their objection in writing within thirty (30) days after receipt of the proposed estimate, stating the reasons for its objection, and the Parties shall exercise their best efforts to resolve the disputed item(s). In the event that the disputed item is not resolved within fifteen (15) days after Defendants' or AISLIC's notice of objection, the disputed item(s) shall be submitted to the Cost Consultant, for expedited resolution in accordance with Article 7, below. Following meet and confer and any determinations of the Cost Consultant, the Parties

shall jointly prepare the Joint Estimate of Project O&M as agreed among the Parties or determined by the Cost Consultant.

5.2.3 In the event that CLWA determines it will be necessary to supplement the Project O&M Escrow Account in any given year to pay for Project O&M Costs, CLWA shall notify Defendants, AISLIC and Steadfast of its determination and provide an itemized statement, using the same format as the then-current Joint Estimate of Project O&M, of the amount of the supplemental funding **("Estimate of Supplemental Project O&M"**) required to cover the additional Project O&M Costs. In the event of Defendants' or AISLIC's objection to any item included in the Plaintiffs' proposed Estimate of Supplemental Project O&M, Defendants or AISLIC shall notify Plaintiffs of their objection in writing within fifteen (15) days after receipt of the proposed Estimate of Supplemental Project O&M, stating the reasons for its objection, and the Parties shall exercise their best efforts to resolve the disputed item(s). In the event that the disputed item is not resolved within fifteen (15) days after Defendants' or AISLIC's notice of objection, the disputed item(s) shall be submitted to the Cost Consultant for expedited resolution in accordance with Article 7. Defendants shall deposit into the Project O&M Escrow Account the amount of the Estimate of Supplemental Project O&M within ten (10) days after determination of the amount of the Estimate of Supplemental Project O&M by agreement of the Parties or determination of the Cost Consultant.

5.2.4 Subject to the provisions of Section 9.1.7 below, the obligation to pay Project O&M Costs pursuant to this Article 5 shall cease the earlier of (i) the California Department of Health Services (DHS), and any other agency that has asserted jurisdiction and whose agreement is required, agrees that treatment of water pumped from Saugus 1 & 2 can be discontinued; or (ii) thirty (30) years after Commencement of Operations of the Project.

5.2.5 Any dispute regarding the reasonableness, applicability or necessity of Project O&M Costs, except for the issue of whether treatment of water pumped from Saugus 1 & 2 can be discontinued, shall be resolved through binding arbitration, as provided in Article 7 of this Agreement, provided that the arbitration decision must be consistent with the requirements of all regulatory agencies with jurisdiction, and prior to determination of the Lump Sum as described in Section 5.2.6. Any dispute regarding whether treatment of water pumped from Saugus 1 & 2 can be discontinued, shall be resolved through binding arbitration, as provided in Sections 13.1 and 13.2 of this Agreement (unless all Parties agree that the issue may be resolved as provided in Article 7 of this Agreement), provided that the arbitration decision must be consistent with the requirements of all regulatory agencies with jurisdiction, and prior to determination of the Lump Sum as described in Section 5.2.6.

5.2.6 Subject to the provisions of Section 9.1.7 below, beginning five years after Commencement of Operations of the Project (which time period will be tolled during any period in excess of one week of Remedy Stoppage), CLWA, Whittaker, or AISLIC may demand binding arbitration, as provided in Article 13 of this Agreement, for purposes of obtaining a determination of a lump sum for payment in lieu of the Project O&M Costs that would otherwise be due and payable during the remainder of the up-to thirty-year period (the "Lump Sum") based on the following criteria:

5.2.6.1 The Lump Sum will be calculated on a net present value basis using appropriate assumptions and techniques, including consideration of risk, activities and costs anticipated to occur after payment of the Lump Sum, and any other factors introduced by the Parties at arbitration and determined to be relevant by the arbitrator, but the Lump Sum shall be calculated on the assumption that the Defendants' obligation to pay for the Project O&M shall

cease not later than thirty years after Commencement of Operations of the Project, except as provided in Section 9.1.7. The Lump Sum determination shall also be based, in part, on consideration of the actual Project O&M Costs experienced prior to arbitration, but excluding any such Project O&M Costs as may have been associated with start-up of the system or otherwise not indicative of future Project O&M Costs. The Lump Sum amount will not include any capital costs, including but not limited to, capital costs of Project Modifications implemented pursuant to Article 9 of this Agreement or any projected or potential capital costs for Project Modifications which become or may become necessary after the first three years following Commencement of Operations of the Project (which time period will be tolled during any period in excess of one week of Remedy Stoppage). The Lump Sum amount will not include any lobbying costs or legal fees or costs associated with obtaining funding from Public Funding Sources. With respect to the activities and costs subject to the annual flat fee payment of twenty thousand dollars ($20,000), described in Section 1.59, the Lump Sum will be calculated based on an assumption that the $20,000 annual flat fee will be escalated based on CPI. For purposes of this Agreement, CPI means the Consumer Price Index for All Urban Consumers (CPI-U) in the Los Angeles-Riverside-Orange County Consolidated Metropolitan Statistical Area, All Items, as published by the United States Department of Labor, Bureau of Labor Statistics, for which the base year is 1982-84 = 100, or if such publication ceases to be in existence, a comparable index agreed by the Parties.

5.2.7 In the event a Lump Sum determination is made in accordance with Section 5.2.6, the amount of the Lump Sum shall be paid by Defendants, jointly and severally, and subject to Section 2.5, to Plaintiffs within thirty (30) Working Days after the arbitrator's decision is issued and any petition filed prior to that time to vacate or correct the arbitrator’s

decision, pursuant to Cal. Code of Civil Procedure Section 1286.2 (Grounds for Vacation of Award) or Section 1286.6 (Grounds for Correction of Award), is finally adjudicated. Plaintiffs agree to use the Lump Sum amount solely for Project O&M Costs until such Lump Sum amount is exhausted, or until Plaintiffs' obligation to operate the Project, as set forth in Section 8.3.1, ceases.

ARTICLE 6. PAYMENTS FROM THE ESCROW ACCOUNTS

6.1 General

6.1.1 Payments from the Q2 Escrow Account, the Replacement Wells/Distribution Pipeline Capital Costs Escrow Account, the Project Capital Costs Escrow Account, and the Project O&M Escrow Account (the "**Escrow Accounts**") shall be made in accordance with the procedures set forth in this Section and each Escrow Account's instructions, which instructions shall be jointly approved by Plaintiffs, Whittaker, and AISLIC, and shall be consistent with the terms of this Agreement. The Parties acknowledge and agree that funding of the Escrow Accounts is based on the cost estimates contained in the Exhibits to this Agreement, which estimates were prepared by Plaintiffs' consultants and reviewed but not independently verified by Defendants' and AISLIC's consultants, and that the actual costs and expenses incurred will control all corresponding future payments from the Escrow Accounts. The Parties acknowledge and agree that payments from the Escrow Accounts are to be made solely for reasonable and necessary costs and expenses actually incurred and not paid or reimbursed by other sources, even if less than the sums set forth in any estimate. The Parties shall cooperate in minimizing all costs incurred and paid pursuant to this Agreement. The Parties acknowledge and agree that payments from the Escrow Accounts are to be made only for reasonable capital or operations and maintenance costs for the Project, the Replacement Wells and Associated

Pipelines, Q2 Treatment System, and Distribution Pipelines pursuant to this Agreement, and only to the extent such costs are necessary.

6.1.2 Except as provided in this Agreement, Defendants and AISLIC shall not be entitled to withdraw any funds from the Escrow Accounts or to direct or control the payment of such funds, and shall have no rights with respect to such funds, other than approval rights expressly provided in this Agreement. Reporting and payment of taxes owed on income earned with respect to the escrows shall be the responsibility of Plaintiffs.

6.1.3 Upon termination of the Escrow Accounts in accordance with this Agreement, any balance in the Escrow Accounts shall be refunded to the SF Escrow 1 Account. The Q2 Escrow Account shall terminate as set forth in Section 4.1.6. The Project Capital Costs Escrow Account shall terminate upon completion of the construction of the Project, provided that payment has been made for all Project Capital Costs in accordance with the procedures set forth in this Agreement. The Project O&M Costs Escrow Account shall terminate as set forth in Section 5.1.4. The Replacement Wells/Distribution Pipelines Escrow Account shall terminate upon completion of the construction of the Replacement Wells & Associated Pipelines and Distribution Pipelines, provided that payment has been made for all Replacement Wells & Associated Pipelines and Distribution Pipelines in accordance with the procedures set forth in this Agreement. The term "completion" as used in this Section 6.1.3 shall mean satisfactory completion of construction, startup and testing, and formal acceptance by the applicable Plaintiff.

6.2 <u>Payment of Capital Costs</u>

6.2.1 Costs incurred for activities and within the aggregate approved amounts set forth in Exhibit G, with respect to the Project, and Exhibit S, with respect to the Replacement Wells/Distribution Pipelines, following resolution of disputed costs pursuant to Article 7, shall

constitute **"Approved Capital Costs."** Costs incurred for activities or items that are not contained in Exhibits G and S for the applicable Escrow Account, or are in excess of the aggregate amount set forth therein, shall be subject to the approval of Whittaker and AISLIC or confirmation by the Cost Consultant in accordance with Article 7, below, and upon such approval or confirmation, such costs shall also constitute "Approved Capital Costs".

6.2.2 Plaintiffs shall prepare (1) a monthly statement setting forth capital costs incurred by Plaintiffs for the prior period for the Project (the "**Project Monthly Capital Costs Statement**") and paid by Plaintiffs from the Project Capital Costs Escrow Account, (2) a monthly statement setting forth capital costs incurred by Plaintiffs for the prior period for the Replacement Wells/Distribution Pipeline Capital Costs Escrow Account (the "**Replacement Wells/Distribution Pipeline Capital Costs Statement**") and paid by Plaintiffs from the Replacement Wells/Distribution Pipeline Capital Costs Escrow Account, in each case accompanied by copies of relevant underlying invoices and other supporting documentation for such costs. Copies of the Project Monthly Capital Costs Statement, the Replacement Wells/Distribution Pipeline Capital Costs Statement (together, the **"Monthly Capital Costs Statements"**) shall be provided to Whittaker, AISLIC and Steadfast for review at least ten (10) days prior to each monthly Technical Meeting described in Section 8.4, below, and the Parties shall exercise their best efforts to resolve any disputes concerning the invoices included in the Monthly Capital Costs Statements at or prior to the Technical Meeting.

6.2.3 In the event of a dispute concerning items on any invoice, if such dispute is not resolved at or prior to the Technical Meeting, Whittaker or AISLIC shall provide Plaintiffs with written notice of the reason it disputes the invoice within ten (10) days after the Technical Meeting, and the disputed item(s) shall be resolved by the Cost Consultant in accordance with

Article 7, below. Notwithstanding any pending dispute regarding Whittaker or AISLIC's disapproval of an invoice for payment, Plaintiffs may withdraw funds on a monthly basis from the Escrow Accounts to pay for Project Capital Costs, and Replacement Wells/Distribution Pipelines Capital Costs, subject to the provisions of Article 7 of this Agreement, and to pay Escrow Agent's fees, and any fees incurred for the Cost Consultant in accordance with Article 7 below or for arbitrator's fees in accordance with Article 13, Section 13.2 below. Any appropriate adjustment resulting from the determination of the Cost Consultant shall be reconciled in the following Monthly Capital Costs Statement.

6.2.4 Plaintiffs shall provide the tax identification number required to open any Escrow and shall be responsible for fulfilling tax payment, reporting and filing requirements. Interest that accrues on the balances in the Escrow Accounts shall be retained in those Accounts and available for use by Plaintiffs pursuant to the respective agreed uses of each Account until Termination, and credited against Defendants' funding obligations as to the applicable Account.

6.3 Payment of Q2 O&M Costs

6.3.1 Costs incurred for activities and within the approved Q2 Monthly O&M Costs amount shall constitute **"Approved Q2 O&M Costs."**

6.3.2 VWC shall, within ten (10) Working Days after the end of each semi-annual period after Commencement of Operations for the Q2 Treatment System, deliver to Whittaker and AISLIC a statement of invoices for Q2 O&M Costs incurred by VWC during the preceding semi-annual period **("Q2 Semi-Annual O&M Statement"**), accompanied by copies of all of the underlying invoices and other supporting documentation. Copies of the Q2 Semi-Annual O&M Statements shall be provided to Whittaker, AISLIC and Steadfast for review at least twenty (20) days prior to the Technical Meeting following the end of each semi-annual

period. Plaintiffs, Whittaker and AISLIC shall exercise their best efforts to resolve any disputes concerning the invoices included in the Q2 Semi-Annual O&M Statement at or prior to the Technical Meeting; provided, however, that Approved O&M Costs shall not be subject to review or approval.

6.3.3 In the event of a dispute concerning items other than Approved O&M Costs on any invoice, if such dispute is not resolved at or prior to the Technical Meeting, Whittaker or AISLIC shall provide Plaintiffs with written notice of the reason it disputes the invoice within ten (10) days after the Technical Meeting, and the disputed item(s) shall be resolved by the Cost Consultant in accordance with Article 7, below.

6.3.4 Notwithstanding any pending dispute regarding Whittaker's or AISLIC's disapproval of an invoice for payment, Plaintiffs may withdraw funds on a monthly basis from the Q2 Escrow Account to pay Q2 O&M Costs for the Q2 Treatment System, subject to the provisions of Article 7 of this Agreement, and to pay Escrow Agent's fees, and any fees incurred by Plaintiffs for the Cost Consultant in accordance with Article 7, below, or for arbitrator's fees in accordance with Article 13, Section 13.2 below. Any appropriate adjustment resulting from the determination of the Cost Consultant shall be reconciled in the following Q2 Semi-Annual O&M Statement.

6.3.5 Upon request, Plaintiffs shall additionally provide to SCLLC and RFI, or Buyer if the sale has closed, the statement of invoices with copies of the underlying invoices and supporting documentation.

6.4 <u>Payment of Project O&M Costs</u>

6.4.1 Costs incurred for Project O&M activities and within the aggregate amount set forth in the applicable Joint Estimate of Annual Project O&M or Estimate of

Supplemental Project O&M following resolution of any disputed items pursuant to Article 7, shall constitute "**Approved O&M Costs**." Costs incurred for activities or items that are not Approved O&M Costs or are in excess of the aggregate amount set forth in the applicable Joint Estimate of Annual Project O&M or Estimate of Supplemental Project O&M shall be subject to the approval of Whittaker and AISLIC or confirmation by the Cost Consultant in accordance with Article 7, below, and upon such approval or confirmation, such costs shall also constitute "Approved O&M Costs."

6.4.2 Plaintiffs shall, within ten (10) Working Days after the end of each quarterly period following the Commencement of Operations, deliver to Whittaker, AISLIC and Steadfast a statement of invoices for Project O&M Costs incurred and paid by Plaintiffs from the Project O&M Escrow Account during the preceding quarterly period (**"Quarterly Project O&M Statements"**), accompanied by copies of all of the underlying invoices and other supporting documentation. Copies of the Quarterly Project O&M Statements shall be provided to Whittaker and AISLIC for review at least ten (10) days prior to the Technical Meeting following the end of each quarter, and the Parties shall exercise their best efforts to resolve any disputes concerning the invoices included in the Quarterly Project O&M Statement at or prior to the Technical Meeting.

6.4.3 Upon request, Plaintiffs shall additionally provide to SCLLC and RFI, or Buyer if the sale has closed, the Quarterly Project O&M Statements with copies of the underlying invoices and supporting documentation.

6.4.4 In the event of a dispute concerning items on any invoice, if such dispute is not resolved at or prior to the Technical Meeting, Whittaker and/or AISLIC shall provide Plaintiffs with written notice of the reason it disputes the invoice within ten (10) days after the

Technical Meeting, and the disputed item(s) shall be resolved by the Cost Consultant in accordance with Article 7, below.

6.4.5 Notwithstanding any pending dispute regarding Whittaker or AISLIC's disapproval of an invoice for payment, Plaintiffs may withdraw funds on a monthly basis from the Project O&M Escrow Account to pay actual Project O&M Costs, subject to the provisions of Article 7 of this Agreement, and to pay Escrow Agent's fees, and any fees incurred for the Cost Consultant in accordance with Article 7 below or for arbitrator's fees in accordance with Article 13, Section 13.2 below. Any appropriate adjustment resulting from the determination of the Cost Consultant shall be reconciled in the following Quarterly Project O&M Statement.

ARTICLE 7. COST CONSULTANT ARBITRATION

7.1 Cost Consultant

7.1.1 Appointment of Cost Consultant. Michael Kavanaugh shall act as Cost Consultant and perform the functions of Cost Consultant set forth in this Agreement. If Mr. Kavanaugh, any replacement Cost Consultant, or all parties to a disputed issue, determine that the Cost Consultant lacks expertise as to a specific disputed issue, the Cost Consultant (after consultation with the parties to the dispute) shall retain an expert to assist him or her in reaching a determination of that particular dispute.

7.1.2 Functions of Cost Consultant

7.1.2.1 The Cost Consultant, and any replacement Cost Consultant, shall not act as an agent or representative for any Party, and shall exercise independent, neutral judgment in the performance of the Cost Consultant's responsibilities under this Agreement.

7.1.2.2 In the event of a timely demand for arbitration pursuant to Sections 4.1, 4.2, 4.3, 4.4, 5.2 (except as otherwise provided in Sections 5.2.5 and 5.2.6), 6.2,

6.3, 6.4, 8.2, 8.3, 8.4.2, and 9.1 of this Agreement, the Cost Consultant shall resolve the dispute in accordance with this Article 7.

7.1.3 Cost Consultant Fees: The Cost Consultant's fees and costs shall be included in Project O&M Costs.

7.1.4 Replacement of Cost Consultant: The Cost Consultant may only be replaced by mutual agreement of the Plaintiffs, Whittaker and AISLIC or for good cause established to the satisfaction of the arbitrator designated pursuant to Article 13, Section 13.2 of this Agreement. In the event of the resignation, replacement for good cause, or unavailability of the Cost Consultant, Plaintiffs and Whittaker and AISLIC shall jointly retain a replacement Cost Consultant. If the Parties are unable to agree on a replacement, a replacement shall be chosen by the arbitrator designated pursuant to Article 13, Section 13.2 of this Agreement.

7.2 Cost Consultant Dispute Resolution

In the event that the Parties are unable to resolve a dispute arising under the sections listed in Section 7.1.2.2, Plaintiffs, Whittaker and/or AISLIC may, within the time period provided by the applicable section of this Agreement, demand expedited arbitration of the dispute. If no time period is specified in the applicable section, then the demand for expedited arbitration must be made within ten (10) days after the Technical Meeting at which such dispute was addressed and not resolved. Any such demand, accompanied by all materials that Plaintiffs, Whittaker and/or AISLIC consider necessary for resolution of the dispute, shall be served on the other Parties. By the end of the tenth day after their receipt of such a demand for arbitration, the receiving Party may submit to the Cost Consultant and, if so, shall serve upon the other Parties all materials that the receiving Party consider necessary for resolution of the dispute. The Cost Consultant may request further information from the Parties or schedule an arbitration hearing

date (in-person or by telephone conference) and shall render a decision within twenty (20) days after delivery of the demand for arbitration or, if an arbitration hearing is conducted, within ten (10) days of the conclusion of the arbitration hearing, or at such later time as may be agreed by the parties to the dispute and the Cost Consultant. If a Party does not timely demand arbitration, its disapproval shall be deemed waived.

ARTICLE 8. OWNERSHIP, CONSTRUCTION, OPERATION AND MANAGEMENT OF FACILITIES

8.1 Ownership of Facilities

Plaintiffs shall own or lease all Project facilities, all Replacement Wells and Associated Pipelines, all Distribution Pipelines, and the Q2 Treatment System. Plaintiffs represent and warrant that they have reached separate agreement as to their respective ownership of Project facilities, and this Agreement shall remain in full force and effect regardless of any dispute or disagreement that may exist or arise relating to their ownership of Project facilities, all Replacement Wells and Associated Pipelines, all Distribution Pipelines, and the Q2 Treatment System.

8.2 Plaintiffs' Responsibilities

8.2.1 Plaintiffs will be responsible for the planning, development, design, permitting, construction, installation, operation and maintenance of the Project, Q2 Treatment System, and Replacement Wells & Associated Pipelines and Distribution Pipelines consistent with generally accepted industry standards and practices, and subject to review of Project Capital Costs and Project O&M Costs as provided in Articles 4 and 5 of this Agreement, review of Q2 Treatment System as provided in Article 4 of this Agreement, and review of Replacement Wells & Associated Pipelines and Distribution Pipelines as provided in Article 4 of this Agreement, and resolution of disputed items or costs as provided in Articles 6 and 7 of this Agreement.

Subject to dispute resolution by the Cost Consultant in accordance with Article 7, Plaintiffs shall conduct such planning, development, design, permitting, construction and installation of the Project and the Q2 Treatment System through one or more contracts with design professionals and licensed contractors approved by Whittaker and AISLIC, such approval not to be unreasonably withheld.

8.2.2 Whittaker and AISLIC have previously approved of U.S. Filter as the initial Resin Service Contract Vendor for the Project, and the Q2 Treatment System which has already commenced operations. Whittaker and AISLIC shall participate with Plaintiffs in the negotiation of the initial Resin Service Contract with U.S. Filter for the Project, and shall be participants in Plaintiffs' negotiation of any renewal or substitute Resin Service Contract(s) for the Project prior to payment of the Lump Sum. Prior to an arbitration determination of the Lump Sum, all Plaintiff/Whittaker/AISLIC negotiations on Resin Service Contract(s) will include consideration and negotiation of insurance that the Vendor is able to obtain for Plaintiffs and Defendants and obtaining Vendor Labor in connection with operations, monitoring, sampling and maintenance of the Project, and comparison with alternative options of Plaintiffs' costs for substantially same Labor and insurance, liability exposure considerations, and all associated costs. The Parties agree that Plaintiffs will have the option of performing all or certain of the operations, monitoring, sampling and maintenance of the Project and to secure their own insurance policies in accordance with Article 11 "Project Insurance", provided, however, that Defendants' Project O&M payment obligations for such labor and insurance costs will be limited to the cost of reasonably comparable, efficient and effective alternatives available by means of a bid for a resin service contract selected through a competitive bidding process in accordance with CLWA bid procedures and applicable law.

8.2.3 The Project shall be designed, constructed and installed in accordance with Exhibit F (subject to Project Modification pursuant to Article 9 of this Agreement) and all applicable state, federal and local government laws, regulations, ordinances and other applicable legal requirements.

8.3 Operation, Maintenance and Management of Project

8.3.1 Plaintiffs shall, in consultation with each other, operate, maintain and manage the Project (a) in accordance with all applicable state, federal and local government laws, regulations, ordinances, other applicable legal requirements (including the DTSC-approved IRAP), and generally accepted industry standards and practices, and (b) to perform its intended function of providing containment of perchlorate as defined in Section 9.1 of this Agreement, until exhaustion of any Lump Sum determined and paid pursuant to Section 5.2.6 of this Agreement; provided, however, that if there is no Lump Sum determination and payment, Plaintiffs shall operate, maintain, and manage the Project until Defendants cease funding Project O&M Costs pursuant to Section 5.2.4 of this Agreement or any other reason. In fulfilling their obligations hereunder, Plaintiffs shall not be required to fund any Project Modification.

8.3.1.1 Plaintiffs shall provide accounting services necessary for accurately tracking Project Capital and O&M Costs, invoice payments, budget process, deposits to and disbursements from the Escrow Accounts, and credits for funds received from Public Funding Sources.

8.3.2 Monitoring and Reporting

8.3.2.1 As contemplated by the DTSC approved IRAP, Plaintiffs shall arrange for and supervise the required groundwater monitoring and promptly after receipt

provide sampling data to Whittaker, AISLIC, and upon request, to SCLLC, RFI, or if the sale has closed, the Buyer.

8.3.2.2 Plaintiffs shall ensure timely, complete, and satisfactory preparation and submission of any reports and other deliverables that may be required by any state, federal or local government law, regulation, ordinance or other applicable legal requirement, including the DTSC-approved IRAP, and provide copies of such reports to Whittaker and AISLIC. Copies of such reports shall, upon request, be made available to SCLLC, RFI, or if the sale has closed, the Buyer. This obligation can be met by an electronic posting of the requested materials.

8.3.2.3 Plaintiffs shall maintain any and all books, records, accounts and supporting documentation **("Records")** either required by or necessary to document (i) compliance with all applicable state, federal and local government laws, regulations, ordinances and other applicable legal requirements; and (ii) responsible financial management of the Project. Financial Records shall be maintained in accordance with generally accepted accounting principles and shall be retained until the later of (a) five (5) years from the "as of" date or period applicable to the financial Record; or (b) the Internal Revenue Service retention period for such Records. All other Records shall be retained for a minimum of ten (10) years after the record was created. All Records shall be subject to audit pursuant to Section 8.5 of this Agreement.

8.3.2.4 Plaintiffs shall provide Whittaker, AISLIC, and Steadfast on a semi-annual basis, copies of the Plaintiffs' cost estimates for the Project, the Replacement Wells/Distribution Pipelines and the Q2 Treatment System, showing expenditures against such budgets, and shall provide copies of any reports, contracts or other materials to be considered at

the Technical Meeting, in accordance with Section 8.4, below. Plaintiffs shall make available such reports to SCLLC, RFI, or if the sale has closed, the Buyer, upon request.

8.4 Monthly Technical Meetings

8.4.1 Plaintiffs shall hold monthly meetings to consider technical, financial and other issues related to the planning, development, design, permitting, construction, installation, operation and management of the Project, the Q2 Treatment System, and the Replacement Wells/Distribution Pipelines ("Technical Meetings").

8.4.2 Participation in Technical Meetings

8.4.2.1 Each Plaintiff and Whittaker and AISLIC shall designate one or more representative(s) to participate in Technical Meetings in furtherance of planning, development, design, permitting, construction, installation, operation and management of the Project and the Q2 Treatment System, and the planning, development, design, permitting, construction, and installation of the Distribution Pipelines and Replacement Wells & Associated Pipelines. Such meetings shall be held monthly, or more or less frequently if agreed to by all Plaintiffs and Whittaker and AISLIC, upon no less than ten (10) days written notice from Plaintiffs. After Defendants' payment of the Lump Sum as described in Section 5.2.6 and installation of the Distribution Pipelines and Replacement Wells & Associated Pipelines, such meetings will no longer be held, unless otherwise requested by Whittaker and/or AISLIC, with reasonable compensation payable to Plaintiffs as agreed by the Parties.

8.4.2.2 Except for those contracts, proposals, and/or solicitation materials listed in Exhibit T attached to this Agreement, no contract, request for proposal, solicitation of bid package or other solicitation for planning, development, design, permitting, construction or installation of the Project, the Q2 Treatment System or the Distribution Pipelines

and Replacement Wells & Associated Pipelines shall be made by any Plaintiff unless approved by Whittaker and AISLIC, or -- if disapproved by Whittaker and/or AISLIC-- approved by the Cost Consultant. Copies of any contract, request for proposal, solicitation of bid package, report or other document to be considered at any Technical Meeting held pursuant to Section 8.4.2.1 of this Agreement shall be provided to each designated representative at least ten (10) days before the meeting, unless such document or report was then not available, in which event the document or report shall be distributed as long in advance of the meeting as possible. Whittaker and AISLIC shall notify Plaintiffs as soon as possible, but in any event within ten (10) Working Days after receipt, whether they respectively approve each contract, request for proposal, solicitation of bid package or other solicitation for planning, development, design, permitting, construction or installation of the Project, the Q2 Treatment System, or the Distribution Pipelines and Replacement Wells & Associated Pipelines. Absent such timely notice, approval shall be presumed. If Whittaker and/or AISLIC gives timely notice of disapproval of any such contract, request for proposal, solicitation of bid package or other solicitation for planning, development, design, permitting, construction or installation, such notice must be accompanied by a written explanation of the reason for disapproval and, if possible, a proposed revision that is approved.

8.4.2.3 Whittaker's and/or AISLIC's disapproval of any contract, request for proposal, solicitation of bid package or other solicitation for planning, development, design, permitting, construction or installation of the Project, the Q2 Treatment System, or the Distribution Pipelines and Replacement Wells & Associated Pipelines will be subject to binding arbitration, pursuant to Article 7 of this Agreement. The arbitration shall be conducted by the Cost Consultant. Within fifteen (15) Days after Whittaker and/or AISLIC's timely notice of disapproval of any contract, request for proposal, solicitation of bid package or other solicitation

for planning, development, design, permitting, construction or installation of the Project, the Q2 Treatment System, or the Distribution Pipelines and Replacement Wells & Associated Pipelines, Whittaker and/or AISLIC may demand such expedited arbitration. Any such demand, accompanied by all materials that Whittaker and/or AISLIC considers necessary for resolution of the dispute, shall be served on Plaintiffs within that fifteen (15) day period. By the end of the tenth day after their receipt of such a demand for arbitration, Plaintiffs may submit to the Cost Consultant and, if so, shall serve upon Whittaker and AISLIC, all materials that Plaintiffs consider necessary for resolution of the dispute. The Cost Consultant may request further information from the Parties and AISLIC or schedule an arbitration hearing date (in-person or by telephone conference) and shall render a decision within twenty (20) days after delivery of the demand for arbitration or, if an arbitration hearing is conducted, within ten (10) days of the conclusion of the arbitration hearing, or at such later time as may be agreed by the parties to the dispute and the Cost Consultant. If Whittaker and/or AISLIC does not timely demand arbitration, its disapproval shall be deemed waived.

8.4.2.4 Plaintiffs shall make available to Whittaker, AISLIC and Steadfast (i) copies of all notices, documents and other written communications (including, without limitation, drafts and revisions) concerning planning, development, design, permitting, construction or installation of the Project or the Q2 Treatment System sent by Plaintiffs or their consultants to DTSC, DHS, Regional Water Quality Control Board ("**RWQCB**"), California Public Utilities Commission ("**CPUC**"), U.S. Environmental Protection Agency ("**EPA**") and/or any other regulatory agency with jurisdiction at the same time and by the same manner of delivery by which such notices, documents or other written communications are sent; and (ii) promptly following receipt, all notices, documents and other written communications concerning

planning, development, design, permitting, construction or installation of the Project or the Q2 Treatment System received by Plaintiffs or their consultants from DTSC, DHS, RWQCB, CPUC, EPA and/or any other regulatory agency with jurisdiction. Plaintiffs shall additionally make all of such information available upon request to SCLLC, RFI, or if the sale has closed, to the Buyer.

8.4.2.5 Whittaker shall make available to Plaintiffs, AISLIC and Steadfast copies of all public or non-public and non-confidential notices, reports, documents and other written communications to or from Whittaker and DTSC, DHS, RWQCB, EPA and the Buyer (with the Buyer's consent) concerning the Site and groundwater remediation activities and obligations, at the same time and by the same manner of delivery by which such notices, documents or other written communications are sent, or promptly upon receipt by Whittaker.

8.5 Audits

Whittaker and/ or AISLIC may, upon reasonable notice and no more frequently than once a year, audit Plaintiffs' Records, including all invoices and supporting documentation for Project expenditures. The costs of any such audit shall be paid by the requesting party. Any dispute arising from an audit shall be resolved by the arbitrator designated pursuant to Section 13.2.2. Whittaker and/or AISLIC may demand arbitration of such a dispute within thirty (30) Days after receipt of the audit report triggering the dispute. Failure to demand arbitration within that time period shall be a waiver of any dispute triggered by the audit report.

ARTICLE 9. PROJECT MODIFICATION

9.1 Project Modification

9.1.1 The Parties acknowledge that the effectiveness of the remedy contemplated by the Project is not guaranteed by the Plaintiffs, although the Parties believe that the implementation of the Project represents a reasonable approach to providing containment of

perchlorate as defined below and restoring water production. In the event that within the first three (3) years after Commencement of Operations of the Project (which time period will be tolled during any period in excess of one week of Remedy Stoppage), a modification of the Project relating to perchlorate remediation is required (1) because of any regulatory requirement or directive or court order; (2) because of a change in water quality standards or regulations; (3) because of an increase in concentration levels of perchlorate in the Subject Wells; (4) to achieve containment of downgradient perchlorate migration; (5) to restore the contemplated capability of the Project to provide water for potable purposes; or (6) to improve Project efficiency or cost effectiveness, Plaintiffs, Whittaker, and/or AISLIC may develop and implement the necessary modification of the Project ("**Project Modification**") in accordance with this Article 9. Any Project Modification will be funded separately from and is not included in the amounts deposited into the Project Capital Costs Escrow Account as described in Section 1.56. For the purposes of this Agreement, containment is achieved when groundwater monitoring and modeling demonstrates (subject to agreement by representatives of Plaintiffs, Whittaker and AISLIC at the monthly Technical Meetings or there is a determination by the Cost Consultant) that hydraulic control of Saugus Formation groundwater in the vicinity of Saugus 1 and 2 is such that future perchlorate migration from the Site in the Saugus Formation will not result in impacts to existing Saugus Formation production wells identified in Exhibit U above an applicable Notification Level or Maximum Contaminant Level ("MCL"). The groundwater modeling and evaluation of containment will also consider other contaminant mass removal and contaminant containment measures implemented on and in the vicinity of the Site.

9.1.2 Promptly upon the occurrence of any of the circumstances described in Section 9.1.1, above, Plaintiffs may provide Whittaker, AISLIC and Steadfast with written

notification of the need for a Project Modification (**"Project Modification Notice"**), with a proposal for the required modification and/or a procedure for developing, implementing and funding such a modification, and the Plaintiffs, Whittaker and AISLIC shall exercise their best efforts to develop an appropriate and mutually acceptable Project Modification. Any proposed Project Modification shall incorporate the use of best available, cost efficient and effective technology upon consultation with the technical representatives of Whittaker and AISLIC. If, within 60 days after the receipt of the Project Modification Notice, the Plaintiffs, Whittaker and AISLIC are unable to agree upon a Project Modification, Plaintiffs may demand arbitration. In that event, the matter will be resolved by the Cost Consultant in accordance with Article 7.

9.1.3 In addition to the foregoing, within the first three (3) years after Commencement of Operations of the Project (which time period will be tolled during any period in excess of one week of Remedy Stoppage), Whittaker or AISLIC may propose a Project Modification based upon the occurrence of any of the circumstances described in Section 9.1.1 above, and deliver the proposal, including all appropriate documentation, to the other Parties for consideration at the next Technical Meeting. If the Plaintiffs, Whittaker and AISLIC are unable to agree on the proposed Project Modification within 60 days after delivery of the proposal and documentation, the proposing party may demand arbitration. In that event, the matter will be resolved by the Cost Consultant in accordance with Article 7.

9.1.4 Following the first three (3) years after Commencement of Operations of the Project (which time period will be tolled during any period in excess of one week of remedy stoppage requiring Project Modification), and prior to determination of a Lump Sum pursuant to Section 5.2.6, Whittaker or AISLIC may propose a Project Modification and deliver the proposal, including all appropriate documentation, to the other Parties for consideration at the

next Technical Meeting, if Whittaker or AISLIC are willing to pay for the capital costs and O&M costs associated with such Project Modification. If the Parties are unable to agree on the proposed Project Modification within 60 days after delivery of the proposal and documentation, the matter will be resolved by arbitration in accordance with Article 7.

9.1.5 Following the first three (3) years after Commencement of Operations of the Project (which time period will be tolled during any period in excess of one week of Remedy Stoppage, and prior to determination of a Lump Sum pursuant to Section 5.2.6, Plaintiffs may propose a Project Modification and deliver the proposal, including all appropriate documentation, to the other Parties for consideration at the next Technical Meeting, if Plaintiffs are willing to pay for the capital costs associated with such Project Modification. Defendants, subject to Section 2.5, will retain the obligation to pay Project O&M Costs, including any increase in such costs resulting from the Project Modification. If the Parties are unable to agree on the proposed Project Modification within 60 days after delivery of the proposal and documentation, the matter will be resolved by arbitration in accordance with Article 7.

9.1.6 Funding By Defendants

Once a Project Modification has been agreed upon or resolved by arbitration, the Project Modification shall become incorporated in the Project, and shall be handled in all respects as a part of the Project, with Defendants obligated on a joint and several basis subject to Section 2.5 to pay for all reasonable and necessary Project Capital Costs and Project O&M Costs associated with the Project Modification, including costs of replacement water in the event of a Remedy Stoppage within the first three years after Commencement of Operation of the Project (which time period will be tolled during any period in excess of one week of Remedy Stoppage). This Project Modification funding obligation for Project Capital Costs is in addition to the obligation

for funding Project Capital Costs as defined in Section 1.5.4, for which an amount of ten million dollars ($10,000,000) has been allocated. In the event that a modification of the Project is required or desired after the first three (3) years following Commencement of Operations of the Project (which time period will be tolled during any period in excess of one week of Remedy Stoppage), Plaintiffs will bear all Project Capital Costs associated with the Project Modification, except for Project Modifications proposed by Whittaker or AISLIC pursuant to Section 9.1.4. Any increase in O&M costs resulting from such Project Modification will be included in Project O&M Costs required to be paid by Defendants pursuant to the applicable provisions of this Agreement.

9.1.7 Newhall County Well NC13

9.1.7.1 Notwithstanding any other provisions of this Agreement, the provisions of this Section shall govern matters relating to Newhall County Well NC13 in the event of any conflict.

9.1.7.2 The Parties recognize that perchlorate contamination reportedly found in Newhall County Well NC13 may require well-head or equivalent treatment, or well replacement, in the future. If NCWD reasonably believes that well-head or equivalent treatment or replacement of Newhall County Well NC13 is in fact required, then such proposed measures may, in NCWD's sole discretion, be treated as a request for a Project Modification subject to the provisions of Section 9.1.2, even if the proposal is not made until later than three (3) years after Commencement of Operations of the Project; provided, however, that Whittaker and AISLIC retain expressly all rights under the Project Modification provisions of Article 9, including the right to object based on the cost-ineffectiveness of the proposal or on other grounds, and provided that the proposal shall not be treated as a Project Modification unless it is made no later

than July 1, 2017. The funding by Defendants of a Project Modification pursuant to this Section shall include capital costs even if it does not occur until later than three (3) years after Commencement of Operations of the Project.

9.1.7.3 If NCWD seeks and obtains a Project Modification with respect to NC13, then NC13 shall be treated as a Subject Well; however, unless and until NCWD obtains a Project Modification with respect to NC13, it shall not be deemed a Subject Well and there shall be no release of any liability in connection therewith.

9.1.7.4 Any Lump Sum Arbitration conducted at a time when NC13 is not part of a Project Modification shall have no impact on the obligations created in this Section. If NC13 is a Project Modification and is undergoing well head or equivalent treatment at the time a Lump Sum Arbitration for Saugus 1 and 2 Treatment Plant Operations and Maintenance is conducted, the Lump Sum Arbitration shall also determine a separate lump sum for the operation and maintenance of NC13 for the remainder of the up to thirty (30) year period after the commencement of well-head or equivalent treatment at NC13, deducting that portion of the Lump Sum determined for Saugus 1 and 2 Treatment Plant Operations and Maintenance costs allocable to NC13 from such separate lump sum to the extent NC13 is being treated through the Saugus 1 and 2 Treatment Plant.

9.1.7.5 In the event that NC13 becomes a Project Modification after a Lump Sum Arbitration for Saugus 1 and 2 Treatment Plant Operations and Maintenance costs has occurred, the obligation to pay for Project Modification costs shall continue for a period of up to thirty (30) years after the commencement of well-head or equivalent treatment at NC13, unless, beginning three (3) years after such Project Modification, Plaintiffs, Whittaker, or AISLIC, demand binding arbitration as provided in Article 13 of this Agreement and consistent

with this Section, to determine a lump sum payment of NC13 operation and maintenance costs for the remainder of the up to thirty (30) year period.

9.1.7.6 Prior to NC13 becoming a Project Modification, Plaintiffs' rights under the Rapid Response Fund will not be impaired.

ARTICLE 10. DISPUTES REGARDING POSSIBLE FUTURE PERCHLORATE CONTAMINATION

10.1 Process for Addressing Possible Future Perchlorate Contamination

The Parties acknowledge that the remedy contemplated by the Project and Distribution Pipelines, the Q2 Treatment System, and the Replacement Wells and Associated Pipelines does not specifically address possible future impacts of perchlorate on wells other than the Subject Wells.

10.1.1 In the event that there is detection of perchlorate contamination confirmed by subsequent sample above the Notification Level or MCL that affects water production from Presently Existing Saugus Production Wells or Alluvial Wells, other than one of the Subject Wells (hereinafter referred to as a "**Non-Subject Well Future Perchlorate Circumstance**" or "**Circumstance**"), one or more of the affected Plaintiffs shall provide written notice to all other Parties that a Non-Subject Well Future Perchlorate Circumstance exists. Such written notice shall include the facts relevant to such Circumstance, as well as documents relevant to such Circumstance, and shall specify whether any action, payment, or relief is being demanded. The sender of the Notice shall provide such other and further information and documentation, and updates regarding the Circumstance, as may be reasonably appropriate. In the event that an action, payment, or other relief is being demanded of Whittaker, Whittaker shall, within fifteen (15) days of receipt of the Notice, forward such Notice to AISLIC seeking a determination of coverage with respect to such demand, if Whittaker believes that coverage exists for such

demand. In its letter to AISLIC requesting a determination of coverage, and thereafter, Whittaker shall provide to AISLIC all information and documents relating to the Circumstance as have been provided to Whittaker, and Whittaker shall request that AISLIC provide a determination of coverage as soon as possible, and AISLIC shall respond no later than sixty (60) days following AISLIC's receipt of information and documents reasonably necessary to make a coverage determination. In the event that an action, payment, or other relief is being requested, the sender of the Notice shall meet and confer in good faith with such Party that is a subject of the Notice and, as appropriate, its insurers, to attempt to negotiate a resolution of the issues presented by the Circumstance. In the event that after 90 days from the date of receipt of the Notice (the "**Notice Period**"), the issues presented in the Notice are not resolved through such meeting or meetings, then any Plaintiff may elect to initiate the arbitration process for Future Perchlorate Contamination Disputes under Section 13.3.2.1 of this Agreement, provided that the AISLIC Future Perchlorate Determination of Coverage has been received by Whittaker, and Whittaker satisfies itself, at its discretion exercised in good faith, that AISLIC's determination of coverage is acceptable to allow the arbitration to go forward. Whittaker shall notify such Party and AISLIC in writing of Whittaker's decision within 15 days of receiving AISLIC's determination of coverage. If Whittaker provides such notice indicating that AISLIC's determination of coverage is not acceptable to Whittaker, or if AISLIC fails to provide any determination of coverage within the requisite sixty (60) period, then no Plaintiff may elect to initiate the arbitration process.. Where arbitration may be initiated hereunder and a Plaintiff elects to initiate the arbitration process, said Future Perchlorate Contamination Dispute will be resolved through the procedures for Future Perchlorate Contamination Disputes set forth in Section 13.3 of this Agreement.

10.1.2 Unless arbitration may be initiated pursuant to Section 10.1.1 above, and a Plaintiff elects in its sole discretion to initiate the arbitration process pursuant to Section 13.3.2.1 with respect to a Future Perchlorate Contamination Dispute, such dispute will not be subject to the procedures set forth in Section 13.3 and may instead be heard in its entirety by a court of competent jurisdiction.

10.1.3 Except as provided herein, each Party agrees that execution of this Agreement shall constitute their respective consents to jurisdiction of the Federal District Court, Central District of California, or the Superior Court of the County of Los Angeles with regard to Future Perchlorate Contamination Disputes. Notwithstanding the foregoing, the venue for any action against the Debtors, or the reorganized Debtors pursuant to a plan of reorganization approved by the Bankruptcy Court, shall be the Bankruptcy Court to the fullest extent that the Bankruptcy Court has subject matter jurisdiction over such action.

10.1.4 Notwithstanding the foregoing, in the event that Plaintiffs have obtained funds from the Rapid Response Fund pursuant to Section 11.2 to address a Circumstance as defined herein, any disputes over the use of the Rapid Response Fund for the Circumstance for which arbitration is initiated under Section 10.1.1 will be handled in accordance with Section 13.3.

ARTICLE 11. PROJECT INSURANCE; RAPID RESPONSE FUND

11.1 Project Insurance

11.1.1 Plaintiffs shall obtain and maintain in force the following policies of insurance for the Project or obtain additional insured status on policies offered by the Resin Service Contract Vendor throughout the first thirty years of operation of the Project (including any renewals with same or substantially similar coverage):

- a comprehensive general liability policy of insurance, including contractual liability, in substantially the form of Exhibit V to this Agreement (the "**CGL Policy**");
- an Environmental Impairment Liability policy in substantially the form of Exhibit W to this Agreement (the "**EIL Policy**") if obtainable for a commercially reasonable premium as agreed by the Parties and AISLIC or determined by the Cost Consultant;
- an earthquake policy of insurance in substantially the form of Exhibit X to this Agreement (the "**Earthquake Policy**")
- a First-Party Property Insurance policy in substantially the form of Exhibit Y to this Agreement (the **"Property Policy"**).

The CGL Policy, the EIL Policy, the Earthquake Policy and the Property Policy must be obtained by Plaintiffs with Plaintiffs and, other than the Earthquake and Property Policies, Defendants and the Buyer, identified as named insureds or additional insureds, and with coverages, policy limits, and deductibles or self-insured retentions as set forth on Exhibits V, W, X, and Y or as provided on substantially similar coverage, or alternatively, as provided on less expensive similar insurance offered through the Resin Service Contract Vendor. In the event that the Resin Service Contract Vendor is retained to provide operations and maintenance Labor for the Project, no cost of EIL coverage shall be paid by Defendants as Project O&M Costs or otherwise, so long as EIL coverage substantially similar to Exhibit W is provided to Plaintiffs by the Resin Service Contract Vendor.

11.1.2 Incremental costs of the Project Insurance coverage, in excess of the Plaintiffs' non-Project costs of such coverage, will constitute Project O&M Costs.

11.1.3 Duties of Named Insureds

11.1.3.1 Each Party that is named as an insured or additional insured under the CGL Policy, the EIL Policy, or substitute insurance obtained through Resin Service Contract Vendor, Earthquake Policy and Property Policy, shall perform its duties as an insured as set forth in each such policy of insurance.

11.1.3.2 No Party that is named as an insured or additional insured under the CGL Policy or EIL Policy shall act on behalf of any other Party also insured under said insurance policies with respect to (a) giving or receiving of notice of cancellation; or (b) receipt or acceptance of any endorsement issued to or for a part of any of said insurance policies. No Party insured under the CGL Policy or EIL Policy shall cancel, or assign the right to cancel, any of said policies without first obtaining the written consent of all other Parties, which shall not be unreasonably withheld.

11.1.4 The Parties agree not to make a claim against Plaintiffs, Whittaker, AISLIC, the Buyer, Debtors, Steadfast, or SF Escrow 1 or SF Escrow 2 for any sums paid by any insurance policy referenced in this Article 11. The insurance obtained pursuant to this Article 11 shall contain a waiver of subrogation against Plaintiffs, Whittaker, AISLIC, the Buyer, Debtors, Steadfast, and SF Escrow 1 and SF Escrow 2.

11.2 Rapid Response Fund

11.2.1 The Parties acknowledge that the remedy contemplated by the Project and Q2 Treatment System may not effectively contain downgradient movement immediately of perchlorate contamination in the Alluvial Aquifer or portions of the Saugus Formation. Accordingly, Plaintiffs may submit to AISLIC and AISLIC shall process and pay, as soon as practicable from the SF Escrow 1 Account in accordance with this Section 11.2 and the

Coverage and Claims Settlement Agreement, costs incurred to respond on an expedited basis to perchlorate contamination that is confirmed to be present by subsequent sampling, with split samples to be provided to Defendants, in concentrations exceeding the applicable Notification Level or MCL, in VWC wells N, N-7, N-8, S6, S7, S8, 201, and 205, and NCWD wells NC-10, NC-12 and/or NC-13 (the **"Threatened Wells"**) up to a total amount of ten million dollars ($10,000,000) (the **"Rapid Response Fund"**). Plaintiffs shall be entitled to seek such payment and/or reimbursement only for the period ending July 1, 2017.

11.2.2 Pending agreement between Plaintiffs, Whittaker and AISLIC, or a final determination of the appropriate remedy and amounts payable, allowable uses of the Rapid Response Fund by Plaintiffs include, (a) the additional costs of providing consumers with water from alternative water sources ("**Replacement Water**"), if and to the extent that Replacement Water is necessary and not otherwise available, from existing sources without negative impact to Plaintiffs or any of them, and (b) any costs for rental equipment and resin, including the costs of operating and maintaining leased treatment equipment, or for associated site acquisition, preparation and installation costs. Capital Costs for purchase of capital equipment or permanent capital improvements, and operations and maintenance costs associated with purchased capital equipment or permanent capital improvements, are not allowable uses of the Rapid Response Funds absent later agreement by both AISLIC and Whittaker on a case by case basis.

11.2.3 The Rapid Response Fund obligation will be paid from the funds maintained in the SF Escrow 1 Account. The Defendants and AISLIC agree, and the Defendants represent and warrant that they have obtained the agreement of the "Zurich Parties" and the "AISLIC Parties" (as defined in the Coverage and Claims Settlement Agreement) that

the funding of the Rapid Response Fund from the SF Escrow 1 Account falls within the Uses of SF Escrow 1 Funds, Section IV.F.5.a.(i) of the Coverage and Claims Settlement Agreement.

11.2.4 To obtain payment and/or reimbursement from the Rapid Response Fund, Plaintiffs must directly tender their written request(s) for payment for a ninety day period of time, along with a sworn statement describing the need for specified funds due to confirmed perchlorate contamination in concentrations exceeding the applicable Notification Level or MCL in one or more of the Threatened Wells, and identifying the last date, if any, that the Well for which funding is sought may have been disinfected and the product or solution that may have been used, to AISLIC, with courtesy copies to Defendants. All written requests for payment shall state the need for said specified funds within a ninety day period. Any request for additional ninety day funding shall require a new written request for payment accompanied by a new supporting statement as described above and supporting cost documentation. Within fifteen (15) days of receipt of such written request and sworn statement, AISLIC will instruct Wells Fargo Bank or other agreed bank to make payment of the required Rapid Response Funds to Plaintiffs from the SF Escrow 1 Account.

11.2.5 In the event that the SF Escrow 1 Account Terminates (as defined in Section 5 of the SF Escrow 1 Instructions) prior to the expiration of the time period described in Section 11.2.1 above and in the further event that the $10,000,000 Rapid Response Funds have not been fully paid, the AISLIC Policy Coverages A-F, to the extent that limits remain thereunder, will be available to Whittaker to provide Plaintiffs with a rapid response for the remainder of the time period described in Section 11.2.1 above for the remaining unpaid amount of the agreed $10,000,000 in Rapid Response Funds. In the aforementioned circumstances, Plaintiffs must directly submit their written request(s) for payment for a ninety day period of

time, along with a sworn statement describing the need for specified funds due to confirmed perchlorate contamination in concentrations exceeding the applicable Notification Level or MCL in one or more of the Threatened Wells as described in Section 11.2.4, to Whittaker, with courtesy copies to AISLIC. Within seven (7) Working Days of receipt of such written request and sworn statement, Whittaker, in turn, shall submit a claim pursuant to this Agreement to AISLIC under Coverages A-F for the aforementioned Rapid Response Funds, and Whittaker's payment shall be due within twenty-eight (28) Working Days of receipt of Plaintiff's written request to the extent that limits remain under AISLIC Policy Coverages A-F. Upon receipt of said claim from Whittaker ("Whittaker Rapid Response Claim") and provided that the CLWA Plaintiffs have provided a written request and sworn statement to Whittaker pursuant to and in accordance with Section 11.2 "Rapid Response Fund" of this Agreement, AISLIC shall: (1) treat any Whittaker Rapid Response Claim as a covered claim under AISLIC Policy Coverages A, B, C, D, E, or F, and respond to said claim pursuant to the terms of the AISLIC Policy Coverages A-F and without reservation of coverage rights to the extent that limits remain under AISLIC Policy Coverages A-F, but with reservation of AISLIC's rights, to the full extent of the rights set forth herein (a) to assert disputes, claims or controversies under this Agreement and (b) to assert all of Whittaker's substantive defenses to payment of Rapid Response Funds as provided in this Agreement and (2) make payment on Whittaker's Rapid Response Claim to CLWA Plaintiffs on behalf of Whittaker within twenty one (21) Working Days of AISLIC's receipt of a Whittaker Rapid Response Claim that is fully compliant with Section 11.2 of the Castaic Lake Water Agency Litigation Settlement to the extent that limits remain under AISLIC Policy Coverages A-F. Nothing in this Section 11.2.5 of this Agreement is intended or shall be construed to be agreement as to which Coverage(s) (i.e., A, B, C, D, E, or F) apply to Whittaker's Rapid

Response Claim(s). This Section 11.2.5 is unique and specific to Whittaker's Rapid Response obligation and nothing in this Section 11.2.5 is intended to be or shall be of precedential value or construed to be agreement as to treatment or handling of any other current or future claims that Whittaker may assert under or Plaintiffs may assert with respect to the AISLIC Policy.

11.2.6 Any dispute, claim or controversy concerning payment of costs or losses under this Section, including any disputes as to the reasonableness and necessity of said costs, will be resolved by expedited binding arbitration in accordance with Section 13.2 or Section 13.3, as appropriate.

11.2.7 This Rapid Response Fund remedy is in addition to any remedy otherwise available to Plaintiffs at law or in equity, or pursuant to this Agreement, provided that Plaintiffs will not seek duplicate recovery from Defendants or their insurers or AISLIC or SF Escrow 1 for any losses, costs, expenses, or damages paid by the Rapid Response Funds. Defendants and their insurers reserve all defenses they may have with respect to payment of Rapid Response Funds, including but not limited to the defense that Plaintiffs' disinfection or other operation and maintenance procedures carried out after the Effective Date hereof have contributed to or caused the perchlorate detection and the defense that Defendants are not otherwise legally or factually responsible or liable for the perchlorate contamination. In the event that Rapid Response Funds are determined by binding arbitration to have been improperly requested by or paid to Plaintiffs in whole or in part based upon defenses the Defendants or their insurers or AISLIC may have with respect to payment of Rapid Response Funds, Plaintiffs shall be required to reimburse those funds in whole or in part to the SF Escrow 1 or the AISLIC Coverages A-F limits, as appropriate, which Escrow and/or Policy shall be replenished to the extent of the reimbursement.

ARTICLE 12. RELEASES AND DISMISSAL OF UNDERLYING ACTION

12.1 Plaintiffs' Releases

12.1.1 In consideration of Defendants' payments, promises, and covenants herein, including funding provided by or on behalf of Defendants pursuant to the Coverage and Claims Settlement Agreement and the Related Settlement, each Plaintiff, on behalf of itself and its predecessors, successors and assigns, hereby forever releases, acquits and forever discharges Whittaker and its insurers (including but not limited to AISLIC, The Insurance Company of the State of Pennsylvania ("ISOP"), and Steadfast), SCLLC, RFI, RFI Realty, BRLLC, the Buyer, and Steadfast Santa Clarita Holdings, LLC (**"SSCH"**), and their respective officers, directors, shareholders, members, employees, agents, representatives, contractors, reinsurers, consultants, subsidiaries, affiliates, predecessors, successors and assigns from any and all actions, causes of action, claims, demands, liabilities, damages, penalties, fines, debts, losses, costs, expenses and fees (including, without limitation, litigation costs and attorney and consultant fees) of every kind and nature whatsoever, in law and in equity, whether known or unknown, suspected or unsuspected, foreseen or unforeseen, arising out of or relating to the past, present or future detection of perchlorate in the Subject Wells, (except for claims addressed in Section 12.1.2 and Section 12.1.3 which are not released in this Section 12.1.1) including (without limitation) all claims for past and future purchase of replacement water as a result of the detection of perchlorate in the Subject Wells (except for the costs of providing consumers with water from alternative water sources during the first three years after Project operations commence if there is a Remedy Stoppage during said time period), all Plaintiffs' Past Environmental Claims, all Plaintiffs' Past Design Costs Claims, all Plaintiffs' claims relating to the V-206 Replacement Well, including, but not limited to, construction and installation of VWC's well V-206 and associated pipelines, and permanent closure and abandonment of VWC's well V-157, all claims

with respect to the Capital Costs for Q2, and all claims for past or future response costs and other costs incurred as a result of perchlorate detection in the Subject Wells, including attorneys' and consultants' fees and costs. However, excluded from the release provided in this section are any claims or causes of action arising out of or relating to any future claims, causes of action, suits, legal or administrative proceedings by third parties (or by Defendants where the proceeding is initiated by a third party) against Plaintiffs for actual bodily injury, property damage or response costs allegedly suffered or incurred by such third-parties, including but not limited to any and all third party claims, causes of action, suits, legal or administrative proceedings against Plaintiffs and any resulting damages, losses, penalties, fines or liabilities , after the Effective Date arising out of or related to alleged exposure to or release of perchlorate or other chemicals caused by Plaintiffs' operation of the Project, (collectively, **"Third Party Claims"**) but not excluding any Third Party Claims resulting from the Plaintiffs' negligence or willful misconduct in operation of the Project. Plaintiffs represent and warrant that, as of the Effective Date of this Agreement, they are not aware of any Third Party Claims brought against any of them. The releases provided in this Section 12.1.1 shall be effective upon payment of all funds required to be paid within thirty (30) days after the Effective Date of this Agreement..

12.1.2 Release For Costs Applied Against Escrows. Upon each payment from the Escrow Accounts for Project Capital and O&M Costs, Q2 O&M Costs, and Replacement Wells/Distribution Pipeline Capital Costs (and following any adjustment for a disputed item), and upon each payment of Rapid Response Funds from the SF Escrow 1 Account or the AISLIC Policy, as applicable, each Plaintiff, on behalf of itself and its predecessors, successors and assigns, hereby forever releases, acquits and forever discharges Whittaker and its insurers (including but not limited to AISLIC, ISOP and Steadfast), SCLLC, RFI, RFI Realty, BRLLC,

the Buyer, and SSCH, and their respective officers, directors, shareholders, members, employees, agents, representatives, contractors, reinsurers, consultants, subsidiaries, affiliates, predecessors, successors and assigns from any and all actions, causes of action, claims, demands, liabilities, damages, penalties, debts, losses, costs, expenses and fees (including, without limitation, litigation costs and attorney and consultant fees) of every kind and nature whatsoever, in law and in equity, in connection with the Project, the Q2 Treatment System, the Replacement Wells and the Distribution Pipelines, and the Rapid Response Funds, but only to the extent of such payment.

12.1.3 As to Project O&M Costs, and subject to Section 9.1.7 hereof, upon the sooner of payment by Defendants of a Lump Sum determined by arbitration pursuant to Section 5.2.6 hereinabove or of payment of all Project O&M pursuant to Article 5, each Plaintiff, on behalf of itself and its predecessors, successors and assigns, hereby forever releases, acquits and forever discharges Whittaker and its insurers (including but not limited to AISLIC, ISOP and Steadfast), SCLLC, RFI, RFI Realty, BRLLC, the Buyer, and SSCH and their respective officers, directors, shareholders, employees, agents, representatives, contractors, reinsurers consultants, subsidiaries, affiliates, predecessors, successors and assigns from any and all actions, causes of action, claims, demands, liabilities, damages, penalties, debts, losses, costs, expenses and fees (including, without limitation, litigation costs and attorney and consultant fees) of every kind and nature whatsoever, in law and in equity, in connection with the Project. The releases provided in this Section 12.1.3 exclude any Third Party Claims arising after the Effective Date related to alleged exposure to or release of perchlorate or other chemicals caused by Plaintiffs' operation of the Project, other than Third Party Claims resulting from the Plaintiffs' negligence or willful misconduct in operation of the Project.

12.1.4 Plaintiffs agree that the Steadfast PLC policy no. PLC 3598792-00 issued by Steadfast to Defendants has been exhausted by Steadfast's deposit into the SF Escrow 1 Account and the SF Escrow 2 Account of the remaining limits of this pollution liability coverage (**"Steadfast PLC Policy"**) insurance policy, with Plaintiffs waiving any and all purported rights and claims they have or may have against such PLC Policy. Plaintiffs waive and release any and all purported rights and claims they have or may have against the Steadfast EOC policy no. 3554336.

12.1.5 Each of the Plaintiffs has filed a proof of claim in each of the Bankruptcy Cases in which RFI and SCLLC are the debtors asserting the liquidated and unliquidated claims alleged by them against RFI and SCLLC in the Underlying Action (**"Proofs of Claim"**). In place of the Proofs of Claim, Plaintiffs shall have a single allowed claim against the Debtors, and each of them, in the Bankruptcy Cases in an amount equal to the obligations of Debtors pursuant to this Agreement (**"Allowed Claim"**) and the Final Approval Order shall so provide. Except to the extent that certain funds in SF Escrow 1 will be paid on behalf of Defendants to Plaintiffs and to fund escrow accounts for the benefit of Plaintiffs pursuant to this Agreement, and the Coverage and Claims Settlement Agreement, Plaintiffs waive any right to any payment or distribution of assets, property or funds of the estates of the Debtors in the Bankruptcy Cases by reason of their Allowed Claim and such Proofs of Claim shall be deemed satisfied by the consideration furnished by Debtors pursuant to this Agreement. Plaintiffs further agree that, notwithstanding any other provision of this Agreement, their sole recourse against the Debtors and any reorganized Debtors pursuant to a plan of reorganization approved by the Bankruptcy Court, for any and all actions, causes of action, claims, demands, liabilities, damages, penalties, debts, losses, costs, expenses and fees (including, without limitation, litigation costs and attorney

and consultant fees) of every kind and nature whatsoever, in law and in equity against the Debtors shall be the SF Escrow 1 Account.

12.1.6 Plaintiffs agree that this Settlement does not compromise, release, diminish or adversely affect the rights of Debtors or their successors in interest to enforce obligations, if any, of SCWC and/or NCWD to provide water to the Property pursuant to the documents attached collectively as Exhibit Z.

12.1.7 Plaintiffs agree that: (i) the Steadfast PLC Policy is released by all such Plaintiffs such that no Plaintiff can assert any claim against the Steadfast PLC Policy; and (ii) the Steadfast EOC Policy is released by all such Plaintiffs such that no Plaintiff can assert any claim against the Steadfast EOC Policy.

12.2 Bankruptcy Releases.

Debtors, acting on behalf of themselves and on behalf of each of their bankruptcy estates, shall release the Plaintiffs from any and all claims, obligations, causes of action and liabilities (i) under any of sections 542, 544, 545, 547, 548, 549, or 553 of the Bankruptcy Code to avoid any alleged transfer to or seek turnover from a Plaintiff, (ii) under section 550 of the Bankruptcy Code to recovery any such alleged transfer, (iii) under section 510(c) of the Bankruptcy Code to subordinate any claim of a Plaintiff, and (iv) under Section 502(d) or 502(j) of the Bankruptcy Code.

12.3 Civil Code Section 1542

12.3.1 The Parties to this Agreement have read and fully understand the statutory language of Section 1542 of the Civil Code of State of California ("Section 1542"), which reads as follows: "A general release does not extend to claims which the creditor does not know or

suspect to exist in his favor at the time of executing the release, which if known by him must have materially affected his settlement with the debtor."

12.3.2 As to the releases given in Section 12.1 and 12.2, each Party hereto acknowledges that it may hereafter discover facts different from, or in addition to, the facts which it now knows or believes to be true with respect to the perchlorate groundwater contamination in the area of the Site or Subject Wells, and that it is each Party's intention to specifically waive and relinquish any and all protections, privileges, rights and benefits under Section 1542 as to the claims to be specifically released under Sections 12.1 and 12.2.

12.4 Dismissal of Underlying Action

Within forty-five (45) Days after the Effective Date, and provided that the Defendants have paid to Plaintiffs the full amount required to be paid within thirty (30) days after the Effective Date of this Agreement, the Plaintiffs shall file a request for dismissal, with prejudice to the extent expressly released herein and otherwise without prejudice, of the claims asserted in the Underlying Action and, thereafter, shall do whatever is required to effectuate such dismissal.

12.4.1 With respect to any claims dismissed without prejudice, the Parties agree not to assert any statute of limitation or equitable defense based on the passage of any period of time prior to, at a minimum, one year after the Effective Date of this Agreement (the "Tolled Period"). The Tolled Period will be extended automatically for an additional three years (the "Extended Period") unless a Party determines to terminate the Tolled Period at that Party's sole discretion, and provides written notice at any time within the Extended Period, of a specific date, set no earlier than ten days from the date of such written notice. Any applicable statutes of limitation or equitable defense based on the passage of time shall begin to run after four years have elapsed from the Effective Date, or after an earlier date that may be set in accordance with

the foregoing termination of the Extended Period. Notwithstanding anything in this Section, and unless the Extended Period is terminated by a Party, the Parties agree to meet and confer before the expiration of the Extended Period to consider renewal of the tolling period for up to an additional four years in accordance with California Code of Civil Procedure Section 360.5.

12.4.2 With respect to any claims Plaintiffs may allege to have with respect to or arising out of the presence of perchlorate or other hazardous substances, wastes or materials in the groundwater, soil or surface water at or in the vicinity of the Site, Plaintiffs agree to forebear from bringing any action in any court based on such claims for the Tolled Period of one year after the Effective Date of this Agreement and for any additional period of time that the Extended Period is in effect in accordance with subsection 12.4.1 (the "Forbearance Period"). The Forbearance Period shall run concurrently with the Tolling Period and any Extended Period, and the Parties may, by mutual agreement, renew the Tolling and/or Extended Periods in accordance with subsection 12.4.1. Subsections 12.4.1 and 12.4.2 expressly do not apply to any claims that may be asserted in accordance with the provisions of Section 11.2 (Rapid Response Fund), above, and any defenses thereto.

12.5 Notification Regarding Use of Well Disinfectant

Prior to performing any disinfection of any of the Subject Wells or Threatened Wells, Plaintiffs agree to provide Whittaker and AISLIC with 10 days written notice. Prior to applying any disinfecting product or solution down-hole, one water sample will be collected from the Well and analyzed for perchlorate. After all down-hole operations are completed, and prior to putting the Well back into service, one water sample will be collected and analyzed for perchlorate. In addition, one sample of the product or solution to be used for down-hole disinfection will be collected and analyzed for perchlorate. Plaintiffs further agree that in all

other respects, they will follow the American Water Works Association's "AWWA Standard For Disinfection Of Wells", dated November 1, 2003, attached hereto as Exhibit CC, and that Plaintiffs will timely provide Whittaker and AISLIC with the analytic results of the above-referenced three samplings, as well as copies of a completed Worksheet containing the information called for in the AWWA's sample Worksheet that is attached hereto as part of Exhibit CC. All three (3) samples will be tested for perchlorate using the approved United States Environmental Protection Agency (EPA) and DHS Method 314.0 and report the results using a detection limit for reporting (DLR) of 4 ppb. Plaintiffs agree to use the most current perchlorate test method and DLR approved by DHS for drinking water in the event Method 314 is revised in the future.

ARTICLE 13. DISPUTE RESOLUTION

13.1 Disputes Governed by Article 13

All disputes between Parties to this Agreement arising out of or related to this Agreement, including the interpretation, enforcement or breach of this Agreement, (excluding disputes to be decided by the Cost Consultant, which are to be resolved pursuant to Article 7), are subject to the dispute resolution procedures contained in this Article 13.

13.1.1 Procedures Applicable To All Disputes Governed by Article 13

13.1.1.1 Additional Procedural Requirements. The procedural rules of the arbitration herein shall be supplemented by any non-conflicting arbitration procedures of the Judicial Arbitration and Mediation Service (**"JAMS"**) Comprehensive Arbitration Rules & Procedures, or such other alternative dispute resolution provider as may be agreed upon by the parties to the dispute in writing, applicable to commercial arbitration and may be modified by agreement of the parties to the dispute (the "Rules"). If any provision of this Agreement conflicts with the Rules, then this Agreement shall govern.

13.1.1.2 Retention of Consultants. The arbitrator may seek the approval of the parties to the dispute to retain a consultant. The arbitrator shall provide to all parties to the dispute an explanation for the need for the consultant, the consultant's identity, hourly rate, and the estimated costs of the service. All parties to the dispute must approve the retention of the consultant and, if retention of the consultant is approved, the parties to the dispute shall share equally the costs of the consultant. The consultant's cost shall not exceed ten thousand ($10,000) without the prior written consent of the parties to the dispute.

13.2 Expedited Arbitration Procedures

13.2.1 Notice of Dispute; Good Faith Meeting; Demand for Arbitration

Any Party who perceives that a dispute has arisen which is subject to the dispute resolution procedures contained in this Article 13, other than Future Perchlorate Contamination Arbitration or Lump Sum Arbitration governed by Section 13.3 below, may give written notice of such dispute to all other Parties. The Parties shall meet to resolve the dispute within seven (7) Working Days after receipt of such written notice by the last Party to receive it. If the Parties are unable to resolve the dispute in good faith within fifteen (15) Days after receipt of such written notice by the last party to receive it, the Party that gave written notice of the dispute may initiate the arbitration procedure described below by delivery of a Demand for Arbitration to all other Parties (excluding any that no longer legally exist) no later than thirty (30) Days after receipt of the written notice of such dispute by the last party to receive it.

13.2.2 Approved Arbitrators

Disputes subject to the expedited arbitration procedure set forth in this section 13.2 shall be decided by one impartial arbitrator qualified to serve as an arbitrator. The list in Exhibit AA consists of five (5) approved arbitrators; however, on or about the third

anniversary of the effective date of this agreement, the parties shall meet and agree to a list of five arbitrators for the next three year period, and the same process shall take place on each third anniversary thereafter. The list of arbitrators may be supplemented by mutual agreement of the Parties in writing. An arbitrator shall be chosen by agreement of the parties involved in the dispute. If the parties involved in the dispute are unable to reach agreement, the one arbitrator shall be selected by each side (Defendants and AISLIC being considered one side for purposes of such strikes) striking one arbitrator from the list in succession (beginning with Plaintiffs) until only one arbitrator remains. Plaintiffs shall strike one arbitrator within two (2) Working Days of notice of the arbitration. Each successive strike shall take place within two (2) Working Days thereafter. Notice shall be given pursuant to the provisions of Section 15.4 hereof. If the list of five (5) approved arbitrators needs to be supplemented in order to assure a complete list of five (5) available arbitrators before such a selection, the parties to the dispute shall supplement the list by mutual agreement, or in the absence of such agreement, the list shall be supplemented by the Judicial Arbitration and Mediation Service ("JAMS") in Los Angeles (or a mutually agreeable substitute). If the method described above does not identify a person available to act as arbitrator for any particular dispute, the parties involved in the dispute shall use their best efforts to select an arbitrator by mutual agreement. If the parties to the dispute are unable to reach agreement, the listing process set forth by JAMS Rule 15 shall govern.

13.2.3 Expedited Arbitration

Plaintiffs and Defendants and AISLIC shall, within fifteen (15) Working Days after receipt of a Demand for Arbitration pursuant to Section 13.2.1, above, provide written statements of position to the arbitrator, with copies to the other Parties, setting forth their respective positions. Within ten (10) Working Days after receipt of such a written statement of

position, any party may provide a rebuttal to the arbitrator, with copies to the other Parties. Evidentiary hearing and oral argument of the disputed matter shall be held no earlier than fifteen (15) Working Days after delivery of the rebuttal summaries, and should be scheduled at the earliest available convenient time for the parties to the dispute and the arbitrator. The arbitrator shall render a binding written opinion, including detailed findings of fact and conclusions of law, within ten (10) Working Days after the conclusion of the evidentiary hearing and oral argument.

In any such arbitration in which the written opinion is rendered by the arbitrator prior to the arbitrator's determination of the Lump Sum pursuant to Section 5.2.6 and 13.3, the arbitrator's fees shall be a Project O&M Cost. The award by the arbitrator may include the award of reasonable attorney's fees to the prevailing party, if the arbitrator finds that there is a "prevailing" party. The arbitrator will inter alia be empowered to award response costs or damages. The arbitrator will not be empowered to award injunctive or declaratory relief or award punitive damages or determine coverage issues under the AISLIC Policy. In awarding damages resulting from a breach of the Agreement, the arbitrator may take into consideration, among other things, any disruption to the Project, lost production capacity in the Subject Wells, and costs of replacement water resulting from Defendants' breach of their funding obligations hereunder. Any arbitration award against the Debtors is subject to Section 2.5 herein. The Parties acknowledge and agree that each of the Plaintiffs, in its sole discretion, reserves the right to seek declaratory and/or injunctive relief in a state or federal court action against Defendants, notwithstanding the initiation or resolution of any arbitration proceeding under this Article 13. The Plaintiffs agree that they will refrain from pursuing any claim or lawsuit for injunctive or declaratory relief against Defendants based on the same factual circumstances, pending receipt of the arbitrator's determination. The Parties understand and agree that the record from any

arbitration will be admissible in any future claim or lawsuit by Plaintiffs against Defendants or AISLIC, or by Defendants or AISLIC against Plaintiffs, for injunctive or declaratory relief based on the same factual circumstances.

13.3 Procedures Applicable To Arbitration of Future Perchlorate Contamination Disputes And Arbitration of Lump Sum

13.3.1 Panel of Arbitrators. Future Perchlorate Contamination Disputes pursuant to Article 10 hereof and Arbitration of Lump Sum pursuant to Section 5.2.6 and 9.1.7 hereof shall be decided by a panel of three impartial arbitrators qualified to serve as arbitrators. The list in Exhibit "BB" consists of eleven (11) approved arbitrators. The list of arbitrators may be supplemented or amended by mutual agreement of the Parties in writing. An arbitration panel of three (3) shall be chosen by agreement of the parties involved in the dispute. If the parties involved in the dispute are unable to reach agreement, the panel of three (3) arbitrators shall be selected by each side striking one arbitrator from the list in succession (beginning with Plaintiffs) until only a panel of three arbitrators remains. Plaintiffs shall strike one arbitrator within five (5) Working Days of notice of the arbitration. (Defendants and AISLIC being considered one side for purposes of such strikes.) Each successive strike shall take place within two (2) Working Days thereafter. Notice shall be given pursuant to the provisions of Section 15.4 hereof. If the list of eleven (11) approved arbitrators needs to be supplemented in order to assure a complete list of eleven (11) available arbitrators before such a selection, the parties to the dispute shall supplement the list by mutual agreement, or in the absence of such agreement, the list shall be supplemented by the Judicial Arbitration and Mediation Service ("JAMS") in Los Angeles (or a mutually agreeable substitute). If the method described above, does not identify a person available to act as arbitrator for any particular dispute, the parties involved in the dispute shall

use their best efforts to select an arbitrator by mutual agreement. If the parties to the dispute are unable to reach agreement, the listing process set forth by JAMS Rule 15 shall govern.

13.3.2 Election to Arbitrate.

13.3.2.1 Future Perchlorate Contamination Disputes

If there is a dispute with respect to Future Perchlorate Contamination pursuant to Article 10 hereof, any Plaintiff may elect, in its sole discretion, to arbitrate said Future Perchlorate Contamination dispute in accordance with the provisions of Article 10 and this Section 13.3.2. A Plaintiff electing to arbitrate shall initiate the arbitration procedure described below by delivery of a Demand for Arbitration to all other Parties (excluding any that no longer legally exist) no later than thirty (30) Days either (i) after receipt of Whittaker's decision regarding an acceptable AISLIC Future Perchlorate Determination of Coverage as required by Section 10.1.1, or (ii) the expiration of the Notice Period under Section 10.1.1, whichever is later. Within fifteen (15) days of the selection or determination of the panel of arbitrators pursuant to Article 13.2.1 hereof, each party to the dispute shall submit to the arbitrators, and serve on all parties to the arbitration, a short statement of the dispute, their respective positions, and a proposed discovery and hearing schedule. The arbitrators shall be empowered to resolve all issues of law and fact relating to the dispute, including without limitation any issues relating to liability, compensatory damages, response costs and/or the nature and scope of the remedy associated with the presence of perchlorate, but shall not be empowered to award injunctive or declaratory relief. However, the arbitrators designated for any Future Perchlorate Contamination Dispute, may retain continuing jurisdiction after they render a final, binding decision to resolve any additional response cost and damage claims thereafter arising from the same, continuous or related pollution conditions that are involved in the dispute

for which they originally were designated. The Parties acknowledge and agree that each of the Plaintiffs, in its sole discretion, reserves the right to seek declaratory and/or injunctive relief in a state or federal court action against Defendants respecting any Future Perchlorate Contamination Dispute, notwithstanding the initiation or resolution of any arbitration proceeding under this Article 13. The Plaintiffs agree that they will refrain from pursuing any claim or lawsuit for injunctive or declaratory relief against Defendants based on the same factual circumstances, pending receipt of the arbitrator's determination.

13.3.2.2 Lump Sum Arbitration

If Plaintiffs, Whittaker, or AISLIC desire to initiate Lump Sum Arbitration pursuant to Section 5.2.6 and/or 9.1.7, the requesting party shall give written notice to all other Parties. The Parties shall meet and confer to resolve the dispute within fifteen (15) days after receipt of such written notice by the last Party to receive it. If the Parties are unable to resolve the dispute in good faith, the party that gave written notice of the dispute may initiate the arbitration procedure described below by delivery of a Demand for Arbitration to all other Parties (excluding any that no longer legally exist) no later than fifty (50) Days after receipt of the written notice of such dispute by the last party to receive it. Within fifteen (15) days after the selection or determination of the panel of arbitrators pursuant to Article 13.3.1 hereof, Plaintiffs, Whittaker and AISLIC shall submit to the arbitrators and serve on all parties to the arbitration a short statement of the dispute, their respective positions, and a proposed discovery and hearing schedule. The arbitrators shall be empowered to resolve all issues of fact and law relating to said Lump Sum Arbitration.

13.3.3 Preliminary Hearing. Within thirty (30) days after selection or determination of the panel of arbitrators, the arbitrators shall schedule a preliminary hearing. At

the preliminary hearing, the arbitrators shall decide any discovery and briefing issues and set dates, including a hearing date. In resolving discovery issues, the arbitrators shall consider expedition, cost effectiveness, fairness, and the needs of the Parties for adequate information with respect to the dispute.

13.3.4 Commencement of Arbitration. The arbitration hearing shall be scheduled no later than ninety (90) days after the initial preliminary hearing, unless the parties to the dispute mutually agree in writing to extend the date or the arbitrators extend the date.

13.3.5 Decision of Panel Of Arbitrators Final. The arbitrators shall make a written decision, specifying the reasons for the decision, including detailed findings of fact and conclusions of law, within sixty (60) days after the hearing. The decision of at least two (2) of the three (3) panel members shall be binding and final, and there shall be no right to appeal the decision; provided, however, any party to the dispute may seek vacation or correction of the Panel's decision pursuant to California Code of Civil Procedure Section 1286.2 (Grounds for vacation of award) or Section 1286.6 (Grounds for correction of award). Plaintiffs and Defendants, each collectively, shall equally share the expense of the three arbitrators and the arbitration proceeding. The arbitrators will be empowered *inter alia* to award response costs and damages. The arbitrators will not be empowered to award injunctive or declaratory relief or award punitive damages or determine coverage issues under the AISLIC Policy. Any arbitration award against the Debtors is subject to Section 2.5 herein. The Parties understand and agree that the record from any arbitration will be admissible in any future claim or lawsuit by Plaintiffs against Defendants for injunctive or declaratory relief based on the same factual circumstances.

13.3.6 Time Period to Complete Arbitration. The arbitration shall be completed within one hundred fifty (150) days of the preliminary hearing, unless the parties to the dispute mutually agree in writing to extend the date or the arbitrators extend the date.

13.4 Entry of Judgment.

Judgment on the award rendered by the arbitrator(s) may be entered in and enforced by any court of competent jurisdiction.

13.5 Location.

Arbitration proceedings, including hearings, good faith meetings and settlement conferences, shall take place in Los Angeles, California, unless otherwise agreed to by the parties in writing. The Parties shall have the right to participate in any of the arbitration proceedings by telephone.

13.6 Governing Law.

The arbitration, including any proceedings to enforce, confirm, modify or vacate an award, and any proceedings to enforce the terms of this Agreement, shall be governed by the laws of the State of California and applicable federal law.

ARTICLE 14. INSURANCE ISSUES RELATED TO THE AISLIC POLICY

14.1 Condition M of AISLIC Policy

The Parties acknowledge and agree that Condition M of the AISLIC Policy provides as follows:

> Action Against Company – No action shall lie against the Company, unless as a condition precedent thereto, there shall have been full compliance with all of the terms of this Policy, nor until the amount of the Insured's obligation to pay shall have been finally determined either by judgment against the Insured after actual trial or by written agreement of the Insured, the claimant and the Company.
>
> Any person or organization or the legal representative thereof who has secured such judgment or written agreement shall thereafter be entitled to recover under this Policy to the extent of the insurance afforded by the Policy. No person or organization

shall have any right under this Policy to join the Company as a party to any action against the Insured to determine the Insured's liability, nor shall the Company be impleaded by the Insured or his legal representative. Bankruptcy or insolvency of the Insured or of the Insured's estate shall not relieve the Company of its obligations hereunder.

14.2 Effect of This Agreement Under Condition M

Solely to resolve the effect of this Agreement under Condition M of the AISLIC Policy, and not to apply to or affect any other provision of the AISLIC Policy, or affect the terms of the Coverage and Claims Settlement Agreement, nor to affect any other claims for coverage by Whittaker, the Parties agree as set forth in this Section 14.2 as follows. Provided that an arbitration award or Cost Consultant determination is issued pursuant to and in accordance with this Agreement, including but not limited to Articles 7 and 13, and that (a) the time for filing a petition to vacate or correct the arbitrator's or Cost Consultant's decision has expired or such filing has been waived by agreement or (b) any petition filed to vacate or correct the arbitrator's or Cost Consultant's decision, pursuant to Cal. Code of Civil Procedure Section 1286.2 (Grounds for vacation of award) or Section 1286.6 (Grounds for correction of award), is finally adjudicated or dismissed (hereinafter referred to as "Final Arbitration Awards"), AISLIC and Whittaker agree as follows:

i) a Final Arbitration Award issued in favor of Plaintiffs and against Whittaker pursuant to and in accordance with this Agreement shall be deemed to be "a judgment against Insured [Whittaker] after actual trial"; and

ii) any written settlement agreement executed by Plaintiffs, Whittaker, and AISLIC or executed by Plaintiffs and Whittaker (with written consent of AISLIC) on issues or disputes presented to or which could properly be presented to an arbitrator(s) or Cost Consultant pursuant to this Agreement shall be deemed to be

"written agreement of the Insured [Whittaker], the claimant [Plaintiffs] and the Company [AISLIC]", as those quoted phrases are used in Condition M “Action Against Company” of the AISLIC Policy**.**

14.3 Written Agreement

This Agreement shall be deemed to be "written agreement of the Insured [Whittaker], the claimant [Plaintiffs] and the Company [AISLIC]" as that quoted phrase is used in Condition M “Action Against Company” of the AISLIC Policy.

14.4 Full Compliance

AISLIC agrees that, as of the date that AISLIC executes this Agreement, Whittaker’s actions have been in “full compliance with all of the terms of [the AISLIC] Policy” with respect to this Agreement, as said quoted phrase is used in Condition M “Action Against Company” of the AISLIC Policy.

14.5 Covered Claims

Except with respect to the negotiation, arbitration, or litigation of a Non-Subject Well Future Perchlorate Circumstance, AISLIC agrees that (1) all costs, expenses, and obligations incurred by Whittaker pursuant to this Agreement shall be treated as a covered claim under AISLIC Policy Coverages A, B, C, D, E, or F, without reservation of coverage rights to the extent that limits remain under AISLIC Policy Coverages A-F and (2) all costs, expenses, and obligations incurred by Whittaker pursuant to this Agreement shall be paid from either SF Escrow 1, from SF Escrow 2 (under Section IV.F.6.a(iii) of the Coverage and Claims Settlement Agreement), or from any remaining applicable limits of the AISLIC Policy under Coverages A, B, C, D, E, or F, as provided in the Coverage and Claims Settlement Agreement.

14.6 Proceedings Under Article 10

With respect to the negotiation, arbitration, or litigation of a Non-Subject Well Future Perchlorate Circumstance pursuant to Article 10 of this Agreement, AISLIC affirms that it agrees to abide by the obligations set forth in that Article 10. In the event that AISLIC makes a determination of coverage and Whittaker notifies of its satisfaction with such determination pursuant to Article 10 of this Agreement, then the agreements, rights and obligations set forth in Section 14.2 of this Article 14 shall apply with respect to the arbitration of such Non-Subject Well Future Perchlorate Circumstance.

14.7 AISLIC Reservation of Rights

AISLIC reserves all rights of subrogation or contribution pursuant to the AISLIC policy and law with respect to any payments made hereunder, except any claims of subrogation or contribution against the Plaintiffs.

14.8 No Amendment or Waiver

Without limiting the obligations of Whittaker and AISLIC as set forth in this Article 14 of this Agreement, nothing herein shall constitute an amendment of any terms or conditions of the Coverage and Claims Settlement Agreement (including but not limited to, those terms related to funding of settlement of the Underlying Action), or a waiver or amendment of any duties, obligations, reservations, or rights, if any, of AISLIC or Whittaker under the Coverage and Claims Settlement Agreement. In particular, but not by way of limitation, AISLIC and Whittaker disagree over whether Section VI.C.3 of the Coverage and Claims Settlement Agreement independently obligates AISLIC to cover future perchlorate claims without reservation of rights and whether and to what extent, if any, AISLIC has reserved its defenses to

coverage. Nothing in this Article 14, is intended to affect, or shall affect, the resolution of that dispute.

14.9 Coverages K and L

Reference in this Article 14 to Coverages A-F shall not under any circumstances be deemed to affect any duties, obligations, reservations, or rights, if any, of AISLIC or Whittaker with respect to Coverages K and L. In particular, but not by way of limitation, the Parties agree that Coverages K and L are under all circumstances limits of liability that are "inapplicable" to Loss sustained for Clean-up Costs incurred after the Termination Date of the AISLIC Policy.

14.10 Additional Clarifications Regarding AISLIC Policy and Other Agreements

14.10.1 Nothing in this Agreement confers the status of an insured or additional insured or the rights of an insured or additional insured with respect to the AISLIC Policy on any person or entity.

14.10.2 Except as expressly set forth in this Article 14, this Agreement does not alter the rights, duties and obligations between Whittaker and AISLIC under (a) the AISLIC Policy or (b) any other agreements, including but not limited to the Coverage and Claims Settlement Agreement.

14.10.3 The parties agree that nothing in this Agreement shall under any circumstances require AISLIC to make any payment or fulfill any duty or obligation after its applicable limit of liability is exhausted.

14.10.4 Nothing herein shall be deemed or interpreted to alter or amend, nor waive or affect, the terms of Condition C of Section VII, Conditions of the AISLIC Policy.

14.10.5 Nothing herein shall be construed to affect any rights of Whittaker against any of its insurers other than AISLIC or under any of its insurance policies other than the AISLIC Policy.

ARTICLE 15. PUBLIC AND OTHER FUNDING SOURCES

15.1 Background of Intent of the Parties

In entering into this Agreement, the Parties are aware that federal and state Public Funding Sources may be or become available to assist in implementing the Project as well as remedial and/or source control activities to be conducted at or in the vicinity of the Site respecting perchlorate contamination. Federal funds may be available by virtue of the United States Department of Defense involvement and activities conducted at or in the vicinity of the Site. State funds may be available to assist in evaluating and implementing an investigatory/remedial program that may be regionally based, including but not limited to the restoration/containment work contemplated under this Agreement and remedial source control activities to be conducted at the Site.

15.2 Obtaining Funds from Public Funding Sources

The Plaintiffs shall use good faith efforts, in a manner consistent with each of the Plaintiffs' and their representatives' individual and unique obligations under applicable law, to obtain funds from Public Funding Sources so as to provide for reasonable and necessary: (1) costs associated with the Project, including costs to implement the Project, Project Modification, and cost overruns, as identified by Plaintiffs; (2) continued off-Site groundwater monitoring with respect to perchlorate contamination; (3) off-Site response activities in the alluvium and Saugus Formation that address perchlorate contamination; and (4) on-Site source removal activities with respect to perchlorate contamination. To the extent permissible under all applicable laws and the requirements of specific funding authorizations, funding from Public Funding Sources shall

be allocated, credited, and utilized to cover any of the aforementioned categories of reasonable and necessary costs in the above order of priority. The Parties shall comply with all applicable laws, rules and regulations regarding lobbying disclosures in their efforts to obtain funding from Public Funding sources. Whittaker shall cooperate in seeking such funds.

Prior to determination of the Lump Sum pursuant to Section 5.2.6, the reasonable and necessary outside consultant lobbying costs incurred by Plaintiffs and Whittaker that are directly related to the perchlorate contamination and seeking of funding under this Article, shall be Project O&M Costs, and will be included in the Estimate of Project O&M, subject to an annual cap of two hundred thousand dollars ($200,000) on Plaintiffs' outside fees and costs and one hundred thousand dollars ($100,000) on Whittaker's outside fees and costs. In no event shall such "outside fees and costs" include campaign donations or similar donations. Upon request of any Party, a full accounting of such costs shall be provided. The obligation to reimburse lobbying costs shall cease in the year 2011, but such costs may be requested thereafter upon a showing of both good cause and positive results, but in no event later than January 1, 2019.

15.3 Administration of Funds from Public Funding Sources

Plaintiffs shall document, account for, and administer all Public Funding Sources funds received by them in conformity with all applicable laws and all requirements of the administrators of Public Funding Sources.

15.4 Conformity with Public Funding Sources Requirements

Plaintiffs shall design, build, operate and maintain their respective restoration/containment work projects contemplated under this Agreement in conformity with all applicable requirements of the Public Funding Sources from which funds have been secured. If Public Funding Sources have requirements which conflict with this Agreement, the Parties shall

meet and negotiate in good faith to amend this Agreement to conform to the requirements of the Public Funding Sources in a manner that preserves the purposes for the use of such funds as much as possible in a manner consistent with the Parties' intent as contemplated in this Agreement. Notwithstanding any of the provisions of this Article 15 or any other provision of this Agreement, nothing in this Agreement is intended to waive or otherwise effectuate a release, nor shall any Party provide a release of the United States Department of Defense or any other agency or instrumentality of the United States in connection with any alleged liability same may have under federal or state law arising out of or relating to any involvement in operations, waste disposal, or other activities at or in the vicinity of the Site.

ARTICLE 16. MISCELLANEOUS

16.1 Governing Law

This Agreement shall be construed and enforced in accordance with the substantive laws of the State of California, without reference to choice of law rules.

16.2 Waiver

No waiver by a Party of any provision of this Agreement shall be valid unless in writing and signed by an authorized representative of such Party. The waiver by any Party of any failure on the part of another Party to perform any of its obligations under this Agreement shall not be construed as a waiver of any future or continuing failure or failures.

16.3 Amendment of the Agreement

No amendment of this Agreement shall be binding upon the Parties unless it is in writing and executed by all of the Parties (excluding any that no longer legally exist or that do not respond to communications directed to the address for that Party specified below or to such other address as has been designated in accordance with Section 16.4). This Agreement and the

exhibits attached hereto set forth all of the covenants, provisions, agreements, conditions and understandings with respect to the matters addressed in this Agreement and constitute a complete integration.

16.4 Notices

All notices and communications required or permitted to be delivered to the Parties, Steadfast and any Buyer pursuant to this Agreement shall be in writing and (a) delivered personally or (b) sent by a recognized overnight mail or courier service, with delivery receipt requested, or (c) sent by facsimile communication with receipt confirmed by telephone, to the following addresses (or to such other address as may from time to time be specified in writing by the addressee):

Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350-2173
Attn: Dan Masnada, General Manager
Telephone: (661) 297-1600
Facsimile: (661) 297-1610
E-mail: dmasnada@clwa.org

Valencia Water Company
24631 Rockefeller Ave.
P. O. Box 5904
Valencia, CA 91385-5904
Attn: Robert J. DiPrimio, President
Telephone: (661) 294-1150
Facsimile: (661) 294-3806
E-mail: rdiprimio@valencia.com

Newhall County Water District
23780 North Pine St.
P. O. Box 220970
Santa Clarita, CA 91321-0970
Attn: Stephen L. Cole, General Manager
Telephone: (661) 259-3610
Facsimile: (661) 259-9673
E-mail: scole@ncwd.org

Santa Clarita Water Company
22722 West Soledad Canyon Road
P. O. Box 903
Santa Clarita, CA 91380-9003
Attn: William J. Manetta, President
Telephone: (661) 259-2737
Facsimile: (661) 286-4333
E-mail: wmanetta@scwater.org

with a copy for all of the above to:

Nossaman, Guthner, Knox & Elliott LLP
445 South Figueroa Street, 31st Floor
Los Angeles, CA 90071-1602
Attn: Frederic A. Fudacz, Esq.
Telephone: (213) 612-7823
Facsimile: (213) 612-7801
E-mail: ffudacz@nossaman.com

Whittaker Corporation
Eric Lardiere, Esq.
Vice-President, Secretary and General Counsel
Whittaker Corporation
1955 N. Surveyor Ave.
Simi Valley, CA 93063-3349
E-mail: elardiere@wkr.com

with copies for Whittaker Corporation to:

Reynold L. Siemens, Esq.
Heller Ehrman LLP
333 S. Hope Street
Suite 3900
Los Angeles, CA 90071-3043
Fax: 213-614-1868
Email: rsiemens@hewm.com

and

Richard A. Dongell, Esq.
Dongell Lawrence Finney Claypool LLP
707 Wilshire Boulevard, 45th Floor
Los Angeles, CA 90017
213-943-6100 telephone
213-943-6101 facsimile

American International Specialty Lines Insurance Company as Administrator of SF Escrow 1:

Stacy Parker, Complex Claim Director
AIG Domestic Claims, Inc.
Pollution Insurance Products High Profile Unit
175 Water Street, 12th Floor
New York, New York 10038
Telephone: (212) 458-2910
Fax: (866) 261-3935

with a copy to:

Richard W. Bryan, Esq.
Erin N. McGonagle, Esq.
Jackson & Campbell, P.C.
1120 20th Street, N.W.
Washington, DC 20036-3437
Telephone: (202) 457-1600
Fax: (202) 457-1678

Santa Clarita, L.L.C.
Remediation Financial, Inc.
Remediation Financial, Inc., Managing Member
Great American Tower
3200 N. Central Avenue, Suite 1570
Phoenix, Arizona 85296
Attn: Myla D. Bobrow, Pres. & CEO
Remediation Financial, Inc.

with a copy for Santa Clarita, L.L.C.
and Remediation Financial, Inc. to:

Lawrence J. Hilton, Esq./William E. Halle, Esq.
Hewitt & O'Neil LLP
19900 MacArthur Boulevard, Suite 1050
Irvine, California 92612

Bermite Recovery LLC
Remediation Financial, Inc., Managing Member
Great American Tower
3200 N. Central Avenue, Suite 1570
Phoenix, Arizona 85296
Attn: Myla D. Bobrow, Pres. & CEO
Remediation Financial, Inc.

with a copy for Santa Clarita, L.L.C., Remediation Financial, Inc., and Bermite Recovery LLC to:

Avion Holdings, Inc.
Re: Remediation Financial Inc.
Suite B-204
15290 N. 78th Way
Scottsdale, AZ 85260
Fax: 480-905-0469

and

Alisa C. Lacey, Esq.
Stinson Morrison Hecker, LLP
1850 N. Central Avenue, Suite 2100
Phoenix, AZ 85004-6925
Telephone: (602) 212-8628
Facsimile: (602) 586-5237
E-Mail: alacey@stinson.com

American International Specialty Lines Insurance Company

Stacy B. Parker, Complex Claim Director
AIG Domestic Claims, Inc.
P & C Severity Claims
Pollution Insurance Products High Profile Unit
175 Water Street, 12th Floor
New York, NY 10038
Telephone: (212) 458-6364
Facsimile: (866) 253-0395

with a copy to:

Richard W. Bryan, Esq.
Erin N. McGonagle, Esq.
Jackson & Campbell, P.C.
1120 20th Street, N.W.
Washington, DC 20036-3437
Telephone: (202) 457-1600
Facsimile: (202) 457-1678
E-mail: rbryan@jackscamp.com
emcgonagle@jackscamp.com

Steadfast Insurance Company

Zurich North America
1400 American Lane
Schaumberg, IL 60196
Attn: General Counsel
E claim # 912-0038512

with a copy for Steadfast to:

Terry D. Avchen, Esq.
Christensen, Miller, Fink, Jacobs, Glaser, Weil & Shapiro
10250 Constellation Boulevard, 19th Floor
Los Angeles, California 90067
Telephone: (310) 556-2920
Fax: (310) 556-2920

and

Neil Selman, Esq.
Selman Breitman, LLP
11766 Wilshire Blvd
6th Floor
Los Angeles, California 90025-6538
Telephone: (310) 689-7070
Fax: (310) 473-2525

Buyer:

SunCal Santa Clarita LLC
c/o SunCal Companies
21900 Burbank Blvd.
Woodland Hills, CA 12367
Attn: Frank Faye
Telephone: (818) 444-1600
Fax: (818) 444-5501

with copies to:

SunCal Companies
2392 Morse Avenue
Irvine, CA 92614
Attn: Mr. Bruce Elieff
Bruce V. Cook, Esq.
Telephone: (949) 777-4000
Facsimile: (949) 7774280

Cherokee Santa Clarita, LLC
c/o Cherokee Investment Partners
4600 Ulster Street
Suite 500
Denver, Colorado 80237
Attn: Mr. Dwight Stenseth
Mr. Guy Arnold
Telephone: (303) 689-1460
Facsimile: 303-689-1461

16.5 Computation of Time

In computing any period of time under this Agreement, where the last day would fall on a Saturday, Sunday, or federal or California state holiday, the period shall run until 5 p.m. Pacific Time on the next Working Day.

16.6 Counterparts

This Agreement will be executed in counterparts, each of which shall be deemed an original, and all of which, taken together, shall constitute one and the same instrument.

16.7 Assignment

No Party shall assign or otherwise transfer its rights or obligations hereunder without the other Parties' prior written consent, which shall not be unreasonably withheld. This Agreement shall be binding upon and inure to the benefit of the respective successors and permitted assigns of the Parties.

16.8 Cooperation

Each Party agrees to execute and deliver such further documents and to perform such further acts as may be reasonable and necessary to carry out the provisions of this Agreement or to effectuate its intent.

16.9 Joint Drafting and Negotiation/Legal Counsel

This Agreement has been jointly negotiated and drafted. The language of this Agreement shall be construed as a whole according to its fair meaning and without regard to or aid of Civil Code Section 1654 and similar judicial rules of construction. Each Party has been advised in connection herewith by counsel of its own choosing.

16.10 Article and Section Headings and Captions

Article and Section headings and captions used in this Agreement are for reference only and shall not be considered in any way in connection with the interpretation or enforcement of this Agreement.

16.11 No Third Party Beneficiaries

No third party shall be entitled to claim or enforce any rights hereunder except (1) Buyer and BRLLC, but only to the extent expressly provided in this Agreement, and (2) persons specifically released in Section 12.1 are entitled to claim the benefit of and enforce such releases.

16.12 Severability

In the event that any provision of this Agreement is determined by a court to be invalid, the court shall reform the provision in a manner that is both consistent with the intent of the Parties and legally valid. The remainder of this Agreement shall not be affected thereby.

16.13 Successors and Assigns

All covenants and agreements contained in this Agreement by or on behalf of any of the Parties hereto shall bind and inure to the benefit of their respective successors and permitted assigns, whether so expressed or not, including any Trustee appointed in the Bankruptcy Cases or a subsequently converted Chapter 7 case or cases.

16.14 Organization/Authorization

Each of the Parties to this Agreement hereby respectively represents and warrants to the others that each of them is a duly organized or constituted entity, with all requisite power to carry out its obligations under this Agreement, and that the execution, delivery and performance of this Agreement have been duly authorized by all necessary action of the board of directors or other governing body of such Party, and will not result in a violation of such Party's organizational documents. RFI and SCLLC represent and warrant that, upon the Effective Date, this Agreement will have received any and all approvals required by the Bankruptcy Court in their respective bankruptcy cases to make this Agreement enforceable as against them.

16.15 No Assignment of Claims

Other than the assignment provided in Section VII of the Coverage and Claims Settlement Agreement and the assignment provided in the Purchase & Sales Agreement between RFI Parties and Whittaker, there has been no assignment of claims.

16.16 No Admission /Not Insurance

This Agreement effectuates settlement of claims that are disputed, contested and denied. Neither this Agreement nor any Party's performance under this Agreement is intended to be or shall be asserted by any other Party to be an admission of any kind or character whatsoever, nor

shall it be deemed to have precedential effect in any other dealings between or among the Parties in any other context. Nothing herein shall be deemed to constitute an insurance policy.

16.17 No Prejudice to Buyer

Nothing in this Agreement shall be construed to prejudice any rights, claims, or defenses, that a Buyer, as defined herein, of the Site may have under applicable federal or state law, or to impose any monetary obligations or liability on the Buyer.

16.18 Entire Agreement

Except as expressly provided herein, this Agreement is the entire agreement between the Parties with respect to the subject matter hereof and supersedes all prior agreements between the Parties with respect thereto. In the event of any conflict between the terms of this Agreement and the Interim Agreement or the First Amendment, the terms of this Agreement shall control.

16.19 Survival

Except as expressly set forth herein, each and all of the releases, representations, warranties, covenants, and agreements in this Agreement and in the Interim Agreement shall survive the execution and delivery of this Agreement.

IN WITNESS WHEREOF, this Agreement has been executed by the undersigned, effective as of the date first written above.

CASTAIC LAKE WATER AGENCY

_____

By:_____
Its: _____

NEWHALL COUNTY WATER DISTRICT

_____

By:_____
Its: _____

SANTA CLARITA WATER COMPANY

_____

By:_____
Its: _____

VALENCIA WATER COMPANY

_____

By:_____
Its: _____

WHITTAKER CORPORATION

_____

By:_____
Its: _____

SANTA CLARITA L.L.C.
By: Remediation Financial, Inc.,
Its: Managing Member

_____
By: Myla D. Bobrow
Its: President & CEO

REMEDIATION FINANCIAL, INC.

_____
By: Myla D. Bobrow
Its: President & CEO

AIG DOMESTIC CLAIMS, INC., the duly authorized claims handling agent of:

AMERICAN INTERNATIONAL SPECIALTY LINES INSURANCE COMPANY, in its capacity as "Administrator" of "SF Escrow 1 Account" and as insurer of Whittaker

_____
By:_____
Its: _____

REVIEWED AND APPROVED:

AVION HOLDINGS, LLC, in its limited capacity as designated representative for the Bankruptcy Estates.

_____

By: G. Neil Elsey
Its: Managing Member

LIST OF EXHIBITS

Exhibit A	Description of SCLLC Property
Exhibit B	Description of BRLLC Property
Exhibit C	Description of Distribution Pipelines
Exhibit D	Pro-Forma Joint Estimate of Project O&M Costs
Exhibit E	Past Design Costs
Exhibit F	Project Description
Exhibit G	Estimate of Project Capital Costs
Exhibit H-1	Project Capital Costs Escrow Instructions
Exhibit H-2	Project O&M Costs Escrow Instructions
Exhibit I	Estimate of Q2 Capital Costs
Exhibit J	Q2 Capital Costs Joint Escrow Agreement and Instructions
Exhibit K-1	Amendment No. 1 to Joint Q2 Escrow Agreement and Instructions
Exhibit K-2	Amendment No. 2 to Joint Q2 Escrow Agreement and Instructions
Exhibit L	Estimate of Q2 O&M Costs
Exhibit M	Description of Magic Mountain Wells
Exhibit N	Description of Well Closure
Exhibit O	Description of Stadium Replacement Well
Exhibit P	Replacement Well/Distribution Pipeline Capital Costs Escrow Instructions
Exhibit Q	Description of V-206 Replacement Well and Closure of V157 Well
Exhibit R	Cost Allocation for Distribution Pipelines and Replacement Wells & Associated Pipelines
Exhibit S	Estimate of Distribution Pipelines and Replacement Wells Capital Costs
Exhibit T	List of Approved Contracts
Exhibit U	Identification of Presently Existing Saugus and Alluvial Production Wells
Exhibit V	Form of CGL Policy

Exhibit W	Form of EIL Policy
Exhibit X	Form of Earthquake Policy
Exhibit Y	Form of First Party Property Insurance Policy
Exhibit Z	Section 12.1.6 Documents
Exhibit AA	List of Approved Arbitrators
Exhibit BB	List of Approved Arbitrators for Future Perchlorate Contamination Disputes and Lump Sum Arbitration
Exhibit CC	AWWA Standard for Disinfection of Wells and Sample Worksheet

Order Granting Joint Motion for Court Approval, Good Faith Settlement Determination and Entry of Consent Order, July 16, 2007

FREDERIC A. FUDACZ (SBN 050546)
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Attorneys for Plaintiffs and Counter-Defendants
Castaic Lake Water Agency; Newhall County Water District;
Santa Clarita Water Company; and Valencia Water Company

FILED
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JUL 13 2007
CENTRAL DISTRICT OF CALIFORNIA
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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

CASTAIC LAKE WATER AGENCY; NEWHALL COUNTY WATER DISTRICT; SANTA CLARITA WATER COMPANY; and VALENCIA WATER COMPANY,

Plaintiffs,

vs.

WHITTAKER CORPORATION; SANTA CLARITA LLC; REMEDIATION FINANCIAL, INC.; and DOES 1-10, Inclusive,

Defendants.

AND RELATED ACTIONS

Case No.: CV 00-12613 AHM(RZx)

PROPOSED ORDER GRANTING JOINT MOTION FOR COURT APPROVAL, GOOD FAITH SETTLEMENT DETERMINATION AND ENTRY OF CONSENT ORDER

Hearing Date: **July 16, 2007**
Time: **10:00 a.m.**
Place: **Courtroom 14**
Hon. A. Howard Matz

The motion of Plaintiffs and Counter-Defendants Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Water Company and Valencia Water Company (collectively, "Plaintiffs" or "Counter-Defendants"), Defendants and Counter Claimants Whittaker Corporation ("Whittaker") and Santa Clarita LLC ("SCLLC"), and Defendant Remediation Financial, Inc. ("RFI") (collectively, "Defendants"), (the foregoing Plaintiffs, Defendants collectively referred to herein as the "Parties"), for approval of the settlement agreement of Plaintiffs' claims ("Claims Settlement") and the settlement agreement of Defendants' counterclaims ("Counterclaim Settlement") and a determination that the settlements were in good faith came before this Court regularly for possible hearing after notice to all counsel. No hearing was necessary nor was a hearing held, in part because no opposition was filed. ATM

Having considered the papers submitted by the Parties, the proposed settlement agreements, and good cause appearing, the Court enters the following findings of fact:

1. The Claims Settlement and Counterclaim Settlement (collectively, the "Settlements") were reached by counsel experienced in similar litigation;
2. The Settlements were reached through the oversight of the Court appointed mediator, the Honorable (ret.) Eugene Lynch;
3. The Settlements were reached through arm's length negotiations without fraud or collusion;
4. Investigation and discovery were and are sufficient to allow counsel, the mediator and the Court to act intelligently; ATM
5. The amounts being paid by the Parties and other consideration being exchanged are fair and reasonable in order to end significant litigation costs and avoid the litigation risks by all Parties in having the unresolved issues determined at trial; ATM

Based on these findings of fact, IT IS HEREBY ORDERED that:

1. The proposed Claims Settlement and Counterclaims Settlement are hereby approved by this Court; and

2. The Claims Settlement and Counterclaims Settlement are in good faith and any and all claims against the settling Defendants and the settling Counter-Defendants that are addressed in the Claims Settlement and the Counterclaims Settlement, and the releases of the claims therein, regardless of when asserted or by whom, are barred; such claims are barred regardless of whether they are brought pursuant to CERCLA, or pursuant to common law or other federal or state laws.

3. The Court commends counsel for their exemplary professionalism.

DATED: July 13, 2007

The Honorable Howard A. Matz
United States District Court Judge

Stipulation to Dismiss Plaintiffs' Claims and Defendants' Counterclaim, August 20, 2007

FREDERIC A. FUDACZ (SBN 050546)
ALFRED E. SMITH (SBN 186257)
BYRON P. GEE (SBN 190919)
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Attorneys for Plaintiffs and Counter-Defendants Castaic Lake Water Agency; Newhall County Water District; Santa Clarita Water Company; and Valencia Water Company

FILED
CLERK, U.S. DISTRICT COURT
AUG 20 2007
CENTRAL DISTRICT OF CALIFORNIA
BY DEPUTY

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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

CASTAIC LAKE WATER AGENCY; NEWHALL COUNTY WATER DISTRICT; SANTA CLARITA WATER COMPANY; and VALENCIA WATER COMPANY, Plaintiffs, vs. WHITTAKER CORPORATION; SANTA CLARITA LLC; REMEDIATION FINANCIAL, INC.; and DOES 1-10, Inclusive, Defendants. AND RELATED ACTIONS.	Case No.: 00-12613AHM(RZx) **STIPULATION TO DISMISS PLAINTIFFS' CLAIMS AND DEFENDANTS' COUNTERCLAIMS** **Hearing Date:** N/A **Time:** N/A **Place:** Courtroom 14 Hon. A. Howard Matz

ENTERED
CLERK, U.S. DISTRICT COURT
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CENTRAL DISTRICT OF CALIFORNIA
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This Stipulation to dismiss plaintiffs' claims and defendants' counterclaims, entered into by and among Plaintiffs and Counter Defendants Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Water Company and Valencia Water Company (collectively, "Plaintiffs"), Defendants and Counter Claimants Whittaker Corporation ("Whittaker") and Santa Clarita LLC ("SCLLC") and Defendant Remediation Financial, Inc. ("RFI") (collectively, "Defendants"), (the foregoing Plaintiffs, and Defendants are collectively referred to herein as the "Parties"), is made with reference to the following facts and recitals:

RECITALS

1. **WHEREAS,** Whittaker is the former owner of approximately 960 acres of real property located in the City of Santa Clarita, County of Los Angeles, California, (the "Site"). The Site is currently owned by SCLLC.

2. **WHEREAS,** Plaintiff Santa Clarita Water Company is the operator of wells commonly designated as Saugus 1, Saugus 2, and the Stadium Well. Plaintiff Newhall County Water District is the owner and operator of a water well commonly designated as NC11. Plaintiff Valencia Water Company is the owner and operator of water wells commonly designated as V157 and Q2. Saugus 1, Saugus 2, the Stadium Well, NC11, V157 and Q2 are collectively referred to at all times herein the "Subject Wells."

3. **WHEREAS,** on or about November 29, 2000, a civil action was brought in the United States District Court for the Central District of California ("Court"), Case No. CV 00-12613 AHM (RZx) by Plaintiffs (the "CLWA action"). Whittaker, SCLLC and RFI were named as defendants in the CLWA action. In the CLWA action, Plaintiffs vdldsflkdsfkl;alleged, among other things, that 1) the groundwater in and around the Site has been contaminated by perchlorate and other hazardous materials; 2) perchlorate contamination has been found in Subject Wells owned by Plaintiffs; and 3) Whittaker, SCLLC, and RFI caused and/or permitted the contamination. Plaintiffs further alleged that they have incurred "response costs" in addressing this contamination, including the costs of engaging consultants to undertake environmental assessment, water treatment

studies, groundwater analysis and characterization work in connection with the alleged perchlorate contamination.

4. **WHEREAS,** on or about January 19, 2001, Whittaker answered the allegations of Plaintiffs and filed its affirmative defenses in support thereof, and filed its own counter-claims against Plaintiffs alleging, among other things, that Plaintiffs were responsible for the release or threatened release of hazardous substances in and around the Site and as a result Whittaker was entitled to a Declaratory Judgment pursuant to the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") §113(g)(2), contribution pursuant to CERCLA §113(f), and response costs pursuant to the Hazardous Substances Account Act ("HSAA"). The action commenced by Whittaker's filing of its counter-claims is hereinafter referred to as the "Whittaker Action." On or about January 18, 2001, SCLLC answered the allegations of Plaintiffs and filed its affirmative defenses in support thereof, and SCLLC filed a counter-claim against Plaintiffs (the "SCLLC Action") alleging substantially identical facts as the Whittaker Action and seeking declaratory relief under CERCLA §§ 107(a), contribution under CERCLA §113(f), and recovery of response costs under the HSAA.

5. **WHEREAS,** Whittaker, SCLLC and RFI, and Plaintiffs have entered into the Interim Settlement and Funding Agreement dated as of July 28, 2003 (the "Interim Agreement") and the First Amendment to the Interim Settlement and Funding Agreement dated October 11, 2004, which, among other things, extended the term of the Interim Agreement through January 2005.

6. **WHEREAS,** in or around July, 2004, SCLLC and two of its affiliates filed voluntary Chapter 11 bankruptcy petitions, and the cases thereby commenced are pending in the United States Bankruptcy Court for the District of Arizona (the "Arizona Bankruptcy Court"), denominated Cases Nos. 2-04-BK-11910 CGC, 2-04-BK 11911 CGC and 2-04-BK-17294 CGC, respectively, which cases are jointly administered with a bankruptcy case previously commenced by a petition filed by a third affiliate of SCLLC, RFI, and denominated as Case No. 2-04-BK-10486 CGC. Case Nos. 2-04-BK-11910

CGC, 2-04-BK 11911 CGC, 2-04-BK-17294 CGC and 2-04-BK-10486 are jointly administered under Case No. 2-04-BK-10486 CGC and are collectively referred to as the "Bankruptcy Cases."

7. **WHEREAS,** on April 6, 2007, Plaintiffs and Defendants entered into two settlement agreements that resolve Plaintiffs' claims and Defendants' counterclaims. The settlement agreements require that a joint stipulation to dismiss the claims and counterclaims be filed with the court after the settlement agreements are funded. The claims settlement agreement was funded on or about August 9, 2007 and the counterclaim settlement was funded on or about August 10, 2007.

NOW, THEREFORE, the parties hereby stipulate to dismiss Plaintiffs' claims against Defendants in accordance with the "Castaic Lake Water Agency Litigation Settlement Agreement," (previously filed as Exhibit 1 to the Parties' June 18, 2007 Joint Motion for Court Approval of Settlement Agreements and Good Faith Settlement Determination) with prejudice to the extent expressly released therein, and otherwise without prejudice, as to the claims asserted in the underlying complaint.

The Parties further stipulate to dismiss defendants Whittaker Corporation's and Santa Clarita, LLC's counterclaims against Plaintiffs in accordance with the Counterclaim Settlement Agreement and Release (previously filed as Exhibit 2 to the Parties' June 18, 2007 Joint Motion for Court Approval of Settlement Agreements and Good Faith Settlement Determination) with prejudice to the extent expressly released therein, and otherwise without prejudice, as to the claims asserted in the underlying counter-complaints.

Dated: August 17, 2007

FREDERIC A. FUDACZ
ALFRED E. SMITH
BYRON P. GEE
NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

By: _____
Attorneys for Plaintiffs and Counter-Defendants Castaic Lake Water Agency; Newhall County Water District; Santa Clarita Water Company; and Valencia Water Company

IT IS SO ORDERED
Dated August 20, 2007

_____
United States District Judge

344788_2 DOC

Dated: August 16, 2007

LAWRENCE J. HILTON
WILLIAM E. HALLE
HEWITT & O'NEIL LLP

By: _____
Attorneys for Defendant and Counter-Claimant Santa Clarita, LLC and Defendant Remediation Financial, Inc.

Dated: August ___, 2007

JOSEPH J. ARMAO
HELLER EHRMAN WHITE & McAULIFFE, LLP
RICHARD A. DONGELL
THOMAS F. VANDENBURG
DONGELL LAWRENCE FINNEY LLP

By: _____
Attorneys for Defendant Whittaker Corporation

Dated: August ___, 2007

LAWRENCE J. HILTON
WILLIAM E. HALLE
HEWITT & O'NEIL LLP

By: _____
Attorneys for Defendant and Counter-Claimant Santa Clarita, LLC and Defendant Remediation Financial, Inc.

Dated: August 17, 2007

JOSEPH J. ARMAO
HELLER EHRMAN WHITE & McAULIFFE, LLP
RICHARD A. DONGELL
THOMAS F. VANDENBURG
DONGELL LAWRENCE FINNEY LLP

By: _____
Attorneys for Defendant Whittaker Corporation

PROOF OF SERVICE

The undersigned declares:

I am employed in the County of , State of California. I am over the age of 18 and am not a party to the within action; my business address is c/o Nossaman, Guthner, Knox & Elliott, LLP, 445 S. Figueroa Street, 31st Floor Los Angeles, California 90071-1602.

On August 17, 2007, I served the foregoing

STIPULATION TO DISMISS PLAINTIFFS' CLAIMS AND DEFENDANTS' COUNTERCLAIMS

on parties to the within action by placing ( ) the original (x) a true copy thereof enclosed in a sealed envelope, addressed as shown on the attached service list.

(XX) (By U.S. Mail) On the same date, at my said place of business, said correspondence was sealed and placed for collection and mailing following the usual business practice of my said employer. I am readily familiar with my said employer's business practice for collection and processing of correspondence for mailing with the United States Postal Service, and, pursuant to that practice, the correspondence would be deposited with the United States Postal Service, with postage thereon fully prepaid, on the same date at Los Angeles, California.

( ) (By Facsimile) I served a true and correct copy by facsimile pursuant to C.C.P. 1013(e), to the number(s) listed on the attached sheet. Said transmission was reported complete and without error. A transmission report was properly issued by the transmitting facsimile machine, which report states the time and date of sending and the telephone number of the sending facsimile machine. A copy of that transmission report is attached hereto.

( ) (By Overnight Service) I served a true and correct copy by overnight delivery service for delivery on the next business day. Each copy was enclosed in an envelope or package designated by the express service carrier; deposited in a facility regularly maintained by the express service carrier or delivered to a courier or driver authorized to receive documents on its behalf; with delivery fees paid or provided for; addressed as shown on the accompanying service list.

Executed on August 17, 2007.

( ) (STATE) I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

(XX) (FEDERAL) I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Mina Munoz

SERVICE LIST

CASTAIC LAKE WATER AGENCY, et al. v. WHITTAKER CORPORATION, et al.
USDC Case No. CV 00-12613 AHM (RZx)

Lawrence Hilton, Esq. William Halle, Esq. **HEWITT & O'NEIL, LLP** 19900 MacArthur Boulevard, Suite 1050 Irvine, CA 92612	Telephone: (949) 798-0500 Facsimile: (949) 798-0511 **Attorneys for Defendants Santa Clarita, L.L.C. and Remediation Financial, Inc.**
Reynold L. Siemens, Esq. **HELLER EHRMAN, LLP** 333 South Hope Street, Suite 3900 Los Angeles, CA 90071	Telephone: (213) 689-0200 Facsimile: (213) 614-1868 **Attorneys for Defendant Whittaker Corporation**
Richard A. Dongell, Esq. Matthew Clark Bures, Esq. Thomas Vandenburg, Esq. **DONGELL LAWRENCE & FINNEY** 707 Wilshire Blvd, 45th Floor Los Angeles, CA 90017	Telephone: (213) 943-6100 Facsimile: (213) 943-6101 **Attorneys for Defendant Whittaker Corporation**
Joseph J. Armao, Esq. **HELLER EHRMAN, LLP** 333 Bush Street San Francisco, CA 94104-2878	Telephone: (415) 772-6000 Facsimile: (415) 772-6268 **Attorneys for Defendant Whittaker Corporation**
Steven L. Crane, Esq. Steven L. Feldman, Esq. **GOLDFARB, STURMAN & AVERBACH** 15760 Ventura Blvd, Suite 1900 Encino, CA 91436	Telephone: (818) 990-4414 Facsimile: (818) 905-7173 **Attorneys for Third Party Defendant and Third Party Counter-Claimant Hasa Chemicals, Inc.**

AMEC Geomatrix, Progress Letter Report from Hassan Amini, Ph.D., Project Coordinator, to DTSC, September 15, 2009

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By

September 15, 2009

Project 9967.000.0

Mr. Jose Diaz
Department of Toxic Substances Control
Site Mitigation Branch
9211 Oakdale Avenue
Chatsworth, CA 91311

Re: Former Whittaker-Bermite Facility, Santa Clarita, CA
Summary Report for Month of August 2009

Dear Mr. Diaz:

This letter constitutes a progress report for the month of August 2009, prepared pursuant to Task 4 and Section 6.3 of the "Imminent and Substantial Endangerment Determination and Order and Remedial Action Order" (the Order) that the Department of Toxic Substances Control (DTSC) issued on November 22, 2002, for the former Whittaker-Bermite facility (site) in Santa Clarita, California.

SECTION I – SOIL ISSUES

Specific actions taken on behalf of the respondent, actions expected to be undertaken, and planned activities for soil issues are summarized in the following sections:

OU1 REMEDIATION

Activities for This Report Period (1)

All excavation, bio-treatment, backfilling, and slope restoration activities for the OU1 remediation program were completed during previous reporting periods. During this reporting period, CDM worked on the preparation of the closure report documenting the soil remediation operations for OU1.

Anticipated Activities for This Month

Work on the closure report documenting the soil remediation operations for OU1.

Long-Term Actions

Complete the closure report documenting the soil remediation operations for OU1 and submit to DTSC for review.

Activities for This Report Period (2)

Operated the primary soil vapor extraction (SVE) system at Area 43 and the secondary (hi-vacuum) SVE system at Building 329.

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AMEC Geomatrix

Anticipated Activities for This Month

Continue operation and optimization of SVE systems at Building 329 and Area 43.

Long-Term Actions

Continue the SVE operations until volatile organic compound levels are eliminated or reduced to appropriate levels or until asymptotic levels are reached.

REMEDIAL ACTION PLAN

Activities for This Report Period

CDM completed the third draft of the Remedial Action Plan (RAP) for OU2 through OU6 soils (Site-Wide Soils RAP), which was submitted to DTSC on August 14, 2009. The DTSC issued preliminary review comments via email on August 24, 2009. DTSC's preliminary review comments were incorporated and the third draft of the RAP was resubmitted to DTSC on August 31, 2009.

Anticipated Activities for This Month

Allow DTSC review of the Site-Wide Soils RAP. Address DTSC's comments, if any received.

Long-Term Actions

Work with DTSC to finalize the Site-Wide Soils RAP and present for public review.

PILOT STUDIES (SVE)

Activities for This Report Period

CDM had previously prepared a pilot study work plan for SVE. DTSC approved the revised SVE work plan in a letter dated October 22, 2008.

The field pilot programs for Areas 2, 4, 27, 31/45, 53/54/72, Area 14-South, and Hula Bowl Canyon I were completed during prior reporting periods. During this reporting period the field pilot program for Area 14-Central was completed. However, due to the large amount of VOC mass removal achieved for both Area 14-South and 14-Central using the G.E.O. cryogenic/condenser system, the operations in Area 14 were extended for an additional two months while evaluations are completed to determine if further operation of the G.E.O. system with the existing well configuration is warranted prior to scale up of the pilot study operations.

Anticipated Activities for This Month

Prepare the report documenting the results of the pilot studies, and extended SVE pilot operations in Area 14.

Long-Term Actions

Complete planned pilot study activities and prepare documentation reports for submittal to DTSC. Incorporate the results of the SVE Pilot Study to the Site-Wide RAP and the Remedial Design document.

PILOT STUDIES (GEDIT)

Activities for This Report Period

CDM had previously prepared pilot study work plan for in-situ bioremediation of perchlorate impact to deep soils via Gaseous Electron Donor Injection Technology (GEDIT). DTSC provided conditional approval of the GEDIT work plan on November 14, 2008.

The laboratory bench-scale treatability study for the GEDIT pilot study was initiated at CDM's laboratory in Bellevue, Washington, during a previous reporting period. The bench-scale study was continued during this reporting period.

Anticipated Activities for This Month

Continue tracking and monitoring of bench-scale study.

Long-Term Actions

Complete planned pilot study activities and prepare documentation reports for submittal to DTSC. Incorporate the results of the GEDIT Pilot Study to the Site-Wide RAP and the Remedial Design document.

SOILS INTERIM REMEDIAL MEASURES (IRMS) AND REMOVAL ACTIONS

Depleted Uranium (DU) Investigation and Clearance Activities

Activities for this Report Period

Continued to maintain close contact with California Department of Public Health-Radiological Health Branch (CDPH-RHB) regarding the review of the Work Plan and have provided preliminary information to address requests made by CDPH-RHB. Site visit by CDPH-RHB has not been scheduled at this time and is being coordinated by Mr. Jerry Hensley at RHB along with Mr. Jose Diaz at DTSC. Meeting with California Department of Fish and Game representative was completed on August 24th resulting in approval of permit for brush removal as described in our notification. Development of the project Health and Safety Plan (HASP) as well as the Final Status Survey Plan (FSSP) have also been started during this period. Finalization of both plans will be pending information received from CDPH-RHB review of Work Plan.

Anticipated Activities for this Month

It is anticipated that a site visit will be scheduled by CDPH-RHB and DTSC as part of the Work Plan review process. This visit will provide supporting information pertinent to the review of the submitted Work Plan. Pending comments from CDPH-RBH, changes may be necessary to the Work Plan. Work on both the HASP and FSSP will be continued during this period. We are awaiting approval from ACOE and RWQCB prior to moving forward with the brush removal. We expect to initiate coordination for brush removal during this period.

Long Term Actions

Once approval is confirmed with ACOE and RWQCB the brush removal and UXO clearance survey can be coordinated. Pending necessary changes to the Work Plan, submittal of the FSSP to CDPH-RHB will be required. A specific schedule will be developed for brush removal, UXO clearance, DU removal and Final Status Surveys.

UXO/OE Investigation and Clearance Activities

Activities for This Report Period

EODT completed the following activities during this reporting period.

Work Plan Addendum (WPA) Further Investigation and No Further Action Areas
The EODT Work Plan Addendum (WPA) and associated Conceptual Site Model were submitted for DTSC and stakeholders review on July 23, 2009. The WPA field work will characterize the Further Investigations Areas and confirm the No Further Action status of the areas not affected by Munitions and Explosives of Concerns (MEC) as originally referenced in the 2006 Historical Site Assessment (HSA) Report.

Munitions and Explosives of Concern Clearance Activities at Hula Bowl II and III Associated Drainage Area, and the Depleted Uranium (DU) Impacted Area
The Hula Bowl II and III and DU Work Plan Addenda were approved with comments by DTSC in June 2008. EODT continues to coordinate with the DU-Impacted Area contractor Energy Solutions and AMEC Geomatrix to refine a phased removal plan consisting of an initial surface clearance to be followed by a removal to depth in the footprint of the DU excavation. After the MEC surface clearance is complete and actual site conditions are known, along with DTSC, the subsurface removal action alternatives will be planned and completed. Fish and Game permit application has been submitted and approved for brush clearance in the DU clearance area.

Hula Bowl II and III Drainage
EODT is tracking the landfill drainage so the clearance is completed after the drainage 'dam' is in place (so new items do not enter the drainage).

Anticipated Activities for This Month

Work Plan Addendum Further Investigation and No Further Action Areas
Anticipate planning for the field work execution and staffing in coordination with DTSC and the stakeholders.

Munitions and Explosives of Concern Clearance Activities at Hula Bowl II and III Associated Drainage Area, and the Depleted Uranium Impacted Area
Track the progress on the Hula Bowl II and III drainage 'dam' to determine the appropriate time for surface removal.

DU area MEC clearance
EODT will continue to track the progress of the review and approval process and refine the schedule for the surface clearance.

SECTION III – GROUNDWATER AND SURFACE WATER ISSUES

Specific actions taken on behalf of the respondent, action expected to be undertaken and planned activities for groundwater and surface water issues are summarized in the following sections:

GROUNDWATER (OU7) FEASIBILITY STUDY (FS)

Activities for This Report Period (1)

The Draft OU-7 FS report has been prepared and is under internal review. To support the OU-7 FS evaluations, step drawdown testing was conducted in selected OU2/OU6 perched zone wells to assess hydraulic properties.

Anticipated Activities for This Month

Continue the OU-7 FS evaluations. The Draft OU-7 FS report is under review and will be submitted to DTSC in October 2009.

Review the step drawdown testing results for selected OU2/OU6 perched zone wells. This information will be used in the OU-7 FS evaluation of groundwater extraction and dewatering options for the perched groundwater zone.

Long-Term Actions

Prepare the Remedial Action Plan for OU-7.

INTERIM REMEDIAL MEASURES (IRMS) AND PILOT PROGRAMS FOR GROUNDWATER

SAUGUS AQUIFER EXTRACTION PILOT PROGRAM

Activities for This Report Period

The Work Plan, Saugus Aquifer Pilot Remediation Well Network, Operable Unit 7 was submitted to DTSC on September 22, 2008. DTSC provided comments on November 18, 2008 and subsequently provided conditional approval of the Work Plan on December 31, 2008. A request for qualifications and proposals (RFQ/RFP) for implementation of the Saugus Extraction Pilot program was issued during March and a site tour was given to the bidders on March 25th. Responses to RFQ/RFP were received from five firms on the proposal deadline of April 23. Following review of the proposals, presentations and interviews were conducted with the five companies on May 27, 2009. Whittaker team has entered into contract negotiations with the front runner firm for implementation of the Saugus Extraction Pilot program.

Anticipated Activities for This Month

Whittaker team will continue negotiations with the front runner firm and execute a mutually agreeable contract so that the scope of work outlined in the Work Plan, Saugus Aquifer Pilot Remediation Well Network is implemented. DTSC comments on the Pilot Saugus Groundwater Remediation Work Plan will be incorporated as the Work Plan is implemented.

Long-Term Actions

Implement the Saugus Aquifer Extraction Pilot Program. Incorporate the results of the pilot work to the groundwater (OU7) RAP and design document.

NORTHERN ALLUVIUM GROUNDWATER TREATMENT SYSTEM OPERATION

Activities for This Report Period (1)

A Pilot Remediation Pumping Program was started in Northern Alluvium Areas 11, 67, and 75, in 2006. An alternate extraction well 75-MW-35 for higher groundwater extraction and six hot spot wells were connected to the new higher capacity groundwater treatment system in 2007. Sustained pumping of the extraction well 75-MW-35 that began in mid-October 2007 continues to date, with the exception of a brief period of shut down for treatment system maintenance. As of August 31, 2009, approximately 23,017,700 gallons of impacted water have been treated and discharged.

The August monthly compliance sample was collected on August 3, 2009. The sampling results indicated that the system was in compliance during May. Media were replaced in the treatment vessels as follows:

- August 6, 2009 – Removed/replaced perchlorate media in lead vessel.

- August 31, 2009 – Removed/replaced nitrate medial in lead vessel.

After replacement, the nitrate and perchlorate treatment vessels were reconfigured to have the old lag vessel as the lead and the new vessel with fresh media as the lag vessel. Because of a cracked valve on the GAC manifold, only the lead GAC vessel is in operation. Siemens is working on a solution to repair the leaky manifold.

The system was operated routinely throughout the month. The low flow wells were shut down during the routine quarterly sampling event (August 5 to August 12, 2009), however, the high flow well remained on during this time. As of August 31, 2009, approximately 23,017,700 gallons of impacted water have been treated and discharged. Approximately 91 percent of the treated volume was from the extraction wells of the Northern Alluvium pumping system; the remaining 9 percent is from IDW water collected during the quarterly sampling events, storm water collected from various areas of the site, and Saugus well development water.

Anticipated Activities for This Month

Continue the pumping, treatment, and discharge system operation and routine weekly and monthly NPDES compliance sampling and media change outs as needed.

Monitoring of the aquifer response to pumping from the alternate extraction well 75-MW-35 and the downgradient site boundary low flow extraction wells will continue.

Repair GAC manifold and put the second GAC treatment vessel back into service.

Long-Term Actions

Continue operating the extraction and treatment system and conduct additional performance monitoring.

Activities for This Report Period (2)

Potential application of remedial technologies for Northern Alluvium groundwater hot spots, including evaluation of the Area 75 boundary containment established by sustained operation of the low flow pumping wells is being addressed in the OU7 FS.

Anticipated Activities for This Month

Evaluation of potential pilot studies for the Northern Alluvium area of the site will continue. The results presented in the Shaw Technology Demonstration Summary Report for Area 11 will be reviewed for potential applicability to other areas in the Northern Alluvium.

Long-Term Actions

Additional source control measures in Northern Alluvium will be considered and recommended where determined to be necessary.

GROUNDWATER AND MONITORING

Activities for This Report Period (1)

Data review and preparation of the report is in progress for the Second Quarter 2009 quarterly groundwater monitoring. Sampling for the Third Quarter 2009 monitoring event was conducted during August.

Anticipated Activities for This Month

Data review and preparation of the report is in progress for the Second Quarter 2009 quarterly groundwater monitoring.

Long-Term Actions

Continue monitoring and reporting of the proposed network of monitoring wells on the updated schedule presented in Technical Memorandum No. 8.

Activities for This Report Period (2)

RCRA groundwater monitoring of the Area 1 (former Building 317) continues on schedule. Data from the Second Quarter 2009 groundwater monitoring event conducted in May 2009 is being reviewed. Sampling for the Third Quarter 2009 monitoring event was conducted during August.

Anticipated Activities for This Month

Data from the Second Quarter 2009 groundwater monitoring event conducted in May 2009 is being reviewed and report preparation is in progress.

Long-Term Actions

The current RCRA groundwater monitoring program will be modified to include the proposed wells and frequency and DTSC input to the monitoring plan.

STORM WATER MONITORING

Activities for This Report Period

Pursuant to the site Storm Water Pollution Prevention Plan, Environ continued coordinating the implementation of short-term surface water run-off mitigation measures. Implementation of the short-term mitigation measures is being coordinated with CDM, particularly in the areas of the site where soil remediation activities have occurred.

Anticipated Activities for This Month

Upgrades to the short-term mitigation measures will continue as necessary. CDM is working on a plan for upgrading the short-term mitigation measures. Surface water run-off sampling will be conducted following significant rainfall events in accordance with the site-wide surface water runoff sampling plan.

Long-Term Actions

Long-term mitigation of the drainages and excavations will be conducted in conjunction with the soil remediation.

SECTION IV – REQUIREMENTS UNDER THE ORDER THAT WERE NOT COMPLETED

All requirements of the Order were completed. Whittaker has met or exceeded all the substantive requirements of the Order.

SECTION V – PROBLEMS OR ANTICIPATED PROBLEMS IN COMPLYING WITH THE ORDER

Following DTSC's agreement with Whittaker's proposed modifications to implementation plans in compliance with the Order reflected in the letter dated September 28, 2004, DTSC's letter dated July 11, 2005, included a schedule for submitting a number of documents. All deadlines have been met and documents have been submitted per requested schedule.

SECTION VI – RESULTS OF SAMPLE ANALYSIS, TESTS, AND OTHER DATA

Whittaker has instructed its contractors to continue to provide DTSC staff with raw data sets for ongoing quarterly groundwater monitoring events and RI/FS work upon receipt from the lab.

Sincerely yours,
AMEC Geomatrix, Inc.

Hassan Amini, PhD, CHG
Project Coordinator

cc: Eric Lardiere, Esq., Whittaker Corp; Joseph Armao, Winston & Strawn, LLP; William Weaver, CDM; Jessica Donovan, ENVIRON; Paul Bergstrom, Knight Piésold; Larry Sievers, EODT; Tim Bricker, Santa Clarita L.L.C.; Megan Trend, Chubb Financial Solutions; Cindy Hunter, MariKay Fish, Julie Diebenow, AIG Insurance; Vitthal Hosangadi, NOREAS; John Carty, Zurich North America; Hal Dash, Cerrell Associates; Jeff Hogan, City of Santa Clarita; Yueh

Chuang, CH2M Hill; Kathy Stryker Anderson, US Army Corps of Engineers; Robert DiPrimio, Valencia Water Company; Lynn Takaichi, and Meredith Durant, Kennedy Jenks; David Bacharowski, RWQCB; James Leserman, Castaic Lake Water Agency; Steve Cole, Newhall County Water District; Mauricio Guardado, Santa Clarita Water; Neil Elsey, Avion Holdings LLC; Alisa Lacey, Stinson Morrison Hecker LLP; Jeff O'Keefe, Department of Public Health.

NEWS RELEASE
DATE: September 14, 2009
FOR IMMEDIATE RELEASE

CONTACT: Dan Masnada (661) 297-1600 ext. 239
Brian Folsom (661) 297-1600 ext. 270

CASTAIC LAKE WATER AGENCY

CLWA TO CELEBRATE COMPLETION OF PROJECT TO RESTORE GROUNDWATER PRODUCTION CAPACITY IMPACTED BY PERCHLORATE CONTAMINATION

The Castaic Lake Water Agency (CLWA), in partnership with the CLWA Santa Clarita Water Division, Newhall County Water District, Valencia Water Company and the City of Santa Clarita, will be holding an event celebrating completion of a project to restore groundwater production capacity impacted by perchlorate contamination and stop migration of a contaminant plume emanating from the former Whittaker-Bermite site in the center of the Santa Clarita Valley. The event is scheduled for Tuesday, September 22, 2009 at 9:30 a.m. at CLWA Rio Vista Intake Pump Station (RVIPS) located at 26401 Bouquet Canyon Road. The RVIPS is the stucco building to the left of In-N-Out Burger near Lowe's Home Improvement Warehouse.

After years of negotiations and studies, regulatory agencies, property owners and water suppliers agreed on the process to clean up ammonium perchlorate contaminating a portion of the local groundwater basin. The contamination is a result of manufacturing and storing explosives, fireworks and munitions over 50 years at the approximate 996 site.

The project to restore the well production capacity and mitigate the migration of the perchlorate plume began in 2007. Pumping and treatment operations will occur on a continuous basis over a number of decades. The affected groundwater will be pumped from two existing wells through a dedicated underground pipeline to the new perchlorate treatment plant located at CLWA's RVIPS. The project will remove the perchlorate from the pumped groundwater using ion exchange technology. The treated groundwater will then be disinfected and pumped into the CLWA distribution system.

Other activities on the project include continual monitoring of the wells and further characterization of the groundwater contamination to ensure migration of the contaminate plume is fully contained. The entire process will be overseen by State regulatory agencies to ensure public health and safety. The successful completion of the project would not be possible without the mutual cooperation of many parties in addition to the four water agencies and the City, including the U.S. Army Corps of Engineers, California Department of Public Health, California Department of Toxic Substances Control, Los Angeles County Department of Public Works, community groups, Whittaker Corporation, and numerous consultants, contractors, and suppliers.

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AMEC Geomatrix, Progress Letter Report from Hassan Amini, Ph.D., Project Coordinator, to DTSC, June 8, 2009

June 8, 2009

Project 9967

Mr. Jose Diaz
Department of Toxic Substances Control
Site Mitigation Branch
9211 Oakdale Avenue
Chatsworth, California 91311

Re: Request for Deadline Extension for OU2-6 RAP
Former Whittaker Bermite Facility, Santa Clarita, CA

Dear Mr. Diaz:

Confirming our discussions of May 22 and June 2, this letter presents Whittaker's formal request to extend the deadline for submitting the Remedial Action Plan (RAP) for Operable Units 2 through 6 of the former Whittaker Bermite site (the site) from May 29, 2009, to August 14, 2009.

As you are aware, the Whittaker team prepared and submitted the second draft of the RAP to the Department of Toxic Substance Control (DTSC) on January 30, 2009. DTSC provided comments on April 10, 2009, and referenced the February 18, 2009, letter from the City of Santa Clarita (City) and raised concern that modifications to the terms and conditions of the Porta Bella Development Plan that was referenced in the City letter would significantly delay cleanup of the site. Based on that concern DTSC requested that the RAP should be revised to remove any reference to the Porta Bella Plan. As requested, the Whittaker team is currently revising the RAP and removing specific references to the Porta Bella Plan. Nonetheless, we wish to maintain the references to the integration of site remediation with potential future development on a conceptual level to allow flexibility for any potential future development.

As we discussed during our telephone conversations on May 22nd and June 2nd, 2009, a technical meeting between the DTSC and Whittaker teams will be highly beneficial to discuss application of the selected remedial measures to specific areas referenced in the RAP. To that end, I will contact you to coordinate that meeting. Following our technical meeting and discussions with DTSC, we will make appropriate changes to the text, figures, tables, and appendixes as necessary.

The April 10, 2009, DTSC letter also provided comments related to the Resource Conservation and Recovery Act (RCRA) unit (OU6). DTSC requested a revised "Closure Plan" for the RCRA unit to incorporate pilot and field studies proposed for that area. DTSC anticipates that the revisions to the Closure Plan will trigger Class 2 or 3 modifications to the RCRA Interim Status Hazardous Waste Facility Permit. As I briefed you during our telephone conversations, we are currently reviewing the available closure options for the RCRA unit (i.e., clean closure vs. closure with waste in place). Based on the review of the DTSC comments and our telephone conversations, we understand that modifications to the Closure Plan can be proposed at this time while the pilot and field studies are underway. However, the determination of "clean" vs. "waste in place" closure will need to be made based on the results of the studies as well as an

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AMEC Geomatrix

assessment of the risks to human health and environment that may be posed by any residual chemicals beneath the RCRA unit. Although we have already started review of this matter, development of modifications to the Closure Plan will require additional time. Therefore, I respectfully request a revised deadline of September 15 for the proposed modifications.

As you are aware, we are making good progress in implementing the work plan for the soil vapor extraction pilot study that has been approved by the DTSC. We have also started the laboratory scale testing portion of our pilot study work plan for Gaseous Electron Donor Injection Technology potentially applicable to deep soil treatment at the site. Meanwhile, we will continue our focus on expediting on-site groundwater containment through implementation of the pilot scale extraction and treatment operation that was approved by DTSC. To that end, we have finished review of the contractors' proposals and have conducted interviews to select a qualified firm. We will make that selection in the next two weeks. In addition, Energy Solutions results of characterization of the depleted uranium (DU) impact in the Areas 57 and 14 and their work plan for DU removal has been finalized and will be submitted to DTSC and the Radiological Health Branch of the California Department of Public Health shortly. In summary, we are making good progress in all areas of compliance with the DTSC order, as I regularly summarize in my monthly project progress summary reports.

Please call me at (949) 642-0245 if you need any additional information. Thank you for your continuous attention and support.

Sincerely,
AMEC Geomatrix, Inc.

Hassan Amini, Ph.D. C.HG.
Project Coordinator

cc: Eric Lardiere, Whittaker Corp; William Weaver, CDM; Jessica Donovan, ENVIRON; Paul Bergstrom, Knight Piésold; Larry Sievers, EODT; Tim Bricker, Santa Clarita L.L.C.; Megan Trend, Chubb Financial Solutions; Cindy Hunter, MariKay Fish, Julie Diebenow, AIG Insurance; Vitthal Hosangadi, NOREAS; John Carty, Zurich North America; Hal Dash, Cerrell Associates; Jeff Hogan, City of Santa Clarita; Yueh Chuang, CH2M Hill; Kathy Stryker Anderson, US Army Corps of Engineers; Robert DiPrimio, Valencia Water Company; Lynn Takaichi, and Meredith Durant, Kennedy Jenks; David Bacharowski, RWQCB; James Leserman, Castaic Lake Water Agency; Steve Cole, Newhall County Water District; Mauricio Guardado, Santa Clarita Water; Neil Elsey, Avion Holdings LLC; Alisa Lacey, Stinson Morrison Hecker LLP; Jeff O'Keefe, Department of Public Health

CLWA Memorandum from Brian J. Folsom to CLWA Board of Directors, October 1, 2009

Castaic Lake Water Agency
Memorandum

ITEM NO. 4.1

October 1, 2009

To: CLWA Board of Directors

From: Brian J. Folsom BJF
Engineering and Operations Manager

Subject: Engineering and Operations Department Report

TREATMENT PLANT OPERATIONS AND MAINTENANCE

Completed Work:

Deliveries to the purveyors in September totaled 4,663 acre-feet (AF), for an average daily flow rate of 51 million gallons per day (MGD). September 2009 deliveries were 8.7% above September 2008 deliveries. The fiscal-year-to-date (FYTD) deliveries for FY 2009/2010 are 15,036 AF, which is 2.2% above FYTD 2008/2009. Monthly flows for 2006, 2007, 2008 and 2009 are presented in the attached table. *(FY 09/10 Action A1.1. Meet all purveyor water demands and Action B3.9: Meet all applicable water quality regulations.)*

FYTD electrical use for FY 2009/10 at the Agency's major facilities is shown in the attached "Energy Usage at Major Facilities" table and equals 2,990,433 kWh at a total cost of $343,452.77.

Inspection and maintenance activities during September included cleaning wash water return basins, chemical feed pump monthly maintenance, on-line analyzer maintenance and fabrication of clarifier screens at RVWTP.

Distribution system maintenance activities during September included preventive maintenance on air release and vacuum valves and pump outs, and exercising of valves. Grading at Sand Canyon Reservoir was completed.

Inspector Activities

Pressure recorders/data loggers readings and GPS coordinates were gathered at various points throughout the system.

Magic Mountain Pipeline/Recycled Water Pipeline Modification: Performed inspections of Security Paving's construction of the Magic Mountain Pipeline Vault Replacement.

Rio Vista Water Treatment Plant Expansion: Inspected soil borings, located underground facilities and collected GPS coordinates of existing utilities throughout jobsite.

Completed 50 dig alerts.

Work in Progress:

Maintenance of air release and vacuum valves and pump-outs throughout the distribution system continues. Ozone injector preventive maintenance is ongoing. At RVWTP, a leak was discovered near the plant water line and the area was excavated to determine the source of the leak. Repair of the leak is nearly complete. Electrical switch gear preventive maintenance and testing at all facilities continues.

Planned Actions:

Install ozone generator cooling water closed loop system. Perform repairs on plant water tank at Rio Vista Water Treatment Plant.

PERCHLORATE CONTAMINATION PROGRAM MANAGEMENT

(FY 2009/10 Action A4.1: Complete construction of the Groundwater Production Restoration Project; Action A4.2: Complete construction and startup of the Perchlorate Treatment Project; Action A4.8: Develop replacement wells for capacity lost due to perchlorate contamination.)

SUMMARY

Work continues on multiple tasks to address the groundwater contamination stemming from past manufacturing activities on the Whittaker-Bermite site. The Agency and purveyors are proceeding to restore the production capacity of the groundwater supply wells contaminated by perchlorate, while working on the objectives of containing the downgradient migration of perchlorate and recovering costs incurred in responding to the perchlorate contamination.

PERCHLORATE CONTAMINATION PROGRAM MANAGEMENT

The following table provides a status report on the activities and tasks:

Task Group	Tasks	Consultant	Status
Settlement Activities	Project Description	K/J	Complete.
	Final Settlement	K/J, Nossaman	Settlement agreement took effect on 7/13/07 with U.S. District Court approval.
DTSC Approval Activities	Remedial Investigation (RI)	K/J	DTSC approved 8/16/05.
	Feasibility Study (FS)	K/J	DTSC approved 8/16/05.
	Final Remedial Action Plan	K/J	Public hearing held 9/7/05. DTSC approved 1/20/06.
U.S. Army Corps of Engineers Feasibility Phase Study	Conceptual Hydrogeology Technical Memorandum	CH2MHill	Final distributed 1/19/05. Progress report with model construction calibration distributed 10/11/05.
DPH Approval Activities (97-005)	Source Water Assessment	B&V, CE	Received comments on revised document from DPH 4/27/06.
	Effective Monitoring and Treatment	B&V, CE, CH2MHill	Received comments on revised document from DPH 4/27/06.
	Water Quality Investigation	B&V, CE	Received comments on revised document from DPH 4/27/06.
	Human Health Risk	B&V	Received comments on revised document from DPH 4/27/06.
	Source Protection Plan	B&V	Received comments on revised document from DPH 4/27/06.

Task Group	Tasks	Consultant	Status
	Alternatives Evaluation	B&V, CE	Received comments on revised document from DPH 5/10/06. Revised document will be returned to DPH with Engineer's Report.
	Engineers Report	B&V	Final submitted to DPH 1/29/09.
	CEQA	B&V	Mitigated Negative Declaration certified 9/14/05.
	Operations and Maintenance Report	K/J	Staff is reviewing K/J draft report submitted on 8/19/09.
	Permit Application	B&V	Will be submitted with documents.
	Public Hearing	B&V	Will take place upon approval of all documents.
	DPH Evaluation and Permit	B&V	Awaiting response from DPH.
Implementation Activities	Easements and Right of Way	K/J	Easement and right-of-way acquisition completed 1/08.
	Treatment Project	K/J	Project is 96% complete.
	Pipeline Project	K/J	Project is 98% complete.
	Well Rehabilitation	SCP/GPC	General Pump completed the rehabilitation work on 2/3/09 and installed the new pumps.
	Start-up and Monitoring	K/J	Scheduled fall 2009.
	Sentinel Wells	Environ	Wells have been installed. Disposal of investigation derived wastes awaits results of laboratory analyses.

The monthly Technical Committee Meeting was held on September 9, 2009. The next Technical Committee Meeting is scheduled for October 13, 2009. The next Whittaker-Bermite Multi-Jurisdictional Task Force meeting is scheduled for December 9, 2009. A ribbon cutting event was held at the new Perchlorate Treatment Facility on September 22, 2009.

FINANCIAL STATUS

The Settlement Agreement among CLWA, the purveyors, Whittaker-Bermite and insurance carriers is in effect. Reimbursement requests have been submitted and payments have been made for expenses through July 31, 2009.

CAPITAL IMPROVEMENT PROJECTS

Sand Canyon Pipeline and Reservoir

Completed Work:

Nye and Nelson, Inc. completed construction work on July 31, 2009. The Agency approved the Certificate of Acceptance for the project on August 26, 2009 and recorded the Notice of Completion on September 2, 2009.

Work In Progress:

Construction contract is in close-out phase.

Planned Actions:

Close out project and process final payment to contractor.

Rio Vista Water Treatment Plant Expansion

(FY 2009/10 Action B1.26: Complete construction of the RVWTP Expansion Project.)

Completed Work:

The contractor has installed the foundation rebar for the new washwater return basin and the formwork for a portion of the chlorine building walls. The contractor has also constructed a portion of the ozone injection sample stations and prepared the subgrade for the new clarifier structure.

Work In Progress:

The contactor is working on the remaining submittals and Kennedy/Jenks Consultants (K/J) is reviewing the submitted submittals. The contractor is installing the formwork for the chlorine building walls and preparing the clarifier structure area for rebar installation. The contractor is also installing electrical duct banks.

Planned Actions:

The contractor will continue to prepare and submit his construction submittals and K/J will continue to review them. Construction activities will continue.

Modification to MWDSC Foothill Feeder Connection

(FY 2009/10 Action B1.25: Complete construction of the permanent raw water connection to MWDSC's Foothill Feeder pipeline.)

Completed Work:

The connection agreement has been executed. The 60% design submittal has been completed.

Work in Progress:

MWDSC and staff are reviewing the 60% submittal.

Planned Actions:

MWDSC and staff will be submitting comments to K/J for action.

Honby Parallel Phase II

(FY 2009/10 Action B1.3: Complete design of the Honby Parallel Pipeline Phase 2; Action B1.24: Complete construction of the Honby Parallel Pipeline Phase 2.)

Completed Work:

The City has approved the pipeline alignment and geotechnical data.

Work in Progress:

Permits, license agreements and easements are in the process of being acquired. K/J is revising the plans and specifications to address LADWP comments.

Planned Actions:

Complete and submit the traffic control plans to the City for approval. Mail notification letters to businesses along the project route to inform them of the project. Acquire permits, license agreement and easements. Submit the revised plans and specifications to LADWP.

RVWTP Relocate Entrance Gate and Security Kiosk

(FY 2009/10 Action B6.2: Complete design of RVWTP entrance gate and security kiosk relocation.)

Completed Work:

Lee & Ro completed the PDR.

Work In Progress:

Staff is in the process of requesting Board approval of the final design services.

Planned Actions:

Start final design.

RVWTP Warehouse and Storage Facilities

(FY 2009/10 Action B1.16: Complete design of the RVWTP Maintenance Facility Expansion Project.)

Completed Work:

Lee & Ro completed the preliminary plans.

Work in Progress:

Staff is reviewing the preliminary plans.

Planned Actions:

Staff will meet with Lee & Ro to discuss staff's comments to the preliminary plans.

ESFP Chemical Storage and Delivery

Completed Work:

SoCal Pacific Construction completed 99% of the construction contract. Remaining work was evaluated and credits and liquidated damages were issued as deductive contract change orders. Notice of Completion for the project was recorded in the Los Angeles County Recorder's Office on August 20, 2009 and the final payment was released on September 30, 2009.

ESFP Chemical Storage and Delivery

(Continued from previous page...)

Work in Progress:

Construction contract is in closeout phase.

Planned Actions:

Agency staff will complete the remaining construction items.

ESFP Drainage and Paving Improvements

(FY 2009/10 Action B1.23: Complete construction of the ESFP Drainage and Paving Improvements Project.)

a) Planning and Preliminary Design for ESFP Drainage and Paving Improvements.

b) ESFP Ozone Injection Station Canopy, Lighting and Pavement Improvements.

Completed Work:

a) Notice to Proceed was issued to Civiltec Engineering, Inc. on November 13, 2008. Civiltec completed topographic survey, subsurface investigations, initial Base Map and submitted the Geotechnical Investigation Report and a draft of a Preliminary Design Report. On September 30, 2009, Civiltec submitted recommended alternatives for discussion.

b) Design drawings have been completed.

Work in Progress:

a) Civiltec Engineering, Inc. is finalizing the recommendations for a Preliminary Design Report draft.

b) The specifications are being finalized.

Planned Actions:

a) Staff will review the proposed design alternatives.

b) Advertise the project for construction bids.

ESFP Railing and Platform Modifications

(FY 2009/10 Action B2.16: Complete modifications of the ESFP railings and platforms.)

Completed Work:

The topographic survey has been completed. Construction drawings for the railing and platform improvements at washwater basin are being finalized. The design of railing and platform improvements at filter gallery was added to the project scope in April 2009. Hilts Consulting Group, Inc. collected and reviewed record drawings information and conducted field investigations and provided 90% submittals plans and specifications for staff review and comments.

Work in Progress:

Hilts Consulting Group is reviewing the comments and modifying the plans and specifications.

ESFP Railing and Platform Modifications

(Continued from previous page...)

Planned Actions:

On October 5, 2009, meet with the consultant to field verify proposed design details. Consultant anticipates submitting final plans and specifications for staff review and approval in October 2009.

Recycled Water Program Phase II

(FY 2009/10 Action B1.27: Complete design and construct Recycled Water Program Phase II.)

Completed Work:

The draft initial study for Phase 2A has been completed. The draft evaluation for the old Honby Pump Station has been completed. The draft design has been completed for the installation of inspection access structures for the old Honby Pipeline.

Work in Progress:

Staff is reviewing the draft initial study for Phase 2A and the draft evaluation of the old Honby Pump Station for Phase 2B. K/J is analyzing potential recycled water facilities near Lost Canyon for Phase 2B. Staff is reviewing the draft design of the inspection access structures for the old Honby Pipeline.

Planned Actions:

Complete the draft environmental documentation for Phase 2A. Finalize the evaluation of the old Honby Pump Station.

Kennedy/Jenks Consultants' General Engineering Services Work Authorization

During September, K/J assisted the Agency staff with various engineering tasks including coordinating with the Los Angeles County Sanitation District regarding the treatment and availability of recycled water at the Saugus Water Reclamation Plant and coordinating with Civiltec Engineering, Inc. on the development of the water system hydraulic model and the system emergency storage study.

FACILITY CAPACITY FEES

(Goal C1.: Fairness Doctrine - Apply all costs using the Fairness Doctrine by applying costs to those who benefit from an expenditure and ensuring that existing and future users will pay their fair share.)

Completed Work:

During September, 20 new certificates were issued and $145,894 was collected in facility capacity fees, representing approximately 11.7 acre-feet of water demand. For the fiscal year, 54 new certificates have been issued and $1,129,853 has been collected in developer impact fees representing 100.26 acre-feet of water demand.

Attachments

CASTAIC LAKE WATER AGENCY

SWP Water Deliveries to Purveyors (Acre-Feet)

2006	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC	807	775	428	545	1,603	2,051	2,648	2,410	2,183	1,495	1,267	936	17,146
VWC	821	875	622	887	1,736	2,050	2,360	1,412	1,614	1,574	1,327	1,035	16,313
NCWD	490	347	158	245	589	454	828	625	647	464	597	455	5,898
LACo	68	75	52	55	113	146	178	161	143	112	105	81	1,289
Total	2,186	2,072	1,260	1,732	4,041	4,701	6,013	4,608	4,586	3,644	3,295	2,508	**40,646**
Cum. YTD	2,186	4,258	5,518	7,250	11,291	15,992	22,005	26,613	31,199	34,843	38,138	40,646	
Cum. FYTD	26,700	28,772	30,032	31,763	35,804	**40,505**	6,013	10,622	15,207	18,852	22,146	24,654	

2007	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC	984	684	1,217	1,423	2,023	2,370	2,732	2,773	2,229	1,906	1,403	926	20,669
VWC	983	640	1,212	908	1,871	2,003	2,046	1,857	1,767	1,428	1,270	922	16,906
NCWD	436	185	397	578	712	586	765	910	630	443	420	418	6,478
LACo	83	63	92	102	137	151	174	168	138	122	107	69	1,406
Total	2,485	1,572	2,918	3,012	4,742	5,110	5,717	5,707	4,764	3,899	3,200	2,334	**45,459**
Cum. YTD	2,485	4,056	6,974	9,986	14,729	19,838	25,555	31,262	36,026	39,925	43,125	45,459	
Cum. FYTD	27,139	28,711	31,629	34,641	39,383	**44,493**	5,717	11,424	16,188	20,087	23,286	25,621	

2008	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC	764	707	1,203	1,273	1,795	2,333	2,446	2,283	2,064	2,044	1,162	638	18,712
VWC	815	583	1,631	1,443	1,640	1,845	2,159	1,761	1,577	1,419	1,000	547	16,419
NCWD	414	300	270	344	505	640	767	671	505	493	302	217	5,427
LACo	56	53	92	116	134	158	167	163	144	127	82	62	1,353
Total	2,049	1,642	3,196	3,175	4,074	4,975	5,539	4,879	4,290	4,083	2,546	1,465	**41,912**
Cum. YTD	2,049	3,692	6,887	10,062	14,136	19,111	24,650	29,529	33,819	37,901	40,447	41,912	
Cum. FYTD	27,670	29,312	32,508	35,683	39,757	**44,732**	5,539	10,418	14,708	18,790	21,336	22,801	

2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC	910	367	1,106	1,448	2,135	1,896	2,073	2,300	2,032	0	0	0	14,267
VWC	518	364	923	1,242	1,135	996	2,102	2,063	2,011	0	0	0	11,353
NCWD	242	132	210	415	467	427	937	599	477	0	0	0	3,904
LACo	75	38	73	102	134	121	152	149	143	0	0	0	986
Total	1,744	901	2,312	3,207	3,870	3,440	5,263	5,110	4,663	0	0	0	**30,510**
Cum. YTD	1,744	2,645	4,957	8,164	12,034	15,474	20,737	25,847	30,510	30,510	30,510	30,510	
Cum. FYTD	24,545	25,446	27,758	30,965	34,835	**38,275**	5,263	10,373	15,036	15,036	15,036	15,036	

10/1/2009

CASTAIC LAKE WATER AGENCY

Recycled Water Deliveries to Purveyors (Acre-Feet)

2006	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC													0
VWC	14	16	6	12	42	66	75	63	67	33	20	12	427
NCWD													0
LACo													0
Total*	14	16	6	12	42	66	75	63	67	33	20	12	**426**
Cum. YTD	14	30	36	48	90	156	231	294	361	394	414	426	
Cum. FYTD	284	300	306	318	360	**426**	75	142	209	242	262	274	

2007	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC													0
VWC	17	14	43	38	58	63	78	67	55	37	25	7	501
NCWD													0
LACo													0
Total*	17	14	43	38	58	63	78	67	55	37	25	7	**501**
Cum. YTD	17	32	74	112	170	233	311	378	433	469	494	501	
Cum. FYTD	291	306	348	386	444	**507**	78	133	187	224	249	256	

2008	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC													0
VWC	4	11	39	37	56	34	26	63	44	38	4	1	358
NCWD													0
LACo													0
Total*	4	11	39	37	56	34	26	63	44	38	4	1	**358**
Cum. YTD	4	16	54	92	147	182	208	271	315	353	357	358	
Cum. FYTD	260	271	310	348	403	**438**	26	89	133	171	175	176	

2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SCWC													0
VWC	8	3	24	39	30	46	71	59	17	0	0	0	298
NCWD													0
LACo													0
Total*	8	3	24	39	30	46	71	59	17	0	0	0	**298**
Cum. YTD	8	11	35	74	104	150	221	280	298	298	298	298	
Cum. FYTD	184	187	211	250	280	**326**	71	88	105	105	105	105	

10/1/2009

FY 2009/10
Energy Usage at Major Facilities

Service Date From	Service Date To	Usage kWh Total	Usage kVarh Total	Total $ Amount
Earl Schmidt Intake Pump Station				
07/01/09	07/29/09	4,008	4,302	$489.20
07/29/09	08/27/09	7,226	10,163	$6,311.53
		Total		**$6,800.73**
Earl Schmidt Filtration Plant				
07/01/09	07/28/09	118,668	89,844	$12,575.44
07/28/09	08/26/09	124,925	97,018	$13,573.19
		Total		**$26,148.63**
Honby Pump Station				
07/01/09	07/22/09	0		$67.28
07/22/09	08/20/09	0		$94.80
		Total		**$162.08**
Recycled Water Meter				
07/01/09	07/10/09	10,987	4,197	$1,617.58
07/10/09	08/10/09	37,110	14,067	$5,325.10
		Total		**$6,942.68**
Rio Vista Intake Pump Station				
07/01/09	07/29/09	578,750	206	$73,917.27
06/29/09	07/29/09			$10.00
07/29/09	08/27/09	632,506	142,890	$80,482.94
		Total		**$154,410.21**
Rio Vista Water Treatment Plant				
07/01/09	07/29/09	183,775		$15,847.44
07/29/09	08/27/09	190,833		$16,335.09
		Total		**$32,182.53**
Sand Canyon Pump Station				
07/01/09	07/29/09	467,599	168,661	$53,803.10
07/29/09	08/27/09	574,056	202,627	$63,002.81
				$116,805.91
	TOTAL	**2,930,443**		**$343,452.77**

MANAGEMENT OF THE

CALIFORNIA STATE WATER PROJECT

BULLETIN 132-06 | *DECEMBER 2007*

ARNOLD SCHWARZENEGGER
Governor, State of California

MIKE CHRISMAN
Secretary for Resources, The Resources Agency

LESTER A. SNOW
Director, Department of Water Resources

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Bulletin 132-06

Management of the California State Water Project

Covers Activities during Calendar Year 2005

Published December 2007

Arnold Schwarzenegger *Governor*
State of California

Mike Chrisman *Secretary for Resources*
The Resources Agency

Lester A. Snow *Director*
Department of Water Resources

Foreword

Bulletin 132-06, Management of the California State Water Project, continues the Bulletin 132 annual series begun in 1963. Bulletin 132-06 updates water supply planning, construction, financing, management, and operation activities of the State Water Project. Appendix B contains data and computations used to determine the State Water Project contractors' Statement of Charges for 2007. Appendix B was previously published as a separate document.

The Bulletin discusses significant events and issues that affect SWP management and operations. The Bulletin covers the period from January 1, 2005, to December 31, 2005.

Bulletin 132-06 also discusses water supply and delivery; Delta resources and environmental issues, including the CALFED Bay-Delta Authority; Oroville facilities relicensing; financial analysis of the SWP; and the update of business systems in the Department.

Lester A. Snow
Director

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California Water Commission

The California Water Commission serves as a policy advisory body to the Director of Water Resources on all California water resources matters. The citizen commission provides a water resources forum for the people of the State, acts as a liaison between the legislative and executive branches of State government, and coordinates federal, State, and local water resources efforts. As of March 2004, all members had either resigned or their terms had expired. New members have not been appointed by the Governor at the time of printing of this bulletin.

Abbreviations and Acronyms

A

AB Assembly Bill
ACWA Association of California Water Agencies
ADA Americans with Disabilities Act
af acre-feet
AFRP Anadromous Fish Restoration Plan
Ag Council Agricultural Water Management Council
ASCE American Society of Civil Engineers
AWMP Agricultural Water Management Plan

B

BDAC Bay-Delta Advisory Council
BDPAC Bay-Delta Public Advisory Committee
BOD biochemical oxygen demand

C

CAISO California Independent System Operator
CALFED State (CAL) and federal (FED) agencies participating in the Bay-Delta Accord
CalPX California Power Exchange
CAMAL California Association of Mutual Aid Laboratories
C.A.S.T. Catch a Special Thrill
CBDA California Bay-Delta Authority
CCSG Cantua Creek Stream Group
CCWA Central Coast Water Authority
CD Conservation District
CDEC California Date Exchange Center
CEA Capacity Exchange Agreement
CEQA California Environmental Quality Act
CESA California Endangered Species Act
cfs cubic feet per second
CIDH cast in drill hole
CIMIS California Irrigation Management Information System
COA Coordinated Operation Agreement
Corps U.S. Army Corps of Engineers

CPUC California Public Utilities Commission
CUSE Catholic University of Santiago del Estero
CVC Cross Valley Canal
CVHJV Central Valley Habitat Joint Venture
CVP Central Valley Project
CVPIA Central Valley Project Improvement Act
CVRWQCB Central Valley Regional Water Quality Control Board

D

D-1485 State Water Resources Control Board Water Right Decision 1485
D-1641 State Water Resources Control Board Water Right Decision 1641
DBPs disinfection by-products
DBW California Department of Boating and Waterways
DCC Delta Cross Channel
DCVCW Direct Cross Valley Canal Wheeling
DEIR draft environmental impact report
DFG California Department of Fish and Game
DHS California Department of Health Services
DLRD Delta Lands Reclamation District
DO dissolved oxygen
DOC dissolved organic carbon
DOE Department of Energy or Division of Engineering
DOI U.S. Department of the Interior or Delta Outflow Index
DPR California Department of Parks and Recreation
DPS Distinct Population Segment
DSM2 Delta Simulation Model 2
DSOD Division of Safety of Dams
DWR California Department of Water Resources

E

EA/IS Environmental Assessment/Initial Study
EBRPD East Bay Regional Park District
ECAT Environmental Coordination Advisory Team
EHV extra-high voltage
E/I Export/Import
EIR environmental impact report
EIS environmental impact statement
EPA U.S. Environmental Protection Agency
ESA Endangered Species Act
ESO Environmental Services Office
ESU Evolutionarily Significant Unit
ETo Reference Evapotranspiration
EWA Environmental Water Account

F

FERC Federal Energy Regulatory Commission
FLIMS Field and Laboratory Information Management System

G

GBP Grasslands Bypass Project
gpm gallons per minute

H

HMP Hazard Mitigation Plan

I

ICR Information Collection Rule
IEP Interagency Ecological Program
IFDM Integrated on-Farm Drainage Management
IHSim Integrated Hydrological Simulator
INDP Interim North Delta Plan
ISDP Interim South Delta Program
ISI Integrated Storage Investigation
ITRC Irrigation Training and Research Center

J

JWR&DTF Joint Water Reuse & Desalination Task Force

K

kV kilovolt
KWB Kern Water Bank
kWh kilowatt hour

L

LADWP Los Angeles Department of Water and Power
LSEs Load Serving Entities

M

maf million acre-feet
MCL maximum contaminant level
MCWA Mokelumne-Cosumnes Watershed Alliance

MD02 Market Design 2002
MFP Middle Fork Project
mg/L milligrams per liter
MIB Methylisoborneal
MIDS Morrow Island Distribution System
MRTU Market Redesign and Technology Upgrade
MTBE methyl tertiary butyl ether
MWh megawatt hour
MWQI Municipal Water Quality Investigations

N

NBA North Bay Aqueduct
NDOI Net Delta Outflow Index
NEMDC Natomas East Main Drainage Canal
NEPA National Environmental Policy Act
NOAA Fisheries National Marine Fisheries Service
NODOS north-of-the-Delta offstream storage
NOP/NOI Notice of Preparation/Notice of Intent
NPC Nevada Power Company
NPDES National Pollutant Discharge Elimination System

O

OBS optical backscatter
OCAP Operating Criteria and Plan
O&M Division of Operations and Maintenance
OM&P operations, maintenance, and power
OMP&R operations, maintenance, power, and replacement
OM&R operations, maintenance, and replacement

P

PCL Planning and Conservation League
PG&E Pacific Gas and Electric Company
pH [p(otential) of H(ydrogen)]
ppt parts per thousand
PAO Public Affairs Office
PDEA Preliminary Draft Environmental Assessment
PFMA Potential Failure Mode Analysis
PM particulate matter
POD pelagic organism decline
PSA Public Service Announcement
PSP Proposal Solicitation Packet

Q

QA/QC Quality Assurance/Quality Control

R

RCRC Regional Council of Rural Counties
RD reclamation district
Reclamation Bureau of Reclamation
RMR Reliability Must-Run
RMS Reliability Management System
ROD Record of Decision
RRR Red Rock Ranch
RTWQMP Real-time Water Quality Monitoring Program

S

SAP System Application Products
SB Senate Bill
SCE Southern California Edison
SDG&E San Diego Gas and Electric
SDIP South Delta Improvements Program
SDTBP South Delta Temporary Barriers Project
SDWA South Delta Water Agency
Se Selenium
SEW Suisun Ecological Workgroup
SGA Sacramento Groundwater Authority
SJVDIP San Joaquin Valley Drainage Implementation Program
SJRA San Joaquin River Agreement
SJREC San Joaquin River Exchange Contractors Water Authority
SJRIODAY San Joaquin River Input-Output Day
SLFD San Luis Field Division
SMPA Suisun Marsh Preservation Agreement
SMSCG Suisun Marsh Salinity Control Gates
SNL Sandia National Laboratories
SPPC Sierra Pacific Power Company
SRB State Reclamation Board
SRCD Suisun Resource Conservation District
STID Supporting Technical Information Document
SVUR Sacramento Valley Unimpaired Runoff
SVWMA Sacramento Valley Water Management Agreement
SVWMP Sacramento Valley Water Management Program
SWP State Water Project
SWRCB State Water Resources Control Board
SWT Sephton Water Technology

T

taf thousand acre-feet
TDF through-Delta facilities
TEAM Transmission Economic Assessment Methodology
THM trihalomethane
TOC total organic carbon

U

UCLA University of California at Los Angeles
USFWS U.S. Fish and Wildlife Service
USGS U.S. Geological Survey
UWMP Urban Water Management Plan

V

VAMP Vernalis Adaptive Management Plan
VTE vertical tube evaporation

W

WAM Water Awareness Month
WECC Western Electricity Coordinating Council
WET Water Education for Teachers
WQA water quality assessment
WQCP Water Quality Control Plan
WR 95-06 SWRCB Water Right Order 95-06
WSCC Western Systems Coordinating Council
WSDB West Side Detention Basin

The State Water Project long-term water supply contractors are listed below, followed by shortened forms of their names that are used in Bulletin 132 instead of acronyms.

Alameda County Flood Control and Water Conservation District, Zone 7	Alameda-Zone 7
Alameda County Water District	Alameda County
Antelope Valley-East Kern Water Agency	AVEK
Castaic Lake Water Agency	Castaic Lake
City of Yuba City	Yuba City
Coachella Valley Water District	Coachella
County of Butte	Butte
County of Kings	Kings
Crestline-Lake Arrowhead Water Agency	Crestline
Desert Water Agency	Desert
Dudley Ridge Water District	Dudley Ridge
Empire-West Side Irrigation District	Empire
Kern County Water Agency	Kern
Littlerock Creek Irrigation District	Littlerock
Metropolitan Water District of Southern California	Metropolitan
Mojave Water Agency	Mojave
Napa County Flood Control and Water Conservation District	Napa
Oak Flat Water District	Oak Flat
Palmdale Water District	Palmdale
Plumas County Flood Control and Water Conservation District	Plumas
San Bernardino Valley Municipal Water District	San Bernardino
San Gabriel Valley Municipal Water District	San Gabriel
San Gorgonio Pass Water Agency	San Gorgonio
San Luis Obispo County Flood Control and Water Conservation District	San Luis Obispo
Santa Barbara County Flood Control and Water Conservation District	Santa Barbara
Santa Clara Valley Water District	Santa Clara
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura

The non-SWP water contractors are listed below, followed by shortened forms of their names that are used in Bulletin 132 instead of acronyms.

Arvin-Edison Water Storage District	Arvin-Edison
Belridge Water Storage District	Belridge
Berrenda Mesa Water District	Berrenda Mesa
Buena Vista Water Storage District	Buena Vista
Byron-Bethany Irrigation District	Byron-Bethany
Cawelo Water District	Cawelo
Contra Costa Water District	Contra Costa
County of Tulare	Tulare
East Contra Costa Irrigation District	East Contra Costa
Fresno County Public Works	Fresno
Hills Valley Irrigation District	Hills Valley
Kern-Tulare Water District	Kern-Tulare
Lost Hills Water District	Lost Hills
Lower Tule River Irrigation District	Lower Tule
Merced Irrigation District	Merced
Pixley Irrigation District	Pixley
Placer County Water Agency	Placer
Rag Gulch Water District	Rag Gulch
Rosedale-Rio Bravo Water Storage District	Rosedale-Rio
San Luis & Delta-Mendota Water Authority	San Luis & Delta-Mendota
Semitropic Water Storage District	Semitropic
South Feather Water and Power Agency	South Feather
Tranquility Irrigation District	Tranquility
Tri-Valley Water District	Tri-Valley
United Water Conservation District	United
West Kern Water District	West Kern
Western Hills Water District	Western Hills
Westlands Water District	Westlands
Westside Mutual Water Company	Westside
Wheeler Ridge-Maricopa Water Storage District	Wheeler Ridge-Maricopa
Yuba County Water Agency	Yuba

Executive Summary

Part of the North Bay Aqueduct, the Cordelia Pumping Plant serves the cities of Benecia, Vallejo, and Napa.

The Bulletin 132 series began in 1963 and reported the first deliveries of water by the new State Water Project (SWP), which was still under construction. Bulletin 132-06, Management of the California State Water Project, continues this series with the forty-fourth edition. It reports planning, construction, financing, managing, and operating activities of the SWP in 2005. The SWP is operated and maintained by the California Department of Water Resources (DWR).

2005 SWP Highlights

The SWP is one of the largest water and power systems in the world. It conveys an average annual 2.4 million af of water through its 17 pumping plants, 8 hydroelectric power plants, 3 pumping-generating plants, 29 dams and reservoirs, and about 675 miles of aqueducts and pipelines.

California experienced higher-than-average rainfall and mountain snowpack during water year 2004–2005. The State received precipitation at 140 percent of average. The Sacramento Valley Water Year Hydrologic Classification (40-30-30 Index) was above normal and the San Joaquin Valley Water Year Hydrologic Classification (60-20-20 Index) was wet. The Northern Sierra Eight Station Index finished with 57.5 inches of precipitation, or 115 percent of average.

Water storage in all SWP reservoirs at the end of water year 2004–2005 was 4.52 maf, or 83 percent of average. Total water storage in major SWP reservoirs at the end of calendar year 2005 was about 4.64 maf, as compared with 3.07 maf in 2004.

The project provides water for approximately 24 million people throughout the State, irrigation for 750,000 acres of farmland, and environmental benefits to wildlife refuges, as well as environmental mitigation programs. In 2005, the SWP delivered 4,732,633 af of water to 27 of its 29 long-term contractors and 26 other agencies. Ten non-SWP agencies in the Feather River area received 1,074,706 af.

DWR continued to be its own energy scheduling coordinator with the California Independent System Operator (CAISO) and to schedule the purchase and sale of energy to operate the SWP. In 2005, energy used at the 28 SWP pumping and generating plants totaled 8.29 million MWh. DWR sold 2.15 million MWh of energy to 20 utilities and 22 power marketers, for total revenues of $148.62 million in 2005.

The project continued to pay bondholders as scheduled and remained financially viable. The long-term water contractors continued to repay project construction bonds and operating expenses. In 2005, the SWP handled approximately $789 million each in revenues and expenses, with General Fund contributions limited to recreation facilities.

2005 Precipitation and Water Storage

The water stored and delivered by the SWP conservation and transportation facilities originates from rainfall and snowmelt in Northern and Central California watersheds, where most of the State's

precipitation occurs. DWR monitors and records annual precipitation and runoff during each water year, which begins on October 1 and ends on September 30.

Precipitation and Snowpack in Water Year 2004–2005

California experienced higher-than-average rainfall and mountain snowpack during water year 2004–2005. The State received precipitation at 140 percent of average in 2004–2005, as compared to 85 percent of average in 2003–2004. During the second week of April 2005, the statewide average snowpack peaked at 40 inches of snow water content. This amount of mountain snowpack is 146 percent of normal. These snowpack conditions are in stark contrast to snowpack levels in 2003–2004. During that time period, the statewide snow water content peaked at 30 inches in the first week of March. The Northern Sierra Eight Station Index finished the 2004–2005 water year with 57.5 inches of precipitation, which was 115 percent of average.

Runoff

Statewide river runoff totaled 105 percent of average in water year 2004–2005. Runoff in the Sacramento River and San Joaquin River regions was 95 percent and 150 percent of average, respectively.

The Sacramento River Index for water year 2004–2005 was 18.5 maf (95 percent of average). The Sacramento Valley Water Year Hydrologic Classification (40-30-30 Index) was above normal, based on observed data for water year 2004-2005.

The San Joaquin River system unimpaired runoff from the Stanislaus, Tuolumne, Merced, and San Joaquin rivers was 9.2 maf (155 percent of average). The San Joaquin Valley Water Year Hydrologic Classification (60-20-20 Index) was wet, based on observed data for water year 2004-2005.

Water Year 2004–2005 Storage Totals

Total water storage in all SWP reservoirs at the end of water year 2004–2005 was 4.52 maf, or 83 percent of average, compared to 2.99 maf or 76 percent of average at the end of water year 2003–2004. The average end-of-month total storage in major SWP reservoirs was 4.19 maf. End-of-water-year storage on September 30, 2005, at Lake Oroville was 2.88 maf, which was about 1.13 maf more than water year 2003-2004.

Calendar Year 2005 Storage Totals

Total water storage in major SWP reservoirs at the end of calendar year 2005 was about 4.64 maf, as compared with 3.07 maf in 2004.

Water Year 2005–2006 October–December Water Conditions

The last three months of calendar year 2005 mark the beginning of a new water year, 2005–2006. By the end of October, the runoff was near 80 percent of average in the Northern Sierra and closer to average in the central and southern regions of the Sierra. November provided lower percentages of average runoff. By the end of November, statewide runoff since October 1 had fallen to near 70 percent of average. December, however, resulted in near 200 percent of normal precipitation statewide and, in addition, the statewide water year-to-date runoff rose to nearly 200 percent of average.

2005 Water Supplies, Contracts, and Deliveries

2005 Water Deliveries

DWR approved deliveries of 1.65 million af on November 30, 2004, resulting in initial approved Table A amounts of 40 percent of most SWP contractor requests. DWR increased the 2005 approved Table A amounts to 2.48 million af, or 60 percent on January 14, 2005. As water conditions improved, approved Table A amounts were increased to 2.89 million af (70 percent) on April 1, 2005, 3.30 million af (80 percent) on April 21, 2005, and 3.30 million af (90 percent) on May 27, 2005.

In 2005, 4,732,633 af of water were conveyed to 27 long-term contractors and 26 other agencies. That amount includes:

- 2,828,406 af of approved Table A water;
- 731,083 af of Article 21 water;
- 1,506 af of SWP water for recreation and fish and wildlife;
- 1,101,429 af of water delivered to satisfy water rights settlement agreements and agreements with SWP contractors for local water supplies; and
- 70,209 af of water delivered to satisfy agreements between the SWP and the Central Valley Project (CVP).

Table ES-1 on page 6 shows SWP water deliveries by category for 1962–2005.

Non-SWP Water Conveyance

In 2005, DWR conveyed 67,792 af of CVP water through SWP facilities for the Bureau of Reclamation (Reclamation).

Dry Year Water Purchase Program

Due to the wet hydrology of 2005, there was no need for a dry year water purchase program.

Power Resources

In 2005, energy used at the 29 SWP pumping and generating plants totaled 8.29 million MWh.

The Hyatt-Thermalito power complex in Oroville generated 1.83 million MWh of energy in 2005. Energy generated at SWP aqueduct recovery plants—Gianelli, Alamo, Devil Canyon, Mojave Siphon, and Warne—totaled 1.74 million MWh. The SWP share of energy generated at the coal-fired Reid Gardner Unit 4 in Nevada totaled 1.58 million MWh of energy.

DWR sold 2.15 million MWh of energy to 20 utilities and 22 power marketers, for total revenues of $148.62 million in 2005. DWR also received $33.50 million in revenues for capacity, including $21.03 million for transactions made through CAISO.

DWR purchased 4.74 million MWh of energy at a cost of $232.07 million. Other SWP power costs, including transmission, operation, maintenance, and CAISO ancillary services totaled $123.83 million. This amount includes $4.95 million for debt service and $3.81 million for operations and maintenance costs at Pine Flat Power Plant. It also includes $3.42 million for transmission at Reid Gardner Unit 4 and $59.33 million for costs associated with operations and maintenance, fuel, insurance, and property taxes at Reid Gardner Unit 4.

Table ES-1. SWP Water Delivered by Category, 1962–2005 (Acre-feet)

	Table A Water			Other SWP Water Deliveries					
				Article 21/Unscheduled					
	Municipal and Industrial	Agricultural	Total	Municipal and Industrial	Agricultural	Other Water[a]	Feather River Diversions[b]	Fish and Wildlife/ Recreation Water	Total Deliveries
Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1962	---	---	---	---	---	18,289	---	---	18,289
1963	---	---	---	---	---	22,456	---	---	22,456
1964	---	---	---	---	---	32,507	---	---	32,507
1965	---	---	---	---	---	44,105	---	---	44,105
1966	---	---	---	---	---	67,928	---	---	67,928
1967	5,747	5,791	11,538	0	0	53,605	---	---	65,143
1968	46,472	125,237	171,709	10,000	111,534	14,777	866,926	---	1,174,946
1969	34,434	158,586	193,020	0	72,397	18,829	794,374	---	1,078,620
1970	47,996	185,997	233,993	0	133,024	38,080	759,759	---	1,164,856
1971	85,286	272,054	357,340	2,400	293,619	44,119	778,362	8	1,475,848
1972	181,066	430,735	611,801	22,205	401,759	66,638	817,398	6,489	1,926,290
1973	293,824	400,564	694,388	3,161	293,255	42,511	800,743	1,155	1,835,213
1974	418,521	455,556	874,077	4,753	412,923	46,224	911,613	2,118	2,251,708
1975	641,621	582,369	1,223,990	21,043	601,859	63,793	862,218	3,377	2,776,280
1976	818,588	554,414	1,373,002	32,488	547,622	115,217	946,440	1,745	3,016,514
1977	280,919	293,236	574,155	0	0	389,065	581,994	1,111	1,546,325
1978	742,385	710,314	1,452,699	3,566	13,348	121,225	786,517	1,691	2,379,046
1979	690,659	969,237	1,659,896	66,081	582,308	187,630	882,549	1,766	3,380,230
1980	730,545	799,204	1,529,749	19,722	384,835	46,459	875,045	2,131	2,857,941
1981	1,057,273	852,289	1,909,562	12,000	896,428	279,161	838,557	4,688	3,940,396
1982	928,721	821,303	1,750,024	0	215,873	154,882	776,330	4,646	2,901,755
1983	483,499	701,370	1,184,869	0	13,019	181,453	602,905	7,849	1,990,095
1984	725,925	862,694	1,588,619	3,663	259,254	381,024	832,332	7,040	3,071,932
1985	992,538	1,002,915	1,995,453	9,638	298,034	404,842	870,008	4,033	3,582,008
1986	998,611	997,025	1,995,636	2,595	34,025	193,606	791,737	3,865	3,021,464
1987	1,096,368	1,033,718	2,130,086	6,949	107,958	377,592	831,947	7,672	3,462,204
1988	1,316,820	1,068,302	2,385,122	0	0	507,076	794,834	4,889	3,691,921
1989	1,602,454	1,251,293	2,853,747	0	0	474,559	830,500	8,135	4,166,941
1990	1,876,072	706,079	2,582,151	0	90	424,697	875,099	9,262	3,891,299
1991	536,669	12,444	549,113	3,521	0	551,051	565,395	4,879	1,673,959
1992	961,649	509,805	1,471,454	1,156	0	144,789	613,978	2,605	2,233,982
1993	1,064,866	1,250,369	2,315,235	0	0	254,854	822,589	2,609	3,395,287
1994	1,134,992	614,359	1,749,351	48,150	64,475	236,739	874,018	8,200	2,980,933
1995	801,570	1,165,523	1,967,093	17,984	46,346	78,425	860,077	2,575	2,972,500
1996	1,145,638	1,369,187	2,514,825	12,091	16,556	251,391	934,997	3,907	3,733,767
1997	1,258,456	1,067,319	2,325,775	2,814	18,618	322,000	993,211	4,146	3,666,564
1998	864,795	860,724	1,725,519	9,982	10,306	134,682	872,738	2,108	2,755,335
1999	1,405,299	1,333,592	2,738,891	61,191	96,879	85,312	1,108,672	4,324	4,095,269
2000	2,022,703	1,177,974	3,200,677	170,302	138,483	332,654	1,085,886	4,030	4,932,032
2001	1,162,897	383,845	1,546,742	10,261	33,174	535,160	1,078,656	2,929	3,206,922
2002	1,808,017	765,013	2,573,030	15,478	27,637	309,094	1,132,938	3,694	4,061,871
2003	2,118,150	782,891	2,901,041	23,019	36,809	251,447	1,008,093	2,846	4,223,255
2004	1,950,407	649,129	2,599,536	103,890	114,606	385,088	1,174,672	2,865	4,380,657
2005	1,959,162	869,244	2,828,406	199,834	531,249	96,932	1,074,706	1,506	4,732,633
Total	**36,291,614**	**28,051,700**	**64,343,314**	**899,937**	**6,808,302**	**8,781,967**	**32,908,813**	**136,893**	**113,879,226**

[a] Includes water conveyed for SWP and non-SWP water contractors.
[b] Includes amounts of water diverted according to various water rights agreements.

State Water Project Power Generation and Consumption in 2005

Power Generation and Consumption	Millions of Megawatt Hours
Energy generation by SWP facilities	5.151
Energy sources and firm purchases under long-term agreeements and exchanges	5.367
Total Energy Available to the SWP	**10.518**
Energy sales	(2.210)
Net Power Consumption of the SWP	**8.308**

The sidebar above shows 2005 power generation and consumption.

Oroville Facilities Relicensing

The existing 50-year term FERC hydropower license, Project Number 2100 for operation of the Oroville Facilities, will expire January 31, 2007. To obtain a new license, DWR must file a new application with FERC by January 31, 2005.

On January 26, 2005, DWR submitted its Application for New License for the Oroville Facilities with FERC. On September 12, 2005, following DWR's successful compliance with FERC's May 2005 Additional Information Request, FERC accepted DWR's Application for a New License for operating the Oroville Facilities. FERC's acceptance of DWR's license application marked the conclusion of the multiyear collaborative Alternative Licensing Process (ALP) involving federal and State agencies, Indian tribes, local agencies, environmental organizations, and other interested parties that worked to assist DWR in completing a comprehensive license application and accompanying Preliminary Draft Environmental Assessment (PDEA). While this procedurally completed the ALP phase of FERC relicensing, settlement negotiations and completion of all federal and State environmental documentation was still ongoing at the end of 2005 in pursuit of a new FERC license at the Oroville Facilities.

During 2005, primary achievements included:

- completing all 165 technical reports resulting from the 72 collaboratively developed and approved study plans. These roughly 40,000 pages of supporting documentation were submitted to FERC in support of DWR's application for license;
- completing a package of responses addressing deficiencies, clarifications, additional information requests, and revisions to the January 2005 license application;
- receiving notification that the Oroville Facilities New License Application was accepted for filing by FERC;

- submitting the application for water quality certification to the State Water Resources Control Board;
- continuing settlement agreement negotiations meetings with Indian tribes, Butte County, local governmental agencies, State and federal agencies, and other interested stakeholders; and
- continuing to prepare and update the recreation management plan submitted with the Application for License to reflect additional enhancements derived from the Settlement Agreement negotiations.

As an interim settlement activity, DWR obtained approval to provide $3 million to the Feather River Recreation and Park District to fund recreation improvements at Riverbend Park in Oroville through calendar year 2007.

The following SWP facilities will be subject to new license terms and conditions:

- Oroville Dam and Reservoir;
- Hyatt Pumping-Generating Plant;
- Thermalito Pumping-Generating Plant;
- Thermalito Diversion Dam Power Plant;
- Thermalito Diversion Dam;
- Fish Barrier Dam;
- Feather River Fish Hatchery;
- Thermalito Power Canal;
- Thermalito Forebay; and
- Thermalito Afterbay.

Financial Analysis

In 2005, DWR continued to pay bondholders as scheduled. The SWP was financially viable and was indirectly paid for by the approximately 24 million water users who were served by the project. Direct payment was through the 29 long-term water contractors. In 2005, the SWP handled approximately $789 million in revenues and $789 million in expenses. The sidebar on page 9 shows the 2005 income statement for the SWP.

California Water Plan Update 2005

On April 13, 2005, DWR released the public review draft of the *California Water Plan Update 2005*, a proposed strategic plan to meet the State's water needs through 2030.

California Water Plan Update 2005 is the product of unprecedented public input from a 65-member advisory committee representing agriculture, urban water districts, businesses, environmentalists, Native Americans, environmental justice advocacy, cities, counties, federal and State agencies, the California Bay-Delta Authority, academia, and different regions of California. The plan also incorporates input from a 350-member extended review forum, and more than 2,000 interested members of the public.

For the first time, the *California Water Plan* includes a short- and long-term implementation strategy, and details 25 actions, such as water conservation and recycling, conjunctive management and groundwater storage, surface storage and conveyance, system reoperation and water transfers, and desalination; as well as other strategies.

Public hearings on the review draft were held in June, and the final *California Water Plan Update 2005* and the *Water Plan Highlights* briefing book were completed in December 2005.

2005 Income Statement for the State Water Project

Revenues	Thousands of Dollars
Water Contract Payments	836,533
Revenue Bond Cover Adjustments	(37,121)
Rate Management Adjustments	(36,584)
Other Revenues	26,513
Total Operating Revenues	**789,341**
Expenses	
Project Operations, Maintenance, Power, and Replacement	571,073
Deposits to Reserves	(39,719)
Water Bond Principal	108,282
Water Bond Interest	149,705
Total Operating Expense and Debt Service	**789,341**
Net System Revenues	**0**

DWR first published the *California Water Plan* in 1957 and has updated it eight times in the Bulletin 160 series.

Monterey Amendment

The Monterey Amendment, based on Principles of Agreement released on December 16, 1994, was designed to increase the reliability of existing water supplies, provide stronger financial management for the SWP, and increase water management flexibility by providing more tools for local water agencies. In accordance with terms of the May 5, 2003, Monterey Settlement Agreement, the SWP continues to operate pursuant to the Monterey Amendments while the new EIR is being prepared. The draft EIR is expected to be released in 2007.

Delta Resources and Environmental Issues

The 738,000-acre Delta is the heart of California's water environment. The Delta, at the convergence of the Sacramento and San Joaquin rivers, is a network of islands, sloughs, marshes, and reclaimed farmland that stretches from Sacramento to San Francisco Bay. A source of drinking water for about two-thirds of California's population, the Delta also provides irrigation for the Central Valley. The State Water Resources Control Board has adopted water quality control plans and policies to protect the Delta's water quality

and ecosystem while at the same time maintaining SWP water supply reliability.

California Bay-Delta Authority

The California Bay-Delta Act of 2003 established the California Bay-Delta Authority as a new governance structure. The Authority oversees the 25 State and federal agencies working cooperatively through the CALFED Bay-Delta Program to improve the quality and reliability of California's water supplies while restoring the Bay-Delta ecosystem. The Authority is charged with tracking and assessing the CALFED Bay-Delta Program progress, using sound science, providing accountability and ensuring balanced implementation of the program, assuring public involvement and outreach, and coordinating and integrating related government programs.

Environmental Water Account

The Environmental Water Account (EWA) is designed to provide water at critical times to meet environmental needs while providing water supply reliability to SWP and CVP water users. To do that, EWA buys water from willing sellers or diverts surplus water when safe for fish. EWA then banks, stores, conveys, and releases the water as needed to protect fish and compensate water users.

In 2005, EWA's fifth operational year, exports were periodically curtailed at the SWP and CVP export facilities between December 15, 2004, and June 8, 2005. These actions resulted in an EWA debt of about 328,681 af at the SWP (December—4,163 af; February—33,967 af; April—121,888 af; May—133,997 af; June—34,666 af) and 11,400 af at the CVP in February.

During water year 2005, DWR and Reclamation acquired 171,917 af and 28,568 af, respectively, in operational assets and 154,560 af of purchase assets through contract agreements. All purchase asset acquisitions in 2005 were made by DWR and were covered under the EWA environmental impact statement/environmental impact report (EIS/EIR) in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). A source shift was not implemented because there was no risk of a low-point problem at San Luis Reservoir.

In fall 2004, EWA carried a debt of 14,927 af to water year 2005. EWA ended with no debt at the end of December 2005.

North Delta Program

The North Delta Program is part of CALFED's Conveyance Program. Three North Delta conveyance facilities improvements are being evaluated. One is to improve operational procedures for the Delta Cross Channel (DCC) to address fishery and water quality concerns; the second is a screened Through-Delta Facility on the Sacramento River; and the third is the Franks Tract Project, which involves installation of operable gates either on Three Mile Slough or West False River to improve water quality and benefit fisheries. DWR is leading all three studies in cooperation with other agencies. DWR is in the process of initiating the preparation of an EIR/EIS for the Franks Tract Project.

In 2005, projects relating to the DCC Reoperation Project and Through-Delta Facility were limited to completing analyses and writing reports on field work. These activities included reevaluating project funding and schedules. For

example, the Flooded Islands Pre-Feasibility Study, initiated in April 2004, to develop and evaluate conceptual alternatives for modifying Franks Tract, Lower Sherman Lake, and Big Break was completed in June 2005. It provides conceptual modification alternatives on the three flooded islands, with their respective benefits and costs.

The Franks Tract 2005 modifications study showed significant Delta water quality improvements—at a relatively modest cost. This study recommends that operations of the proposed gates are refined for these alternatives to optimize water quality benefits. The report also recommends conducting a pilot project to evaluate, implement, and demonstrate the effectiveness and impacts of the facility before considering a full-scale project. Subsequently, in 2006 and 2007, DWR will continue to refine and evaluate the operation and design of several pilot project alternatives in the Franks Tract area. The scope of the proposed pilot project is currently under development. In mid-2007, an EIR/EIS will be initiated for the pilot project.

South Delta Improvements Program

The South Delta Improvements Program (SDIP) is the second component of CALFED's Conveyance Program. The purpose of SDIP is to do the following:

- improve the reliability of existing SWP facilities;
- ensure that water of adequate quantity and quality is available for diversion to the South Delta Water Agency's service area for beneficial use; and
- reduce the effects of SWP exports on both aquatic resources and direct losses of fish in the South Delta.

In November 2005, a draft EIS/EIR was released for the SDIP. The decision to proceed with the proposed project addresses a precipitous decline in the populations of pelagic (open water) fish in the Bay-Delta environment. One of the fish species is the delta smelt, which is an endangered fish. Stage 1 addresses the physical and structural component of the program, which is not expected to affect fish populations. Stage 2 is the operational component of the program. This stage will increase water deliveries and delivery reliability by increasing the Clifton Court Forebay diversion limit to 8,500 cfs. Only Stage 1 is being sought at this time, while Stage 2 is being deferred. Stage 1 of the SDIP includes the construction and operation of the following projects:

- three permanent operable gates to improve local water levels and circulation in South Delta channels;
- one permanent operable gate to prevent straying of salmon migrating to the San Joaquin River;
- extensive dredging in the South Delta to improve channel capacity for local agricultural users; and
- modifications to existing agricultural diversion intakes.

Several ways of operating the Clifton Court Forebay diversion at 8500 cfs are available, but a preferred operation is not identified in the draft EIR/EIS. DWR is committed to issuing a supplemental environmental document on Stage 2, and circulating this document for a minimum of 45 days, prior to making any decisions.

Status of Threatened or Endangered Species Listings

Delta Export Curtailment

SWP and CVP operated under a new Delta Smelt Biological Opinion in 2005, which was signed in August 2004. This biological opinion set new incidental take limits, based on the most recent 10 years of data (1993–2003). The new take limits are based on two categories of water year type: wet or above normal and below normal, dry, or critical. The Delta Smelt Risk Assessment Matrix (DSRAM) adult concern level is set at 892, and the reconsultation level varies by month, ranging from 100 to 44,800. When the incidental take is exceeded, a team of interagency scientists, known as the Delta Smelt Working Group, will convene a meeting to review smelt distribution, abundance, projected project operations, and other information. This work group will recommend any actions that should be taken to reduce salvage.

On January 24, 2005, the incidental take of pre-spawning adult delta smelt at SWP and CVP exceeded the concern level of 892. The Delta Smelt Working Group met to discuss possible actions. As a result, combined exports were reduced to 3,000 cfs for seven days.

In 2005, 2,922 delta smelt were salvaged by SWP and 818 were salvaged by CVP. These fish compare to 20,470 delta smelt salvaged at both facilities in 2004.

Pelagic Organism Decline in the Upper San Francisco Estuary

There have been marked declines of numerous pelagic fishes in the upper San Francisco Estuary. The major resident pelagic fishes sampled in the upper estuary include delta smelt, longfin smelt, striped bass, and threadfin shad. Historically, low populations of these fishes have been the result of dry years, such as the drought in 1987–1992. Abundance indices for 2002–2005 indicate record and near-record lows for these populations, which are unexpected given the moderate winter-spring flows of the past several years. In response to the Pelagic Organism Decline (POD), the Interagency Ecological Program (IEP) formed a work team to evaluate the potential causes. An interdisciplinary, multiagency research effort was undertaken in 2005 to identify the most likely causes of the POD. The overall approach was based on a "triage" model to identify the most likely causes and assign priorities to projects, based on funding and resources. The 2005 work fell into four general types: an expansion of existing monitoring; analysis of existing data; new studies; and ongoing studies. A conceptual model was developed to describe possible mechanisms, by which a combination of long-term and recent changes in the ecosystem could produce the observed declines in the abundance indices.

Possible stressors influencing the POD included entrainment, toxic effects on fish, toxic effects on fish food, harmful algal blooms, clam effects on food availability, disease, and parasites. Narrative explanations in the context of long-term trends have been developed for four major components: (1) prior fish abundance—which describes how the continued low abundance of adults leads to reduced juvenile production; (2) habitat—which describes how water quality variables, including contaminants and toxic algal blooms, affect estuarine species; (3) top-down effects—which posit that predation and water project entrainment affect mortality rates; and (4) bottom-up effects—

which focus on how food web interactions in Suisun Bay and the West Delta have affected fish abundance. These narrative explanations will be developed for 2006–2007 to cover each component of the conceptual model.

Flood Protection

Arroyo Pasajero

The Arroyo Pasajero and its tributaries drain the coastal mountains west of the California Aqueduct in Fresno County. During heavy rainfall, high flows in the Arroyo Pasajero carry heavy sediment loads. Over eons, this flood sediment has formed an alluvial fan that extends from Tulare Lake to Fresno Slough. The alluvial fan is traversed by the California Aqueduct, which forms a barrier to Arroyo flood flows. Flood control facilities constructed to solve this problem include the West Side Detention Basin, designed to store floodwaters and sediment, an evacuation culvert to release floodwaters east of the California Aqueduct, and drain inlets to release floodwaters into the California Aqueduct. Since the floods of 1969, when nearly all the West Side Detention Basin's planned 50-year sediment storage space was filled, DWR and Reclamation have worked to minimize the effects of heavy flooding. In 1990, DWR asked the U.S. Army Corps of Engineers to help identify solutions to the Arroyo Pasajero flooding and sediment problems. Two candidate plans were prepared and released to the public in 1999; however, due to prohibitive costs, neither plan was adopted. Since then, DWR and Reclamation have been working on an alternate plan. This plan would rely on increased storage in the existing West Side Detention Basin, possibly combined with a reservoir to be constructed in the western Tulare Lakebed east of the California Aqueduct. The State Water Contractors asked DWR to develop the least costly alternative that would still provide a 100-year level of flood protection to the California Aqueduct. In 2004, DWR finished its feasibility investigation into a more cost-effective plan and proceeded with final design, environmental documentation, and other procedural steps leading to construction. Construction started in fall 2004 and included implementing improvements to increase the storage capacity of the West Side Detention Basin. The plan also included both adding new and improving the existing flood control structures.

Security Measures for the State Water Project after September 11, 2001

Security and protection of the SWP is a primary goal for DWR. Since September 2001, DWR has taken action to further increase security, regulate access, and closely monitor activities at SWP facilities and DWR's offices. For example, SWP operations are monitored more closely now, and staff exercise vigilance in maintaining a secure environment. Security patrols are more frequent and planning is in place to address potential or actual acts of terrorism. Improvements to existing security systems are ongoing and done in conjunction with Reclamation and other federal and State agencies. In 2005, DWR continued to implement recommended actions from a security assessment completed by an independent consultant in 2004. While DWR does not discuss details of its security program, it does coordinate very closely on security issues and emergency preparedness with federal and State public safety and law enforcement agencies, Reclamation,

utilities, regional and municipal water entities, and others.

SWP Milestones through the Decades

Forty Years Ago – 1965

Construction begins on the Edmonston Pumping Plant, the largest pumping facility of the State Water Project. Edmonston lifts water almost 2,000 feet up and over the Tehachapi Mountains into Southern California. At peak capacity, the plant pumps almost 2 million gallons a minute through 10 miles of pipeline across the Tehachapi Mountains.

Thirty Years Ago – 1975

Governor Edmund G. Brown, Jr. appoints Ronald E. Robie, an attorney and legislative consultant on water law and policy, as DWR Director. Robie serves until 1983.

Twenty Years Ago – 1985

In March 1985, a groundbreaking ceremony is held for the North Bay Aqueduct, Phase Two.

Ten Years Ago – 1995

DWR relocates operational headquarters for the SWP from the Resources Building in downtown Sacramento to a renovated building north of downtown. The new Joint Operations Center is shared with Reclamation, operators of the CVP, and the National Weather Service, a partner in DWR's new Flood Center.

Chapter 1
The State Water Project

The State Water Project is the largest state-built, multipurpose water project in the country.

Information in this chapter was contributed by the Division of Operations and Maintenance and the State Water Project Analysis Office.

California's diverse geography contains both the highest and lowest elevations in the coterminous United States, with a resulting diversity of climate that ranges from desert to alpine to subtropical. In a typical year, some areas receive as little as 2 inches of rain, while others receive more than 100 inches. This diversity of geography and climate creates an intricate and constantly changing pattern of water supplies, which, in turn, creates enormous challenges in managing this vital resource.

Like present-day Californians, the earliest settlers faced the problem of how best to conserve, control, and deliver water. Remains of aqueducts, canals, and dams are still found near some of California's original missions. The first recorded aqueduct was 6 miles long; it was built in 1770 to serve the San Diego mission. In the early twentieth century, several cities—San Francisco and Los Angeles among them—built aqueducts to convey water from the Sierra Nevada to other parts of the State.

In 1951, after many years of discussion and study, the Legislature authorized construction of a water storage and supply system to capture and store runoff in Northern California and deliver it to areas of need throughout the State. Eight years later, the Legislature passed the Burns-Porter Act, which provided the mechanism for obtaining funds necessary to construct the initial facilities. In 1960, California voters approved an issue of $1.75 billion in general obligation bonds, as authorized in the act, thereby obtaining funds to build the State Water Project (SWP). In 1962, the first water was delivered through a portion of the South Bay Aqueduct to two long-term contracting agencies in Alameda County.

Today the SWP, managed by the Department of Water Resources (DWR), is the largest state-built, multipurpose water project in the country. It was designed and built to deliver water, control floods, generate power, provide recreational opportunities, and enhance habitat for fish and wildlife. SWP water irrigates about 750,000 acres of farmland, mainly in the south San Joaquin Valley. About 24 million of California's estimated 36 million residents benefit from SWP water.

Precipitation and Runoff

The water stored and delivered by the SWP originates from rainfall and snowmelt runoff in Northern and Central California's watersheds, where most of the State's precipitation occurs.

Since 1968, DWR has monitored and recorded annual precipitation and runoff, because precipitation, snowpack, and the rate and amount of snowmelt help determine how much water the SWP can deliver in any given year. The water year, as designated by DWR, is October 1 through September 30.

Water Delivery Facilities

The SWP depends on a complex system of dams, reservoirs, power plants, pumping plants, canals, and aqueducts to deliver water. Although initial transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be built, as needed.

The SWP facilities include 25 dams and reservoirs, 29 pumping and generating plants, and approximately 700 miles of aqueducts in total. Figure 1-1 shows the names and locations of primary water delivery facilities.

Existing long-term SWP water supply contracts call for the annual delivery of up to 4,125,686 af of Table A water during 2005 through SWP facilities, gradually increasing to a maximum of up to 4,172,786 af by 2021. Some changes have occurred since the long-term water contracts were signed in the 1960s. These changes include population growth variations, differences in local use, local water conservation programs, and conjunctive-use programs. The SWP delivered 2,828,406 af of approved Table A water to long-term contractors' service areas in 2005. Demands for SWP water are expected to increase as California's population continues to grow.

Project Design

Water from rainfall and snowmelt runoff is stored in SWP conservation facilities and delivered via SWP transportation facilities to water agencies and districts in the Southern California, Central Coastal, San Joaquin Valley, South Bay, North Bay, and Upper Feather River areas.

Three small reservoirs—Lake Davis, Frenchman Lake, and Antelope Lake—are the northernmost SWP facilities. Situated on Feather River tributaries in Plumas County, these lakes are used primarily for recreation. They also provide water to the City of Portola and local agencies that have water rights agreements with DWR.

Downstream from these three lakes lies Lake Oroville, the keystone of the SWP. Lake Oroville conserves water from the Feather River watershed. Created by Oroville Dam, the tallest earthfill dam in the Western Hemisphere, Lake Oroville is the project's largest storage facility, with a capacity of about 3.5 million af (an acre-foot is about 326,000 gallons).

Releases from Lake Oroville flow down the Feather River into the Sacramento River, which drains the northern portion of California's great Central Valley. The Sacramento River flows into the Sacramento-San Joaquin Delta, comprised of 738,000 acres of land interlaced with channels that receive runoff from 40 percent of the State's land area. The SWP, federal Central Valley Project (CVP), and local agencies all divert water from the Delta.

From the northern Delta, Barker Slough Pumping Plant diverts water for delivery to Napa and Solano counties through the North Bay Aqueduct, which was completed in 1988. Near Byron, in the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. Banks Pumping Plant lifts water from Clifton Court Forebay into the California Aqueduct, which flows to Bethany Reservoir. From Bethany Reservoir, the South Bay Pumping Plant lifts water into

Figure 1-1. Names and Locations of Primary Water Delivery Facilities, December 31, 2005

the South Bay Aqueduct to supply Alameda and Santa Clara counties. The South Bay Aqueduct provided initial deliveries in 1962 and has been fully operational since 1965.

Most of the water delivered to Bethany Reservoir from Banks Pumping Plant flows into the California Aqueduct. This 444-mile-long main aqueduct conveys water to the agricultural lands of the San Joaquin Valley and the urban regions of Southern California.

The California Aqueduct winds along the west side of the San Joaquin Valley. It transports water to O'Neill Forebay, Gianelli Pumping-Generating Plant, and San Luis Reservoir. San Luis Reservoir has a storage capacity of more than 2 million af and is jointly owned by DWR and the Bureau of Reclamation (Reclamation). DWR's share of gross storage in the reservoir is about 1,062,000 af. Generally, water is pumped into San Luis Reservoir during late fall through early spring, where it is temporarily stored for release back to the California Aqueduct to meet summertime peaking demands of SWP and CVP contractors.

SWP water not stored in San Luis Reservoir, as well as water eventually released from San Luis, flow south through the San Luis Canal, a portion of the California Aqueduct jointly owned by DWR and Reclamation.

As the water flows through the San Joaquin Valley, numerous turnouts convey the water to farmlands within the service areas of the SWP and CVP. Along its journey, water is lifted more than 1,000 feet by four pumping plants—Dos Amigos, Buena Vista, Teerink, and Chrisman—before reaching the foot of the Tehachapi Mountains.

In the San Joaquin Valley, near Kettleman City, Phase I of the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. In August 1997, completion of Phase II extended this branch to serve municipal and industrial water users in San Luis Obispo and Santa Barbara counties.

The remaining water conveyed by the California Aqueduct is delivered to Southern California, which is home to about two-thirds of California's population. Before this water can be delivered, it must first cross the Tehachapi Mountains. Pumps at Edmonston Pumping Plant, situated at the foot of the mountains, raise the water 1,926 feet—the highest single lift of any pumping plant in the world. The water enters 8.5 miles of tunnels and siphons as it flows into Antelope Valley, where the California Aqueduct divides into two branches: the East Branch and the West Branch.

The East Branch carries water through Alamo Power Plant, Pearblossom Pumping Plant, and Mojave Siphon Power Plant into Silverwood Lake in the San Bernardino Mountains. From Silverwood Lake, water flows through the San Bernardino Tunnel into Devil Canyon Power Plant. Water continues down the East Branch through the Santa Ana Pipeline to Lake Perris, the southernmost SWP reservoir.

The East Branch Extension is a nearly 33-mile pipeline linking parts of service areas for San Bernardino Valley Municipal Water District and San Gorgonio Pass Water Agency to the California Aqueduct. The East Branch Extension, Phase I, carries water from Devil Canyon Power Plant

Afterbay to Cherry Valley, bringing water to Yucaipa, Calimesa, Beaumont, Banning, and other communities. Phase II, when completed, will assist with delivery.

Water in the West Branch flows through Oso Pumping Plant, Quail Lake, and then through Warne Power Plant into Pyramid Lake in Los Angeles County. From there it flows through the Angeles Tunnel, Castaic Power Plant, Elderberry Forebay, and into Castaic Lake, terminus of the West Branch. Castaic Power Plant is operated by the Los Angeles Department of Water and Power.

The energy needed to operate the SWP, the largest single user of electrical power in California, comes from a combination of its own hydroelectric and coal-fired generation plants and power purchased and exchanged from other utilities. The coal-fired plant and the project's eight hydroelectric power plants, including three pumping-generating plants, produce enough electricity in a normal year to supply about two-thirds of the necessary operating power.

Tables 1-1 through 1-5 present statistical information about primary reservoirs, primary dams, pumping plants, power plants, and aqueducts. Additional information regarding operation of the plants under full development can be found in Chapter 10.

Additional Construction

SWP aqueduct facilities were initially designed and constructed to provide service to all agencies to meet their water delivery needs up to 1990. Project water conservation reservoirs were planned to be constructed in stages as water demands increased. Oroville and San Luis were the first SWP conservation reservoir facilities constructed. Additional SWP facilities were scheduled to meet increased demands. It was anticipated that population growth in delivery service areas and water supply areas of origin would influence the final schedule for the additional SWP facilities. However, increased costs, environmental issues, and increased non-SWP demands for limited water supplies delayed the construction schedule for some of the planned additional facilities.

Table 1-1. Physical Characteristics of Primary Storage Facilities

Facility	Gross Capacity at Absolute Maximum Elevation (Acre-feet)	Surface Area (Acres)	Shore-line (Miles)
Antelope Lake	22,600	930	15
Frenchman Lake	55,500	1,580	21
Lake Davis	84,400	4,030	32
Lake Oroville	3,537,600	15,800	167
Thermalito Forebay	11,800	630	10
Thermalito Afterbay	57,000	4,300	26
Thermalito Diversion Pool	13,400	320	10
Clifton Court Forebay	31,300	2,180	8
Bethany Reservoir	5,100	180	6
Lake del Valle	77,100	1,060	16
San Luis Reservoir	2,027,800	12,520	65
SWP storage, 1,062,180 af			
O'Neill Forebay	56,100	2,700	12
SWP storage, 29,500 af			
Los Banos Reservoir	34,600	620	12
Little Panoche Reservoir	5,580	190	6
Quail Lake	7,600	290	3
Pyramid Lake	171,200	1,300	21
Elderberry Forebay	32,500	500	7
Castaic Lake	323,700	2,240	29
Silverwood Lake	75,000	980	13
Lake Perris	131,500	2,320	10

Table 1-2. Physical Characteristics of Primary Dams

Facility	Crest Elevation (Feet)	Structural Height (Feet)	Crest Length (Feet)	Structural Volume (Thousands Cubic Yards)
Antelope	5,025	120	1,320	380
Frenchman	5,607	139	720	537
Grizzly Valley	5,785	132	800	253
Oroville	922	770	6,920	80,000
Thermalito Diversion	233	143	1,300	154
Thermalito Forebay	231	91	15,900	1,840
Thermalito Afterbay	142	39	42,000	5,020
Clifton Court Forebay	14	30	36,500	2,440
Bethany	250	121	3,940	1,400
Del Valle	773	235	880	4,180
Sisk	554	385	18,600	77,645
O'Neill	233	88	14,350	3,000
Los Banos Detention	384	167	1,370	2,100
Little Panoche Detention	676	152	1,440	1,210
Pyramid	2,606	400	1,090	6,800
Elderberry Forebay	1,550	200	1,990	6,000
Castaic	1,535	425	4,900	46,000
Cedar Springs	3,378	249	2,230	7,600
Perris	1,600	128	11,600	20,000
Crafton Hills	2,932	95	500	144

Table 1-3. Pumping Plant Characteristics

Facility	Number Of Units	Normal Static Head (Feet)	Total Flow at Design Head (cfs)	Total Motor Rating (hp)
Thermalito	3 (p-g)[a]	85-102	9,120	120,000
Hyatt	3 (p-g)[a]	500-625	5,610	519,000
Barker Slough	9	95-120	228	4,800
Cordelia	11	110-376	138	5,600
Banks	11	236-252	10,670	333,000
South Bay	9	566	330	27,750
Del Valle	4	0-38	120	1,000
Gianelli	8 (p-g)[a]	99-327	11,000	504,000
Dos Amigos	6	107-125	15,450	240,000
Las Perillas	6	55	461	4,050
Badger Hill	6	151	454	11,750
Devil's Den[b]	6	521	134	10,500
Bluestone[b]	6	484	134	10,500
Polonio Pass[b]	6	533	134	10,500
Buena Vista[b]	10	205	5,405	144,500
Teerink[b]	9	233	5,445	150,000
Chrisman[b]	9	518	4,995	330,000
Edmonston[b]	14	1,926	4,480	1,120,000
Oso	8	231	3,252	93,800
Pearblossom	9	540	2,525	203,200
Greenspot	4	382	50	3,900
Crafton Hills	3	613	40	4,000
Cherry Valley	2	75	16	300

[a] The term p-g indicates pumping-generating units.
[b] These plants have one unit in reserve.

Table 1-4. Power Plant Characteristics, by Type and Facility

Type and Facility	Number of Units	Normal Static Head (Feet)	Total Flow at Design Head (cfs)	Net Dependable Capacity	Nameplate Capacity
Hydro					
Thermalito Diversion Dam	1	63-77	615	3.3	3.3
Thermalito	4 (3 p-g)[a]	85-102	17,400	128	126.1
Hyatt	6 (3 p-g)[a]	410-676	16,950	639	714
Gianelli (total)	8 p-g[a]	99-327	16,960	362	424
Alamo	1	115-141	1,740	18	18
Warne	2	719-739	1,600	76	78.2
Mojave Siphon	3	81-136	2,880	14	30
Devil Canyon	4	1,406	2,940	235	291
Castaic	7 (6 p-g)[a]	900-1,050	20,820		1,319.7
Coal					
Reid Gardner, Unit 4 (total)	1[b]			275	265
SWP share of generation[c]					

[a] The term p-g indicates pumping-generating units.
[b] Life of the plants is expected to extend through 2013.
[c] SWP ownership share in Reid Gardner, Unit 4, is 67.8%.

Table 1-5. Total Miles of Aqueducts

Facility	Channel and Reservoir	Canal and Siphon	Pipeline and Discharge Line	Tunnel	Total
Grizzly Valley Pipeline	0.0	0.0	6.0	0.0	6.0
Thermalito Power Canal and Tail Channel	1.5	1.9	0.0	0.0	3.4
North Bay Aqueduct	0.0	0.0	27.6	0.0	27.6
South Bay Aqueduct (including Del Valle Branch)	0.3	10.7	31.9	1.7	44.6
Subtotal	*1.8*	*12.6*	*65.5*	*1.7*	*81.6*
California Aqueduct					
Clifton Court Forebay to O'Neill Forebay	4.5	61.9	0.3	0.0	66.7
O'Neill Forebay to Kettleman City	4.1	101.4	0.2	0.0	105.7
Kettleman City to Edmonston Pumping Plant	0.0	120.1	0.9	0.0	121.0
Edmonston Pumping Plant to Tehachapi Afterbay	0.0	0.2	1.9	7.9	10.0
Tehachapi Afterbay to Lake Perris	4.0	97.8	34.3	3.9	140.0
Subtotal	*12.6*	*381.4*	*37.6*	*11.8*	*443.4*
California Aqueduct Branches					
Coastal Branch	0.0	14.1	98.7	2.7	115.5
West Branch	9.7	9.3	5.8	7.1	31.9
East Branch Extension					
Devil Canyon Power Plant to Greenspot Pumping Station	0.0	0.0	15.8	0.0	15.8
Greenspot Pumping Station to Noble Creek Terminus	0.0	0.0	13.3	0.0	13.3
Subtotal	*9.7*	*23.4*	*133.6*	*9.8*	*176.5*
Total	**24.1**	**417.4**	**236.7**	**23.3**	**701.5**

In response to changes in water management policy, DWR continues to reassess plans for the additional facilities that will incorporate increased environmental safeguards while also increasing the SWP delivery yield. Developing these plans involves the time-consuming process of finding technically suitable projects and satisfying the many complex and dynamic environmental procedures, laws, and regulations.

In the mid-1980s, DWR began planning an offstream storage complex, Los Banos Grandes, in Merced County. Initial plans for Los Banos Grandes were completed, but additional planning has been suspended until environmental concerns have been addressed.

DWR also developed alternative methods of storing water, including the Kern Water Bank, a conjunctive-use groundwater storage facility located in Kern County.

The signing of the Monterey Agreement in December 1994 set the principles for permanently transferring the State-owned Kern Fan Element of the Kern Water Bank from DWR to two agricultural contractors, Kern County Water Agency and Dudley Ridge Water District. The transfer occurred August 9, 1996.

DWR continues to plan, design, and construct transportation and power-producing facilities for the SWP. The enlarged Devil Canyon Power Plant and the new Devil Canyon Power Plant Second Afterbay became operational in 1995. Mojave Siphon Power Plant was completed in 1996. Phase II of the Coastal Branch of the California Aqueduct began operation in August 1997. The Coastal Branch can transport about 50,000 af of water annually to San Luis Obispo and Santa Barbara counties.

Methods of Financing

Project facilities have been constructed with several general types of financing: general obligation bonds and tideland oil revenues (under the Burns-Porter Act, which was approved by the Legislature in 1959, and the bond issue approved by voters in 1960); revenue bonds; and capital resources revenues. Repayment of these funds, and the operations, maintenance, power, and replacement costs associated with water supply, are paid by the 29 agencies and districts that have long-term contracts with DWR for SWP water. Costs are repaid as debt service on the bonds is due.

The contracts initially provided for a combined maximum annual Table A amount of 4,230,000 af of water supply. As a result of contract amendments in the 1980s and the Monterey Amendment, the current combined maximum annual Table A by 2021 totals 4,172,786 af. The contracts are in effect for the longest of the following periods:

- the project repayment period, which extends to the year 2035;
- 75 years from the date of the contract; or
- the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

Long-Term Contracting Agencies

From 1963 through 1967, 32 agencies or districts signed long-term water supply contracts with DWR. However, in 1965, the City of West Covina was annexed to the Metropolitan Water District of Southern California, and in 1981, Hacienda Water District was assigned to Tulare Lake Basin Water Storage District. On January 1, 1992, Castaic Lake Water Agency assumed all rights and obligations granted to Devil's Den Water District according to its long-term water supply contract. Therefore, only 29 agencies and districts now have long-term contracts with DWR as of December 31, 2005. These 29 are listed in Figure 1-2 and Table 1-6.

Figure 1-2 shows the name and location of each contracting agency and district and lists the first year of SWP delivery service for each. Table 1-6 presents information about each contracting agency.

Table 1-6. Long-Term Water Supply Contracting Agencies, by Area, as of December 31, 2005

Contracting Agency	Cumulative Deliveries (Acre-Feet)[a]	Annual Table A (Acre-Feet)	Payments (Dollars)	Gross Area (Acres)	Assessed Valuation (Dollars)[b]	Estimated Population
Upper Feather River Area						
City of Yuba City	17,158	9,600	3,770,255	5,888	1,680,000,000	47,144
County of Butte	12,923	1,200	1,080,462	1,069,000	13,000,000,000	214,119
Plumas County Flood Control and WCD	10,472	0	1,447,821	1,676,056[c]	2,060,744,342	21,200
Subtotal	*40,553*	*10,800*	*6,298,538*	*2,750,944*	*16,740,744,342*	*282,463*
North Bay Area						
Napa County Flood Control and WCD	215,830	22,225	67,690,686	510,010	20,782,359,897	132,765
Solano County Water Agency	544,599	47,256	93,244,608	537,600	32,733,946,293	421,657
Subtotal	*760,429*	*69,481*	*160,935,294*	*1,047,610*	*53,516,306,190*	*554,422*
South Bay Area						
Alameda County Flood Control and WCD–Zone 7	1,124,978	80,619	119,370,083	275,900	30,029,886,413	191,100
Alameda County WD	1,030,610	42,000	85,361,945	67,072	37,558,158,090	324,796
Santa Clara Valley WD	3,348,193	100,000	270,119,989	849,000	147,074,863,200	1,715,374
Subtotal	*5,503,781*	*222,619*	*474,852,017*	*1,191,972*	*214,662,907,703*	*2,231,270*
San Joaquin Valley Area						
County of Kings	89,970	9,000	4,605,001	893,300	7,300,545,655	147,729
Castaic Lake Water Agency	468,638	12,700	---	8,700	4,654,458	0
Dudley Ridge WD	1,985,178	57,343	64,752,959	37,568	45,390,000	36
Empire West Side Irrigation District	105,989	3,000	3,238,607	7,400	[d]	50
Kern County Water Agency	30,246,989	998,730	1,460,535,128	5,161,000	58,600,000,000	756,825
Oak Flat WD	187,876	5,700	5,187,714	4,500	[d]	10
Tulare Lake Basin Water Storage District	4,348,958	96,227	131,856,689	189,519	152,288,305	23
Subtotal	*37,433,598*	*1,182,700*	*1,670,176,098*	*6,301,987*	*66,102,878,418*	*904,673*
Central Coastal Area						
San Luis Obispo County Flood Control and WCD	34,003	25,000	54,652,638	2,122,240	34,023,607,303	255,478
Santa Barbara County Flood Control and WCD	196,549	45,486	331,148,234	1,775,296	49,196,921,210	421,625
Subtotal	*230,552*	*70,486*	*385,800,871*	*3,897,536*	*83,220,528,513*	*677,103*
Southern California Area						
Antelope Valley–East Kern Water Agency	1,482,392	141,400	352,527,421	1,525,547	18,000,000,000	365,000
Castaic Lake Water Agency[e]	600,560	82,500	199,994,142	133,500	26,243,095,000	249,000
Coachella Valley WD	726,423	121,100	177,217,908	639,857	40,703,747,303	264,869
Crestline-Lake Arrowhead Water Agency	44,789	5,800	20,380,365	55,100	1,500,527,807	25,000
Desert Water Agency	1,009,525	50,000	193,019,545	209,760	7,520,537,310	66,310
Littlerock Creek Irrigation District	18,995	2,300	5,213,975	10,000	375,160,450	2,900
Metropolitan WD of Southern California	25,975,429	1,911,500	7,309,242,182	3,328,000[f]	1,563,002,519,611	18,300,000
Mojave Water Agency	213,318	75,800	176,117,355	3,136,000	18,666,247,597	358,800
Palmdale WD	179,238	21,300	51,917,434	119,680	1,470,701,596	109,845
San Bernardino Valley Municipal WD	508,680	102,600	386,485,871	210,000	20,296,330,129	600,000
San Gabriel Valley Municipal WD	321,620	28,800	112,118,625	18,297	11,720,110,333	210,145
San Gorgonio Pass Water Agency	1,649	6,500	65,774,794	140,800	3,664,061,473	65,000
Ventura County Flood Control District	40,955	20,000	44,247,916	308,252	21,957,265,429	457,000
Subtotal	*31,123,573*	*2,569,600*	*9,094,257,534*	*9,834,793*	*1,735,120,304,038*	*21,073,869*
Total	**75,092,486**	**4,125,686**	**11,792,320,354**	**25,024,842[g]**	**2,169,363,669,204**	**25,723,800**

[a]All water delivered to long-term SWP contractors, including carryover, Article 21, surplus, unscheduled, exchange, permit, purchased, local, and non-SWP water.
[b]Statutes of 1978, Chapter 1207, added Section 135 to the Revenue and Taxation Code, requiring assessment at 100% of full value for the 1981–82 fiscal year and fiscal years thereafter.
[c]Total of all Plumas County Flood Control and Water Conservation District, including Last Chance Creek Water District.
[d]Assessed valuation not available on an agency area breakdown.
[e]District includes land in the San Joaquin Valley Area formerly known as Devil's Den Water District.
[f]Total for Metropolitan, including Calleguas Municipal Water District, which is common to Metropolitan and Ventura County Flood Control District.
[g]Includes duplicate values. Some areas that are within two or more agencies are included in each agency's total.

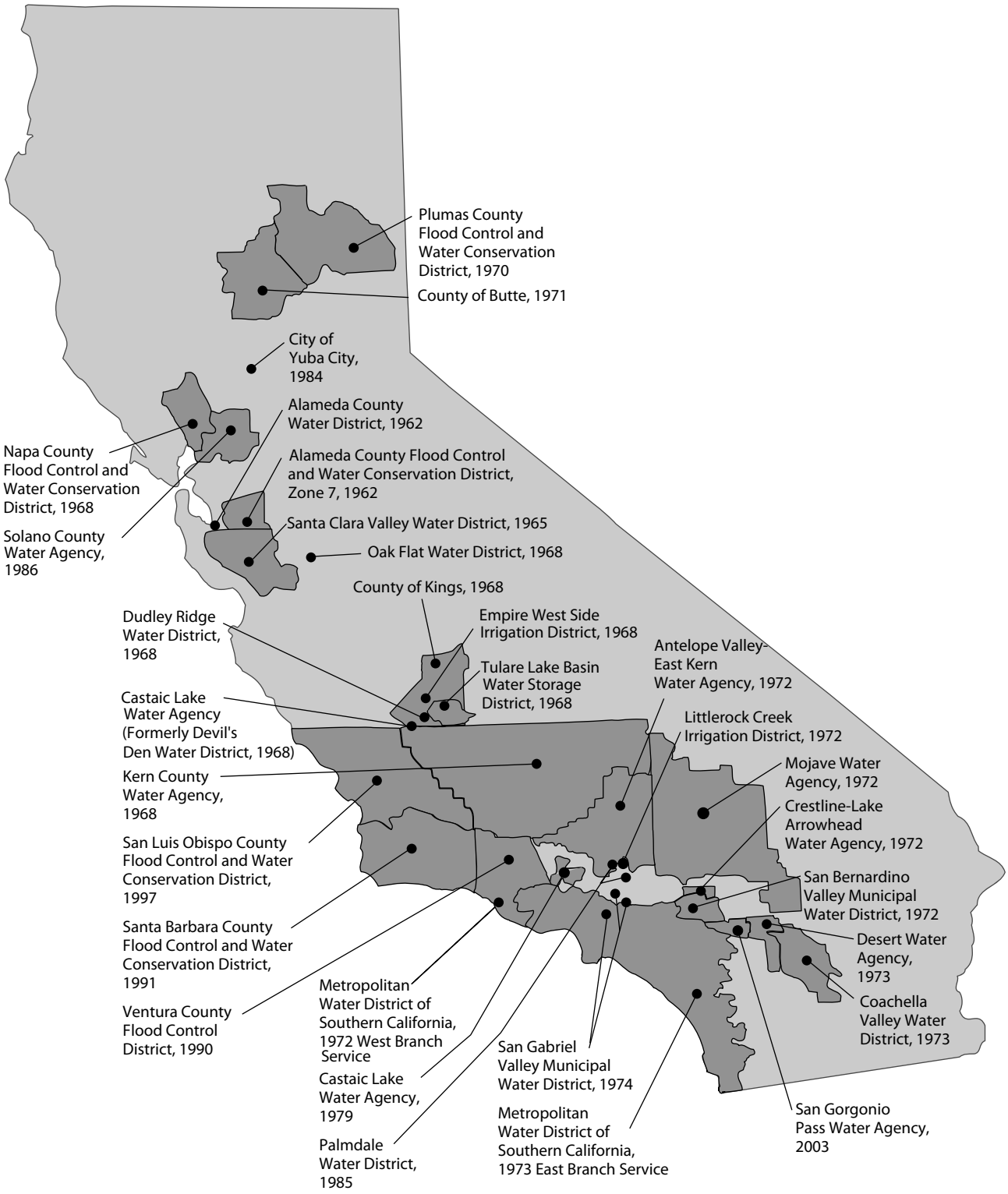

Figure 1-2. Names, Locations, and First Year of Service of Long-Term Contracting Agencies, December 31, 2005

Chapter 2
Delta Resources

An aerial view of the Sacramento River and oxbow formations.

Significant Events in 2005

In November 2005, a draft environmental impact statement/environmental impact report (EIS/EIR) was released for the South Delta Improvements Program (SDIP). The decision to proceed with the proposed project addresses a precipitous decline in the populations of pelagic (open water) fish in the Bay-Delta environment. One of the fish species is the delta smelt, which is an endangered fish.

The CALFED Record of Decision (ROD) calls for various modifications. These modifications include changes in the North Delta's conveyance facilities to improve Delta water quality, fisheries, and water supply reliability, as well as other modifications to improve flood protection and ecosystem health.

The Franks Tract 2005 modifications study showed significant Delta water quality improvements—at a relatively modest cost. This study recommends that operations of the proposed gates are refined for these alternatives to optimize water quality benefits. The report also recommends conducting a pilot project to evaluate, implement, and demonstrate the effectiveness and impacts of the facility before considering a full-scale project.

Information for this chapter was contributed by the Division of Planning and Local Assistance, the Central District, and the Bay-Delta Office.

The Sacramento-San Joaquin Delta is a unique environmental resource and a major source of water for millions of Californians. Over the past 40 years, the Department of Water Resources (DWR), and other State and federal agencies, have developed and implemented numerous programs to manage the Delta.

DWR's water management programs focus on solving problems in three distinct areas of the Sacramento-San Joaquin Delta: the North Delta, West Delta, and South Delta (see Figure 2-1).

These programs share the following common goals:

- to improve water supply reliability to the State Water Project (SWP), Central Valley Project (CVP), and Delta water users;
- to determine levels of flow and salinity necessary to protect fish and wildlife habitat;
- to devise methods to control flooding;
- protect fish and wildlife; and
- to provide recreational activities.

Delta Water Management Programs

During the last decade, water management issues in the Delta have been complicated by the listing of native species under the federal Endangered Species Act (ESA); the creation of new Delta standards by the U.S. Environmental Protection Agency (EPA); the issuance of biological opinions under the ESA; and the implementation of 800,000 af of CVP yield for fish and wildlife protection (1992 Central Valley Improvement Act). Some of DWR's programs were deferred while solutions were sought.

In June 1994, a Framework Agreement between federal and State governments was established which defined a joint federal-State cooperative process for developing a long-term solution to water supply, water quality, and ecosystem problems of the Delta. Hence, the CALFED Bay-Delta Program was created with the goal of developing a long-term Delta solution. It put into place an extensive public outreach and input program as an important element of its planning methods.

In June 2000, the CALFED Bay-Delta Program issued a final programmatic Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS). The associated decision documents, primarily a Record of Decision (ROD), were published in August 2000. The ROD defined the approach and projects to be undertaken by the CALFED Program over a 30-year period.

The first stage of the CALFED Program (2000–2007) focuses on conveying water supply through the Delta. Specific projects and studies will be undertaken during Stage 1 to determine the feasibility of a through-Delta approach. DWR is the lead State agency for the projects and studies contained in the CALFED Conveyance Program and the Levee System Integrity Program. Actions contained in the CALFED Conveyance and Levee programs affect the North, West, and South Delta regions.

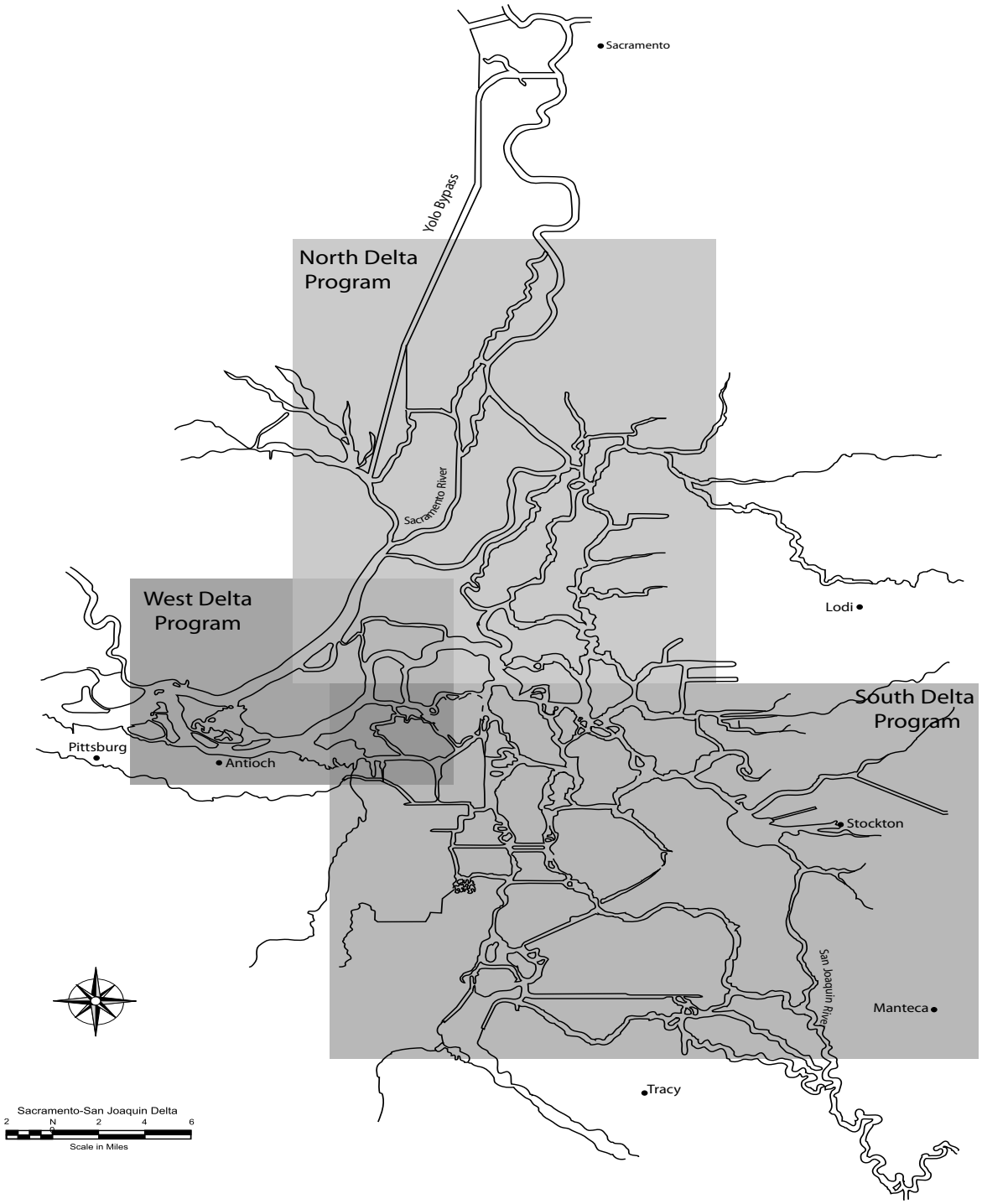

Figure 2-1. The North, West, and South Delta Water Management Programs

South Delta Improvements Program

During the late 1990s, DWR pursued the Interim South Delta Program (ISDP), which accelerated construction of South Delta facilities to improve Delta water conditions. During the same period, the CALFED Bay-Delta Program worked on an independent long-term solution. DWR released a draft EIS/EIR for the ISDP in July 1996; however, a final EIS/EIR was never produced. In 1999, the South Delta facilities became a key component of the CALFED Bay-Delta Program. Subsequently, the program was renamed the South Delta Improvements Program (SDIP). The purpose of SDIP is slightly different than that of the ISDP.

In October 2005, a draft EIS/EIR was released for the SDIP. The decision to proceed with the proposed project addresses a precipitous decline in the populations of pelagic (open water) fish in the Bay-Delta environment. One of the fish species is the delta smelt, an endangered species. Stage 1 addresses the physical and structural component of the program, which is not expected to affect fish populations. Stage 2 is the operational component of the program. This stage will increase water deliveries and delivery reliability by increasing the Clifton Court Forebay diversion limit to 8,500 cfs. Only Stage 1 is being sought at this time, while Stage 2 is being deferred. Stage 1 of the SDIP includes the construction and operation of the following projects:

- three permanent operable gates to improve local water levels and circulation in South Delta channels;
- one permanent operable gate to prevent straying of salmon migrating to the San Joaquin River;
- extensive dredging in the South Delta to improve channel capacity for local agricultural users; and
- modifications to existing agricultural diversion intakes.

Several ways of operating the Clifton Court Forebay diversion at 8,500 cfs are available, but a preferred operation is not identified in the draft EIR/EIS. DWR is committed to issuing a supplemental environmental document on Stage 2, and circulating this document for a minimum of 45 days, prior to making any decisions.

SDIP elements originally placed in the ROD included increasing diversions through Clifton Court Forebay (first to 8,500 cfs and then to 10,300 cfs), dredging and installing operable tidal barriers in the South Delta, installing a fish barrier at Head of Old River, and constructing the first phase of a new intake and fish screen into Clifton Court Forebay. DWR deferred the increase in diversions of up to 10,300 cfs and the associated new fish screens as components of the SDIP due to major funding issues, as well as significant technical uncertainties associated with the design and construction of the new fish screens.

The SDIP continues to implement its original purposes:

- to reduce the movement of Central Valley fall and late fall juvenile Chinook salmon runs into the South Delta via Old River;
- to maintain adequate water levels and water quality, through improved circulation, to provide water for agricultural diversions in the South Delta downstream of the Head of Old River;

- to increase water deliveries and delivery reliability to SWP and CVP water contractors south of the Delta; and
- to provide opportunities to convey water for fish and wildlife by increasing the maximum permitted level of daily diversion through the existing intake gates at Clifton Court Forebay to 8,500 cfs.

Preferred Plan

The preferred plan for SDIP is to construct the physical/structural component as soon as permitting is complete and defer the operational component until more is known about the project's potential effects on the delta smelt.

Temporary Barrier Facilities

Temporary rock barriers are being installed annually, during low flow conditions, until the four permanent gates are operational. These barriers are being installed at four sites, as follows:

1) Head of Old River, in Old River where it splits from the San Joaquin River;
2) Old River near Tracy, one-half mile east of the Tracy Pumping Plant intake, and about eight miles northwest of Tracy;
3) Middle River, just south of the confluence of Middle River, Trapper Slough, and North Canal; and
4) Grant Line Canal, 420 feet east of the Tracy Boulevard Bridge.

The Head of Old River barrier prevents the San Joaquin River flow from entering Old River and flowing toward export facilities. This additional flow in the San Joaquin River helps guide San Joaquin salmon to the ocean in the spring and improves dissolved oxygen levels for upstream salmon migration in the fall. The other barriers have culverts with flap gates that improve water levels and circulation in South Delta channels during the irrigation season.

Since 1963, the Head of Old River barrier has been installed in the fall. Since 1992, this barrier has also been installed intermittently in the spring, although high San Joaquin River flows sometimes prevent installation. The Old River barrier near Tracy has been seasonally installed since 1991; the Middle River barrier has been seasonally installed since 1987; and the Grant Line Canal barrier has been seasonally installed since 1996.

West Delta Program

The objectives of the West Delta Program include the following goals:

- to effectively manage SWP-owned lands on Sherman and Twitchell islands (approximately 12,000 acres total);
- to improve the integrity of local levees;
- to implement land-use management techniques to control subsidence and soil erosion on Sherman and Twitchell islands;
- to implement mitigation requirements associated with the Temporary Barriers Program and proposed SDIP; and
- to provide diverse habitat for wildlife and waterfowl.

DWR contracted with a consultant to develop preliminary wildlife management plans for Sherman and Twitchell islands. These plans are designed to benefit wildlife species that occupy wetland, upland, and riparian habitats; as well as provide

recreational opportunities for hunting and viewing wildlife. Property acquired and habitat developed by DWR could mitigate impacts associated with current and future Delta water management programs, including programs proposed by DWR and the CALFED Bay-Delta Program. (See Chapter 7 for more information.)

DWR is a major landowner on Twitchell and Sherman islands and holds two of the three trustees' positions for Reclamation Districts 1601 (Twitchell Island) and 341 (Sherman Island). Consequently, DWR participates in the management and operation of each district, with the goal of improving conditions and accountability. The reclamation districts provide levee maintenance, island drainage, and some internal water supply. These districts assess the landowners for the operational needs of the public districts.

North Delta Program

The CALFED ROD calls for various modifications. These modifications include changes in the North Delta's conveyance facilities to improve Delta water quality, fisheries, and water supply reliability, as well as other modifications to improve flood protection and ecosystem health.

Mitigations include the following:

1) evaluation and implementation of improved operational procedures for the Delta Cross Channel (DCC) to address fishery and water quality concerns;
2) evaluation of a screened Through-Delta Facility on the Sacramento River of up to 4,000 cfs; and
3) design and construction of floodway improvements to provide conveyance, flood control, and ecosystem health.

The DCC Reoperation Project involves an evaluation of improved operational procedures for the DCC, which maintains high-quality water in the Central Delta, while reducing juvenile fish entrainment. The Through-Delta Facility is a diversion facility with a capacity of up to 4,000 cfs on the Sacramento River. Operation of the Through-Delta Facility is considered only after three separate assessments are satisfactorily completed: first, a thorough assessment of DCC operation strategies and the confirmation of continued concern over water quality impacts from its operations; second, a thorough evaluation of the technical viability of a diversion facility; and third, satisfactory resolution of the fisheries' concerns about a diversion facility.

The Franks Tract Project evaluates the restoration of remnant levees and the construction of tidal gates to inhibit salt trapping and mixing in Franks Tract. This process improves water quality in the Delta. Other benefits of restoring Franks Tract include the restoration of tidal marsh habitat and increased recreational opportunities.

In 2003, DWR became actively involved in the DCC Reoperation Project and Through-Delta Facilities (DCC/TDF) projects. DWR took the lead in managing the on-going DCC/TDF projects, as well as administering and funding all DCC/TDF contracts. DWR also initiated the Franks Tract Project in 2003 as part of the North Delta Convergence improvement project.

The purpose of the Franks Tract Project is to evaluate the feasibility of rehabilitating

Franks Tract's remnant levees for water quality, ecosystem, and recreation improvements. DWR is the implementing agency for the Franks Tract Project, Through-Delta Facility evaluation, and the design and construction of floodway improvements. DWR is a participating agency on the DCC Reoperation Project.

In 2005, projects relating to the DCC Reoperation Project and Through-Delta Facility were limited to completing analyses and writing reports on field work. These activities included reevaluating project funding and schedules. For example, the Flooded Islands Pre-Feasibility Study, initiated in April 2004, to develop and evaluate conceptual alternatives for modifying Franks Tract, Lower Sherman Lake, and Big Break, was completed in June 2005. It provides conceptual modification alternatives on the three flooded islands, with their respective benefits and costs.

The Franks Tract 2005 modifications study showed significant Delta water quality improvements—at a relatively modest cost. This study recommends that operations of the proposed gates are refined for these alternatives to optimize water quality benefits. The report also recommends conducting a pilot project to evaluate, implement, and demonstrate the effectiveness and impacts of the facility before considering a full-scale project. Subsequently, in 2006 and 2007, DWR will continue to refine and evaluate the operation and design of several pilot project alternatives in the Franks Tract area. The scope of the proposed pilot project is currently under development. In mid-2007, an EIR/EIS will be initiated for the pilot project.

North Delta Flood Control and Ecosystem Restoration Improvements, a Stage 1 action under the CALFED Bay-Delta Program, provides flood control and ecosystem restoration in the North Delta area. These improvements support other CALFED goals, which include water supply reliability, recreation, and agricultural land preservation. DWR is the State implementing agency, and many of the proposed CALFED elements for the project are similar to elements of earlier North Delta planning efforts. These earlier projects were suspended in deference to the CALFED program.

DWR is overseeing the preparation of an EIR and has engaged stakeholders and interested agencies in the North Delta planning process, through the North Delta Improvements Group and the Mokelumne-Cosumnes Watershed Alliance. DWR has worked cooperatively with stakeholders to develop and incorporate phases in project alternatives. These plans include implementation flexibility, complete hydraulic modeling analysis of phased alternatives, and significant progress on project impact analysis and cost estimates. DWR staff has also worked with federal regulatory agency scientists and academic experts. They are continuing the academic science panel project review and the provision of science advisement through alternatives refinement and project planning. Project environmental documentation is scheduled for completion in 2006.

Delta Flood Control

Many of the important assets in the Sacramento-San Joaquin Delta are protected from flooding by levees. Without the levees, the Delta as we know

it today would be an inland sea. The levees serve many needs: they protect valuable wildlife habitat, farms, homes, urban areas, recreational developments, highways, railroads, natural gas fields, utility lines, major aqueducts, and other public developments. They are critical to the protection of in-Delta water quality and water quality for approximately 24 million Californians who receive their water from the State's export system. The State Legislature recognized the importance of the Delta and enacted the Delta Flood Protection Act of 1988 (Senate Bill (SB) 34 [Water Code Sections 12310 et seq., and 12980 et seq.]). With SB 34, the Legislature declared that "...the Delta is endowed with many invaluable and unique resources and that these resources are of major statewide significance."

In SB 34, the Legislature declared its intent to appropriate $12 million annually for the Delta Flood Protection Fund. Six million dollars of the appropriation are for local assistance under the Delta Levee Maintenance Subventions Program. The remaining $6 million are for Delta Special Flood Control Projects, including subsidence studies and monitoring on Bethel, Bradford, Jersey, Sherman, and Twitchell islands; Holland, Hotchkiss, and Webb tracts; and the towns of Thornton and Walnut Grove.

Since 1988, the program has managed $202 million in appropriated funds and, combined with local funds, has realized $275 million in levee improvements. In 1996, Assembly Bill (AB) 360 was signed into law and expanded the area covered by the Delta Special Flood Control Projects Program to include the remainder of the legal Delta and the northern Suisun Bay from Van Sickle Island to Montezuma Slough. Bond appropriations of $25 million from Proposition 204 (enacted in 1996) and $30 million from Proposition 13 (enacted in 2000) provide supplemental funding. In November 2002, Proposition 50 was approved. It provides $70 million in additional funding to implement the Delta Flood Protection Program as adopted in CALFED, where the program is known as the Levee System Integrity Program.

CALFED Levee System Integrity Program

The goals and objectives for the Levee System Integrity Program are listed as follows.

Base Level Protection

This program provides funding to help local reclamation districts reconstruct all Delta levees to a base level of protection (Public Law 84-99 standard). About 520 out of 1,100 miles of Delta levees initially do not meet this standard. During Stage 1, about 200 additional miles of levees are planned to be brought up to a base level of protection, provided there is sufficient funding.

Special Improvement Projects

This program will enhance levee stability on levees that have particular importance in the State. Priorities include protecting life and personal property (more than 400,000 people live in Delta towns and cities), water quality (preventing salinity intrusion), the Delta ecosystem, and agricultural production.

Suisun Marsh Flood Protection and Ecosystem Enhancement

This program provides levee integrity, ecosystem restoration, and water quality benefits by supporting maintenance

and improvement of the levee system in the Suisun Marsh. The Suisun Marsh Levee Investigation was undertaken in January 1999, at the request of the CALFED Policy Group, to determine if adding Suisun Marsh levees into the Levee System Integrity Program would contribute to CALFED program goals. The team has identified significant links between Suisun Marsh levee maintenance and achievement of CALFED drinking water quality and ecosystem restoration goals. Furthermore, modeling research indicates a significant risk of negative water quality impacts in the Delta if Suisun Marsh levees are inadequately maintained and allowed to fail. When adopted, the CALFED Suisun Marsh Charter will help guide future actions.

Levee Emergency Response Plan

The emergency response plan for the Delta has been improved recently to better coordinate response agency activities, and the distribution of materials, when combined with local agency efforts. This will enhance the combined ability to respond to levee emergencies.

Delta Levee Maintenance Subventions Program

The Delta Levee Maintenance Subventions Program provides matching funds for levee work critical to the long-term survival of Delta islands and the State water supply. This program assures the continuance of the Delta's ability to provide its many statewide and local benefits. Within CALFED's Levee System Integrity Program, the Delta Levee Maintenance Subventions Program provides funding, as a reimbursement, to local Delta reclamation districts for levee maintenance and improvement. Each year up to 65 participating districts prepare work plans and file applications with the State Reclamation Board (SRB) for funding.

The applications and work plans are reviewed by DWR, which then makes a recommendation and requests the approval of SRB for the program funding level. SRB approves each district's maximum possible reimbursement—up to 75 percent for levee work and habitat mitigation—and maximum advanced reimbursement amount. The reimbursement amount may be up to 75 percent of eligible costs. After SRB approval, agreements are executed between SRB and each participating district. These agreements state that eligible work will be completed during the current fiscal year. All work must be in compliance with appropriate State and federal laws, including the California Environmental Quality Act, the State and federal ESA, Section 1600 of the Fish and Game Code, and Section 404 of the Clean Water Act, and must have confirmation from the Department of Fish and Game (DFG) that a net long-term habitat improvement of riparian, fisheries, and wildlife habitat will result.

Delta Special Flood Control Projects

The Special Flood Control Projects Program under CALFED assists the eight western islands, portions of the Suisun Marsh, the towns of Thornton and Walnut Grove, and other locations in the Delta with flood protection and levee stability repairs. The California Water Commission approved a report of initial actions in September 1989, and it approved the long-term actions and priorities in May 1990. The long-term actions and priorities serve as a guide for DWR to determine how best to use appropriations to protect these

islands. Long-term actions and priorities include the following:

- rehabilitation of threatened levees through the use of imported dredged material;
- verification of elevations in the Delta through the use of Global Positioning System equipment;
- upgrading levees to the standards included in Bulletin 192-82, Delta Levees Investigation; and
- projects to achieve net long-term habitat improvement for fish and wildlife.

While DWR always seeks cost sharing for all projects, the actual reimbursement depends on each reclamation district's ability to pay. DWR provides up to 100 percent of the cost of these activities. Districts receiving these funds are required to participate in a habitat improvement program to ensure net long-term habitat enhancement.

Levee restoration projects in 2005 include the following:

- initiation of two large-scale levee rehabilitation projects on Sherman Island;
- initiation of the phase III levee rehabilitation project on Bethel Island;
- development of a 50-acre mitigation project on Bradford Island;
- completion of large scale rehabilitation projects on Jersey Island;
- continuation of a large scale rehabilitation project on New Hope Tract; and
- initiation of a Delta-wide program to conduct magnetic anomaly surveys of district levees.

Delta Levees Habitat Improvement

The Delta Suisun Marsh Office, as part of the CALFED Levee System Integrity Program, continues to make significant strides in its efforts to create valuable habitat in the Delta. By the end of 2005, the program had developed 247.4 acres of various types of habitat, 9,410 linear feet of shaded riverine aquatic habitat for mitigation, and 14.4 acres and 14,328 linear feet for enhancement. During 2005, the program continued to develop almost 36 acres of habitat for levee project mitigation and 10 acres for enhancement.

Completed mitigation and enhancement projects include the following:

- Medford, Bethel, and Kimball islands;
- Terminous, Wright Elmwood, Palm, and Thornton-New Hope (Grizzly Slough) tracts;
- Twitchell Island setback levee;
- Twitchell Island mitigation areas;
- Staten Island berm and channel islands;
- Canal Ranch attached berm;
- Lower Sacramento River revegetation, Grand Island, in participation with the U.S. Army Corps of Engineers (Corps);
- Webb Tract Sites 3 and 1, and Little Tinsley Island in-channel island protection and restoration;
- Decker Island Phase I and Phase II construction, and tidal wetlands restoration at Horseshoe Bend along the lower Sacramento River;
- Tyler Island bank stabilization demonstration; and

- purchase of 666 acres at Meins Landing in the Suisun Marsh for tidal wetland restoration.

Projects underway include the following:

- fish monitoring of Decker Island restoration site;
- construction of a setback levee on Sherman Island;
- Sherman Island Parcel 11 Revegetation Project;
- Dutch Slough feasibility study concepts; and
- Bradford Island Tract 19 mitigation area development.

Projects proposed include the following:

- Delta levees habitat mitigation; and
- Tidal restoration of Dutch Slough.

DWR, DFG, and reclamation districts are successfully providing avoidance or mitigation of habitat losses and net long-term habitat improvement in the Delta. Reclamation districts have been very cooperative in helping DWR meet its mitigation and enhancement needs. Decker Island Habitat Restoration Area, completed in 2004, is targeted specifically for the needs of endangered Sacramento splittail and delta smelt, providing 26 acres of tidal aquatic area. Continued monitoring is determining the amount of fishery use of the restoration site, evaluating the hydrogeomorphic performance of the site, and providing valuable data for future restoration work.

DWR and DFG will continue to work with the reclamation districts to preserve existing habitat and to improve the quantity and quality of newly developed habitat in the Delta.

Reuse of Dredged Material for Delta Levees

As local sources of fill material for levee repair are depleted, new economical sources must be located. During the last 15 years, DWR, in coordination with the Corps, local reclamation districts, and the Central Valley Regional Water Quality Control Board (CVRWQCB) implemented three pilot projects at Sherman, Twitchell, and Jersey islands to demonstrate the viability of relocating material from the San Francisco Bay Area to the Delta. Extensive monitoring and testing programs for salinity impact were required; no salinity impact was demonstrated. More recently, CVRWQCB has started looking at other constituents of dredged material and is becoming more stringent in its requirements. The addition of new monitoring and preparation requirements has raised the cost of reuse. If these costs continue to rise, DWR will reevaluate the practicality of participating in this portion of the program. Based on the assumption that reuse will remain economically beneficial, DWR has worked to find more opportunities to reuse clean, bay-dredged materials in the Sacramento-San Joaquin Delta. Current efforts for beneficial reuse of dredged material from the Bay area principally consist of the following:

- participation in the multiagency Delta Long Term Management Strategy (LTMS) for the beneficial reuse of dredged material;
- coordination with CVRWQCB to address water quality concerns;
- discussions with the Corps to promote identification and acquisition of federal funds to support beneficial reuse

projects;
- participation in a large regional meeting with various stakeholders in the Delta to address dredging and dredged material reuse issues;
- coordination with the Corps, CVRWQCB, CALFED, and Reclamation District 341 to stockpile dredged material from Suisun Bay and New York Slough on Sherman Island; this long-term project could consist of 200,000 cubic yards of material dredged annually for five years. This project will be initiated by a demonstration project with 150,000 cubic yards coupled with an intense monitoring program;
- levee restoration and habitat projects proposed or under construction;
- obtaining waste discharge requirements for the demonstration project on Sherman Island;
- obtaining 54,000 cubic yards of dredged material on Sherman Island; and
- reusing dredged material on Sherman Island to construct the set-back levee.

Levee Upgrades

Upgrading the Delta levees is an integral part of the CALFED Levee System Integrity Program plan being implemented through the DWR Delta Flood Control Program. According to the CALFED ROD, all Delta levees should be built to the Corps' Delta-specific Public Law 84-99 levee standard. This standard is comparable to DWR's Bulletin 192-82 standard and provides protection against flooding in a 100-year flood event. The minimum freeboard is 1.5 feet for levees protecting agricultural land, and 3 feet for levees protecting urban areas. A typical improved levee section would have a 16-foot crown width, a waterside slope of 2 horizontal to 1 vertical, and a landside slope designed for the depth of peat soils under the levee. Generally, the landside slope would be between 2:1 and 5:1.

DWR and the Corps signed an agreement in 2001 to co-manage the CALFED Levee System Integrity Program, including the Delta Flood Protection Program. This agreement allows close coordination of efforts and assures compatibility with CALFED goals and objectives.

Subsidence Investigations

Historically, draining and cultivating Sacramento-San Joaquin Delta marshlands caused the peat soil to break down and compact. The peat has oxidized and subsided since the mid-1800s, when the land was first drained and levees constructed. The surface of organic soils in the Delta is now between 10 and 29 feet below sea level. The Legislature recognized the problem and, with the initiation of the Delta Flood Protection Act of 1988, DWR began monitoring subsidence and studying its causes and the means for reversing its effects.

DWR and the U.S. Geological Survey conduct an ongoing subsidence investigation in the Delta. Preliminary data indicate the following:

- land management practices substantially influence subsidence rates;
- cultivation practices that raise soil temperature and lower the water table dramatically increase oxidation of the peat soils;
- conversion of highly organic peat soils to carbon dioxide gas (oxidation) appears to be the recent primary cause

of subsidence;
- permanently flooded shallow wetlands decrease release of gaseous carbon by as much as 80 percent, thereby mitigating subsidence; and
- permanently flooded shallow wetlands also promote the growth of wetland vegetation that adds biomass back into the system.

Current studies of subsidence mitigation and growth of wetland vegetation suggest that shallow permanent flooding will be part of the process to reverse subsidence through biomass accretion.

In 1999, CALFED granted Category III funds to DWR to construct a Subsidence Reversal Demonstration Project on Twitchell Island. To date, field monitoring, determination of hydrologic and tidal boundary conditions, and sediment modeling have been completed; construction, monitoring, and instrumentation installation continues at the field test sites. Water quality, soils, and hydraulic and carbon release data were collected from the test sites, and the preliminary model for groundwater has been completed. The contract amendments were completed in 2005, and work on the study was resumed. The study is to be completed by the end of 2006.

DWR will also work with the CALFED Science Program to develop best management practices to control and reverse subsidence and will work with local districts and landowners to implement cost-effective measures.

The U.S. Geological Survey and area consultants have set up a learning laboratory to study ways to reverse subsidence at Oulton Point on Twitchell Island. This project will combine the cultivation of tules and other aquatic vegetation in shallow ponds with application of thin layers of sediment. Land surface accretion and organic soil oxidation rates will be measured.

Delta Agricultural Water Users

In 1974, the Delta Water Agency was replaced by six Delta agricultural water agencies: North Delta, South Delta, and Central Delta water agencies; Contra Costa County Water Agency, East Contra Costa Irrigation District, and Byron-Bethany Irrigation District. In 1981, North Delta Water Agency and East Contra Costa Irrigation District signed water rights management contracts with DWR. The department negotiated contracts and requested negotiations with other agencies to provide water level, circulation, and quality needs in certain areas.

South Delta Water Agency Contract

In September 1990, DWR completed negotiations for a long-term agreement with the South Delta Water Agency and Reclamation. Under this proposal, the South Delta contract, the parties agreed to proceed with the design, construction, and operation of certain barrier facilities in the South Delta channels. These facilities resolved those portions of the lawsuit that South Delta filed in 1982, regarding the alleged effects of export pumping by SWP and CVP on water levels, quality, and circulation in the South Delta.

DWR has installed and operated temporary barrier facilities in the South Delta to improve area conditions, as well as collect data needed to design and operate

permanent barrier facilities. Data collected in the Temporary Barriers Program was used to assess the barriers' ability to reduce or eliminate adverse water levels and improve local hydraulic circulation patterns.

Western Delta Municipal Water Users

DWR signed contracts with Contra Costa Water District in 1967 and Antioch in 1968. These contracts compensated Contra Costa and Antioch for purchasing water of usable quality, when such water was not available from Mallard Slough and the San Joaquin River.

According to the terms of these contracts, DWR compensates each agency for the additional costs of purchasing a substitute water supply from the Contra Costa Canal. This water is purchased to replace water supplies of usable quality, which are lost due to SWP operations. Credits for the number of days of above-average water supplies of usable quality, from Mallard Slough and the San Joaquin River, accrue to offset the number of below-average days in future years.

Chapter 3
Environmental Programs

Pelicans take flight over a waterway in the Sacramento-San Joaquin Estuary.

Significant Events in 2005

In April 2005, the National Marine Fisheries Services (NOAA Fisheries) issued a proposed listing of the southern population of North American green sturgeon (*Acipenser medirostris*) as threatened under the Endangered Species Act (ESA). This listing was based on a March 2004 U.S. District Court decision. The court remanded a NOAA Fisheries finding that the North American green sturgeon does not warrant listing as a threatened or endangered species.

On September 2, 2005, NOAA Fisheries issued a final rule designating Critical Habitat for California salmonids. Approximately 8,935 miles of riverine habitat and 470 square miles of estuarine habitat were designated as Critical Habitat Area for seven Evolutionarily Significant Units (ESUs) of Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) in California. This rule will become effective on January 2, 2006.

On October 20, 2005, the Resources Agency released the Delta Smelt Action Plan, a researched-based, scientific approach to counteract the decline of pelagic fish in the Delta. During 2004, Interagency Ecological Program (IEP) scientists detected sharp population declines in pelagic fish species, including delta smelt, which are considered a key indicator of the health of the Delta ecosystem. The State will research potential causes of this decline, including pollutants, contaminants, invasive species, food chain disruptions, and water operations of State and federal projects. The Bureau of Reclamation (Reclamation) and the Department of Water Resources (DWR) increased the IEP 2005 budget by $1.7 million to support research to identify causes for the decline of pelagic fish in the Delta.

In April 2005, the Lower Yuba River Accord was announced. This collaborative proposal settled long-standing litigation over instream flow requirements in the lower Yuba River. The accord is based on three proposed agreements: a water purchase agreement, including water for the Environmental Water Account (EWA); a conjunctive use agreement; and a fisheries agreement. The fisheries agreement is intended to benefit some of the last wild populations of salmon and steelhead in the Central Valley by establishing instream flow requirements. On November 29, 2005, DWR and the Department of Fish and Game (DFG) announced their support for the proposed Lower Yuba River Accord pilot program. The Lower Yuba River Accord will formally take effect in late 2006.

On December 23, 2005, NOAA Fisheries published a final listing that recognized 10 Distinct Population Segments (DPSs) of West Coast Steelhead as either threatened or endangered under ESA. This listing confirmed the threatened status of all California steelhead DPSs.

Information in this chapter was contributed by the State Water Project Analysis Office, the Division of Environmental Services, and the Division of Operations and Maintenance.

The Department of Water Resources (DWR) has developed and implemented several programs to avoid, minimize, or offset adverse environmental impacts, which may result from the operation of State Water Project (SWP) facilities.

Operations for Species of Concern

A primary consideration in the operation of the SWP is avoiding, minimizing, and off-setting adverse environmental impacts to species of concern. A species of concern is listed (or proposed for listing) as threatened or endangered by a State or federal agency. The legal authority for listing is the federal Endangered Species Act (ESA) or the California ESA. A key to avoiding and minimizing adverse impacts to these species is maintaining flexibility in SWP operations, which is done mainly through the Environmental Water Account (EWA). EWA provides protection to Delta fisheries through changes in SWP and CVP operations, while maintaining water supply reliability to the projects' water users. Operational responses can include Delta Cross Channel gate closure, export curtailments, changes in delivery schedules, increased reservoir releases, preferential use of certain facilities, or a combination of these actions. (Additional information about EWA can be found in Chapters 7 and 9.)

San Joaquin River Activities

DWR coordinated with the Bureau of Reclamation (Reclamation) to increase flows in the San Joaquin River, from mid-April through mid-May (pulse flow period), to benefit fall-run Chinook salmon emigrating from the San Joaquin River Basin. This plan, known as the Vernalis Adaptive Management Plan (VAMP), is a 12-year federal and State research program, which is associated with the San Joaquin River Agreement. VAMP calls for intensive fisheries sampling in the lower San Joaquin River. Several studies were coordinated with the fisheries collection efforts to estimate the relative survival of marked salmon moving through the Delta under VAMP during the pulse flow period. The goal is to conduct operational changes and associated studies over a number of years (to determine if a relationship exists between river flow, Delta exports, and salmon survival) throughout the southern Delta. The resulting information will be used to determine if changing San Joaquin River flows and Delta exports in the spring can significantly benefit San Joaquin River fall-run Chinook salmon.

Temporary Barriers

VAMP-participating agencies use temporary barriers as a tool to facilitate the following goals:

- provide an adequate water supply for South Delta water diverters;
- improve water quality conditions in the Stockton Deep Water Channel; and
- prevent young Chinook salmon from entering Old River, thereby reducing the likelihood of entrainment at the South Delta facilities.

In 2005, the Spring Head of Old River barrier was not installed, due to high flows on the San Joaquin River. This spring season barrier will help improve conditions for juvenile Chinook salmon,

which migrate out of the San Joaquin River Basin. The barrier was installed in the fall, between September 30 and November 15. The purpose of this barrier is to help with low dissolved oxygen levels in the lower San Joaquin River and prevent migrating adult Chinook salmon from entering the area.

Temporary barriers were installed on Middle River and Old River near Tracy, on May 17 and June 6, respectively, and the Grant Line Canal barrier was completed on June 18. The primary purpose of these barriers is to increase water levels in the South Delta for local water users. The barriers were removed in mid- to late-November, due to the lack of need for irrigation water and possible conflicts with winter-run salmon.

Piru Creek/Pyramid Dam Operations

The original Federal Energy Regulatory Commission (FERC) License for the Castaic Power plant project, FERC Project No. 2426, contained a provision that specified continuous minimum releases from Pyramid Lake to Piru Creek (5 cfs from November 1 thorough March 31 and 10 cfs for the remainder of the year) for the maintenance of a trout fishery, located in middle Piru Creek. This requirement was amended in 1982 to require a continuous minimum flow (5 cfs from November 16 through April 30 and 10 cfs for the remainder of the year). Additional releases were stipulated, based on the daily ambient air temperature, to maintain water temperatures suitable for the trout fishery.

The daily flow fluctuations were found to be detrimental to the Arroyo toad, which is known to breed along middle Piru Creek. In 1994, the Arroyo toad was listed as a federally endangered species. Since 1995, at the request of the California Department of Fish and Game (DFG), the summer releases to Piru Creek were maintained at 25 cfs (April 1 through August 31). This release schedule provided water temperatures protective of the trout fishery and eliminated the flow fluctuations thought to be detrimental to the Arroyo toad.

Concerns were raised regarding the impact of the flow release schedule on the Arroyo toad population at a series of interagency meetings held in 2003 with representative from the U.S. Fish and Wildlife Service (USFWS), DWR, DFG, and other organizations. It was concluded that the higher summer maintenance flows were contributing to conditions in middle Piru Creek that were detrimental to the Arroyo toad and had resulted in incidental take. New operational criteria were developed to simulate the natural hydrology of middle Piru Creek, to the extent operationally feasible, to provide the greatest benefit to the Arroyo toad. DWR agreed to alter Pyramid operations to avoid further incidental take.

New operational guidelines for Pyramid Dam releases to Piru Creek were adopted in 2005. These guidelines were released after the certification of the Final EIR in February 2005 and FERC approval of a temporary waiver of the minimum flow requirements (Article 52 of the license for project 2426) in April 2005. Under the new criteria, releases to Piru Creek from Pyramid Dam will match natural surface inflow into Pyramid Lake to the extent operationally feasible.

DWR holds a water rights permit authorizing the appropriation of water from Piru Creek, at Pyramid Lake, when flows are greater than the demands of the downstream water users. DWR has appropriated water from Piru Creek in only seven years since 1978.

The operational revisions will limit future SWP appropriations from Piru Creek to those flows in excess of the safe release from Pyramid Dam. The new guidelines, consistent with the Final EIR, also allow for the delivery of up to 3,150 af of SWP water, via Piru Creek, to Ventura County Watershed Protection District, under the provisions of the long-term water supply contract for United Water Conservation District. The SWP water deliveries will occur only between November 1 and the end of February each year.

Biological Opinions Issued on the Revised CVP/SWP Operating Plan

USFWS Biological Opinion

On August 6, 2004, USFWS issued a non-jeopardy biological opinion on impacts to threatened delta smelt by proposed revised operations of CVP and SWP. The USFWS concluded that any adverse effects from the Operating Criteria and Plan (OCAP) for the two jointly operated projects will be avoided or minimized by conservation measures and the adaptive management measures which were newly incorporated into the project plan. This Biological Opinion was renewed in 2005.

OCAP addressed the operational impacts on delta smelt by committing the two projects to take early protective actions for the species. These actions will occur before high numbers of the fish reach the major export pumps, where losses often occur. OCAP incorporated the EWA into the delta smelt protective actions.

The biological opinion also set new incidental take limits for delta smelt. The new USFWS take limits are based on the most recent 11 years of data (1993–2003), using more recent information. The new take limits are based on two categories of water year type: (1) wet or above normal, and (2) below normal, dry, or critical. The Delta Smelt Risk Assessment Matrix (DSRAM) adult concern level is set at 892, and the reconsultation level varies by month, ranging from 100 to 44,800. When the incidental take is exceeded, a team of interagency scientists, called the Delta Smelt Working Group, will convene a meeting to review smelt distribution, abundance, projected project operations, and other information. This work group will recommend any actions that should be taken to reduce salvage. The adaptive management measures in OCAP are intended to provide better protection for the species.

NOAA Fisheries Biological Opinion

In its supplemental biological opinion, issued February 27, 2004, NOAA Fisheries concluded that the continuation of OCAP, through March 2006, is not likely to jeopardize the continued existence of spring-run Chinook salmon or steelhead in the Central Valley. This opinion was issued to provide an ESA take exemption for project operations, while work continued on the long-term consultation project. Notwithstanding this conclusion,

an incidental take statement and several reasonable and prudent measures were issued to minimize take.

Reasonable and prudent measures to protect spring-run Chinook salmon and steelhead in the Central Valley include the following:

- continuing research on the effects of flow and water temperature;
- operating to meet temperature objectives;
- minimizing adverse effects of Delta Cross Channel operations;
- minimizing Delta exports during fisheries' sensitive times;
- conducting research to improve facility operations at fish salvage collection facilities;
- conducting weekly scientific reviews of current data; and
- minimizing take from unscreened diversions that are part of interim water contract renewals.

Delta Export Curtailment

SWP and CVP operated under a new Delta Smelt Biological Opinion in 2005, which was signed in August 2004.

On January 24, 2005, the incidental take of pre-spawning adult delta smelt at SWP and CVP exceeded the concern level of 892. The Delta Smelt Working Group met to discuss possible actions. As a result, combined exports were reduced to 3,000 cfs for seven days.

In 2005, 2,922 delta smelt were salvaged by SWP and 818 were salvaged by CVP. This compares to 20,470 delta smelt salvaged at both facilities in 2004.

Decisions on Endangered Species

North American Green Sturgeon

In 2001, NOAA Fisheries received a petition from the Environmental Protection Information Center, the Center for Biological Diversity, and Waterkeepers Northern California that requested a listing of the North American green sturgeon (*Acipenser medirostris*) as either a threatened or an endangered species under ESA. The petition also noted a request for the designation of critical habitat for the species, concurrently with any listing determination.

In January 2003, NOAA Fisheries issued a 12-month determination that listing of the species was not warranted. However, on April 7, 2003, the plaintiffs challenged the NOAA Fisheries determination. The initial finding was set aside by the U.S. District Court, and the matter was remanded to NOAA Fisheries in March 2004. The court was not satisfied with the NOAA Fisheries examination of whether purported lost spawning habitat constituted a significant portion of either Distinct Population Segment's (DPS's) range.

On April 5, 2005, NOAA Fisheries filed a proposed rule with the Federal Register to list the southern DPS of North American green sturgeon, the population occurring south of the Eel River, as threatened under the ESA. The biological review team used previous studies of salmon in the Central Valley to examine the likelihood that spawning habitat has been lost within the range of the southern green sturgeon DPS. It was determined that dams built on the upper Sacramento and Feather rivers likely block migration of green sturgeon,

Endangered Species Acts

In planning, constructing, and operating the SWP, DWR must consider the effects its actions will have on organisms, including plants, birds, reptiles, fish, and mammals, listed as threatened or endangered according to the Federal Endangered Species Act (Title 16, United States Code sections 1531–1544 [1973]) and the California Endangered Species Act (California Fish and Game Code sections 2050–2098 [1984]).

An endangered species is one in danger of extinction in all or a significant portion of its range; a threatened species is one likely to become endangered. These acts are designed to protect threatened and endangered species by

- ensuring federal and State agencies adopt measures to protect the species during the design, construction, and operation of projects and in taking other forms of agency action; and
- prohibiting the unauthorized take of endangered species.

One important aspect of the acts is preserving habitat critical to the survival of the species.

significantly reducing the historical habitat of the southern DPS.

Trends in Fish Abundance

Figure 3-1 shows the abundance index for delta smelt, from 1967 through 2005, based on fall midwater trawl sampling. Using the first two tow net surveys only, delta smelt abundance indices are calculated as the product of the total catch at each site and a weighting factor that represents the estimated water volume for the site, divided by 1,000. The fall abundance index provides one of the best indicators of the status of the adult delta smelt population. The 2005 index was the lowest index on record. Since 2002, abundance indices for this species have been lower than expected, given moderate flow conditions of the past several years. The Delta Smelt Action Plan was implemented in October 2005 to help understand and counteract the causes of the decline of delta smelt.

Figure 3-2 shows estimates of returning adult winter-run Chinook salmon, from 1967–2005. These estimates are referred to as escapement estimates—the number of adults that escape mortality and return to spawn. The Sacramento River winter-run Chinook salmon escapement estimates are generated using data from the DFG carcass survey. DFG has been using the carcass survey data to generate escapement estimates since 2002. Prior to 2002, Red Bluff Diversion Dam counts were used to generate the escapement estimate. Winter-run escapement has continued to increase since 2002. The estimated winter-run Chinook escapement for 2005 was 15,839, which was substantially more than the estimated 7,464 adults in the parent stock of 2002, and the highest escapement since 1981. Factors such as improved spawning

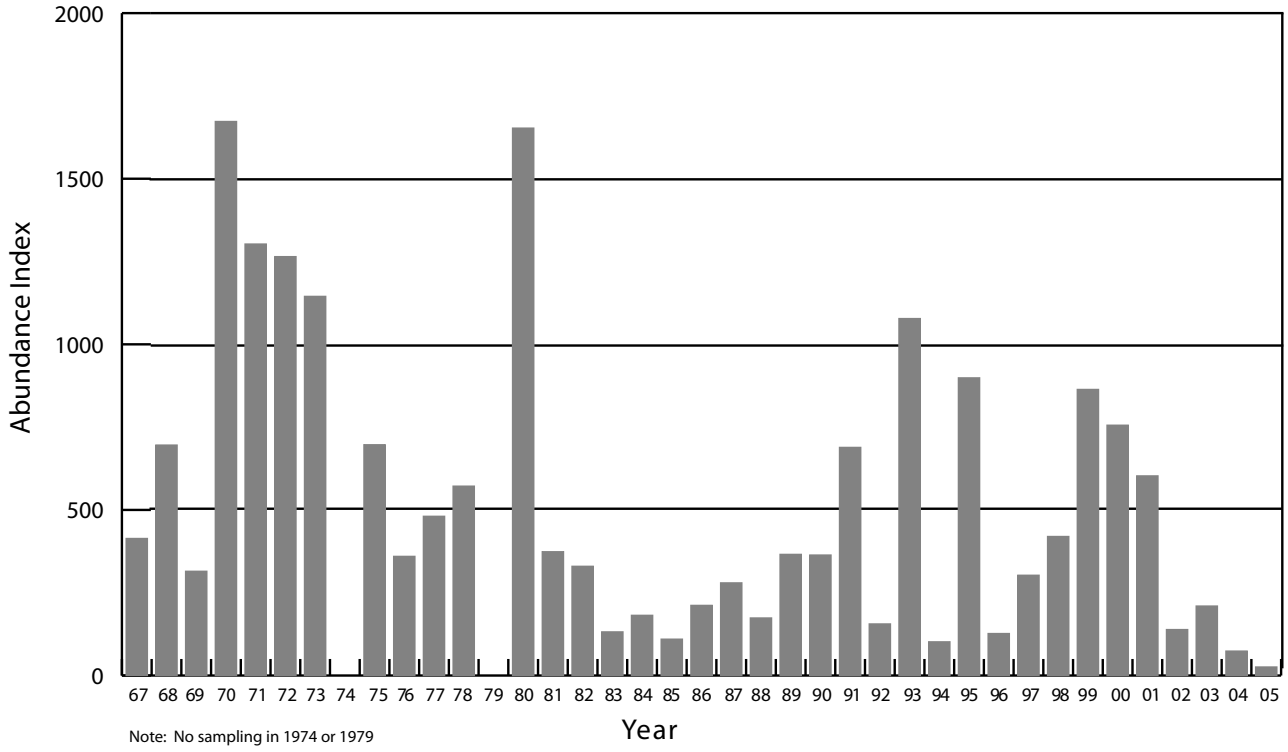

Figure 3-1. Delta Smelt Fall Midwater Trawl Abundance Index, 1967-2005

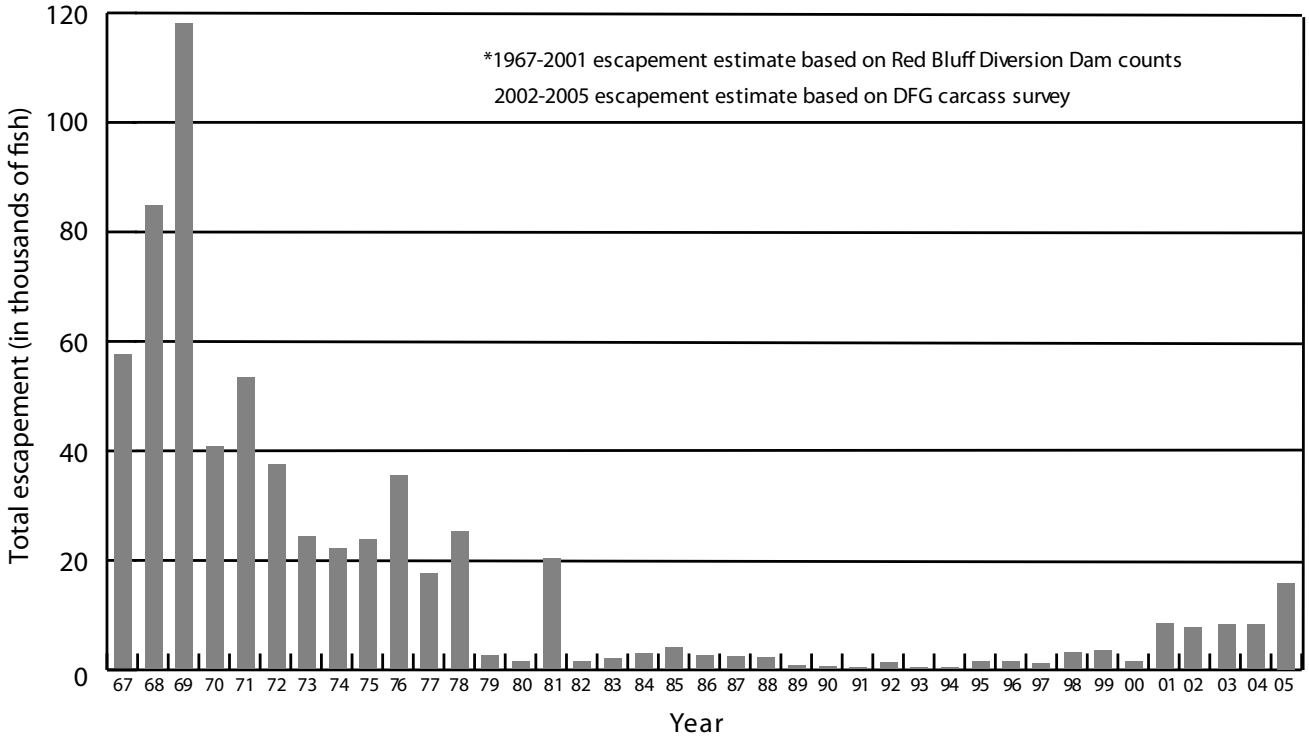

Figure 3-2. Estimated Total Adult Winter-Run Chinook Salmon Escapement, 1967-2005

and rearing habitat, reduced losses in the Delta, reduced commercial fishing losses, and changing ocean conditions are likely to benefit winter-run Chinook salmon.

Figure 3-3 shows estimates of returning adult spring-run Chinook salmon, from 1990–2005. Individual estimates are shown for Mill Creek, Deer Creek, Butte Creek, and the Feather River—the principal spawning streams for this race of salmon. The escapement estimates are shown separately for each stream, because the Feather River estimate is based on returns to the Feather River Hatchery, where the genetic integrity of spring-run Chinook salmon is uncertain. The estimated escapement for 2005 was 1,820 for the Feather River Hatchery and about 14,000 for the other streams combined.

Spring-run escapement in 2005 increased about 24 percent, as compared to 2004 statistics.

Counting methods for returning adult spring-run Chinook salmon from the Feather River Hatchery changed in 2004. From May 17 through June 30, 2005, the fish ladder was opened, allowing adult spring-run Chinook salmon to enter the Feather River Fish Hatchery. During this time period, 5,950 fish entered the hatchery. In an effort to better estimate spring-run Chinook salmon abundance, and to distinguish fall- from spring-run, the fish were tagged with an external "floy" tag and released back into the Feather River. When spawning commenced in the fall, a total of 2,991 spring-run fish were recaptured: 1,835 at the hatchery, 1,049 in

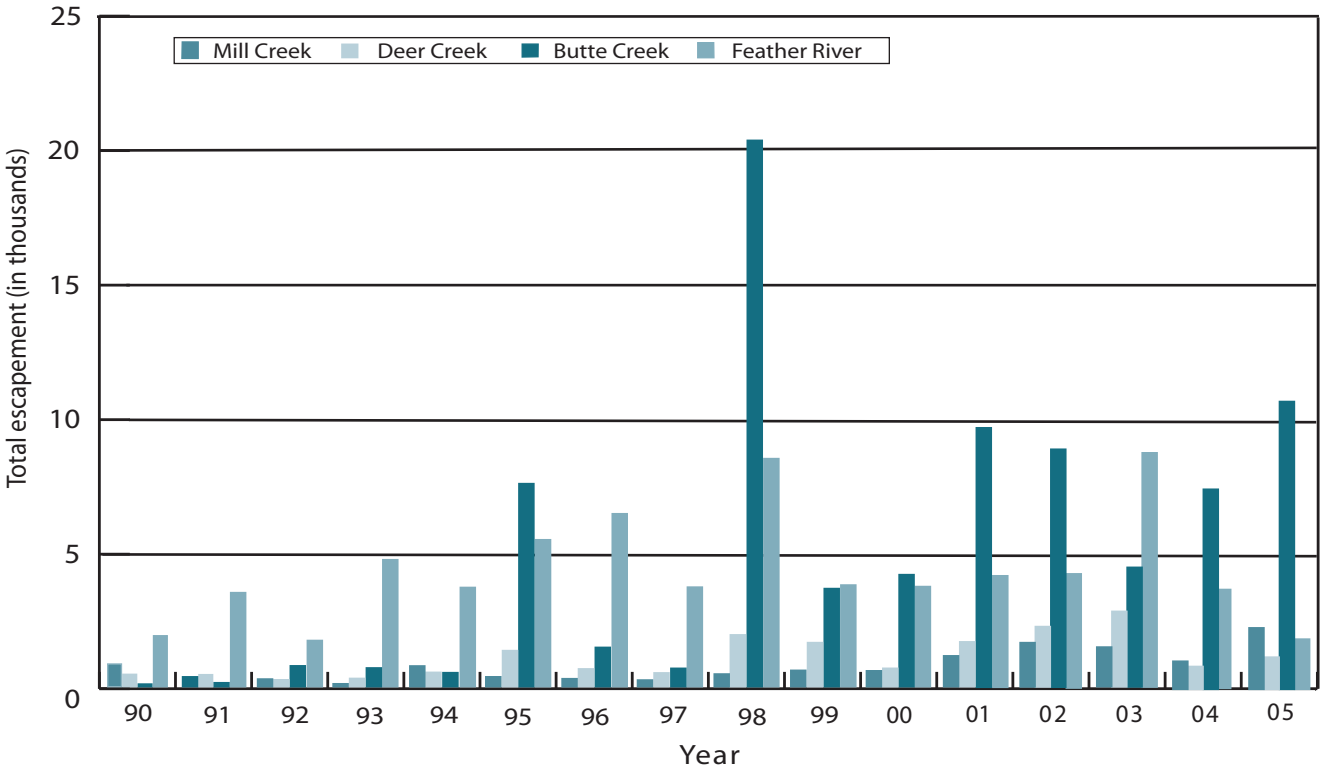

Figure 3-3. Estimated Spring-Run Chinook Salmon Escapement, 1990-2005

the river escapement survey, and 107 by anglers.

The Feather River Hatchery successfully spawned 1,830 (99.7 percent) of the fish returning to the hatchery. Four hundred twenty-three (89 percent) of the 474 female salmon recovered in the river escapement survey were classified as spent (and are thus assumed to have spawned successfully). Based on the escapement survey recapture data, the sex ratio of the marked spring-run was 2.24:1—females to males. While these methods do not yet provide a complete population estimate for Feather River spring-run Chinook salmon, future refinements may make such an estimate possible.

The return numbers for spring-run Chinook salmon remain consistently higher than the early 1990s statistics. Like winter-run Chinook salmon, factors such as improved spawning and rearing habitat, reduced losses in the Delta, and reduced commercial fishing losses likely benefited spring-run Chinook salmon.

Due to lack of comprehensive monitoring programs and the difficulty in conducting that monitoring, there are no reliable escapement estimates for wild Central Valley steelhead.

Feather River Fish Studies

In the early 1990s, the Feather River fish studies were initiated to document and monitor fish populations in the lower Feather River. Early efforts focused on studies to identify flow requirements for Chinook salmon and steelhead. This program has progressively expanded since the mid-1990s in preparation for the FERC relicensing of the SWP Oroville-Thermalito Complex. Field program elements include the operation of rotary screw traps, snorkeling, salmon spawning surveys, radiotelemetry, and spring-run Chinook tagging.

Rotary screw traps capture juvenile salmon and steelhead as they emigrate from the Feather River. Data collected from the traps are used to monitor the timing and abundance of salmonid emigrants. This long-term monitoring effort yields valuable baseline information about juvenile salmon production in the Feather River and the effects of project operations on abundance and migration timing. Snorkel surveys monitor juvenile and adult steelhead abundance, distribution, and habitat use in the Feather River. This information is used to identify major habitats used by steelhead and evaluate the impacts of project operations on the natural production of steelhead. Steelhead redd surveys are conducted to determine the distribution and physical characteristics of natural steelhead spawning sites in the Feather River. Salmon spawning surveys estimate the number and distribution of adult Chinook salmon that returned to spawn in the river. Radiotelemetry gathers baseline information on the migration and holding patterns of adult Chinook salmon in river.

Data from the Feather River sampling programs revealed several significant trends. For example, steelhead redd surveys show that in-river spawning continues at low levels. Juvenile steelhead first appear in March and are most abundant in well-vegetated side channels of the low-flow channel. Water temperatures do not appear to limit the abundance of juvenile steelhead within the low-flow channel. Rotary screw traps

show that the peak of salmon emigration occurs in February or March, indicating that flows do not cue or influence the timing of salmon emigration. Salmon spawning surveys demonstrated that two-thirds of all spawning occurs within the low-flow channel. In fall 2005, more than 43,738 adults and 4,838 grilse spawned in the Feather River, from the Fish Barrier Dam downstream to Gridley. These estimates include both fall- and spring-run Chinook salmon, since their spawning is currently not fully segregated on the Feather River.

Twenty-six adult salmon were captured and radio tagged in 2005 to assess patterns of holding habitat use for adult Chinook salmon which up-migrate in the spring. A combination of manual tracking and fixed station data logging was used to assess the location of adult Chinook salmon. The Chinook salmon were detected anywhere from 81 to 153 days after being tagged. The total observed distance traveled by tagged Chinook salmon ranged from 0.3 to 25.1 river miles. The largest surveyed net movement was 11.2 river miles, which was navigated downstream. Of the 25 fish successfully tracked, only three fish were detected at the Thermalito Outlet. These fish spent a total of one to six days at the outlet throughout the entire survey season. Twenty-three of the 25 fish were last detected or recovered in the low-flow channel above the Thermalito Outlet, while the remaining two fish were detected downstream of the outlet.

Pelagic Organism Decline in the Upper San Francisco Estuary

Abundance indices calculated by the Interagency Ecological Program (IEP) suggest recent marked declines in numerous pelagic fishes in the upper San Francisco Estuary. The major resident pelagic fishes sampled in the upper estuary include delta smelt, longfin smelt, striped bass, and threadfin shad. Historically, low populations of these fishes have been the result of dry years, such as the drought in 1987–1992. Abundance indices for 2002–2005 indicate record and near-record lows for these populations, which are unexpected given the moderate winter-spring flows of the past several years. In response to the Pelagic Organism Decline (POD), the IEP formed a work team to evaluate the potential causes. An interdisciplinary, multiagency research effort was undertaken in 2005 to identify the most likely causes of the POD. The overall approach was based on a "triage" model to identify the most likely causes and assign priorities to projects on the basis of where funds and resources can best be used. The 2005 work fell into four general types: an expansion of existing monitoring; analysis of existing data; new studies; and ongoing studies. A conceptual model was developed to describe possible mechanisms by which a combination of long-term and recent changes in the ecosystem could produce the observed declines in the abundance indices.

Possible stressors influencing the POD studied in this initial effort were: entrainment, toxic effects on fish, toxic effects on fish food, harmful algal blooms, clam *Corbula* effects on food availability, disease, and parasites. Narrative explanations in the context of long-term trends have been developed for four major components: (1) prior fish abundance—which describes how the continued low abundance of adults leads to reduced juvenile production; (2) habitat—which describes how water quality variables,

including contaminants and toxic algal blooms, affect estuarine species; (3) top-down effects—which posit that predation and water project entrainment affect mortality rates; and (4) bottom-up effects—which focus on how food web interactions in Suisun Bay and the West Delta have affected fish abundance. Based on the product of the 2005 effort, a suite of 47 proposals were developed, and several studies begun, for 2006–2007 to cover each component of the conceptual model.

Fish-Related Mitigation Projects

In 1986, DWR and DFG signed the Four Pumps Agreement to annually provide funds to replace fish lost at Banks Pumping Plant. This agreement provided a $15 million lump sum for additional projects to compensate for losses prior to 1986. The agreement focuses on Chinook salmon, striped bass, and steelhead, and considers other fish.

Since 1986, DWR has spent $42 million on mitigation projects, which were developed under the Four Pumps Agreement. These projects include the following:

- improving salmon spawning and rearing habitat and migration pathways in the San Joaquin Basin;
- planting hatchery-reared and net-pen-reared striped bass;
- expanding the Merced River Fish Facility to increase salmon production and cost-sharing in annual operating costs;
- implementing a conjunctive-use project to improve salmon migration flows in Mill and Deer creeks in Tehama County;
- constructing fish ladders and screens on Butte Creek;
- constructing fish screens in Suisun Marsh and in the San Joaquin Basin;
- operating an acclimation pen to improve the survival of hatchery-reared salmon during their release into San Pablo Bay; and
- enhancing the enforcement of fish and game laws in the Delta and upstream to benefit salmon, steelhead, and striped bass, as well as increasing protection for spring-run Chinook salmon.

In 1996, DWR and DFG amended the agreement to include the following:

- allow another five years to spend the remaining $9 million of the $15 million lump sum provided in the agreement, because of difficulties in developing mitigation projects; and
- specify the likely allocation of the remaining funds.

DWR could not spend the full $15 million lump sum in the 10 years required by the original agreement. The remaining funds were tentatively allocated to provide the following:

- $2 million for screening diversions in Suisun Marsh;
- $1 million for predator-isolation projects on San Joaquin River tributaries;
- $2 million for a conjunctive-use project to improve spring-run salmon migration in Deer Creek in Tehama County; and
- $4 million for a salmon conservation hatchery on the Tuolumne River.

In December 2001, the five-year extension expired with only $4 million of the remaining $9 million spent, due to difficulties in implementing several of the mitigation projects. Approximately $1.4 million remained of the allocations under Amendment 1, and $3.6 million became available for other projects when DFG halted planning for a conservation salmon hatchery in the San Joaquin Basin. DWR and DFG amended the agreement again, to provide three more years to spend the remaining $5 million of the $15 million lump sum, and to specify the likely allocation of the remaining unallocated funds.

The $3.6 million in available remaining funds were tentatively allocated to provide the following:

- $950,000 for a revised conjunctive-use project to improve spring-run salmon migration in Deer Creek in Tehama County;
- $300,000 for screening diversions on the San Joaquin River tributaries;
- $500,000 for salmon spawning habitat and floodplain restoration on the Stanislaus River;
- $700,000 for two salmon spawning habitat and channel restoration projects on the Tuolumne River;
- $1.1 million for salmon habitat and river restoration on the Merced River; and
- $68,000 for salmon spawning gravel replenishment at wing deflector sites on the Merced River.

In December 2004, about $3.6 million of the funds allocated in the previous two extensions were still unexpended, and the agreement was amended with a three-year extension, through December 2007. Much of this funding is currently encumbered in contracts.

Other mitigation projects approved in 2005, for implementation from the agreement's annual mitigation funds and the $15 million lump sum, included the following:

- $228,000 for the operations and maintenance of 14 fish screens in Suisun Marsh, to be completed by the Suisun Resource Conservation District (SRCD) over the next 12 years;
- $313,000 for the Expansion of the Robinson Reach Conservation Easement, Merced River Salmon Habitat Enhancement Project, to cost share with the Wildlife Conservation Board to complete funding for the $1.3 million estimated total easement cost; and
- $160,480 to complete design scenarios for the Upper Western Stones Reach, Merced River Salmon Habitat Enhancement Project.

Chapter 4
Water Quality Programs

Suisun Marsh salinity control gates help control the water quality of the marsh.

Significant Events in 2005

On March 23, 2005, a landslide occurred in Posey Canyon near Pyramid Lake that broke a 14-inch crude oil pipeline spilling about 120,000 gallons of oil. Within hours, crews from the Department of Water Resources (DWR) and Los Angeles County's Fire and Sheriff's departments built earthen dikes in the canyon to contain the oil. DWR staff deployed oil booms to contain the oil which had entered the small cove that receives runoff from Posey Canyon.

The bulk of the oil was contained within the canyon, and a light wind helped ensure that the oil that did make it into the lake remained isolated in the narrow cove. Water deliveries from Pyramid Lake were cancelled immediately after the spill and during the cleanup. Water quality monitoring began the morning after the spill and continued until it was determined that the water was safe to move.

On May 5, 2005, the State Water Resources Control Board (SWRCB) issued a draft cease and desist order to DWR and the Bureau of Reclamation (Reclamation) regarding alleged threatened noncompliance of their licenses and permits that pertain to the operation of the State Water Project (SWP) and the Central Valley Project (CVP). If the SWRCB adopts the draft order, it will find that DWR and Reclamation are threatening to violate the conditions of their licenses and permits, which require that they meet the 0.7 millimhos per centimeter electrical conductivity (EC) objective at three of the southern Delta compliance locations between April 1 and August 31. The SWRCB conducted a public hearing on October 24, 2005, to receive evidence relevant to determining whether to adopt the draft cease and desist order, but SWRCB did not adopt the draft order in 2005. The 0.7 millimhos objective was not exceeded in 2005.

Information in this chapter was contributed by the Division of Environmental Services and the Division of Operations and Maintenance.

The State Water Project (SWP) provides many Californians with part or all of their daily residential water needs. This includes water for agriculture, industry, power generation, recreation, and fish and wildlife. The water provided by the SWP is monitored by the Department of Water Resources (DWR) for quality throughout the system. This assurance of quality is made possible by the use of an automated network of continually operating recorders and laboratory analyses of field samples collected weekly, monthly, quarterly, and annually.

Delta Activities

The State Water Resources Control Board (SWRCB) sets water quality objectives for beneficial water uses in California, and the Department of Health Services (DHS) establishes maximum contaminant levels for treated drinking water. Additional water quality objectives are set at points of delivery by Article 19 of the long-term SWP water supply contracts. Water quality in the Delta and Suisun Marsh is protected under SWRCB's Decision 1641 (D-1641), adopted in December 1999 (see sidebar). SWRCB's issuance of D-1641 is part of its implementation of the 1995 Bay-Delta Water Quality Control Plan and, accordingly, this decision amends certain water rights of the water rights holders to help achieve the plan's objectives.

Water Supply Conditions

Water Year Classifications and Water Supply Indexes

DWR conducts extensive monitoring to protect beneficial uses of water in the Delta and Suisun Marsh, as required by D-1641. Figure 4-1 shows water quality compliance stations throughout the Sacramento-San Joaquin Delta required by D-1641.

SWRCB's D-1641 contains water quality and flow standards that are conditioned by water year type, which generally become less stringent in years with less precipitation. The water year classification system provides relative estimates of a basin's available water supply based on the amounts of rainfall, snowmelt runoff, and groundwater accretion rates. Water year types are classified as "wet," "above normal," "below normal," "dry," or "critical."

Water year 2005 was classified as above normal for California under criteria set forth by SWRCB in D-1641. (For a detailed discussion of water year 2005, see Chapter 8.)

D-1641 applies the Sacramento Valley 40-30-30 Index, a water supply forecasting tool which largely replaced the Sacramento River Index. SWRCB first introduced the Sacramento Valley 40-30-30 Index in its 1991 *Bay-Delta Water Quality Control Plan for Salinity*.

The Sacramento Valley unimpaired runoff is a sum of the major flows into the Sacramento Basin. The factors used in the Sacramento Valley 40-30-30 Index are: (1) the current year's April-through-July Sacramento Valley unimpaired runoff

State Water Resources Control Board

The State Water Resources Control Board (SWRCB), established by the California Legislature in 1967, oversees water rights and water quality for California. Among its many responsibilities, SWRCB issues permits for the use of all water except groundwater and riparian water; distributes State and federal loans and grants for constructing sewage facilities; adopts water quality control plans, regulations, and policies; and sets water quality standards for the Delta.

In 1978, to implement its mandate to set Delta water quality standards, SWRCB issued Water Right Decision 1485 (D-1485): Sacramento-San Joaquin Delta and Suisun Marsh. That decision focused on SWP and CVP water right permits and operations, requiring SWP and CVP to maintain Delta water quality as it would have existed without the projects. However, after D-1485 was adopted, various water users and the federal government challenged it in court. Since then, SWRCB updated its Water Quality Control Plan (WQCP), adopted on May 22, 1995. Water Right Order 95-06 amended D-1485 to be consistent with the plan on June 8, 1995. WR 95-06 modified the standards for Suisun Marsh and allowed the SWP and CVP to use either project's Delta pumping plant to pump project water to increase fish protection and maintain project delivery capability. Water Right Order 98-09, adopted by SWRCB on December 3, 1998, extended the terms and conditions of WR 95-06 to allow time for the issuance of a comprehensive Water Right Decision.

On December 29, 1999, SWRCB issued Decision 1641 (D-1641), replacing D-1485, and conditioning the water right permits of the SWP and CVP to implement the objectives of the Bay-Delta Water Quality Control Plan. D-1641 covers Phases 1-7 of the Bay-Delta Water Rights Hearings. On March 15, 2000, SWRCB adopted Water Right Order 2000-02, which denies the petitions for reconsideration of D-1641, clarifies findings, and amends several conditions of D-1641. On April 26, 2001, SWRCB adopted Water Right Order 2001-05, which facilitates negotiations to settle the potential responsibilities for implementing the WQCP. This order stayed Phase 8 for 18 months, and automatically dismisses it at the end of that period, unless SWRCB receives notice requesting its resumption. SWRCB dismissed Phase 8 on January 31, 2003.

(40 percent); (2) current October-through-March Sacramento Valley unimpaired runoff (30 percent); and (3) the previous year's 40-30-30 Index (30 percent, with a cap of 10 maf).

D-1641 also includes another water supply forecasting tool, the San Joaquin Valley 60-20-20 Index, which uses methods similar to the Sacramento Valley 40-30-30 Index.

The Eight River Index is a sum of the runoff from the eight major rivers of the Sacramento and San Joaquin valleys. This index determines the duration of the fish and wildlife salinity and flow standards at Chipps Island or Port Chicago from February through June.

The April-through-July Sacramento Valley unimpaired runoff forecast for May 1, 2005, was 6.63 maf (99 percent of average). The resulting Sacramento Valley 40-30-30 Index forecast was 7.4, resulting in the forecast classification of below normal for water year 2005. The forecast of the San Joaquin Valley 60-20-20 Index on May 1 was 4.3, resulting in the water year being classified as wet in the San Joaquin Basin. The Eight River Index forecast on May 1 was 12.1 maf for April through July.

Operations under the State Water Resources Control Board Water Right Decision 1641

During 2005, DWR and the U.S. Bureau of Reclamation (Reclamation) operated joint projects in accordance with SWRCB's D-1641, which includes water quality, flow, and operational criteria for the Delta. Operations of the SWP and Central Valley Project (CVP) were coordinated with various objectives of CALFED, the Bay-Delta Plan, Central Valley Project Improvement Act, and biological opinions for fish species listed under the federal and State Endangered Species Acts (ESA).

As mentioned above, the water quality and flow criteria contained within D-1641 are conditioned by water year type. Specifically, the 40-30-30 Index water year type forecast on May 1 of each year determines the water year type for the implementation of flow and water quality criteria contained within D-1641. During most years, the water year type forecast and the actual water year type (calculated at the end of the water year) are in agreement, but this was not the case in 2005. Due to late-season precipitation, the 2005 water year ended with an above normal classification; but on May 1, 2005, the forecast was for a below normal water year. It is important to mention that in 2005, the SWP and CVP were operated using water quality and flow criteria based on the May 1 forecast of below normal, as required by D-1641.

CALFED's Record of Decision mandates an Environmental Water Account (EWA) managed by DWR, Reclamation, the Department of Fish and Game (DFG), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NOAA Fisheries) for the protection of listed fish species. Fish species currently listed under the federal and State ESA include the winter and spring runs of Chinook salmon, delta smelt, and steelhead.

Real-time monitoring of fish movement and conditions in the estuary aids daily water management and provides more

Figure 4-1. Decision 1641 Water Quality Compliance and Monitoring Stations in the Sacramento-San Joaquin Delta

timely protection of targeted fish species from entrainment at the Delta pumping facilities. (See Chapter 3 for a discussion of other environmental issues.)

Delta Cross Channel Gates

The Delta Cross Channel gates allow fresher Sacramento River water to flow into interior Delta channels toward the export facilities of the SWP and CVP. During 2005, the gates were open for 157 days. Reclamation's standard operating procedures call for gate closure any time the Sacramento River flow at Freeport reaches between 20,000 cfs and 25,000 cfs to reduce flooding potential on the Mokelumne River and to prevent scouring on the downstream side of the gate structure. D-1641 contains measures that require closure of the gates from February 1 until May 20, during peak migration of winter-, spring-, and fall-run Chinook salmon smolts and steelhead, and the spawning season for delta smelt, longfin smelt, Sacramento splittail, and striped bass.

During 2005, the gates remained closed from January 1 through late June. On June 25, the gates were opened, and they remained open until November 16, when the gates were closed to protect out-migrating winter-run salmon. The gates were reopened on November 20 and then were closed again on December 3, 2005, for fishery protection. The gates remained closed through the end of December.

Water Quality Standards

DWR attempts to meet D-1641 water quality and flow standards through releases from upstream reservoirs and Delta export operations, but D-1641 also contains a salinity standard for the San Joaquin River at Vernalis. San Joaquin River flows are not influenced by SWP upstream reservoirs, but they may be influenced by SWP exports and placement of South Delta barriers.

High river outflows, export restrictions, and water releases to benefit migrating fish (both pulse and attraction flows) help maintain most electrical conductivity (EC) values below standards.

Municipal and Industrial Objectives

D-1641 includes a year-round 250 mg/L chloride objective that is in effect at Delta export locations (Contra Costa Canal Pumping Plant No. 1, Clifton Court Forebay, Tracy Pumping Plant, Cache Slough at the City of Vallejo intake, and Barker Slough). Chloride levels remained below the objective throughout 2005.

An additional municipal and industrial water quality objective for chloride at the Contra Costa Canal Intake, near Rock Slough, specifies that the chloride level must be below 150 mg/L for a given number of days during the year, dependent upon the water year forecast. The below normal year requirement of 175 days was met on July 14, 2005.

Agricultural Objectives

D-1641 contains an agricultural EC objective, which varies by location, based on both water year type and a 14-day running average during the irrigation season, from April to mid-August, set at Emmaton, Jersey Point, Terminous, and San Andreas in the western and central Delta. The agricultural salinity objective at these Delta locations is also based on

water year type, becoming less stringent under dryer conditions. The agricultural EC objective was met at all four stations during 2005. An additional salinity objective is applied year round in the southern Delta at two locations on the San Joaquin River (Brandt Bridge and Vernalis) and two locations on Old River (Tracy Road Bridge and the head of Middle River). The SWP and CVP are jointly required by D-1641 to meet agricultural EC objectives imposed at these South Delta compliance locations. Meeting these objectives has sometimes been problematic. The SWRCB recognized in the 1995 Bay-Delta Water Quality Control Plan that elevated salinity in the South Delta is caused by multiple factors, including locally derived salts. On February 18, 2005, DWR and Reclamation jointly filed a petition with the SWRCB to change the effective date of the southern Delta water quality objective of 0.7 EC from April 1, 2005, to December 31, 2008, and to require that DWR and Reclamation continue to meet the 1.0 EC objective during these months. The request was made because installation of permanent operable gates in the South Delta had been delayed, and the gates are necessary for DWR and Reclamation to effectively implement the objective. A draft initial study and proposed negative declaration was submitted to the Office of Planning and Research on November 1, 2005. The SWRCB did not take action on the change petition by the end of the year.

Estuarine Habitat Protection Standard

The estuarine habitat protection standard incorporates modified X2 criteria (geographic isohaline) first established in the *1994 Delta Smelt Biological Opinion*. The upstream movement of 2 ppt isohaline (2 parts per thousand of salt in the water), measured as 2.64 mS/cm at the surface, is maintained within a certain range of positions in the estuary by adequate Delta outflow. These positions at Chipps Island or Port Chicago, from February through June, are associated with an abundance of fish and biota.

The number of days per month when the daily averaged EC maximum (2.64 mS/cm) is in effect at Chipps Island or Port Chicago is conditioned by the previous month's Eight River Index. This may alternately be met with a maximum 14-day running average EC of 2.64 mS/cm or with specific Delta outflow, set as a 3-day average Net Delta Outflow Index of 11,400 cfs or 29,200 cfs, when the X2 position is at Chipps Island or Port Chicago, respectively. The Port Chicago standard becomes effective when the Port Chicago 14-day EC average, immediately prior to the first day of the month, is less than or equal to 2.64 mS/cm. The Eight River Index, from December 2004 through May 2005, in af, was 1.56 million, 2.49 million, 2.01 million, 3.75 million, 3.18 million, and 7.23 million, respectively. On the last day of January 2005, the 14-day EC average at Port Chicago exceeded 2.64 mS/cm, triggering compliance at Chipps Island for February. Twenty-eight days were required for X2 at Chipps Island during February; all three criteria were met for 28 days. During March, the required 31 days were also met at Chipps Island, with all three criteria in compliance. During April, X2 was met at Port Chicago, and all criteria surpassed the required 18 days. In May, X2 was met for the required 31 days at Chipps Island. On the last day of May, due to above average May precipitation, the 14-day EC average at Port Chicago was less than 2.64 mS/cm, triggering X2 compliance at Port Chicago for June. The X2 requirement of 28 days was met for the entire month of June.

Net Delta Outflow Index Standard

Delta outflow cannot be measured directly due to the tidal influence in the Delta. Instead, an approximation of Delta outflow is calculated using measured inflows, exports, and estimated Delta water use. The Net Delta Outflow Index (NDOI), introduced in the 1995 Bay-Delta Plan, now part of D-1641, guided operations in 2005. NDOI calculates Delta outflow by including inflows of the Sacramento River, the Yolo Bypass system, the eastside stream system (consisting of the Mokelumne, Cosumnes, and Calaveras rivers), the Sacramento Regional Treatment Plant, and a measurement of San Joaquin River flow at Vernalis.

Excess outflow conditions, as defined by the Coordinated Operation Agreement, allow for greater flexibility in project operations. During 2005, Delta water conditions began and ended in excess, totaling an accumulated 306 days.

D-1641 sets specific minimum monthly NDOI standards, based upon water year type, between 3,000 and 8,000 cfs for the protection of fish and wildlife during January and from July to December. During below normal water years, July's NDOI objective of 6,500 cfs is the most stringent of all months. In 2005, the monthly mean NDOI was highest in May, averaging 59,442 cfs. This was unusual, because in most years, this occurs during the winter months. The monthly mean NDOI remained above 4,700 cfs during all months of the year, with the lowest monthly mean NDOI occurring in October with 4,749 cfs. All NDOI standards were met in 2005.

Flow Standards

D-1641 includes minimum flow requirements measured in the Sacramento River at Rio Vista. These flow standards, incorporated from the *Winter-Run Salmon Biological Opinion*, set flow requirements based on the May 1 water year classification forecast. Water year 2005 was forecast to be below normal, requiring mean monthly flows of 3,000 cfs for September; 4,000 cfs for October; and 4,500 cfs for November to December. During these periods, the seven-day running average could not be more than 1,000 cfs below the monthly standard. The actual mean monthly flows were 7,817 cfs for September; 8,487 cfs for October; and 38,232 cfs for November to December. All Rio Vista flow objectives were met during 2005.

D-1641 contains minimum San Joaquin River base and pulse flows measured at Vernalis from the *Winter-Run Salmon Biological Opinion*. These flows vary depending on the San Joaquin Valley water year type. Water year 2005 was forecast to be wet in the San Joaquin Valley.

If the X2 objective is required to be at or west of the Chipps Island location, wet year base flows are set at 3,420 cfs from February to April 14 and from May 16 through June 30. The base flow objective is relaxed to 2,130 cfs when X2 is required to be east of Chipps Island.

D-1641 requires the San Joaquin River spring pulse flow for April 15 to May 15 at Vernalis. This spring pulse flow requirement varies based on the location of X2 during April. However, the CALFED Operations Group may vary the actual timing and duration of the pulse attraction

flow based on real-time monitoring data. The Vernalis Adaptive Management Plan (VAMP), part of the San Joaquin River Agreement and approved in D-1641, contains SWRCB-approved alternate spring pulse flow and export limits. Typically, Reclamation and DWR use this alternate in lieu of D-1641 limits. The pulse flow objective for the spring 2005 VAMP period was 7,020 cfs. During October, D-1641 also requires a pulse attraction flow of up to 2,000 cfs at Vernalis to benefit salmon.

Export Standards

D-1641 includes an export limitation for SWP and CVP. It limits Delta exports to a ratio of Delta inflow to combined water project exports and is expressed as a maximum export rate in percentage of Delta inflow. The maximum percentage of Delta inflow diverted varies by month; for example, in February, it is conditioned by the previous month's Eight River Index. During the San Joaquin River spring pulse flow season, VAMP export rates are typically used as an alternative to the D-1641 spring export limitation, and the CALFED Operations Group may impose additional export restrictions.

The actual export amount is calculated using the three-day average that combines the inflow rate for Clifton Court Forebay (excluding Byron-Bethany Irrigation District diversions from Clifton Court Forebay) added to the Tracy Pumping Plant diversion. The export to inflow ratio limit is reported as either a 3-day or 14-day running average. A 14-day running average of inflows is used unless storage withdrawals from upstream reservoirs are being made for export, in which case a 3-day average of inflows is used. In all water year types, the maximum combined export rate from February through June is 35 percent of Delta inflow. This rate may be relaxed in February, during years with less precipitation, to between 35 and 45 percent. From July through January, the export to inflow ratio rises to 65 percent.

During January 2005, combined SWP and CVP exports averaged about 30 percent of Delta inflow, far below the 65 percent limitation. Excess conditions during January were beneficial to Delta water quality and prevented the need for export curtailments for water quality protection.

During the more restrictive period from February through June (35 percent objective), exports averaged about 19 percent. Combined exports were curtailed from February 2 through February 7 for the protection of delta smelt. Following the April 15 to May 15 VAMP period, exports continued to be restricted through the end of May due to concern over the level of delta smelt salvage.

From July through the following January, the SWP and CVP are allowed to export at 65 percent of Delta inflow. From July through December 2005, the combined inflow diverted averaged 52 percent. Exports were halted on June 22 to allow for pondweed eradication spraying on Clifton Court Forebay.

South Delta Temporary Barriers

The South Delta Temporary Barriers Project was initiated as a test project in 1991, was extended for five years in 1996, and extended again for seven years in 2001. The project was created partially in response to a 1982 lawsuit filed by the

South Delta Water Agency and consists of four rock barriers across South Delta channels.

These temporary seasonal barriers are designed to improve local water levels and circulation patterns, protect fishery resources, and improve water quality. They are placed across Middle River, Old River at Tracy, Grant Line Canal, and at Head of Old River.

The installation of the Middle River barrier was completed on May 17, 2005, and the Old River barrier near Tracy installation was completed on June 6. The spring barrier at Head of Old River, which functions as part of VAMP, was not installed in 2005 due to high flows on the San Joaquin River. The Grant Line Canal barrier was partially installed by May 2, with the installation completed on July 18. The Middle River barrier was notched on September 15, and removal was completed by November 9. The Old River near Tracy barrier and the Grant Line Canal barrier were both removed by November 30.

The barrier placed at Head of Old River in the fall, which helps keep upstream migrating adult salmon from straying out of the San Joaquin River into interior Delta channels, can help improve dissolved oxygen conditions in the Stockton Ship Channel. The Head of Old River barrier installation was completed on September 30 and removal was completed on November 15.

Special Study and Biological Surveys

DWR conducts several special studies and biological surveys each year. This includes a special study in the Stockton Ship Channel during the late summer and early fall to monitor the occurrence of low dissolved oxygen (DO) levels. Low DO levels can potentially cause physiological stress to fish and block the migration of salmon into the San Joaquin River. DWR also conducts biological surveys of benthic organism density and diversity, and of phytoplankton biomass and community composition in the Sacramento-San Joaquin Delta, Suisun Bay, and San Pablo Bay.

Fall Dissolved Oxygen Study in the Stockton Ship Channel

Historically, during the late summer and early fall, DO levels in the eastern and central portions of the Stockton Ship Channel have dropped below both the 5.0 mg/L and 6.0 mg/L water quality objectives set by SWRCB and the Regional Water Quality Control Board, respectively. These low DO levels are a result of several factors, including low San Joaquin River inflows, warm water temperatures, high biochemical oxygen demand, reduced tidal circulation, and intermittent reverse flow conditions in the San Joaquin River at Stockton.

To help reduce the severity of these low DO conditions, DWR normally installs a temporary rock barrier across the Head of Old River during periods of projected low fall flows in the San Joaquin River. The barrier increases net flows in the San Joaquin River past Stockton by reducing the upstream diversion of flows down Old River.

During the late summer and early fall of 2005, flows in the Stockton Ship Channel were not projected to be sufficient to

alleviate low DO concerns, and in-water construction of the barrier began on September 19. The barrier was in place and fully operational on September 30. Barrier removal began on November 7 and was completed by November 15.

Methods

Monitoring of DO concentrations in the Stockton Ship Channel was conducted by boat on eight monitoring runs, from August 3 to November 15, 2005. During each of the runs, 14 sites were sampled at low water slack tide from Prisoner's Point in the Central Delta to the Stockton Turning Basin at the terminus of the ship channel.

Because monitoring results differ within the channel, sampling stations were grouped into western, central, and eastern regions. The findings of previous fall studies have shown that fall DO levels are typically robust and high (7.0 to 9.0 mg/L) in the western channel; transitional, variable (4.0 to 7.0 mg/L), and stratified in the central channel; and low (3.0 to 5.0 mg/L) and stratified in the eastern channel. The western channel begins at Prisoner's Point and ends at Columbia Cut. The central channel begins one half mile east of Columbia Cut and ends at Fourteen Mile Slough. Finally, the eastern channel begins at Buckley Cove and ends at Rough and Ready Island. The Turning Basin is unique within the channel because it is east of the entry point of the San Joaquin River into the channel and isolated from down-channel flows.

Results

During the period of this study (August 3 to November 15), DO levels varied considerably between regions within the channel (not including the turning basin) from a low of 4.1 mg/L to a high of 8.9 mg/L. In the western channel, DO concentrations were relatively high and stable, ranging from 6.5 to 8.9 mg/L. The robustness of DO concentrations in this portion of the channel, in comparison to the east and central channels, is apparently due to greater tidal mixing, the absence of conditions creating biochemical oxygen demand, and shorter hydrological residence time. In the central channel, DO concentrations were more variable, ranging from 4.1 to 8.2 mg/L. In the eastern channel, DO levels were the most variable and stratified, ranging from a low of 4.5 mg/L to a high of 8.7 mg/L.

DO concentrations in the Stockton Ship Channel fell below both the State's 5.0 mg/L and 6.0 mg /L objectives in August, September, and the beginning of October 2005. This period coincided with warm temperatures and relatively low net flows in the San Joaquin River past Stockton.

Higher inflows in October coincided with improved DO conditions, with most stations showing levels above the 6.0 mg/L objective, except for DO levels in the central channel and in the turning basin, which were slightly below State objectives. DO levels remained high through the first half of November until the barrier was removed on November 15. The removal of the barrier coincided with a reduction in net flows at Vernalis. Further monitoring operations for the fall 2005 special study were suspended after November 15, 2005.

Benthic Survey

The benthic monitoring program documents changes in the composition, abundance, density, and distribution

of the benthic biota within the upper San Francisco Estuary. Benthic biota are relatively long-lived and can respond to changes in physical factors within the estuary, such as fresh water inflows, salinity, and substrate composition. As a result, benthic data can provide an indication of physical changes occurring within the upper estuary. Because the operation of the SWP can impact flow characteristics of the estuary, and subsequently influence the density and distribution of benthic biota, benthic monitoring is an important biological survey conducted by DWR. In addition, benthic monitoring data are also used to detect and document the presence of newly introduced species within the upper estuary.

Benthic monitoring was conducted at 10 sampling sites distributed throughout the major habitat types within the estuary. The sampling stations are as follows:

- Clifton Court Forebay Intake;
- San Joaquin River at Buckley Cove;
- San Joaquin River at Twitchell Island;
- Old River opposite Rancho del Rio;
- Sacramento River below the Rio Vista Bridge;
- Sacramento River above Point Sacramento;
- Suisun Bay at Bulls Head;
- Grizzly Bay at Dolphin near Suisun Slough;
- San Pablo Bay near Pinole Point; and
- San Pablo Bay near the mouth of the Petaluma River.

Four bottom grab samples for benthic analysis and one sample for sediment analysis were collected monthly at each site during 2005. Samples were analyzed to identify organisms to the lowest possible identifiable taxon and to count all organisms collected.

DWR maintains a database of benthic organisms located within the upper estuary. The benthic database is dynamic and regularly undergoes peer review and update. When a new organism is identified at any of the sampling stations it is added to the database. In addition, the taxonomic names of organisms on the list are updated when sufficient evidence is produced to warrant such changes.

A total of 152 species of benthic macrofauna were collected in 2005 at the 10 sampling sites. Of the 152 species, 10 species represented 88 percent of all organisms collected. The 10 dominant species were

- the amphipods: *Americorophium stimpsoni, Corophium alienense, Ampelisca abdita,* and *Gammarus daiberi;*
- the aquatic oligochaete: *Varichaetadrilus angustipenis;*
- the turbificid worm: *Limnodrilus hoffmeisteri;*
- the sabellide polychaetes: *Laonome* sp. A and *Manayunkia speciosa;* and
- the Asian clams: *Corbula amurensis,* and *Corbicula fluminea*.

Of the 10 dominant species, *Ampelisca abdita* and *Corbula amurensis* represent macrofauna that inhabit a typically high saline environment and were found in San Pablo Bay, Suisun Bay, and Grizzly Bay. *Corophium alienense, Americorophium stimpsoni, Limnodrilus hoffmeisteri,* and *Laonome* sp. A tolerate a wider range of salinity. They were collected both in the

higher saline western sites, and the more brackish to fresh water eastern sites, such as the San Joaquin River at Twitchell Island and the Sacramento River above Point Sacramento. The remaining four species, *Manayunkia speciosa, Gammarus daiberi, Varichaetadrilus angustipenis,* and *Corbicula fluminea* are predominantly fresh water species and were collected at sites east of Suisun Bay.

Phytoplankton and Chlorophyll *a* Survey

Monthly sampling of chlorophyll *a* concentrations and phytoplankton was conducted in 2005 by DWR's Bay-Delta Monitoring Branch at 13 stations throughout the upper San Francisco Estuary. These stations are

- Sacramento River at Greene's Landing/ Hood and above Point Sacramento;
- San Joaquin River at Vernalis, Buckley Cove, and Potato Point;
- Old River opposite Rancho Del Rio;
- Disappointment Slough near Bishop Cut;
- Frank's Tract near Russo's Landing;
- Suisun Bay at Bull's Head near Martinez and off Middle Point near Nichols;
- Grizzly Bay at Dolphin near Suisun Slough; and
- San Pablo Bay near Pinole Point and near Mouth of Petaluma River.

Chlorophyll *a* is one of the main groups of pigments contained in the algal species that make up phytoplankton. Phytoplankton are small, free-floating or attached algae that can be tiny, single-celled organisms (less than 5 µm in diameter) or larger colonial organisms. Phytoplankton are an important source of food in the estuary for zooplankton, invertebrates, and some species of fish. Phytoplankton biomass is an indicator of the status of primary productivity in the estuary. Chlorophyll *a* concentration was measured for each of the 13 monitoring stations to estimate overall phytoplankton biomass in the estuary. Phytoplankton samples were collected and analyzed separately to determine which species were present in the estuary.

Monthly chlorophyll *a* concentrations throughout much of the estuary were relatively low when compared to historical data. Of the 156 samples taken in 2005, 95.5 percent had chlorophyll *a* levels below 15 µg/L, and 85.9 percent of the samples were below 5 µg/L. The mean chlorophyll *a* concentration for all samples in 2005 was 3.48 µg/L, and the median value was 1.88 µg/L. In 2004, median chlorophyll *a* concentrations were higher, with a mean of 5.3 µg/L and a median of 2.0 µg/L. The maximum chlorophyll *a* concentration in 2005 was 21.5 µg/L, recorded in August at the San Joaquin River at Vernalis monitoring site. This maximum was considerably lower than the 2004 peak of 94.2 µg L. The minimum chlorophyll *a* concentration in 2005 was 0.4 µg/L, recorded in February at the San Joaquin River at Potato Point monitoring station.

The samples with chlorophyll *a* levels above 15 µg/L were all measured in the San Joaquin River at Vernalis, Buckley Cove, and Disappointment Slough near Bishop Cut. These three monitoring sites also had the highest chlorophyll *a* concentrations measured in 2004.

Phytoplankton biomass and resulting chlorophyll *a* concentrations in some areas of the estuary may be influenced by

extensive filtration of the water column by the introduced Asian clam, *Corbula amurensis*. Well-established benthic populations of *C. amurensis* in Suisun and San Pablo bays are thought to have contributed to the low chlorophyll *a* concentrations (and increased water clarity) measured in these westerly bays since the mid-1980s.

In addition to monitoring for chlorophyll *a*, water samples were analyzed for pheophytin. Pheophytin is a primary degradation product of chlorophyll *a*, and its relative concentration is useful for estimating the general physiological state of phytoplankton populations. When phytoplankton are actively growing, the concentrations of pheophytin are normally expected to be low in relation to chlorophyll *a*. The mean pheophytin *a* concentration for all samples in 2005 was 1.53 µg/L, and the median value was 0.97 µg/L. The maximum pheophytin *a* concentration was 15.10 µg/L, recorded at the San Joaquin River near Vernalis monitoring station. The minimum pheophytin *a* concentration was 0.13 µg/L, recorded at the San Pablo Bay near the mouth of Petaluma River.

Phytoplankton populations consisted of (families in order of abundance): Bacillariophyceae (diatoms), Chlorophyceae (green algae), Cryptophyceae (cryptomonads), Cyanophyceae (blue-green algae), unidentified flagellates, Euglenophyceae (euglenoids), Chrysophyceae (yellow-brown algae), and Dinophyceae (dinoflagellates). Of the genera identified, the following were the 10 most common, in order of abundance: *Cyclotella*, *Skeletonema*, *Monoraphidium*, *Cryptomonas*, *Rhodomonas*, *Aulacoseira*, unidentified flagellates, unidentified centric diatoms, *Aphanizomenon*, and *Pseudanabaena*.

Activities Outside the Delta

Activities conducted outside the Delta included scheduled routine SWP water quality monitoring, as well as special studies. Most of these special studies were in response to fish and wildlife and water quality issues of importance to agencies that provide domestic water supply. These agencies face increasingly stringent regulations and rely on SWP deliveries of high quality raw water.

Water Quality Monitoring

The Division of Operations and Maintenance collects detailed water quality information on the concentration and distribution of chemical, biological, and physical parameters at 40 aqueduct and reservoir sites located throughout SWP facilities. Stations are situated south of the Delta at reservoirs, pumping plants, power plants, and check structures of the South Bay, Coastal Branch, and California Aqueduct. Other monitoring activities are conducted on the North Bay Aqueduct, Feather River, and at State reservoirs north of the Delta—Lake Oroville, Antelope Lake, Frenchman Lake, and Lake Davis.

The SWP Water Quality Program was established in 1968 when the California Aqueduct was completed. More than 200 different chemical constituents are monitored monthly or quarterly. In addition, 13 automated stations are maintained for continuous monitoring of aqueduct water.

DWR maintains a staff at its own Bryte Laboratory in West Sacramento, who process and analyze most SWP laboratory water quality samples. DWR also contracts for some laboratory services. Water samples from 15 SWP stations are analyzed monthly to determine concentrations of dissolved solids, nutrients, chloride, sulfate, sodium, trace metals, and other constituents. Herbicides, pesticides, organic substances, and phytoplankton are monitored three times per year.

During 2005, bromide, total and dissolved organic carbon, taste and odor producing algae, and turbidity were factors in defining water quality. Dissolved metals, pesticides, and other constituents were at very low levels, well below treated drinking water standards, and were not a factor in water treatment. Bromide levels at SWP locations were lowest from February through August, and peaked in the early fall and winter, until winter runoff in the Delta increased outflow. Dissolved and total organic carbon are the lowest from March through October and increase, often significantly, with the first heavy Delta outflow event in winter. Turbidity, taste, and odor events are sporadic and usually seasonal. Selected SWP water quality data are available electronically through DWR's website at http://www.omwq.water.ca.gov. Table 4-1 presents laboratory results of sampling at several representative stations in 2005.

Nonproject Water Turn-ins

Turn-ins are authorized during periods of reductions in approved Table A amounts. DWR previously accepted turn-ins in the early 1990s in response to the 1987–1992 drought. Nonproject groundwater was accepted into SWP facilities provided it did not result in the degradation of SWP water quality, toxicity to fish and wildlife, or adverse changes in the suitability of the water for beneficial uses.

In 2001, DWR established new interim criteria to review the water quality of the turn-ins using a two-tiered approach. Tier 1 programs have a "no adverse impact" criteria and are tied to historical water quality levels in California. Programs meeting Tier 1 criteria are generally approved by DWR without referral to the State Water Contractor facilitation group. Tier 2 programs involve water quality levels that exceed the historical water quality in the California Aqueduct and have the potential to cause adverse impacts to the State Water Contractors. Tier 2 programs are referred to the State Water Contractor facilitation group for review and recommendations to DWR. DWR considers all factors before making a decision on the proposed water turn-in.

Turn-ins not only add versatility to SWP water operations, but can also improve SWP water quality for some constituents. Turn-ins can reduce total dissolved solids, conductivity, bromide, and organic carbon in the California Aqueduct. Slight increases in nitrate, sulfate, and arsenic often result. During 2005, there were no water turn-ins to the SWP.

Municipal Water Quality Investigations Program

The Sacramento-San Joaquin Delta provides drinking water for more than 24 million people in California. Because the Delta and its tributaries are located in a relatively unprotected watershed, water quality degradation is possible from many sources, including industrial and municipal

Table 4-1. 2005 Mean Water Quality at Selected State Water Project Locations

Constituent	Units[a]	Detection Limit	Thermalito Afterbay at Outlet	North Bay Aqueduct Barker Slough Pumping Plant	Delta-Mendota Canal Upstream of McCabe Rd	California Aqueduct					
						Banks Delta Pumping Plant	O'Neill Forebay Outlet (Check 13)	Kettleman City (Check 21)	Near Highway 119 (Check 29)	Tehachapi Afterbay (Check 41)	Devil Canyon Afterbay Near San Bernardino
Alkalinity	mg/L as $CaCO_3$	1	41	102	70	65	71	71	72	70	71
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NR	NR
Arsenic	mg/L	0.001	<0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.1	<0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1
Bromide	mg/L	0.01	<0.01	0.05	0.17	0.16	0.18	0.19	0.19	0.18	0.17
Calcium	mg/L	1	8	16	20	18	20	20	20	19	20
Chloride	mg/L	1	<1	24	58	53	61	64	63	59	57
Chromium	mg/L	0.001	<0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Copper	mg/L	0.001	<0.001	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.003
Fluoride	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hardness	mg/L as $CaCO_3$	1	35	98	97	86	96	96	97	93	94
Iron	mg/L	0.005	<0.005	0.048	0.010	0.021	0.021	0.010	0.010	0.012	0.007
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	1	4	14	11	10	12	12	12	11	11
Manganese	mg/L	0.005	<0.005	0.068	<0.005	0.016	0.005	<0.005	<0.005	<0.005	0.010
Nitrite + Nitrate	mg/L as N	0.01	<0.01	0.24	NR	0.66	0.80	0.78	0.79	0.76	0.79
Organic Carbon, Dissolved	mg/L as C	0.1	NR	6.8	3.7	3.7	4.0	3.8	3.6	3.4	3.7
Organic Carbon, Total	mg/L as C	0.1	NR	7.6	3.9	3.9	4.1	3.7	3.8	3.7	3.9
Phosphate-Ortho	mg/L as P	0.01	<0.01	0.12	NR	0.07	0.09	0.09	0.15	0.08	0.09
Phosphorus-Total	mg/L	0.01	0.01	0.25	NR	0.12	0.12	0.12	0.12	0.12	0.11
Selenium	mg/L	0.001	<0.001	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Sodium	mg/L	1	3	30	46	40	44	46	46	42	42
Specific Conductance	µS/cm	1	87	323	423	364	418	423	423	402	403
Sulfate	mg/L	1	2	25	46	33	38	39	39	35	36
Total Dissolved Solids	mg/L	1	57	188	240	212	239	242	246	228	221
Turbidity	N.T.U.	1	3	56	19	13	8	7	9	10	3
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Note: All reported constituents are the yearly mean of laboratory analytical values sampled monthly. Nondetectable values were not used in the calculation of the yearly mean.
[a]mg/L = milligrams per liter; µS/cm = microSiemens per centimeter; N.T.U. = nephelometric turbidity unit; NR = No data recorded at this location.

wastewater discharges, storm water runoff from cities, agricultural discharges, recreational activities, abandoned mines, and illegal dumping. The Municipal Water Quality Investigations Program (MWQI) was established to evaluate the suitability of Delta water as a drinking water source, to identify sources of water quality degradation, and to evaluate means of eliminating or preventing degradation.

Participants in the program include the municipal water contractors of the SWP and Contra Costa Water District. Program advisors include representatives of participating agencies, including the U.S. Environmental Protection Agency (EPA), DHS, and California Urban Water Agencies.

Components of the MWQI Program include the following:

- Evaluation of the water quality impacts at drinking water intakes from the proposed Delta wetlands storage project;
- The study and fractionation of organic carbon molecules from Delta carbon sources;
- Evaluation of proposed CALFED restoration actions in terms of drinking water impacts;
- Working with the State and regional water quality control boards to develop drinking water policy as part of the basin plan;
- Evaluation of water quality effects from the Jones Tract Flood;
- Development of models to predict water quality based on sources and loads; and
- Investigation of new and increasing sources of pollution, including urban sources.

Collectively, these and other MWQI studies and activities are designed and conducted to address major water quality and water supply issues. Each study or activity serves to discover, test, and assess possible solutions to problems in the Delta and other watersheds of the SWP. Overall, the results of these studies and activities are intended to assure that future demands for safe, potable water supplies can be met.

Because water quality concerns change rapidly with new drinking water regulations and water quality issues, the MWQI Program must be flexible enough to adapt to changing requirements. The former Delta Health Aspects Monitoring and Delta Island Drainage Investigations Programs merged into the MWQI Program in 1990, and the program continues to evolve.

The program's initial focus was to compile a comprehensive database on the quality of drinking water in the Delta. Since then, it has investigated ways of managing Delta lands and waters to minimize adverse impacts on drinking water quality. It has also identified sources of contaminants in the Delta and assessed their significance for drinking water quality and water treatment. Drinking water standards are more difficult to meet using Delta source waters because natural organic materials from agricultural drainage and watershed runoff potentially contain contaminants of concern.

The current MWQI Program has progressed from monitoring, problem identification, and assessment stages to the development of studies on source water improvement and management. The MWQI Program also continues to provide CALFED with expertise for assessing potential effects

from proposed Delta projects. The *2001 California State Water Project Watershed Sanitary Survey Report*, the third in a series for the SWP, provides this information in the latest five-year update from the original sanitary survey required by DHS in 1990. A searchable CD-ROM version of the report is available on the MWQI website at http://www.wq.water.ca.gov/mwqi/pubs.cfm. The next update of the sanitary survey will be available in mid-2007.

DWR, the Bureau of Land Management, Ducks Unlimited, DFG, and the Nature Conservancy partnered on a CALFED grant to develop a wildlife friendly farm management project on the Delta's Staten Island. The MWQI Program is responsible for the project's water quality monitoring component. Monitoring water quality on Staten Island provides a unique opportunity to examine the effects of agriculture management practices on water quality, the quantity of carbon exported off the island, and the effects of water management practices on agricultural lands under different soil regimes found in the Delta. Access to the island's pump facilities provides an unprecedented opportunity to measure carbon loads directly. Results from these experiments will provide direct measurement of carbon quantities discharged off a Delta island.

Starting at the end of October 2004, when the fields were first flooded, samples were collected weekly from two fields. Sampling continued until the fields were drained of water in early 2005. Carbon loading studies began in fall 2005 and will continue through fall 2007. Following the completion of this second portion of monitoring, a report on the results will be prepared for Ducks Unlimited.

It is anticipated that the carbon loading studies may be submitted to a journal for publication and wider dissemination in the scientific community.

The MWQI Program received a CALFED grant in 2000 to purchase and install three automated carbon analyzers in the Delta. In summer 2001, the first analyzer began operating at Banks Pumping Plant. The analyzer automatically samples the exported water, determines the total organic carbon and dissolved organic carbon levels, and sends the data to Sacramento, where it is posted on the California Data Exchange Center (CDEC) website.

The second analyzer started operation in winter 2002, and is located at the Hood water quality monitoring station on the Sacramento River. The third analyzer started operation in March 2005 at the new San Joaquin River monitoring station near Vernalis (McCune Station). Construction of this station was partially funded by a 2002 CALFED grant.

Automated carbon analyzers can sample every hour compared to the historical grab-sample program that only sampled weekly or monthly. The more frequent data, coupled with flow measurements, will allow for the calculation of mass transport and loading of carbon from the two main Delta tributaries. These data, currently posted to DWR's CDEC website, will also be used by modelers to refine the Delta Simulation Model 2 (DSM2) for calculation of organic carbon transport through the Delta.

The MWQI Program, in partnership with the Dry Creek Conservancy, also received Proposition 13 and CALFED grant funding

of $595,000 in 2004 to assess water quality and loads of parameters of concern from an urban drain in metropolitan Sacramento in a watershed that includes several areas of rapid development. The Natomas East Main Drainage Canal (NEMDC), also known as Steelhead Creek, has been part of the routine MWQI monitoring program since 1997. The grant project expanded the scope of monitoring to include installation of a real-time stage recorder to determine daily flows, installation of an autosampler station to more accurately determine loads, and preparation of a GIS of land use and impervious cover in the NEMDC watershed to serve as a basis for change detection analysis in subsequent years.

From 2003 to 2004, MWQI staff conducted a collaborative special study on trihalomethane (THM) reactivity of organic carbon for carbon-rich soils of the Delta. Organic carbon of soil origin in Delta waterways results in elevated organic carbon levels in Delta waterways. Elevated organic carbon in drinking water source waters represents a major public health concern because organic carbon reacts with chlorine, a disinfectant currently used by most water utilities with entitlement to Delta source waters, and forms harmful disinfection by-products (DBPs), such as THMs. To date, the nature and properties of reactive organic carbon has been poorly characterized. MWQI staff collected representative soils from various Delta islands from the soil surface down to 10 feet. Organic carbon from the soils was extracted with different extractants and fractionated into relatively homogeneous isolates of distinct properties for determination of THM reactivity. MWQI staff has summarized findings of this study into three peer-reviewed manuscripts, one of which appeared in *Water Research* in May 2005. The other two manuscripts are being revised for publication in *The Journal of Environmental Quality*.

A two-year MWQI data summary report, entitled *The Municipal Water Quality Investigations Program Summary and Findings from Data Collected from October 2001 through September 2003*, was distributed in August 2005. This report summarizes and interprets MWQI grab-sampling data collected from 11 MWQI stations. The report is available in hard copy and searchable CD-ROM, as well as online on the MWQI website at http://www.wq.water.ca.gov/mwq/.

Bryte Chemical Laboratory

Bryte Chemical Laboratory was established in 1951 and certified in 1990 by the DHS Environmental Laboratory Accreditation Program to perform drinking water and wastewater analyses. The laboratory continues to perform the vast majority of chemical and other related analyses required to support DWR's water quality programs. Every year, thousands of water samples are routinely analyzed for minerals, nutrients, metals, pesticides, herbicides, volatile organic compounds, and many other chemical constituents.

In 2005, Bryte Chemical Laboratory upgraded the lab's capability to detect and analyze trace metals in water and wastewater with the purchase of a Perkin Elmer, ICP/MS, DRCe instrument system. The ICP/MS, DRCe is equipped with new collision cell technology that removes matrix and polyatomic interferences normally encountered when analyzing trace metals in water and wastewater. Removal of these interferences allows for lower detection limits, in the parts

per trillion ranges, for trace metals such as arsenic, selenium, vanadium, and chromium. The new ICP/MS, DRCe instrumentation became fully operational and was certified in October 2005 to perform trace metal analyses using EPA Method 200.8. The new instrumentation also performs EPA Method 1643, an ultra-low level trace metal analysis requirement for Northern District water quality programs. These specialized analyses were formerly performed through Bryte Lab's contract laboratories. The program savings in analytical costs alone for Northern District will be well over $150,000 per year.

Bryte Chemical Laboratory has continued to manage a variety of analytical contracts with other State agencies and several outside laboratories in accordance with the master contract policy approved in fiscal year 1994–1995. The laboratory works in conjunction with the Quality Assurance and Quality Control Section to replace these contracts as they expire each fiscal year. In 2005, no significant contracts expired or were required to be replaced.

Security and protection of the SWP has continued to be a primary goal for DWR since September 11, 2001. To help protect the SWP from biochemical and chemical agents, Bryte Laboratory has continued in 2005 to be an active member in a group of laboratories called the California Association of Mutual Aid Laboratories Network (CAMAL Net) headed by DHS. The laboratory network's main objective is to voluntarily assist DHS in the analysis of chemical agents in water quality samples should a natural disaster or terrorist event occur in California. The assistance to DHS is only required should the analytical capacity of DHS be exceeded or to confirm the presence or absence of chemical agents in water quality samples provided by DHS. Should DHS activate CAMAL Net, members will be notified, and water quality samples that are determined to be safe to handle by DHS will be shipped to the participating CAMAL Net laboratories. In 2005, Bryte Laboratory was classified as a Level II participating laboratory in the CAMAL Net organization.

Suisun Marsh Activities

Suisun Marsh consists of approximately 59,000 acres of tidal and managed brackish water wetlands and 30,000 acres of bays and sloughs. It is the largest contiguous brackish marsh remaining in the United States. Situated in southern Solano County, west of the Sacramento-San Joaquin Delta and north of Suisun Bay, the marsh encompasses more than 10 percent of California's remaining natural wetlands. In addition, the marsh is the resting and feeding ground for thousands of waterfowl migrating on the Pacific Flyway.

Since the early 1970s, the California Legislature, SWRCB, Reclamation, DFG, Suisun Resource Conservation District (SRCD), DWR, and other agencies have focused on preserving the Suisun Marsh as a unique environmental resource. As part of its responsibility for protecting Suisun Marsh, SWRCB included water quality standards for the marsh in Term 10 of D-1641, which applies to SWP and CVP operations. D-1641 was adopted by SWRCB on December 29, 1999. In 1987, DWR, Reclamation, DFG, and SRCD signed the Suisun Marsh Preservation Agreement (SMPA) (see sidebar). SMPA contains provisions for actions to control channel water and soil salinity to mitigate impacts of the SWP, CVP, and other upstream

Suisun Marsh Preservation Agreement

In 1986, federal legislation (Public Law 99-546) authorized funds to Reclamation to protect Suisun Marsh. On March 2, 1987, DWR, Reclamation, DFG, and SRCD signed the Suisun Marsh Preservation Agreement (SMPA). The objective of SMPA is to assure that Reclamation and DWR mitigate for any adverse effects of the CVP and SWP on managed wetlands in the marsh, as well as a portion of the adverse effects of other upstream diversions. Under the original agreement, this objective is primarily accomplished by constructing large-scale facilities in the marsh to maintain a dependable supply of adequate quality water within Suisun Marsh channels. A component of the large-scale facilities is the Suisun Marsh Salinity Control Gates facility, which began operating in November 1988.

On August 4, 1995, the Suisun Marsh Coordinators, representing the four agencies party to SMPA, began discussions directed at updating the agreement, pursuant to SMPA Articles 4 and 17. Representatives from Reclamation, DWR, DFG, and SRCD established an ad hoc Negotiating Team, Technical Group, Drafting Committee, and Environmental Documentation Team. Beginning September 1995, the SMPA Negotiating Team met monthly in Sacramento and made significant progress in developing the basis to amend the agreement. Representatives from the SWP and CVP contractors actively participated in the negotiations. Updating SMPA will reflect future hydrologic and salinity conditions in the Suisun Marsh as prescribed by the SWRCB 1995 Water Quality Control Plan and will place more emphasis on improving water and land management practices and facilities on managed wetlands.

diverters on managed wetlands in Suisun Marsh.

Revised Suisun Marsh Preservation Agreement

In 2005, SMPA parties completed the Revised SMPA. This agreement includes only those actions that would not cause any taking of listed species, as identified by the regulatory agencies. The Revised SMPA includes the following actions: operation of the initial facilities and Suisun Marsh Salinity Control Gates; channel water salinity standards consistent with D-1641; water manager program; portable pumps program; Individual Ownership Adaptive Management Habitat Plan updates; drought response fund; and replacing turnouts on the Roaring River Distribution System. The SMPA parties also completed the Revised Suisun Marsh Monitoring and Suisun Marsh Mitigation agreements.

Operation and Maintenance

Initial Facilities Maintenance

Several facilities constructed by DWR and Reclamation operate in the Suisun Marsh. They are identified in the *Plan of Protection for the Suisun Marsh* and the 1987 SMPA. These facilities provide lower salinity water to managed wetlands. The initial facilities, including the Roaring River Distribution System, Morrow Island Distribution System (MIDS), and Goodyear Slough Outfall, were constructed in 1979 and 1980. The Suisun Marsh Salinity Control Gates were installed and became operational in 1988. During 2005, DWR's Delta Field Division performed routine maintenance on all initial facilities in the Suisun Marsh, including MIDS.

Morrow Island Distribution System (MIDS) Fish Screen and Alternatives

In 1997, the USFWS issued a biological opinion requiring Reclamation and DWR to install a fish screen at the intake of MIDS on Goodyear Slough. Reclamation requested USFWS reinitiate consultation in a November 2002 memorandum and committed to reinitiate Section 7 consultation on the MIDS maintenance project after completion of the Habitat Management, Preservation, and Restoration Plan for the Suisun Marsh programmatic Environmental Impact Statement/Report. In March 2003, the USFWS reinitiated consultation and amended Term and Condition number 3, granting Reclamation and DWR until May 9, 2006, to begin construction of a screen or implement an approved mitigation or conservation alternative.

Because the cost of adding a fish screen to the MIDS intake structure is likely to be high, and the effectiveness of such screening to conserve Suisun Marsh fish populations is unknown, DWR and Reclamation proposed to investigate fish entrainment at the MIDS intake with regard to fishery populations in Goodyear Slough and to evaluate whether screening the diversion would provide substantial benefits to local populations of listed fish species. The objectives of this sampling project are: (1) to determine what species of fish and what life stages are entrained by the MIDS intake facility; and (2) to quantitatively assess whether certain species of fish are more likely to be entrained than others.

Sampling for the first year of the study began in September 2004 and continued through May 2005. The second year of sampling began in October 2005 and will continue through May 2006. A final report is anticipated by early 2007.

Suisun Marsh Salinity Control Gates

The Suisun Marsh Salinity Control Gates are operated from October 1 of the current year through May 31 of the following year, as needed, to meet salinity standards; otherwise, they are placed in an open position to minimize fish concerns related to predation and impedance. In the past, the gates' operation and installation or removal of the flashboards has varied due to salinity conditions, fisheries agencies' requests for sensitive species concerns, or special studies and repairs.

Gates Status for 2004–2005

During the 2004–2005 control season (October 2004 through May 2005), the fall 2004 fish passage study continued with modification to the boat lock in its fourth and final year as an alternative for passage, instead of flashboards as in previous years. The gates were operated for both the fish

study and for salinity control during this control season.

From September 28 through October 11, 2004, Phase I was carried out with gates open, flashboards out, and boat lock gates closed. From October 12 through October 25, Phase II was in action with gates operated to full-bore, boat lock open, and flashboards installed. In Phase III, from October 26 through November 9, the gates were operated full-bore with flashboards installed and boat lock closed for fish passage study. Thereafter, the gates were operated to control salinity with the boat lock gates held open until February 9, 2005, when salinity levels were not a concern any longer and the gates were held open. However, the flashboards remained installed until May 20, when conditions were so fresh that flashboard removal was ordered. During the 2004–2005 control season, many gate problems occurred. Gate #1 was in a closed position due to cable failure at the start of the fish study in late September, and the Gate #3 cable failed on January 14, 2005, leaving only Gate #2 functional thereafter to control salinity. Repair on both gates was not completed until late summer of 2005. Despite these issues, compliance was met at all stations.

Monitoring

Water Quality and Compliance

Suisun Marsh channel water salinity standards were specified in SWRCB WR 98-09 for seven compliance stations. Four of these—National Steel (S-64), Beldon's Landing (S-49), Volanti (S 42), and Sunrise (S-21)—are located within the marsh. A fifth, Collinsville (C-2), is located in the western Delta (Figure 4-2). Two remaining sites located in the western marsh, Morrow Island (S-35) and Ibis (S-97), are specified as baseline monitoring stations because of the SWP's minimal control on salinity levels at these locations. In 2000, SWRCB amended D-1641 to remove the compliance monitoring requirement for these stations. However, both remain active as water salinity monitoring stations. To be consistent with D-1641, the June 2005 Revised SMPA Monitoring Agreement had the same specification for S97 and S35 to become monitoring stations, instead of compliance stations. Details of the agreement can be viewed online at: http://iep/suisun/smpa/RevisedSMPAMonitoringAgreement_20JUN2005.pdf.

Salinity levels remained well within compliance during the period from October 1, 2004, through May 31, 2005. (See DWR's annual report to SWRCB, *Suisun Marsh Monitoring Program Data Summary: 2005 Water Year*, for details.)

Suisun Marsh Expenditure History

Suisun Marsh expenditures and reimbursements administered by DWR for calendar years 1968 through 2005 are summarized in Table 4-2. From 1968 through December 31, 2005, DWR disbursed more than $113.9 million SWP funds for planning, design, environmental documentation, construction, maintenance, monitoring, mitigation, and permit compliance in support of implementing the plan of protection for Suisun Marsh through the SMPA and for meeting standards set by SWRCB. Reclamation has reimbursed DWR about $44.8 million (40 percent), and the State's General Fund has reimbursed about $9.4 million (8 percent). These figures do not include up-front payments made by Reclamation for staff and other direct costs, as well as about $5.7 million in

Reclamation interest payments during 1988 and 1989.

Annual figures are reported in Table 4-2 for DWR's up-front payments, Reclamation reimbursements, General Fund reimbursements, and DWR's cumulative expenditure balance.

Figure 4-2. Compliance and Monitoring Stations in the Suisun Bay and Marsh

Table 4-2. Suisun Marsh Expenditures and Reimbursements Administered by DWR (in dollars)

Year [1]	Reach 305 Costs [2]	General Fund Payment [3]	Adjustment for General Fund Payment[a] [4]	USBR Invoice Payment [5]	Interest Payment Credited Back to Contractors [6]	Net SWP Costs [2] through [6] [7]	Recreation Costs [8]	SWP Contractors' Costs [7] minus [8] [9]
1968	10,571					10,571	1,480	9,091
1969	34,181					34,181	4,785	29,396
1970	23,343					23,343	3,268	20,075
1971	1,042					1,042	146	896
1972	47					47	7	40
1973	0					0	0	0
1974	0					0	0	0
1975	2,709					2,709	379	2,330
1976	32,960					32,960	4,614	28,346
1977	37,475					37,475	5,246	32,229
1978	350,831					350,831	49,117	301,714
1979	3,660,099					3,660,099	512,568	3,147,531
1980	5,005,759					5,005,759	701,227	4,304,532
1981	2,964,974					2,964,974	415,096	2,549,878
1982	2,955,705			(2,500,000)		455,705	413,801	41,904
1983	2,754,094					2,754,094	385,574	2,368,520
1984	2,418,344					2,418,344	338,567	2,079,777
1985	2,332,773					2,332,773	326,587	2,006,186
1986	6,495,322					6,495,322	909,344	5,585,978
1987	13,600,701					13,600,701	1,904,099	11,696,602
1988	7,456,364			(17,368,725)[b]	(2,039,752)	(11,952,113)	1,043,891	(12,996,004)
1989	2,341,960	(9,478,000)	6,634,600	(1,219,691)[b]	(283,857)	(2,004,988)	327,874	(2,332,862)
1990	3,030,010			(695,450)		2,334,560	424,202	1,910,358
1991	6,223,042			(2,925,429)		3,297,613	871,226	2,426,387
1992	2,737,259			(1,174,655)		1,562,604	383,218	1,179,386
1993	2,979,255			(238,130)		2,741,125	417,100	2,324,025
1994	3,192,213			(1,962,549)		1,229,664	446,914	782,750
1995	2,721,978			(647,138)		2,074,840	381,079	1,693,761
1996	3,391,678			(1,482,396)		1,909,282	474,838	1,434,444
1997	3,634,267			(1,520,219)		2,114,048	508,800	1,605,248
1998	5,342,834			(1,107,501)		4,235,333	748,000	3,487,333
1999	8,867,742			(2,696,200)		6,171,542	1,241,486	4,930,056
2000	2,857,534			(3,300,053)		(442,519)	400,055	(842,574)
2001	2,623,227			(444,009)		2,179,218	367,252	1,811,966
2002	3,752,265			(791,319)		2,960,946	525,317	2,435,629
2003	3,258,583			(2,389,979)		868,604	456,202	412,402
2004	2,874,629			(952,940)		1,921,689	402,448	1,519,241
2005	3,940,876			(1,409,296)		2,531,580	551,723	1,979,857
Total	113,906,645	(9,478,000)	6,634,600	(44,825,679)	(2,323,609)	63,913,957	15,947,529	47,966,428

[a]Under State Assembly Bill 1442 the General Fund paid 20% of the Suisun Marsh costs through 6/88 which amounts to $9,478,000. This payment includes $2,843,400, which represents 6% of the costs through 6/88 paid by the General Fund. This amount has reduced the costs billed to the SWP contractors. The remaining $6,634,600 received from the General Fund represents our Recreation project purpose share of 14%.
[b]Excludes interest payments made by USBR.

Chapter 5
Local Assistance

Reverse osmosis is a way to increase water supply.

Significant Events in 2005

By the end of 2005, 69 water districts, three environmental interest groups, and more than 55 other interested groups had signed the Agricultural Water Management Memorandum of Understanding (MOU) as members of the Agricultural Water Management Council (Ag Council).

DWR received 148 urban water management plans.

Southern Illinois University completed a report under contract with DWR. The report evaluated methods of removing selenium from agricultural subsurface drainage water using absorbent materials

Information in this chapter was contributed by the Division of Planning and Local Assistance and the Office of Water Use Efficiency.

The Department of Water Resources (DWR) manages water use efficiency, the Davis-Grunsky Act, agricultural drainage, environmental impact document review, and Water Conservation Bond Law programs, and participates in several other programs that assist local agencies and benefit State Water Project (SWP) contractors.

Davis-Grunsky Act Program

The Davis-Grunsky Act, authorized in 1960 as part of the Burns-Porter Act, provides construction loans for local domestic water projects and agricultural water conservation projects. It also provides grants for recreation and fish and wildlife enhancement. Loans and grants may be given to rehabilitate dams and reservoirs.

DWR's ongoing administration of the program provides oversight of the 32 recreation grant projects to ensure compliance with the contracts. Administration costs are recovered from the revenues provided by the repayment of Davis-Grunsky Act loans. The recreation grant contracts are being amended to reflect actual facilities constructed and the modification of DWR's fee oversight function.

Water Use Efficiency

The Water Conservation Office was reorganized and a new Office of Water Use Efficiency (OWUE) was created in 2001. OWUE activities include providing technical assistance to local agencies; managing water use efficiency financial assistance programs; managing the California Irrigation Management Information System; reviewing, tracking, and reporting on urban and agricultural water management plans; and managing drainage and water recycling/desalination projects.

California Irrigation Management Information System (CIMIS)

CIMIS is a network of automated weather stations that collects weather data and transmits it to a central repository in Sacramento each day. After performing quality control and calculations, the data are made available to the public for such diverse purposes as irrigation scheduling, resource planning, research, and modeling.

DWR's CIMIS network remained at 130 stations in 2005. Approximately 70 percent of the stations on the network belong to local cooperators. The demand for CIMIS data has been increasing steadily since its establishment in 1982. For example, the number of registered data users has grown from 661 in 1989, to more than 7,000 in 2005.

Due to the growing demand for data and information, the CIMIS database and the Web application were upgraded to increase performance and enhance content in 2004. Further enhancements will take place in 2007.

More than 196,000 reports were generated from the database with more than

20,000,000 visits to the website (http://wwwcimis.water.ca.gov), for information in 2005. Users can register online, access archived data, download data files, and peruse content about the CIMIS program and other helpful meta data and information. A separate but concurrently-operating database and a Web application were developed to keep pace with the rapidly evolving program. A Web administrative module was also created to make the website more dynamic.

Other ongoing enhancements for CIMIS include the non-ideal site weather station network study and the incorporation of the GOES model producing statewide daily evapotranspiration (ET_o) maps.

In addition, staff is updating CIMIS brochures, evapotranspiration calculation, other methods of data acquisition and dissemination, data quality refinements, and technical assistance.

Water Recycling and Desalination Branch

The Water Recycling and Desalination Branch of OWUE was established in 2001. The branch's goal is to improve water use efficiency and to promote increased use of nonconventional water sources through planning, technical, and financial assistance. As part of a balanced water portfolio, nonconventional water will help meet existing and future water supply and environmental needs, by increasing safe and beneficial use of recycled water. It will also encourage economically and environmentally acceptable use of desalinated brackish and sea waters.

In 2005, the Water Recycling and Desalination Branch activities included the following:

- awarding proposition 50 funds of $25 million for the first desalination grant cycle to fund 24 different projects, including: three constructions, six pilots and demonstrations, seven research and development projects, and eight feasibility studies.
- developing and managing grant agreements for the 24 different projects, which were awarded through the initial 2005 cycle of the desalination grant program.
- the Housing And Community Development, at the request of DWR and DHS, initiated recommendation 3.3.1 of the recycled water task force, which states that the "Housing And Community Development Department should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code." The Housing And Community Development Department submitted this on September 24, 2004, and updated it on November 15, 2004 for the 2004 California Plumbing Code, and updated it again on March 1, 2005.
- disseminated information regarding AB 334 (Goldberg, Chapter 172, Statutes of 2003), which gives communities additional flexibility to regulate water softeners as a source-control measure. For example, on July 8, 2005, conducted a joint workshop between DWR and the Santa Clara Valley Water District entitled "A Salinity Management Strategy-Water Softener Replacement Rebate Program."
- presented a water fact brochure entitled *Water Recycling* (DWR water

facts no. 23) and Water Recycling 2030 at several workshops statewide.
- served as a member on the Executive Management Team of the Southern California Water Recycling Projects Initiative sponsored by Reclamation.
- participated on the Project Advisory Committee to design an activity booklet for upper elementary students, entitled *Give Water A Second Chance… Recycle It*, which provides information on the process and the need for recycled water and its similarity to the water cycle.

Agricultural Water Management Plans

By the end of 2005, 69 water districts, three environmental interest groups, and more than 55 other interested groups had signed the Agricultural Water Management Memorandum of Understanding (MOU) as members of the Agricultural Water Management Council (Ag Council). The agricultural signatories represent more than 4.75 million acres of irrigated agricultural land statewide.

In 2005, the council endorsed an additional three agricultural water management plans that had been submitted by agricultural water suppliers to the Ag Council. Subsequently, these plans have become the basis for the districts' water conservation efforts. The districts with endorsed water management plans are expected to prepare and submit a biannual progress report to the Ag Council from the date their plan was endorsed. DWR staff provides technical review and evaluation of these plans. DWR also reviewed four biannual progress reports for the Ag Council.

DWR staff provided technical assistance to water districts to prepare water management plans and helped implement efficient water management practices, as well as administrative and programmatic assistance to both the Council and water districts.

Three-Way Cooperative Agreement–Ag Council

In 2001, DWR set up a three-way cooperative agreement between itself, Reclamation, and CALFED, and has been managing the State-funded portion of the agreement. This agreement provides funding to the Ag Council for a period of three years to help implement the MOU. The management and implementation of tasks in the agreement are closely coordinated with Reclamation Mid-Pacific Region. This activity, with a $1.2 million budget, is shared equally between DWR and Reclamation. By the end of 2005, all DWR funds were spent for relevant tasks identified in the three-way cooperative agreement. The work continued with federal share of funds and tasks.

The Ag Council is making progress on tasks identified in this cooperative agreement. The Ag Council has hired additional staff to help with technical issues as well as with database development, and the enhancement of web-based applications related to the water management planning process. It is also making significant progress in implementing all tasks identified in the agreement. The council provided technical and financial assistance to the signatories of the MOU to develop water management plans, since development of a model water management plan and refinement of net benefit analysis are important tasks of the agreement.

Urban Water Management Plans

DWR received 148 urban water management plans in 2005. The 2005 Urban Water Management Plan Guidebook and DWR 2005 UWMP Review Sheets were published. In addition, a series of ten workshops on how to prepare an UWMP were conducted around the State.

Three-Way Cooperative Agreement—Urban Council

DWR set up a three-way cooperative agreement between itself, Reclamation, and CALFED and has been managing the State-funded portion of the agreement. This agreement provides funding to the California Urban Water Conservation Council, for a period of three years to provide technical assistance to urban water suppliers to implement the first four years of the CALFED incentive-driven Water Use Efficiency Program. The management and implementation of tasks in the agreement are closely coordinated with Reclamation's Mid-Pacific Region. This is a $1.5 million, three-year activity, of which $600,000 is funded by Reclamation.

The Urban Council continues to make progress on tasks identified in this cooperative agreement, including timely achievement of tasks outlined in the CALFED Water Use Efficiency Program Budget Change Proposal. In 2005, five of the tasks in the three-way cooperative agreement between DWR, Reclamation, and CALFED were performed for DWR.

Draft Senate Bill 610 and Senate Bill 221 Guidebook

Senate Bill 610 became effective on January 1, 2002. It expands the requirement for public water systems to prepare water supply assessments for large-scale projects, requires that additional information be included in assessments, and makes related changes. The draft Senate Bill 610/Senate Bill 221 Guidebook was published to provide assistance to water suppliers, cities, and counties in integrating water and land use planning.

Outreach

OWUE outreach extends to presentations, workshops, trade shows, expositions, and exhibits.

In 2005, OWUE staff performed outreach that included the following:

- organized staff meeting with University California Rice Workgroup;
- presented water and resource conservation exhibit at Genentech in Vacaville;
- met with several University of California Cooperative Extension;
- attended the Sacramento Valley Exposition Trade Show;
- participated in various California Urban Water Conservation Council committees, Steering Committee and Plenary Meetings, League of California Cities meeting, the Association of California Water Agencies Spring and Fall conferences; and
- participated in California Energy Commission workshops on water-energy efficiency; and
- conducted nine Urban Water Management Plan (UWMP) workshops around the state.

Water Conservation News continues to be the primary water conservation outreach newsletter. The quarterly publication

reaches more than 8,000 California subscribers.

Agricultural Drainage Program

The Agricultural Drainage Program mission is to seek in-valley solutions to the surface and subsurface agricultural drainage water problems in the State and, in particular, the San Joaquin Valley, and improve water quality in the San Joaquin River by promoting measures to reduce salinity and discharge of harmful elements.

Even though the San Joaquin Valley Drainage Implementation Program (SJVDIP) has been idle since 2003, DWR continues to implement many of its recommendations through its Agricultural Drainage Program. DWR works in partnership with California universities, CALFED, Reclamation, resource conservation districts, watershed groups, water and drainage districts and many other local, State and federal entities. DWR works with these organizations to develop, educate, and promote the use of Integrated On-Farm and Regional Drainage Management Systems (IFDM) in the San Joaquin Valley;

- provide technical assistance and collaborate with water and drainage districts, and local entities to reduce and control surface and subsurface agricultural drainage water;
- maintain research and demonstration projects to develop drainage reuse systems, including the development of cost-effective salt tolerant crops (including energy crops), drainage treatment, disposal technologies, and salt separation and utilization;
- monitor the quality and distribution of shallow groundwater water levels in drainage-impaired areas of the San Joaquin Valley;
- promote agricultural water and energy use efficiency programs in drainage-impaired lands to reduce the volume of surface and subsurface drainage water and expand regional water supplies;
- maintain programs to help improve water quality on the San Joaquin River; and
- provide grants for control of agricultural drainage water and the reduction of its toxic elements, using Propositions 13, 50, 204, and DWR project fund monies.

The Agricultural Drainage Program was divided into two major activities: management of Proposition 204 (Drainage Subaccount) and the San Joaquin Valley Agricultural Drainage Program.

Proposition 204 (Drainage Management Subaccount)

In 1996, Proposition 204, The Safe, Clean, Reliable Water Supply Act, authorized the transfer of approximately $6.1 million from the State Water Resources Control Board (SWRCB) to the California Department of Food and Agriculture (CDFA). In 1997, CDFA, SWRCB, and DWR signed an MOU that established a process for utilizing the funds designated for agricultural drainage activities. In 1999, CDFA and DWR signed an interagency agreement to transfer the funds to DWR for developing and implementing programs consistent with Water Code Section 78645, as outlined in the MOU. The funds are distributed throughout the duration of the six-year Proposition 204 program. The goal of the program is to develop methods of using

and concentrating salts and reducing contaminants in the California's subsurface agricultural drainage water.

Each year, DWR solicits proposals from public entities seeking funding for research activities. A technical review committee reviews and screens the proposals. DWR then submits the proposal packages to an oversight committee, comprised of representatives from DWR, CDFA, and SWRCB for final approval. Ultimately, DWR is responsible for preparing and managing contracts for the approved proposals.

In 2005, the Proposition 204 program funded the following projects:

- characterization of forages growing in saline drainage water reuse systems: influence of management practices on forage productivity and nutritional value, California State University Fresno (CSUF);
- wetland drainage management technology development in support of San Joaquin River real-time water quality management, University of California, at Merced;
- concentration of mineral salts from membrane desalting of agricultural drainage in the San Joaquin Valley, University of California, at Los Angeles;
- predicting water use, crop growth, and quality of Bermuda grass under saline irrigation, University of California, at Davis; and
- the production of biofuel and selenium-enriched feed from canola irrigated with agricultural drainage water on the west side of California's San Joaquin Valley, U.S. Department of Agriculture, and CSUF, partial funding.

San Joaquin Valley Agricultural Drainage Program

This program consists of several activities, including drainage monitoring and evaluation, drainage treatment, integrated on-farm drainage management, drainage reduction and reuse, environmental services activities and the San Joaquin River Water Quality Improvement Program.

Drainage Monitoring and Evaluation

Drainage monitoring and evaluation involves collecting and evaluating information on the quality, quantity, and movement of drainage water. The following activities were conducted:

- monitoring and collecting shallow groundwater levels, flows, and water quality data for drainage water from Westside San Joaquin Valley tile drain sumps;
- publishing an annual drainage report in December 2005, The San Joaquin Valley Drainage Monitoring Program 2002 Report;
- preparing shallow groundwater and irrigation methods maps of drainage-impaired areas, using drainage monitoring data in conjunction with land use and irrigation methods data;
- providing assistance for the collecting of groundwater, soil, and operational data for the integrated on-farm drainage management project, at Red Rock Ranch in western Fresno County; and
- maintaining a website that includes information on drainage programs and activities, salinity and shallow groundwater maps, Proposition 204 grants, and links related to other agricultural drainage programs: (www.dpla.water.ca.gov/sjd/waterquality/index.html).

Drainage Treatment

Development of Membrane Treatment of Agricultural Drainage Water. DWR continues to fund research under a contract with University of California, Los Angeles, (Department of Chemical Engineering) to explore the use of membrane treatment desalting agricultural drainage water. Under this multi-year contract, UCLA is performing fundamental work to: (1) evaluate the relationships between anti-scalant dose and membrane mineral salt scale prevention; (2) evaluate the potential for enhanced crystallization of membrane concentrate by crystal seeding and pH control; and (3) reducing membrane fouling due to scale formation. A final progress report entitled "Recovery Enhancement and Brine Minimization" for tasks nine through 18 in the contract were submitted in September 2005.

Grasslands Area Farmers: In-Valley Drainage Reuse Plan. DWR continues to participate in a multi-agency cooperative effort with Grasslands Area farmers to comply with the objectives of the California Regional Water Quality Control Board's (CRWQCB) Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River (SJR). DWR developed an economic model to evaluate all possible options, costs for subsurface drainage water treatment, and active land management alternatives.

Agricultural Subsurface

Drainage: Salt Recovery, Purification, and Utilization. DWR continues to support investigations of processes for concentrating and purifying drainage salts for marketing purposes. These activities are performed on two fronts. The first, with University of California Davis, involves recovering sodium sulfate from farm drainage water and using it in the reactive dye process of cotton. It also involves separating and purifying agricultural salts and brines to produce value-added salt products, while mitigating environmental impacts of salt accumulation. The university developed a pilot salt separation unit for field testing. The second area of investigation involves pilot scale research at Red Rock Ranch using a solar still to demonstrate various ways of using solar energy to recover potable water from drainage water.

Selenium Removal from Agricultural Subsurface Water. Southern Illinois University completed a report under contract with DWR. The report evaluated methods of removing selenium from agricultural subsurface drainage water using absorbent materials. One of the most prominent results indicated that nano-sized zerovalent Ni-Fe and Fe particles can rapidly reduce and immobilize selenate from the drainage water, despite the presence of sulfates. Nearly 100 percent removal was obtained in five hours under most conditions. The report is available at the DWR/DPLA San Joaquin District website.

DWR continues to participate in cooperative research with the University of California Salinity/Drainage Program (http://www.waterresources.ucr.edu). Activities include a multi-year study for mitigating selenium ecotoxic risk in agricultural drainage systems.

Integrated On-Farm Drainage Management. The Integrated Drainage Management Section, created in 2001, provides technical assistance on Integrated On-Farm Drainage Management (IFDM) systems through advisory, technical, and

oversight committees. IFDM is a drainage management system based on sequential reuse of saline drainage water to irrigate crops of progressively increasing salt tolerance. Each sequential reuse reduces the volume of drainage water and increases the salt concentration. Drainage water too saline for irrigation can be applied to a variety of discharge points. The IFDM program funds, administers, and monitors contracts with State, federal, university, and local entities to learn more about IFDM systems. Findings indicate that IFDM systems have less significant environmental impacts than other options and reduce the volume of drainage water. Staff working on activities investigate the use of accelerated evaporation systems (solar evaporators) for zero discharge systems and evaluate the feasibility of using salt-gradient solar pond systems as a way of removing salt and generating heat or electricity for agricultural use.

IFDM Program staff also:

- coordinate IFDM research activities and data collection with other agencies;
- assist growers and local agencies in planning and developing IFDM system;
- worked with the Westside Resources Conservation District and SWRCB to improve the design, management, and operation of IFDM systems;
- investigate new techniques for zero discharge, including enhanced evaporation techniques and extraction of salts from reused drainage water at a solar still facility at Red Rock Ranch;
- participate in joint investigations with Reclamation to determine the feasibility of nanofiltration as a pretreatment for desalination of subsurface drainage water, using reverse osmosis technology and the feasibility of using a patent biotreatment process to remove selenium from agricultural subsurface drainage water;
- provide assistance to research projects for the development of crops, including research being performed at Red Rock Ranch by CSUF to assess the suitability of various salt-tolerant forages and halophytes for the sequential reuse of drainage water, forage quality, productivity, and water use; and
- cooperate with U.S. Department of Agriculture in an investigation to determine crop production using an active drainage management system that employs insitu use of shallow groundwater and subsurface drainage water.

DWR continues to work cooperatively with Reclamation to investigate the long-term interaction of irrigation, rainfall, and local and regional groundwater with the movement of salts and selenium in the soils of Red Rock Ranch. The project will use a three-dimensional numerical model for fully-integrated subsurface and surface flow and solute transport. DWR continues to monitor a series of observation wells at Red Rock Ranch and surrounding areas collect water quality samples, and measure groundwater levels to provide data for the model. Other activities include the following:

- assisting growers, water and drainage districts, and regional entities, by providing information on salt-tolerant grasses and IFDM design specifications;
- assisting SWRCB to develop policies for the management of drainage water, salt, and selenium;
- constructing a pilot solar evaporator to collect data on evaporation rates of subsurface drainage water, using

nozzles, screens, and other devices and materials. The purpose is to develop design specifications for evaporating and recovering salts from drainage water in the solar evaporator, to determine optimum weather parameters to operate it, and to study methods to minimize and control potential salt drift. The results and conclusions from the pilot model will be used to scale a solar evaporator for the 640-acre IFDM system at Red Rock Ranch and future IFDM systems in the Central Valley.

IFDM Manual. DWR contributed to the publication of a *Technical Advisor's Manual, a Guide for Designing IFDM systems*. Published in 2005, it serves as a companion to the landowner's manual, *A Landowner's Manual Managing Agricultural Irrigation Drainage Water: A Guide for Developing Integrated On-Farm Drainage Management Systems.* DWR held two seminars in Five Points and Bakersfield to educate growers and professionals. The seminars included field trips to farms that have implemented IFDM systems. Participants toured Red Rock Ranch in Fresno County and AndrewsAg in Kern County. AndrewsAg is unique in that the owner closed evaporation basins and converted the system to include a solar evaporator.

DWR staff continues to assist Reclamation on performing project tasks for the HydroGeoSphere project at Red Rock Ranch. To facilitate development of the conceptual model, DWR staff collected topographic survey data of Red Rock Ranch and surrounding area to determine elevation points and to locate fixed works, such as sumps, pumps, and wells. The model results from this case study will be useful for the formulation of optimal design and management guidelines for IFDM systems.

Researchers at California State University Fresno (CSU, Fresno) and Center for Irrigation Technology studied the particle emissions produced by the operation of a pilot module solar evaporator at Red Rock Ranch. Information is needed to determine if the salt emissions from the solar evaporator are significant or of a threshold subject to air quality regulations. The principal air quality concerns arising from particle emissions produced by the operation of the solar evaporator are those related to particulate matter (PM) standards, PM10 or PM2.5. Field sampling involved collecting data during nine sampling periods of various weather and water quality conditions to determine the salt deposition patterns. From this data, researchers measured salt deposition and used characteristic equations to model the deposition pattern. The study concluded that the particles small enough to be regulated are a very small fraction of the total emissions. Among the findings, to prevent significant salt deposition from occurring on salt sensitive crops, 200 meters appears to be the maximum amount of buffer zone needed downwind of the solar evaporator (or 100 meters if crop is salt tolerant). Information from this study offers a framework to solar evaporator designers and operators for adhering to air quality and emission standards.

DWR staff used GIS technology to map more than 100 locations of salt-tolerant tree plantations and plant materials and link to information on growth, salinity tolerances, and survival. These plantings began in the mid 1980s,

with the origination of the agriforestry concept, while new plantings continue as components of the IFDM system. Salt-tolerant trees and plant materials are used to lower shallow groundwater, intercept regional groundwater, and in agricultural subsurface drainage reuse. The GIS database will be used to disseminate geographic locations of these plantings and will serve as the central information system for anyone seeking site-specific information on performance of salt-tolerant plantings in the San Joaquin Valley.

DWR is continuing research on *Prosopis alba* in cooperation the Forestry Research Station, at Catholic University of Santiago del Estero (CUSE) in Argentina. Prosopis alba is a highly salt-tolerant tree species and holds promise of ameliorating subsurface drainage problems in the soils of the western San Joaquin Valley. There is good potential for investment of the agriforestry component in an IFDM system. The lumber is coveted by the furniture industry and has a value of $1,000 ton-1 of sawn lumber. Research and development is needed to perfect the process for the reliability of massive production of elite Prosopis alba for large-scale reforestation. The CUSE provided approximately 2,000 scarified Prosopis alba seeds to initiate plantation trials in the San Joaquin Valley. After inspection and quarantine in a USDA facility, the seeds were taken to a plant nursery to produce plants needed for trials at five locations within drainage-impaired lands.

Feasibility Analysis of Solar Evaporation and Recovery of Dissolved Salts from Agricultural Drainage Water in the San Joaquin Valley:

1) The evaluation of the data from the pilot test at Red Rock Ranch demonstrates that accumulated salt can be leached from soil and that future buildup of salt in the soil can be prevented.
2) Proposed control of the brine chemistry during evaporation includes remedial removal of scale, equipment replacement, or to prevent scale deposition. Separation of boric acid, magnesium oxide, sodium chloride, and potassium nitrate may be useful in dealing with scaling and provide for the potential of salable quality products.
3) The brine recovered from agricultural drainage water is well-suited for use in a salt gradient solar pond for electric power generation, refrigeration, or any other use for low-grade heat.
4) Onsite storage of mixed agricultural salts will be necessary until all the detailed design data is developed for a large-scale plant design. Researches and engineers initiated the process of developing the fundamental solubility data for specific salt mixtures present in drainage waters in the San Joaquin Valley.

DWR staff continues to collect operational data from IFDM projects at Red Rock Ranch and AndrewsAg for analysis of performance. DWR staff provided technical information and assistance on an agriforestry planting program in Kern County on farms with salinity and shallow groundwater problems.

Drainage Reduction and Reuse Program. DWR's Drainage Reduction and Reuse Program, managed by Office of Water Use Efficiency (OWUE), offers technical assistance, information, and other resources to growers and irrigators for

applying irrigation water efficiently to reduce both excessive deep percolation and drainage water from the immediate on-farm source, while maintaining salt balance in the root zone.

The program objective is being achieved through on-farm demonstration projects, studies, research, training, and workshops on scheduling irrigation, management, advances in irrigation technologies, evaluating irrigation systems, reusing drainage water, and managing salinity.

Several on-farm demonstrations and other studies for salinity and irrigation management are ongoing. They help improve and advance irrigation management, fine-tune the performance of irrigation hardware, and increase grower and irrigator knowledge.

Staff is presently involved in managing in-progress contracts and preparing technical reports on the on-farm demonstrations projects and studies. Staff is also preparing semi-technical summary reports of findings and results of completed projects.

Management of Contracts

In-progress contracts for research and demonstration projects and contracts for workshops are designed to disseminate state-of-the-art irrigation technologies and management practices to reduce and manage drainage water. The following contracts were developed from a Request for Proposals process, which was targeted for State water contract areas. The contracts include the following:

- *Integrated Management of Irrigation and Shallow Groundwater*—field demonstration at Westlake Farms of irrigation management techniques to optimize crop use of shallow groundwater.
- *Using Forage Grasses and Livestock to Manage Subsurface Drainage Water in the San Joaquin Valley*—field demonstration at Westlake Farms to evaluate the feasibility of growing Bermuda, Elephant, and other salt-tolerant grasses with subsurface drainage water as livestock forage.
- *Center for Irrigation Technology Irrigation/ Drainage Management Workshops*—training and educational workshops on recent advances in irrigation and drainage management at CSU, Fresno.
- *Irrigation Management Education and Training Workshop Through the Use of Demonstration Farms*—workshops that provide practical methods of irrigation management at on- farm demonstration sites, effectiveness of various practices will be determined through the use of a mobile irrigation lab.
- *Educational and Training Workshops for all Prevalent Irrigation Systems in California*—workshops designed for staff from irrigation/water districts, farming communities, consultants, and the public.
- *Irrigation System Evaluation short courses conducted by Cal Poly.* These two workshops, each two-half day, are designed to provide hands–on training and education for irrigators, and those that are involved in irrigation decision process.

Environmental Services

The Environmental Services Section investigates and reports on short- and long-term use and operation of evaporation ponds, IFDM, and other systems used for disposal and/or management of drainage water. During 2005, the section continued to assist CVRWQCB in assessing the biological implications of proposed and implemented modifications to evaporation basins. Environmental investigations include the following:

- Red Rock Ranch research projects that involve required biological monitoring activities in accordance with Waste Discharge Requirements;
- IFDM wildlife monitoring and development of BMP. DWR continues to monitor avian wildlife at the existing Red Rock Ranch IFDM terminal reuse areas, which include a solar evaporator, halophyte plots, and salt tolerant grasses. DWR biological staff, in cooperation with the United States Fish and Wildlife Service (USFWS) completed a study to determine adequate long-term wildlife impact and avoidance assessment and BMP for current and future IFDM projects. This information is crucial because IFDM systems that are not managed can result in selenium-induced avian teratogenesis (developmental defects). IFDM appears to be a viable drainage management tool, when managed in a way that avoids or minimizes wildlife impacts posed by other drainage water management techniques, such as evaporation ponds assisting in evaporation pond studies. DWR continues to provide assistance with invertebrate collection and species identification at San Joaquin Valley evaporation ponds. This information is being used by several UC studies that are evaluating food chain transfer of selenium and insitu volatilization.
- Assisting landowners in locating information for preparing California Environmental Quality Act (CEQA) documentation necessary for obtaining permits and authorization for implementing, monitoring, and operating drainage reduction, treatment, and disposal projects;
- Mapping agriforestry and herbaceous plots in drainage-impacted areas, using Global Positioning System technology. Information was then imported into a Geographic Information System format linked to a database created to track key information associated with development of the vegetation plots;
- Responding to information requests from landowners wanting a better understanding of the CEQA and National Environmental Policy Act (NEPA) public review process, so they would be able to more meaningfully comment on upcoming State and federal drainage related projects; and
- Reviewing quarterly and annual environmental monitoring reports related to evaporation pond operation and investigation.

San Joaquin River Water Quality Improvement Program

DWR Agricultural Drainage Program, in collaboration with other agencies, continues to make significant efforts to improve water quality in the San Joaquin River to benefit the State and DWR water contractors. These efforts are aimed to control salinity and selenium discharges upstream of Vernalis. They include promoting on-farm and regional

water management activities to reduce subsurface drainage, real-time water quality management to maximize the assimilative capacity of the San Joaquin River, and efforts to time wetlands discharges when there is assimilative capacity in the San Joaquin River.

On-Farm and Regional Drainage Management Activities

Drainage management activities involving source control and drainage reuse have proven to be effective in reducing salt loads in the San Joaquin River.

This is demonstrated by the efforts of the Grasslands Area farmers on the Grasslands Bypass Project (GBP). Since the implementation of the GBP, drainage discharges have decreased from 58,000 af to about 30,000 af, and salt loads have been reduced from 210,000 tons to 117,000 tons. The reductions are possible because DWR funded through Proposition 13, an important component of the GBP, the San Joaquin River Improvement Project. It consists of about 4,000 acres of lands dedicated for reuse of subsurface drainage water, generated by Grasslands Area Farmers to grow salt-tolerant crops. DWR continues to provide technical assistance to continue improving and developing this important part of the GBP project.

DWR continues to collaborate with many entities in efforts proposed to control, reduce, or eliminate drainage water discharges into the San Joaquin River, such as the West Side Regional Plan, Reclamation's San Luis Drainage Feature Reevaluation to provide drainage service to the San Luis Unit of the Central Valley Project and by promoting Integrated On-Farm Drainage Management Program that DWR and collaborating agencies maintain.

DWR collaborated with the San Joaquin River Water Quality Management Group to develop a paper with ideas, information, and concepts to assist policy makers in deciding what actions will be implemented, strategies to meet water quality objectives in the San Joaquin River, specifically salinity at Vernalis and dissolved oxygen in the Stockton Deep Water Channel.

Real-Time Water Quality Monitoring Program

The Real-time Water Quality Monitoring Program (RTWQMP) provides information on existing water quality conditions and forecasts flow and water quality conditions to San Joaquin River water managers and stakeholders. The information provided is important for improving the management and coordination of reservoir releases, agricultural and wetland drainage flows, and eastside tributary releases to achieve water quality objectives at the San Joaquin River compliance points. In the early stages, the RTWQMP was funded by Reclamation and then by CALFED. Currently, DWR has assumed responsibility for funding most of the RTWQMP for the San Joaquin River.

One important activity of this program is forecasting flow and salinity conditions on the San Joaquin River, so decision makers can take advantage of assimilative capacity of the river when available. For this purpose, DWR collects data from the network of stations and inputs it into the San Joaquin River Input-Output Day (SJRIODAY) model. The model forecasts salinity and flow conditions on the River

near Vernalis, and other upstream stations on a biweekly basis. DWR publishes the information on its website on a weekly basis. Figure 5-1 shows an example of the information displayed.

Efforts to Improve Wetlands Discharges

As per Central Valley Regional Water Quality Control Board (CVRWQCB) data, wetlands discharges contributed about nine percent of the total salt load in the San Joaquin River at Vernalis. The contribution is likely to be higher today, as additional water supply and land are acquired for wetlands wildlife refuges, through Central Valley Project Improvement Act (CVPIA), Environmental Water Account (EWA), and other programs. The timing of wetland releases with assimilative capacity of the San Joaquin River could result in significant water quality improvements. However, little has been done in this regard, due to concerns over disrupting existing, proven wetland management practices.

Research is undergoing to determine if improved wetlands management practices can be achieved for the benefit of both wildlife and San Joaquin River water quality. Current research has focused on real-time water quality monitoring and adaptive management. Research goals are to coordinate the timing of wetland discharges, when assimilative capacity is available. In addition to funds provided

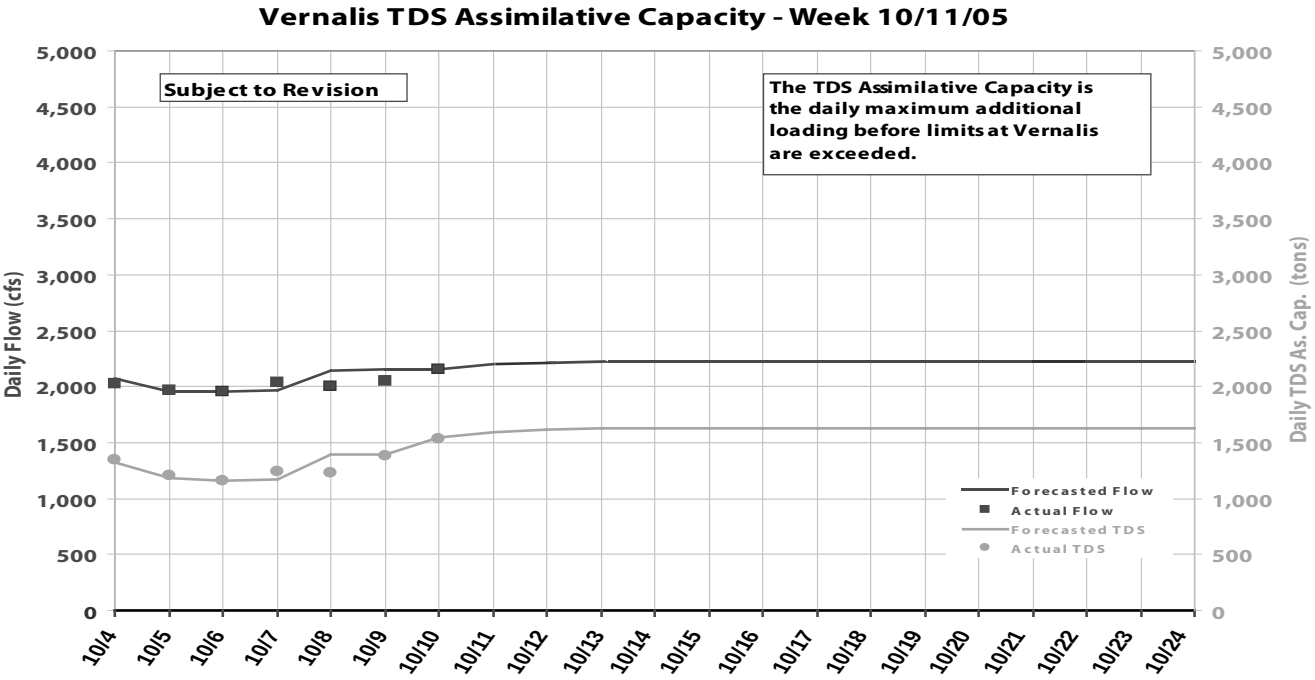

Figure 5-1. San Joaquin River Input-Output Day Modeling Forecasts Example

by CALFED for the study of the *Effect of Delayed Wetland Drawdown on Moist Soil Plants*, staff from DWR is collaborating with the Department of Fish and Game (DFG) and private wetlands, in a study to assess other aspects of delayed wetland drawdown. The studies on delayed wetland drawdown will be complemented by a study funded by DWR, under Proposition 204 (drainage subaccount). Real-time Water Quality Monitoring Program staff manages the contract.

The ADP prepared information for DWR to submit, as part of its testimony for the hearing on the cease and desist order issued by the SWRCB in 2005 against DWR. The referred testimony describes Decision 1641 actions that DWR has been implementing to improve salinity conditions in the San Joaquin River upstream Vernalis.

Environmental Impact Documents Review

The Environmental Review Section in the Division of Planning and Local Assistance screens State Clearinghouse documents and circulates SWP-related materials for review by DWR's four districts, as well as DPLA, Division of Operations and Maintenance, and the Division of Engineering. In addition, other divisions and offices are notified of activities and are asked to comment when their expertise is required.

Some environmental impact documents handled by the State Clearinghouse concern proposed activities that would affect the SWP. State Clearinghouse documents are regularly reviewed to identify any public safety or liability issues arising from the proposed activities.

From January through December, about 4,714 documents were screened by the Environmental Review Section; 1,056 were referred for detailed review. Of these referrals, 794 were made when the projects were at the Notice of Preparation or Early Consultation stage and 262 assignments were for negative declarations, environmental impact reports, and NEPA environmental assessments. O&M received 136 formal referrals and two for information. The State Water Project Analysis Office (SWPAO) received 11 formal referrals and 20 for information. In addition to the information referrals made to O&M and SWPAO, 749 other information referrals were made to other DWR staff.

Comments submitted to the lead agencies addressed a number of issues, including runoff from proposed developments, safety and water supply, encroachment on physical facilities, and water quality. During 2005, several requests for additional data were made to lead agencies when the environmental document did not contain enough information. Additional departmental actions, involving such items as encroachment permit submittals and informal comments took place, but are not tracked by the Environmental Review Section. During 2005,12 documents involving tribal gaming issues were assigned to the districts for review. These projects are of special concern to the State and require a specific review process. While none of these projects affected the SWP in 2005, they have a potential for causing future concerns.

During 2005, the Environmental Review Section tracked documents related to development along the California

Aqueduct, levee encroachment, water transfers and other water supply issues, wastewater treatment, quarry development, and electrical transmission lines near SWP facilities.

While the additional emphasis on preliminary screening started in 2004 was continued in 2005, several factors contributed to a higher number of referrals in 2005. These factors included an increase in overall documents circulated through the State Clearinghouse and a continued increase in development near State Water Project facilities, including the East, West and Coastal Branches of the California Aqueduct.

Water Conservation Bond Laws

To assist local agencies in obtaining financing for their water management programs, California voters approved six bond laws between 1984 and 2002, authorizing DWR to provide low-interest loans and grants to fund project feasibility studies or construction activities.

- The Clean Water Bond Law of 1984 (Proposition 25) authorized $10.5 million for water conservation projects.
- The Water Conservation and Water Quality Bond Law of 1986 (Proposition 44) authorized $75 million for water conservation and groundwater recharge projects.
- The Water Conservation Bond Law of 1988 (Proposition 82) authorized $60 million for water conservation, groundwater recharge, and new local water supply improvements.
- The Safe, Clean, Reliable Water Supply Act of 1996 (Proposition 204) authorized $55 million for water conservation, groundwater recharge, and local water supply projects.
- The Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act of 2000 (Proposition 13) authorized $535 million for agricultural and urban water conservation, groundwater recharge, infrastructure rehabilitation, groundwater storage, and interim reliable water supply projects and studies.
- The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50, Chapter 8) authorized $500 million for the Integrated Regional Water Management Grant Program to be implemented jointly by DWR and SWRCB.

Under these programs, grants are available and construction loans are also available with repayment of up to 20 years, at reduced interest rates for most programs.

Propositions 25, 44, and 204

Funding is fully obligated.

Proposition 82

Water supply loan funding is still available.

Proposition 13

Agricultural water conservation loan funding is still available.

All loan and grant funds for the Groundwater Recharge, Infrastructure Rehabilitation, Urban Water Conservation, Groundwater Storage and Interim Reliable Water Supply programs has been obligated.

Proposition 50

DWR, in collaboration with the SWRCB, conducted the first funding cycle for the Integrated Regional Water Management program. Proposal Solicitation Packages were prepared and issued for Planning Grants and the Implementation Grants. Program staff conducted regional workshops to assist potential applicants in completion of the applications. Planning grant applications were reviewed and evaluated and preliminary funding recommendations were developed and released for public comment. Step 1 Implementation grant proposals were reviewed. Also funded from Proposition 50 funds, the Local Groundwater Assistance program reviewed and evaluated applications, held a Technical Advisory Panel and public meeting, developed recommendations, and awarded $6.4 million in grants to 30 local public agencies for groundwater data collection, modeling, monitoring and management studies; monitoring programs and installation of equipment; basin management; and development of information systems.

Among other approval criteria for most of the Water Conservation Bond Law programs, applicants must demonstrate that project benefits equal or exceed project costs. Typical projects fall under the following categories:

Agricultural Water Conservation

- improvements to, or replacement of, distribution and storage systems;
- lining and piping ditches;
- lining or covering reservoirs; and
- capital outlay features of agricultural water conservation programs

Local Water Supply

- new conveyance and/or storage facilities groundwater extraction facilities, well-field development
- groundwater extraction facilities, well-field development
- desalination (ocean or brackish groundwater recovery)

Integrated Regional Water Management

- projects to protect communities from drought, protect and improve water quality, and improve water security by reducing dependence on imported water. Table 5-1 summarizes the number of projects and funds committed for each of the six bond laws through December 2005.

Table 5-1. Water Conservation Bond Laws - Projects and Funding

Bond Law	Type of Project	Number of Projects [a]	Funding [a] (millions of dollars)
Clean Water Bond Law of 1984	Water Conservation	7	9.74
Water Conservation and Water Quality Bond Law of 1986	Water Conservation	24	41.60
	Groundwater Recharge	10	28.04
	Subtotal	*34*	*69.64*
Water Conservation Bond Law of 1988	Water Conservation	7	17.44
	Groundwater Recharge	8	24.30
	Local Water Supply	4	9.00
	Subtotal	*19*	*50.74*
Safe, Clean, Reliable Water Supply Act of 1996	Water Conservation	2	7.00
	Groundwater Recharge	5	22.10
	Local Water Supply	23	23.48
	Subtotal	*30*	*52.58*
Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act of 2000	Agricultural Water Conservation	13	1.18
	Urban Water Conservation	54	28.00
	Groundwater Recharge	24	28.30
	Infrastructure Rehabilitation	42	56.40
	Groundwater Storage	41	180.00
	Interim Reliable Water Supply	13	169.31
	Subtotal	*187*	*463.19*
Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002	Local Groundwater Assistance	84	18.40
	Integrated Regional Water Management	1	6.89
	Subtotal	*85*	*25.29*
	All Water Conservation	107	104.96
	All Groundwater Recharge	47	102.74
	All Local Water Supply	27	32.48
	All Infrastructure Rehabilitation	42	56.40
	All Groundwater Storage	41	180.00
	All Interim Reliable Water Supply	13	169.31
	All Local Groundwater Assistance	84	18.40
	All Integrated Regional Water Management	1	6.89
	Total of All Projects	**362**	**671.18**

[a] Construction and feasibility study loan and grant commitments as of December 31, 2005

Chapter 6
Legislation and Litigation

The California State Capitol, located in Sacramento, California.

Significant Events in 2005

AB 1200 requires DWR to prepare a report evaluating the impacts on Sacramento-San Joaquin Delta water supplies of various possible future events, including levee subsidence, earthquakes, floods, and climate change no later than January 1, 2008.

On April 29, 2005, 14 of the 29 State Water Contractors brought suit against DWR. These contractors claimed the method used by DWR to allocate costs and revenue of its Hyatt and Thermalito Power Plants (Hyatt-Thermalito) at Lake Oroville violated the terms of long-term water supply contracts. (Alameda County Flood Control & Water Conservation District, Zone 7 et al. v. State of California Department of Water Resources (Sacramento County Superior Court, Case No. 05ASO1775).) In December 2005, entities representing 13 other contractors intervened in the lawsuit in opposition to the claims of the plaintiffs and in support of DWR's method of allocating costs and revenue. If the water contractors who filed the lawsuit are ultimately successful, this could result in contractors requiring the most pumping for delivery of their State Water Project water to pay more to DWR, while those contractors requiring less pumping would pay less.

Information for this chapter was provided by the Assistant Director, Legislative Affairs Office, and the Office of the Chief Counsel.

The Department of Water Resources (DWR) monitors State and federal legislation that affects the management of the State Water Project (SWP). Legislative bill tracking involves reviewing legislation at its introduction, evaluating amendments in State Assembly and Senate committee hearings, and monitoring its enactment into law. The DWR Assistant Director for Legislation monitors proposed legislation. The Office of the Chief Counsel tracks State and federal litigation that impacts management of the SWP. The DWR Chief Counsel also manages legal cases that involve SWP operations.

Legislation

State Legislation

AB 1200 (Laird) Sacramento-San Joaquin Delta (Chapter 573, Statutes of 2005).

AB 1200 requires DWR to prepare a report evaluating the impacts on Sacramento-San Joaquin Delta water supplies of various possible future events, including levee subsidence, earthquakes, floods, and climate change no later than January 1, 2008. The report also requires DWR, in cooperation with the Department of Fish and Game (DFG), to comparatively rate the options available to prevent disruption of Delta water supplies, improve Delta drinking water quality, reduce the salts in Delta water, maintain Delta water quality, preserve Delta lands, protect area of origin water rights, protect infrastructure located in the Delta, and restore salmon and other fisheries in the Delta.

AB 1328 (Wolk) Wild and Scenic Rivers: Cache Creek (Chapter 576, Statutes of 2005).

AB 1328 includes various sections of Cache Creek, which is located in Lake and Yolo counties, within the California Wild and Scenic Rivers system. This bill protects existing and future water rights for various public water agencies within the Cache Creek watershed; provides that the wild and scenic designation would not hinder efforts to remove invasive plant species or toxic substances from the river; and prohibits the State from petitioning for a federal wild and scenic designation of the river.

SB 264 (Machado) Delta Flood Protection Fund (Chapter 583, Statutes of 2005).

SB 264 extends the Delta Flood Protection Fund until July 1, 2008, to help implement the Delta Levee Maintenance Subventions Program.

SB 543 (Margett) State Water Project (Chapter 263, Statutes of 2005).

SB 543 requires individuals and entities to obtain a permit before construction, improvement, excavation, work, or other use is conducted within SWP right of way. This bill requires DWR to issue a general encroachment permit for routine operation and maintenance activities to public agencies that have a water delivery contract with DWR. The general encroachment permit would be issued for a period not to exceed 10 years. This bill provides that any person or entity responsible for an unauthorized encroachment would be guilty of a misdemeanor and liable for a $1,000 per day penalty.

Federal Legislation

The Energy Policy Act of 2005 was signed into law on August 8, 2005, by the president. One major element of the act includes the development of energy corridors. The U.S. Secretary of Energy was ordered to conduct a study of electric transmission congestion. This study must be completed within a year and be updated every three years after the original study's implementation.

The act designates the construction of National Interest Electric Transmission Corridors to meet the criteria of: (1) economic vitality; (2) economic growth; (3) energy independence; (4) interest of national energy policy; and (5) enhanced national defense and homeland security.

Another major element of the act was the creation of an Electric Reliability Organization by the Federal Energy Regulatory Commission (FERC). In addition, FERC is directed by the act to conduct investigations on transmission rate reform and demand response.

The act further requires FERC to establish, within one year, an incentive-based rate treatment for transmission. The purpose of this rate treatment is for consumers to receive the reduction of the cost of delivered power and the benefits of reliable transmission. These savings are due to the reduction of transmission congestion. The changes are anticipated to provide additional economic incentives for the construction of transmission. Higher transmission rates are anticipated to be partially offset by lower energy rates, which will be made available to the typical customer.

FERC is required by the act to prepare an annual report, by region, to assess electricity demand response resources. This report will include resources available from all consumer classes. FERC will determine the potential for demand response, as a resource for planning purposes, and to ensure that demand resources are provided equitable treatment.

Litigation

As of December 31, 2005, DWR was involved in, or closely monitored, a number of court cases and other actions related to the management of the SWP.

Sacramento-San Joaquin Delta

Delta Smelt

A coalition of environmental groups challenged the Biological Opinion issued by the U.S. Fish and Wildlife Service (USFWS). This opinion finds that SWP and Central Valley Project (CVP) operations will not jeopardize the continued existence of the delta smelt. (*Natural Resources Defense Council, et al. v. Gale A. Norton, et al.* (U.S. District Court for the Eastern District of California, 2005, Case No. 05 CV 01207 OWW (LJO)).) The plaintiffs claim the opinion fails to adequately consider or address the effects of the U.S. Bureau of Reclamation's (Reclamation's) delivery of water on delta smelt. This water delivery will be provided in soon-to-be renewed long-term water service contracts. The plaintiffs seek to have the U.S. Department of the Interior and USFWS withdraw the opinion and not take any action in reliance upon it. DWR filed a motion to intervene to protect its interests in the biological opinion, relevant to the operations of the SWP. The court granted this motion on December 12, 2005.

State Water Resources Control Board Hearing

In February 2005, DWR and Reclamation petitioned the State Water Resources Control Board (SWRCB). This petition called for a temporary change and delay of the effective date to implement the southern Delta agricultural objective in Decision 1641 (D-1641). This objective was scheduled to begin on April 1, 2005. A second petition was submitted to request a change of the implementation date to April 1, 2008. (This date matches the date when the South Delta permanent gates are scheduled for operation.) SWRCB denied the first petition. No action was taken on the second petition.

On May 3, 2005, SWRCB notified DWR and Reclamation of its intention to issue a cease and desist order. This order regarded a threatened violation of the southern Delta agricultural water quality objective of 0.7 electrical conductivity. This water quality objective was scheduled to be in effect annually, from April 1 through August 31, beginning in 2005. SWRCB D-1641 conditioned the operation of the SWP and CVP with implementation of this agricultural objective. DWR and Reclamation requested a hearing on the cease and desist order. In October and November 2005, DWR and Reclamation presented evidence and argued that the cease and desist order should not be issued.

On December 30, 2005, SWRCB issued a proposed draft cease and desist order. The draft order requires DWR and Reclamation to construct permanent gates in the southern Delta—or take alternative measures for achieving water quality objectives—by 2009. In addition, the draft order requires DWR and Reclamation to report to SWRCB if they violate or threaten to violate the water quality requirements and to report the reasons for the violation. SWRCB would then determine if enforcement actions are necessary. SWRCB set a hearing date to consider adoption of this proposed order in January 2006.

Decision 1641

The SWRCB implemented D-1641, which created certain long-term water quality objectives. These objectives were published in the May 1995 Water Quality Control Plan (1995 Plan) for the Sacramento-San Joaquin Bay-Delta Estuary. Eleven different lawsuits were filed and coordinated in this action, which challenged D-1641 on three grounds: (1) whether D-1641 complied with the California Environmental Quality Act (CEQA); (2) whether the changes in D-1641 injured certain Delta water users; and (3) whether D-1641 was consistent with area of origin laws. (Coordinated Special Proceedings, State Water Resources Control Board Cases, Court of Appeals, Third District, Case No. C044714 (Sacramento County Superior Court; Case No. JC 4118).) The Sacramento County Superior Court upheld D-1641. The Superior Court found that D-1641 improperly limited the place of use for Westlands Water District, and it improperly implemented the San Joaquin River flow objectives under the San Joaquin River Agreement. This matter is on appeal.

Delta Wetlands

A private initiative to develop two Delta islands into water storage facilities was challenged. (*Central Delta Water Agency, et al., v. State Water Resources Control Board, et al.* (2004) 124 Cal. App.4th 245.) This proposal stated that once the project was built, purchasers of the stored water

would be identified, and likely purchasers would be users within CVP or SWP service areas. The appellate court found that the SWRCB issued an invalid Delta wetlands water right permit. The court held that the State Constitution and Water Code require SWRCB to determine the actual intended beneficial use of the impounded water before issuing a permit. The court found it insufficient for SWRCB to issue a general statement of potential beneficial use with limiting conditions. On March 16, 2005, the California Supreme Court denied review of this case, and the decision of the Third District Court of Appeals is now law.

CALFED Litigation

The CALFED Record of Decision (ROD) issued on August 28, 2000, was challenged by environmental groups and agricultural interests in both State and federal courts. The ROD established program measures to help resolve conflicts over the use of water in the Delta. Initially, three complaints were filed in State courts: *Laub v. Davis, et al.* (California Farm Bureau Federation (Farm Bureau) and three individuals); *Regional Council of Rural Counties v. State, et al.* (RCRC and South and Central Delta); and *Municipal Water District of Orange County v. Resources Agency*. Subsequently, these cases were coordinated in the Sacramento County Superior Court. The parties to the third suit settled, based on an agreement that emphasizes the importance of the CALFED Science Program. This agreement also provides notice to the water district about the CALFED stakeholders' opportunity to participate in offering information about these issues.

The remaining parties claimed the CALFED programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR) violates CEQA, National Environmental Policy Act (NEPA), and the federal Administrative Procedure Act. The Superior Court found in favor of the plaintiffs. The State agencies appealed, and oral argument was held on August 30, 2005. The two cases were consolidated on appeal, and the Appellate Court reversed the lower court (*In Re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings*, Court of Appeals, Third District, Consolidated Case Nos. C044267 and C044577).

The court rejected the vast majority of arguments by the Farm Bureau, Regional Council of Rural Counties, and the South and Central Delta water agencies. However, the court reversed the trial court's judgment in favor of the State CALFED agencies. The court found programmatic EIR/EIS was required to identify the sources of water for the CALFED program. Specifically, programmatic EIR/EIS should have considered whether reducing current exports would restrict projected growth and the subsequent need for that water. The court found that programmatic EIR/EIS should have provided more information on the entire CALFED program. The court emphasized that programmatic EIR/EIS should have provided more information on the Environmental Water Account (EWA) component of the CALFED program.

The California Supreme Court filed a Petition for Review on November 16, 2005. The issue of whether federal agencies violated NEPA is pending in federal district court.

Environmental Water Account

On April 16, 2004, the Farm Bureau challenged the adoption of a final EIS/EIR. The Farm Bureau filed a CEQA claim against DWR (*California Farm Bureau Federation v. Mike Chrisman, et al.* (Sacramento County Superior Court, Case No. 04CS00490)). The EIS/EIR covered the operation of the EWA through 2007—the end of the first stage of implementation of the CALFED Program. The Farm Bureau contends that the EIS/EIR does not adequately address "agricultural resources" when analyzing impacts, alternatives, mitigation, and other issues regarding EWA operations. The parties have reached a settlement in this matter and have filed a request for dismissal with prejudice.

Term 91

Two lawsuits were filed in 2004 that challenged SWRCB Decision 2001-22. This decision approved an application by El Dorado Irrigation District to divert water for urban purposes. (*El Dorado Irrigation District v. State Water Resources Control Board*); California Court of Appeal, Third District, Case No. C046211. See also (*El Dorado Irrigation District v. State Water Resources Control Board*); Sacramento County Superior Court, Case No. 01CS01319 and consolidated cases, filed June 18, 2002. El Dorado Irrigation District and El Dorado County Water Agency challenged the imposition of Term 91, which protects SWP stored water, as part of the decision. Another lawsuit was filed by an environmental group, the League to Save Sierra Lakes, which alleged CEQA violations. The court issued its final decision in December 2003, finding that Term 91 was improperly applied to the El Dorado Irrigation District. SWRCB appealed the decision, and the cases are pending on appeal.

Hydropower

Hyatt-Thermalito

On April 29, 2005, 14 of the 29 State Water Contractors brought suit against DWR. These contractors claimed the method used by DWR to allocate costs and revenue of its Hyatt and Thermalito Power Plants (Hyatt-Thermalito) at Lake Oroville violated the terms of long-term water supply contracts. (Alameda County Flood Control & Water Conservation District, Zone 7 et al. v. State of California Department of Water Resources (Sacramento County Superior Court, Case No. 05ASO1775).) In December 2005, entities representing 13 other contractors intervened in the lawsuit in opposition to the claims of the plaintiffs and in support of DWR's method of allocating costs and revenue. If the water contractors who filed the lawsuit are ultimately successful, this could result in contractors requiring the most pumping for delivery of their State Water Project water to pay more to DWR, while those contractors requiring less pumping would pay less.

Refunds on Power Sales

In 2000, FERC initiated an investigation in response to a complaint filed by San Diego Gas & Electric (SDG&E). This complaint claimed that the California Independent System Operator (CAISO) and California Power Exchange electric energy markets were producing unjust and unreasonable prices. As a result, FERC ordered public entities to provide refunds for the sales of ancillary services to the CAISO markets in 2000 and 2001. This order was challenged by large numbers of participants, including DWR and State Water Contractors. In September 2005, the 9th Circuit Court of Appeals ruled that FERC lacked jurisdiction under the Federal Power Act to order governmental agencies, such as DWR,

to provide refunds. (*Bonneville Power Administration, et al. v. Federal Energy Regulatory Commission et al.*, (9th.Cir. 2005) 422 F.3d 908.) Any party wishing to challenge this decision must request an "en banc" hearing before the full 9th Circuit Court by January 2007. DWR should have no refund obligation, unless the 9th Circuit Court order is reversed.

In December 2005, a group of California entities filed separate claims with the Victim Compensation and Government Claims Board. These claims were filed as a result of the 9th Circuit Court ruling. The organizations filing these suits included the Pacific Gas & Electric Company (PG&E), Southern California Edison (SCE), SDG&E, and the California Oversight Board. The suits are against a number of California government entities, including DWR. These claims seek partial refunds from the sellers of energy and related services in the years 2000 and 2001. The suits contained similar allegations regarding partial refunds as those made in the original complaint to FERC.

Other Cases

Several cases pending resolution may affect SWP operations and costs. The first case involves a FERC ruling that the cost of certain PG&E transmission facilities should be integrated into grid-wide charges to CAISO customers, including DWR. The department has appealed these charges on the basis that the facilities primarily benefit PG&E—not the grid as a whole—and the cost allocation mechanism should reflect this fact. (*California Department of Water Resources v. Federal Energy Regulatory Commission*, U.S. Court of Appeals for the Ninth Circuit (No. 04-76131).)

The *California Department of Water Resources v. Federal Energy Regulatory Commission* (U.S. Court of Appeals for the Ninth Circuit (No. 04-73577)) case involves a challenge to the manner in which the costs for the transfer of transmission facilities are allocated. FERC approved the transfer of transmission facilities at Anaheim and Riverside to CAISO. As part of this transfer, costs for the facilities were spread to the users of the grid, including DWR. The department is contesting the cost allocation mechanism in a current FERC proceeding. This appeal preserves the ability of DWR to contest costs in the administrative cost allocation proceeding.

The *California Department of Water Resources v. Federal Energy Regulatory Commission* (U.S. Court of Appeals for the Ninth Circuit (No. 05-74488)) case involves a challenge to the FERC decision concerning transmission access charge methodology. This charge is imposed on users of the CAISO grid to recover the embedded costs of the grid. DWR has appealed these charges, primarily on the basis that FERC failed to use time-of-use methodology.

The *California Department of Water Resources v. Federal Energy Regulatory Commission* (U.S. Court of Appeals for the District of Columbia, Case No. 04-7290) case involves a DWR challenge to a FERC order that gives CAISO the ability to dispatch (request to turn off or on) SWP generation and pumps based on economic criteria and without regard to water management needs.

DWR intervened in *Sacramento Municipal Utility District (SMUD) v. Federal Energy Regulatory Commission*, (D.C. Cir.) No. 04-1171, to support the SMUD claim

that SMUD has renewal rights to its extra-high voltage contract with PG&E. This high voltage contract terminated in 2005. DWR contended that its similar contract with PG&E provided renewal rights. The court ruled in favor of FERC, finding that SMUD did not have a right to an automatic renewal of the contract under federal energy law. This case is now final.

Colorado River

Two lawsuits related to the Colorado River have potential implications for California water supply. The first lawsuit is *Imperial Irrigation District v. All Interested Persons* and eight related cases (Judicial Council Coordination Proceeding No. 4353, Sacramento County Superior Court). This lawsuit is a series of nine claims, which have been coordinated into a single proceeding, before the Sacramento County Superior Court. These lawsuits challenge the Quantification Settlement Agreement (QSA) and associated actions taken to implement the QSA. The QSA is a collection of 38 agreements that resolve disputes among water users in Southern California, regarding their rights to California's shrinking share of Colorado River water. The QSA facilitates California's plan to reduce its use by settling disputes regarding priority and use. For example: (1) transferring of conserved agricultural water from the Imperial Irrigation District (IID) to San Diego County Water Agency (SDCWA) for urban uses; (2) establishing water budgets for the parties; and (3) providing for the mitigation of environmental impacts and the restoration of the Salton Sea. Proceedings in the superior court have been stayed, pending oral argument before the Third District Court of Appeal, on Imperial County's petition for writ of mandate.

Consejo de Desarrollo Economico de Mexicali, A.C. et al. v. Norton, et al. (U.S. District Court, District of Nevada, Las Vegas, Case No. CV-S-05-0870-KJD-PAL), is a challenge to Reclamation lining the All American Canal. The All American Canal lining is a water conservation project that is an integral part of the QSA. The State, through DWR, is contributing $220 million to the canal lining project. Mexican business leaders and California environmental groups filed a lawsuit that challenges the Secretary of the Interior and the Commissioner of the Bureau of Reclamation actions to authorize the All American Canal improvement project. This complaint seeks declaratory and injunctive relief. The plaintiffs assert a deprivation of water rights, including claims based on prior appropriation, estoppel, constitutional violations, Mexican federal law, and international and equitable concepts of apportionment and comity. The plaintiffs also challenge the action based on violations of NEPA, the Administrative Procedure Act, the Endangered Species Act, the Migratory Bird Treaty Act, and environmental mitigation obligations under the authorizing legislation (San Luis Rey Act (P.L. 100-675)) for the conservation project.

In November, the State of California filed a brief to: (1) request the court to grant a special appearance without submitting to the court's jurisdiction; and (2) move to dismiss the lawsuit, based on the fact that California is a necessary and indispensable party with 11th Amendment immunity from suit in federal court. This brief argues that California is an indispensable party because the plaintiffs are attempting to stake a claim to a portion of California's Colorado River apportionment. Opposition and response briefs were filed on the

California motion, and the parties are awaiting a ruling from the court.

Castaic Lake Water Agency

California Water Impact Network (CWIN) and the Friends of the Santa Clara River, both nonprofit environmental organizations, filed a Petition for Writ of Mandate against Castaic Lake Water Agency (Castaic Lake). This Petition for Writ of Mandate challenged Castaic Lake approval of a project to store up to 24,000 af of allocated 2002 Table A water, in the Semitropical Groundwater Storage Program, before the end of 2004. The plaintiffs alleged the approval of the project violated CEQA, the Urban Water Management Planning Act, and the Public Trust Doctrine. The CEQA process followed by DWR was upheld by the lower court. This matter is on appeal. The Friends of the Santa Clara River also filed a Reverse Validation Action in Sacramento County, which seeks to set aside the agreement. This case is stayed, pending the resolution of the CEQA case.

CWIN and the Planning and Conservation League (PCL) are also challenging the new EIR. This EIR is certified by Castaic Lake for the permanent transfer of 41,000 af of SWP Table A water to Castaic Lake, from Kern County Water Agency (Kern) member unit, Wheeler Ridge-Maricopa Water District. These lawsuits were filed on January 24 and 26, 2005. The original EIR, which was certified by Castaic Lake for this transaction, was successfully challenged in *Friends of the Santa Clara River v. Castaic Lake*. This EIR was challenged on the grounds that it tiered off the decertified Monterey Agreement EIR. In response to the Los Angeles Superior Court's Order on remand in that case, Castaic Lake decertified its original EIR on December 27, 2002, and issued a Notice of Preparation for a new EIR on January 22, 2003. The new EIR, which does not tier off any EIR for the Monterey Agreement, was certified on December 23, 2004. DWR entered into contract amendments with both Castaic Lake and Kern, which implemented this transfer in 1999. DWR has been basing its SWP allocations to Castaic Lake on the increased Table A amount reflecting the transfer.

DWR is primarily concerned with the CWIN and PCL arguments that: (1) DWR, and not Castaic Lake, should be the lead agency under CEQA for this transaction; and (2) the EIR should tier off of the not-yet-complete DWR Monterey Plus EIR. Other issues raised by CWIN and PCL are that the EIR is inadequate under CEQA for a number of reasons, including that it violates the Urban Water Management Planning Act and the Public Trust Doctrine, and that it represents a prejudicial abuse of discretion.

These two cases were consolidated in May. No further action has occurred.

Water Code Section 1810–1811

1810. Notwithstanding any other provision of law, neither the state, nor any regional or local public agency may deny a bona fide transferor of water the use of a water conveyance facility which has unused capacity, for the period of time for which that capacity is available, if fair compensation is paid for that use, subject to the following:

(a) Any person or public agency that has a long-term water service contract with or the right to receive water from the owner of the conveyance facility shall have the right to use any unused capacity prior to any bona fide transferor.

(b) The commingling of transferred water does not result in a diminution of the beneficial uses or quality of the water in the facility, except that the transferor may, at the transferor's own expense, provide for treatment to prevent the diminution, and the transferred water is of substantially the same quality as the water in the facility.

(c) Any person or public agency that has a water service contract with or the right to receive water from the owner of the conveyance facility who has an emergency need may utilize the unused capacity that was made available pursuant to this section for the duration of the emergency.

(d) This use of a water conveyance facility is to be made without injuring any legal user of water and without unreasonably affecting fish, wildlife, or other instream beneficial uses and without unreasonably affecting the overall economy or the environment of the county from which the water is being transferred.

1811. As used in this article, the following terms shall have the following meanings:

(a) "Bona fide transferor" means a person or public agency as defined in Section 20009 of the Government Code with a contract for sale of water which may be conditioned upon the acquisition of conveyance facility capacity to convey the water that is the subject of the contract.

(b) "Emergency" means a sudden occurrence such as a storm, flood, fire, or an unexpected equipment outage impairing the ability of a person or public agency to make water deliveries.

(c) "Fair compensation" means the reasonable charge incurred by the owner of the conveyance system, including capital, operation, maintenance, and replacement costs, increased costs from any necessitated purchase of supplemental power, and including reasonable credit for any offsetting benefits for the use of the conveyance system.

(d) "Replacement costs" means the reasonable portion of costs associated with material acquisition for the correction of unrepairable wear or other deterioration of conveyance facility parts which have an anticipated life which is less than the conveyance facility repayment period and which costs are attributable to the proposed use.

(e) "Unused capacity" means space that is available within the operational limits of the conveyance system and which the owner is not using during the period for which the transfer is proposed and which space is sufficient to convey the quantity of water proposed to be transferred.

Water Code Section 1812–1814

1812. The state, regional, or local public agency owning the water conveyance facility shall in a timely manner determine the following:

(a) The amount and availability of unused capacity.

(b) The terms and conditions, including operation and maintenance requirements and scheduling, quality requirements, term or use, priorities, and fair compensation.

1813. In making the determinations required by this article, the respective public agency shall act in a reasonable manner consistent with the requirements of law to facilitate the voluntary sale, lease, or exchange of water and shall support its determinations by written findings. In any judicial action challenging any determination made under this article the court shall consider all relevant evidence, and the court shall give due consideration to the purposes and policies of this article. In any such case the court shall sustain the determination of the public agency if it finds that the determination is supported by substantial evidence.

1814. This article shall apply to only 70 percent of the unused capacity.

Environmental Review Acts

The National Environmental Policy Act (NEPA) (Title 42 United States Code sections 4321-4370 [1970]) and the California Environmental Quality Act (CEQA) (California Public Resources Code sections 21000-21177 [1970]) require government agencies to document and consider environmental consequences of their actions in their decision-making process. NEPA states that it is the goal of the federal government to use all practicable means consistent with other considerations of national policy to protect and enhance the quality of the environment. All federal agencies must prepare an environmental impact statement, including a discussion of mitigation measures and alternatives, for actions significantly affecting environmental quality.

CEQA is patterned after NEPA. According to CEQA, agencies are required to (1) disclose, through an environmental impact report, the significant effects proposed projects would have on the environment; and (2) search for ways to reduce or avoid environmental damage.

CEQA applies to projects directly undertaken, funded, or approved by State or local agencies. NEPA applies to projects directly undertaken, funded, or approved by federal agencies. The Department conducts many projects in cooperation with federal agencies. In those cases both CEQA and NEPA must be followed.

NEPA requires that mitigation measures and alternatives be disclosed to the public in the Environmental Impact Statement, but it does not generally require federal agencies to adopt such mitigation measures or alternatives. CEQA, on the other hand, does impose substantive duties on all California government agencies approving projects with significant environmental impacts to adopt alternatives or mitigation measures that they find to be feasible to substantially lessen these impacts, unless there are overriding reasons why they cannot. When a project is subject to both CEQA and NEPA, both laws encourage the agencies to cooperate in planning the project and preparing joint environmental documents.

Through the environmental review process, citizens can learn about those significant effects and, if the project is approved, the reasons for approving the project. The review process requires agencies to

- describe the proposed project;
- identify the lead and cooperating agencies involved in the project;
- determine the scope of study with responsible agencies and/or the public;
- prepare and distribute a draft EIS or EIR;
- respond to comments received on the draft;
- prepare the final EIS or EIR;

Environmental Review Acts, Continued

- make findings and adopt feasible alternatives or mitigation measures to avoid significant effects, if applicable;
- adopt a monitoring plan to ensure compliance with mitigation measures; and
- prepare a list of permits required to implement the project if the project is approved.

The scoping phase, which occurs early in the review process, is particularly important because it enables government agencies to identify issues and topics to be considered when preparing the report.

Information gathered in the scoping phase helps agencies identify and evaluate reasonable alternatives, identify potential environmental impacts of the project, determine data and information needed, develop a work schedule, and allocate resources for preparing and distributing the draft environmental document for public review and comment.

NEPA requires a lead agency to involve the public during scoping, while CEQA does not. CEQA, however, does encourage public involvement at this stage. Members of the public may raise issues during the scoping phase and not just after the draft environmental document is prepared. Thus, the CEQA process leads to changes in projects through the development, consideration, and adoption of alternatives or enforceable mitigation measures to avoid or reduce any potential significant adverse effects on the environment.

Chapter 7
Water Supply Development and Reliability

The Delta is the critical link between water supplies and water deliveries.

Significant Events in 2005

During 2005, the Department of Water Resources (DWR), the U.S. Bureau of Reclamation (Reclamation), Sacramento Valley upstream water users, and certain downstream water users continued work to implement the Sacramento Valley Water Management Agreement (SVWMA) settlement.

To assist local agencies assessing their overall water supplies, DWR provided current data on the SWP's ability to deliver water under 2005 conditions and for projected conditions through a report entitled *The State Water Project Delivery Reliability Report–2005*.

In 2005, DWR and Reclamation continued with the feasibility study and NEPA/CEQA process for the North of the Delta Off-Stream Storage Investigation.

Information in this chapter was contributed by the State Water Project Analysis Office, the Division of Planning and Local Assistance, and the Bay-Delta Office.

The Department of Water Resources (DWR) is working to improve the reliability of State Water Project (SWP) supplies and the annual Table A water allocations delivered to SWP contractors. Staff is engaged in planning activities to develop additional water supplies and storage capacity.

Developing new water supply and storage projects that are economically, environmentally, and technically sound, while satisfying institutional requirements and political concerns, presents significant challenges. Many concerns center on the possible adverse effects that additional storage and delivery facilities may have locally and on the Sacramento-San Joaquin Delta. In the SWP conveyance system, the Delta is the critical link between water supplies in the Sacramento Valley and deliveries to the Central Valley and Southern California.

The CALFED Bay-Delta Program is a component of a process defined in the State-federal Framework Agreement, signed in June 1994, which calls for a cooperative and coordinated process to solve long-term water quality and ecosystem problems in the Bay-Delta Estuary. The signatories of the agreement, known collectively as CALFED, became responsible for developing long-term solutions for fish and wildlife, water supply reliability, flood control, and water quality problems in the estuary. On August 28, 2000, CALFED released its Record of Decision, formalizing State and federal agreement on the CALFED Bay-Delta Program plan to address major Delta water issues, including establishment of the Environmental Water Account (EWA).

As a CALFED agency, DWR is working with the federal government, local agencies, and public interest stakeholder groups to ensure water supply reliability now and in the future. To meet SWP contractors' needs for reliable, sufficient water supplies, DWR is engaged in planning, development, and local assistance to augment future SWP water supplies.

Supply Development and Reliability

Some of these activities that DWR is engaged in, include the following:

- implementing programs to transfer water, such as the Dry Year Water Purchase Program, EWA, and facilitating transfers between SWP long-term contractors and other agencies, including Central Valley Project (CVP) contractors;
- assisting in the development and implementation of local and regional conjunctive use programs in the Sacramento Valley;
- using SWP funds to assist in monitoring and developing local water supplies;
- managing the Feather River watershed above Lake Oroville to reduce sedimentation in the lake to preserve storage capacity; and
- investigating and evaluating storage projects (see CALFED Bay-Delta Program section below).

Water Conveyance Through the SWP

DWR encourages and arranges for temporary transfers of water using SWP

conveyance facilities for long-term SWP contractors and various agencies to help meet local, State, and environmental water supply needs. As a practical matter, SWP facilities are often needed to convey transfer water to the place of use of the transferee. State law requires DWR to make unused SWP capacity available for transfers upon payment of fair compensation, provided that: (1) no legal user of water would be injured; (2) there would be no unreasonable effect on fish, wildlife, or other instream beneficial uses; and (3) there would be no unreasonable effect on the overall economy or the environment of the county from which the water is being transferred. Water transfers can occur in three different ways:

1) water exchanges among the SWP long-term contractors or between contractors and non-SWP contracting entities;
2) water transfers among long-term SWP contractors; and
3) transfers of non–SWP water to the non-SWP and SWP agencies.

The transferability of water depends on the source of the water right being transferred. For example, provisions in the California Water Code authorize "temporary transfers" (Sections 1725-1732), "transfers by water suppliers" (Sections 1745-1745.11), "irrigation districts" (Section 22228), and California Water Districts (Section 34525). Before allowing the use of SWP conveyance facilities by other agencies, DWR makes determinations regarding the use of surplus conveyance capacity (Section 1810). (For information regarding specific transfers or exchanges, please see Chapter 9.)

Transfer and Exchange Evaluations

An important element of any water transfer is determining what quantity, if any, is transferable. Some provisions of the Water Code (e.g., CWC Sections 1702, 1706, and 1725), are intended to protect other legal users of water and fish and wildlife from possible adverse effects of a water transfer. Such protections reflect the "no injury" rule, which originates in the common law. Basically, the rationale for the no injury rule in state water law is to protect senior water users (those with the oldest water rights) from junior diverters, while protecting junior water right holders from the expansion of senior water rights. Hence, under the no injury rule, only "new water" is transferable; i.e., water that is added to the downstream water supply as a result of the transfer. Further, a transfer would not be authorized to the extent that it reduced the availability of water for downstream users, regardless of the water priority of those users.

Water Code Section 1810(d) requires DWR to consider all three types of third-party impacts (i.e., to legal users, to instream uses, and to the economy of the area from which the water would be transferred). DWR must determine whether to allow use of its surplus water conveyance capacity for a water transfer. Other provisions in the law specify the requirements that must be met for DWR to allow use of its conveyance facilities.

Generally, transfer water is developed through four methods: (1) surplus water released from storage facilities; (2) substituting groundwater for transferred surface water; (3) idling agricultural land to make water available for transfer; and (4) undertaking conservation activities that develop surplus water (e.g., under

CWC Section 1011). Transfers that involve groundwater substitution or fallowing may cause third party impacts; so provisions of state law limits their extent. For example, Water Code Sections 1745.10 and 1745.11 generally require a water supplier that increases groundwater use to replace transferred surface water so that the groundwater use: (1) would be consistent with a groundwater management plan adopted pursuant to State law for the affected area; or (2) would not create or contribute to conditions of long-term overdraft in the affected groundwater basin.

Groundwater substitution transfers have the potential to cause injury to other local groundwater users due to the additional pumping needed to allow the surface water transfer to take place. Injury can also occur due to stream depletion induced by pumping wells near the stream. The amount of water credit given such a transfer is the amount of the increased pumping that takes place to support the transfer, which assumes there is no stream depletion by the additional pumping. If there is pumping-induced stream depletion, then the groundwater pumped is not truly an alternative source to the surface water supply, and the net surface water flows will not increase as assumed. Consequently, in order to evaluate possible impacts to SWP supplies by groundwater substitution transfers that propose using SWP conveyances, DWR requires information necessary to support the assumption that the additional groundwater pumping does not affect the surface water system.

Water transfers are subject to compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

The State Water Project Analysis Office, Division of Operations and Maintenance, and the Office of the Chief Counsel perform evaluations of the effects of proposed non-SWP water transfers on the SWP. This team develops formal responses to specific issues, projects, or programs. The Office of Water Transfers evaluates possible impacts to the SWP by proposed water transfers (with technical assistance from the Division of Planning and Local Assistance.) The team also identifies and evaluates water transfer proposals and water acquisitions by Reclamation and other water agencies, and proposes settlement agreements for potential impacts on the SWP.

Emphasis on early intervention allows DWR to tailor proposals to maximize benefits or minimize adverse effects to the SWP, other legal water users, and the environment. The team monitors Reclamation contract renewal processes to evaluate potential impact. These activities help DWR understand the potential cumulative impact of other agencies' actions on the SWP and to proactively address those actions.

This team also explores potential transfer options available to the SWP and individual contractors. Analysis of contractor profiles helps DWR facilitate transfers and exchanges between individual contractors.

SWP Delivery Reliability Report

To assist local agencies assessing their overall water supplies, DWR provided current data on the SWP's ability to

deliver water under 2005 conditions and for projected conditions through a report entitled *The State Water Project Delivery Reliability Report–2005*. A draft report underwent a 30-day public review during November and December 2005. The information contained in this report was recommended by DWR in May 2005 for use by SWP water supply contractors in developing their 2005 Urban Water Management plans. The 2005 report will be finalized in 2006, and the next report in this biennial series is expected in 2007.

Water delivery reliability depends on three factors: the availability of water at the source; the ability to convey water from the source to the desired point of delivery, and the level of demand. Information in The State Water Project Delivery Reliability Report–2005 is based on the assumption that future weather patterns will be similar to those in the past. As more information becomes available on the impact of global warming upon SWP water supply, it will be analyzed in future editions of this report. In addition, the analysis of the ability to convey water from the source to the point of delivery assumes only SWP facilities and permits existing in 2005 would be used. No planned facility improvements to the SWP are assumed to provide a conservative estimate of water delivery reliability. Lastly, the level of demand for SWP water, the amount and pattern of demand, were derived from historical data and information received from SWP contractors.

The probability that a given level of SWP Annual Table A amount will be delivered from the Delta for conditions projected to exist in year 2025 is shown in Figure 7-1. The following can be deduced:

- In 75 percent of the years, annual SWP water delivery is estimated to be at or above 2.7 million af per year (65 percent of 4.13 million af);
- In 50 percent of the years, it is estimated to be at or above 3.5 million af per year (85 percent of 4.13 million af); and
- In 25 percent of the years, it is at 4.13 million af per year.

Detailed information on the assumptions, data, and results of additional studies, as well as the other scenarios for annual Table A amounts can be found in the reliability report, published on the Internet at http://baydeltaoffice.water.ca.gov/swpreliability/index.cfm.

Conjunctive Use and Groundwater Substitution

Conjunctive use refers to the planned and coordinated management of surface water and groundwater to improve water supply reliability. A typical conjunctive use project recharges a groundwater basin with surface water in years when excess surface water is available. That project will then extract the stored water for use by pumping additional groundwater in years when additional water supply is needed. By using a groundwater basin as a reservoir in this manner, surface water that would otherwise be lost can be added to the available water supply.

In the 1990s, groundwater substitution water transfers, a form of conjunctive use, became increasingly controversial in some regions of the State. Some counties, particularly in the Sacramento Valley, adopted ordinances designed to regulate water transfers that involve groundwater

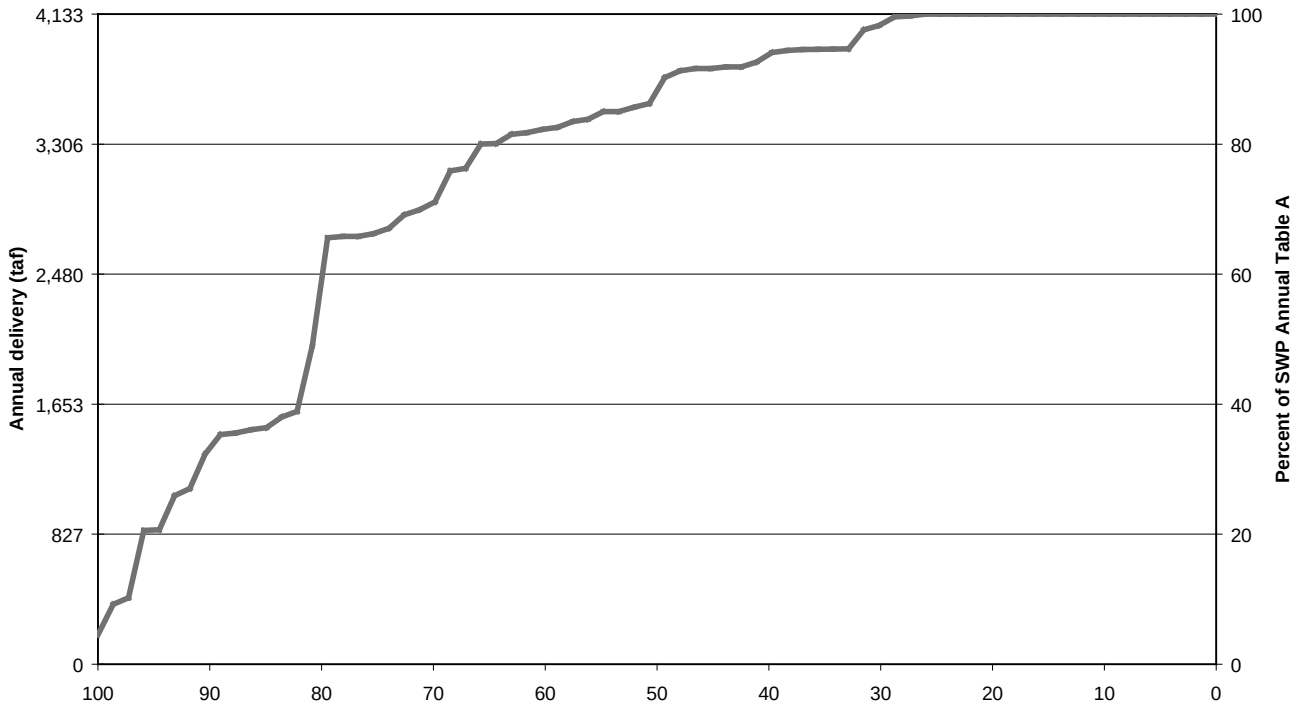

Figure 7-1. Projected SWP System Delivery Capability (Scenario 2025, Annual Table A)

substitution. Groundwater substitution refers to the practice of increasing groundwater pumping to replace an available surface water supply. The surface water becomes available to be used elsewhere. One possibility is to sell that newly-available surface water to willing buyers downstream.

Conjunctive use projects can be operated with negligible impacts to the environment and third parties. However, the effects of implementing conjunctive use projects varies as the pre-existing condition of groundwater basins vary. For instance, Sacramento Valley groundwater basins tend to refill completely after an average winter season. Therefore, additional groundwater withdrawals associated with groundwater substitution water transfers, typically during the irrigation season, result in additional loss to streamflow during the following wet season, or even later. A successful conjunctive use operation in the Sacramento Valley operates so that the aquifer refills by depleting streamflow during wet winter months, when streamflow reductions have no detrimental effect on water supply.

Due to the potential for conjunctive use projects and groundwater substitution water transfers to deplete streamflow and impact State Water Project operations, DWR's Sacramento Valley Groundwater Program evaluates water transfers, conjunctive use, and other water management proposals in the Sacramento Valley.

Sacramento Valley Groundwater Program

Local agencies are increasingly active in developing groundwater management programs and asserting control over water supply development and management activities. DWR works with local agencies and interested parties by providing technical and other assistance to improve groundwater monitoring and management to study and develop water management alternatives, help alleviate local anxieties, and build consensus for local and regional conjunctive use.

The Sacramento Valley Groundwater Program, a component of the SWP Future Supply Program, originally identified and implemented individual conjunctive use projects to augment SWP supplies. Now this program focuses on implementing the Sacramento Valley Water Management Agreement (often referred to as Phase 8) and evaluating water transfers. It also supports EWA Program components and implementation of the Yuba Accord Conjunctive Use component. It coordinates these efforts with DWR's Conjunctive Water Management Program in the geographic areas in which they overlap.

In 2005, Sacramento Valley Groundwater Program activities involving local agencies included the following:

Yuba County. DWR, in cooperation with the Yuba County Water Agency (Yuba) operated an adaptive long-term groundwater monitoring and measurement program. Specific activities focused on evaluating the interaction between the Yuba River, the Bear River, and its local groundwater basin, and impacts to other groundwater users. With the development of the Yuba Accord, the operations of the Yuba River system are becoming intertwined with those of the SWP. Monitoring activities are focused on incorporating conjunctive use into Yuba operations to meet the agency's Phase 8 and Yuba Accord objectives.

Lower Colusa Basin. DWR assisted Reclamation District 108 and River Garden Farms with groundwater monitoring that will be used to determine the effects of implementing conjunctive use projects for the Sacramento Valley Water Management Program. These projects are expected to provide up to 25,000 af of capacity to the program.

Butte Basin. DWR's efforts in Butte County improved the technical understanding of the Butte Basin groundwater system, especially as it relates to groundwater resources in adjacent Glenn and Tehama Counties. Additionally, DWR assisted the Butte County in collecting and evaluating groundwater monitoring data.

Glenn County. DWR provided technical assistance to Glenn County and its local irrigation districts. This included assisting in developing groundwater level, groundwater quality, and subsidence monitoring networks in the county to facilitate future water transfers and the development of Sacramento Valley Water Management Program (SVWMP) conjunctive-use projects that will benefit the SWP. These activities are coordinated with related investigations by DWR's storage program. Recently, SVWMP participants have expressed interest in building wells that develop deep groundwater aquifers as a means of avoiding groundwater level impacts to other groundwater users. DWR is assisting local participants determine the feasibility

of this groundwater management technique.

Watershed Management

This continuing effort evaluates the state of the Feather River watershed above Lake Oroville, and it identifies actions that can be taken within the watershed to increase base-flow runoff and reduce sedimentation. The initial effort explored ways to improve local water supplies without adversely affecting SWP supply or operations. Early activities included installing monitoring equipment and gathering pertinent data on stream flows, water quality, erosion, and land use. This data will be used to formulate reports and studies for future actions. The work continues to receive strong local support.

SWP Water Rights Activities

Water Rights Permits

Operations of the SWP are governed by the terms and conditions contained in DWR's water rights permits and licenses along with other state and federal regulatory restrictions including biological opinions for the protection of endangered species. DWR currently holds 15 water rights for the operation of the State Water Project and upper Feather facilities, five of which specifically authorize SWP operations at the Oroville/Thermalito and Delta facilities, including the North Bay Aqueduct, for water supply purposes. Each permit specifies the authorized quantities of direct diversion and diversion to storage, place of use and time within which the permitted quantities must be put to beneficial use. A change in any of the terms and conditions contained in the water rights permits and licenses requires the approval of the SWRCB.

Diversion and use of SWP water throughout the SWP service area has steadily increased since initial operations in the 1960s. However due to a number of factors including operational and regulatory constraints, the beneficial use of water has not yet reached the maximum quantities anticipated for full development of the SWP. When the full permitted quantity of water authorized under the water rights permits has not been utilized by the date specified in the permit, a petition for time extension must be submitted to the SWRCB. In 2005, DWR submitted a Petition for Extension of Time to the SWRCB for permit 16483 (Application 17514A) authorizing diversions at the North Bay Aqueduct in order to allow additional time to fully develop the diversion and use of water within the NBA service area.

In addition, in 2005, DWR submitted to the SWRCB a Petition for Change in Place of Use in four permits authorizing diversions at the Banks pumping plant. The Petition requests the SWRCB to correct an error in the DWR water rights to include Oak Flat Water District within the authorized SWP place of use. Since the 1960s, Oak Flat has received SWP water under its long-term water supply contract with DWR. In the 1990s during review of DWR's water rights, it became apparent that the Oak Flat service area was inadvertently omitted from the authorized SWP place of use. The petition explains that correcting the error and adding Oak Flat to the SWP place of use will not result in any changes to SWP operations or deliveries.

SWP Bay-Delta Proceedings—2005 Activities

DWR has worked intensely for more than 40 years to develop the appropriate water quality standards for the San Francisco Bay and Sacramento–San Joaquin Delta Estuary and identify which water sources are required to meet those standards. SWRCB has received and reviewed numerous testimony and evidence to establish water quality objectives for the Bay-Delta Estuary to protect urban, agricultural, and fish and wildlife uses.

Cease and Desist Order Hearings

In February 2005, DWR and Reclamation petitioned SWRCB to temporarily change, and delay, the effective date for implementation of the southern Delta agricultural objective in Decision 1641, scheduled to begin in April 1, 2005. A second petition was submitted requesting a long-term change of the date to April 1, 2008, the date when the South Delta permanent gates were scheduled to be operating. The SWRCB denied the temporary change petition, and no action was taken on the long-term change petition.

On May 3, 2005, SWRCB notified DWR and Reclamation of the its intention to issue a cease and desist order because of a threatened violation of the southern Delta agricultural water quality objective of 0.7 electrical conductivity (EC), scheduled to be in effect annually between April 1 and August 31, beginning 2005. The SWRCB D-1641 conditions the operation of the SWP and the CVP, with implementation of the agricultural objective. DWR and Reclamation requested a hearing on the cease and desist order. In October and November, DWR and Reclamation presented evidence and argued that the cease and desist order should not be issued.

On December 30, 2005, SWRCB issued a proposed draft cease and desist order requiring DWR and Reclamation to construct permanent gates in the southern Delta or take alternative measures for achieving the water quality objective by 2009. Additionally, the draft order would require DWR and Reclamation to report to SWRCB if there is a threat of non-compliance of the water quality requirements, and to report the reasons for the non-compliance. The Board will then determine if enforcement actions are necessary. SWRCB has set a hearing date to consider adoption of the proposed order in January 2006. The 0.7 millimhos/cm objective was not exceeded in 2005.

Sacramento Valley Water Management Agreement

During 2005, DWR, Reclamation, Sacramento Valley upstream water users, and certain downstream water users continued work to implement the Sacramento Valley Water Management Agreement (SVWMA) settlement, in lieu of continuing with SWRCB Phase 8 hearings. SVWMA avoided the adversarial issues of Phase 8 and was developed to promote better management of California's water resources.

SVWMA provides that DWR and Reclamation will continue to be responsible for meeting the flow-related water quality objectives of D-1641, and a series of local projects, owned and operated by Sacramento Valley water users, will be developed to provide up to

185,000 af of water supplies for use by the sponsoring local agencies as well as water to the SWP and CVP for Delta water quality and supply. A key element in developing the agreement was the preparation of a short-term workplan for investigating short-term projects to meet the goals of SVWMA. The short-term workplan was adopted with approximately 45 projects falling into the following general categories:

- water management—conjunctive use;
- reservoir reoperation;
- system improvements;
- surface water and groundwater planning; and
- regulatory/institutional arrangements.

It is anticipated that short-term projects will operate for 10 years. Consultants were hired to work on the Environmental Impact Report/Environmental Impact Statement (EIR/EIS). DWR and Reclamation, in cooperation with the Sacramento Valley water users and downstream water users, are preparing environmental analysis and documentation for the projects, as required prior to implementation.

SVWMA establishes a Technical Measurement and Monitoring Committee responsible for developing monitoring programs for the projects being developed, assessing their accomplishments and impacts, and recommending remediation activities if needed. The local agencies, DWR, and Reclamation will enter into specific implementation agreements for each project.

SVWMA also provides for the possible development of a long-term workplan and settlement agreement, that could continue certain short-term projects and other projects, which could meet the goals of the Phase 8 settlement.

Periodic Review of the 1995 San Francisco Bay / Sacramento-San Joaquin Delta Estuary Water Quality Control Plan

SWRCB previously received comments from agencies and members of the public regarding any elements of the 1995 Bay-Delta Water Quality Control Plan that SWRCB should consider amending. DWR presented its comments to the Board regarding the scope of issues, supporting the Board's review and urged them to consider the issues in context with recently proposed Delta actions and progress that could provide useful information to help evaluate whether modifications to existing water quality objectives were needed. SWRCB extended the comment period and encouraged the participants to provide the Board with their remarks.

The SWRCB staff prepared a report summarizing comments received from agencies. This report, adopted on September 20, 2004, recommended the following issues be considered during the upcoming workshops:

- Delta outflow;
- river flows: Sacramento River at Rio Vista;
- river flows: San Joaquin River at Airport Way Bridge, Vernalis: February to April 14, and May 16 to June;
- export limits;
- flow objectives in the San Joaquin River at Airport Way Bridge, Vernalis: 31-day pulse flow April 15 through May 15;

CALFED Bay-Delta Program

The San Francisco Bay/Sacramento-San Joaquin Delta (Bay/Delta) Estuary is the largest estuary on the West Coast. It is a maze of tributaries, sloughs, and islands, and a haven for over 750 plants and wildlife species. It is also the hub of California's two largest water distribution systems—the Central Valley Project, operated by the U.S. Bureau of Reclamation, and the State Water Project, operated by the Department of Water Resources. Together, these water development projects divert approximately 20 to 70 percent of the natural flow in the system, depending on the amount of runoff available in a given year. This, along with other issues, such as population growth and pollution, have had a serious impact on water supply and quality, and on the fish and wildlife resources in the estuary. Although there was consensus that the Bay-Delta estuary is important as both a reliable source of water and as a fish and wildlife habitat, there was none for solving conflicts regarding methods of management, conservation, increasing capacity of the system, and protecting the ecology of the region.

In June 1994, in the quest for solutions to the resource problems in the Bay-Delta, State and federal agencies signed an agreement to (1) coordinate their actions to meet water quality standards to protect the Bay-Delta estuary; (2) coordinate the operation of the State Water Project and the Central Valley Project more closely with recent environmental mandates; and (3) develop a process to establish a long-term Bay-Delta solution to address four categories of problems—ecosystem quality, water quality, water supply reliability, and levee system vulnerability. This agreement laid the foundation for the Principles of Agreement signed in December 1994 by the State and federal governments, detailing interim measures for both environmental protection and regulatory stability. This Accord led to the CALFED Bay-Delta Program, which began in May 1995, and the Record of Decision, which was signed on August 28, 2000.

The California Bay-Delta Act of 2003 established the California Bay-Delta Authority as the new governance structure and charged it with providing accountability, ensuring balanced implementation, tracking and assessing the CALFED Bay-Delta Program progress, using sound science, assuring public involvement and outreach, and coordinating and integrating related government programs.

The Program is designed to address the complex issues that surround the Bay-Delta and is a cooperative interagency effort involving 18 State and federal agencies with management or regulatory responsibilities for the Bay-Delta. It is an unprecedented effort to build a framework for managing California's most precious natural resource—water. The establishment of the CALFED Bay-Delta Program represents State and federal government in partnership, launching the largest, most comprehensive water management program in the world.

- southern Delta electrical conductivity;
- chloride objectives, compliance location at Contra Costa Canal at Pumping Plant No. 1, and potential new objectives;
- salmon protection;
- Delta Cross Channel gates closure;
- changes to the water quality compliance and baseline monitoring program; and
- recommended changes to the program of implementation.

On August 31, 2005, SWRCB convened a workshop to receive additional evidence on the Delta outflow objectives. A panel consisting of federal and State agencies presented its comments on issues revolving causes and effects of the pelagic organism decline (POD). The scientists were still at early stages of understanding the causes of such decline. The State Water Contractors and California Urban Water Agencies suggested performing operational flexibility for both SWP and CVP. Bay-Delta Institute and Central Delta Water Agencies were against such actions. SWRCB recommended that one of the Board staff, working under the division chief, be directly involved in the above process and report future progress to the Board.

CALFED Bay-Delta Program

The California Bay-Delta Authority (CBDA) oversees the implementation of the CALFED Bay-Delta Program for the 25 State and federal agencies working cooperatively to improve the quality and reliability of California's water supplies, while restoring the Bay-Delta ecosystem.

The California Bay-Delta Act of 2003 established the CBDA as the new governance structure and charged it with providing accountability, ensuring balanced implementation, tracking and assessing the CALFED Bay-Delta Program progress, using sound science, assuring public involvement and outreach, and coordinating and integrating related government programs.

The mission of the CALFED Bay-Delta Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta. DWR has vigorously supported this effort, seeing it as a means to develop and manage the State's water resources to meet the water delivery commitments of the SWP, and to benefit both the public and the environment.

The CALFED Bay-Delta Program was envisioned as a 30-year plan and is implemented through 11 major program elements. The first 7-year phase of implementation, Stage 1, includes planning for proposed large facilities and implementation of lesser facilities. DWR is the State lead agency for the storage program element, which consists of surface storage studies and groundwater programs and projects.

Storage Program

This is a comprehensive program with potential benefit for the SWP, consisting of actions related to surface and groundwater storage. The Division of Planning and Local Assistance has been working with the CALFED agencies to enhance storage as well as conjunctive-use programs that support local project development via

loans and grants. The Storage Program is part of an ongoing evaluation of the appropriate role of storage, both groundwater conjunctive use and surface storage.

Surface Storage Investigations

The Surface Storage Investigations are developing environmental documentation and feasibility studies for four of the five surface storage projects identified for further study in the CALFED Record of Decision (ROD.)

In-Delta Storage Program. In 2001, DWR, in coordination with the CBDA and Reclamation, began a planning study to evaluate the Delta Wetlands Project and other In-Delta storage options. This study, completed in May 2002, concluded that the project concepts proposed by Delta Wetlands were generally well planned. However, design modifications and further evaluations were needed before considering public ownership of the project.

The In-Delta Storage Project would provide capacity to store approximately 217,000 af of water in the South Delta for a wide array of water supply, water quality, and ecosystem benefits. The project would include two storage islands (Webb Tract and Bacon Island) and two habitat islands (Holland Tract and Bouldin Island), similar to that proposed by Delta Wetlands, over a decade.

DWR, in coordination with CBDA and with technical assistance from Reclamation, completed the Draft In-Delta Storage Program State Feasibility Study in 2004. The State Draft Feasibility Report addresses the technical feasibility of the proposed In-Delta Storage Project.

In response to public comments on the report, new studies were conducted in 2005 on a broad array of issues, including water supply and quality, project design, risk analysis, environmental evaluations, and construction costs. New information gathered during the response to the June 2004 Middle River levee breach and flooding of Jones Tract was also incorporated in these studies.

Los Vaqueros Reservoir Expansion. Contra Costa Water District owns and operates the 100,000 af Los Vaqueros Reservoir just northwest of the Sacramento-San Joaquin Delta. The Los Vaqueros Reservoir Expansion would increase the reservoir storage up to 400,000 af, for a potential storage capability of 500,000 af.

The objectives of the Los Vaqueros Reservoir Expansion are: (1) improve Bay Area water supply reliability; (2) provide an environmental water supply to the long-term EWA or similar program; and (3) improve water quality for Bay Area water users.

Contra Costa Water District ratepayers voted to support further studies of the Los Vaqueros Reservoir Expansion in the March 2004 advisory vote. In 2005, Reclamation, in coordination with DWR and Contra Costa Water District, completed the Initial Alternatives Information Report. Also in 2005, Reclamation filed a Notice of Intent under NEPA for preparation of an EIS. Contra Costa County Water District is the lead agency under CEQA and, in conjunction with Reclamation and DWR, will continue with the feasibility study and environmental documentation.

Shasta Lake Enlargement. Reclamation, in coordination with DWR and other agencies, is conducting a feasibility study of expanding Shasta Dam and Reservoir, primarily to promote increased survival of anadromous fish populations in the upper Sacramento River and to increase water supply reliability. An enlargement of Shasta Dam would inundate additional lands around the existing reservoir and affect a portion of the McCloud River. California Public Resources Code Section 5093.542(c), the Wild and Scenic Rivers Act, states that, "except for participation by the Department of Water Resources in studies involving the technical and economic feasibility of enlargement of Shasta Dam, no department or agency of the state shall assist or cooperate with, whether by loan, grant, license, or otherwise, any agency of the federal, state, or local government in the planning or construction of any dam, reservoir, diversion, or impoundment facility that could have an adverse effect on the free-flowing condition of the McCloud River, or on its wild trout fishery."

The State's fiscal year 2005-2006, budget did not include funding for DWR to continue to participate in this study. However, Reclamation continues to work on this project. In 2005, Reclamation filed a Notice of Intent to prepare the EIS consistent with requirements of NEPA for the Shasta Lake Water Resources Investigation. Six public scoping meetings were held to solicit public input on topics to be addressed in the EIS, including resources to be evaluated, alternatives to be considered, and significant concerns and issues.

North-of-the-Delta Offstream Storage. DWR and Reclamation are working in partnership with local and other State and federal agencies to further study north-of-the-Delta offstream storage opportunities. The North-of-the-Delta Offstream Storage (NODOS) Investigation focuses on potential projects on the west side of the Sacramento Valley, including Sites Reservoir.

Storing water in offstream reservoirs during excess flow periods provides opportunities to increase water storage in an environmentally-sensitive manner. The stored water could then be made available for beneficial uses, including enhancing water management flexibility in the Sacramento Valley and the Bay-Delta, reducing water diversions on the Sacramento River during critical fish migration periods, increasing the reliability of supplies for the Sacramento Valley and statewide, and providing storage and operational benefits for other CALFED programs, including Delta water quality and EWA.

In 2005, DWR and Reclamation continued with the feasibility study and NEPA/CEQA process for the NODOS Investigation. Accomplishments for NODOS in 2005 included completion of engineering feasibility studies on dams and appurtenant structures, conveyance facilities, and road relocations, and on reverse flow facilities, for releasing water back to the river.

Upper San Joaquin River Basin Storage Investigation. DWR and Reclamation, in coordination with other State and federal agencies, are evaluating increased storage in the upper San Joaquin River watershed. This additional storage could be added by

expanding Millerton Lake by raising Friant Dam, or a functionally-equivalent storage program. Potential benefits of the Upper San Joaquin River Basin Investigation are: (1) contribute to restoration of the San Joaquin River; (2) improve water quality of the San Joaquin River; and (3) facilitate additional conjunctive management and water exchanges that improve the quality of water deliveries for urban communities. Other benefits could include hydropower, flood control, and recreation.

In 2005, DWR and Reclamation continued with the feasibility study and the NEPA/CEQA process for the Upper San Joaquin River Basin Storage Investigation. Accomplishments for the Upper San Joaquin River Basin Storage Investigation in 2005 included completion of the Federal Initial Alternatives Information Report.

Conjunctive-Use Programs

The CALFED Storage Program component, like DWR's Conjunctive Water Management Program, emphasizes the importance of forming partnerships with local agencies and stakeholders to assist in planning and developing conjunctive water management projects. Six principles guide the implementation of this component:

- local planning process;
- local control of proposed projects;
- voluntary implementation of projects;
- priority for in-basin water needs;
- compensation for out-of-basin transfers; and
- basin-wide planning and monitoring the Water Transfer Program.

DWR actively participated in the formulation of CALFED's Water Transfer Program through the Bay-Delta Advisory Council Water Transfer Work Group and the Transfers Agency Group. The program proposed a framework of actions, policies, and processes to facilitate water transfers and further develop a statewide water transfer market. The program document describes the relationship of water transfers to other water management actions and programs, discusses existing laws and statutes, and identifies issues and problems related to transfers. It also makes recommendations to resolve these issues and suggests strategies to implement them.

As part of the Water Transfer Work Group, DWR staff, along with other agencies, assisted SWRCB in the formulation and publication of A Guide to Water Transfers (July 1999 draft) in order to provide a resource for information.

In 2002, DWR drafted transfer white papers based on SWRCB's Guide and discussions with Sacramento Valley water agencies. The white papers are updated as information becomes available.

Conveyance Program

The Conveyance Program consists of projects proposed in the North and South Delta. The North Delta Program is comprised of studies related to the Delta Cross Channel, a potential through-Delta facility, and a project to improve flood management and the ecosystem along the Mokelumne River and Franks Tract.

North Delta. Three North Delta conveyance facilities improvements are being evaluated. One is to improve operational procedures for the Delta Cross Channel to address fishery and water quality concerns, the second is a screened through-Delta

facility on the Sacramento River, and the third is the Franks Tract Project, which involves installation of operable gates either on Three Mile Slough or West False River to improve water quality and benefit fisheries. DWR is leading all three studies in cooperation with other agencies. DWR is in the process of initiating the preparation of an EIR/EIS for the Franks Tract Project.

With the North Delta Flood Control and Ecosystem Restoration Project, solutions to improve flood management and the ecosystem are being considered, including setback levees, detention basins, dredging, and levee degradation for floodplain expansion.

South Delta. Actions in the South Delta include the South Delta Improvement Program, implementing flood/ecosystem improvements in the lower San Joaquin River, and potential interties between the SWP and CVP.

SDIP is a key component of the CALFED Bay-Delta Program. The purpose of SDIP is to do the following:

- improve the reliability of existing SWP facilities;
- ensure that water of adequate quantity and quality is available for diversion to the South Delta Water Agency's service area for beneficial use; and
- reduce the effects of SWP exports on both aquatic resources and direct losses of fish in the South Delta.

The proposed project is likely to consist of the following:

- three flow-control structures to improve local water levels and circulation in South Delta channels;
- a fish-control structure to improve fish migration in the San Joaquin River;
- some dredging in West Canal to improve conveyance capacity to Clifton Court Forebay;
- extensive dredging in the South Delta to improve channel capacity for local agricultural users;
- modifications to existing agricultural diversion intakes; and
- planning to build a new intake to Clifton Court Forebay and increase the export limit to 8,500 cfs.

For more information on the North and South Delta, see Chapter 2, *Delta Resources.*

Environmental Water Account

EWA is a cooperatively managed program intended to provide protection to the fish of the Bay-Delta Estuary through environmentally beneficial changes and increased flexibility in the operations of the SWP and CVP, while maintaining water supply reliability to the projects' water users. Responsibility for implementing EWA rests with National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service (USFWS), and Department of Fish and Game (DFG) (management agencies), as well as with Reclamation and DWR (project agencies).

The management agencies are responsible for managing EWA assets and recommending SWP/CVP operational changes beneficial to the Bay-Delta ecosystem and the long-term survival of fish species. The project agencies are responsible for acquiring EWA assets and cooperating with the management agencies in administering EWA and

implementing operational changes proposed by the management agencies, as appropriate.

Under EWA, fish protection is achieved by periodic curtailment of project water delivery from the Bay-Delta to project water users south of the Delta and replacing it at a later date within the same calendar year. This necessitates the acquisition of EWA assets, which are used to replace the project water supply. EWA assets consist of variable assets, which are acquired through changes in operations; fixed assets, which are acquired through water purchases from willing water sellers; source shifting, which involves deferral of scheduled delivery of water by willing participants; and other nonwater assets, such as 500 cfs dedicated pumping capacity at Banks Pumping Plant. EWA is considered operational for any year when these assets are in place and Endangered Species Act commitments are provided by the management agencies. EWA was operational starting in 2001.

In 2001, DWR and Reclamation initiated work on a joint EIS/EIR document for EWA, which takes into consideration the environmental impacts associated with use of EWA, on both SWP and CVP operations through December 2007, and will allow for multiyear EWA contracts with willing water sellers.

The EWA Project and Management Agencies completed and approved a joint EIS/EIR for the short-term EWA pertaining to the acquisition and management of EWA assets between 2004 and 2007. In July 2004, the Agencies began the process of developing a long-term EWA EIS/EIR.

For more details on EWA deliveries, see Chapter 9, *Water Contracts and Deliveries*.

Chapter 8
Water Supply

Snowpack in the Sierras

Significant Events in 2005

California experienced higher than average rainfall and mountain snowpack during water year 2004–2005. The State received precipitation at 140 percent of average in 2004–2005, as compared to 85 percent of average in 2003–2004.

Statewide river runoff totaled 105 percent of average in the 2004–2005 water year. Runoff in the Sacramento River and San Joaquin River regions was 95 percent and 150 percent of average, respectively. Feather River unimpaired inflow to Lake Oroville was 4.3 maf (90 percent of average) for the water year, compared to 3.8 maf (80 percent of average) the previous year.

Information from this chapter was contributed by the Division of Flood Management, the Division of Operations and Maintenance, and the State Water Project Analysis Office.

The Department of Water Resources (DWR) monitors precipitation, calculates runoff, and operates storage facilities during each water year. The official California water year runs from October 1 through September 30. DWR works during the water year to fulfill its key contractual obligations to the State Water Project (SWP) long-term water supply contractors.

Water Year 2004–2005

Precipitation and Snowpack

California experienced higher than average rainfall and mountain snowpack during water year 2004–2005. The State received precipitation at 140 percent of average in 2004–2005, as compared to 85 percent of average in 2003–2004. During the second week of April 2005, the statewide average snowpack peaked at 40 inches of snow water content. This amount of mountain snowpack is 146 percent of normal. These snowpack conditions are in stark contrast to snowpack levels in 2003–2004. During that time, the statewide snow water content peaked at 30 inches in the first week of March. The Northern Sierra Eight Station Index finished the 2004–2005 water year with 57.5 inches of precipitation, which was 115 percent of average.

The water year kicked off October 1, 2004, with a wet start for most of the State. Heavy precipitation fell throughout the month, which resulted in significant snowpack accumulation in the Sierras. The Northern Sierra Eight Station Index registered 7.1 inches of precipitation for the month of October, which was 237 percent of average. Some locations in the San Joaquin River Basin received monthly precipitation totals exceeding 500 percent of average. By November 1, the statewide snowpack stood at 5 inches of snow water content. This amount represented approximately 16 percent of the statewide historical average for April 1 testing of the State snow water content.

Wet conditions in October were offset by a dry November. Consequently, by the end of November, the snowpack had grown only slightly beyond the value achieved at the beginning of the month. The average snow water content increased statewide from 5 inches on November 1, to 6 inches on December 1. By the end of November, the State snowpack measured 133 percent of normal.

Significant precipitation returned in December, with a major event taking place in Southern California, as the calendar year drew to a close. A series of storms occurred from December 26 to January 5, producing nearly 20 inches of cumulative rainfall at some locations. Most of the heavy precipitation fell from Point Conception south; however, the entire California coast experienced above-average precipitation for the month. By the end of the month, the Northern Sierra Eight Station Index stood at 10.9 inches, 130 percent of average, and precipitation totaling 155 percent of average fell in the San Joaquin River Basin. As a result of these widespread wet conditions, the State snowpack increased to 16 inches of snow water content by the end of the month, 57 percent of the April 1 snow water

content and 159 percent of the year-to-date average.

Precipitation during the month of January varied widely throughout the State. Southern California experienced another extreme storm from Point Conception south to the San Gabriel and San Bernardino mountains. From January 7 to January 11, some locations in this area received 30 inches of cumulative rainfall. In contrast, most of Northern California received slightly below average precipitation for the month. This resulted in a Northern Sierra Eight Station Index value of 8.3 inches, 92 percent of average, while the American River Basin received precipitation at 95 percent of average. Precipitation falling in the San Joaquin River Basin was significantly above average, with several locations recording total values exceeding 200 percent of average. The statewide snowpack remained well above average by the end of the month: 28 inches, 101 percent of April 1 snow water content and 163 percent of normal. Corresponding with the north-to-south precipitation gradient, the Northern Sierra snowpack totaled 142 percent of average, and the Southern Sierra snowpack equaled 200 percent of average.

The wet conditions experienced in Southern California during December and January continued into February, while Northern California experienced precipitation totals falling well below historical monthly averages. Between February 17 and February 23, a very cold storm passed through the State from Point Conception south. The southern coast received 4 to 8 inches of rainfall during this period, while the adjacent mountain regions received 8 to 18 inches. Due to the cold temperatures associated with this storm, snowfall ranging from 8 to 10 feet was received in the mountains above Los Angeles. Northern California, on the other hand, received well below average precipitation for the month. The Klamath Basin, for example, received precipitation totaling 20 percent of average, while the Northern Sierra Eight Station Index totaled 4.4 inches, which is only 55 percent of average. As an exception to the dry conditions experienced in the northern half of the State, parts of the San Joaquin River Basin continued to receive above average precipitation. The end of February statewide snowpack remained well above average with 32 inches of snow water content, which is 115 percent of the April 1 average and 131 percent of the water year-to-date average.

By contrast, Northern California experienced more significant precipitation during March. The month began with warm and dry conditions, which resulted in some melt of the Sierra snowpack. However, the final two weeks of March ushered in a cold, wet weather pattern, which resulted in considerable precipitation. All of the major water supply basins in Northern California experienced above-average precipitation for the month. The Northern Sierra Eight Station Index was 9.3 inches, which is 135 percent of average. Above-average precipitation was experienced at all locations within the San Joaquin region. By the end of the month, average snow water content stood at 39 inches, which is 138 percent of normal. Snowpack totals in the North Sierra, Central Sierra, and South Sierra were 124 percent, 135 percent, and 158 percent of average, respectively. These increasing percentages reflect the fact that Southern California received more

precipitation throughout the winter months than Northern California.

The month of April brought average precipitation for most of the State. Rainfall along the North Coast was generally above average, with some locations receiving total precipitation exceeding 200 percent. The Northern Sierra Eight Station Index was 3.5 inches, or 90 percent of average. Statewide snowpack peaked at 40 inches on April 9, about a week later than usual. As the month progressed, cool weather prevented major snowmelt at higher elevations, although lower elevations experienced some pronounced melt. By the end of the month, 34 inches of snow water remained statewide.

In May, an atypically large, late-season storm occurred in Northern California. From May 17 through May 19, much of California north of Interstate 80 received 72 hour totals that allowed historical records for the month to be broken at many locations. While storm totals throughout the northern portion of the State were generally between 2 and 5 inches, the Feather River Basin was particularly impacted, with totals between 5 and 10 inches. The Eight Station Index reached a May record of 8.3 inches, or 395 percent of average. Throughout the month, the average statewide snowpack decreased from 34 inches on May 1 to only 13 inches on June 1. The May storm was a major factor in the elevated rate of snowmelt. (See Figure 8-1 for 2004–2005 statewide precipitation percentages by hydrologic region.)

Runoff and Storage

Statewide river runoff totaled 105 percent of average in the 2004–2005 water year. Runoff in the Sacramento River and San Joaquin River regions was 95 percent and 150 percent of average, respectively. Feather River unimpaired inflow to Lake Oroville was 4.3 maf (90 percent of average) for the water year, compared to 3.8 maf (80 percent of average) the previous year.

The Sacramento River Index for water year 2004–2005 was 18.5 maf (95 percent of average). The Sacramento Valley Water Year Hydrologic Classification (40-30-30 Index) was above normal, based on observed data for water year 2005.

The San Joaquin River system unimpaired runoff from the Stanislaus, Tuolumne, Merced, and San Joaquin rivers was 9.2 maf (155 percent of average). The San Joaquin Valley Water Year Hydrologic Classification (60-20-20 Index) was wet, based on observed data for water year 2005.

The water year began with statewide runoff about 110 percent of average in October. Below normal runoff during November, especially in the Sacramento River region, lowered the statewide runoff to 65 percent of average for the first 2 months of the water year. Season-to-date statewide runoff totals rose to 70 percent of average by the end of December, with statewide storage increasing by 1.4 maf to 19.9 maf.

The variation in precipitation amounts during January was reflected in runoff totals. The Sacramento River region experienced about 65 percent of average January runoff, while the San Joaquin and Tulare Lake regions had flows near 155 percent of average. This pattern, observed in January, continued through February. The Sacramento, San Joaquin,

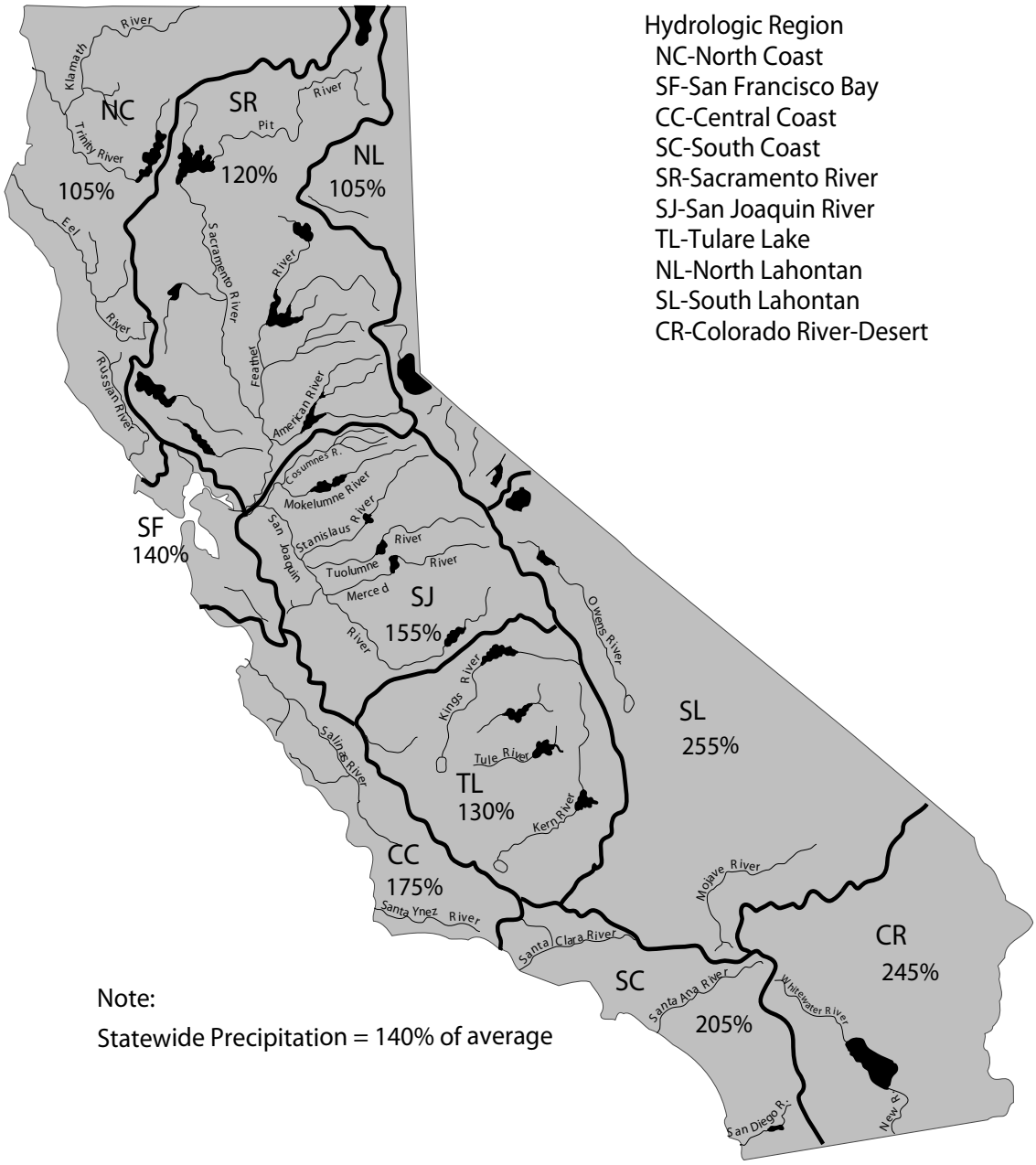

Figure 8-1. Statewide Precipitation by Hydrologic Region, 2004–2005 Water Year, Percentage Average

and Tulare Lake regions received average flows of 55 percent, 110 percent, and 90 percent, respectively. The storm track and water supply patterns changed slightly during March. The Sacramento region received near normal runoff for the month, while well above average runoff persisted in the Central and Southern Sierra.

From a water supply perspective, the most closely monitored period is April through July. The month of April concluded with near normal runoff over most of the Sierra. The month of May was very wet, and it ended with statewide runoff volumes at nearly 190 percent of average for the month. During May, the statewide reservoir storage rose from about 105 percent of average to almost 115 percent of average.

By the end of July, the water year runoff volumes were 95 percent, 150 percent, and 145 percent of average for the Sacramento, San Joaquin, and Tulare Lake regions, respectively.

Water Year 2005–2006 October–December Water Conditions

The last three months of calendar year 2005 mark the beginning of the new 2005–2006 water year. By the end of October, the runoff was near 80 percent of average in the Northern Sierra and closer to average in the central and southern regions of the Sierra. November provided lower percentages of average runoff. By the end of November, statewide runoff since October 1 had fallen to near 70 percent of average. December, however, received nearly 200 percent of normal precipitation statewide and, in addition, the statewide water year-to-date runoff rose to nearly 200 percent of average.

SWP Storage

The SWP operates a complex system of 29 dams and reservoirs to collect and store water for future deliveries. Lake Oroville is the first of two primary SWP conservation facilities. Inflow into Lake Oroville comes from the Feather River.

The San Luis Reservoir is the second primary SWP conservation facility. This Central California facility derives its inflow from pumping at the Gianelli Pumping-Generating Plant. San Luis is an off-stream reservoir. Most of the water is pumped into the reservoir from late fall to early spring. This water is temporarily stored, then released to the California Aqueduct to meet water contractor peaking demands in the summer months. The remaining 27 dams and reservoirs regulate the stored water supply in water delivery patterns that are designed to fit local needs.

Water Year 2004–2005 Storage Totals

At the end of the 2004–2005 water year, water storage in all SWP reservoirs was 4.52 maf or 83 percent of average, compared to 2.99 maf or 76 percent of average at the end of water year 2003–2004. The average end-of-month total storage for the 2004–2005 water year in major SWP reservoirs was 4.19 maf. End-of-water-year storage on September 30, 2005, at Lake Oroville was 2.88 maf, which was about 1.13 maf more than the previous water year. The State's share of San Luis Reservoir storage at the end of the 2004–2005 water year was 925,701 af, as compared to 513,406 af in the previous

water year. The combined storage in southern reservoirs was 620,933 af on September 30, 2005, as compared to 646,828 af at the end of the 2003–2004 water year.

Calendar Year 2005 Storage Totals

The total storage in major SWP reservoirs was about 4.64 maf at the end of calendar year 2005, as compared with 3.07 maf in 2004. The State's share of San Luis Reservoir storage was 1,167,613 af on December 31, 2005, as compared to about 672,181 af at the same time in 2004. The combined storage in the southern reservoirs was 566,207 af on December 31, 2005, as compared to 642,042 af at the same time in 2004.

Lake Oroville

Lake Oroville is the keystone of SWP. It has a maximum water storage capacity of 3,537,580 af. Runoff from Feather River drainage is collected and stored in this reservoir. This water is released to the Sacramento-San Joaquin Delta through Oroville Dam, Thermalito Diversion Dam, and Thermalito Afterbay.

Water Year 2004–2005 Inflow

Lake Oroville inflow for the 2004–2005 water year totaled about 3.87 maf, which was 91 percent of the 30-year average (4.24 maf). Maximum daily inflow occurred on May 19, 2005, at 105,055 af. Minimum daily inflow occurred on October 11, 2004, at 1,640 af. The maximum total in 30 years was in water year 1982–1983 at 8,853,572 af. The minimum total in 30 years was in water year 1991–1992 at 1,555,774 af. (See Figures 8-2 and 8-3 for monthly and cumulative inflows, respectively, into Lake Oroville.)

Calendar Year 2005 Inflow and Storage

Total inflow into Lake Oroville during the calendar year was 4,762,959 af. Minimum storage on January 1, 2005, was 1,654,440 af, which was 47 percent of its capacity. Maximum storage on June 15, 2005, was 3,529,207 af. End-of-year Lake Oroville storage was 2,924,684 af. (Figure 8-4 compares end-of-month storage in Lake Oroville Reservoir for the 2004 and 2005 calendar years.)

2004–2005 Water Year San Luis Reservoir Operations

San Luis Reservoir is operated jointly by DWR and the U.S. Bureau of Reclamation (Reclamation), per operating procedures that were adopted in June 1981. San Luis Reservoir has a normal operating capacity of 2,027,840 af. The SWP share of this capacity is 1,062,183 af.

San Luis Reservoir reached its maximum water year total storage on March 25, 2005, at 2,031,395 af, 100 percent of its normal maximum operating capacity. At the beginning of the water year, San Luis Reservoir contained 670,634 af, 33 percent of its capacity. SWP storage share in the beginning of the water year was 522,041 af. On February 28, 2005, the highest end-of-month SWP share of water storage was 1,099,886 af for the 2004–2005 water year (Figure 8-5).

2004–2005 Water Year Lake Del Valle Operations

Lake del Valle, which is situated off the South Bay Aqueduct, functions primarily as a storage facility for later water delivery in Santa Clara and Alameda counties. At the beginning of the water year, Lake del Valle

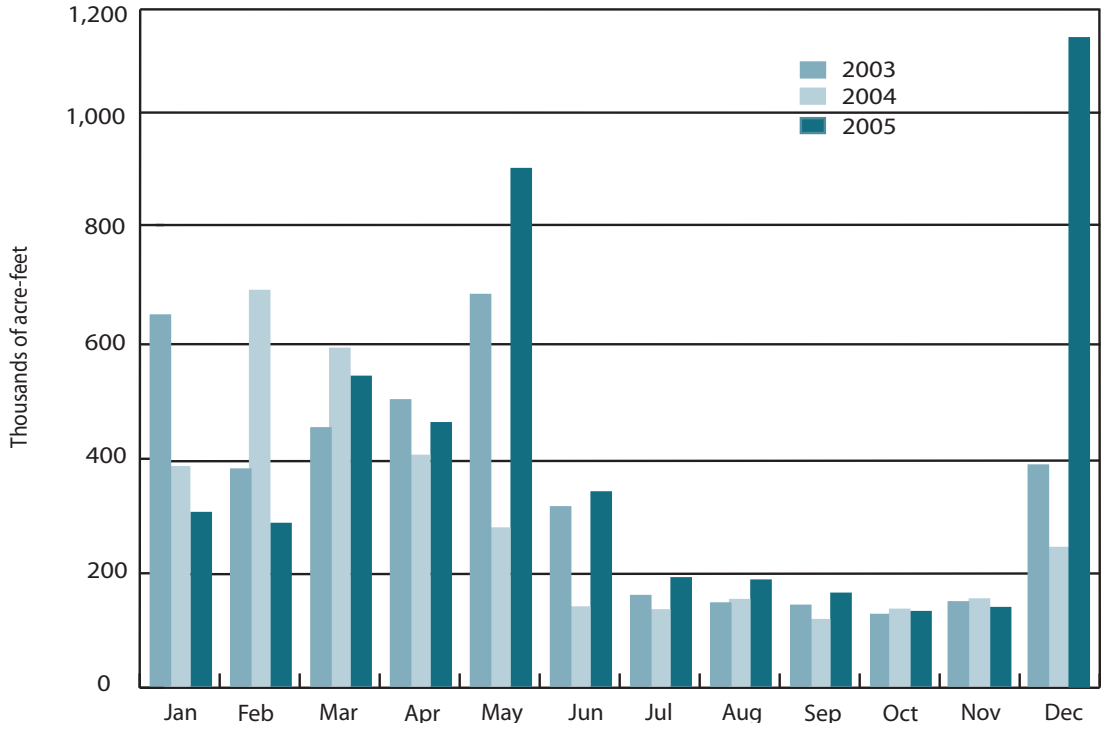

Figure 8-2. Monthly Lake Oroville Inflow, 2003-2005

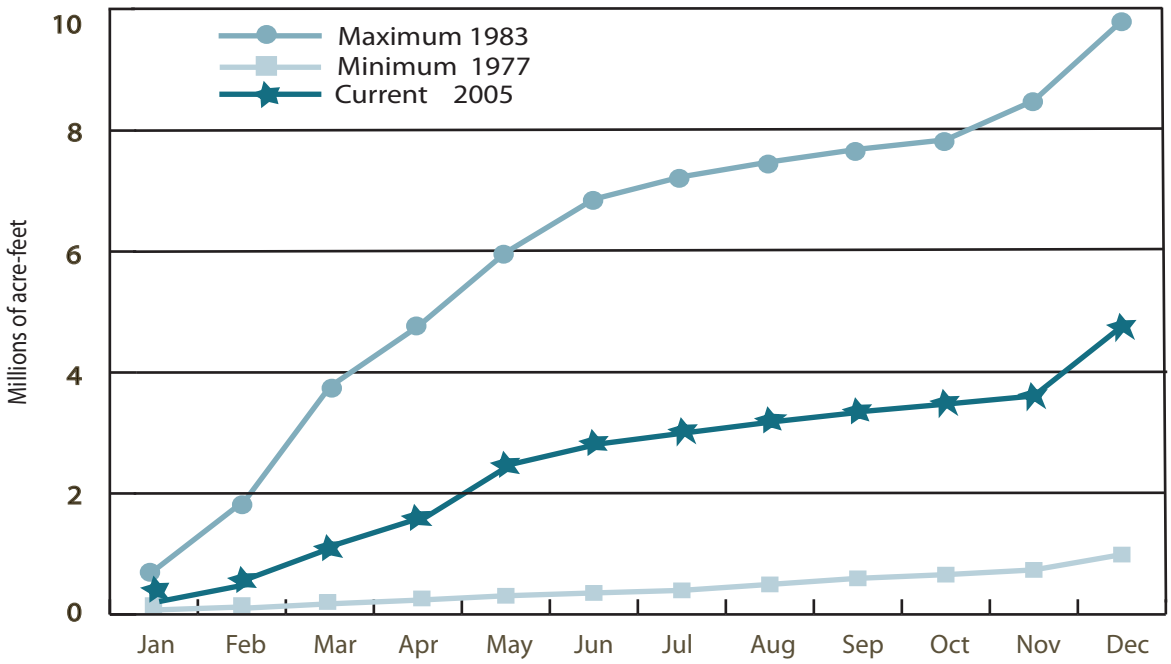

Figure 8-3. Cumulative Maximum, Minimum, and Current Lake Oroville Inflow

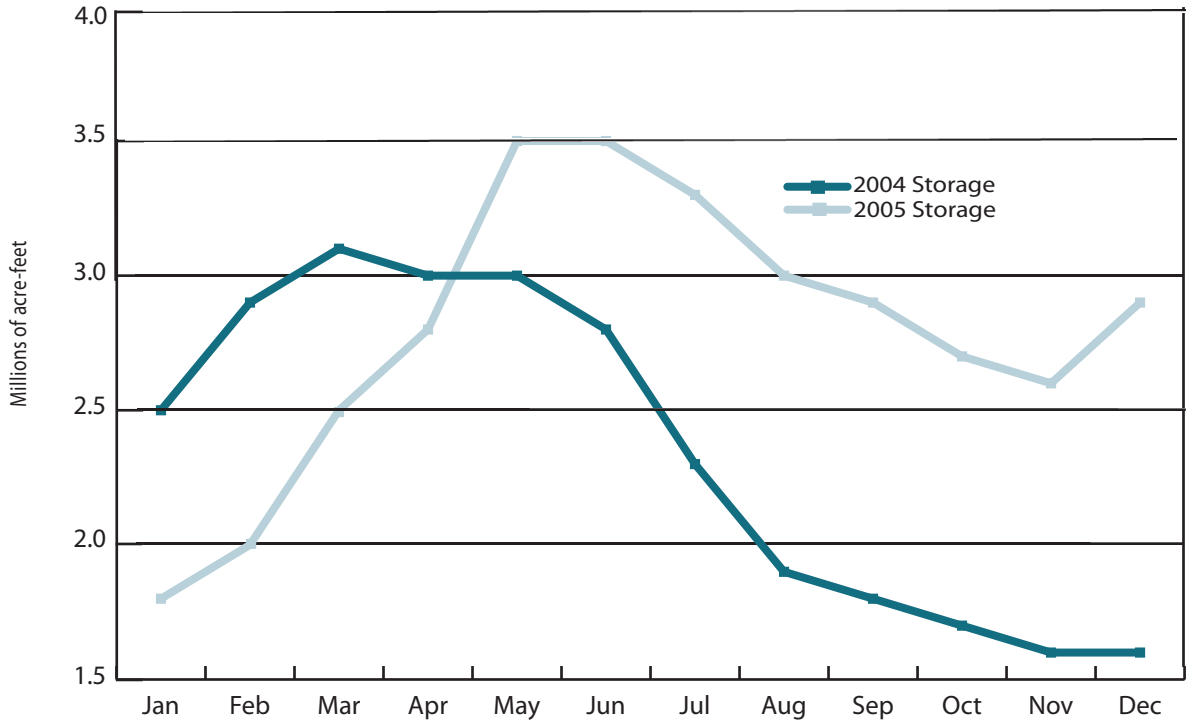

Figure 8-4. End-of-Month Storage in Lake Oroville, 2004 and 2005 Calendar Years

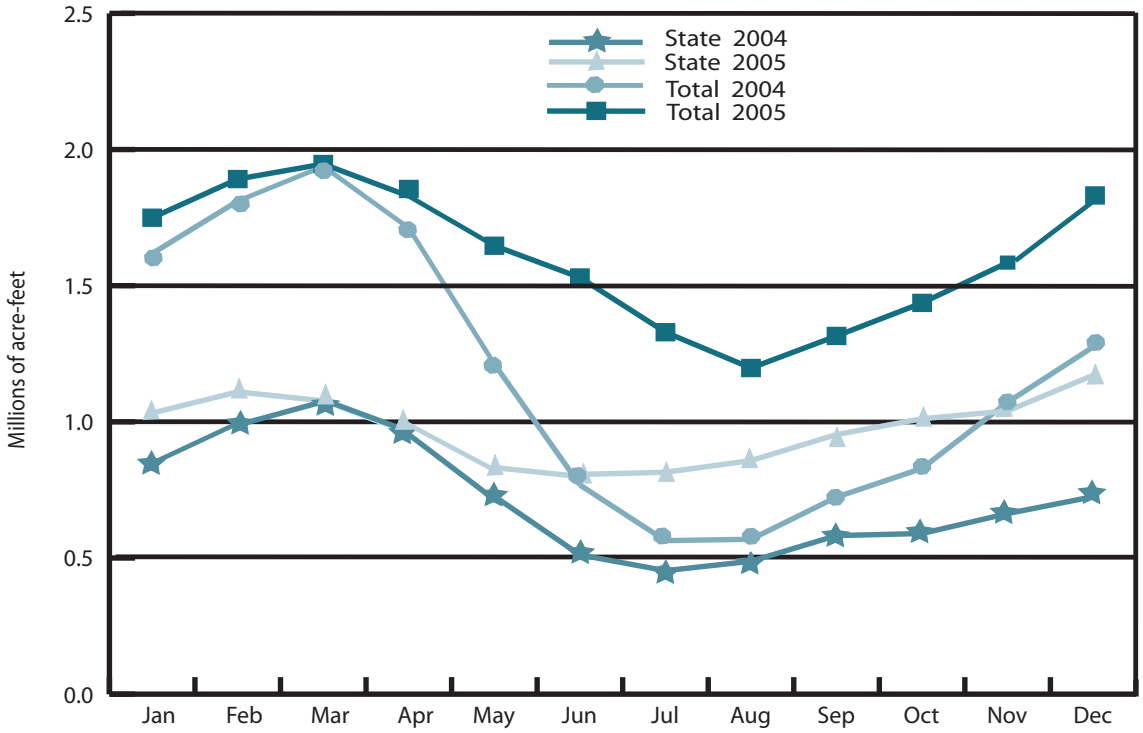

Figure 8-5. End-of-Month Storage in San Luis Reservoir, 2004 and 2005 Calendar Years

held 29,770 af, which was about 39 percent of its maximum capacity of 77,106 af. Its highest storage occurred during the 2004–2005 water year on February 21, 2005, with 41,367 af. Its lowest storage occurred on December 26, 2004, with 25,569 af.

By the end of the water year, on September 30, 2005, storage in Lake del Valle was 33,716 af, 44 percent of maximum capacity. Water year releases to Arroyo Valle and South Bay Aqueduct from Lake Del Valle totaled 27,948 af.

2004–2005 Water Year Southern Reservoir Operations

During normal operating conditions, DWR maintains its four southern reservoirs—Pyramid, Castaic, Silverwood, and Perris—at or near full operating capacity to ensure uninterrupted delivery of water to Southern California contractors.

At the beginning of the water year, these reservoirs held 646,828 af, with 93.9 percent of their combined normal maximum operating capacity of 689,021 af. At the end of the water year, the reservoirs held 620,933 af, 90.1 percent of combined normal maximum operating capacity.

Diversions from the Delta

SWP diverts water from the Sacramento-San Joaquin Delta, through Banks and Barker Slough pumping plants, for delivery to SWP contractors' storage facilities. In 2005, the SWP diverted 4,042,013 af at Banks Pumping Plant, including a combined total of 5,091 af of Central Valley Project (CVP) and Cross Valley Canal water, which was wheeled by DWR. In 2005, CVP diverted 2,705,849 af at the Tracy Pumping Plant and 123,477 af at the Contra Costa Pumping Plant. The combined Delta exports include all of these plants. (Figure 8-6 shows the amounts of water pumped each month in 2005 at the Banks Pumping Plant. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2005 by the SWP and CVP. CVP diverts water to similar areas from the Delta through Tracy Pumping Plant and Contra Costa Pumping Plant.)

Water is delivered from Banks Pumping Plant to the South Bay area through the South Bay Aqueduct and to the San Joaquin Valley, Central Coastal, and Southern California areas through the California Aqueduct. The SWP diverts water from Barker Slough Pumping Plant to the North Bay Aqueduct. In 2005, a total of 46,424 af were diverted.

Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California Aqueduct. (Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for the calendar year 2005.) Pumping peaked in July 2005, at 642,712 af.

Maximum daily Delta exports occurred on December 30, 2005, at 25,960 af. Combined SWP and CVP monthly Delta exports in 2005 varied from a low of 203,773 af in May, to a high of 744,362 af in January. In 2005, Delta exports totaled approximately 6.87 million af.

In 2005, water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 1,561,036 af. (Figure 8-9 shows the amount of water pumped each month in 2005.)

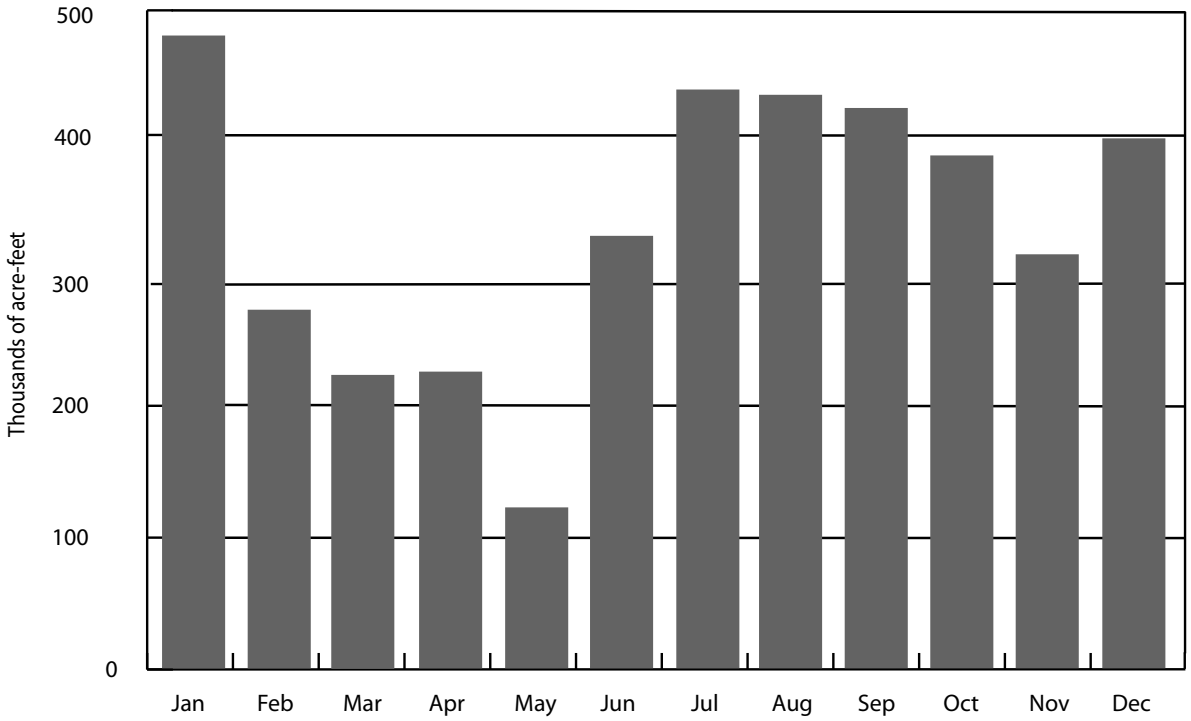

Figure 8-6. Water Pumped at Banks Pumping Plant, 2005 by Month

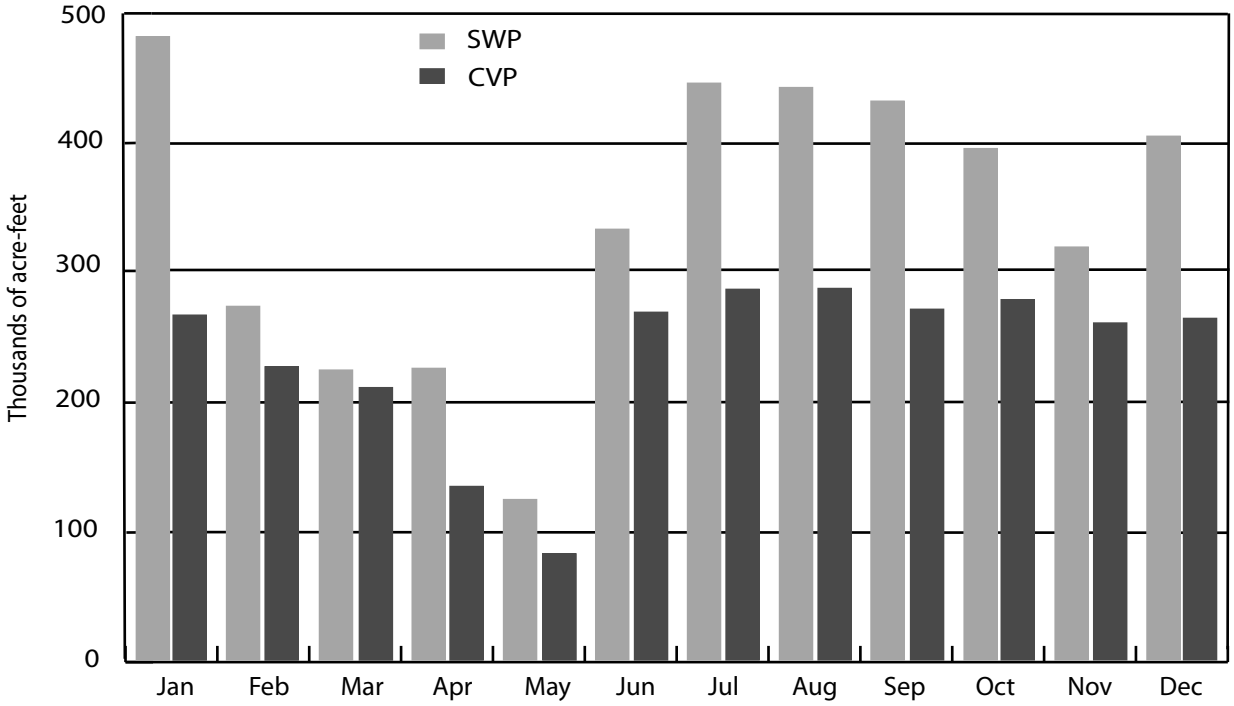

Figure 8-7. Sacramento-San Joaquin Delta Exports by State Water Project and Central Valley Project, 2005

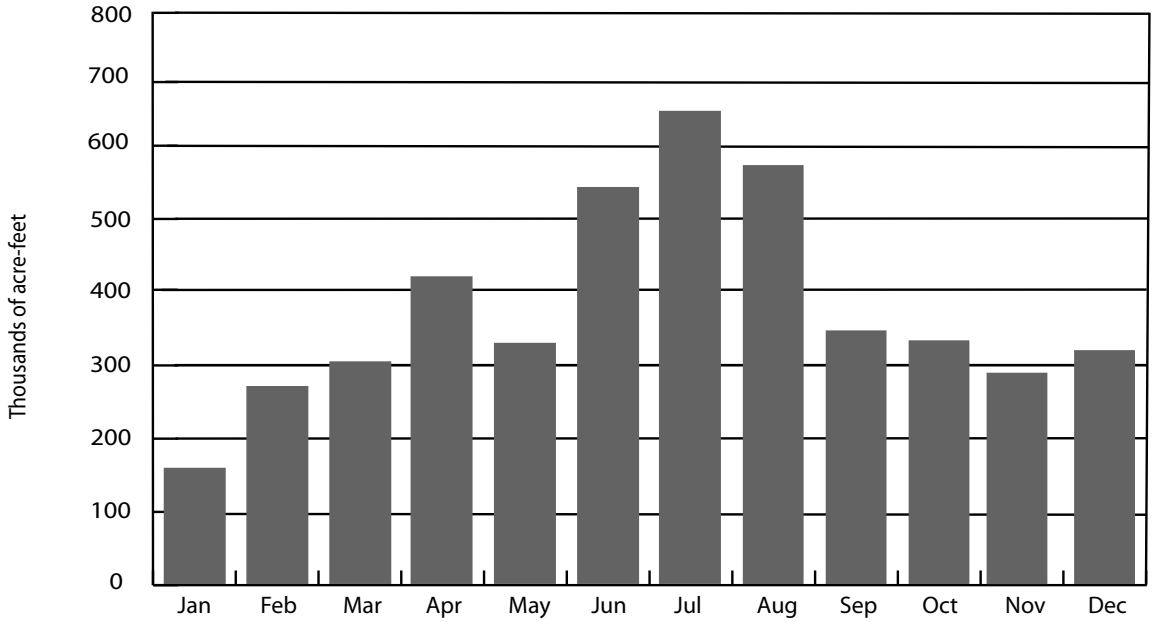

Figure 8-8. Water Pumped At Dos Amigos Pumping Plant, 2005 by Month

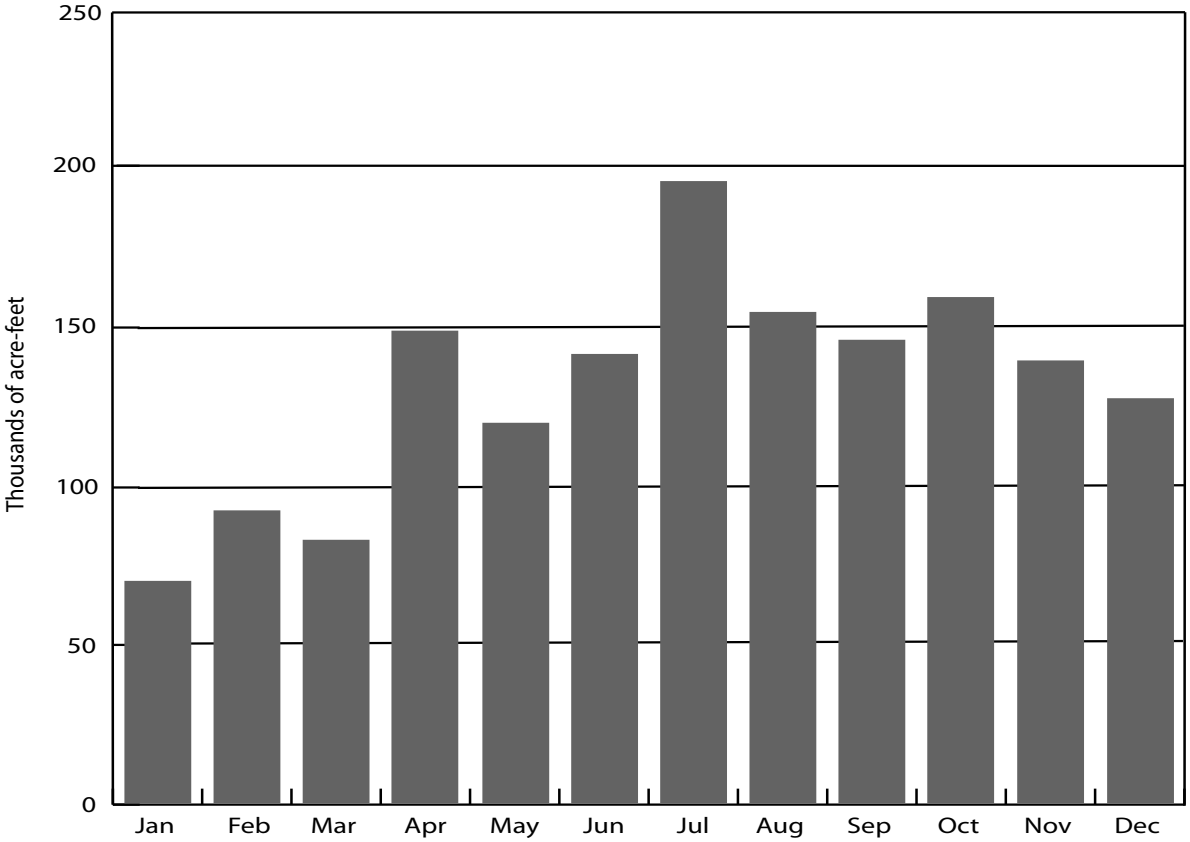

Figure 8-9. Water Pumped at Edmonston Pumping Plant, 2005 by Month

Chapter 9
Water Contracts and Deliveries

Clifton Court Forebay

Significant Events in 2005

During 2005,the Department of Water Resources (DWR) executed seven water conveyance and exchange agreements, 27 Turn-Back Water Pool Program agreements,14 Article 21 Water Program agreements with SWP contractors.

DWR also delivered water pursuant to seven conveyance and exchange agreements and eight storage agreements pending execution, and six conveyance and exchange agreements and three storage agreements executed prior to 2005.

In 2005, 4,732,633 af of water were conveyed to 27 long-term contractors and 26 other agencies.

The Environmental Water Account curtailed pumping at SWP and CVP by 681 af and 11,400 af, respectively. All EWA debt was paid back to the projects by the end of 2005.

Information for this chapter was provided by the State Water Project Analysis Office.

The long-term water supply contracts for water service from the State Water Project (SWP) between the Department of Water Resources (DWR) and 29 local agencies are basic to the project's construction and operation. In return for State financing, constructing, operating, and maintenance of facilities, the agencies contractually agreed to repay all associated SWP capital and operating costs.

DWR delivers water to SWP contractors in accordance with their long-term water supply contracts. These contracts set forth Table A amounts, which determine how much water a contractor may request each year from DWR. Table A amounts also are used as a factor for apportioning available supply to each contractor. Contracts can be found at http:// www.swpao.water.ca.gov/wsc/index.cfm.

"Approved Table A or approved Table A water" represents a portion or all of the annual Table A requested by the contractors and approved for delivery by DWR, based on hydrologic conditions, current reservoir storage, and combined requests from the SWP water contractors. DWR is not always able to deliver the quantity of water requested by contractors. In these cases, and under certain conditions, a lesser amount is allocated and delivered according to the long-term water supply contracts and the process noted above.

Approved Table A amounts may also be referred to in this chapter as "approved amounts" or "approved water".

The Water Supply Contracts are amended as needed. During 2005, two amendments were executed.

DWR also enters into miscellaneous agreements with SWP contractors and other agencies—which may be amended periodically—to convey SWP and non-SWP water through the California Aqueduct and to approve the construction, operation, and maintenance of turnouts along SWP facilities. During 2005, DWR executed seven water conveyance and exchange agreements, 27 Turn-back Water Pool Program agreements,14 Article 21 Water Program agreements with SWP contractors. DWR also delivered water pursuant to seven conveyance and exchange agreements and eight storage agreements pending execution, and six conveyance and exchange agreements and three storage agreements executed prior to 2005.

The State Water Project Analysis Office has developed a numbering system for contracts, amendments, and agreements executed by DWR. These numbers, called SWPAO numbers and designated in text as "SWPAO #XXXXX," are located in parentheses after each contract, amendment, or agreement. These numbers can be used as an identifier for anyone who contacts DWR staff for more detailed information on a particular document.

Amendments to Long-Term SWP Water Supply Contracts

All the original contracts signed by DWR and local agencies have been previously amended to incorporate mutually desired

Long-Term SWP Water Supply Contracts

The first water supply contract was signed with the Metropolitan Water District of Southern Cali¬fornia on November 4, 1960. The contract was negotiated by DWR and Metropolitan according to terms of the contracting principles for water service contracts announced by Governor Edmund G. Brown on January 20, 1960.

The Metropolitan contract became the prototype for all water contracts; by the end of 1967, 31 agencies had contracted for water. In addition, a water supply contract was executed with the City of West Covina in December 1963, but was terminated in August 1965; the city's Table A amount was transferred to Metropolitan through an amendment to the district's long-term contract with DWR. Long-term contracts with Hacienda Water District and Devil's Den Water District were also terminated when those districts transferred their Table A amounts, through contract amendments, to Tulare Lake Basin Water Storage District (1981) and Castaic Lake Water Agency (1992), respectively. Today the SWP has long-term water supply contracts with 29 agencies. Those contracts have been amended periodically to incorporate mutually agreed upon modifications.

All water contracts signed in the 1960s included an estimate of the date water would first be delivered and a schedule of the amount of water the agency could expect to be delivered annually (annual Table A amounts). That amount was designed to increase gradually until the maximum amount of annual Table A was reached. The total combined maximum annual Table A amount for all water contracting agencies was initially 4,230,000 acre-feet, assuming full development of the SWP.

The contracts were initially designed to be valid for 75 years or until all bonds sold as part of the California Water Resources Development Bond Act were repaid, whichever period was longer. As a result of amendments to contracts in the 1990s, the current combined maximum annual Table A amount totals 4,172,786 acre-feet, and the contracts are in effect for the longest of the following periods: (1) the project repayment period, which extends to the year 2035; (2) 75 years from the date of the contract; or (3) the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

changes. Most amendments fall under the following five general categories:

1) revision of annual Table A amounts in the water supply contracts;
2) allocation of costs and benefits for the enlargement or extension of the East Branch and extension of the Coastal Branch of the California Aqueduct;
3) purchase of excess capacity in the California Aqueduct;
4) provisions to allow contractors, under certain conditions, to carry over undelivered SWP approved Table A

water from one year for delivery in the next year; and

5) implementation of Monterey Agreement principles.

2005 Amendments to Long-Term Water Supply Contracts

The following Water Supply Contracts were amended during 2005.

County of Kings

DWR executed Amendment No. 17 to the Water Supply Contract between County of Kings and DWR on September 23, 2005. The amendment provided for the permanent transfer of 305 af of SWP Table A water from Tulare Lake Basin Water Storage District to County of Kings, and set forth the conditions of the transfer. The transfer becomes effective January 1, 2006. (SWPAO #05014)

Tulare Lake Basin Water Storage District

DWR executed Amendment No. 32 to the Water Supply Contract between Tulare and DWR on September 23, 2005. The amendment provided for the permanent transfer of 305 af of Table A water from Tulare to County of Kings, and set forth the conditions of the transfer. The transfer becomes effective January 1, 2006. (SWPAO #05013)

The following long-term Water Supply Contract amendments (part of the 2003 Colorado River Quantification Settlement Agreement) were executed in 2003, and became effective in 2005. The amendments are a result of the 2003 Exchange Agreement that became effective on November 9, 2004, among Coachella Valley Water District, Metropolitan Water District of Southern California, and Desert Water Agency. The exchange agreement provides for the transfer of 88,100 af of Metropolitan's Table A amounts to Coachella and 11,900 af of Metropolitan's Table A amounts to Desert. The transfers are consistent with the implementation of the 2003 Colorado River Quantification Settlement Agreement.

Coachella Valley Water District

DWR executed Amendment No. 18 to the Water Supply Contract between Coachella and DWR on October 10, 2003. The amendment provided for the permanent transfer of 88,100 af of Table A amounts from Metropolitan to Coachella and set forth conditions for the transfer. The transfer became effective January 1, 2005. (SWPAO #04009)

Desert Water Agency

DWR executed Amendment No. 18 to the Water Supply Contract between Desert and DWR on November 3, 2003. The amendment provided for the permanent transfer of 11,900 af of Table A amounts from Metropolitan to Desert and set forth conditions for the transfer. The transfer became effective on January 1, 2005. (SWPAO #04011)

Metropolitan Water District of Southern California

DWR executed Amendment No. 27 to the Water Supply Contract between Metropolitan and DWR on October 24, 2003. The amendment provided for the permanent transfer of 88,100 af of Table A amounts from Metropolitan to Coachella, and set forth conditions for the transfer. The transfer became effective January 1, 2005. (SWPAO #04008)

DWR executed Amendment No. 28 to the Water Supply Contract between

Metropolitan and DWR on October 24, 2003. The amendment provided for the permanent transfer of 11,900 af of Table A amounts from Metropolitan to Desert, and set forth conditions for the transfer. The transfer became effective January 1, 2005. (SWPAO #04010)

Monterey Amendments

The Monterey Amendments increase the reliability of existing water supplies; provide stronger financial management for the SWP; and increase water management flexibility, providing more tools for local water agencies to maximize use of existing facilities.

The Monterey Amendments include changes in allocation of approved Table A water, the transfer of Table A amounts and land, financial restructuring, and increased operational flexibility. The Monterey Amendments are discussed in detail in Chapter 1, "Summary of Significant Events", of Bulletin 132-95 (available online at http://www.swpao.water.ca.gov/publications/index.cfm).

Plumas and Empire remain the only long-term SWP contractors who have not signed the Monterey Amendment.

In accordance with the terms of the May 5, 2003, Monterey Settlement Agreement, the SWP continues to operate pursuant to the Monterey Amendments, while the new Environmental Impact Report (EIR) is being prepared. The draft EIR is expected to be released in 2007. The settlement agreement is discussed in detail in Chapter 9, "Water Contracts and Deliveries," of Bulletin 132-04, (available online at http://www.swpao.water.ca.gov/publications/index.cfm.)

Miscellaneous Agreements with Long-Term SWP Contractors

2005 Water Conveyance and Exchange Agreements

During 2005, water conveyance and exchange agreements were executed or pending execution with long-term SWP contractors as described below.

Dudley Ridge Water District

A letter agreement dated June 20, 2005 and executed July 5, 2005, between DWR and Dudley Ridge approved the conveyance of Central Valley Project (CVP) Section 215 water to Dudley Ridge from March 1, 2005 through May 31, 2010. The CVP section 215 water will be made available at O'Neill Forebay. Dudley Ridge requested this water to be delivered to Dudley Ridge through SWP facilities pursuant to Article 55 of its long-term Water Supply Contract. During 2005, a total of 576 af of CVP Section 215 water was delivered to Dudley Ridge from Reach 8D of the California Aqueduct. (SWPAO #05005)

A letter agreement, pending execution among DWR, Dudley Ridge, and Kern County Water Agency, will provide for the delivery of up to 12,000 af of Dudley Ridge's 2005 Table A water to Kern for delivery to Berrenda Mesa Water District. In exchange, Kern will return a portion of its Table A water, equal to two-thirds (66.7 per cent) of Dudley Ridge's 2005 Table A water delivery to Kern. All return water is to be delivered to Dudley Ridge by December 31, 2018. During 2005, a total of 4,684 af was delivered to Kern from Reach 31A of the Coastal Branch. (SWPAO #05015)

A letter agreement, pending execution among DWR, Dudley Ridge, and San Gabriel Valley Municipal Water District, will provide for the delivery of a portion of Dudley Ridge's 2005 and 2006 approved SWP water supplies to San Gabriel's service area. In exchange, San Gabriel will return a like amount of its future SWP water supplies to Dudley Ridge by December 31, 2016. During 2005, a total of 3,484 af of Dudley Ridge's approved SWP water was delivered to San Gabriel at Reach 1 of the East Branch Extension, of which 2,988 af were 2005 Table A water, and 496 af were 2004 extended carryover water. (SWPAO #05017)

Empire West Side Irrigation District

An agreement executed December 13, 2005, between DWR and Empire, provided for the delivery of unscheduled water (Article 21) to Empire in 2005, at times when SWP water was not needed for fulfilling approved Table A deliveries, or for meeting project operational commitments. A total of 1,799 af of unscheduled water was delivered to Empire in 2005 at Reach 8C. (SWPAO #05002)

Kern County Water Agency

A letter agreement pending execution between DWR and Kern, will provide for the delivery of up to 27,000 af of Kern's approved 2005 Table A water to Westlands Water District. In return, Kern will receive a like amount of Kern River water from CVP contractors. This is to facilitate a sale of CVP water from an "eastside" Friant–Kern CVP contractor to Westlands, a "westside" CVP contractor. DWR petitioned the State Water Resources Control Board on May 25, 2005, and received approval on July 20, 2005, for a temporary change of place of use for the delivery of SWP water to Westlands. During 2005, a total of 7,000 af was delivered to Westlands at Reach 4. (SWPAO #05012)

A letter agreement dated August 9, 2005, and executed August 22, 2005, between DWR and Kern, approved the delivery of up to 20,000 af of Kern's 2005 Table A water to the U.S. Bureau of Reclamation (Reclamation) in O'Neill Forebay during 2005. This is to facilitate the delivery of up to 20,000 af of Kern–Tulare Water District's Friant–Kern water to Reclamation by in-lieu exchange, with a portion of Kern's approved Table A water. A portion of the 20,000 af was delivered to Kern National Wildlife Refuge located within Kern's service area. Reclamation was responsible for delivering the remaining portion to wildlife refuges in the San Joaquin Valley via the CVP Delta-Mendota Canal, or CVP side of the joint use facilities of the California Aqueduct. DWR petitioned SWRCB on April 21, 2005, and received approval on August 11, 2005 for such temporary change of place of use. During 2005, a total of 20,000 af was delivered to Reclamation in O'Neill Forebay. (SWPAO #05004)

A letter agreement, pending execution between DWR and Kern, will provide for the delivery of up to 25,000 af of Westlands' 2005 CVP water to Kern for storage in the Semitropic Groundwater Banking and Exchange Program. In exchange, Kern will return a like amount to Westlands in a future year. Westlands' approved CVP water will be made available at O'Neill Forebay for delivery to Kern. During 2005, a total of 11,284 af was delivered to Kern at Reach 10A. (SWPAO #05020)

A letter agreement dated September 14, 2005, and executed October 28, 2005,

between DWR and Kern, approved the delivery of up to 53,300 af of 2004 CVP water to Kern. Kern acquired this water from two CVP/Cross Valley Canal contractors (Kern–Tulare and Rag Gulch Water Districts) and requested the water to be delivered pursuant to Article 55 of Kern's Water Supply Contract. A portion of Kern–Tulare and Rag Gulch Water Districts' service area is within Kern County. During 2005, a total of 7,932 af was delivered to Kern. (SWPAO #04025)

A long-term agreement executed February 23, 2005, among DWR, Kern, and West Kern Water District, approved the introduction of local water from the West Kern Turn-in into Reach 13B of the California Aqueduct. The local water will be delivered concurrently by exchange with SWP water supplies to West Kern Turnout in Reach 12D of the California Aqueduct for use by La Paloma Power Plant. No water was moved under this agreement in 2005. (SWPAO #04015)

Mojave Water Agency

A letter agreement, pending execution among DWR, Mojave, and Solano County Water Agency will provide for the delivery of up to 2,000 af of Solano's approved 2005 SWP water supplies to Mojave, in exchange for up to 1,000 af of Mojave's future SWP water supplies during a dry year. All return water is to be delivered to Solano by December 31, 2015. Similar agreements were approved by DWR in 1998, 1999, 2000, and 2004. During 2005, a total of 2,000 af of Solano's Table A water was delivered to Mojave at Reach 22B. (SWPAO #05019)

Santa Clara Valley Water District

A letter agreement, pending execution among DWR, Santa Clara, and Kern, will provide for the delivery of up to 20,000 af of Santa Clara's 2005 CVP water to Semitropic Water Storage District, a member unit of Kern, in exchange for Kern's Table A water in the future. The water will be delivered to Kern in accordance to Article 55 of Kern's long–term Water Supply Contract. During 2005, a total of 20,000 af of Santa Clara's CVP water was delivered to Semitropic at Reach 10A. (SWPAO #06012)

A letter agreement dated January 31, 2005, and executed March 7, 2005, between DWR and Santa Clara, approved the delivery of up to 3,100 af of Brown's Valley Irrigation District's non-SWP water to Santa Clara in 2004. This water, which is under Brown's Valley pre-1914 water rights, was made available at Banks Pumping Plant and conveyed to Santa Clara at Reach 9 of the South Bay Aqueduct. Santa Clara requested this water be delivered pursuant to Article 55 of its Water Supply Contract. During 2004, a total of 3,100 af of non-SWP water was delivered to Santa Clara. (SWPAO #04026)

Tulare Lake Basin Water Storage District

A letter agreement dated June 20, 2005, and executed June 29, 2005, between DWR and Tulare, approved the transfer of up to 5,500 af of Tulare's 2005 Table A water to Westlands at Reaches 5, 6, and 7 of the California Aqueduct. The transfer was made on behalf of two land owners, Hansen Ranches (called Vista Verde Farms in Westlands) for up to 3,500 af, and Newton Farms for up to 2,000 af, both of which operate in Tulare's and Westlands' service areas. DWR petitioned the SWRCB on April 19, 2005, and received approval on June 29, 2005, for a temporary change of place of use. During 2005, a total of

3,000 af were delivered to Westlands at Reaches 5 and 7. (SWPAO #05001)

A letter agreement dated June 29, 2005, and executed August 15, 2005, among DWR, Tulare, and Westlands, approved the delivery and re-regulation of up to 500 af of CVP water from Westlands to Tulare in March 2005. In exchange, Tulare would return a like amount of its 2005 approved SWP Table A water to Westlands at Reaches 5, 6, and 7 of the California Aqueduct by December 31, 2005. The point of delivery for the exchange was at O'Neill Forebay. DWR petitioned SWRCB on April 19, 2005, and received approval on June 29, 2005, for a temporary change of place of use for the delivery of return water. During 2005, a total of 277 af was delivered to Tulare at O'Neill Forebay and a total of 277 af of Tulare's 2005 Table A water was returned from O'Neill Forebay to Westlands. (SWPAO #05003)

A letter agreement, pending execution between DWR and Tulare, will provide for the delivery of up to 2,000 af of Tulare's 2005 Table A water to Westlands at Reach 7 of the California Aqueduct, on behalf of Westlake Farms Inc. operates in both contractors' service areas. The water is to be delivered to Westlands for use on lands within the Kings County portion of Westlands' service area. During 2005, a total of 2,000 af was delivered to Westlands at Reach 7. (SWPAO #05011)

Water Conveyance and Exchange Agreements Prior to 2005

During 2005, water was delivered pursuant to agreements with SWP contractors that were executed prior to 2005. These water conveyance and exchange agreements are described below.

Kern County Water Agency

An agreement executed on June 8, 2000, among DWR, Kern, and Western Hills Water District approved delivery of 8,000 af of pre-1914 Lower Kern River rights water banked in Kern's share of the Pioneer Groundwater Banking Project. A portion of Kern's approved Table A water will be delivered annually to Western Hills from Reach 2A of the California Aqueduct. In exchange, Kern will take a like amount of banked local water from the Pioneer Groundwater Bank. DWR petitioned SWRCB and by an SWRCB order dated April 21, 2000, Western Hills' service area was included within the authorized SWP place of use. During 2005, a total of 1,046 af of Kern's Table A water was delivered to Western Hills at Reach 2A.
(SWPAO #01001)

A letter agreement executed October 11, 2002, between DWR and Kern approved the delivery to Kern in 2000, of up to 30,000 af of non-SWP water from four CVP contractors, members of the San Luis and Delta Mendota Water Authority. In exchange, Kern would return a like amount of its approved Table A water to the Water Authority by December 31, 2003. A total of 23,941 af of CVP water was delivered to Kern in 2000. Kern requested an extension of the return period in 2003, and a total of 2,000 af was returned to the Water Authority by the end of 2004, leaving a balance of 21,941 af to be returned to the CVP contractors. The Water Authority, Kern and Santa Clara entered into an exchange agreement dated June 28, 2005, to facilitate the return of the remaining 21,941 af to the Water Authority. Pursuant to the exchange agreement, Santa Clara, a contractor who has both SWP and CVP water supplies, will deliver 21,941 af of its CVP water supplies to the Water Authority. In return, a like amount of Kern's approved

SWP water supplies will be delivered to Santa Clara's account in the Semitropic Water Banking Program for later recovery. During 2005, a total of 21,941 af of Kern's Table A water was delivered to Semitropic from Reach 10A, thereby completing the exchange. (SWPAO #00032)

Mojave Water Agency

An agreement executed November 13, 1997, among AVEK, Mojave, and DWR, approved a change in point of delivery through 2019 of up to 2,250 af annually of Mojave's approved Table A amount to AVEK's Fairmont Turnout in Reach 19 of the California Aqueduct. Mojave does not have conveyance facilities to provide service to a solar energy generating station located within its service area. AVEK has conveyance capability and has agreed to provide service. During 2005, DWR delivered 973 af of Mojave's 2005 Table A water and 43 af of Mojave's 2004 extended carryover water through AVEK's turnout at Reach 19. (SWPAO #97003)

Napa County Flood Control and Water Conservation District

A change in point of delivery agreement executed December 26, 2001, among DWR, Napa County Flood Control and Water Conservation District and Solano County Water Agency, approved the delivery of up to 628 af of Napa's annual Table A water to the City of Vallejo Water Treatment Plant at Reach 3A of the North Bay Aqueduct, in Solano's service area. This water is further conveyed to the City of American Canyon, a member agency of Napa. During 2005, a total of 160 af of Napa's Table A water was delivered to Solano from Reach 3A. (SWPAO #00029)

Solano County Water Agency

A settlement agreement was executed May 19, 2003, among DWR, Solano, and the cities of Fairfield, Vacaville, and Benicia. Concurrently, a conveyance agreement was executed between DWR and Solano. Together, these agreements approved the delivery of up to 31,620 af annually of settlement water to Solano for delivery to the three cities to help meet their current and future municipal and industrial water needs through the North Bay Aqueduct. During 2005, a total of 1,132 af of settlement water was delivered to the three cities through Reach 1 of the North Bay Aqueduct. (SWPAO #03017)

San Bernardino Valley Municipal Water District

San Bernardino and Metropolitan entered into a coordinated use agreement for conveyance facilities and SWP water supplies on May 14, 2001. DWR responded on February 27, 2002, concurring with the agreement and acknowledging the coordinated use of local facilities currently existing within San Bernardino's jurisdictional boundaries. This coordinated use involves delivery of San Bernardino's SWP water to Metropolitan's facilities within San Bernardino's service area, as permitted under Article 10 of the Water Supply Contract. During 2005, a total of 20,000 af of San Bernardino's approved Table A water was delivered to Metropolitan, of which 15,834 af was delivered to Reach 26A and 4,166 af was delivered to Reach 1 of the East Branch Extension. (SWPAO #02035)

Turnout Agreements

Antelope Valley–East Kern Water Agency.

An agreement dated March 28, 2000, between DWR and Antelope Valley–

East Kern Water Agency, allowed the construction, operation, and maintenance of the Rancho Vista Turnout at Milepost 339.68, Reach 20B of the California Aqueduct. The turnout has a design capacity of 5 cfs. Construction was completed in March 2000, but was not formally accepted in 2005.

New Point of Delivery for Ventura County Watershed Protection District

United Water Conservation District (United) currently contracts for 5,000 af per year of SWP water from Ventura County Watershed Protection District. Of the 5,000 af, 1,850 af are allocated to the Port Hueneme Water Agency and delivered through Castaic Lake. In February 2002, United released an Initial Study and Negative Declaration for the delivery of its SWP water from Pyramid Lake via Piru Creek. The proposal to deliver Ventura's SWP water for United via Piru Creek was included as an objective in the EIR for the revised operations guidelines for Pyramid Lake. The new guidelines, consistent with the final EIR, allow for the delivery of up to 3,150 af of SWP water to United between November 1 and the end of February each year.

Agreements and Activities Related to the Monterey Amendments

Turn-Back Water Pool Program

Pursuant to Article 56(d) of the Monterey Amendments, the tenth year of the Turn-Back Water Pool Program was initiated through Notice to State Water Project Contractors No. 05-04, dated February 2, 2005. All SWP contractors who signed Monterey Amendments were permitted to participate in the program. The program allowed SWP contractors to offer a portion of their approved 2005 Table A water for sale in a Turn-back pool for use by interested SWP contractors. Based on Table A supply and demand, the Turn-back water was allocated among the selling and purchasing contractors. In 2005, 38,275 af of water were purchased under the Turn-Back Water Pool Program.

Transactions for Pool A and Pool B of the Turn-Back Water Pool Program occurred in February and March 2005, respectively. In 2005, the program was extended to June 1 to allow for changes in the percentage of Table A allocations between April 1 and June 1. Only SWP contractors who were already committed to purchase water through Pool B were allowed to continue with the program until June. Turn-back water sold for $12.24 per acre-foot—50 percent of the Delta Water Rate—through Pool A, and for $6.12 per acre-foot—25 percent of the Delta Water Rate—through Pool B. All money collected through the Turn-Back Water Pool Program was paid to the selling contractors. The 2005 Turn-Back Water Pool Program closed on June 1, 2005. Notices to State Water Project Contractors describing the Turn-Back Water Pool Program are available online at http://www.swpao.water.ca.gov/notices/index.cfm.

Table 9–1 lists contractors who participated in Pool A and Pool B of the Turn-Back Water Pool Program.

Storage of Water Outside Service Area

Pursuant to Article 56 of the Monterey Amendments, seven SWP contractors have agreements with DWR to deliver or store SWP water outside their service area for later use within their service area. The following agreements include provisions concerning the conveyance and points of delivery of such water.

Table 9-1. 2005 Turn-Back Water Pool Program (Acre-feet)

Contractor	Sold	Purchased
	Pool A	
City of Yuba City	2,160	
Littlerock	880	
Ventura County	9,000	
Alameda County		144
Coachella		414
Desert		171
Dudley Ridge		196
Kern		3,412
Kings		31
Metropolitan		6,530
Oak Flat		19
San Gorgonio		22
Santa Barbara		155
Santa Clara		342
Tulare		329
Zone 7		275
Total	**12,040**	**12,040**
	Pool B	
City of Yuba City	3,480	
San Gabriel	15,420	
Ventura	7,335	
Alameda County		799
Coachella		2,302
Desert		951
Dudley Ridge		1,090
Kern		18,985
Kings		171
Oak Flat		108
Tulare		1,829
Total	**26,235**	**26,235**

Alameda County Flood Control and Water Conservation District, Zone 7. A long-term change in point of delivery agreement pending execution, among DWR, Alameda-Zone 7, and Kern, will provide for the delivery of a portion of Alameda-Zone 7's approved 2004 through 2020 SWP water supplies, for storage in Semitropic, and for the return of such water by future exchange of a like amount of Kern's Table A water, in accordance with the Alameda-Zone 7 and Semitropic Water Banking and Exchange Program Agreement. All return water is to be delivered to Alameda-Zone 7 by December 31, 2035. During 2005, DWR delivered a total of 5,740 af of Alameda-Zone 7's 2004 extended carryover water to Semitropic. (SWPAO #04017)

Alameda County Water District. A change in point of delivery agreement pending execution, among DWR, Alameda, and Kern, will provide for the delivery of a portion of Alameda's 2005 approved SWP water supplies for storage in and later recovery from Semitropic, in accordance with the Alameda County and Semitropic Water Banking and Exchange Program Agreement. During 2005, DWR delivered 25,700 af of Alameda's 2005 Table A water and 4,600 af of Alameda's 2004 extended carryover water to Semitropic. (SWPAO #07005)

Castaic Lake Water Agency. A long-term change in point of delivery agreement, pending execution, among DWR, Castaic, and Kern, will provide for the delivery of a portion of Castaic's approved 2005 and future SWP water supplies for storage in and later recovery from the groundwater basin underlying Rosedale–Rio Bravo Water Storage District, a member unit of Kern. This is in accordance with the Castaic and Rosedale–Rio Bravo Water Banking and Exchange Program Agreement. During 2005, DWR delivered 20,000 af of Castaic's approved 2005 Table A water to Reach 12E for subsequent delivery to Rosedale–Rio. (SWPAO #05016)

County of Kings. A change in point of delivery agreement, executed March 24, 2004, among DWR, Kings, and Westlands,

provides for the delivery of up to 5,000 af of County of Kings' Table A water through Westlands' turnouts at Reach 6 and Reach 7. Water will be conveyed through Westlands and into Kings County for use at LeMoore Naval Air Station. The agreement became effective January 1, 2004, and remains in effect until December 31, 2035. During 2005, DWR delivered a total of 2,439 af of Kings' Table A water to Westlands at Reach 6. (SWPAO #04005)

A change in point of delivery agreement, pending execution, among DWR, County of Kings, and Westlands, will provide for the delivery of a portion of Kings' approved 2005 and 2006 SWP water supplies through Westlands' turnouts at Reaches 6 and 7 of the California Aqueduct. County of Kings requested the SWP water supplies be delivered to Westlands' agricultural lands within King's county. During 2005, DWR delivered a total of 170 af of County of Kings' 2005 Table A water and 11,248 af of Article 21 water to Reaches 6 and 7. (SWPAO #05026)

A long-term agreement, pending execution, among DWR, County of Kings, Tulare, and Westlands, will provide for a change in point of delivery of up to 200 af of Kings annual approved Table A water and other SWP water supplies to Westlands' turnouts at Reaches 6 and 7 of the California Aqueduct. The water is conveyed to GWF Energy, LLP, for use within Kings' service area; however, GWF Energy relies on CVP water supplies before SWP water supplies. During 2005, one af was delivered to Reach 6. (SWPAO #02031)

Dudley Ridge Water District. A change in point of delivery agreement, pending execution, among DWR, Dudley Ridge, and Kern, will provide for the delivery of a portion of Dudley Ridge's approved SWP water supplies for storage in and later recovery from the Kern Water Bank (KWB). During 2005, DWR delivered a total of 15,694 af of Dudley Ridge's approved SWP water supplies for storage in KWB, of which 2,500 af were 2005 Table A water, 48 af were 2004 extended carryover water, and 13,146 af were Article 21 water. (SWPAO #07001)

Metropolitan Water District of Southern California. A long-term change in point of delivery agreement executed August 30, 2004, among DWR, Metropolitan, and Kern, approved the delivery of a portion of Metropolitan's approved SWP supplies for storage in and later recovery from the groundwater basin underlying Kern Delta Water District, a member unit of Kern, in accordance with the Metropolitan and Kern Delta Water Management Program Agreement. During 2005, a total of 15,576 af of Metropolitan's Table A water was delivered to Reaches 12E and 13B. (SWPAO #03019)

A change in point of delivery agreement pending execution, among DWR, Metropolitan, and Mojave, will provide for the delivery of up to 75,000 af of Metropolitans' 2003, 2004, and 2005 approved SWP water supplies for storage in the Mojave River Basin within Mojave, in accordance with the Metropolitan and Mojave Water Banking Demonstration Agreement. The water is to be returned to Metropolitan, by exchange of Mojave's Table A water, by January 15, 2010. During 2005, DWR delivered a total of 20,000 af of Metropolitan's 2005 Table A water to Mojave at Reaches 22B and 24. (SWPAO #03057)

A long-term agreement, executed on August 21, 1995, among DWR, Metropolitan, and Kern, approved the annual delivery of a portion of Metropolitan's annual approved Table A and other water supplies for storage in and later recovery from Semitropic, in accordance with the Metropolitan and Semitropic Water Banking Program Agreement. The long-term agreement remains in effect until November 4, 2035. During 2005, a total of 31,210 af of Metropolitan's Table A water was delivered to Semitropic from Reach 10A. (SWPAO #95010)

Santa Clara Valley Water District. A change in point of delivery agreement, pending execution among DWR, Santa Clara and Kern, will provide for the delivery of a portion of Santa Clara's approved 2005 SWP water supplies for storage in and later recovery from Semitropic, in accordance to the Santa Clara and Semitropic Water Banking and Exchange Program Agreement. During 2005, DWR delivered a total of 47,081 af of Santa Clara's approved SWP water supplies to Semitropic, of which 32,333 af were 2005 Table A water, 11,633 af were 2004 extended carryover water, and 3,115 af were Article 21 water. (SWPAO #05008)

Article 21 Water Program

Pursuant to Monterey Amendments, the Article 21 water replaces unscheduled, surplus, wet weather, and Article 12(d) water. The Article 21 water program allows a contractor to take delivery of water over the approved and scheduled Table A amounts for the current year. Article 21 water is available for delivery on a short-term basis as determined by DWR when water is still available after operational requirements for SWP water deliveries, water quality, and Delta requirements are met.

The conditions for the Article 21 Water Program for 2005 were described in the January 12, 2005, Notice to State Water Project Contractors No. 05-01. Thirteen participants signed the notice, which indicated their acceptance of the criteria, procedures, and charges for the program. They collectively received a total of 729,284 af of Article 21 water. (Table 9-2)

During the Article 21 water program period, unscheduled water was also made available to Empire pursuant to its long-term water supply contract. Empire received 1,799 af of unscheduled water in 2005 for agricultural purposes.

Table 9-2. Article 21 Water Deliveries (Acre-feet)

Contractor	Amount
Alameda County WD	846
Castaic Lake	2,451
Kings	11,504
Dudley Ridge	28,197
Kern	453,078
Napa	606
San Bernardino	56
San Gorgonio	15
San Luis Obispo	245
Santa Clara	6,298
Solano	10,421
Metropolitan	168,300
Tulare	47,267
Subtotal	729,284
Empire [a]	1,799
Total	**731,083**

a) Unscheduled agricultural water

Flexible Storage Program

No SWP contractor participated in the Flexible Storage Program in 2005.

Extended Carryover Program

Pursuant to Article 56 of the Monterey Amendments, contractors can elect to store project water outside of their service area for later use within their service area. Qualified contractors can request Table A water carried over for delivery in the following year to the extent that such deliveries do not adversely affect current or future project operations. Factors that influence how much extended carryover water can be delivered include operational constraints of project facilities, filling of SWP conservation storage facilities, flood control releases, and water quality restrictions. If storage requests exceed the available storage capacity, the amount available is allocated among the contractors requesting storage in proportion to their annual Table A water for that year. Fifteen SWP contractors took delivery of 169,171 af of approved 2004 Table A water carried over into 2005, as extended carryover.

Dry Year Water Purchase Program

Due to the wet hydrology of 2005, there was no need for a dry year water purchase program this year.

Environmental Water Account

EWA is a cooperatively managed program intended to provide (1) protection to fish of the Bay-Delta Estuary through environmentally beneficial changes and (2) water supply reliability to SWP and CVP water users through increased flexibility in operations (SWP and CVP). Responsibility for implementing EWA rests with the NOAA Fisheries, U.S.. Fish and Wildlife Service, and the Department of Fish and Game (management agencies), and Reclamation and DWR (project agencies).

Under EWA, fish protection is achieved by periodically curtailing project water delivery from the Bay-Delta to project water users south of the Delta and replacing it at a later date within the same calendar year. EWA operates on a water year basis, which begins October 1 and ends September 30 of the following year. However, EWA has the entire water year, plus the three remaining months of the calendar year, to replace curtailed water. This necessitates the acquisition of alternative sources of water, which are used to replace the project water supply (i.e., the undelivered water). EWA assets consist of "operational assets", which are acquired through changes in operations as defined in the August 28, 2000 CALFED ROD; "purchase assets," which are acquired water through purchases from willing water sellers; "source shifting," which involves deferral of scheduled delivery of water by willing participants; and other non-water assets including dedicated pumping capacity at Banks Pumping Plant during the summer. EWA is considered operational for any year when these assets are in place and Endangered Species Act commitments are provided by the management agencies.

In 2005, EWA's fifth operational year, exports were periodically curtailed at the SWP and CVP export facilities between December 15, 2004 and June 8, 2005. These actions resulted in an EWA debt of about 328,681 af at the SWP (December—4,163 af; February—33,967 af; April—121,888 af; May—133,997 af; June—34,666 af) and 11,400 af at the CVP in February.

During water year 2005, DWR and Reclamation acquired 171,917 af and 28,568 af, respectively, in operational assets and 154,560 af of purchase assets through contract agreements. All purchase asset acquisitions in 2005 were made by DWR and were covered under the EWA EIS/EIR in compliance with NEPA and CEQA. A source shift was not implemented because there was no risk of a low-point problem at San Luis Reservoir.

In fall 2004, EWA carried a debt of 14,927 af to water year 2005. EWA ended with no debt at the end of December 2005.

Purchase Assets

The following SWP contractors and non-SWP contractors participated in the EWA Program in 2005. The purchase asset water amounts below represent the total amounts of water acquired for EWA from various sources. These amounts have not been adjusted to reflect conveyance losses.

Kern County Water Agency

DWR and Kern County Water Agency executed an amendment, on May 20, 2005, to a 2003 agreement for selling previously stored groundwater to EWA and exchanging it for Kern's approved 2005 Table A water. The amendment approved the purchase of 29,712 af of groundwater to be exchanged in June 2005 (SWPAO #04-715). The purchased groundwater consisted of 5,432 af of previously stored Kern River Flood water and 24,280 af of previously stored Table A water (11,584 af stored in 1993; 8,631 af stored in 1995; 2,664 af stored in 1997; 532 af stored in 1998; and 869 af stored in 2000).

A multi-year groundwater purchase agreement was also executed on September 23, 2005, which expires December 31, 2007. In 2005, 60,000 af of water was purchased and exchanged for Kern's approved 2005 Table A water: 30,000 af of water in August and 30,000 af of water in September (SWPAO #05-705). A total of 89,712 af of Kern's groundwater was purchased in 2005. The purchased groundwater consisted of 8,879 af of previously stored Kern River Flood water and 51,121 af of previously stored Table A water (1,064 af stored in 1993, 15,075 af stored in 1995; 3,685 af stored in 1996; 3,802 stored in 1998; and 27,495 af stored in 2000).

Yuba County Water Agency. An agreement executed on April 7, 2005, between DWR and Yuba County Water Agency approved the transfer of up to 125,000 af of water from storage in New Bullards Bar Reservoir and groundwater substitution for support of EWA. Due to the wet hydrology of 2005, only 6,044 af of Yuba's water was purchased (SWPAO #04-716).

Placer County Water Agency. An agreement executed on October 26, 2004, between DWR and Placer County Water Agency approved the transfer of up to 20,000 af of water. DWR purchased a total of 18,700 af water from Placer for EWA in 2004. Since EWA was not able to use the Placer water in 2004, EWA applied 15,372 af of Placer's water for lower American River in stream temperature improvement benefits for fisheries in January 2005, and the remaining 3,328 af of Placer water spilled from Folsom Dam during flood control operations in February, 2005 (SWPAO #04-705).

South Feather Water and Power Agency

DWR and South Feather Water and Power Agency executed an agreement on December 15, 2004, for South Feather to transfer up to 10,000 af of water to DWR for EWA. South Feather released a total of 6,200 af water into Lake Oroville in December 2004 for use by EWA in 2005. This water later spilled out of Lake Oroville in June 2005, resulting in no purchase of water for EWA from South Feather (SWPAO #04-709).

Santa Clara Valley Water District

An amendment to a 2003 agreement was executed on May 4, 2005, among DWR, Santa Clara Valley Water District, and Kern. The amendment facilitated the purchase of up to 10,800 af of water stored in Santa Clara's portion of Semitropic Groundwater Bank that could then be exchange for Santa Clara's approved 2005 Table A water for support of EWA. Under the amendment, a portion or all of the purchased water could be Santa Clara's CVP water. A total of 8,804 af of Santa Clara's CVP water was purchased and exchanged for Santa Clara's 2005 Table A water for EWA (SWPAO #04-714).

The exchange of CVP water for Table A water was covered under a separate letter agreement dated July 26, 2005 (SWPAO #05-706). In compliance with CEQA, DWR approved an Addendum to an Initial Study and Negative Declaration, State Clearinghouse Number 2003042104, in July 2005.

Metropolitan Water District of Southern California

An agreement executed on September 16, 2005, between DWR and Metropolitan Water District of Southern California, approved up to 50,000 af of water for a wet-dry exchange. EWA receives water from Metropolitan in a wet year in exchange for returning water to Metropolitan in a drier year, where Metropolitan pays half of the returned water costs. Metropolitan delivered to EWA 20,000 af of water in August, 20,000 af of water in September, and 10,000 af of water in October (SWPAO #05-701).

Operational Assets

Project Pumping of excess flows in the Delta was don to reduce EWA Debt. In 2005, DWR pumped at total of 171,917 af of water to reduce EWA debt (February–34,477 af; July–29,649 af; August–28,493 af; September–27,898 af; and December–51,400 af.) Reclamation pumped 28,568 af of water to reduce EWA debt in March. The combined total project pumping to reduce EWA debt was 200,485 af in 2005. EWA had 500 cfs dedicated pumping capacity available at Banks Pumping Plant during July, August, and September. No other operational assets were available to EWA in 2005.

Miscellaneous Agreements with Other Agencies

In addition to negotiating agreements with SWP contractors to provide for specified water deliveries, DWR also entered into several agreements with other agencies for water conveyance, or exchange, between January 1, 2005, and December 31, 2005.

Water Conveyance Agreements—CVP Water

DWR regularly enters into agreements to convey CVP water such as agreements with contractors receiving water from Reclamation through the Cross Valley

Canal, a water conveyance facility that connects with the Aqueduct near Tupman in Kern County. Other agencies or corporations receive CVP water through agreements between DWR and Reclamation, including the U.S. Department of Veterans Affairs, USFWS, and Musco Family Olive Company. Occasionally, DWR also enters into agreements with Reclamation to convey CVP or SWP water from the Delta to O'Neill Forebay through CVP or SWP facilities. Some of these agreements allow Reclamation to make up for curtailed water exports from Tracy Pumping Plant associated with improving conditions for fish in the Delta. Other agreements allow replacing water exports foregone during maintenance and repair of Tracy and Banks Pumping Plants and CVP and SWP conveyance facilities between the Delta and O'Neill Forebay.

Cross Valley Canal

Eight CVP water contractors use CVC to obtain water from the California Aqueduct either by exchange with other agencies or by direct delivery. The eight water contractors are: County of Fresno, County of Tulare, Hills Valley Irrigation District, Kern–Tulare Water District, Lower Tule River Irrigation District, Pixley Irrigation District, Rag Gulch Water District, and Tri–Valley Water District. These agencies have had water conveyance service by DWR since 1976 through

- long-term 3-party contracts with DWR and Reclamation, executed in 1976, and amendments extending the contracts through February 29, 1996; and
- interim renewal contracts: (1) March 1, 1996, through February 28, 1998; (2) March 1, 1998, through February 28, 2000; (3) March 1, 2000, through November 30, 2000; (4) December 1, 2000, through February 28, 2001; (5) March 1, 2001, through February 28, 2002; (6) March 1, 2002 through February 28, 2003; and (7) March 1, 2003 through February 29, 2004, and (8) March 1, 2005 through February 28, 2005, and (9) March 1, 2005 through February 28, 2006.

Between January 1, 2005, and December 31, 2005, DWR delivered CVP water to the CVC contractors as follows:

On June 13, 2005, Lower Tule River Irrigation District requested that DWR and Reclamation approve a change in the point of delivery for up to 5,000 af of their 2005 approved CVP water from the CVC turnout in Reach 12E to Reach 3 of the California Aqueduct (O'Neill Forebay) for delivery to Reclamation's Level 4 Refuge Program. Under this agreement, which was executed on November 9, 2005, DWR conveyed 2,469 af of water in October of 2005. (SWPAO #05312)

On June 13, 2005, Pixley Irrigation District requested that DWR and Reclamation approve a change in the point of delivery for up to 5,000 af of their 2005 approved CVP water from the CVC turnout in Reach 12E to Reach 3 of the California Aqueduct (O'Neill Forebay) for delivery to Reclamation's Level 4 Refuge Program. Under this agreement, which was executed on November 9, 2005, DWR conveyed 2,469 af of water in October of 2005. (SWPAO #05313)

Musco Family Olive Company

A pending agreement among Musco Family Olive Company, Plain View Water District, DWR, and Reclamation provides for the conveyance of up to 800 af of

Plain View's CVP water to Reach 2A of the California Aqueduct for use by Musco Family Olive Company. A total of 569 af was delivered in 2005 under this pending agreement (SWPAO #04300). Construction of a permanent turnout is currently being pursued.

U.S. Department of Veterans Affairs

A pending letter agreement among the U.S. Department of Veterans Affairs, DWR, and Reclamation, provides for the conveyance of up to 450 af of CVP-approved water to Reach 2B of the California Aqueduct to the U.S. Department of Veterans Affairs' San Joaquin Valley National Cemetery. A total of 52 af was delivered to the National Cemetery in Reach 2B of the California Aqueduct in 2005 under this pending agreement. (SWPAO #02322)

U.S. Fish and Wildlife Service Cooperative Agreement

Reclamation initiated a cooperative agreement with DWR to deliver CVP water to the Kern National Wildlife Refuge for USFWS. Under the terms of this cooperative agreement, dated September 28, 2004, up to 30,500 af of CVP water would be delivered from Check 21 to the Buena Vista Water Storage District Turnout BV-1B, on Reach 10A of the California Aqueduct, from May 1, 2002, to May 31, 2009. DWR conveyed 22,947 af of CVP water to Kern National Wildlife Refuge in 2005.

Water Deliveries

Approved Table A Deliveries

Each year, by October 1, the SWP long-term water contractors submit initial requests for approved Table A deliveries allocated to contractors for use in the subsequent calendar year. Initial approved Table A amounts for the coming year are made by DWR in December. They are based on operations studies that assume 90 per cent exceedence of historic water supply (where exceedence refers to the possibility that water supply in the coming year will be exceeded by the historic water supply), current reservoir storage, and total requests by the SWP water contractors. Forecasts for the year are updated as hydrological conditions change. Approved Table A amounts are increased or decreased depending on both actual and projected hydrologic conditions.

On October 1, 2004, SWP long-term contractors submitted initial requests for 2005.

DWR approved deliveries of 1.65 million af on November 30, 2004, resulting in initial approved Table A amounts of 40 percent of most SWP contractor requests. DWR increased the 2005 approved Table A amounts to 2.48 million af, or 60 percent on January 14, 2005. As water conditions improved, approved Table A amounts were increased to 2.89 million af (70 percent) on April 01, 2005, 3.30 million af (80 percent) on April 21, 2005 and 3.30 million af (90 percent) on May 27, 2005.

Notices to State Water Project Contractors informing them of increases or decreases in approved Table A amounts are online at http:// www.swpao.water.ca.gov/notices/index.cfm.

SWP Deliveries

The SWP delivers water for a variety of beneficial uses. In addition to delivering approved Table A water to long-term water supply contractors, the SWP

- conveys water to other public agencies through special contracts and agreements;
- provides water for wildlife and recreational uses; and
- stores, releases, and delivers local runoff water from SWP facilities to agencies that hold local water rights.

In 2005, 4,732,633 af of water were conveyed to 27 long-term contractors and 26 other agencies. That amount includes

- 2,828,406 af of approved Table A water;
- 731,083 af of Article 21 water;
- 1,506 af of SWP water for recreation and fish and wildlife; and
- 1,101,429 af of water delivered to satisfy water rights settlement agreements and agreements with SWP contractors for local water supplies.
- 70,209 af of water delivered to satisfy agreements between the SWP and CVP

Figure 9-1, shows amounts of water delivered to various locations during 2005.

Specific information about water deliveries made to long-term contractors and other agencies during 2005 and historical deliveries from 1962 through 2005 are presented in the following three sections, each with a corresponding table, located at the end of the chapter:

- Water Delivered to Long-term Water Supply Contractors in 2005, by Service Area (Table 9-3);
- Water Delivered in 2005, by Month (Table 9-4); and
- Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962-2005 (Table 9-5).

Water Deliveries to Long-Term SWP Contractors

Table 9-3 shows amounts of water delivered in 2005. The following information is arranged by column number.

2005 Approved Table A Water Delivered

Columns 1 through 6 show a detailed breakdown of approved Table A water delivered for long-term water supply contractors in 2005.

Turn-Back Pool Water

Column 4 shows 38,275 af of Turn-Back pool water was delivered to long-term water supply contractors in 2005.

2004 Carryover Approved Table A Water Delivered During 2005

Column 6 shows 185,587 af of water was carried over from 2004 for delivery in 2005. For several years, DWR has offered contractors the opportunity to carry over a portion of their approved Table A water for delivery in the current year to be delivered during the next year.

The carryover program was designed to encourage the most effective and beneficial use of water and to avoid obligating the contractors to use or lose the water by December 31 of each year. The SWP contractors' long-term contracts and amendments state the criteria for carrying over approved Table A water from one year to the next.

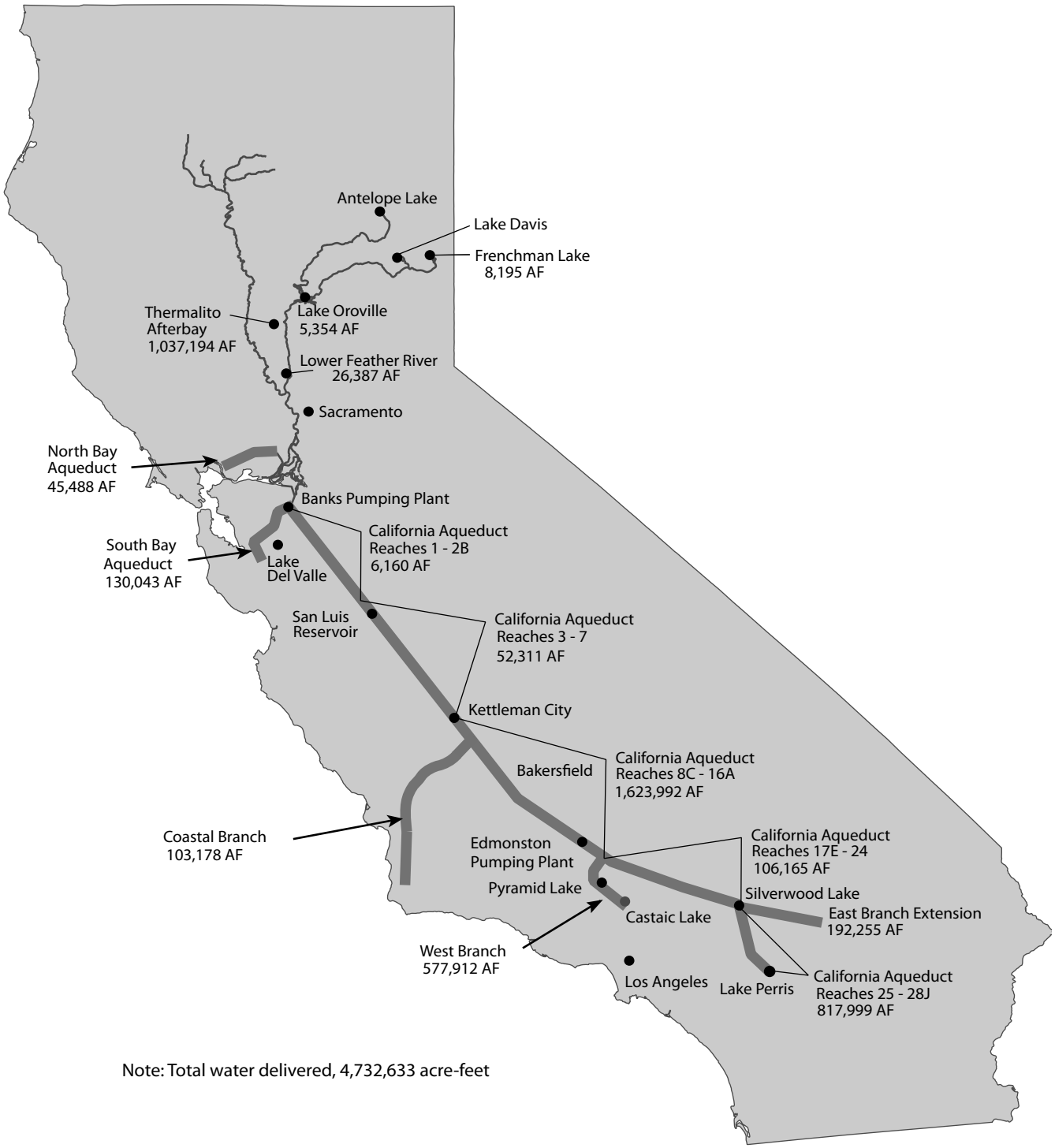

Figure 9-1. Water Delivered in 2005 and Delivery Locations of Long-Term Water Supply Contractors and Feather River Area Districts with Water Right Agreements with DWR

Total Table A Water Delivered
Column 6 shows all approved Table A water delivered in 2005—a total of 2,828,406 af.

2005 Article 21 and Unscheduled Water
Column 8 shows 731,083 af of 2005 Article 21 water delivered to long-term water supply contractors (includes 729,284 af of Article 21 and 1,799 af of unscheduled water to Empire Westside ID). Long-term water supply contractors who have not signed the Monterey Amendment receive unscheduled water.

Total SWP Water Delivered
Column 9 shows 3,559,489 af of total SWP water delivered in 2005. This includes total approved Table A water, water bank recoveries, flexible storage withdrawal, and Article 21 and unscheduled water.

Non-SWP Water Deliveries
Column 10 includes deliveries of non-SWP water to long-term water contractors. Non-SWP water is generally local, settlement, and permit water that a SWP contractor has a water right to, or water purchased from, exchanged with, or transferred from non-SWP agencies. In 2005, non-SWP water deliveries totaled 67,792 af.

Total Deliveries
Column 11 shows total amounts of water delivered to long-term contractors. In 2005, the SWP delivered 3,627,281 af to 27 long-term contractors.

Water Delivered in 2005 by Month

During 2005, the SWP provided water service to 53 agencies, including 27 SWP long-term water contractors. Those agencies and the amounts of water delivered to them by month are listed in Table 9-4, and are summarized below as SWP water and non-SWP water.

SWP Water
SWP water as defined in the long-term water supply contracts, includes Article 21 water, carryover approved Table A water, current year approved Table A amounts, flexible storage water, transfer and exchange of approved Table A water, and Turn-back pools A and B. Detailed information concerning those conveyances is found under the Miscellaneous Agreements with Long-Term SWP Contractors section in this chapter.

Non-SWP Water

In 2005, DWR used SWP facilities to convey non-SWP water for various agencies according to the terms of water rights and water transfer and exchange agreements. Detailed information concerning those conveyances is found under the Miscellaneous Agreements with Other Agencies section in this chapter.

Floodwater
Occasionally, during wet years, DWR accepts floodwater from the Kern River into the California Aqueduct through the Kern River-California Aqueduct Intertie under an agreement entitled Agreement among the State of California, Kern County Water Agency, and the Kern River Interests for Diversions of Floodwaters through the Kern River-California Aqueduct Intertie, dated November 18, 1975. In 2005, DWR did not accept any floodwater into the California Aqueduct.

Water Rights Water

Water in this category is transported through SWP facilities to long-term SWP contractors and other agencies according to terms of various local water rights agreements. Some water simply passes through SWP transportation facilities; a portion is stored in SWP reservoirs for release later. In 2005, 1,101,429 af of water in this category were delivered to the Feather River, South Bay, North Bay, and Southern California, and are summarized below.

Feather River Area. Ten non-SWP agencies in the Feather River area received 1,074,706 af. Those agencies are

- Last Chance Creek Water District, 8,195 af
- Thermalito Irrigation District, 2,355 af
- South Feather Water and Power Agency, formerly Oroville-Wyandotte Irrigation District, 5,354 af
- Western Canal Water District, 283,181 af
- Joint Water Districts Board, 751,128 af
- Oswald Water District, 560 af
- Tudor Mutual Water Company, 3,497 af
- Garden Highway Mutual Water Company, 13,987 af
- Plumas Mutual Water Company, 6,449 af

North Bay Area. In the North Bay Area, 3,668 af of Vallejo permit and 1,132 af of water pursuant to the May 19, 2003 Settlement Agreement among DWR, Solano County Water Agency (Solano), and the Cities of Fairfield Vacaville, and Benicia, were delivered.

South Bay Area. In the South Bay Area, a total of 21,753 af of local water was delivered to Alameda-Zone 7 and Alameda County. These two South Bay Aqueduct contractors hold water rights to runoff from Lake Del Valle watershed.

Southern California. In Southern California, 170 af of local runoff from the Houston Creek watershed were stored and delivered to Crestline under water rights held by DWR on Houston Creek. The authorized place of use is limited to Crestline.

Annual Table A Water and Water Delivered Since 1962

Information about annual Table A water and water conveyed for the past 40 years is contained in Table 9-5. The following discussion of conveyed Table A water is arranged according to column numbers.

Annual Table A

Columns 1 through 7 of Table 9-5 show the amount of long-term contractors' annual Table A water by area for years 1962 through 2005 as specified in the Table A schedules of the long-term water supply contracts.

In some instances Table A schedules—projections of each contractor's need for water to 2035—have been amended to meet the needs of individual contractors. The amounts of annual Table A water each contractor may request for years 1962 through 2035 can be found in Table B-4 in Appendix B.

Water Delivered

Columns 8 through 16 show water delivered or conveyed, including initial

fill water and operational losses and storage changes.

Approved Table A Water
Column 8 shows amounts of approved Table A water delivered each year from 1962 through 2005.

Article 21 and Unscheduled Water
Column 9 shows amounts of Article 21 water, as defined under SWP Deliveries, and unscheduled water delivered from 1962 through 2005.

Article 21 and unscheduled water is water in excess of that required to meet all demands for the year's approved Table A water and water to be stored in SWP reservoirs.

Other Water
Column 10 includes amounts of water classified as other water delivered in 2005, including non-SWP water conveyed through SWP facilities and regulated delivery of local supply.

In 2005, a total of 96,932 af of other water was delivered.

Feather River Diversions
Column 11 includes amounts of water from the Feather River delivered according to agreements for water rights water. In 2005, a total of 1,074,706 af in this category was delivered to agencies in the Feather River area.

Recreation Water
Column 12 shows water conveyed for recreational use or to provide water to improve water quality for fish and wildlife. In 2005, a total of 1,604 af of SWP water was conveyed for this purpose.

Initial Fill Water
The quantities listed in Column 14 represent the amounts used to initially fill the aqueducts and reservoirs south of the Delta to maximum operating capacities. Initial filling began in 1962 with the filling of the South Bay Aqueduct, and was completed in 1979 when Lake Perris reached its maximum operating capacity of 127,000 af. In 1996 and 1997, the Coastal Aqueduct was initially filled.

Operational Losses
Column 15 includes the total amounts of water lost through evaporation and seepage, net storage changes in reservoirs south of the Delta, and amounts of inflow from local drainage areas, including inflows into San Luis Canal and from the Kern River Intertie.

Negative values are indicated for years when withdrawals and evaporation from reservoirs south of the Delta exceed the amounts of water added to the reservoirs.

Table 9-3. Water Delivered to Long-Term Contractors through 2005 (Acre-Feet)

SWP Contractor	Table A Water Deliveries										
	2005 Table A not Transfered, Exchanged,or Stored (1)	2005 Table A Transfered or Exchanged (2)	2005 Table A Stored (3)	2005 Turnback Pool (4)	Total 2005 Table A (5)	2004 Carryover (6)	Total Table A (7)	2005 Article 21 (8)	Total SWP Water (9)	Non-SWP Water (10)	Total (11)
Feather River											
County of Butte	527				527		527		527		527
Plumas County FC&WCD											
City of Yuba City	1,894				1,894		1,894		1,894		1,894
North Bay											
Napa County FC&WCD	5,322				5,322	1,741	7,063	606	7,669		7,669
Solano County WA	22,515	2,000			24,515	83	24,598	10,421	35,019	4,800	39,819
South Bay											
Alameda County FC&WCD, Zone 7	38,388			275	38,663	7,849	46,512		46,512	11,901	58,413
Alameda County WD	10,769		25,700	943	37,412	6,341	43,753	846	44,599	10,852	55,451
Santa Clara Valley WD	48,339		32,333	342	81,014	12,133	93,147	6,298	99,445	20,000	119,445
San Joaquin Valley											
Castaic Lake WA	258		20,000		20,258		20,258	2,451	22,709		22,709
County of Kings	8,100			202	8,302		8,302	11,504	19,806		19,806
Dudley Ridge WD	41,437	7,672	2,500	1,286	52,895	821	53,716	28,197	81,913	576	82,489
Empire West Side ID	1,448				1,448	587	2,035	1,799	3,834		3,834
Kern County WA	754,786	48,941		22,397	826,124	9,851	835,975	453,078	1,289,053	19,216	1,308,269
Oak Flat WD	4,067			127	4,194		4,194		4,194		4,194
Tulare Lake Basin WSD	81,327	5,277		2,158	88,762	3,973	92,735	47,267	140,002	277	140,279
Central Coastal											
San Luis Obispo County FC&WCD	4,006				4,006		4,006	245	4,251		4,251
Santa Barbara County FC&WCD	22,981			155	23,136	208	23,344		23,344		23,344
Southern California											
Antelope Valley-East Kern WA	57,205				57,205	2,626	59,831		59,831		59,831
Castaic Lake WA	34,045				34,045	2,702	36,747		36,747		36,747
Coachella Valley WD	26,984			2,716	29,700	12,819	42,519		42,519		42,519
Crestline-Lake Arrowhead WA	807				807		807		807	170	977
Desert WA	33,168			1,122	34,290	14,799	49,089		49,089		49,089
Littlerock Creek ID											
Metropolitan WDSC	1,130,397	20,000	46,786	6,530	1,203,713	106,032	1,309,745	168,300	1,478,045		1,478,045
Mojave WA	10,360				10,360	1,201	11,561		11,561		11,561
Palmdale WD	10,174				10,174	1,538	11,712		11,712		11,712
San Bernardino Valley MWD	11,211	20,000			31,211	283	31,494	56	31,550		31,550
San Gabriel Valley MWD	10,500				10,500		10,500		10,500		10,500
San Gorgonio Pass WA	655			22	677		677	15	692		692
Ventura County FCD	1,665				1,665		1,665		1,665		1,665
Totals	**2,373,335**	**103,890**	**127,319**	**38,275**	**2,642,819**	**185,587**	**2,828,406**	**731,083**	**3,559,489**	**67,792**	**3,627,281**

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
FEATHER RIVER AREA														
City of Yuba City														
Approved Table A water	0	0	0	0	0	0	939	955	0	0	0	0	1,894	9,600
Pool A water sale*	2,160	0	0	0	0	0	0	0	0	0	0	0	2,160	
Pool B water sale*	0	3,480	0	0	0	0	0	0	0	0	0	0	3,480	
Agency Total (* excluded water)	0	0	0	0	0	0	939	955	0	0	0	0	1,894	
County of Butte														
Approved Table A water	83	6	9	119	36	5	20	105	29	4	2	109	527	1,200
Agency Total	83	6	9	119	36	5	20	105	29	4	2	109	527	
Plumas County Flood Control and Water Conservation District														
Approved Table A water	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recreation/Fish and Wildlife (SWP)														
Recreation/fish and wildlife water	0	0	0	0	1	0	1	1	0	0	0	0	3	
Last Chance Creek Water District														
Regulated delivery of local supply	0	0	0	0	1,164	1,880	2,091	2,142	603	196	119	0	8,195	
Thermalito Irrigation District														
Regulated delivery of local supply	91	66	88	126	202	275	405	421	316	219	118	28	2,355	
South Feather Water & Power Agency														
Regulated delivery of local supply	0	0	0	78	511	783	924	1,050	1,010	701	176	121	5,354	
Western Canal Water District														
Regulated delivery of local supply	1,560	0	0	4,170	41,467	40,431	62,104	49,426	12,079	26,760	30,630	14,554	283,181	
Joint Water Districts Board														
Regulated delivery of local supply	45,810	0	0	9,770	104,058	104,886	129,418	114,896	53,920	45,470	77,020	65,880	751,128	
Oswald WD														
Regulated delivery of local supply	0	0	0	1	78	158	246	32	45	0	0	0	560	
Tudor Mutual Water Company														
Regulated delivery of local supply	0	0	0	189	290	953	1,115	505	443	2	0	0	3,497	
Garden Highway Water Company														
Regulated delivery of local supply	0	0	0	883	1,748	1,220	6,505	1,882	865	884	0	0	13,987	
Plumas Mutual Water Company														
Regulated delivery of local supply	0	0	0	0	866	1,295	1,633	1,430	1,225	0	0	0	6,449	
SWP	83	6	9	119	37	5	960	1,061	29	4	2	109	2,424	
Non-SWP	47,461	66	88	15,217	150,384	151,881	204,441	171,784	70,506	74,232	108,063	80,583	1,074,706	
Feather River Area Total	***47,544***	***72***	***97***	***15,336***	***150,421***	***151,886***	***205,401***	***172,845***	***70,535***	***74,236***	***108,065***	***80,692***	***1,077,130***	***10,800***
NORTH BAY AREA														
Napa County Flood Control and Water Conservation District (NCFCWCD)														
Approved Table A water	0	0	4	236	371	577	628	607	556	409	883	891	5,162	22,225

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Approved Table A water delivered from Solano's service area*	3	2	3	3	4	23	33	18	30	25	3	13	160	
Article 21 water	0	0	606	0	0	0	0	0	0	0	0	0	606	
Article 56C extended carryover	900	841	0	0	0	0	0	0	0	0	0	0	1,741	
Vallejo Permit water from Solano	0	0	0	0	0	0	200	200	100	0	0	0	500	
Agency Total (* excluded water)	900	841	610	236	371	577	828	807	656	409	883	891	8,009	
Solano County Water Agency														
Approved Table A water	0	0	18	73	326	3,873	4,323	4,437	2,631	3,427	2,391	1,016	22,515	47,256
Napa's approved Table A water delivered through Solano's service area	3	2	3	3	4	23	33	18	30	25	3	13	160	
Article 21 water	791	403	289	705	1,406	0	1,162	1,846	2,644	1,175	0	0	10,421	
Article 56C extended carryover	47	36	0	0	0	0	0	0	0	0	0	0	83	
Approved Table A water exchange to Mojave*	0	0	0	0	0	0	0	0	0	0	0	2000	2,000	
Settlement water	0	0	0	0	0	0	0	0	0	349	783	0	1,132	
Vallejo Permit water	0	0	0	0	0	502	198	0	1025	223	686	534	3,168	
Vallejo Permit water delivered to Napa*	0	0	0	0	0	0	200	200	100	0	0	0	500	
Agency Total (* excluded water)	841	441	310	781	1,736	4,398	5,716	6,301	6,330	5,199	3,863	1,563	37,479	
SWP	1,741	1,282	920	1,017	2,107	4,473	6,146	6,908	5,861	5,036	3,277	1,920	40,688	
Non-SWP	0	0	0	0	0	502	398	200	1,125	572	1,469	534	4,800	
North Bay Area Total	***1,741***	***1,282***	***920***	***1,017***	***2,107***	***4,975***	***6,544***	***7,108***	***6,986***	***5,608***	***4,746***	***2,454***	***45,488***	***69,481***
SOUTH BAY AREA														
Alameda County Flood Control and Water Conservation District, Zone 7														
Approved Table A water	0	0	1,093	1,231	1,950	6,283	3385	6,208	6,260	5,307	4,087	2,584	38,388	80,619
Article 56C extended carryover	1,654	455	0	0	0	0	0	0	0	0	0	0	2,109	
Article 56C extended carryover to Semitropic*	845	4,895	0	0	0	0	0	0	0	0	0	0	5,740	
Pool A water	0	0	0	0	0	0	275	0	0	0	0	0	275	
Local water	186	1,144	1,006	1,389	2,059	141	3,890	370	176	287	85	168	10,901	
Transfer water from BBID	0	0	0	0	0	0	0	1,000	0	0	0	0	1,000	
Agency Total (* excluded water)	1,840	1,599	2,099	2,620	4,009	6,424	7,550	7,578	6,436	5,594	4,172	2,752	52,673	
Alameda County Water District														
Approved Table A water	0	844	0	0	0	1,188	83	690	2,273	2,400	1,724	1,567	10,769	42,000
Approved Table A water to Semitropic*	0	0	0	0	0	0	10,100	15,600	0	0	0	0	25,700	
Article 21 water	0	0	0	0	0	846	0	0	0	0	0	0	846	
Article 56C extended carryover	1,400	341	0	0	0	0	0	0	0	0	0	0	1,741	
Article 56C extended carryover to Semitropic*	1,952	2,648	0	0	0	0	0	0	0	0	0	0	4,600	
Local water	0	0	1,341	1,503	1,831	1,372	1,936	2,248	621	0	0	0	10,852	

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Pool A water	0	0	0	0	0	0	0	144	0	0	0	0	144	
Pool B water	0	0	0	0	0	0	799	0	0	0	0	0	799	
Agency Total (* excluded water)	1,400	1,185	1,341	1,503	1,831	3,406	2,818	3,082	2,894	2,400	1,724	1,567	25,151	
Santa Clara Valley Water District														
Approved Table A water	67	1,105	588	4,195	6,130	7,432	6,876	3,981	3,526	3,990	7,068	3,381	48,339	100,000
Approved Table A water to Semitropic*	0	0	0	0	0	0	23,041	7,792	0	0	0	1,500	32,333	
Approved Table A water to EWA*	0	0	0	0	0	0	0	8,804	0	0	0	0	8,804	
Article 21 water	0	873	2,310	0	0	0	0	0	0	0	0	0	3,183	
Article 21 water to Semitropic*	0	0	0	0	764	2,351	0	0	0	0	0	0	3,115	
Article 56C extended carryover	500	0	0	0	0	0	0	0	0	0	0	0	500	
Article 56C extended carryover to Semitropic*	4,554	7,079	0	0	0	0	0	0	0	0	0	0	11,633	
CVP water to Semitropic*	0	0	0	0	0	0	0	0	0	19,000	1,000	0	20,000	
Pool A water	0	0	0	0	0	0	0	0	342	0	0	0	342	
Approved Table A water transfer from KCWA to Semitropic*	0	0	0	0	0	0	0	0	21,941	0	0	0	21,941	
Agency Total (* excluded water)	567	1,978	2,898	4,195	6,130	7,432	6,876	3,981	3,868	3,990	7,068	3,381	52,364	
Recreation/Fish And Wildlife (SWP)														
Recreation/fish and Wildlife water, Lake Del Valle	5	4	7	8	12	16	20	20	20	18	16	8	154	
SWP	3,626	3,622	3,998	5,434	8,092	15,765	11,438	11,043	12,421	11,715	12,895	7,540	107,589	
Non-SWP	186	1,144	2,347	2,892	3,890	1,513	5,826	3,618	797	287	85	168	22,753	
South Bay Area Total	***3,812***	***4,766***	***6,345***	***8,326***	***11,982***	***17,278***	***17,264***	***14,661***	***13,218***	***12,002***	***12,980***	***7,708***	***130,342***	***222,619***
SAN JOAQUIN VALLEY AREA														
Castaic Lake Water Agency														
Approved Table A water	0	0	0	0	0	0	0	0	0	0	64	194	258	
Approved Table A water to Rosedale Rio Bravo*	0	0	0	0	0	0	0	0	0	0	12,869	7,131	20,000	
Article 21 water	0	916	533	0	0	0	0	0	0	0	0	1,002	2,451	
Agency Total (* excluded water)	0	916	533	0	0	0	0	0	0	0	64	1196	2709	
County of Kings														
Approved Table A water	0	0	0	0	0	0	278	849	630	1,161	502	2,070	5,490	9,000
Approved Table A water to WWD for Kings County*	0	1	0	0	433	391	378	517	376	236	174	104	2,610	
Article 21 water	256	0	0	0	0	0	0	0	0	0	0	0	256	
Article 21 water to WWD for Kings County*	319	1298	150	172	2,309	7,000	0	0	0	0	0	0	11,248	
Pool A water	0	0	0	0	0	0	0	31	0	0	0	0	31	
Pool B water	0	0	0	0	0	0	0	171	0	0	0	0	171	
Agency Total (* excluded water)	256	0	0	0	0	0	278	1,051	630	1,161	502	2,070	5,948	
Dudley Ridge Water District														

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Approved Table A water	0	0	100	2,205	3,014	6,576	10,109	8,341	5,292	2,791	212	2,797	41,437	57,343
Approved Table A water to Kern Water Bank*	0	0	0	0	0	0	0	0	0	1,500	1,000	0	2,500	
Article 21 water	1765	4,941	2811	0	0	0	0	0	0	0	0	5,534	15,051	
Article 21 water to Kern Water Bank*	845	2323	3377	2954	649	1064	0	0	0	0	0	1934	13,146	
Article 56C extended carryover	177	100	0	0	0	0	0	0	0	0	0	0	277	
Article 56C extended carryover to Kern Water Bank*	48	0	0	0	0	0	0	0	0	0	0	0	48	
Approved Table A water exchange to San Gabriel WA*	0	0	0	0	0	0	0	0	0	0	1,271	1,717	2,988	
Exchange approved Art 56C extended carryover water to San Gabriel WA*	316	180	0	0	0	0	0	0	0	0	0	0	496	
Approved Table A water exchange to KCWA*	0	0	0	0	0	0	0	0	0	4,684	0	0	4,684	
Pool A water	0	0	0	0	0	0	0	196	0	0	0	0	196	
Pool B water	0	0	0	0	0	0	0	1,090	0	0	0	0	1,090	
Transfer of Bureau water to DRWD from USBR	0	0	0	576	0	0	0	0	0	0	0	0	576	
Agency Total (* excluded water)	1,942	5,041	2,911	2,781	3,014	6,576	10,109	9,627	5,292	2,791	212	8,331	58,627	
Empire West Side Irrigation District														
Approved Table A water	0	0	0	37	0	0	0	0	0	140	214	1,057	1,448	3,000
Article 12E carryover	353	234	0	0	0	0	0	0	0	0	0	0	587	
Article 21 unscheduled water	0	0	568	1,231	0	0	0	0	0	0	0	0	1,799	
Agency Total	353	234	568	1,268	0	0	0	0	0	140	214	1,057	3,834	
Kern County Water Agency														
Approved Table A water	0	5,931	15,961	34,192	40,474	123,770	113,387	162,910	92,113	80,049	59,177	25,776	753,740	998,730
Approved Table A water for Western Hills	5	15	14	53	76	131	158	194	121	119	132	28	1,046	
Approved Table A water to EWA*	0	0	0	0	0	29,712	0	30,000	30,000	0	0	0	89,712	
Article 21 water	29101	85,722	120,563	122,343	15,517	34,659	0	0	0	0	0	45,173	453,078	
Article 55 carryover from Kern-Tulare WD (to San Luis in Oct 2004)	7,932	0	0	0	0	0	0	0	0	0	0	0	7,932	
Article 56C extended carryover	7045	2,806	0	0	0	0	0	0	0	0	0	0	9,851	
Exchange Table A to USBR*	0	0	0	0	0	0	0	0	20,000	0	0	0	20,000	
Exchange water from Westlands	0	0	0	0	0	0	0	0	0	0	10,717	567	11,284	
Approved Table A water exchange from DRWD	0	0	0	0	0	0	0	0	0	4,684	0	0	4,684	
Pool A water	0	0	0	0	0	0	3,412	0	0	0	0	0	3,412	
Pool B water	0	0	0	0	0	0	18,985	0	0	0	0	0	18,985	
Approved Table A transfer to SCVWD in Semitropic*	0	0	0	0	0	0	0	0	21,941	0	0	0	21,941	
Transfer Table A to Westlands*	0	0	0	0	0	0	0	7,000	0	0	0	0	7,000	
Water Bank Deliveries														
Article 56C extended carryover from ACFC&WCD to Semitropic	845	4,895	0	0	0	0	0	0	0	0	0	0	5,740	
Approved Table A water from ACWD to Semitropic	0	0	0	0	0	0	10,100	15,600	0	0	0	0	25,700	

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Article 56C extended carryover from ACWD to Semitropic	1952	2,648	0	0	0	0	0	0	0	0	0	0	4,600	
Approved Table A water from SCVWD to Semitropic	0	0	0	0	0	0	23,041	7,792	0	0	0	1,500	32,333	
Article 21 water from SCVWD to Semitropic	0	0	0	0	764	2,351	0	0	0	0	0	0	3,115	
Article 56C extended carryover from SCVWD to Semitropic	4554	7,079	0	0	0	0	0	0	0	0	0	0	11,633	
Conveyance of SCVWD water to Semitropic	0	0	0	0	0	0	0	0	0	19,000	1,000	0	20,000	
Transfer of Table A water from KCWA to SCVWD	0	0	0	0	0	0	0	0	21,941	0	0	0	21,941	
Approved Table A water from CLWA to Semitropic	0	0	0	0	0	0	0	0	0	0	12,869	7,131	20,000	
Approved Table A water from DRWD to Kern Water Bank	0	0	0	0	0	0	0	0	0	1,500	1,000	0	2,500	
Article 21 water from DRWD to Kern Water Bank	845	2323	3377	2954	649	1064	0	0	0	0	0	1934	13,146	
Article 56C extended carryover from DRWD to Kern Water Bank	48	0	0	0	0	0	0	0	0	0	0	0	48	
Approved Table A water from MWDSC to Semitropic	0	0	0	0	25,036	0	6,174	0	0	0	0	0	31,210	
Approved Table A water from MWDSC to Arvin Edison	0	0	0	0	1,138	1,324	9,808	2,538	0	576	0	0	15,384	
Approved Table A water from MWDSC Kern Delta	0	0	0	0	0	0	192	0	0	0	0	0	192	
Water Bank Delivery Subtotal	8,244	16,945	3,377	2,954	27,587	4,739	49,315	25,930	21,941	21,076	14,869	10,565	207,542	
Agency Total (* excluded water)	52,327	111,419	139,915	159,542	83,654	163,299	185,257	189,034	114,175	105,928	84,895	82,109	1,471,554	
Oak Flat Water District														
Approved Table A water	0	10	31	156	536	716	867	923	389	302	122	15	4,067	5,700
Pool A water	0	0	0	0	0	0	19	0	0	0	0	0	19	
Pool B water	0	0	0	0	0	0	108	0	0	0	0	0	108	
Agency Total	0	10	31	156	536	716	994	923	389	302	122	15	4,194	
Tulare Lake Basin Water Storage District														
Approved Table A water	0	0	0	0	377	181	2,299	18,186	11,419	3,701	16,523	28,641	81,327	96,227
Article 21 water	3646	3,564	5,817	18,706	1,111	2,837	0	0	0	0	0	11,586	47,267	
Article 12E carryover	158	3,815	0	0	0	0	0	0	0	0	0	0	3,973	
Exchange Table A water to Westlands Water District*	0	0	0	0	0	0	0	277	0	0	0	0	277	
Exchange water from Westlands Water District	0	0	177	100	0	0	0	0	0	0	0	0	277	
Pool A water	0	0	0	0	0	0	0	329	0	0	0	0	329	
Pool B water	0	0	0	0	0	0	0	1,829	0	0	0	0	1,829	
Transfer approved Table A water to Westlands Water District *	0	0	0	0	0	100	2,400	1,200	750	550	0	0	5,000	
Agency Total (* excluded water)	3,804	7,379	5,994	18,806	1,488	3,018	2,299	20,344	11,419	3,701	16,523	40,227	135,002	
Westlands Water District														
Approved Table A water from County of Kings to Kings County	0	1	0	0	433	391	378	517	376	236	174	104	2,610	
Article 21 water from County of Kings to Kings County	319	1298	150	172	2,309	7,000	0	0	0	0	0	0	11,248	
Approved Table A transfer from KCWA	0	0	0	0	0	0	0	7,000	0	0	0	0	7,000	

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Exchange water to KCWA*	0	0	0	0	0	0	0	0	0	0	10,717	567	11,284	
Approved Table A water exchange from TLBWSD	0	0	0	0	0	0	0	277	0	0	0	0	277	
Exchange water to TLBWSD*	0	0	177	100	0	0	0	0	0	0	0	0	277	
Approved Table A water transfer from TLBWSD	0	0	0	0	0	100	2,400	1,200	750	550	0	0	5,000	
Agency Total (* excluded water)	319	1,299	150	172	2,742	7,491	2,778	8,994	1,126	786	174	104	26,135	
Recreation/Fish and Wildlife (SWP)														
Department of Fish & Game, O'Neill/Lateral 4	71	38	5	44	95	27	40	52	45	44	47	52	560	
Parks and Recreation, O'Neill/San Luis/Cattle	1	1	1	1	5	12	10	12	5	1	2	2	53	
RF&W Total	72	39	6	45	100	39	50	64	50	45	49	54	613	
Environmental Water Account Program														
Approved Table A water from Kern County WD	0	0	0	0	0	29,712	0	0	0	0	0	0	29,712	
Approved Table A water from Kern County WD	0	0	0	0	0	0	0	30,000	30,000	0	0	0	60,000	
Approved Table A water from MWDSC	0	0	0	0	0	0	0	20,000	20,000	10,000	0	0	50,000	
Approved Table A water from SCVWD	0	0	0	0	0	0	0	8,804	0	0	0	0	8,804	
Yuba County Water Agency	0	0	0	0	0	0	0	0	0	4,549	1,495	0	6,044	
EWA program Total *	0	0	0	0	0	29,712	0	58,804	50,000	14,549	1,495	0	154,560	
US Bureau of Reclamation (CVP Water Conveyed)														
Plain View WD/Musco Olive Products, Inc (Annual Contract)	46	39	47	47	40	38	48	65	65	77	55	2	569	
US Dept of Veterans Affairs, SJV National Cemetery (Annual Contract)	1	1	1	1	5	10	12	9	6	3	2	1	52	
Transfer water to DRWD*	0	0	0	576	0	0	0	0	0	0	0	0	576	
Exchange Table A water from KCWA	0	0	0	0	0	0	0	0	20,000	0	0	0	20,000	
Kern National Wildlife Refuge	411	0	620	849	506	0	0	1,602	5,130	5,367	5,222	3,240	22,947	
Recreation water	0	1	1	1	5	9	7	10	4	1	0	4	43	
Fish and wildlife water	64	31	5	36	77	22	33	42	37	36	39	160	582	
USBR Total (* excluded water)	522	72	674	934	633	79	100	1,728	25,242	5,484	5,318	3,407	44,193	
Cross Valley Canal Contracts														
Lower Tule River CVP water to the USBR	0	0	0	0	0	0	0	0	0	2,469	0	0	2,469	
Pixley Irrigation District CVP water to the USBR	0	0	0	0	0	0	0	0	0	2,469	0	0	2,469	
CVC Total	0	0	0	0	0	0	0	0	0	4,938	0	0	4,938	
SWP	51,141	126,337	149,931	182,094	91,534	181,139	201,765	230,037	153,081	95,854	91,038	134,596	1,688,547	
Non-SWP	8,454	72	851	1,610	633	79	100	1,728	5,242	29,422	17,035	3,974	69,200	
San Joaquin Valley Area Total	***59,595***	***126,409***	***150,782***	***183,704***	***92,167***	***181,218***	***201,865***	***231,765***	***158,323***	***125,276***	***108,073***	***138,570***	***1,757,747***	***1,170,000***
CENTRAL COASTAL AREA														
San Luis Obispo County Flood Control and Water Conservation District														
Approved Table A water	157	321	347	257	370	402	410	431	423	419	177	292	4,006	25,000

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Article 21 water	0	0	0	145	42	34	0	0	0	0	0	24	245	
Agency Total	157	321	347	402	412	436	410	431	423	419	177	316	4,251	
Santa Barbara County Flood Control and Water Conservation District														
Approved Table A water	839	972	1,253	1,803	2,258	2,689	3,009	2,753	2,654	2,179	999	1,573	22,981	45,486
Carryover 14B	208	0	0	0	0	0	0	0	0	0	0	0	208	
Pool A water	0	0	0	0	0	0	0	155	0	0	0	0	155	
Agency Total	1,047	972	1,253	1,803	2,258	2,689	3,009	2,908	2,654	2,179	999	1,573	23,344	
SWP	1,204	1,293	1,600	2,205	2,670	3,125	3,419	3,339	3,077	2,598	1,176	1,889	27,595	
Non-SWP	0	0	0	0	0	0	0	0	0	0	0	0	0	
Central Coastal Area Total	***1,204***	***1,293***	***1,600***	***2,205***	***2,670***	***3,125***	***3,419***	***3,339***	***3,077***	***2,598***	***1,176***	***1,889***	***27,595***	***70,486***
SOUTHERN CALIFORNIA AREA														
Antelope Valley-East Kern Water Agency														
Approved Table A water	0	0	2,075	3,583	4,883	6,625	8,993	9,674	7,287	5,294	4,439	4,352	57,205	141,400
Article 12E carryover	1,450	1,176	0	0	0	0	0	0	0	0	0	0	2,626	
MWA's Approved Table A water delivered through AVEK's service area	0	0	53	111	118	148	181	136	123	82	0	21	973	
MWA's Article 56C carryover water delivered through AVEK's service area	19	24	0	0	0	0	0	0	0	0	0	0	43	
Agency Total	1,469	1,200	2,128	3,694	5,001	6,773	9,174	9,810	7,410	5,376	4,439	4,373	60,847	
Castaic Lake Water Agency														
Approved Table A water	0	0	1,250	2,018	2,952	4,324	5,512	5,204	4,815	2,989	2,762	2,219	34,045	95,200
Article 56C extended carryover	1,557	1,145	0	0	0	0	0	0	0	0	0	0	2,702	
Agency Total	1,557	1,145	1,250	2,018	2,952	4,324	5,512	5,204	4,815	2,989	2,762	2,219	36,747	
Coachella Valley Water District														
Approved Table A water	0	0	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300	584	0	26,984	121,000
Article 12E carryover	3,932	0	0	0	0	0	0	0	0	0	0	0	3,932	
Article 56C extended carryover	8,887	0	0	0	0	0	0	0	0	0	0	0	8,887	
Pool A water	0	0	0	0	0	0	414	0	0	0	0	0	414	
Pool B water	0	0	0	0	0	0	2,302	0	0	0	0	0	2,302	
Agency Total	12,819	0	3,300	3,300	3,300	3,300	6,016	3,300	3,300	3,300	584	0	42,519	
Crestline-Lake Arrowhead Water Agency														
Approved Table A water	0	0	18	28	73	85	136	146	116	85	75	45	807	5,800
Local water	103	47	20	0	0	0	0	0	0	0	0	0	170	
Agency Total	103	47	38	28	73	85	136	146	116	85	75	45	977	
Desert Water Agency														

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Approved Table A water	0	0	3,810	3,810	3,810	3,810	3,810	3,810	3,810	3,810	2,688	0	33,168	
Article 12E carryover	7,716	0	0	0	0	0	0	0	0	0	0	0	7,716	
Article 56C extended carryover	7,083	0	0	0	0	0	0	0	0	0	0	0	7,083	
Pool A water	0	0	0	0	0	0	0	171	0	0	0	0	171	
Pool B water	0	0	0	0	0	0	0	951	0	0	0	0	951	
Agency Total (* excluded water)	14,799	0	3,810	3,810	3,810	3,810	3,810	4,932	3,810	3,810	2,688	0	49,089	
Littlerock Creek Irrigation District														
Approved Table A water	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pool A water sale*	880	0	0	0	0	0	0	0	0	0	0	0	880	
Agency Total (* excluded water)	0	0	0	0	0	0	0	0	0	0	0	0	0	2,300
Metropolitan Water District of Southern California														
Approved Table A water	0	0	0	101,572	104,118	120,176	135,913	143,652	144,053	132,988	115,572	132,353	1,130,397	1,911,500
Approved Table A water to Semitropic*	0	0	0	0	25,036	0	6,174	0	0	0	0	0	31,210	
Approved Table A water to Kern Delta*	0	0	0	0	1,138	1,324	10,000	2,538	0	576	0	0	15,576	
Approved Table A water transfer from SBVMWD	0	0	0	0	0	0	0	0	0	0	10,000	10,000	20,000	
Approved Table A water to EWA *	0	0	0	0	0	0	0	20,000	20,000	10,000	0	0	50,000	
Article 21 water	18,664	66,664	82,972	0	0	0	0	0	0	0	0	0	168,300	
Article 56C extended carryover	73,283	32,749	0	0	0	0	0	0	0	0	0	0	106,032	
Approved Table A water exchange to Mojave*	0	0	0	0	0	0	0	0	0	0	9,725	10,275	20,000	
Pool A water	0	0	0	0	0	0	6,530	0	0	0	0	0	6,530	
Agency Total (* excluded water)	91,947	99,413	82,972	101,572	104,118	120,176	142,443	143,652	144,053	132,988	125,572	142,353	1,431,259	
Mojave Water Agency														
Approved Table A water	0	0	297	585	669	1,166	1,791	2,139	1,191	761	376	412	9,387	75,800
Approved Table A water through AVEK's service area*	0	0	53	111	118	148	181	136	123	82	0	21	973	
Article 56C extended carryover	345	813	0	0	0	0	0	0	0	0	0	0	1,158	
Article 56C carryover water delivered through AVEK's service area*	19	24	0	0	0	0	0	0	0	0	0	0	43	
Approved Table A water exchange from MWD	0	0	0	0	0	0	0	0	0	0	9,725	10,275	20,000	
Approved Table A water exchange from Solano	0	0	0	0	0	0	0	0	0	0	0	2000	2,000	
Agency Total (* excluded water)	345	813	297	585	669	1,166	1,791	2,139	1,191	761	10,101	12,687	32,545	
Palmdale Water District														
Approved Table A water	0	0	339	1,045	1,063	1,018	1,380	1,392	1,067	1,296	899	675	10,174	21,300
Article 56C extended carryover	1,459	79	0	0	0	0	0	0	0	0	0	0	1,538	
Agency Total	1,459	79	339	1,045	1,063	1,018	1,380	1,392	1,067	1,296	899	675	11,712	
San Bernardino Valley Municipal Water District														
Approved Table A water	0	0	0	127	300	772	1,902	1,508	693	1,437	1,668	2,804	11,211	102,600
Article 21 water	0	0	56	0	0	0	0	0	0	0	0	0	56	
Article 56C extended carryover	22	261	0	0	0	0	0	0	0	0	0	0	283	

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Approved Table A water transfer to MWD *	0	0	0	0	0	0	0	0	0	0	10,000	10,000	20,000	
Agency Total (* excluded water)	22	261	56	127	300	772	1,902	1,508	693	1,437	1,668	2,804	11,550	
San Gabriel Valley Municipal Water District														
Approved Table A water	0	0	0	12	0	2,407	961	0	2,384	3,111	1,625	0	10,500	28,800
Approved Table A water from DRWD	0	0	0	0	0	0	0	0	0	0	1,271	1,717	2,988	
Exchange approved Art 56C extended carryover water from DRWD	316	180	0	0	0	0	0	0	0	0	0	0	496	
Pool B water sale*	0	15,420	0	0	0	0	0	0	0	0	0	0	15,420	
Agency Total	316	180	0	12	0	2,407	961	0	2,384	3,111	2,896	1,717	13,984	
San Gorgonio Pass Water Agency														
Approved Table A water	0	16	0	53	46	57	28	42	95	116	108	94	655	6,500
Article 21 water	0	0	15	0	0	0	0	0	0	0	0	0	15	
Pool A water	0	0	0	0	0	0	0	22	0	0	0	0	22	
Agency Total (* excluded water)	0	16	15	53	46	57	28	64	95	116	108	94	692	
Ventura County Flood Control District														
Approved Table A water	0	0	0	0	231	231	231	231	231	231	231	48	1,665	20,000
Pool A water sale*	9,000	0	0	0	0	0	0	0	0	0	0	0	9,000	
Pool B water sale*	0	7,335	0	0	0	0	0	0	0	0	0	0	7,335	
Agency Total (* excluded water)	0	0	0	0	231	231	231	231	231	231	231	48	1,665	
Recreation/Fish And Wildlife (SWP)														
Castaic Lake	28	27	30	33	32	10	72	90	54	42	18	36	472	
Castaic Lake to Lagoon	0	0	0	0	0	0	0	112	68	0	0	0	180	
Silverwood Lake	4	4	4	4	6	14	13	14	7	5	4	5	84	
Agency Total	32	31	34	37	38	24	85	216	129	47	22	41	736	
Recreation/Fish And Wildlife (CVP)														
USFS Recreation/Fish and Wildlife water (Pyramid Lake)	0	0	0	0	0	0	5	1	1	1	0	1	9	
SWP	124,765	103,138	94,219	116,281	121,601	144,143	173,469	172,594	169,294	155,547	152,045	167,056	1,694,152	
Non-SWP	103	47	20	0	0	0	5	1	1	1	0	1	179	
Southern California Area Total	***124,868***	***103,185***	***94,239***	***116,281***	***121,601***	***144,143***	***173,474***	***172,595***	***169,295***	***155,548***	***152,045***	***167,057***	***1,694,331***	***2,582,300***
SWP Water														
SWP Approved Table A water														
Agriculture and M&I approved water	1,154	9,223	30,563	160,804	204,092	299,680	360,635	409,269	297,887	264,235	239,350	223,762	2,500,654	
Agriculture and M&I approved water for EWA*	0	0	0	0	0	29,712	0	58,804	50,000	10,000	0	0	148,516	
Article 21 water	55,387	166,704	219,499	145,025	21,798	48,791	1,162	1,846	2,644	1,175	0	65,253	729,284	
Article 12E carryover	12,159	4,049	0	0	0	0	0	0	0	0	0	0	16,208	
Article 14B carryover	208	0	0	0	0	0	0	0	0	0	0	0	208	
Article 56C extended carryover	113,227	55,448	0	0	0	0	0	0	0	0	0	0	168,675	

Table 9-4. Total Amounts of Water Delivered in 2005, by Month

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2005 Deliveries	2005 Table A
Article 56C extended carryover exchange	316	180	0	0	0	0	0	0	0	0	0	0	496	
Article 21 unscheduled water	0	0	568	1,231	0	0	0	0	0	0	0	0	1,799	
Transfer approved water	0	0	0	0	0	100	2,400	8,200	22,691	550	10,000	10,000	53,941	
Exchange approved water	0	0	0	0	0	0	0	0	20,000	4,684	10,996	13,992	49,672	
Pool A water	0	0	0	0	0	0	10,650	1,048	342	0	0	0	12,040	
Pool B water	0	0	0	0	0	0	22,194	4,041	0	0	0	0	26,235	
Pool A water sale*	12,040	0	0	0	0	0	0	0	0	0	0	0	12,040	
Pool B water sale*	0	26,235	0	0	0	0	0	0	0	0	0	0	26,235	
Supply approved water	0	0	0	0	0	0	0	277	0	0	0	0	277	
Agency Total (* excluded water)	182,451	235,604	250,630	307,060	225,890	348,571	397,041	424,681	343,564	270,644	260,346	313,007	3,559,489	
SWP Table A-related water														
Recreation/Fish and Wildlife water	109	74	47	90	151	79	156	301	199	110	87	103	1,506	
SWP Total	***182,560***	***235,678***	***250,677***	***307,150***	***226,041***	***348,650***	***397,197***	***424,982***	***343,763***	***270,754***	***260,433***	***313,110***	***3,560,995***	
NON-SWP WATER														
Other water														
Local	47,750	1,257	2,455	18,109	154,274	153,394	210,267	174,402	71,303	74,519	108,148	80,751	1,096,629	
Solano Settlement water	0	0	0	0	0	0	0	0	0	349	783	0	1,132	
Vallejo Permit water	0	0	0	0	0	502	398	200	1,125	223	686	534	3,668	
Subtotal (Other water)	47,750	1,257	2,455	18,109	154,274	153,896	210,665	174,602	72,428	75,091	109,617	81,285	1,101,429	
CVP/USBR water														
Water to DWR	0	0	0	0	0	0	0	0	0	4,938	0	0	4,938	
Annual Contract water	47	40	48	48	45	48	60	74	71	80	57	3	621	
Kern National Wildlife Refuge water	411	0	620	849	506	0	0	1,602	5,130	5,367	5,222	3,240	22,947	
Recreation/Fish& Wildlife water	64	32	6	37	82	31	45	53	42	38	39	165	634	
Water exchange to SWP contractor	7,932	0	177	100	0	0	0	0	0	0	0	0	8,209	
Water transfer to SWP contractor	0	0	0	576	0	0	0	1,000	0	0	0	0	1,576	
General Conveyance	0	0	0	0	0	0	0	0	0	19,000	11,717	567	31,284	
Subtotal (CVP water)	8,454	72	851	1,610	633	79	105	2,729	5,243	24,485	17,035	3,975	70,209	
Non-SWP Total	***56,204***	***1,329***	***3,306***	***19,719***	***154,907***	***153,975***	***210,770***	***177,331***	***77,671***	***99,576***	***126,652***	***85,260***	***1,171,638***	
Grand total	**238,764**	**237,007**	**253,983**	**326,869**	**380,948**	**502,625**	**607,967**	**602,313**	**421,434**	**370,330**	**387,085**	**398,370**	**4,732,633**	**4,125,686**

Table 9-5. Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962-2005 (Acre-Feet)

Year	Annual Table Amounts According to Long-Term Water Supply Contracts							Water Conveyed								Total
								Deliveries								
	Upper Feather River Area (1)	North Bay Area (2)	South Bay Area (3)	San Joaquin Valley Area (4)	Central Coastal Area (5)	Southern California Area (6)	Total (7)	Table A Water (8)	Article 21, Surplus, and Unscheduled Water (a (9)	Other Water (b (10)	Feather River Diversions (c (11)	Wildlife/ Recreation Water (12)	Subtotal (13)	Initial Fill Water (14)	Losses and Storage Changes (d (15)	(16)
1962	0	0	0	0	0	0	0	0	0	18,289	0	0	18,289	9	272	18,570
1963	0	0	0	0	0	0	0	0	0	22,456	0	0	22,456	71	185	22,712
1964	0	0	0	0	0	0	0	0	0	32,507	0	0	32,507	171	152	32,830
1965	0	0	0	0	0	0	0	0	0	44,105	0	0	44,105	93	729	44,927
1966	0	0	0	0	0	0	0	0	0	67,928	0	0	67,928	0	1,746	69,674
1967	0	0	11,538	0	0	0	11,538	11,538	0	53,605	0	0	65,143	8,328	4,212	77,683
1968	550	0	109,900	77,350	0	3,700	191,500	171,709	121,534	14,777	866,926	0	1,174,946	498,926	117,906	1,791,778
1969	620	0	98,700	163,075	0	5,000	267,395	193,020	72,397	18,829	794,374	0	1,078,620	510,614	72,196	1,661,430
1970	700	0	114,200	202,000	0	5,700	322,600	233,993	133,024	38,080	759,759	0	1,164,856	23,947	2,435	1,191,238
1971	890	0	116,200	251,800	0	6,700	375,590	357,340	296,019	44,119	778,362	8	1,475,848	7,853	5,812	1,489,513
1972	970	0	118,300	413,066	0	209,423	741,759	611,801	423,964	66,638	817,398	6,489	1,926,290	100,274	53,062	2,079,626
1973	1,100	0	120,400	383,652	0	481,100	986,252	694,388	296,416	42,511	800,743	1,155	1,835,213	204,638	53,798	2,093,649
1974	1,230	0	122,400	460,650	0	597,920	1,182,200	874,077	417,676	46,224	911,613	2,118	2,251,708	237,554	10,657	2,499,919
1975	1,610	0	124,500	545,809	0	714,950	1,386,869	1,223,990	622,902	63,793	862,218	3,377	2,776,280	103,352	(94,606)	2,785,026
1976	1,990	0	126,500	543,417	0	836,480	1,508,387	1,373,002	580,110	115,217	946,440	1,745	3,016,514	61,122	(681,025)	2,396,611
1977	2,420	0	128,600	581,400	0	954,901	1,667,321	574,155	0	389,065	581,994	1,111	1,546,325	0	(131,151)	1,415,174
1978	1,850	0	130,700	635,900	0	1,049,584	1,818,034	1,452,699	16,914	121,225	786,517	1,691	2,379,046	64,443	717,370	3,160,859
1979	2,130	0	132,700	702,685	0	1,190,573	2,028,088	1,659,896	648,389	187,630	882,549	1,766	3,380,230	12,302	(83,430)	3,309,102
1980	1,810	500	134,800	758,100	1,946	1,317,614	2,214,770	1,529,749	404,557	46,459	875,045	2,131	2,857,941	0	(26,606)	2,831,335
1981	1,940	650	137,000	818,000	2,813	1,432,065	2,392,468	1,909,562	908,428	279,161	838,557	4,688	3,940,396	0	(802,263)	3,138,133
1982	1,970	800	139,200	876,500	5,626	1,550,449	2,574,545	1,750,024	215,873	154,882	776,330	4,646	2,901,755	0	480,752	3,382,507
1983	2,000	950	141,400	867,118	8,439	1,681,257	2,701,164	1,184,869	13,019	181,453	602,905	7,849	1,990,095	0	(90,997)	1,899,098
1984	3,630	1,100	143,600	979,211	12,698	1,744,098	2,884,337	1,588,619	262,917	381,024	832,332	7,040	3,071,932	0	(140,182)	2,931,750
1985	3,760	1,250	145,800	1,019,049	21,138	1,864,849	3,055,846	1,995,453	307,672	404,842	870,008	4,033	3,582,008	0	92,885	3,674,893
1986	4,190	1,400	148,100	1,091,946	28,210	1,983,890	3,257,736	1,995,636	36,620	193,606	791,737	3,865	3,021,464	0	284,380	3,305,844
1987	4,620	1,550	150,300	1,188,500	35,204	2,103,941	3,484,115	2,130,086	114,907	377,592	831,947	7,672	3,462,204	0	(390,413)	3,071,791
1988	5,060	15,471	152,500	1,246,100	43,722	2,225,482	3,688,335	2,385,122	0	507,076	794,834	4,889	3,691,921	0	(92,850)	3,599,071
1989	5,500	24,615	156,700	1,290,400	56,342	2,424,633	3,958,190	2,853,747	0	474,559	830,500	8,135	4,166,941	0	447,917	4,614,858
1990	6,040	28,190	160,900	1,313,450	70,486	2,500,600	4,079,666	2,582,151	90	424,697	875,099	9,262	3,891,299	0	(528,869)	3,362,430
1991	11,880	29,590	166,400	1,338,011	70,486	2,510,200	4,126,567	549,113	3,521	551,051	565,395	4,879	1,673,959	0	167,435	1,841,394

Table 9-5. Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962-2005 (Acre-Feet)

Year	Annual Table Amounts According to Long-Term Water Supply Contracts							Water Conveyed								
								Deliveries								
	Upper Feather River Area (1)	North Bay Area (2)	South Bay Area (3)	San Joaquin Valley Area (4)	Central Coastal Area (5)	Southern California Area (6)	Total (7)	Table A Water (8)	Article 21, Surplus, and Unscheduled Water (a (9)	Other Water (b (10)	Feather River Diversions (c (11)	Wildlife/ Recreation Water (12)	Subtotal (13)	Initial Fill Water (14)	Losses and Storage Changes (d (15)	Total (16)
1992	11,920	32,010	171,900	1,342,300	70,486	2,510,200	4,138,816	1,471,454	1,156	144,789	613,978	2,605	2,233,982	0	(63,541)	2,170,441
1993	11,960	34,620	177,400	1,342,300	70,486	2,510,200	4,146,966	2,315,235	0	254,854	822,589	2,609	3,395,287	0	726,123	4,121,410
1994	12,000	37,215	182,000	1,342,300	70,486	2,510,200	4,154,201	1,749,351	112,625	236,739	874,018	8,200	2,980,933	0	(295,405)	2,685,528
1995	12,050	44,030	184,000	1,342,300	70,486	2,510,200	4,163,066	1,967,093	64,330	78,425	860,077	2,575	2,972,500	0	69,536	3,042,036
1996	12,100	48,225	186,000	1,301,630	70,486	2,492,900	4,111,341	2,514,825	28,647	251,391	934,997	3,907	3,733,767	86	491,550	4,225,403
1997	12,150	49,315	188,000	1,297,300	45,201	2,492,900	4,084,866	2,325,775	21,432	322,000	993,211	4,146	3,666,564	527	(11,806)	3,655,285
1998	12,200	50,420	188,000	1,272,300	45,201	2,517,900	4,086,021	1,725,519	20,288	134,682	872,738	2,108	2,755,335	0	(132,491)	2,622,844
1999	12,250	51,500	188,000	1,272,300	70,486	2,519,900	4,114,436	2,738,891	158,070	85,312	1,108,672	4,324	4,095,269	0	(189,525)	3,905,744
2000	14,000	55,945	210,000	1,205,300	70,486	2,565,900	4,121,631	3,200,677	308,785	332,654	1,085,886	4,030	4,932,032	0	(20,103)	4,911,929
2001	14,670	66,561	220,000	1,185,519	70,486	2,566,900	4,124,136	1,690,926	43,435	477,835	1,078,656	2,929	3,293,781	0	159,983	3,453,764
2002	14,730	67,396	220,000	1,195,219	70,486	2,557,200	4,125,031	2,573,030	37,165	307,162	1,132,938	3,694	4,053,989	0	80,709	4,134,698
2003	14,790	68,231	220,400	1,194,819	70,486	2,558,200	4,126,926	2,901,041	59,828	251,447	1,008,093	2,846	4,223,255	0	459,377	4,682,632
2004	13,100	69,056	222,619	1,182,700	70,486	2,569,100	4,127,061	2,599,536	218,496	385,088	1,174,672	2,865	4,380,657	0	108,840	4,489,497
2005	10,800	69,481	222,619	1,170,000	70,486	2,582,300	4,125,686	2,828,406	731,083	96,932	1,074,706	1,506	4,732,633	0	529,347	5,261,980
Total	**236,380**	**780,590**	**5,789,657**	**34,223,476**	**1,222,858**	**62,276,809**	**104,529,770**	**64,487,498**	**7,702,289**	**8,722,710**	**32,908,813**	**136,893**	**113,958,203**	**1,834,310**	**1,364,103**	**117,156,616**

a) Values include amounts of deliveries to short-term contractors (Mustang Water District, 1970-1972; Tracy Golf and Country Club 1974, 1979, and 1980; Green Valley Water District, 1974,1975, 1978, 1979, 1980, and 1985; Granite Construction Company, 1980).
b) Includes amounts of SWP and non-SWP water conveyed for SWP and non-SWP water contractors.
c) Includes amounts of water diverted under various water rights agreements.
d) Amounts reflect net effect of (1) operational losses from SWP transportation facilities; (2) changes in reservoir storage south of Delta; (3) storable local inflows to SWP reservoirs; (4) side inflow to San Luis Canal; and (5) inflow into California Aqueduct from Kern River Intertie.

Chapter 10
Power Resources

Delivery of a new runner for Oroville's Hyatt Power Plant refurbishment project.

Significant Events in 2005

On January 26, 2005, the Department of Water Resources (DWR) submitted its Application for New License for the Oroville Facilities with the Federal Energy Regulatory Commission (FERC).

In August 2005, the federal Energy Policy Act of 2005 was signed into law. The law authorized an Electric Reliability Organization with the statutory authority to enforce compliance with mandatory reliability standards applicable to all market participants throughout the United States' bulk electric system.

On September 12, 2005, following DWR's successful compliance with FERC's May 2005 Additional Information Request, FERC accepted DWR's Application for a New License for operating the Oroville Facilities. FERC's acceptance of DWR's license application marked the conclusion of the multiyear collaborative Alternative Licensing Process (ALP) involving federal and State agencies, Indian tribes, local agencies, environmental organizations, and other interested parties that worked to assist DWR in completing a comprehensive license application and accompanying Preliminary Draft Environmental Assessment. While this procedurally completed the ALP phase of FERC relicensing, settlement negotiations and completion of all federal/State environmental documentation was still ongoing at the end of 2005 in pursuit of a new FERC license at the Oroville Facilities.

Information for this chapter was provided by the State Water Project Analysis Office.

Long-term State Water Project (SWP) contractors depend on the SWP to provide economical sources of power to deliver affordable water. In response to that need, the Department of Water Resources (DWR) developed and administers a comprehensive power resources program. Key elements of the program include the strategic timing of generation and pumping schedules, purchase of power resources and transmission services, short-term sales of power surpluses, and studies of power resources for future needs.

Power Resources Program

The goals of the SWP power resources program are to

- obtain reliable, environmentally sensitive, and competitively priced power resources and transmission services sufficient to operate the SWP;
- develop and manage power resources to minimize the cost of water deliveries to SWP contractors;
- meet responsibilities and criteria of the Western Electricity Coordinating Council (WECC); and
- conform to regulations of the Federal Energy Regulatory Commission (FERC).

To achieve these goals, DWR constructed its own generating, pumping, and pumped-storage facilities; and enters into long-term and short-term contracts with other electric utilities for transmission access and power purchases, sales, and exchanges.

In addition, DWR participates in the California Independent System Operator (CAISO) supplemental energy market to help CAISO maintain its control area demand and supply balance. DWR generators and pumps also participate in CAISO ancillary services markets by providing spinning and non-spinning reserves to the CAISO controlled grid. In the case of system emergencies or contingencies, DWR can drop its pump load to help CAISO maintain reliable system operation.

The power resources program takes advantage of SWP water storage and conveyance capacities that allow DWR to operate the SWP in a cost-effective manner. This control of pumping loads and generation allows DWR to enter into advantageous agreements with other electric utilities that complement the use of SWP generation to meet SWP power requirements.

Major Electric Utility Industry Developments

In August 2005, the federal Energy Policy Act of 2005 was signed into law. The law authorized an Electric Reliability Organization with the statutory authority to enforce compliance with mandatory reliability standards applicable to all market participants throughout the United States' bulk electric system.

During 2005, CAISO continued work on proposals for major redesign of its

markets that became necessary as a result of the California energy crisis in 2000 and 2001. Initially termed Market Design 2002 (MD02), the proposal was renamed Market Redesign and Technology Upgrade (MRTU).

During 2005, the California Public Utilities Commission (CPUC) issued Decision 05-10-042, which reaffirmed and clarified the policy framework CPUC established under its *Order Instituting Rulemaking to Promote Policy and Program Coordination and Integration in Electric Utility Planning* (OIR.04-04-003). Key program determinants included monthly system obligations based on coincident peaks, supply contracts with specific resources for qualifying capacity, deferred local capacity requirements, noncompliance penalties of three times the cost for new capacity, and retention of the FERC Must Offer Obligation and waiver process until 2007.

In late 2005, CPUC issued its *Ruling Regarding Next Steps in Procurement Proceeding*. It also initiated two successor rulemakings to consider future resource adequacy issues such as the implementation of existing and multiyear requirements and mandates in local areas; and the biennial long-term procurement planning cycle and other procurement issues.

In September 2005, California Assembly Bill (AB) 380 was passed by the Legislature and signed by the Governor. AB 380 contains two sections that address resource adequacy requirements for entities subject to CPUC jurisdiction and publicly owned utilities. SWP is specifically exempted from AB 380 requirements.

DWR Participation in Electric Utility Industry Activities

In 2005, DWR participated in CAISO's MRTU stakeholder processes and litigation before FERC (ER02-1656) to help ensure that MRTU was fully functional and cost allocations were appropriately structured. DWR's participation focused on the following primary elements:

- congestion revenue rights allocations;
- generation and import deliverability;
- hour-ahead scheduling process, day-ahead schedules;
- integrated forward market;
- residual unit commitment;
- real-time market;
- local area reliability contracts;
- local regulatory authority resource adequacy criteria for the SWP;
- locational marginal pricing;
- management of use-limited resources;
- market power mitigation;
- must-offer obligation for curtailable loads and resource adequacy requirements;
- participating load nodal settlement and functionality;
- perfect hedge for existing transmission contracts;
- pricing ancillary services in HASP and RT;
- trading hubs and load aggregation points; and
- marginal losses.

In 2005, DWR participated in a number of CAISO and non-CAISO electric utility stakeholder processes and FERC proceedings to help ensure that various market requirements or cost allocation mechanisms were appropriately

structured. The major processes and litigations included the following (with FERC docket number given in parenthesis):

- FERC assessment of demand response resources (AD06-2);
- FERC Opinion 478: transmission access charges/time-of-use rates (ER00-2019);
- FERC Opinion 479: transmission entitlements costs not under CAISO operational control included in jurisdictional rates (EL00-105, ER00-2019);
- FERC Order 2003: CAISO large generator interconnection agreements and procedures (ER04-445);
- FERC voltage support from non-reliability must run resources (AD05-1-000);
- CAISO Tariff Amendment 60: minimum load reliability cost allocation (ER02-1656-024, ER04-835, EL04-103);
- CAISO Tariff Amendment 66: interim solution for import and export bids under MRTU Phase 1B (ER05-718);
- CAISO Tariff Amendment 67: revisions to revise the deadline for submitting supplemental energy bids and provide for a deadline of 62 minutes prior to the operating hour (ER05-796);
- CAISO Tariff Amendment 68: station power protocol (ER05-849);
- CAISO Tariff Amendment 72: 95% DA scheduling requirement (ER05-1502);
- CAISO Tariff Amendment 73: bid caps (ER06-354);
- CAISO grid management charge (ER05-346, ER05-367);
- CAISO and Independent Energy Producer's Association joint motion on capacity generation charged for must-offer obligations energy (EL05-146);
- City of Pasadena transmission control agreement (ER05-381, EL05-18);
- southern cities transmission owner tariffs (EL03-15 and EL03-20);
- CPUC order instituting rulemaking to promote policy and program coordination and integration in electric utility resource planning: Phase IIB workshops (R.04-04-003);
- CPUC order instituting rulemaking to consider refinements to and further development of the resource adequacy requirements program (R.05-12-013);
- CPUC transmission infrastructure to access renewable energy resources (OII.05-09-005);
- Pacific Gas & Electric (PG&E) 8th transmission owner tariff (ER05-1284);
- PG&E reliability service tariff (ER06-34);
- PG&E transmission revenue balancing account adjustment, reliability services rates and transmission access charge balancing account adjustment (ER04-337, ER05-82, ER05-378);
- PG&E agreement with the City and County of San Francisco and PG&E's wholesale distribution tariff (ER05-1190);
- Southern California Edison (SCE) 3rd transmission owner tariff (ER06-186);
- SCE reliability service tariff: cost allocation-coincident peak methodology (ER05-410);
- SCE reliability service tariff: 2005 summer true-up using ER05-410 methodology (ER05-1154);
- SCE petition for declaratory order concerning transmission projects to interconnect potential wind generation in the Antelope Valley/Tehachapi Region (EL05-80);
- SCE reliability services costs associated with CAISO M-438 operating procedure (ER05-763, ER05-1154);

- SCE contracts to secure additional capacity for system reliability in SP-15 (A.05-06-003);
- San Diego Gas & Electric (SDG&E) revision to transmission owner tariff: transmission congestion costs (ER05-853); and
- U.S. Department of Energy demand response in CAISO/regional transmission organizations systems.

DWR also participated in litigation before the DC Circuit Court on several electric utility matters, including FERC Opinion No. 466, 466-A, and 466-B: approval of rolled-in rate compensation for PG&E generation plants connecting to the transmission grid (Case 04-76131); termination of extra high voltage agreements (Case 04-1171); and FERC Order 478: time differentiated rates (Case 06-74506).

Oroville Facilities Relicensing

The existing 50-year term FERC hydropower license, Project Number 2100 for operation of the Oroville Facilities, will expire January 31, 2007. FERC offers three relicensing procedures—traditional, hybrid, and alternative—that allow applicants to accommodate their unique interests and operations while seeking license renewal. The traditional procedures require minimal FERC involvement, while the alternative procedures allow for more FERC involvement and encourage collaborative stakeholder interaction throughout the multiyear relicensing process. DWR selected the alternative licensing procedures. Participants in the relicensing activities indicated support for the collaborative approach, and on November 16, 2000, DWR submitted a request to FERC to use the alternative procedures. On January 11, 2001, FERC approved DWR's request. On January 26, 2005, DWR submitted its Application for New License for the Oroville Facilities with FERC.

On September 12, 2005, following DWR's successful compliance with FERC's May 2005 Additional Information Request, FERC accepted DWR's Application for a New License for operating the Oroville Facilities. FERC's acceptance of DWR's license application marked the conclusion of the multiyear collaborative Alternative Licensing Process (ALP) involving federal and State agencies, Indian tribes, local agencies, environmental organizations, and other interested parties that worked to assist DWR in completing a comprehensive license application and accompanying Preliminary Draft Environmental Assessment. While this procedurally completed the ALP phase of FERC relicensing, settlement negotiations and completion of all federal/State environmental documentation was still ongoing at the end of 2005 in pursuit of a new FERC license at the Oroville Facilities.

During 2005, primary achievements included

- completing all 165 technical reports resulting from the 72 collaboratively developed and approved study plans. These roughly 40,000 pages of supporting documentation were submitted to FERC in support of DWR's application for license;
- completing a package of responses addressing deficiencies, clarifications, additional information requests, and revisions to the January 2005 license application;

- receiving notification that the Oroville Facilities New License Application was accepted for filing by FERC;
- submitting the application for water quality certification to the State Water Resources Control Board;
- continuing settlement agreement negotiations meetings with Indian tribes, Butte County, local governmental agencies, State and federal agencies, and other interested stakeholders; and
- continuing to prepare and update the recreation management plan submitted with the Application for License to reflect additional enhancements derived from the Settlement Agreement negotiations.

As an interim settlement activity, DWR obtained approval to provide $3 million to the Feather River Recreation and Park District to fund recreation improvements at Riverbend Park in Oroville through calendar year 2007.

The following SWP facilities will be subject to new license terms and conditions:

- Oroville Dam and Reservoir;
- Hyatt Pumping-Generating Plant;
- Thermalito Pumping-Generating Plant;
- Thermalito Diversion Dam Power Plant;
- Thermalito Diversion Dam;
- Fish Barrier Dam;
- Feather River Fish Hatchery;
- Thermalito Power Canal;
- Thermalito Forebay; and
- Thermalito Afterbay.

Existing SWP Power Facilities

Figure 10-1 shows the names, locations, and nominal capacities of DWR's primary power facilities.

Hydroelectric

Economic hydroelectric generation provides the largest share of SWP power resources. The combined Hyatt Pumping-Generating Plant and Thermalito Pumping-Generating Plant (Hyatt-Thermalito) generate about 2.2 billion kWh of energy in a median water year, while the 3 MW from Thermalito Diversion Dam Power Plant adds another 24 million kWh of energy a year.

Generation at California Aqueduct recovery plants—Alamo, Devil Canyon, Gianelli, Mojave Siphon, and Warne—varies with the amount of water conveyed. These five plants generate about one-sixth of the total energy used by the SWP.

Coal

Since July 1983, under the "Participation Agreement Reid Gardner Unit No. 4" between DWR and Nevada Power Company (NPC), DWR has received energy from Reid Gardner Power Plant, a coal-fired facility near Las Vegas, Nevada. Reid Gardner consists of four units. DWR owns 67.8 percent of Unit 4, while NPC owns the remainder of Unit 4, as well as all of Units 1, 2, and 3. Under the agreement, DWR receives up to 235 MW from Unit 4, subject to NPC's limited right to interrupt DWR's energy deliveries. Whenever NPC interrupts DWR's scheduled energy, DWR receives payment based on NPC's combustion turbine costs.

In June 1990, DWR began receiving an additional 15 MW of power from Reid

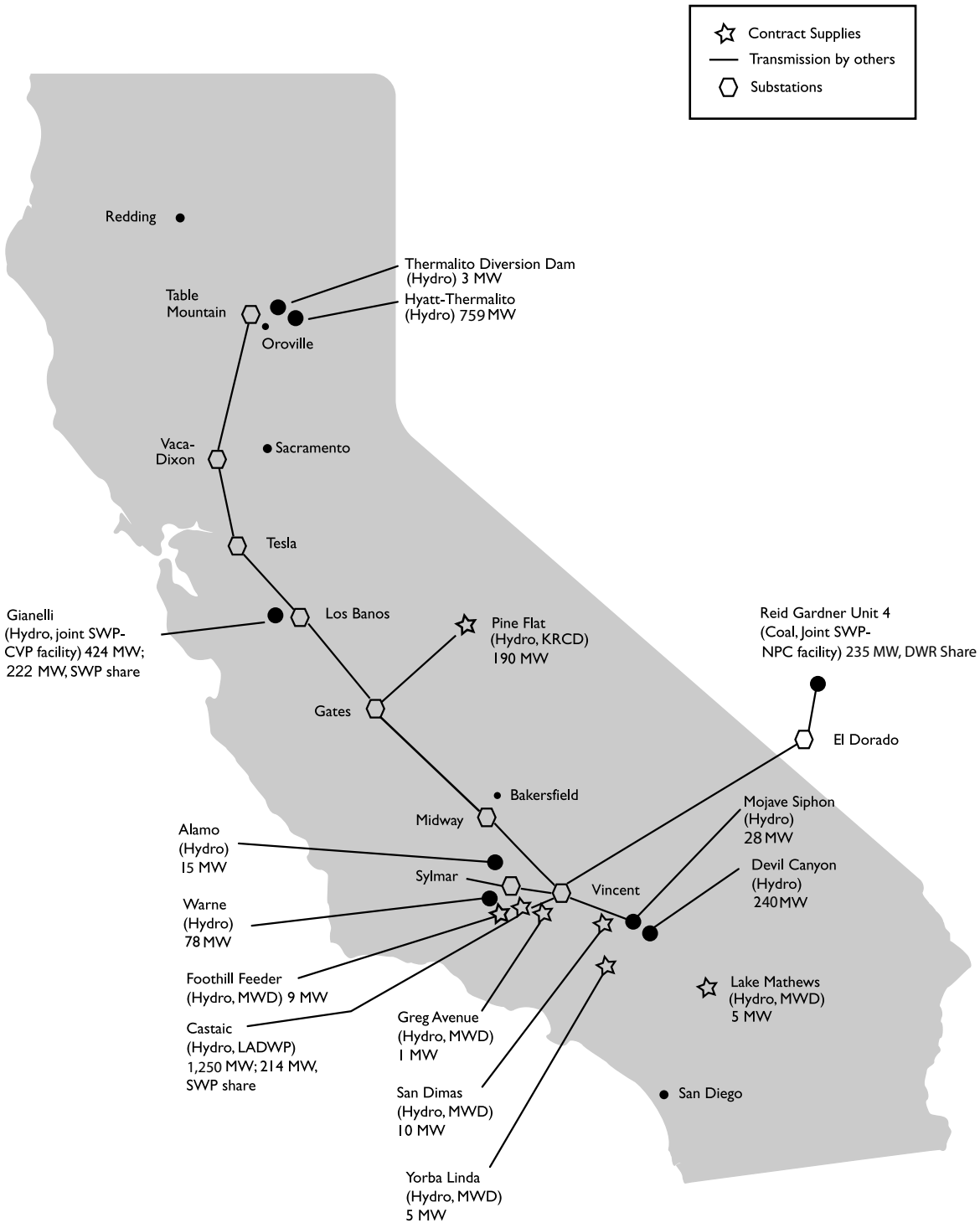

Figure 10-1. Names, Locations, and Nameplate Capacities of Primary Power Facilities

Gardner Unit 4 due to plant capacity upgrades. However, beginning in August 2004, new environmental restrictions in Nevada were imposed which reduced Reid Gardner Unit 4 production back to its original capacity of 260 MW. Consequently, DWR is currently not receiving the energy associated with this upgraded capacity.

Future SWP Power Facilities

To meet future SWP power requirements, DWR evaluates new power resources. Factors considered include

- the anticipated power requirements for pumping;
- transmission access;
- anticipated water deliveries to contractors;
- cost of the resource;
- availability and cost of financing;
- environmental impacts and costs of mitigation; and
- operating characteristics.

In addition, DWR continues to consider several potential power resources at existing plants, including a second unit at Alamo Power Plant and a third unit at Warne Power Plant.

Contractual Resource Arrangements

Through joint development, exchanges, and purchases, DWR obtains a significant amount of capacity and energy for SWP operations from other utilities throughout California, the Northwest, and the Southwest. Under these agreements, DWR can sell, buy, or exchange energy.

Some agreements allow DWR to sell, buy, and exchange energy on an hourly, daily, weekly, or monthly basis. Those agreements permit more economical use of DWR's generating resources and more efficient scheduling of energy deliveries.

Joint Developments

In 1966, DWR entered into a contract with the Los Angeles Department of Water and Power (LADWP) for joint development of the West Branch of the California Aqueduct. LADWP constructed and operates Castaic Power Plant, which is connected to the LADWP transmission system at the Sylmar Substation. DWR receives capacity and energy at the Sylmar Substation based on weekly water schedules through the West Branch.

Gianelli Pumping-Generating Plant is a joint SWP (222 MW) and U.S. Bureau of Reclamation (Reclamation) (202 MW) facility.

Purchases

DWR obtains a significant amount of energy through long-term and short-term purchase agreements.

Long-Term Purchase Agreements. DWR purchases hydroelectric energy generated by other utilities. The output of the 165 MW Pine Flat Power Plant, owned and operated by Kings River Conservation District, supplies the SWP with about 400 million kWh of energy in median water years.

DWR contracts for the energy output of five hydroelectric plants owned and operated by Metropolitan Water District of Southern California (Metropolitan). The total capacity of these plants is 30 MW.

Short-Term Purchase Agreements. Through the Western Systems Power Pool Agreement, DWR transacts with member utilities and energy marketers on a short-term basis. Additionally, according to the terms of the 1988 Coordination Agreement between DWR and Metropolitan, DWR may purchase surplus energy from Metropolitan's Colorado River Aqueduct system. The Coordination Agreement provides for coordinated operation between the SWP and Metropolitan's Colorado River Aqueduct system. It also provides for monthly surplus firm energy sales to Metropolitan, economy energy sales to Metropolitan, surplus energy purchases from the Colorado River Aqueduct system, and energy exchanges between DWR and Metropolitan.

Contractual Transmission Agreements

Although able to acquire transmission independently, DWR depends on other sources for transmission services. PG&E and SCE are the primary providers of transmission service between SWP power resources and pumping loads and also with interconnected utilities for purchases, sales, and exchanges of power.

Under the Comprehensive Agreement with PG&E, DWR receives 1,300 MW of firm transmission service over the PG&E transmission system between SWP pump loads and power resources in Northern and Central California.

Previously, under the power contract with SCE, DWR received transmission service over SCE's transmission system to interconnect the SWP loads and resources in Southern California. Upon termination of the power contract at the end of 2004, DWR began receiving transmission service for these loads and resources through CAISO. Additionally, DWR has interconnection and wholesale distribution service agreements with SCE for service over its distribution facilities from the CAISO interchange points to SWP loads and resources.

Under the Participation Agreement with NPC, DWR receives 235 MW of firm transmission service over NPC's transmission system between Reid Gardner Unit 4 and the El Dorado Substation. Under the Firm Transmission Service Agreement between SCE and DWR, DWR receives 235 MW of firm transmission service over SCE's transmission system between the El Dorado Substation and the Vincent Substation.

Load Management

The SWP controls the timing of its pumping load through an extensive computerized network. This control system allows DWR to minimize the cost of power it purchases by maximizing pumping during off-peak periods when power costs are lower—usually at night—and selling power to other utilities and energy marketers during on-peak periods when power costs are higher. Taking advantage of this flexibility in scheduling, SWP pumping load and generation reduces the net cost of power needed for SWP water deliveries.

Sales of Excess Power

When generation from SWP power resources exceeds requirements, DWR sells or exchanges the excess power through contracts with utilities and marketers.

SWP Power Operation in 2005

Tables 10-1 through 10-4, at the end of this chapter, present historical information about SWP power operation for calendar year 2005, including energy consumed, generated, exchanged, purchased, and sold.

Energy Consumed

In 2005, energy used at the 29 SWP pumping and generating plants totaled 8.29 million MWh. According to the terms and conditions of various water conveyance contracts and exchange agreements, some water belonging to the Central Valley Project is pumped through Banks and Dos Amigos Pumping Plants and Gianelli Pumping-Generating Plant. Reclamation furnishes additional energy for this purpose.

Table 10-1 shows the amount of energy used each month at SWP pumping and generating plants to operate the SWP in 2005, excluding transmission losses.

Energy Generated

Table 10-2 shows the amounts of energy generated at SWP facilities in 2005, as well as energy purchased for SWP operations.

Hydroelectric and Coal

The Hyatt-Thermalito power complex in Oroville generated 1.83 million MWh of energy in 2005.

Energy generated at SWP aqueduct recovery plants—Gianelli, Alamo, Devil Canyon, Mojave Siphon, and Warne—totaled 1.74 million MWh.

The SWP share of energy generated at the coal-fired Reid Gardner Unit 4 in Nevada totaled 1.58 million MWh of energy.

Contractual Resource Arrangements

SWP power operations rely on contractual arrangements as well as SWP facilities. These contractual arrangements include joint development projects, energy exchanges, and energy purchases.

Joint Development

Through the West Branch Cooperative Development Agreement with LADWP, DWR receives energy based on the amount of water scheduled through the West Branch. In 2005, LADWP provided 510,093 MWh of energy for DWR's share of energy generated at Castaic Power Plant.

DWR's share of Gianelli Pumping-Generating Plant used 363,023 MWh and generated 125,080 MWh of energy.

Energy Exchanges

DWR has an energy exchange agreement with Sacramento Municipal Utility District (SMUD). Under this agreement, DWR provides SMUD with energy during peak periods from May through September. In return, SMUD provides DWR with energy during off-peak periods from January through March and from September through December. The exchange ratio of off-peak energy to on-peak energy is 1.8.

Purchases and Costs

Table 10-3 shows amounts of power, transmission, and other services purchased in 2005 and the costs of purchases, by area. Amounts shown include short-term and long-term purchases. It also reflects

the restructuring of the electric industry through transactions with CAISO and through new charges (grid management and ancillary services charges).

DWR purchased 4.74 million MWh of energy at a cost of $232.07 million. Other SWP power costs, including transmission, operation, maintenance, and CAISO ancillary services totaled $123.83 million. This amount includes $4.95 million for debt service and $3.81 million for operations and maintenance costs at Pine Flat Power Plant. It also includes $3.42 million for transmission at Reid Gardner Unit 4 and $59.33 million for costs associated with operations and maintenance, fuel, insurance, and property taxes at Reid Gardner Unit 4.

Long-Term Purchase Agreements. According to the terms of the Kings River Conservation District contract, DWR receives the total output of the 165 MW Pine Flat Power Plant. In 2005, the power plant provided 594,002 MWh of energy to the SWP at a total cost of $4.57 million.

Under the Metropolitan Small Hydro Contract, DWR purchased 174,225 MWh of energy in 2005 from five small hydroelectric power plants on the Metropolitan system at a cost of $9.24 million.

DWR purchased 686 MWh of energy at a cost of $2,313, under the Reid Gardner Unit 4 Participation Agreement, associated with plant capacity upgrade.

Short-Term Purchase Agreements. Existing resources and long-term power and transmission contracts ensure that the SWP has enough power to meet long-term needs. When SWP power requirements exceed resources during daily operations, short-term purchases meet the difference. In 2005, the SWP purchased short-term energy from 20 marketers. The short-term energy purchases totaled 2.84 million MWh at a cost of $158.82 million. Also, DWR purchased additional amounts of short-term energy from electric utilities.

Sales of Excess Power

DWR sold 2.15 million MWh of energy to 20 utilities and 22 power marketers, for total revenues of $148.62 million in 2005. DWR also received $33.50 million in revenues for capacity, including $21.03 million for transactions made through CAISO. See Table 10-4 for information about energy and other services sold and revenue received, including those sold to CAISO.

Forecasting Power Operations

Each year, after reviewing the water contractors' water delivery requests and the construction schedule for future facilities, DWR forecasts SWP power requirements through 2035.

Actual SWP power requirements may vary significantly from the amounts forecast. Those variations are due to the amount of water available and delivered in a given year. For example, dry conditions in Northern California could result in a reduction of the amount of water available for delivery. If full deliveries could not be made, less power would be used. Power requirements could also decrease during a wet year because of the availability of local water in the San Joaquin Valley or Southern California.

Conversely, power requirements could exceed the amount originally forecast if actual water deliveries are greater than the amounts estimated. For example, if additional pumping is needed to refill reservoirs south of the Delta after an unexpectedly dry year, then more power would be used.

Criteria

DWR bases its forecast of power operations primarily on the amount of energy necessary to deliver approved Table A water requested by water contractors. The forecast includes losses in reservoirs and aqueducts, recreation water, and water to replace storage in reservoirs south of the Delta.

Short-term power requirements, based on actual water supply and reservoir storage levels, are determined for the current and two ensuing years of operation. Long-term operational studies for the remaining years are based on median-year water supply conditions and optimal reservoir storage levels.

Table 10-1. Energy Used at Pumping Plants and Power Plants in 2005, by Month (Millions of Kilowatt-Hours)

Pumping Plants and Power Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Hyatt-Thermalito Pumping-Generating Plant (pumpback and station service)	0.150	0.002	0.112	0.005	0.066	0.145	0.480	0.111	1.526	0.731	0.206	0.665	4.200
North Bay Interim Pumping Plant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cordelia Pumping Plant	0.646	0.576	0.414	0.343	0.701	0.847	1.127	1.258	1.231	0.907	0.983	0.840	9.872
Barker Slough Pumping Plant	0.312	0.231	0.174	0.185	0.379	0.985	1.428	1.641	1.611	1.175	0.953	0.451	9.524
South Bay Pumping Plant	2.825	1.794	2.749	5.949	8.866	13.209	14.449	12.435	7.679	5.221	8.760	6.343	90.279
Del Valle Pumping Plant	0.005	0.005	0.007	0.015	0.021	0.019	0.014	0.006	0.013	0.015	0.013	0.019	0.153
Banks Pumping Plant	136.880	77.667	62.675	62.658	34.219	91.648	122.175	121.274	118.172	106.698	87.682	111.943	1,133.692
Gianelli Pumping-Generating Plant (SWP share)	118.886	41.923	4.300	0.434	1.110	7.867	18.021	26.375	35.942	25.421	21.609	61.135	363.023
Dos Amigos Pumping Plant (SWP share)	17.297	25.660	34.671	45.790	32.765	46.677	55.389	48.170	40.386	40.656	35.414	31.148	454.022
Buena Vista Pumping Plant	16.773	22.610	22.002	37.980	31.963	40.000	53.237	43.392	38.293	39.872	34.434	31.572	412.128
Teerink Pumping Plant	18.859	25.010	22.946	40.812	33.761	41.168	54.922	43.908	40.571	43.543	37.950	34.951	438.400
Chrisman Pumping Plant	42.314	56.067	50.685	90.118	73.512	88.990	119.723	95.710	89.338	96.737	84.740	78.312	966.247
Edmonston Pumping Plant	155.984	206.947	185.009	331.643	268.423	322.962	436.404	345.398	325.500	355.350	313.355	287.135	3,534.110
Alamo Power Plant (station service)	0.016	0.013	0.003	0.001	0.002	0.000	0.001	0.002	0.004	0.004	0.032	0.017	0.095
Pearblossom Pumping Plant	36.178	42.053	51.564	49.450	50.961	59.305	72.433	60.841	52.529	57.205	55.539	57.579	645.638
Pine Flat Power Plant (station service)	0.234	0.209	0.064	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.240	0.767
Mojave Siphon Power Plant (station service)	0.017	0.007	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.004	0.030
Devil Canyon Power Plant (station Service)	0.001	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.002	0.000	0.033	0.039
Oso Pumping Plant	3.109	7.206	0.358	17.907	9.015	11.367	18.686	12.905	14.730	16.769	12.819	9.577	134.449
Warne Power Plant (station service)	0.140	0.078	0.172	0.025	0.141	0.272	0.135	0.123	0.037	0.014	0.112	0.290	1.541
Las Perillas Pumping Plants	0.160	0.277	0.284	0.559	0.865	1.225	1.403	1.312	0.834	0.581	0.168	0.360	8.028
Badger Hill Pumping Plant	0.406	0.735	0.752	1.461	2.258	3.224	3.579	3.395	2.171	1.511	0.427	0.952	20.871
Devil's Den Pumping Plant	0.875	0.925	1.113	1.556	1.846	2.209	2.458	2.371	2.183	1.851	0.850	1.313	19.549
Bluestone Pumping Plant	0.812	0.864	1.043	1.474	1.752	2.133	2.372	2.290	2.097	1.753	0.794	1.238	18.622
Polonio Pass Pumping Plant	0.888	0.940	1.137	1.581	1.857	2.212	2.468	2.359	2.165	1.847	0.858	1.342	19.653
Greenspot Pumping Station	0.217	0.021	0.039	0.098	0.093	0.194	0.255	0.367	0.241	0.448	0.218	0.159	2.350
Crafton Hills Pumping Station	0.143	0.022	0.040	0.107	0.101	0.181	0.155	0.155	0.214	0.337	0.187	0.143	1.786
Cherry Valley Pumping Station	0.000	0.002	0.002	0.008	0.006	0.008	0.004	0.008	0.013	0.003	0.016	0.013	0.081
Subtotal	*554.128*	*511.844*	*442.318*	*690.160*	*554.686*	*736.846*	*981.319*	*825.804*	*777.480*	*798.653*	*698.138*	*717.773*	*8,289.149*
High Voltage Transmission Line Losses and Deviation	14.747	(4.122)	(15.095)	(10.544)	(3.467)	12.846	11.080	16.087	6.937	(5.407)	(10.509)	6.196	18.750
Total Energy Required for SWP	**568.875**	**507.722**	**427.223**	**679.616**	**551.219**	**749.692**	**992.400**	**841.891**	**784.417**	**793.246**	**687.629**	**723.969**	**8,307.899**

Table 10-2. Energy Generated and Purchased in 2005, by Month (Millions of Kilowatt-Hours)

Sources of Energy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
SWP Energy Sources													
Hyatt-Thermalito Power Plant	67.247	37.043	54.212	39.800	152.664	224.191	258.224	253.026	192.072	158.690	155.752	240.636	1,833.559
Gianelli Pumping-Generating Plant (SWP share)	0.000	2.436	0.335	35.384	35.324	15.072	15.248	11.071	0.602	1.428	5.980	2.200	125.080
Alamo Power Plant	6.242	6.824	8.750	8.788	9.073	10.628	11.744	10.447	9.295	9.741	5.263	8.209	105.003
Mojave Siphon Power Plant	4.029	4.675	5.813	5.372	5.683	6.863	8.360	6.832	5.837	6.451	6.181	6.427	72.525
Devil Canyon Power Plant	72.550	83.338	86.439	90.760	93.486	106.885	127.857	109.858	95.478	103.834	92.552	89.716	1,152.752
Reid Gardner Unit 4 [a]	119.108	124.479	141.980	105.768	51.690	159.798	156.880	128.767	134.719	159.927	144.844	149.945	1,577.905
Warne Power Plant	5.875	16.102	(0.170)	37.519	22.076	23.235	38.000	28.086	32.096	35.863	26.742	18.838	284.261
Subtotal	*275.051*	*274.896*	*297.359*	*323.391*	*369.996*	*546.673*	*616.314*	*548.088*	*470.099*	*475.934*	*437.314*	*515.971*	*5,151.085*
Energy Sources from Long-Term Agreements													
Castaic Power Plant	28.122	42.059	0.000	68.219	34.882	38.031	61.801	47.034	50.510	59.924	51.699	27.810	510.093
Metropolitan Small Hydro Generation	10.598	9.671	9.263	14.398	15.235	17.027	18.254	17.771	16.071	14.843	15.830	15.265	174.227
Pine Flat Power Plant KRCD	0.000	0.000	6.222	35.182	106.963	143.526	144.437	95.771	38.801	21.588	1.512	0.000	594.002
Power Exchange Delivered to other entities[b]	0.000	(0.336)	0.000	0.000	(31.000)	(30.000)	(33.000)	(33.160)	(32.000)	0.000	0.000	0.000	(159.496)
Power Exchange Received from other entities[b]	43.400	39.200	43.400	0.000	0.000	0.000	3.000	3.240	27.000	43.575	42.000	43.400	288.215
Power Exchange Delivered to SCE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Power Exchange Received from SCE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Energy to MWD for CRA Pumping	0.000	0.000	0.000	0.000	0.000	0.000	(20.160)	(15.775)	(26.505)	0.000	0.000	0.000	(62.440)
Energy from Metropolitan for CRA	30.600	8.800	0.000	0.000	0.000	0.000	0.000	6.930	4.950	0.000	0.000	2.880	54.160
Power System Imbalances	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Purchases													
Purchases (Power Contracts)	303.622	253.498	229.904	348.832	283.696	290.518	404.261	412.864	424.998	380.633	312.615	322.814	3,968.255
Subtotal	*416.342*	*352.892*	*288.789*	*466.630*	*409.776*	*459.103*	*578.592*	*534.675*	*503.826*	*520.563*	*423.657*	*412.170*	*5,367.016*
Total Resources	691.393	627.789	586.148	790.021	779.772	1,005.775	1,194.906	1082.763	973.925	996.497	860.971	928.141	10,518.101
Less Energy Sales	(122.518)	(120.067)	(158.925)	(110.405)	(228.553)	(256.083)	(202.506)	(240.872)	(189.508)	(203.251)	(173.342)	(204.172)	(2,210.202)
Total Energy Provided to the SWP	**568.875**	**507.722**	**427.223**	**679.616**	**551.219**	**749.692**	**992.400**	**841.891**	**784.417**	**793.246**	**687.629**	**723.969**	**8,307.899**

[a] The upgraded energy of 686 MWh from Reid Gardner Unit 4 is included.
[b] Amounts show actual energy available for SWP use and include transmission losses.

Table 10-3. Power, Transmission, and Other Services Purchased in 2005 and Costs of Purchases, by Area

Name of Supplier	Type of Service Purchased	Power (MWH)	Power Cost (Dollars)	Total Cost (Dollars)
Power Purchases				
Northwest Area				
Bonneville Power Administration		147	8,967.00	8,967.00
Northern California Area				
Kings River Conservation District		594,002	4,574,843.88	4,574,843.88
Sacramento Municipal Utility District		5,550	315,286.75	315,286.75
City and County of San Francisco		505	24,970.00	24,970.00
Northern California Power Agency		5,066	381,260.00	381,260.00
Pacific Gas & Electric Company		118,733	4,537,095.00	4,537,095.00
Southern California Area				
Metropolitan Water District of Southern California		197,308	11,296,121.85	11,296,121.85
Southern California Edison		321,415	19,660,218.00	19,660,218.00
City of Azusa		107	5,273.00	5,273.00
City of Riverside		1,412	91,098.00	91,098.00
City of Vernon		1,805	121,180.00	121,180.00
San Diego Gas and Electric		165,506	10,003,148.50	10,003,148.50
Arizona Public Services		419,600	19,324,600.00	19,324,600.00
Public Service of New Mexico		61,058	2,895,759.97	2,895,759.97
Nevada Power (Upgrade Energy)		686	2,313.33	2,313.33
Energy Marketers (20) AEP,AVST,BPEC,CALP,CECO,CNCO,CORP,CPSC, DETM,ECH1,MSCG,OPSI,PAC1,PWRX,PW,SEES,SETC,TEMU,UBSW,WESC		2,844,268	158,823,615.67	158,823,615.67
Subtotal		*4,737,168*	*232,065,750.95*	*232,065,750.95*
Transmission and Other Purchases				
California Independent System Operator	Ancillary and other services			36,604,391.82
	FERC charges			374,796.65
California Power Exchange	Wind up fees			140,357.78
Kings River Conservation District	Pine Flat operation and maintenance			3,805,268.00
	Pine Flat debt service and refinance fees (bonds)			4,951,058.21
Los Angeles Department of Water and Power	Hydro Power plant scheduling for Greg Ave.			1,150.00
	Sylmar transmission service			73,907.61
Nevada Power Company [a]	Reid Gardner Unit 4 transmission service			1,672,932.00
	Operations and maintenance			26,600,913.78
	Coal and diesel fuel			31,248,696.51
	Insurance			561,048.94
	Property taxes			919,716.80
Pacific Gas and Electric Company	Midway-Wheeler Ridge, transmission operation and maintenance			98,066.40
	Cost of ownership for Pine Flat			12,076.00
	Transmission			10,619,652.86
	Cost of ownership, special facilities			76,076.00
	Castle Rock Junction—Lakeville ownership charges			102,594.00
	Costal Branch: ownership charges			156,463.00
Southern California Edison Company	East Branch Extension Plants—transmission			576,013.68
	East Branch Extension Plants—interconnection charges			39,817.70
	Additional facilities charges (D.C. and Mojave)			1,259,927.04
	Mojave Siphon and Devil Canyon firm transmission			369,120.00
	East Branch Extension reliability charges			2,189.48
	Reliability services (Edmonston, Oso, Pearblossom)			1,401,258.80
	Firm transmission El Dorado-Vincent			1,551,000.00
	Interconnection charge (WW,AL,ED,OSO,PB)			525,585.74
FERC Charges for Government Lands				86,541.62
Miscellaneous Fees				**3,755.31**
Subtotal				*123,834,375.73*
Total		**4,737,168**	**73,242,135.28**	**355,900,126.68**

[a] NPC amounts are subject to adjustments

Table 10-4. Energy Sold in 2005 and Revenue from Sales, by Area

Name of Supplier	Energy Sold (MWH)	Revenue from Energy Sales (Dollars)	Revenue from Exchanges, Capacity, and other Energy Services (Dollars)	Total Power Sales (Dollars)
Pacific Northwest Area				
Bonneville Power Administration	3,150	106,800.00		106,800.00
Northern California Area				
CAISO—ancillary and other services			21,025,418.29	21,025,418.29
California Power Authority	15,200	1,216,000.00	7,700,000.00	8,916,000.00
City of Redding	175	9,000.00		9,000.00
City of Santa Clara			19,275.23	19,275.23
Northern California Power Agency	3,273	222,027.50	14,922.76	236,950.26
Pacific Gas and Electric Company	156,224	10,761,416.00		10,761,416.00
Sacramento Municipal Utility District	46,931	3,654,158.00	1,284,000.00	4,938,158.00
Southern California Area				
City of Azusa	7,860	484,767.35		484,767.35
City of Banning	8,640	656,640.00		656,640.00
City of Riverside	152,453	6,474,583.76	1,976,820.00	8,451,403.76
City of Vernon	5,148	274,735.00		274,735.00
Los Angeles Department of Water and Power	240	17,760.00	587,100.00	604,860.00
San Diego Gas and Electric	201,928	15,077,255.25		15,077,255.25
Southern California Edison	78,797	5,817,660.00		5,817,660.00
Metropolitan Water District of Southern California	400	3,570.00		3,570.00
Southwest Area				
Arizona Public Service	39,571	2,912,386.00		2,912,386.00
Nevada Power Company	185,162	20,400,398.87	889,338.60	21,289,737.47
Public Service Company of New Mexico	5,850	324,696.00		324,696.00
Salt River Project	2,200	73,808.00		73,808.00
Energy Marketers				
American Electric Power	2,800	160,600.00		160,600.00
Avista Energy	800	38,360.00		38,360.00
BP Energy Company	146,200	8,588,026.00		8,588,026.00
Calpine Energy Services	39,213	1,668,778.50		1,668,778.50
Conoco Phillips	29,053	1,443,919.10		1,443,919.10
Constellation Power Source	58,157	4,788,302.57		4,788,302.57
Coral Power	342,337	23,033,926.50		23,033,926.50
Duke Energy	86,725	4,315,562.20		4,315,562.20
Dynegy Power Marketing	7,200	351,052.00		351,052.00
J. Aron & Company	30,800	2,556,400.00		2,556,400.00
Mirant Americas Energy Marketing	800	46,560.00		46,560.00
Morgan Stanley Capital Group	32,250	1,436,250.00		1,436,250.00
Occidental Power Services	7,200	409,152.00		409,152.00
PacifiCorp	400	11,800.00		11,800.00
Pinacle West	3,800	234,594.00		234,594.00
PPM Energy	45,186	3,015,429.10		3,015,429.10
Powerex	35,321	1,868,021.00		1,868,021.00
Sempra Energy Solutions	800	40,504.00		40,504.00
Sempra Energy Trading	133,678	6,931,442.00		6,931,442.00
Transalta Energy Marketers	180,016	14,670,002.40		14,670,002.40
UBS Energy	35,376	3,492,764.00		3,492,764.00
Williams Energy Marketers	18,725	1,028,176.00		1,028,176.00
Total	**2,150,039[a]**	**148,617,283.10**	**33,496,874.88**	**182,114,157.98**

Chapter 11
Facilities Maintenance

Crafton Hills Reservoir

Significant Events in 2005

The Part 12D Safety Inspection and Potential Failure Mode Analysis (PFMA) for Cedar Springs Dam, Devil Canyon Second Afterbay, Peace Valley Intake Embankment (Quail Dam), and Pyramid Dam were performed in January.

Part 12D Safety Inspection, PFMA and Supporting Technical Information Document (STID) reports for FERC Project #2100, the Oroville-Thermalito Complex, were completed in March.

Part 12D Safety Inspection, PFMA and STID reports for FERC Project #2426 the Castaic-Devil Canyon Power Complex were completed in July 2005.

Information for this chapter was provided by the Division of Operations and Maintenance, the Division of Safety of Dams, and the State Water Project Analysis Office.

The Department of Water Resources (DWR), through the Division of Operations and Maintenance (O&M), monitors all State Water Project (SWP) facilities to ensure safety and reliability. DWR is required, under federal and State law, to contract periodically with independent consultants to review the safety of SWP dams and power facilities.

Inspecting and Maintaining Project Dams

DWR conducts several types of inspections of SWP facilities to ensure that each dam is safe for continued operation. O&M staff collect and evaluate data about the performance of each facility. Engineers from the Division of Safety of Dams (DSOD) review instrumentation data and inspect jurisdictional SWP dams, either semi-annually or annually. They evaluate proposed modifications to existing dams, as well as the design and construction of new jurisdictional dams. The Federal Energy Regulatory Commission (FERC) inspects all licensed SWP facilities annually. These inspections include a review of significant events, instrumentation data, and the visual appearance of each dam, penstock, or power plant. In addition, under FERC and California Water Code requirements, consulting engineers and geologists are retained to evaluate SWP dam facilities every five years.

DWR contracts periodically with independent consultants to review the safety of SWP dams and power facilities, except Pearblossom Spill Basin. The four dams in the San Luis Field Division (San Luis, O'Neill Forebay, Los Banos Detention, and Little Panoche Detention) are used jointly with the U.S. Bureau of Reclamation (Reclamation), and are not under the jurisdiction of DSOD. Pearblossom Spill Basin Dam was originally designed to be used during misoperation at the Pearblossom Pumping Plant; the spill basin was never fully completed and has never been used.

Routine Inspections

During 2005, DSOD, along with O&M staff, inspected Frenchman, Antelope, and Grizzly Valley dams in the Upper Feather River area; Oroville, Bidwell Bar, Parish Camp, and Thermalito Afterbay dams in the Oroville Field Division; Clifton Court Forebay, Bethany, Patterson, and Del Valle dams in the Delta Field Division; and Pyramid, Castaic, Cedar Springs, Devil Canyon Power Plant Second Afterbay, Perris, and Crafton Hills dams in the Southern Field Division.

Joint-Use Facility Inspection

Every six years, Reclamation conducts a comprehensive facility review of the four joint-use facility dams in the San Luis Field Division. The last comprehensive facility review was conducted from April 28 through May 2, 2003.

Underwater Inspection

In May 2005, U.S. Environmental Protection Agency divers inspected the left abutment for Pyramid Dam. The inspection was to ensure clean-up efforts were satisfactory after Pacific Pipeline

No. 63 broke in April 2005, releasing oil into Pyramid Lake, and depositing oil on the left abutment and the upstream rip-rap of Pyramid Dam. In September 2005, DWR divers inspected stoplog slots and sacrificial anodes on Pyramid Dam's radial gate.

Independent Reviews

California Water Code Reviews

To comply with the California Water Code and the California Code of Regulations, DWR is required to retain a consulting board to review

1) the adequacy of the design of any dam or reservoir DWR proposes to construct, and
2) the safety of the completed construction, including the terms and conditions for the Certificate of Approval.

These provisions require DWR to retain a board of three consultants to meet at least once every five years to review the operational performance of DWR-owned dams and more often when consulting on new dams. The board of consultants independently reviews and assesses safety conditions of SWP dams.

Consultants are selected based on their knowledge of geotechnical, structural, and civil engineering, including their experience in evaluating dam performance. Their independent assessments include the review of dam performance during earthquakes, evaluation of instrumentation data, inspection of each dam, and evaluation of studies performed by DWR. The consultants then prepare reports on each dam, approving dams safe for continued operation and making recommendations. Based on these recommendations, DWR prepares action plans.

In June 2003, DSOD and O&M agreed to allow the substitution of FERC Part 12 independent review board reports, in lieu of independent review board reports required by the California Water Code and California Code of Regulations for the following dams, Oroville, Feather River Fish Hatchery, Thermalito Diversion, Thermalito Forebay, Thermalito Afterbay, Cedar Springs, Devil Canyon Second Afterbay, and Pyramid. However, DSOD reserved the right to impose additional requirements not presented by the FERC independent review board.

An independent consulting board met several times in 2004 and again in July 2005, to review the proposed Dyer Dam, located on the East Bay Aqueduct in Alameda County. On September 2005, a construction application for Dyer Dam was filed with DSOD. An independent consulting board also reviewed the safety of Perris Dam in October 2005.

FERC Reviews

Theses reviews and the FERC Part 12D safety inspections, which may be conducted by one or more consultants, are scheduled every five years. As a supplement to FERC Part 12D safety inspection, FERC's Dam Safety Performance Monitoring Program requires that a Potential Failure Mode Analysis (PFMA) be performed for FERC-licensed dams. The PFMA involves document review and site visits to develop a comprehensive list of potential failure modes at each dam. From this review process, three documents are generated, the FERC Part 12D safety inspection report;

PFMA report; and Supporting Technical Information Document (STID), which summarizes the project elements and details that do not change significantly over time.

The Part 12D Safety Inspection, PFMA and STID reports for FERC Project #2100, the Oroville-Thermalito Complex, were completed in March 2005. The Part 12D Safety Inspection and PFMA for Cedar Springs Dam, Devil Canyon Second Afterbay, Peace Valley Intake Embankment (Quail Dam), and Pyramid Dam were performed in January 2005. The Part 12D Safety Inspection, PFMA and STID reports for FERC Project #2426 , the Castaic-Devil Canyon Power Complex were completed in July 2005.

Arroyo Pasajero Program

The Arroyo Pasajero and its tributaries drain approximately 530 square miles of the Diablo Range of the coastal mountains, west of the California Aqueduct in Fresno County. Its downstream juncture with the San Luis Canal segment of the California Aqueduct, between Highway 198 and Avenal Cutoff Road, poses a particularly difficult operational and maintenance problem for the SWP. Reclamation designed and constructed the San Luis Canal segment of the California Aqueduct, while DWR operates and maintains it, with all costs shared 45 percent and 55 percent, respectively.

During periods of heavy rainfall, high flows in the Arroyo Pasajero and its tributaries transport heavy sediment loads eroded from the Diablo range of the coastal mountains. Over eons, sediment transported by Arroyo floods formed a 450-square-mile alluvial fan extending from its apex at the eastern margin of Pleasant Valley (Anticline Ridge) to the San Joaquin Valley trough. The California Aqueduct traverses the Arroyo's alluvial fan and forms a barrier to Arroyo flood flows. Flood control facilities, designed to accommodate Arroyo Pasajero floodwaters, include the West Side Detention Basin (designed to store floodwaters and sediment west of the Aqueduct), an evacuation culvert to release floodwater east of the Aqueduct, and drain inlets to release floodwater into the Aqueduct. The volume of runoff and sediment transported by the Arroyo Pasajero is roughly 400 percent greater than was originally estimated during the design of the detention basin in the mid-1960s.

Since the floods of 1969, when nearly all of the detention basin's planned 50-year sediment storage capacity was filled by deposition, DWR and Reclamation have worked to mitigate the effects of heavy flooding and the diminished storage capacity of the detention basin. In 1980, asbestos discovered in the Metropolitan Water District of Southern California's water supply was traced to runoff from the Arroyo Pasajero and other Diablo range streams. This discovery, in conjunction with the high cost of removing sediment from the aqueduct, led DWR to adjust operating procedures to minimize runoff entering the Aqueduct.

DWR and DWR/Reclamation Alternative Long-term Solution

Since the demise of the two candidate plans that were presented in the March 1999 draft Feasibility Report, the investigation has focused on a new alternative, made possible by the availability of relatively low-productivity

farmland in the western Tulare Lakebed. This plan would rely on some increased storage in the existing West Side Detention Basin, used in conjunction with a flood control reservoir that would be constructed in the western Tulare Lakebed, east of the aqueduct near Kettleman City. It would fully utilize the design philosophy of the San Luis Canal by taking excess floodwaters from detention basins along the San Luis Canal, designed to accommodate cross drainage, into the canal southward, and finally diverting them from Pool 21 into a western Tulare Lakebed reservoir. This plan has the added benefit of accommodating the largely unregulated inflows to the canal upstream of the Arroyo Pasajero.

DWR and Reclamation's version of the western Tulare Lakebed plan provides sufficient and acceptable levels of flood protection to the aqueduct at considerably lower cost. This effort was in response to the State Water Contractors' proposal that DWR develop the least costly alternative that would provide a 100-year level of flood protection to the aqueduct. To be consistent with other SWP flood protection facilities, this level of protection would be based on a single four-day flood, as opposed to the larger flood volume that would be expected from a series of six floods over 30 days, that is used by the Corps.

By applying the lower and more traditional four-day flood volume to the flood control improvements needed at the Arroyo Pasajero, a 100-year level of flood protection can be achieved, at an estimated cost of $51 million. Of this amount, about $13 million is estimated for specific improvements to the existing West Side Detention Basin, such as raised embankments, drain inlet modifications, and facilities to protect adjacent non-SWP infrastructure and private properties. The remaining $38 million is the estimated cost of a 45,000 af reservoir located in the western Tulare Lakebed, as well as an aqueduct floodwater turnout structure and chute, connecting the Aqueduct to the proposed western Tulare Lakebed reservoir. By the end of 2003, DWR had almost finished its feasibility investigation into this cost-effective plan and was planning to proceed with the final design, environmental documentation, and other procedural steps leading to construction. The project will be implemented in two phases, Phase 1 will be the construction of the planned improvements within the West Side Detention Basin; and Phase 2 will be the construction of the reservoir at the western Tulare Lakebed.

DWR is exploring alternative locations for the western Tulare Lakebed reservoir that may lead to a less expensive project.

DWR's feasibility investigation on West Side Detention Basin improvements and the western Tulare Lake reservoir plan is intended to work in conjunction with the interim flood control measures constructed at the Cantua and Salt Creek Detention basins in 1999. In addition to these measures, DWR purchased flood easement on approximately 700 acres of land west of the aqueduct near the Cantua and Salt Creek inlets. This easement purchase provides additional land for detention basins at the newly constructed Salt Creek and Cantua Creek inlet weirs. The detention basins allow sediment-laden floodwaters to decant before entering the aqueduct, thus reducing the amount of suspended solids entering the aqueduct.

In 2004, DWR finalized its plan to restore the storage capacity of the West Side Detention Basin. Construction started in August 2004, to implement the designed improvements and was partially completed in 2005. These improvements will restore the storage capacity to the detention basin and add control over releases of flood water into the aqueduct and onto private farmland. DWR is also negotiating with local landowners to acquire the necessary easements and fee property interests required for the project. Arroyo Pasajero West Side Detention Basin improvements provide a 50-year level of protection to the aqueduct from Arroyo Pasajero flooding. This protection is achieved by raising levees, adding a control structure equipped with a rubber dam, armoring the railroad embankment, installing flood gates, and acquiring flood easements.

Related Activities

DWR, with the support of the State Water Contractors, continued during 2005 to provide funds and staff support to a Coordinated Resource Management Plan group, called the Stewards of the Arroyo Pasajero Watershed. The mission of this group is "to improve the Arroyo Pasajero watershed through erosion and sediment control, by implementing improved land management practices that will sustain and promote the aesthetics, environmental quality, and economic viability of the watershed." It is believed that this watershed management plan will increase watershed infiltration and decrease erosion, complementing any structural flood control improvements, and reducing the threat Arroyo Pasajero poses to the California Aqueduct and surrounding communities.

Repairs and Modifications

DWR continually monitors all SWP facilities and performs repairs and modifications as necessary to ensure safe, reliable, water delivery.

Table 11-1 presents information, arranged chronologically, about significant scheduled and unscheduled outages at SWP pumping and power plants in 2005. The table includes information about incidents resulting in outages exceeding 14 days.

Table 11-1. Outages for Maintenance and Repair of Facilities in 2005, by Month

Month	Facility	Units Out of Service
January	Hyatt Power Plant	Unit 2 from January 4 to January 20 to perform weld repair on scroll case access door
	Banks Pumping Plant	Unit 1 from January 6 to January 25 for annual maintenance and to replace discharge valve o-ring Unit 4 from January 26 to March 4 for annual maintenance, to replace automatic voltage regulator, and remove hot water bypass line
	Buena Vista Pumping Plant	Unit 8 from January 31 to May 12 to overhaul unit, repair and upgrade cooling water system, and repair oil tub leak and pump case
	Mojave Siphon Power Plant	Unit 2 from January 31 to February 24 for annual maintenance and to repair trashrack
	Warne Power Plant	Unit 1 from January 2 to April 7 for annual maintenance, to rewind motor, and clean and modify cooling water sump Unit 2 from January 11 to January 28 to adjust needle timing, calibrate needle limit switches, and clean cooling water sump
February	Gianelli Pumping-Generating Plant	Unit 8 from February 23 to March 28 to adjust loose fasteners on pump/turbine guide bearing and replace brake packing
	Dos Amigos Pumping Plant	Unit 3 from February 22 to April 6 for biennial maintenance
March	Banks Pumping Plant	Unit 4 from March 19 to May 7 to replace unit breakers, station service feeder breaker, and discharge valve o-rings, and repair discharge valve hydraulic system and discharge line Unit 5 from March 19 to May 12 for annual maintenance, to replace unit breakers and station service feeder breaker, repair discharge valve hydraulic system and discharge line, and remove hot water bypass line
	Gianelli Pumping-Generating Plant	Unit 3 from March 13 to May 9 for biennial maintenance, to install automatic voltage regulator, and recoat scrollcase Unit 4 from March 13 to May 12 for biennial maintenance, to install automatic voltage regulator, refurbish pump/turbine, adjust bearings, and recoat scrollcase Unit 6 from March 16 to April 13 to adjust loose fasteners on pump/turbine guide bearing and repair bearing
	Edmonston Pumping Plant	Unit 4 from March 28 to June 30 to repair pump first stage impeller and rewedge motor
	Pearblossom Pumping Plant	Unit 7 from March 7 to March 22 to replace pump mechanical seal and discharge valve o-rings
April	Banks Pumping Plant	Unit 6 from April 29 to May 31 for annual maintenance, to replace unit breakers, and remove hot water bypass line Unit 7 from April 29 to June 16 for annual maintenance, to replace automatic

Table 11-1. Outages for Maintenance and Repair of Facilities in 2005, by Month

Month	Facility	Units Out of Service
		voltage regulator, overhaul exciter, machine pump guide bearing, and remove hot water bypass line
	Dos Amigos Pumping Plant	Unit 2 from April 18 to May 24 for biennial maintenance
	Pearblossom Pumping Plant	Unit 7 from April 7 to April 25 to replace failed pump mechanical seal
	Reid Gardner Power Plant	Unit 4 from April 22 to May 15 for annual maintenance
May	Hyatt Power Plant	Unit 5 from May 9 to June 25 for annual maintenance and to repair damaged impeller wear rings
	Gianelli Pumping-Generating Plant	Units 7 and 8 from May 16 to June 18 for biennial maintenance, to repair penstock, and recoat stay vanes
June	Banks Pumping Plant	Unit 3 from June 20 to July 22 for annual maintenance, to replace automatic voltage regulator, and repair amortisseur straps
July	Badger Hill Pumping Plant	Unit 5 from July 12 to July 28 to repair damaged motor
	Edmonston Pumping Plant	Unit 3 from July 9 to August 4 to replace damaged thrust bearing
	Oso Pumping Plant	Unit 7 from July 25 to expected completion date in 2006 to rewind damaged motor and replace cooling water piping
August	Banks Pumping Plant	Unit 10 from August 23 to December 27 to repair damaged amortisseur winding
	Del Valle Pumping Plant	Unit 2 from August 22 to expected completion date in 2006 to overhaul motor and pump
	Gianelli Pumping-Generating Plant	Unit 7 from August 28 to October 5 for biennial maintenance, to install automatic voltage regulator, and recoat pump/turbine
	Chrisman Pumping Plant	Unit 8 from August 4 to August 18 to resurface damaged pump shaft and refurbish damaged pump guide bearing
	Edmonston Pumping Plant	Unit 11 from August 8 to expected completion date in 2006 to overhaul motor and pump and replace lower pump labyrinth seal
September	Banks Pumping Plant	Unit 2 from September 18 to expected completion date in 2006 to rewind motor, refurbish pump, replace discharge valve and station service feeder breakers, remove hot water bypass line, and modify CO2 system
	Dos Amigos Pumping Plant	Unit 1 from September 12 to October 25 for biennial maintenance, to replace CO2 system, and recoat pump

Table 11-1. Outages for Maintenance and Repair of Facilities in 2005, by Month

Month	Facility	Units Out of Service
	Buena Vista Pumping Plant	Unit 7 from September 6 to expected completion date in 2006 to overhaul motor, pump, and discharge valve
	Teerink Pumping Plant	Unit 4 from September 11 to September 26 to repair oil leak from thrust bearing oil pump and damaged amortisseur winding
	Devil Canyon Power Plant	Unit 2 from September 19 to October 26 for annual maintenance, to replace cooling water strainer and piping, and perform weld repair on turbine shutoff valve piping
October	Hyatt Power Plant	Unit 2 from October 2 to expected completion date in 2006 to refurbish unit and replace turbine runner
	South Bay Pumping Plant	Unit 7 from October 25 to November 23 to replace motor and pump with previously refurbished components
	Del Valle Pumping Plant	Units 1, 3, and 4 from October 22 to November 22 for work on Unit 2
	Gianelli Pumping-Generating Plant	Unit 5 from October 3 to expected completion date in 2006 to work on automatic voltage regulator, penstock, and transformer K6A, and install new CO2 system Unit 6 from October 3 to expected completion date in 2006 for biennial maintenance, to work on automatic voltage regulator, penstock, and transformer K6A, and install new CO2 system
	Chrisman Pumping Plant	Unit 6 from October 24 to expected completion date in 2006 to overhaul motor and pump, replace corroded and damaged piping, perform weld repair on pump case and discharge line, and recoat pump
	Devil Canyon Power Plant	Unit 4 from October 31 to November 18 for annual maintenance, to rebuild needles, and install new cooling water strainer
	Warne Power Plant	Unit 2 from October 11 to October 28 for biennial maintenance and to replace station service breakers
November	Hyatt Power Plant	Unit 4 from November 28 to December 22 to recoat waterway
	Badger Hill Pumping Plant	Unit 5 from November 3 to November 22 to replace bad DTU card and adjust motor breaker linkage
	Polonio Pass Pumping Plant	Unit 2 from November 7 to November 22 to fix starting sequence problems and work in switchyard
	Chrisman Pumping Plant	Units 1 and 2 from November 28 to December 17 for annual maintenance, to repair discharge valve seats, replace discharge line mandoor gasket, and work on transformer KYA

Table 11-1. Outages for Maintenance and Repair of Facilities in 2005, by Month

Month	Facility	Units Out of Service
		Unit 3 from November 28 to December 17 for annual maintenance, to replace discharge line mandoor gasket, and work on transformer KYA
	Alamo Power Plant2221	Unit 1 from November 17 to December 8 to replace shaft mechanical seal and seal water filtration system and repair cooling water return line
	Pearblossom Pumping Plant	Units 1 and 3 from November 28 to expected completion date in 2006 to repair discharge line, replace discharge valve o-rings, and work on transformer KYA Unit 2 from November 21 to expected completion date in 2006 for annual maintenance, to repair rotor poles and discharge line, replace discharge valve o-rings, and work on transformer KYA
	Pine Flat Power Plant	Unit 1 from November 7 to expected completion date in 2006 for annual maintenance, to work in switchyard, and repair concrete encasing penstock Unit 2 from November 7 to December 13 for annual maintenance and to work in switchyard Unit 3 from November 7 to December 19 for annual maintenance and to work in switchyard

Chapter 12
Engineering and Right of Way

Construction at East Branch Extension Reach 5.

Significant Events in 2005

In 2005, work to enhance, expand, and repair water delivery in the State Water Project (SWP) continued. Increased water deliveries were more efficient within the confines of legal constraints, environmental restraints, and power availability. Significant projects included South Bay Aqueduct Enlargement, Tehachapi East Afterbay construction, and East Branch Enlargement.

The Department of Water Resources (DWR) has spent a net total of $251 million to acquire rights of way, recreation, and mitigation land for the SWP, from its inception to December 31, 2005.

Information for this chapter was provided by the Division of Engineering.

Initial construction of the State Water Project (SWP) facilities began in 1957 with the relocation of the Western Pacific Railroad facilities and Highway 70 near the City of Oroville to accommodate the SWP Oroville facilities. Oroville Dam was constructed between 1961 and 1967. Construction of the South Bay Aqueduct (SBA) facilities was started in 1960, and the first SWP water was delivered through the SBA in 1965 to serve Alameda and Santa Clara counties.

In 1963, work began on the California Aqueduct, and by 1968, SWP was delivering water to long-term contractors in the San Joaquin Valley to the foot of the Tehachapi Mountains. By 1973, with the completion of Edmonston Pumping Plant at the foot of the Tehachapi Mountains and other East Branch conveyance facilities, SWP was delivering water to Lake Perris at the southernmost point in Los Angeles County.

In 1974, SWP water was delivered to Los Angeles County through the West Branch Facilities. SWP water was delivered to Napa County in 1968, through the first phase facilities of the North Bay Aqueduct, and to Solano County in 1988 by the second phase facilities. The first SWP water delivery through the Coastal Branch (Phase I) was made in 1968 to Kings and Kern counties.

Prior to the completion of the initial facilities in 1973, work began on the Upper Feather River facilities to supply local water, recreation, and fish enhancement. Power plants, additional pumping units, and turbine-generators that had been deferred from the initial construction of the SWP were built to ensure water quality and fish enhancement in the Delta.

From the 1980s through 2004, design and construction activities shifted to repairing concrete lining failures or potential failures of the canal system and concrete pipeline sections; replacing equipment components of existing facilities; enlarging or extending aqueduct reaches; adding pumps and motors to existing facilities; constructing the Devil Canyon Second Afterbay; constructing Phase II of the Coastal Branch to deliver water to San Luis Obispo and Santa Barbara counties in August 1997; and extending the SWP through the East Branch Extension to San Gorgonio Pass service area in San Bernardino and Riverside counties. The East Branch Extension became operational in local/manual mode in 2003, while the remote control system is still being completed.

Design Activities

In 2005, work to enhance, expand, and repair water delivery in the SWP continued. Increased water deliveries were more efficient within the confines of legal constraints, environmental restraints, and power availability. Significant projects included South Bay Aqueduct Enlargement, Tehachapi East Afterbay construction, and East Branch Enlargement. (Table 12-1 provides a list of completed and ongoing design work that was undertaken in 2005.) (Table 12-2 provides a list of projects that were constructed to replace turbines and pumps, repair pipelines, upgrade trashracks at fish hatcheries, and improve recreational and maintenance facilities at dam and reservoir sites.)

The Department of Water Resources (DWR) designed projects for development into construction contracts. Division of Engineering (DOE) staff worked with the Division of Operations and Maintenance (O&M), Division of Flood Management, Division of Environmental Services, Department of Fish and Game (DFG), Department of Boating and Waterways (DBW), Department of Transportation (Caltrans), SWP contractors, California water districts, Sacramento/San Joaquin River and Delta Levee Maintenance Districts, CALFED, U.S. Army Corps of Engineers (Corps), Bureau of Reclamation (Reclamation), Federal Energy Regulatory Commission (FERC), U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NOAA Fisheries), and other entities concerned with water resources activities. DOE staff prepared preliminary designs and estimates, as well as conducted special studies of dams, canal embankments, and other SWP facilities. The studies, reports, and activities continued from previous reporting periods, or initiated in 2005, include the following:

- stability analysis for Oroville, Parish Camp Saddle, Bidwell Canyon Saddle, and Thermalito Dams;
- North Bay Aqueduct reliability study;
- geologic faulting and seismicity re-evaluation of the Clifton Court Intake Structure;
- South Bay Aqueduct reliability study;
- Gianelli Pumping-Generating Plant power transformer second containment basin;
- Gianelli pump/turbine runner replacement feasibility study;
- Devil's Den Pumping Plant trashrack/ traveling screen modification;
- evaluate capacity of cross-drainage structure between Buena Vista and Teerink Pumping Plants;
- evaluate hydrology and capacity of cross-drainage facilities Buena Vista and Teerink Pumping Plants;
- develop pump refurbishing pilot program for Edmonston Pumping Plant;
- Warne Power Plant Penstock cooling water transient study;
- Castaic, Pyramid, and Perris dams—Emergency Release Facilities;
- Castaic Dam and Perris Dam Breach Inundation study;
- Castaic Dam Low Intake Tower Analysis;
- Pearblossom Disposal Area assessment study, Phase II;
- Devil Canyon Second Afterbay Outlet Structure modification;
- Hesperia Master Drainage Plan for Antelope Wash and adjacent area;
- East Branch Enlargement, Phase II study activities;
- East Branch Extension, Phase II—Citrus Reservoir pre-feasibility study; and
- Seismic Safety Retrofit Program—seismic analysis of 24 SWP bridges.

DOE staff completed the following studies and activities:

- Thermalito Afterbay Temperature Control and Palermo Canal Diversion to Feather River Fish Hatchery, as part of the Oroville Facilities Relicensing Program;
- North Bay Aqueduct capacity enlargement reports;
- Delta seismicity study program;
- Clifton Court Forebay and Dam re-evaluation report prepared for O&M;
- Clifton Court Forebay radial gates rehabilitation;

- Skinner Fish Protection Facility—evaluation of wing gate system;
- Gianelli Pumping-Generating Plant runner replacement feasibility study;
- San Luis Dam trashrack access bridge vehicle load study;
- Vista del Lago landslide study; and
- Perris Dam foundation study.

Environmental Activities

Environmental issues have concerned DWR since the inception of the SWP. These issues have increased in magnitude with the enactment of numerous federal and State laws. DWR has complied with these laws by incorporating environmental requirements and conditions into the design and construction phases of projects. A section dealing with environmental requirements and the protection of listed species has become an integral part of contract specifications for construction contracts. Contracts are reviewed to ensure compliance with requirements outlined in environmental permits. In 2005, two contracts required continuing environmental review.

Excavation, Inspection, and Repair–Phase III, Santa Ana Pipeline–State Water Facilities California Aqueduct, Southern Field Division, San Bernardino and Riverside Counties, California

In 2005, the Santa Ana Pipeline, which conveys water from the Devil Canyon Power Plant to Lake Perris via buried pipeline, was repaired at locations known by DWR to contain anomalies. Pipe sections 2034, 327, 590, and 144 required repairs. These repairs were located in San Bernardino and Riverside counties. Without repairs, the Santa Ana Pipeline had the potential to fail, causing potentially catastrophic impacts to human life and property, as well as water outage to millions of people.

Several actions were taken during these repairs to mitigate potential environmental impacts:

The contractor was required to submit an Air Quality Plan, a Water Quality Control Plan, a Fire Prevention and Control Plan, and a Storm Water Pollution Prevention Plan to DWR prior to the Notice to Begin Work.

The contractor and the contractor's employees were required to attend an environmental training meeting, prior to the start of construction, which addressed potential cultural resources and sensitive species that could be found in areas, exclusion zones, and environmental permit conditions relevant to the project.

Sensitive species known or suspected to occur on or very near portions of the project route included one federally listed species and eight non-federal/State listed species. These project areas were environmentally cleared of any sensitive species by qualified biologists prior to the start of construction.

Tehachapi East Afterbay–Completion–Phase II, Antelope Valley–State Water Facilities, California Aqueduct, East Branch, Mojave Division, Kern County, California

This project was located at the newly constructed Tehachapi East Afterbay, north of the Alamo Power Plant. Thousands of cubic yards of material were excavated

in the existing natural drainage channel for construction of the bypass to the Cottonwood Canal Tie-In. The construction activities had the potential to impact several known special status species such as the Coast horned lizard, the Burrowing owl, and the Pallid bat; as well as flora, fauna, and vegetation communities in the area, including the Round-leaved Filaree and Southern Cottonwood Willow riparian forest. Exclusion zones were installed to protect sensitive sites from any contractor activity. In addition, environmental training meetings were conducted on a regular basis by biologists familiar with the biological resources of the area, keeping the contractor's employees and DWR personnel briefed on the biological resources at the work site.

Construction Activities

DOE worked on 43 construction contracts in 2005. Table 12-2 shows contract title, specification number, date the contractor received the Notice to Begin Work, the expected or actual acceptance date (physical completion date is discussed in narratives below), and the actual or estimated contract cost (including change orders for added work). Resolution of contract claims may extend the actual contract closeout beyond the completion or acceptance date.

Oroville Division

Hyatt Power Plant

The refurbishment of turbine Units 1, 3, and 5, which started in February 1999 (Specification No. 98-22), continued throughout the year, with approximately 99 percent of the work completed by the end of 2005. Due to warranty issues, completion of this project is projected for July 2007. The refurbishment of pump-turbine Units 2, 4, and 6, which started in November 2001 (Specification No. 01-11), continued with approximately 40 percent of the work completed by the end of 2005. The estimated completion date is September 2007.

Oroville Operations and Maintenance Center

Work on a contract to replace the roofs at the Oroville Operations and Maintenance Center planner scheduler and mobile equipment buildings, the Feather River Fish Hatchery, and the Beckworth Subcenter (Specification No. 05-09) began in August 2005 and was completed in November 2005. Work included removal of existing roofing, installation of new roofing, removal and replacement or reinstallation of existing equipment, and painting.

Delta Facilities

Temporary Rock Barriers

Work on a multiyear, 2004 through 2006, contract (Specification No. 03-07) to install and remove seasonal temporary rock barriers in designated South Delta waterways (Middle River, Old River, and Grant Line Canal) continued throughout the year with approximately 64 percent of the work completed by the end of December 2005. The temporary barriers were installed to enhance water levels and circulation in the South Delta for local agricultural diversion, to assist fish migration, and to gather hydraulic data for the design of future permanent barriers. Contract change order work included the following:

- constructing two divider walls in the intake channel at Skinner Fish Facility;
- providing South Bay Aqueduct testing and security;

- removing pond weed at Clifton Court Forebay;
- purchasing and installing piles, support beams, and catwalk for the new Water Quality Monitoring Station at Vernalis;
- purchasing equipment for the new Water Quality Monitoring Station at Vernalis;
- removing and replacing flashboards at Montezuma;
- dredging; and
- providing geologic exploration.

North San Joaquin Division

Skinner Fish Facility

Replacement of the trash rake and trashrack systems (Specification No. 04-02) began in March 2004. Although these systems were installed and provisionally operational by November 2004, work added at the request of the Delta Field Division delayed acceptance until September 2005. Contract work included furnishing and installing the trashrack; an automatic monorail traveling trash rake system; and metal catwalks and handrails.

Added work included the following:

- fabricating and installing a cover plate system and manual control system;
- installing additional differential sensors;
- disposing of the existing trashracks and trash rake mechanical system;
- modifying the trash rake hydraulic system; and
- purchasing and delivering spare parts for the automated trash rake system.

South Bay Aqueduct

A contract to repair the pipeline at Milepost 39 (Specification No. 04-07) began in July 2004. This contract was completed in January 2005 and accepted in April 2005.

South Bay Aqueduct Enlargement/ Improvement

The South Bay Aqueduct Enlargement Project will enlarge the South Bay Pumping Plant to accommodate four additional units, construct a third discharge line, construct Dyer Reservoir, enlarge the canal, and modify associated structures.

A contract (Specification No. 04-05) to furnish 45 cfs pump and motor units for Unit Nos. 10 through 13 and one spare pump and motor for the South Bay Pumping Plant began in November 2004 and is expected to be completed in February 2008.

A contract to furnish power transformers (Specification No. 04-19) began in April 2005 and is expected to be completed in April 2008. In December, the contractor was directed to suspend all contract work for an estimated 150 days, due to a pending feasibility study and environmental permits.

Work on a contract to furnish valves, actuators, and hydraulic power units (Specification No. 04-20) that began in May 2005, is in the submittal stage with completion expected in December 2007.

A contract to furnish switchyard equipment (Specification No. 05-10) began in September 2005, and a contract to furnish 5 kV switchgear (Specification No. 05-05) began in October 2005. In December, both the contractors were directed to suspend all contract work for an estimated 150 days due to a pending

feasibility study and environmental permits. Completion of these two contracts is expected in January 2008.

San Luis Division

Gianelli Pumping-Generating Plant and Dos Amigos Pumping Plant

In July 2004, work began on a contract (Specification No. 04-08) to refurbish the existing carbon dioxide (CO_2) fire suppression system for Motor-Generator Unit Nos. 1 through 8 and the Oil Purifier Room at Gianelli, as well as Motor Unit Nos. 1 through 6 and the Oil Purifier Room at Dos Amigos. This project was approximately 96 percent complete by December 2005. The work included removing the existing devices and CO_2 cylinders, inspecting piping and nozzles, providing required welding and coating, furnishing, and installing the following:

- a fire alarm system, including a fire alarm control panel to provide fully integrated automatic and remote monitoring;
- new motor air housing smoke and temperature detectors;
- audible and visual alarms;
- new fully charged CO_2 cylinders;
- LCD annunciators and new manual pull stations; and
- new discharge heads, manual release station, lockout valves with enclosure, relief vents, bleeder valves, equipment nameplates, CO_2 flexible hoses, and router valves.

Contract change orders included replacing and refurbishing fire extinguishers at the San Luis Field Division, installing an escape platform at Dos Amigos, and installing safety platforms at Gianelli.

The approximate completion date is December 2007 due to a one-year CO_2 service maintenance contract.

San Luis Canal. Work on a contract to restore the West Side Detention Basin (Specification No. 04-03) began in August 2004. This contract work was essentially completed by December 2005, except for punch list items. Subsequently, the contractor was directed to fabricate and install a protective cover over the rubber dam, which will delay acceptance until 2007. Work included the following:

- earthwork;
- concrete and steel reinforcement;
- gravel surfacing on the embankment road;
- chip sealing on the operations and maintenance road;
- erosion protection;
- construction of a concrete weir with inflatable rubber dam, control system, and appurtenances; and
- rehabilitation of the existing drain inlets and evacuation culverts.

Contract change order work included the following:

- repairing MP 166R and MP 122R canal embankment;
- sealing and paving roads at Reaches 6 and 7;
- cleaning the toe drain at O'Neill Dam;
- installing gates at San Joaquin Field Division;
- installing gates at Lost Hills; and
- installing a protective cover over the rubber dam.

Tehachapi Division

Tehachapi East Afterbay

The Tehachapi East Afterbay Project is located near the bifurcation of the East and West Branches of the California Aqueduct, in southern Kern County. The project will provide additional storage to the existing Tehachapi Afterbay. The principal features of this project include: an inlet channel, isolation weir, reservoir, flow barrier, spoil embankment, outlet channel, bypass, drainage culvert, control building, improvements to the existing canal, and site work.

The contract to furnish roller gates (Specification No. 04-18) began in February 2005, and it was approximately 80 percent complete in December 2005. Work included furnishing two roller gates with hydraulic actuators and one hydraulic power unit, metalwork, coatings, and electrical work.

The initial afterbay contract (Specification No. 04-17) began in February 2005, and it was 95 percent completed by December 2005. Features include the following:

- drainage culvert facilities, including a reinforced box culvert;
- inlet channel facilities, including a reinforced concrete weir;
- concrete canal lining and a new inlet tie-in to the existing aqueduct;
- a reservoir;
- an outlet channel with a cofferdam;
- a bypass turnout construction area, access road, and drainage culverts; and
- a cofferdam and water level measurement system.

The last phase of the Tehachapi East Afterbay Project began in May 2005, with the afterbay completion contract (Specification No. 05-03). Work included the following:

- constructing bypass facilities;
- constructing the control building;
- furnishing a propane tank;
- constructing a flow barrier in the reservoir;
- constructing an aqueduct plug, which included a rockfill plug, waterproof membrane, and fabric-formed concrete canal lining;
- constructing an outlet channel; and
- removing the cofferdam at the outlet channel.

This completion contract was terminated due to default, and the remaining work was divided into three contracts—Specification Nos. 05-17, 05-16, and 06-14.

Work began on Specification No. 05-17 (Completion Phase IA) in December 2005, with acceptance anticipated in March 2006. This work included constructing the Cottonwood Canal tie-in and installing Cofferdam No. 2.

Work on Specification No. 05-16 (Completion Phase II) is anticipated to begin in January 2006, and it will include the bypass facilities, control building, flow barrier, removal of Cofferdam No. 2, and miscellaneous roadwork.

The scope of work in Specification No. 06-14 (Completion Phase III), which will be awarded later in 2006, includes the outlet channel completion, aqueduct plug, Cofferdam No. 1 removal, and site work.

Edmonston Pumping Plant

A contract to replace pump Units W2, W4, W6, and W8 (Specification No. 02-10) began in June 2003, and continued throughout 2005, with completion scheduled for March 2011. This work consists of the following:

- designing, fabricating, and testing a four-stage pump model and a single-stage pump model; as well as furnishing a pump model test program report;
- designing, manufacturing, delivering, storing, and installing four pumps to replace existing pumps;
- furnishing spare parts, auxiliary equipment, tools, and templates;
- modifying existing pump foundations, if required, for the new pumps;
- applying coatings; and
- providing liaison services.

A contract to furnish spare impellers and diffusers (Specification No. 04-09) was awarded in June 2004, and was approximately 65 percent completed by December 2005. Work consists of the manufacture and delivery of the following:

- two complete sets of pump impellers and two additional impellers;
- one complete set of diffusers;
- two complete sets of stationary and rotating wearing rings;
- one complete set of upper and lower wear plates; and
- one complete set of interstage bushings and templates.

Work on a contract to refurbish the adit for the Edmonston Pumping Plant discharge lines (Specification No. 05-02) began in March 2005. This project was completed in June 2005. The work consisted of the following:

- blasting metal surfaces, concrete footings, and rock surfaces;
- removing and disposing of corroded steel and rockfall;
- installing chain link fabric;
- providing and placing shotcrete and additional rock bolt anchorage;
- providing hazardous waste removal;
- coatings;
- installing an adit entrance gate; and
- replacing ducts, ventilation, and electrical systems.

West Branch

Castaic Dam

A contract to repair the spillway wall (Specification No. 05-12) began in August 2005, and is expected to be completed in January 2006. Work consists of the following:

- removing and replacing five concrete panels;
- removing and reconstructing damaged V-ditches;
- excavating, backfilling, and regrading;
- placing drain rock; and
- replacing topsoil and seeding disturbed areas.

Oso Pumping Plant

Work on a contract to furnish automatic voltage regulators began in May 2000 (Specification No. 00-06). Although this work was originally scheduled for completion in June 2002, a contract change order to furnish and deliver six additional automatic voltage regulators for Pearblossom Pumping Plant extended the completion date. The contract was

accepted in May 2005, after DWR installed the automatic voltage regulators, and the contractor provided erecting engineer services.

Santa Ana Division

Santa Ana Pipeline

A contract to excavate, inspect, and repair pipe sections of the Santa Ana Pipeline (Specification No. 05-14) began in October 2005, and is scheduled for completion in January 2006.

A contract to widen the concrete encasement under State Route 60 (Specification No. 05-15) began in November 2005, and was completed in December 2005, 30 days prior to the original contract completion date.

East Branch Extension

Construction of the East Branch Extension began with the issuance of a Notice to Begin Work on February 26, 1999, for pipeline Reaches 1 and 2. Phase I of this project will convey 8,650 af of SWP water annually to the San Gorgonio Pass Water Agency service area, with provisions to provide San Bernardino deliveries to the Yucaipa Valley. Located in San Bernardino and Riverside counties, the project facilities will consist of existing pipelines, three new pipeline reaches, three new pump stations, and a new reservoir. The official groundbreaking ceremony for site work took place in Yucaipa on August 23, 1999. Below are brief descriptions of the remaining construction contracts.

Pump Stations

Work began in October 1999, on a contract to design, manufacture, test, and deliver 5 kV switchgear for Greenspot and Crafton Hills Pump Stations. This contract includes work that will design, manufacture, test, and deliver programmable logic controllers for the Cherry Valley Pump Station (Specification No. 99-15). Site acceptance testing was completed in June 2004, and the contract was accepted in July 2005, after the contractor submitted final programming and a global database.

In November 1999, work began on a contract to design, manufacture, shop test, and deliver three 4,500-gpm and one 9,000-gpm vertical turbine pumps for Greenspot Pump Station; two 4,500-gpm and one 9,000-gpm vertical turbine pumps for Crafton Hills Pump Station; and two 3,600-gpm vertical turbine pumps for Cherry Valley Pump Station (Specification No. 99-17). The contract calls for electric motors, variable frequency drives, appurtenant equipment, and associated training programs. Completion of this contract was scheduled for December 2003; however, it was extended to 2007 due to a change order for additional pump units for Greenspot and Crafton Hills Pump Stations.

A contract to construct Greenspot, Crafton Hills, and Cherry Valley Pump Stations (Specification No. 99-27) was awarded in May 2000, and it was accepted in July 2005.

An October 2001 contract to furnish and install the control and communications systems for Greenspot, Crafton Hills, and Cherry Valley Pump Stations (Specification No. 01-05) was 99 percent completed by December 2005. Extensive punch list items and training will delay completion and acceptance, which is projected for December 2007.

Valves

Three separate contracts were awarded to furnish East Branch Extension valves. In October 1999, work began on contracts to furnish ANSI ball valves (Specification No. 99-20) and AWWA butterfly valves (Specification No. 99-22). A contract to furnish ANSI butterfly valves began in November 1999 (Specification No. 99-23). Work on the three contracts was 99 percent completed by December 2005. Acceptance will be delayed until corrective work is finished.

Construction Activities in Multiple Divisions

A May 2003 contract to design, manufacture, deliver, and install automatic digital voltage regulators for Banks Pumping Plant and Gianelli Pumping-Generating Plant (Specification No. 02-12) continued, with approximately 95 percent of the work completed by the end of December 2005.

In July 2005, work began on a contract to monitor, test, and repair copper communications cable and voice and data equipment along 440 miles of the California Aqueduct (Specification No. 05-07). Work on this three-year contract consists of the following:

- troubleshooting, repairing, and testing pressurized underground copper cable;
- interfacing copper cable technology to other technologies of radio, microwave, and multiplexers;
- furnishing and installing, or refurbishing and repairing compressor equipment used to pressurize the communications cable; and
- performing biannual electronic work to voice and data equipment.

Completion of this work is scheduled for April 2007.

Work on a contract that fulfills FERC permit requirements for revegetation of disturbed areas at Mojave Siphon Power Plant and Devil Canyon Second Afterbay (Specification No. 99-21) began in November 1999, and was completed in December 2005. Due to the extensive fires in late 2003, erosion control at the areas surrounding Silverwood Lake, Devil Canyon Second Afterbay, and Mojave Siphon Power Plant was added by change order. Other change order work included revegetation at Crafton Hills.

In September 2005, work began on a contract to apply asphalt seal coat and asphalt concrete to paved areas in the Oroville and Southern Field Divisions (Specification No. 05-11). Approximately 66 percent of this contract work was completed by December 2005. Work added by change order included the following:

- repairing storm damage on North Adit Road;
- furnishing and installing a modular office;
- removing the Devil Canyon Creek culvert bridge; and
- furnishing, installing, and repairing an irrigation system at Lake Perris.

A contract to repair pipeline at Pearblossom Pumping Plant and modify the weir at Devil Canyon Power Plant Afterbay (Specification No. 05-13) began in September 2005, and is expected to be completed in February 2006. This work includes the following:

- repairing 315 interior pipe joints in 108-inch inside diameter prestressed

concrete cylinder pipe;
- repairing damaged coating of a 6-foot long steel pipe section;
- removing and disposing of old joint material;
- fabricating a reinforced concrete cap for the existing weir; and
- setting weir segments in place, installing dowels, and placing shotcrete.

In August 2004, work began on a contract to apply asphalt seal coat and asphalt concrete to paved areas in the San Luis and Southern Field Divisions (Specification No. 04-10). Approximately 99 percent of the contract work was completed by December 2005. Work added by change order included the following:

- providing a temporary construction field office and soils and concrete testing laboratory;
- placing rocks along Piru Creek Road, Osito Adit Channel, Devil Canyon Headquarters Road, Smokey Bear Road, and the South Adit Access Road to stop continuing erosion from high storm flows;
- restoring corrosion test stations; and
- installing an anode bed in the vicinity of Pearblossom Pumping Plant.

A contract to furnish spare coils for Warne Power Plant and Devil Canyon Power Plant (Specification No. 01-13) started in October 2001. By the end of 2005, approximately 99 percent of the original contract work was completed. The anticipated change order for a set of stator bars for Warne Unit 2 will delay completion of all contract work until February 2006.

Miscellaneous Construction Activities

The following non-SWP construction activities are categorized as miscellaneous:

A contract with the DWR Bay-Delta Office to install a demonstration aeration facility on Dock 20 at Rough and Ready Island in the Port of Stockton (Specification No. 05-06) began in December 2005. It is scheduled for completion in September 2006. Work includes installing the following equipment:

- two 30-inch diameter steel U-tube casings and two 20-inch diameter U-tubes to a depth 205 feet below ground surface;
- 24-inch steel piping and 30-inch HDPE diffuser piping;
- two vertical turbine pump-motor units;
- four fish screens with two air burst systems; and
- electrical items, including a programmable logic controller, water flow meter, instrumentation, and a distribution panel and meter.

Upper Jones Tract Levee Breach

Due to a breach in the levee at the Upper Jones Tract, the Governor officially declared a State of Emergency on June 4, 2004, for flooding at Upper and Lower Jones Tracts. In response, the following four emergency contracts were awarded in June 2004 and completed in 2005:

Specification No. 04-13 to close a levee breach at Upper Jones Tract. The breach was closed in October 2004, but work continued until May 2005.

Specification No. 04-14 to provide levee protection support activities and other emergency work at Lower Jones Tract. Work was completed in February 2005.

Specification No. 04-15 to provide levee slope protection by placing riprap on the interior levee slopes of Lower Jones Tract. Work was completed in February 2005. Work was also performed at Trapper Slough levee to mitigate potential impacts from dredge spoil fill material.

Specification No. 04-16 to dewater Upper and Lower Jones Tracts. Work began in July 2004 and was completed in December 2004, with acceptance in October 2005. This work consisted of installing, operating, and maintaining two temporary pump stations, 24 hours a day, 7 days a week, until the flood water was pumped to an elevation established by the engineer.

Real Estate Branch Activities

DWR has spent a net total of $251 million to acquire rights of way, recreation, and mitigation land for the SWP from its inception to December 31, 2005. DWR conducted the following real estate activities from January 1 through December 31, 2005:

- Acquired one parcel (665.93 acres in fee and 1.74 acres in permanent easement) for a cost of $885,700 for Suisun Marsh Mitigation, Meins Landing.
- Acquired one parcel (340.6 in fee) for a cost of $220,000, California Aqueduct, East Branch, Tehachapi East Afterbay.
- Renewed 11 leases on SWP properties.
- SWP income produced $448,882.
- Processed 37 Encroachment Permit applications; issued 29.
- Collected fees of $151,642 for review and inspection costs related to Encroachment Permit applications.
- Received six encroachment reviews where applicant had prior property rights; completed five.
- Received five Encroachment Permit amendments; completed five.
- Coordinated review of 20 tentative tract map developments within one mile of the California Aqueduct.
- Completed four appraisals and ten appraisal reviews.

In addition, DWR obtained 59 temporary permits:

- twenty for Calaveras River Fish Passage Study;
- eight for South Bay Aqueduct Improvement and Enlargement, Bethany Reservoir;
- five each for the East Branch Extension Phase II and Santa Ana Pipeline Repair;
- two each for the Calaveras River Migration Barrier Assessment Study and the South Delta Improvement Program; and
- one for each of the following: American River Watershed, Berryessa Creek Landslide Repair, Cache Creek Erosion Damage Repair, CIMIS Weather Station, Delta Peripheral Canal, Former Cruise 'N Tarry Marina, Gauging Station at Orestimbra Creek, Milepost 62.26 to 64.46 Oil Pipeline Relocation, Old River at the Head of San Joaquin River, South Delta Barriers—Old River Project, South Delta Temporary Barriers, Suisun Marsh Monitoring, Montezuma Harbor, Tehachapi East Afterbay, Tejon Ranch Corp., and York Creek Dam.

Table 12-1. Design Activities, January 1, 2005, through December 31, 2005, by Division

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
Oroville Division			
Oroville O&M Center, Feather River Fish Hatchery and Beckworth Subcenter	Roof replacement	April 2004	May 2005
Oroville Recreation Facilities	Brad B. Freeman bike trail realignment	December 2004	September 2005
Delta Field Division			
North Bay Rehabilitation/Seismic Retrofit	NBA rehabilitation/seismic retrofit—pipeline	March 2004	September 2005
Skinner Fish Facility	Trashrake and trashrack replacement	August 2003	April 2005
South Bay Aqueduct Enlargement (subcomponents below)			
South Bay Pumping Plant	Initial plant structure	April 2003	May 2006
	Furnish valves and actuators	July 2003	April 2005
	Furnish power transformers (re-bid)	December 2003	February 2007
	Furnish switchyard equipment	December 2003	July 2005
	Furnish switchgear	December 2003	August 2005
	Furnish and install SCADA equipment	February 2004	June 2007
	Completion contract	January 2005	June 2007
Discharge Line and Pipelines	Plant discharge line and Brushy Creek Pipeline No. 3	May 2003	October 2006
Surge Tank No. 3	New surge tank	July 2004	July 2007
Canal	Canal modification	July 2003	July 2007
Dyer Reservoir	New 425 af reservoir	September 2003	June 2007
San Joaquin Field Division			
Lost Hills Domestic and Fire Water Supply	Domestic and fire water supply	September 2004	September 2007
Tehachapi Division			
Edmonston Pumping Plant	Adit refurbishment	August 2004	March 2005
Tehachapi East Afterbay	Completion contract[a]	June 2004	February 2005
	Completion Phase IA contract	December 2005	December 2005
	Completion Phase II contract	December 2005	January 2006
Mojave Division			
Pearblossom Pumping Plant	Repair 315 interior pipe joints in 108 inch diameter PCCP—Discharge No. 1	June 2005	August 2005
Santa Ana Division			
Devil Canyon Power Plant	Weir modifications	June 2005	July 2005
Santa Ana Valley Pipeline	Repair of sections with broken wires	May 2005	October 2005
	Concrete encasement of sections under Hwy. 60 expansion	June 2005	October 2005
West Branch			
Castaic Dam	Remove and replace damaged spillway wall	March 2005	June 2005
Multiple Divisions			
Oso Pumping Plant and Cedar Springs Dam Maintenance Station	Civil maintenance and mobile equipment buildings	May 2005	March 2007
Delta and San Luis Field Divisions	Roof replacement and recoating at Banks PP, Dos Amigos PP, and Coalinga O&M subcenter structures	April 2005	January 2006
Miscellaneous			
Yolo Bypass and Fremont Weir	Floodway sediment removal	November 2004	March 2005
Stockton Deep Water Channel	Demonstration aeration facility	December 2004	September 2005
Permanent South Delta Control	Old River control structure	September 2003	December 2005
	Old River flow control structure	September 2003	December 2005
	Grant Line Canal flow control structure	September 2003	December 2005
	Middle River flow control structure	September 2003	December 2005

[a]Contract terminated.

Table 12-2. Construction Activities, January 1, 2005, through December 31, 2005, by Division

Construction Division and Facility	Construction Contract (Specification Number)	Starting Date (NTBW[a])	Acceptance Date (Expected or Actual)	Contract Costs (In Thousands of Dollars)
Oroville Division				
Hyatt Power Plant	Refurbish turbine Units 1, 3, and 5 (98-22)	February 1999	September 2007	10,825
	Refurbish pump-turbine Units 2, 4, and 6 (01-11)	November 2001	November 2007	14,966
Oroville Operations and Maintenance Center	Replace roof (05-09)	August 2005	June 2006	602
Delta Facilities				
Temporary Rock Barriers	Construct temporary rock barriers: Middle River, Old River, and Grant Line Canal (03-07)	November 2003	April 2007	17,378
North San Joaquin Division				
Skinner Fish Facility	Replace trashrack and trashrake systems (04-02)	March 2004	September 2005	1,643
South Bay Aqueduct				
	Repair pipeline, Milepost 39 (04-07)	July 2004	April 2005	2,176
South Bay Aqueduct Enlargement	Furnish 45 cfs pump and motor units (04-05)	November 2004	April 2008	7,150
	Furnish power transformers (04-19)	April 2005	June 2008	1,287
	Furnish valves, actuators, and hydraulic power units (04-20)	May 2005	February 2008	2,178
	Furnish switchyard equipment (05-10)	September 2005	March 2008	847
	Furnish 5 kV switchgear (05-05)	October 2005	March 2008	2,971
San Luis Division				
Gianelli Pumping-Generating Plant and Dos Amigos Pumping Plant	Refurbish CO_2 system (04-08)	July 2004	February 2008	1,176
San Luis Canal	Restore West Side Detention Basin (04-03)	August 2004	April 2007	7,162
Tehachapi Division				
Tehachapi East Afterbay	Furnish roller gates (04-18)	February 2005	April 2006	640
	Construct afterbay, initial (04-17)	February 2005	April 2006	20,626
	Complete afterbay (05-03)	May 2005	terminated	4,639
	Complete afterbay phase IA (05-17)	December 2005	March 2006	2,179
Edmonston Pumping Plant	Replace pumps (02-10)	June 2003	May 2011	32,900
	Furnish spare impellers and diffusers (04-09)	July 2004	June 2007	3,900
	Refurbish adit and discharge lines (05-02)	March 2005	August 2005	1,216
West Branch				
Castaic Dam	Repair spillway wall (05-12)	August 2005	February 2006	432
Oso Pumping Plant	Furnish automatic voltage regulators (00-06)	May 2000	May 2005	1,177
Santa Ana Division				
Santa Ana Pipeline	Excavate, inspect, and repair pipeline (05-14)	October 2005	January 2006	3,264
	Widen concrete encasement under State Route 60 (05-15)	November 2005	March 2006	1,183
East Branch Extension				
Pump Stations				
Greenspot, Crafton Hills, and Cherry Valley	Furnish 5kV switchgear, Greenspot and Crafton Hills Pump Stations, and furnish PLC cubicle, Cherry Valley Pump Station (99-15)	October 1999	July 2005	641
	Furnish pumps, motors, and variable frequency drives (99-17)	November 1999	August 2007	4,748
	Construct pump stations (99-27)	June 2000	July 2005	24,300
	Furnish and install supervisory control and communications systems (01-05)	October 2001	December 2007	5,500

Table 12-2. Construction Activities, January 1, 2005, through December 31, 2005, by Division

Construction Division and Facility	Construction Contract (Specification Number)	Starting Date (NTBW[a])	Acceptance Date (Expected or Actual)	Contract Costs (In Thousands of Dollars)
Valve Facilities				
Carter Street and Morton Canyon	Furnish ANSI ball valves (99-20)	October 1999	August 2007	1,145
	Furnish AWWA butterfly valves (99-22)	October 1999	August 2007	862
	Furnish ANSI butterfly valves (99-23)	November 1999	August 2007	1,417
Multiple Divisions				
Banks Pumping Plant and Gianelli Pumping-Generating Plant	Design, manufacture, deliver and install digital voltage regulators (02-12)	May 2003	June 2007	2,284
California Aqueduct	Monitor, test and repair copper communications equipment (05-07)	July 2005	June 2008	1,804
Mojave Siphon Power Plant and Devil Canyon Second Afterbay	Revegetation (99-21)	November 1999	February 2006	761
Oroville and Southern Field Divisions	Seal and pave roads 2005 (05-11)	September 2005	June 2007	2,318
Pearblossom Pumping Plant and Devil Canyon Powerplant Afterbay	Repair discharge line and modify weir (05-13)	September 2005	February 2006	1,443
San Luis and Southern Field Divisions	Seal and pave roads (04-10)	August 2004	June 2005	6,109
Warne and Devil Canyon Power Plants	Furnish spare coils and materials (01-13)	October 2001	May 2006	2,009
Miscellaneous Activities				
Rough and Ready Island Dock 20	Install demonstration aeration facility, Port of Stockton (05-06)	December 2005	November 2006	3,541
Upper and Lower Jones Tracts	Close levee breach at Upper Jones Tract (04-13)	June 2004	July 2005	10,947
	Support levee protection activities at Lower Jones Tract (04-14)	June 2004	April 2005	509
	Protect levee slope at Lower Jones Tract (04-15)	June 2004	April 2005	1,543
	Dewater Upper and Lower Jones Tract (14-16)	July 2004	October 2005	4,803

[a]Notice to Begin Work.

Chapter 13
Recreation

With its many reservoirs and hundreds of miles of aqueducts, the State Water Project offers a variety of recreational activities.

Significant Events in 2005

The Department of Fish and Game (DFG) continued its fish-planting activities at 10 of the 12 SWP facilities. Total plantings of trout was 522.3 thousand compared to the 531.6 thousand planted in 2004.

SWP facilities recorded 4.79 million recreation days of use a 12 percent increase from the 4.27 million recreation days recorded in 2004.

At Lake Oroville, the North Forebay Aquatic Center was completed and opened in July.

Information for this chapter was provided by the Division of Planning and Local Assistance, Central District, Public Affairs Office, and the State Water Project Analysis Office.

The State Water Project (SWP) is a multipurpose project that benefits millions of Californians. In addition to providing water supply, flood control, and habitat for fish and wildlife, the State Water Project offers extensive and varied recreational opportunities—tours, sightseeing, fishing, hunting, camping, boating, water skiing, bicycling, and swimming. These recreational opportunities, as well as fish and wildlife enhancement, are financed by appropriations from several legislative provisions and other funding sources.

Recreation Areas

The SWP has 37 developed recreation areas, or sites, throughout California, including 18 developed fishing access sites. Figure 13-1 shows the names and locations of each area.

Recreation Days

In 2005, SWP facilities recorded 4.79 million recreation days of use (Table 13-1), a 12 percent increase from the 4.27 million recreation days recorded in 2004. Recreational use at the fishing access sites and along the California Aqueduct Bikeway nearly equaled that of 2004. A recreation day is defined as one individual user visiting a recreation site along the SWP during a 1-day period.

Most SWP recreation use is concentrated at the major reservoirs with 41 percent occurring at the Lakes in Oroville Field Division and an equal 41 percent of the total SWP recreational use in 2005 occurring at the four major reservoirs in Southern California: Pyramid Lake, Castaic Lake, Silverwood Lake, and Lake Perris. Since the SWP began delivering water in 1962, more than 185 million recreation days have been recorded at SWP recreational facilities. In addition to the recreation use, visitation totaled 211,00 at the three following DWR visitors centers:

- Kelly Ridge, Lake Oroville, 87,100
- Romero Overlook, San Luis Reservoir, 112,100
- Vista Del Lago, Pyramid Lake, 11,800 (Usage recorded from January 1 through February 22. Facility closed February 23, 2005 through October 31, 2006 due to rain caused landslides.)

Facilities

Planning

During 2005, the Department of Boating and Waterways began plans for the following projects:

- Lake Davis: Honker Cove Ramp Extension.
- Lake Oroville: Boat launching facility at Feather River Outlet Wilbur Road Boat launching facility.
- Lake Perris: Alessudro Island rehabilitation.

1. Antelope Lake Recreation Area
2. Frenchman Lake Recreation Area
3. Lake Davis Recreation Area
4. Lake Oroville State Recreation Area
5. White Slough Wildlife Area
6. Bethany Reservoir
7. Lake del Valle State Recreation Area
8. Bikeway from Bethany Reservoir to O'Neill Forebay (70 miles)
9. Grant Line Road Fishing Access Site
10. Niels Hansen Fishing Access Site
11. Orestimba Fishing Access Site
12. Access Walk-in Fishing (63 miles)
13. Cottonwood Road Fishing Access Site
14. San Luis Reservoir State Recreation Area
15. Los Banos Reservoir
16. Canyon Road Fishing Access Site
17. Mervel Avenue Fishing Access Site
18. Fairfax Fishing Access Site
19. Access to Walk-in Fishing (208 miles accessible along the aqueduct)
20. Three Rocks Fishing Access Site
21. Huron Fishing Access Site
22. Avenal Cutoff Fishing Access Site
23. Kettleman City Fishing Access Site
24. Lost Hills Fishing Access Site
25. Buttonwillow Fishing Access Site
26. Pyramid Lake State Recreation Area
27. Castaic Lake State Recreation Area
28. Munz Ranch Road Fishing Access Site
29. Bikeway from Quail Lake to Silverwood Lake (107 miles, not all accessible)
30. 70th Street West Fishing Access Site
31. Access Walk-in Fishing (83 miles)
32. Avenue S Fishing Access Site
33. 77th Street East Fishing Access Site
34. Longview Road Fishing Access Site
35. Silverwood Lake State Recreation Area
36. Lake Perris State Recreation Area
37. San Jacinto Wildlife Area

Figure 13-1. Names and Locations of SWP Recreation Areas

Table 13-1. Recreation-Days Recorded in 2005, by Field Division and Facility

Field Division and Facility	Number of Recreation Days
Oroville Field Division	
Frenchman Lake	240,000
Antelope Lake	70,000
Lake Davis	138,000
Lake Oroville and Thermalito Forebays	1,072,000
Thermalito Afterbay and Oroville Wildlife Area	353,500
Lake Oroville Visitor Center	88,500
Subtotal	*1,962,000*
Delta Field Division	
Lake Del Valle	268,100
Bethany Reservoir	28,000
Fishing Access Sites:	
Neils Hansen	100
California Aqueduct:	
Walk-in fishing	600
Bikeway	100
White Slough Wildlife Area	12,000
Subtotal	*308,800*
San Luis Field Division	
San Luis Reservoir SRA, includes San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir	532,000
California Aqueduct:	
Walk-in fishing	12,000
Wildlife Areas	11,000
Subtotal	*555,000*
San Joaquin Field Division	
Fishing Access Sites:	
Kettleman City	1,000
Lost Hills	1,000
Buttonwillow	1,000
California Aqueduct:	
Walk-in fishing	9,500
Subtotal	*12,500*
Southern Field Division	
Silverwood Lake	245,700
Lake Perris	1, 020,700
Pyramid Lake	100,000
Castaic Lake	581,000
Fishing Access Sites:	
Quail Lake	1,300
77th Street East	400
Longview Road	100
California Aqueduct:	
Walk-In fishing	2,500
Bikeway	400
Subtotal	*1,952,100*
Total	**4,790,300**

New Facilities

Lake Oroville

The North Forebay Aquatic Center was completed and opened in July 2005. Bidwell Canyon restroom facility was completed.

Silverwood Lake

Vault toilets at Boat-in Sites Sycamore, Chamise and Live Oak.

Lake Perris

New restroom facilities at ramps 6 and 7.

Lake Del Valle

A new recycling project was initiated by installing six recycling bins on concrete pads. New trail marker discs were installed on major trails. A new check valve, clear well, chlorine generation system, and SCADA system was installed and operating at water treatment plant.

Improvements to Facilities

Improvements were made at the following facilities:

Lake Del Valle

Water faucets were replaced with new metal ones. A second metering pump and a second chlorine analyzer were installed at the water treatment plant. Two group picnic area BBQ pits were replaced with upgraded concrete ones. Major culvert on Deer Jaw Trail was replaced.

Silverwood Lake

Boat-in site renovation project was bid and awarded with construction scheduled for completion in 2005.

Pyramid Lake

Emigrant Landing eroded slopes were repaired. Emergency repairs of docks at boat-in sites were completed.

Oroville Recreation Plan

The Federal Energy Regulatory Commission (FERC) Order 2100-052, issued on October 1, 1992, required DWR to prepare a revised recreation plan for Lake Oroville, replacing the original *Oroville Reservoir, Thermalito Forebay, and Thermalito Afterbay: Water Resources Recreation Report* (Bulletin 117-06). Another plan, FERC Order 2100-054, submitted June 1, 1993, and approved September 22, 1994, included additional recreation facilities and addressed concerns raised by local residents regarding recreation and fishery-related issues.

In 1995, the Lake Oroville Recreation Advisory Committee was established. This committee, comprised of local government, citizens' groups, and State agencies, was formed to advise DWR on recreation plan implementation, which included the following projects:

- ten floating campsites constructed and moored at various locations on the lake;
- an en route RV camping area added at the North Thermalito Forebay area;
- construction completed on a duck brood pond and restroom and picnic facilities at Thermalito Afterbay;
- buoys deployed around the water-ski slalom course;
- construction completed on the 41-mile bike trail main loop;
- construction completed on the Lime Saddle Boat Ramp improvements, an equestrian campground at Loafer Creek Recreation Area, and lighting on Oroville Dam; and
- fishery and fishing improvements completed, including development of a fish management and stocking plan, stocking Chinook salmon, and development of fish shelters.

Most recreation and fish facilities have been completed; however, certain elements of the plan may require time extensions to complete.

Fish Plantings

In 2005, the Department of Fish and Game continued its fish-planting activities at 10 of the 12 SWP facilities. Total plantings of trout was 522.3 thousand compared to the 531.6 thousand planted in 2004 (see Table 13–2).

Recreation Financing

Previously, DWR reported capital costs allocated to fish and wildlife enhancement and recreation in Appendix D to Bulletin 132, *Costs of Recreation and Fish and Wildlife Enhancement*. This report is no longer mandated by the Legislature, and these capital costs, starting with fiscal year 2000-2001, are reported in this bulletin.

The financing of recreation and fish and wildlife enhancement in connection with the SWP was provided for by the Davis-Dolwig Act, Assembly Bill 12, and the Environmental Water Act, Assembly Bills 1441 and 1442. The Davis-Dolwig Act declared the Legislature's intent to provide DWR with General Fund appropriations for SWP fish and wildlife enhancement

Table 13-2. Fish Planted in 2005 (Thousands)

Location and Size	Eagle Lake Trout	Brook Trout	Rainbow Trout	Brown Trout	Coho Salmon	Total
Antelope Lake		Yearling	Yearling			
Adv. Fingerlings	25.1	6.0	10.7			41.8
Lake Davis						
Catchables	47.2					47.2
Frenchman Reservoir						
Adv. Fingerlings	143.1					
Catchables	54.1					197.2
Lake Oroville						
Fingerlings	---	---	No Fish Planted		---	---
Thermalito Forebay						
Catchables			17.9			17.9
Lake Del Valle						
Catchables	---	---	No Fish Planted		---	---
Los Banos Reservoir						
Catchables	2.0		7.2			9.2
Pyramid Lake						
Catchables	1.8		26.1			27.9
Castaic Lake						
Catchables			57.2			57.2
Castaic Lagoon						
Catchables			38.8			38.8
Silverwood Lake						
Catchables			33.0			33.0
Lake Perris						
Catchables	3.4		48.7			52.1
Lake Skinner [a]						
Catchables	---	---	No Fish Planted		---	---
California Aqueduct	---	---	No Fish Planted		---	---
TOTAL	**276.7**	**6.0**	**239.6**			**522.3**

[a] Included in the SWP fish planting program, but not an SWP facility.

and recreation. For fiscal years 1983-1984 through 2004-2005, no funds were appropriated for these purposes.

AB 12 provided for a $5 million annual appropriation from tideland oil and gas revenues to be used for recreation, enhancement of fish and wildlife, and purchases of land for recreational uses. DWR received $90 million from these revenues; there have been no appropriations since 1985.

Legislation enacted in 1989 (AB 1441 and AB 1442) offset a portion of the amount owed by the State for fish and wildlife enhancement and recreational costs against the amount the SWP owed to the California Water Fund (see Chapter 14, *Financial Analysis,* for more details).

Capital Cost Allocations

Table 13-3 shows capital costs allocated to fish and wildlife enhancement and recreation and overall costs of lands acquired for recreation development through 2005. Costs have increased by $814,225 since last reported. These costs are budgeted by DWR from funds available for financing project construction costs. Recreation and enhancement costs not reported in this table are budgeted by several State departments and are financed by appropriations from a variety of funds.

Accrued Interest Charges

Table 13-4 details accrued interest charges included in the costs shown in Table 13-3, and reimbursements through December 2005. These interest accruals are calculated through December 31, 2005, on the portion of annual disbursements financed by the California Water Resources Development Bond Fund, and based on the weighted average interest costs of Burns-Porter and Water System Revenue bonds sold to date. The reimbursements were included in DWR's budget as appropriations from the General Fund and are used by DWR to pay for operations, maintenance, power, and replacement costs associated with operating the SWP for fish and wildlife enhancement and recreation.

For a more detailed discussion of these legislative provisions, and DWR's procedures for reporting and tabulating recreation and enhancement costs, please see the last Appendix D (to Bulletins 132-98, 132-99, 132-00, and 132-01). This report can be found on the Web at http://www.swpao.water.ca.gov/publications/index.cfm.

Table 13-3. Recreation and Enhancement Costs of the State Water Project

Facility	1952-2004 Updated	2005	Subtotal	Interest	Total	B132-05 Costs	Increase/ Decrease
	Joint Costs Allocated to Recreation and Enhancement						
Frenchman Dam and Lake (78.5%)							
California Water Resources Development Bond Fund	102,997	0	102,997	2,097	105,094	105,094	0
All Other Funds	2,839,227	(16,485)	2,822,742	0	2,822,742	2,736,262	86,480
Antelope Dam and Lake (100%)							
California Water Resources Development Bond Fund	1,033,261	0	1,033,261	113,788	1,147,049	1,147,049	0
All Other Funds	4,625,735	0	4,625,735	0	4,625,735	4,413,790	211,945
Grizzly Valley Dam and Lake Davis (99.0%)							
California Water Resources Development Bond Fund	4,003,092	0	4,003,092	486,754	4,489,846	4,489,846	0
All Other Funds	2,602,805	0	2,602,805	0	2,602,805	2,602,436	369
San Luis Dam and Reservoir , O'Neill Forebay and Los Banos Reservoir (3.4%)							
California Water Resources Development Bond Fund	988,910	0	988,910	169,085	1,157,995	1,157,995	0
All Other Funds	3,502,492	536	3,503,028	0	3,503,028	3,501,256	1,772
California Aqueduct Delta to Dos Amigos P.P. (3.4%)							
California Water Resources Development Bond Fund	4,467,667	0	4,467,667	897,406	5,365,073	5,365,073	0
All Other Funds	4,549,626	16,074	4,565,700	0	4,565,700	4,546,926	18,774
Oroville Division (2.9%)							
California Water Resources Development Bond Fund	5,725,216	0	5,725,216	1,790,491	7,515,707	7,515,707	0
All Other Funds	4,823,279	3,096	4,826,375	0	4,826,375	4,822,640	3,735
Del Valle Dam and Lake Del Valle (48.0%)							
California Water Resources Development Bond Fund	10,546,762	0	10,546,762	6,813,560	17,360,322	17,360,322	0
All Other Funds	4,184,406	(2,716)	4,181,690	0	4,181,690	4,184,520	(2,830)
California Aqueduct Dos Amigos P.P. to Termini (5.7%)							
California Water Resources Development Bond Fund	48,382,162	0	48,382,162	75,353,773	123,735,935	123,735,935	0
All Other Funds	58,996,454	492,208	59,488,662	0	59,488,662	58,994,736	493,926
Subtotal	*161,374,091*	*492,713*	*161,866,804*	*85,626,954*	*247,493,758*	*246,679,587*	*814,171*
	Specific Costs of Acquiring Land for Recreation Development						
Frenchman Dam and Lake							
California Water Resources Development Bond Fund	3,379	0	3,379	160	3,539	3,539	0
All Other Funds	49,947	0	49,947	0	49,947	49,947	0
Grizzly Valley Dam and Lake Davis							
California Water Resources Development Bond Fund	204,475	0	204,475	17,573	222,048	222,048	0
All Other Funds	554,260	0	554,260	0	554,260	554,260	0
Abbey Bridge Dam and Reservoir							
California Water Resources Development Bond Fund	9	0	9	0	9	9	0
All Other Funds	9,921	0	9,921	0	9,921	9,921	0
San Luis Dam and Reservoir, O'Neill Forebay and Los Banos Reservoir							
California Water Resources Development Bond Fund	395,284	0	395,284	33,467	428,751	428,751	0
All Other Funds	415,610	0	415,610	0	415,610	415,610	0
California Aqueduct Delta to Dos Amigos P.P.							
California Water Resources Development Bond Fund	461,086	0	461,086	158,456	619,542	619,542	0
All Other Funds	(137,494)	0	(137,494)	0	(137,494)	(137,494)	0
Oroville Division							
California Water Resources Development Bond Fund	7,809,509	0	7,809,509	3,673,041	11,482,550	11,482,550	0
All Other Funds	3,100,347	0	3,100,347	0	3,100,347	3,100,347	0
Del Valle Dam and Lake Del Valle							
California Water Resources Development Bond Fund	519,425	0	519,425	448,292	967,717	967,717	0
All Other Funds	(32,200)	0	(32,200)	0	(32,200)	(32,200)	0
California Aqueduct Dos Amigos P.P. to Termini							
California Water Resources Development Bond Fund	478,971	0	478,971	915,217	1,394,188	1,394,188	0
All Other Funds	398,349	0	398,349	0	398,349	398,349	0
Castaic Dam and Lake							
California Water Resources Development Bond Fund	1,954,297	0	1,954,297	3,856,203	5,810,500	5,810,500	0
All Other Funds	952,352	0	952,352	0	952,352	952,325	27
Cedar Springs Dam and Silverwood Lake							
California Water Resources Development Bond Fund	424,966	0	424,966	817,173	1,242,139	1,242,139	0
All Other Funds	370,164	0	370,164	0	370,164	370,137	27
Perris Dam and Lake Perris							
California Water Resources Development Bond Fund	1,022,313	0	1,022,313	2,033,799	3,056,112	3,056,112	0
All Other Funds	4,939,979	0	4,939,979	0	4,939,979	4,939,979	0
Subtotal	*23,894,949*	*0*	*23,894,949*	*11,953,381*	*35,848,330*	*35,848,276*	*54*
Total Recreation and Enhancement Costs							
California Water Resources Development Bond Fund	88,523,781	0	88,523,781	97,580,335	186,104,116	186,104,116	0
All Other Funds	96,745,259	492,713	97,237,972	0	97,237,972	96,423,747	814,225
Total	**185,269,040**	**492,713**	**185,761,753**	**97,580,335**	**283,342,088**	**282,527,863**	**814,225**

Table 13-4. Calculation of Interest Accruals on California Water Resources Development Bond Fund Disbursements (in dollars at 4.608% per annum)

	1952-2004					2005					2006 Beginning of Year Balance to be Reimbursed				
	Disbursements		Reimbursements			Disbursements		Reimbursements			Disbursements		Reimbursements		
Facility	WRD Bond Funds	All Other Funds	WRD Bond Funds	All Other Funds	**Interest Accrual**	WRD Bond Funds	All Other Funds	WRD Bond Funds	All Other Funds	**Interest Accrual**	WRD Bond Funds	All Other Funds	WRD Bond Funds	All Other Funds	**Interest Accrual**
	t					**Joint Costs Allocated to Recreation and Enhancement**									
Frenchman Dam and Lake	102,997	2,839,227	104,900	2,719,468	2,097	0	(16,485)	0	0	0	102,997	2,822,742	104,900	2,719,468	2,097
Antelope Dam and Lake	1,033,261	4,625,735	1,140,322	4,478,932	113,788	0	0	0	0	0	1,033,261	4,625,735	1,140,322	4,478,932	113,788
Grizzly Valley Dam and Lake Davis	4,003,092	2,602,805	4,444,594	2,568,667	486,754	0	0	0	0	0	4,003,092	2,602,805	4,444,594	2,568,667	486,754
Sisk Dam, San Luis Res., O'Neill Forebay, & Los Banos Reservoir	988,910	3,502,492	1,938,244	2,725,578	169,085	0	536	0	0	0	988,910	3,503,028	1,938,244	2,725,578	169,085
California Aqueduct Delta to Dos Amigos P.P.	4,467,667	4,549,626	5,267,351	4,092,435	897,406	0	16,074	0	0	0	4,467,667	4,565,700	5,267,351	4,092,435	897,406
Oroville Division	5,725,216	4,823,279	7,324,529	4,570,269	1,790,491	0	3,096	0	0	0	5,725,216	4,826,375	7,324,529	4,570,269	1,790,491
Del Valle Dam and Lake Del Valle	10,546,762	4,184,406	16,463,934	3,130,016	6,813,560	0	(2,716)	0	0	0	10,546,762	4,181,690	16,463,934	3,130,016	6,813,560
California Aqueduct Dos Amigos P.P. to Termini	48,382,162	58,996,454	113,035,518	49,410,851	75,353,773	0	492,208	0	0	0	48,382,162	59,488,662	113,035,518	49,410,851	75,353,773
Subtotal	*75,250,067*	*86,124,024*	*149,719,392*	*73,696,216*	*85,626,954*	*0*	*492,713*	*0*	*0*	*0*	*75,250,067*	*86,616,737*	*149,719,392*	*73,696,216*	*85,626,954*
						Specific Costs of Acquiring Land for Recreation Development									
Frenchman Dam and Lake	3,379	49,947	3,520	49,947	160	0	0	0	0	0	3,379	49,947	3,520	49,947	160
Grizzly Valley Dam and Lake Davis	204,475	554,260	220,423	554,244	17,573	0	0	0	0	0	204,475	554,260	220,423	554,244	17,573
Abbey Bridge Dam and Reservoir	9	9,921	9	9,921	0	0	0	0	0	0	9	9,921	9	9,921	0
Sisk Dam, San Luis Res., O'Neill Forebay, & Los Banos Reservoir	395,284	415,610	425,700	415,610	33,467	0	0	0	0	0	395,284	415,610	425,700	415,610	33,467
California Aqueduct Delta to Dos Amigos P.P.	461,086	(137,494)	603,887	(137,494)	158,456	0	0	0	0	0	461,086	(137,494)	603,887	(137,494)	158,456
Oroville Division	7,809,509	3,100,347	11,028,039	649,733	3,673,041	0	0	0	0	0	7,809,509	3,100,347	11,028,039	649,733	3,673,041
Del Valle Dam and Lake Del Valle	519,425	(32,200)	917,078	(32,200)	448,292	0	0	0	0	0	519,425	(32,200)	917,078	(32,200)	448,292
California Aqueduct Dos Amigos P.P. to Termini	478,971	398,349	1,271,912	398,349	915,217	0	0	0	0	0	478,971	398,349	1,271,912	398,349	915,217
Castaic Dam and Lake	1,954,297	952,352	5,291,258	951,070	3,856,203	0	0	0	0	0	1,954,297	952,352	5,291,258	951,070	3,856,203
Cedar Springs Dam and Silverwood Lake	424,966	370,164	1,132,207	370,137	817,173	0	0	0	0	0	424,966	370,164	1,132,207	370,137	817,173
Perris Dam and Lake Perris	1,022,313	4,939,979	2,780,487	4,867,247	2,033,799	0	0	0	0	0	1,022,313	4,939,979	2,780,487	4,867,247	2,033,799
Subtotal	*13,273,714*	*10,621,235*	*23,674,520*	*8,096,564*	*11,953,381*	*0*	*0*	*0*	*0*	*0*	*13,273,714*	*10,621,235*	*23,674,520*	*8,096,564*	*11,953,381*
Total	**88,523,781**	**96,745,259**	**173,393,912**	**81,792,780**	**97,580,335**	**0**	**492,713**	**0**	**0**	**0**	**88,523,781**	**97,237,972**	**173,393,912**	**81,792,780**	**97,580,335**

Chapter 14
Financial Analysis

The California Aqueduct delivers water for irrigation and urban use, benefiting more than 24 million Californians.

Significant Events in 2005

On July 7, the Department of Water Resources issued $112.390 million of Water System Revenue bonds, Series AD. The proceeds were pre-sold on June 14 to refinance $104.750 million of previously issued bonds, finance long-term construction expenditures, and pay bond financing costs.

Information for this chapter was provided by the State Water Project Analysis Office in conjunction with the Division of Fiscal Services.

This chapter presents both a summary and a detailed explanation of State Water Project (SWP) current financial analysis, capital costs and requirements, revenues and expenses, and bond activities for years 2006 through 2020.

The Department of Water Resources (DWR) performs financial analysis annually to ensure that the SWP financing program will have sufficient funds to meet construction obligations; project operation, maintenance, power, and replacement costs; and debt service payments for bonds expended for construction. The results of the current financial analysis, dated December 31, 2005, are presented in Tables 14-1 and 14-2 located at the end of this chapter.

Future contingencies may change the financial analysis, some of which include:

- alterations in schedules of currently planned construction for future facilities;
- changes in economic conditions, including changes in interest rates and in SWP contractor Table A amounts due to changes in amounts of water needed, conserved, or reclaimed;
- completion of Delta transfer facilities;
- development of additional sources of water not foreseen at this time;
- deviations from the assumptions regarding actual rates of price escalations for future construction from those currently assumed for cost estimates;
- increases in capital costs related to additional conservation facilities; and
- outcome of lawsuits now pending before the courts.

Capital Requirements and Financing

In conducting the current analysis, DWR projected that future construction costs through the year 2020 plus reimbursement of $65 million interim financing for prior expenditures will total $1.12 billion. Special capital requirements for revenue bond financing of these construction costs are projected at $124 million for a total capital requirement of $1.31 billion. This projection includes construction and financing costs for the following significant SWP facilities planned for completion by 2020:

- Interim South Delta facilities;
- extension of the East Branch of the California Aqueduct;
- Phase II enlargement of the East Branch;
- enlargement of the South Bay Aqueduct; and
- a new intake at Clifton Court Forebay.

Most of these capital requirements will be financed from the projected sale of $1.24 billion of revenue bonds. The remaining $67 million will be financed from capital resources revenues and the transfer of excess revenues not needed for operation costs or debt service.

The analysis of capital requirements and financing presented in Table 14-1

does not include the costs and financing of all facilities needed to develop the remaining yield necessary to meet the total 4.2 million af contractual commitment to long-term SWP water contractors. Table 14-1 also does not include the costs of associated work essential for realizing full benefits from the SWP, but financed and constructed by local interests or State agencies other than DWR. Those facilities include on-shore recreational developments at SWP facilities and local distribution facilities.

The allocation of capital expenditures for various SWP purposes is detailed in Table 14-3.

Capital Requirements

Lines 1 through 20 in Table 14-1 show actual and projected SWP capital requirements through 2020. Estimates of future capital expenditures include allowances for construction cost escalation of 3 percent per year from 2006 through 2020. Right-of-way costs are escalated at 4 percent per year from 2006 through 2020. Capital expenditures for the SWP also include requirements other than those for construction, such as disbursements made as part of the Davis-Grunsky Act Program (Line 16) and special capital requirements under revenue bond financing (Line 17). DWR will decide whether to construct facilities only after examining alternatives and completing environmental documentation and other review processes.

Line 1, Initial Project Facilities, includes only those facilities completed before 1974 (see Bulletin 132-74, Chapter 2). Additional costs after 1973, and estimated costs of remaining work on the initial SWP facilities, are not included.

Line 2, North Bay Aqueduct, consists of the estimated costs for improvements and the historical costs for Phase II. Phase II, which became operational in May 1988, connected with the Phase I facilities, which were completed in 1968 (Phase I costs are included in the initial project facilities discussed in Line 1). Phase II included costs for pipelines, pumping plants, and a small reservoir necessary to divert water from the western Delta to Napa and Solano counties for urban use. The improvements consist of replacing the existing tank with two five million gallon tanks. Construction is anticipated to begin in 2007 and to be completed in May 2009.

Line 3, Delta and Suisun Marsh Facilities, shows historical costs in Column 1 that include planning for general Delta facilities and the previously planned peripheral canal and overland water delivery facilities for the western Delta. Also included are historical planning costs for Suisun Marsh as well as construction costs for the Suisun Marsh Salinity Control Gates and an access road. The projected amounts include projected planning costs plus projected costs for constructing four permanent barriers in the Delta.

Line 4, Final Four Units at Banks Pumping Plant, includes costs of the final four 1,067-cfs units, which became operational in spring 1992.

Line 5, Coastal Branch Aqueduct, includes all costs for the planning, design, and construction of Phase II of the Coastal Branch of the California Aqueduct. Phase II construction began in October 1993 and

Table 14-3. Allocation of Capital Expenditures (Thousands of Dollars)

Facilities and Construction Divisions	Expenditures Incurred Through 2005	Future Expenditures	Total	Preliminary Allocation Among Project Purposes			
				Water Supply and Power Generation	*Flood Control*[a]	*Recreation and Fish and Wildlife Enhancement*	*Other*[b]
Project Construction Expenditures							
Upper Feather Division	18,275	1	18,276	1,411	0	16,865	0
Oroville Division	591,016	2,771	593,787	500,240	71,792	21,755	0
Delta Facilities Division	400,457	41,760	442,217	395,366	0	46,851	0
North Bay Aqueduct	94,579	10,866	105,445	105,445	0	0	0
South Bay Aqueduct	118,986	124,400	243,386	219,970	8,189	15,227	0
California Aqueduct							
North San Joaquin Division	217,969	13,729	231,698	223,526	0	8,172	0
San Luis Division	266,185	4,247	270,431	258,018	0	12,413	0
South San Joaquin Division	288,752	4,421	293,173	275,558	0	17,614	0
Tehachapi Division	324,817	12,995	337,812	318,744	0	19,068	0
Mojave Division	290,180	15,678	305,858	267,026	0	38,832	0
Santa Ana Division	259,116	49,589	308,705	273,930	0	34,775	0
West Branch	470,591	5,883	476,474	444,727	0	31,747	0
Coastal Branch	490,694	4,213	494,907	494,907	0	0	0
Subtotal, California Aqueduct	*2,608,304*	*110,754*	*2,719,058*	*2,556,437*	*0*	*162,621*	*0*
Other Project Facilities							
Small Hydroelectric Power Generating Facilities	97,368	0	97,368	97,368	0	0	0
Off-Aqueduct Power Generating Facilities	455,369	30,544	485,913	485,913	0	0	0
East Branch Enlargement	453,459	455,771	909,230	909,230	0	0	0
East Branch Extension	128,473	177,930	306,403	306,403	0	0	0
Coastal Power Allocation	30,708	0	30,708	30,708	0	0	0
Agricultural Drainage Facilities	66,440	50,880	117,320	0	0	0	117,320
Planning and Preoperations	145,886	61,615	207,501	207,501	0	0	0
Unassigned/Miscellaneous	101,448	50,891	152,339	0	0	0	152,339
Subtotal, Project Construction Expenditures	*5,310,768*	*1,118,183*	*6,428,951*	*5,815,992*	*79,981*	*263,319*	*269,659*
Other Capital Requirements							
Davis-Grunsky Act Program	130,000	0	130,000	0	0	0	130,000
Total Capital Expenditures	**5,440,768**	**1,118,183**	**6,558,951**	**5,815,992**	**79,981**	**263,319**	**399,659**

[a]Reflects DWR's allocation to this purpose, irrespective of federal payments.
[b]Includes costs currently unassigned to purpose, planning costs of deleted features of project facilities, initial costs of inventoried items, and costs assigned to the Davis-Grunsky Act Program.

was completed in 1997. Water deliveries from Phase II facilities began in July 1997.

Line 6, West Branch Aqueduct, shows costs for all facilities on the West Branch except Warne Power Plant, whose costs are included in Line 11.

Line 7, East Branch Enlargement, includes expenditures for Phases I and II of the East Branch Enlargement. Phase I included the enlargement share of power plant costs at Mojave Siphon and Devil Canyon. (The remaining power plant costs are included in Line 11.) East Branch Enlargement costs for Phase I, by facility, are presented in Table 14-4. Costs for Alamo Power Plant consist of expenditures for Unit 1 facilities allocated to enlargement. Construction of Unit 2 was deferred.

Construction of Phase II of the enlargement is anticipated to begin in March 2007. Project costs include raising the canal embankment and concrete lining, constructing additional siphon barrels, adding bays to check structures, constructing Unit 2 at Alamo Power Plant, and adding two pump/motor units and a discharge line at Pearblossom Pumping Plant.

All costs in Line 7 are allocated to and repaid by the seven Southern California contractors participating in the East Branch Enlargement.

Line 8, East Branch Improvements, shows all aqueduct costs on the East Branch not allocated to the enlargement project. Those costs include improvements constructed concurrently with the enlargement work, the reconstruction of the San Bernardino Tunnel Intake, and the construction of the Tehachapi East Afterbay. Costs for power plant construction at Alamo, Mojave Siphon, and Devil Canyon are not included in this line.

Line 9, East Branch Extension, shows expenditures for Phase I of the extension of the East Branch of the California Aqueduct. The East Branch Extension extends the California Aqueduct east from the Devil Canyon Power Plant to a terminus at Noble Creek near Beaumont in Riverside County. The extension provides water service to the San Gorgonio Pass Water Agency and the San Bernardino Valley Municipal Water District. Construction began in February 1999 and was completed in 2003. Construction of Phase II is anticipated to commence in 2008. All costs in Line 9 will be allocated to and repaid by the two participating contractors.

Line 10, South Bay Aqueduct Enlargement, shows expenditures for providing additional capacity required to meet increases in water demands for the service area of Alameda County Flood Control and Water Conservation District, Zone 7, and increasing the existing capacity of the South Bay Aqueduct to its original design capacity. Construction includes creating a third discharge line, creating a 500 af Dyer Reservoir, modifying the canal, and enlarging the South Bay Pumping Plant. Construction is expected to be completed in 2009.

Line 11, Power Generation and Transmission Facilities, does not include the East Branch Enlargement share of costs for Alamo, Mojave Siphon, and Devil Canyon power plants shown in Line 7 of Table 14-1. The capital costs for facilities included in Line 11 are shown in Table 14-5.

Line 12, Additional Conservation Facilities, shows projected costs to plan and study additional conservation facilities. Specific planning activities and projected spending amounts for 2006 through 2020 are shown in Table 14-6. Expenditures for these items are being reviewed. Construction costs of additional conservation facilities are not included in the financial analysis.

Line 12 does not include CALFED program costs. CALFED expenditures for preliminary planning and environmental impact report preparation are currently financed by appropriations from the General Fund. DWR assumes that future costs of the CALFED program will continue to be financed from the General Fund.

Line 13, Agricultural Drainage Facilities, includes projected costs of the Agricultural Drainage Program. The activities in this program are monitoring, evaluating, reducing, and treating drainage, as well as investigating treatment and reuse of drainage water.

DWR assumes that future costs of the drainage program will be financed by revenue transfers (Line 35).

Line 14, Other Costs, includes items such as general design and construction costs, costs of completing operation and maintenance facilities, and costs of other completion activities for the initial facilities of the California Aqueduct. Portions of those costs ultimately will be allocated to California Aqueduct units described in the preceding paragraphs.

Line 15, Subtotal Project Construction Expenditures, is the total of Lines 1 through 14.

Line 16, Davis-Grunsky Act Program Costs, shows costs of the Davis-Grunsky Act Program, a financial assistance program to provide grants and loans to public agencies for constructing local water projects.

As of December 31, 2005, DWR had disbursed $130 million (including $8.5 million for administration) in grants and loans to local agencies throughout the State.

Line 17, Special Capital Requirements Under Revenue Bond Financing, presents special capital requirements at the time revenue bonds are sold. The financial analysis assumes that proceeds from any future revenue bonds will be used to pay for bond discounts, bond issuance costs, and debt service reserve requirements.

Information about the application of proceeds to these special requirements for actual and assumed revenue bond sales is presented in Table 14-7.

Line 18, Total Capital Requirements, is the total of Lines 15, 16, and 17.

Line 19, Power Facilities Capital Requirements, shows the total capital requirements for power facilities included in Line 18.

Line 20, Water Facilities Capital Requirements, shows the total capital requirements for water facilities included in Line 18.

Table 14-4. East Branch Enlargement Capital Costs by Facility

Facility	Amount (Millions of Dollars)
Aqueduct and Siphons	128.1
Pearblossom Pumping Plant	70.1
Alamo Power Plant	5.0
Mojave Siphon Power Plant	47.3
Devil Canyon Power Plant and Second Afterbay	202.9
Total	**453.4**

Table 14-5. Estimated Capital Costs for Power Generation and Transmission Facilities

Facility	Amount (Millions of Dollars)
Power Plants	
Reid Gardner, Unit 4	308.5
Bottle Rock	120.9
South Geyers	49.6
Devil Canyon	36.8
Warne	84.5
Alamo	44.9
Mojave Siphon	38.4
Thermalito Diversion Dam	14.1
Subtotal	*697.7*
Transmission Lines	
Midway-Wheeler Ridge	10.7
Geysers-Lakeville	6.9
Total	**715.3**

Table 14-6. Estimated Future Costs for Planning Additional Conservation Facilities

Activity	Amount (Millions of Dollars)
SWP Future Water Supply	41.8
Other Planning Costs	19.8
Total	**61.6**

Capital Financing

The SWP was constructed with three general types of financing: Burns-Porter Act, revenue bonds, and capital resources. Lines 21 through 36 of Table 14-1 present specific information about those sources of financing.

Burns-Porter Act

Burns-Porter financing is derived from the sale of California Water Resources Development Bonds (general obligation bonds) and State Tideland Oil Revenues deposited in the California Water Fund as authorized by the Burns-Porter Act (California Water Code Sections 12930-12944), approved by voters in November 1960. The Burns-Porter Act authorized an issuance of $1.75 billion of general obligation State bonds, which are repaid by revenues received according to the water supply contracts. Of that authorization, $130 million were reserved specifically for the Davis-Grunsky Act Program.

Proceeds from the sale of general obligation bonds were deposited in the California Water Resources Development Bond Fund–Bond Proceeds Account, from which monies were expended only for the construction of SWP facilities and for the Davis-Grunsky Act Program. Approximately 29 percent of the expenditures through 2005 for construction and the Davis-Grunsky Act Program were financed with general obligation bonds.

Monies deposited in the California Water Fund were appropriated for purposes outlined in the Burns-Porter Act. Such deposits were derived from a portion of the State Tideland Oil Revenues, according to a continuing authorization. The California Water Fund was used to finance $508 million, or approximately 8 percent, of the construction expenditures through 2005.

Revenue Bonds

Revenue bond financing is derived from the sale of revenue bonds as authorized by the Central Valley Project Act (California Water Code Sections 11100-11925). DWR's authority to issue revenue bonds was confirmed by a decision of the California Supreme Court in 1963 (Warne v. Harkness, 60 Cal. 2d 579).

Proceeds from the sale of revenue bonds are deposited in the Central Valley Water Project Construction Fund, from which money is expended only for purposes specified in the resolution authorizing each bond sale. Those purposes, in addition to paying construction, planning, and right-of-way costs, may include funding the Debt Service Reserve Account, paying interest on bonds, and paying water system operating expenses during a specified period.

As of December 31, 2005, DWR had sold $7.0 billion of revenue bonds. That amount includes $3.6 billion of refunded bonds, leaving a total principal obligation of $3.4 billion.

Capital Resources

Capital resources financing is derived from payments and appropriations (including a portion of the State Tideland Oil Revenues) authorized by a variety of special contracts, cost-sharing agreements, and legislative actions concerning the SWP, plus accrued interest on these funds. Capital resources revenues are deposited in the Central Valley Water Project Construction Fund and may be expended

Table 14-7. Application of Revenue Bond Proceeds (Millions of Dollars)

Bond Series[a]	Construction Expenditures	Other Capital Requirements					Total Principal Amount of Bonds
		Reimbursement of General Fund	*Capitalized Interest*	*Capitalized Operating Costs*	*Bond Financing and Refunding Costs*[b]	*Subtotal*	
Oroville	218.0	2.6	19.9	1.5	3.0	27.0	245.0
Devil Canyon-Castaic	126.4	0.0	10.0	0.7	2.1	12.8	139.2
Pyramid Series A	74.0	0.0	19.2	1.0	1.6	21.8	95.8
Reid Gardner Series B	146.1	0.0	41.9	0.0	12.0	53.9	200.0
Reid Gardner Series C	91.1	0.0	17.9	7.9	8.1	33.9	125.0
Small Hydro-South Geysers Series D	49.6	0.0	19.9	0.0	5.5	25.4	75.0
Bottle Rock Series E	96.9	0.0	22.0	3.7	2.4	28.1	125.0
Alamo-South Geysers Series F	59.1	0.0	14.2	0.0	1.7	15.9	75.0
Reid Gardner Series G	1.6	0.0	0.0	0.0	237.9	237.9	239.5
Power Facilities Series H	22.2	0.0	0.0	0.0	184.5	184.5	206.7
East Branch Enlargement Series A	108.3	0.0	12.6	0.0	11.1	23.7	132.0
Water System Facilities Series B	97.4	0.0	0.0	0.0	2.6	2.6	100.0
Water System Facilities Series C	0.6	0.0	0.0	0.0	8.4	8.4	9.0
Water System Facilities Series D	95.9	0.0	2.9	0.0	1.2	4.1	100.0
Water System Facilities Series E	0.4	0.0	0.0	0.0	8.6	8.6	9.0
Water System Facilities Series F	0.0	0.0	0.0	0.0	160.0	160.0	160.0
Water System Facilities Series G	86.8	0.0	4.6	0.0	8.6	13.2	100.0
Water System Facilities Series H	85.5	0.0	5.7	0.0	8.8	14.5	100.0
Water System Facilities Series I	158.9	0.0	5.8	0.0	15.3	21.1	180.0
Water System Facilities Series J	0.0	0.0	0.0	0.0	649.8	649.8	649.8
Water System Facilities Series K	88.6	0.0	3.1	0.0	8.3	11.4	100.0
Water System Facilities Series L	0.0	0.0	0.0	0.0	537.8	537.8	537.8
Water System Facilities Series M	166.3	0.0	9.9	0.0	13.8	23.7	190.0
Water System Facilities Series N	137.4	0.0	6.0	0.0	8.6	14.6	152.0
Water System Facilities Series O	156.5	0.0	8.4	0.0	170.1	178.5	335.0
Water System Facilities Series P	141.6	0.0	5.2	0.0	13.2	18.4	160.0
Water System Facilities Series Q	135.0	0.0	8.0	0.0	123.6	131.6	266.6
Water System Facilities Series R	0.0	0.0	0.0	0.0	20.7	20.7	20.7
Water System Facilities Series S	78.2	0.0	5.8	0.0	116.2	122.0	200.2
Water System Facilities Series T	0.0	0.0	0.0	0.0	135.7	135.7	135.7
Water System Facilities Series U	98.7	0.0	5.3	0.0	103.2	108.5	207.2
Water System Facilities Series V	0.0	0.0	0.0	0.0	20.6	20.6	20.6
Water System Facilities Series W	41.0	0.0	1.3	0.0	218.7	220.0	261.0
Water System Facilities Series X	0.0	0.0	0.0	0.0	160.2	160.2	160.2
Water System Facilities Series Y	0.0	0.0	0.0	0.0	329.9	329.9	329.9
Water System Facilities Series Z	0.0	0.0	0.0	0.0	170.7	170.7	170.7
Water System Facilities Series AA	0.0	0.0	0.0	0.0	108.7	108.7	108.7
Water System Facilities Series AB	92.2	0.0	3.9	0.0	93.6	97.5	189.7
Water System Facilities Series AC	13.7	0.0	0.6	0.0	257.7	258.3	272.0
Water System Facilities Series AD	12.4	0.0	0.9	0.0	99.1	100.0	112.4
Subtotal	*2,680.4*	*2.6*	*255.0*	*14.8*	*4,043.6*	*4,316.0*	*6,996.4*[c]
Future East Branch Extension Bonds	180.0	0.0	9.0	0.0	11.0	20.0	200.0
Future So. Bay AB. Enlargement Bonds	126.9	0.0	6.3	0.0	7.7	14.0	140.9
Future Water System Facilities Bonds	808.5	0.0	40.4	0.0	49.4	89.8	898.3
Total	**3,795.8**	**2.6**	**310.7**	**14.8**	**4,111.7**	**4,439.8**	**8,235.6**

[a]Actual bond issue for all except Future Water System facilities and Future East Branch Extension bonds.
[b]Bond financing and refunding costs include funds applied to debt service reserve requirements.
[c]Includes $3,581.9 million of refunded principal, leaving a net principal obligation of $3,414.5 million.

for interest on general obligation bonds and costs of constructing SWP facilities.

According to DWR's financial management policy, the capital resources revenues are used first to cover any general obligation bond debt service that exceeds available revenues.

Capital Financing Sources

Capital financing sources include power revenue bonds, East Branch Enlargement bonds, East Branch Extension bonds, South Bay Aqueduct Enlargement bonds, water system facilities bonds, initial project facilities bonds, bond proceeds from the Davis-Grunsky Act Program, California Water Fund monies, and capital resources revenues.

Line 21, Power Revenue Bonds through Series H, includes the proceeds applied from power revenue bonds for Oroville, Devil Canyon, Castaic, Warne, Reid Gardner, Bottle Rock, Alamo, South Geysers, and small hydro projects.

No future power revenue bond sales are projected for this financial analysis.

Line 22, East Branch Enlargement, Current Bonds, shows that $474 million of Water System Revenue Bond proceeds have been applied to the East Branch Enlargement project through December 31, 2005. Of this total amount, $417 million was used for construction expenditures and $57 million for bond discounts, interest costs, and debt service reserves.

No future East Branch Enlargement revenue bond sales are projected for the financial analysis.

Line 23, East Branch Extension, Current Bonds, shows that $140 million of Water System Revenue Bond proceeds had been spent through December 31, 2005.

Line 24, East Branch Extension, Future Bonds, shows DWR's estimate of $200 million of additional bonds required to complete construction of the East Branch Extension and to pay for bond discounts, capitalized interest, and debt service reserve requirements.

Line 25, South Bay Aqueduct Enlargement, Current Bonds, shows that $17 million of Water System Revenue Bond proceeds had been spent through December 31, 2005.

Line 26, South Bay Aqueduct Enlargement, Future Bonds, shows DWR's estimate of $141 million of bonds required to complete construction of the South Bay Aqueduct Enlargement and to pay for bond discounts, capitalized interest, and debt service reserve requirements.

Line 27, Water System Facilities, Current Bonds, shows that through December 31, 2005, $1.5 billion of proceeds from Water System Revenue Bonds, Series A through Series AD, were applied to SWP projects other than the East Branch Enlargement, the East Branch Extension, and the South Bay Aqueduct Enlargement. Of this total amount, $1.3 billion was used to pay for construction expenditures, and $0.2 billion was used to pay for bond discounts, capitalized interest, and debt service reserve requirements.

Line 28, Water System Facilities, Future Bonds, shows that $898 million of future water revenue bonds are needed to provide $809 million for construction

of SWP water system facilities and $89 million for bond discounts, interest costs, and debt service reserve requirements.

Line 29, Subtotal, Water Revenue Bonds, is the total of Lines 22 through 28.

Line 30, Initial Project Facilities Bond Proceeds, shows the amount of general obligation bonds sold to provide financing costs for initial SWP facilities and for costs of planning certain additional conservation facilities.

Financing initial facilities from general obligation bonds was completed in mid-1972 and totaled $1.444 billion—$1.750 billion Burns-Porter Act authorization less $130 million reserved for the Davis-Grunsky Act Program and $176 million "offset" for additional conservation facilities. (The Burns-Porter Act provides that to the extent California Water Fund monies are expended, an equal amount of general obligation bonds are reserved [offset] for financing the construction of additional conservation facilities in certain watersheds.)

In mid-1972, the reservation of offset bonds was effectively limited to $176 million, the total amount of California Water Fund monies expended up to that time. By mid-1972, all general obligation bonds authorized by the Burns-Porter Act had been offset, reserved for the Davis-Grunsky Act Program, or used for SWP construction.

Approximately $8.5 million of the offset bonds was used to finance planning studies of the Middle Fork Eel River Development. This financial analysis is not based on the use of any offset bond proceeds to meet capital requirements. If, at some time, the State constructs an additional conservation facility, as specified in Water Code Section 12938, the remaining offset bonds could be sold.

Line 31, Davis-Grunsky Act Program Bond Proceeds, shows, for simplification, the entire $130 million of capital expenditures authorized for the Davis-Grunsky Act Program, according to the Burns-Porter Act, as being funded by proceeds from the sale of general obligation bonds. In fact, $28 million from the California Water Fund was used for the program in lieu of bond proceeds prior to 1969.

Line 32, Application of California Water Fund Monies, shows the amount of SWP costs financed under the Burns-Porter Act. The act provides that any available money in the California Water Fund must be used for construction in lieu of proceeds from the sale of general obligation bonds.

When the Burns-Porter Act became effective in late 1960, approximately $97 million had been accumulated in the fund. That balance, plus subsequent appropriations, interest earnings, and other miscellaneous income to the fund through December 31, 2005, was used to finance a total of $508 million of SWP costs.

Line 33, Interim Financing, shows the net annual amounts of funds flowing into and out of the Water Revenue Commercial Paper Notes program. This program was established in March 1993 to provide an ongoing source of interim financing for Water System Projects prior to permanent financing from the sale of long-term revenue bonds. DWR has authority to issue up to $94.4 million of Water Revenue

Commercial Paper Notes. A positive number indicates money borrowed from the program to finance construction costs. A negative number indicates money repaid to the program. The financial analysis assumes that all funds borrowed from the program will be repaid before the end of the analysis period.

Line 34, Application of Capital Resources Revenues to Construction, presents the Capital Resources Revenues applied for capital expenditures.

Line 35, Revenue Transfers Applied, shows monies assumed to be transferred to the California Water Fund, according to provisions of the Burns-Porter Act, and subsequently reappropriated to construction (see Line 40 of Table 14-2). Projected amounts for 2006 through 2020 include funds to finance expenditures for agricultural drainage facilities, as indicated in Line 13 of Table 14-1, and expenditures for additional conservation facilities, as indicated in Line 12.

Line 36, Subtotal, Other Capital Financing, is the total of Lines 30 through 35.

Line 37, Total Financing of Capital Requirements, totals Lines 21, 29, and 36.

Annual Revenues and Expenditures

After financial analysis of SWP operations, DWR concluded that projected payments by contractors and other revenues will be adequate to pay annual operations, maintenance, power, and replacement costs and meet all repayment obligations on funds used to finance SWP construction and other authorized costs during the period 2006 through 2020. Data on annual revenues and expenditures are presented in Table 14-2. A detailed discussion of each line item is presented below.

SWP Revenues

SWP revenues consist primarily of SWP contractor payments required under their individual long-term water supply contracts. Those revenues are deposited in two funds: the Central Valley Water Project Revenue Fund, where all revenues pledged to revenue bonds are placed; and the California Water Resources Development Bond Fund-Systems Revenue Account, where all other SWP operating revenues are placed. Use of those funds is limited to paying operating costs and debt service; except that revenues in excess of those costs may be deposited to a reserve for future SWP construction, since the California Water Fund has been repaid (see Line 39).

Line 1, Capital Resources Revenues, includes the following:

- federal payments for SWP capital expenditures;
- appropriations for capital costs allocated to recreation;
- appropriations for SWP capital expenditures prior to passage of the Burns-Porter Act and according to Senate Bill 261 (1968);
- payments from Los Angeles Department of Water and Power for Castaic power development;
- advances from water contractors for construction of requested work;
- investment earnings on the Capital Resources Account; and
- investment earnings on unexpended revenue bond proceeds.

Historically, appropriations for capital costs allocated to recreation and fish and wildlife enhancement have amounted to $5 million per year, which have been appropriated by the California Legislature from the State Tideland Oil Revenues. There have been no appropriations since 1985, and no appropriations are indicated in the financial analysis for the period 2006-2020. Legislation enacted in 1989 offset a portion of the amount owed to the SWP by the State for costs allocated to recreation and fish and wildlife enhancement against the amount the SWP owed to the California Water Fund (see Line 39).

Lines 2 through 12, Water Contractor Payments, show amounts of the separate elements of water contractor payments.

Amounts in Line 4 also include revenues sufficient to cover costs associated with sales of excess power. Appendix B of this bulletin presents a detailed explanation of payments identified in Lines 2 through 12.

Operations, maintenance, power, and replacement (OMP&R) costs are repaid as they are incurred as part of the Transportation Charge; therefore, no interest charges are included. Construction costs included in the Transportation Charge, and all construction and annual OMP&R costs included in the Delta Water Charge, are to be repaid with interest at the Project Interest Rate.

The Project Interest Rate, as defined in Article 1(r) of the standard provisions for water supply contracts, is the weighted average of the rates paid on certain securities issued and loans obtained to finance SWP facilities, as described below.

According to the original contract provisions, the basis for determining the Project Interest Rate was the weighted average of rates paid on general obligation bond sales only. In 1969, after Oroville Revenue Bonds were issued, the contract was amended to expand the basis to include rates on all other securities sold and loans obtained thereafter for financing SWP facilities, including revenue bonds (see Bulletin 132-70, page 28).

However, not all proceeds from the sale of revenue bonds are melded into the calculation of the Project Interest Rate. Only those proceeds applied to construction costs (the only application of general obligation bonds permitted by law) and those consumed by the bond discount (a component of the total interest cost of a revenue bond issue) are included in the calculation (see Table 14-8).

Calculations for determining the Project Interest Rate do not include proceeds from the sale of revenue bonds for Off-Aqueduct Power Facilities, the East Branch Enlargement facilities, or water system facilities defined in the Water Revenue Bond Amendment. Table 14-9 lists all bond sales by date and presents basic information used in the calculation of the Project Interest Rate.

Information about contractor water charges in Appendix B is based on known conditions and substantiates DWR's determination of 2007 water charges to be billed on July 1, 2006. However, information about significant differences between the sum of future charges included in Lines 2 through 12 of Table 14-2 and the substantiation of 2007

Table 14-8. Revenue Bond Proceeds Affecting Project Interest Rate (in Millions of Dollars)

Project	Proceeds Included in Project Interest Rate				Total Principal Amount of Bonds	Percentage of Total Amount Included in Calculating Project Interest Rate
	Applied to Construction Costs	*Less Portion of Proceeds Derived from Interest Earnings Prior to Delivery of Bonds*	*Plus Bond Financing and Refunding Costs*	*Subtotal, Proceeds Included in Calculating Project Interest Rate*		
Devil Canyon-Castaic Project Revenue Bonds	125.3	1.5	1.4	125.2	139.2	90%
Pyramid Project Revenue Bonds (Series A)	71.2	0.5	1.1	71.8	95.8	75%
Alamo Project Bond Anticipation Note	16.8	0.1	0.3	17.0	24.4	70%
Small Hyrdo Project I Revenue Bonds (Series D)	25.4	0.2	1.5	26.7	37.5	71%
Alamo Project Revenue Bonds (Series F)	38.9	0.3	0.7	39.3	50.0	79%
Power Facilities Revenue Bonds (Series H)						
Pyramid Project	5.0	0.0	0.1	5.1	5.1	100%
Alamo Project	1.7	0.0	0.0	1.7	1.7	100%
Small Hydro Project I	25.2[a]	0.2	0.4	25.4	35.6	71%
Water System Revenue Bonds (Series J)						
Pyramid Project	0.0	0.0	75.9[b]	75.9	99.2[b]	77%
Alamo Project	0.0	0.0	45.6[b]	45.6	57.1[b]	80%
Small Hydro Project I	0.0	0.0	27.8[b]	27.8	38.8[b]	72%
Water System Revenue Bonds (Series L)						
Small Hydro Project I	0.0	0.0	1.5[b]	1.5	2.1[b]	71%
Water System Revenue Bonds (Series Q)						
Pyramid Project	0.0	0.0	3.0[b]	3.0	3.9[b]	77%
Alamo Project	0.0	0.0	4.8[b]	4.8	6.0[b]	80%
Water System Revenue Bonds (Series S)						
Pyramid Project	0.0	0.0	8.0[b]	8.0	10.4[b]	77%
Alamo Project	0.0	0.0	7.6[b]	7.6	9.5[b]	80%
Water System Revenue Bonds (Series U)						
Pyramid Project	0.0	0.0	2.4[b]	2.4	3.2[b]	75%
Alamo Project	0.0	0.0	3.2[b]	3.2	4.0[b]	80%
Water System Revenue Bonds (Series W)						
Pyramid Project	0.0	0.0	27.7[b]	27.7	36.0[b]	77%
Alamo Project	0.0	0.0	11.8[b]	11.8	14.7[b]	80%
Small Hydro Project (construction)	3.4	0.0	0.0	3.4	3.7	92%
Small Hydro Project (refunding)	0.0	0.0	16.3[b]	16.3	22.7[b]	72%
Water System Revenue Bonds (Series X)						
Pyramid Project	0.0	0.0	8.5[b]	8.5	11.0[b]	77%
Alamo Project (Series H refunding)	0.0	0.0	0.3[b]	0.3	0.3[b]	100%
Alamo Project (Series F refunding)	0.0	0.0	3.9[b]	3.9	4.9[b]	79%
Small Hydro Project	0.0	0.0	4.6[b]	4.6	6.4[b]	72%
Water System Revenue Bonds (Series AC)						
Pyramid Project	0.0	0.0	3.8[b]	3.8	5.0[b]	76%
Alamo Project	0.0	0.0	2.8[b]	2.8	3.6[b]	80%
Small Hydro Project	0.0	0.0	1.2[b]	1.2	1.6[b]	72%
Water System Revenue Bonds (Series AD)						
Pyramid Project	0.0	0.0	3.2[b]	3.2	4.2[b]	76%
Alamo Project	0.0	0.0	2.6[b]	2.6	3.3[b]	80%
Small Hydro Project	0.0	0.0	0.7[b]	0.7	1.0[b]	72%

[a]Amount consists of 71 percent of proceeds deposited in escrow to refund portion of Series D bonds ($35.1 million plus deposits to construction account ($0.3 million)).
[b]Represents amount of principal used to refund portions of prior bond issues.

Table 14-9. Actual Bond Sales and Project Interest Rates, by Date of Sale

Bond Sales	Date of Sale	Dollar-Years[a] (Thousands)	Interest Cost (Thousands)	Issue Interest Rate[b] (Percent)	Project Interest Rate[c] (Percent)
$ 50,000,000 Bond Anticipation Notes	11/21/63	26,944	531	1.971	1.971
$100,000,000 Series A Water Bonds	2/18/64	3,402,000	119,750	3.520	3.508
$ 50,000,000 Series B Water Bonds	5/05/64	1,726,000	60,986	3.533	3.516
$100,000,000 Series C Water Bonds	10/07/64	3,452,000	123,764	3.585	3.544
$100,000,000 Series D Water Bonds	2/16/65	3,497,900	122,403	3.499	3.531
$100,000,000 Series E Water Bonds	11/23/65	3,497,900	130,029	3.717	3.573
$100,000,000 Series F Water Bonds	6/08/66	3,497,900	137,359	3.927	3.638
$100,000,000 Series G Water Bonds	11/22/66	3,497,900	143,788	4.111	3.711
$100,000,000 Series H Water Bonds	3/21/67	3,497,900	129,261	3.695	3.709
$100,000,000 Series J Water Bonds	7/18/67	3,497,900	143,199	4.094	3.754
$100,000,000 Series K Water Bonds	11/14/67	3,497,900	163,887	4.685	3.853
$150,000,000 Revenue Bonds, Oroville Division, Series A	4/03/68	5,228,700	270,289	5.169	
$100,000,000 Series L Water Bonds	7/11/68	3,497,900	166,918	4.772	3.941
$100,000,000 Series M Water Bonds	10/22/68	3,497,900	169,989	4.860	4.021
$ 94,995,000 Revenue Bonds, Oroville Division, Series B	4/01/69	3,423,460	195,902	5.722	
$ 46,761,000 Cumulative 1970 General Fund Borrowing, repaid 7/10/70	---	4,938	346	7.007	
$200,000,000 Series N and P Bond Anticipation Notes	6/16/70	200,000	11,660	5.830	4.030
$100,000,000 Series N Water Bonds	2/02/71	3,447,900	190,292	5.519	4.148
$100,000,000 Series Q Bond Anticipation Notes	3/10/71	100,000	2,349	2.349	4.143
$100,000,000 Series P Water Bonds	4/21/71	3,397,900	193,377	5.691	4.255
$150,000,000 Series Q and R Water Bonds	11/09/71	5,171,850	265,734	5.138	4.342
$ 40,000,000 Series S Water Bonds	3/28/72	1,399,160	76,509	5.468	4.371
$139,165,000 Devil Canyon-Castaic Revenue Bonds	8/08/72	4,776,204	258,839	5.419	4.457
$ 10,000,000 Series T Water Bonds	3/20/73	185,265	9,491	5.123	4.459
$ 10,000,000 Series U Water Bonds	1/13/76	158,750	8,731	5.500	4.462
$ 10,000,000 Series V Water Bonds	11/15/77	158,750	7,573	4.770	4.462
$ 95,800,000 Pyramid Hydroelectric Revenue Bonds	10/23/79	2,260,072	172,495	7.632	4.584
$150,000,000 Reid Gardner Project, Series A Bond Anticipation Notes	7/1/81	347,906	29,572	8.500	
$ 75,600,000 Bottle Rock Project, Bond Anticipation Notes	12/1/81	264,600	25,137	9.500	
$ 24,400,000 Alamo Project, Bond Anticipation Notes	12/1/81	24,266	2,305	9.499	4.589
$200,000,000 Reid Gardner Project, Series B Revenue Bonds	7/07/82	4,623,137	553,793	11.979	
$125,000,000 Reid Gardner Project, Series C Revenue Bonds	11/16/82	2,720,045	255,744	9.402	
$ 37,500,000 Small Hydro Project I, Series D Revenue Bonds	11/16/82	837,769	84,587	10.097	4.666
$ 37,500,000 South Geysers Project, Series D Revenue Bonds	11/16/82	930,325	90,021	9.676	
$125,000,000 Bottle Rock Project, Series E Revenue Bonds	4/27/83	2,624,805	225,102	8.576	
$ 50,000,000 Alamo Project, Series F Revenue Bonds	4/27/83	1,190,763	100,836	8.468	4.727
$ 25,000,000 South Geysers Project, Series F Revenue Bonds	4/27/83	608,550	52,578	8.640	

[a]A unit equivalent to one dollar of principal amount outstanding for one year.
[b]The total interest cost (without regard to discounts paid or to premiums received) divided by the total dollar-years, expressed as a percent.
[c]Determined by dividing cumulative interest costs by cumulative dollar-years, expressed as a percent. Excluding Oroville Division bonds and revenue bonds for Off-Aqueduct Power Facilities, the East Branch Enlargement Facilities, East Branch Extension Facilities, Water System Facilities as defined in the Water Revenue Bond Amendment, Coastal Extension Facilities, or South Bay Enlargement Facilities.

Table 14-9. Actual Bond Sales and Project Interest Rates, by Date of Sale

Bond Sales	Date of Sale	Dollar-Years[a] (Thousands)	Interest Cost (Thousands)	Issue Interest Rate[b] (Percent)	Project Interest Rate[c] (Percent)
$239,505,000 Reid Gardner Project, Series G Revenue Bonds	3/15/85	4,524,136	425,840	9.413	
$206,690,000 Power Facilities Series H Revenue Bonds	6/20/86	4,430,520	347,745	7.849	4.713
$132,000,000 East Branch Enlargement, Series A Water System Revenue Bonds	7/15/86	3,427,165	254,915	7.438	
Water System Revenue Bonds					
$100,000,000 Series B Water System Revenue Bonds	5/05/87	2,564,012	194,817	7.598	
$ 9,000,000 Series C Water System Revenue Bonds	12/01/87	324,000	31,995	9.875	
$100,000,000 Series D Water System Revenue Bonds	6/14/88	2,640,510	201,253	7.622	
$ 9,000,000 Series E Water System Revenue Bonds	11/29/88	324,000	31,995	9.875	
$160,030,000 Series F Water System Revenue Bonds	3/15/89	2,779,838	189,261	6.808	
$100,000,000 Series G Water System Revenue Bonds	3/06/90	2,434,175	172,277	7.077	
$100,000,000 Series H Water System Revenue Bonds	1/10/91	2,459,172	168,857	6.866	
$180,000,000 Series I Water System Revenue Bonds	5/14/91	4,366,680	294,090	6.735	
$649,835,000 Series J Water System Revenue Bonds	1/16/92	12,422,222	745,198	5.999	
$100,000,000 Series K Water System Revenue Bonds	5/12/92	2,366,783	147,064	6.214	
$ 9,000,000 Series W Water Bonds	8/19/92	95,250	6,172	6.480	4.621
$537,830,000 Series L Water System Revenue Bonds	5/19/93	11,414,859	640,518	5.611	4.620
$ 2,000,000 Series X Water Bonds	9/01/93	26,000	1,247	4.796	
$ 1,400,000 Series Y Water Bonds	11/30/94	19,483	1,249	6.411	
$190,000,000 Series M Water System Revenue Bonds	12/19/93	3,911,846	194,981	4.984	
$152,000,000 Series N Water System Revenue Bonds	3/03/95	2,241,606	122,658	5.472	
$335,000,000 Series O Water System Revenue Bonds	12/05/95	7,528,890	375,667	4.990	
$160,000,000 Series P Water System Revenue Bonds	5/07/96	3,553,823	204,524	5.755	
$266,630,000 Series Q Water System Revenue Bonds	11/05/96	5,481,815	299,846	5.470	
$20,700,000 Series R Water System Revenue Bonds	3/10/97	564,125	36,627	6.493	
$200,205,000 Series S Water System Revenue Bonds	8/04/97	4,093,110	203,755	4.978	
$135,665,000 Series T Water System Revenue Bonds	8/04/97	1,310,620	66,942	5.108	
$207,180,000 Series U Water System Revenue Bonds	12/01/98	4,032,075	200,758	4.979	
$ 20,580,000 Series V Water System Revenue Bonds	12/01/98	525,100	32,819	6.250	
$260,995,000 Series W Water System Revenue Bonds	5/01/01	3,659,312	195,822	5.351	4.613
$160,225,000 Series X Water System Revenue Bonds	5/01/02	2,732,785	139,109	5.090	4.610
$329,885,000 Series Y Water System Revenue Bonds	7/05/02	4,422,973	222,654	5.034	
$170,655,000 Series Z Water System Revenue Bonds	10/02/02	1,706,132	75,696	4.437	
$108,705,000 Series AA Water System Revenue Bonds	10/04/02	2,114,341	104,220	4.929	
$189,625,000 Series AB Water System Revenue Bonds	3/09/04	4,344,942	173,788	4.000	
$272,070,000 Series AC Water System Revenue Bonds	12/15/04	4,479,436	209,150	4.669	
$272,070,000 Series AD Water System Revenue Bonds	6/14/05	1,827,449	90,461	4.950	
Total		**199,322,344**	**11,499,096**		
Portion allocated to Project Interest Rate		**63,912,154**	**2,945,036**	**4.608**	**4.608**

[a]A unit equivalent to one dollar of principal amount outstanding for one year.
[b]The total interest cost (without regard to discounts paid or to premiums received) divided by the total dollar-years, expressed as a percent.
[c]Determined by dividing cumulative interest costs by cumulative dollar-years, expressed as a percent. Excluding Oroville Division bonds and revenue bonds for Off-Aqueduct Power Facilities, the East Branch Enlargement Facilities, East Branch Extension Facilities, Water System Facilities as defined in the Water Revenue Bond Amendment, Coastal Extension Facilities, or South Bay Enlargement Facilities.

charges included in Appendix B are as described below.

- Future capital costs in Appendix B are based on the prevailing prices as of December 31, 2005. Those costs presented in the financial analysis include allowances for price escalation.
- Pre-2006 charges in Appendix B represent charges as they should have been, according to currently known conditions. Pre-2006 charges included in Table 14-2 are those actually paid as part of previously determined bills.
- Charges in Appendix B are unadjusted for past overpayments or underpayments. Charges included in Table 14-2 for 2006 and thereafter have been adjusted for any apparent overpayments or underpayments of pre-2006 charges.
- Charges in Appendix B for East Branch Enlargement costs include the amounts for debt service and 25 percent cover for the East Branch Enlargement share of the Series A through Series AD bonds. Charges in Table 14-2 apply to Series A through Series AD bonds and also include amounts of the debt service and cover for assumed future bonds.
- The water revenue bond surcharge in Appendix B applies only to the Series B through Series AD bonds. Surcharge values included in Table 14-2 apply to Series B through Series AD bonds and to assumed future issues required to finance SWP construction costs included in Table 14-1.

Line 13, Subtotal, Water Contractor Payments, is the total of Lines 2 through 12.

Line 14, Revenue Bond Cover Adjustments, represents the credit to contractors resulting from the cover of 25 percent of one year's debt service for Off-Aqueduct Power Facility Bonds and Water System Revenue Bonds. Cover is collected as required by the bond resolutions to provide security to the bondholders. If not needed to meet annual bond service, the cover is credited to the contractors in the following year. The annual charges for the following cost components include an amount for bond cover:

- minimum OMP&R component of the Transportation Charge for Off-Aqueduct Power Facilities;
- Water System Revenue Bond Surcharge;
- capital cost component of the Transportation Charge for East Branch Enlargement Facilities;
- capital cost component of the Transportation Charge for Coastal Branch Extension Facilities;
- capital cost component of the Transportation Charge for East Branch Extension Facilities;
- capital cost component of the Transportation Charge for Tehachapi Afterbay; and
- capital cost component of the Transportation Charge for South Bay Aqueduct Enlargement.

Line 15, Rate Management Adjustments, shows the projected amount of revenue reductions allocated to SWP contractors after repayment of the California Water Fund (see Line 39). Under provisions of the Monterey Amendment, the reduction amount allocated to agricultural contractors is deposited into a trust fund to stabilize payments in water-short years. The urban contractor allocation is applied as a direct reduction in charges.

Line 16, Federal Payments for Project Operating Costs, shows federal payments made according to the December 31, 1961, agreement between California and the United States providing for DWR to operate and maintain the San Luis Joint-Use Facilities. According to the January 12, 1972, supplement to the agreement, the Bureau of Reclamation (Reclamation) initially paid 45 percent of operations, maintenance, and replacement (OM&R) costs for those activities. (The percentage does not apply to power costs; Reclamation and DWR each provide their own power to pump water through the joint facilities.)

The percentage paid by Reclamation is periodically reviewed by Reclamation and DWR. The most recent review of the percentage paid by Reclamation was completed in 1987 and resulted in a federal share of 44.09 percent. The amounts in Line 13 are based on the assumption that the federal share will continue at this level for calendar years 2006 through 2020.

Line 17, Appropriations for Operating Costs Allocated to Recreation, shows appropriations made under the Davis-Dolwig Act. In passing the Davis-Dolwig Act, the California Legislature declared its intent that except for funds provided according to Assembly Bill 12 (1966), DWR's budget will include appropriations of monies from the General Fund necessary for enhancement of fish and wildlife and recreation in connection with State water projects.

Annual OMP&R costs allocated to recreation and fish and wildlife enhancement are to be paid by annual appropriations from the General Fund. Through fiscal year 1982–1983, these appropriations totaled $16.657 million. There have been no additional appropriations since the 1982–1983 fiscal year, and none are indicated for 2006 through 2020.

Legislation enacted in 1989 offset a portion of the amount owed to the SWP by the State for costs allocated to recreation and to fish and wildlife enhancement against the amount the SWP owed to the California Water Fund (see line 36).

Line 18, Davis-Grunsky Loan Repayments, shows the repayments by local agencies of $54.2 million of loans disbursed as of December 31, 2005. Repayment on any future loans was assumed to be beyond the period covered by the financial analysis.

Line 19, Revenue Bond Proceeds, includes bond proceeds classified as special reserves according to the description of revenue bond financing in Line 17 of Table 14-1. Those proceeds, used for capitalized OMP&R costs, revenue bond debt service, and debt service reserves, are not classified as revenue but are included in this line to simplify the financial presentation.

Line 20, Interest Earnings on Operating Revenues, includes interest earnings on unexpended proceeds from the sale of general obligation bonds, interest on operating reserves, and other short-term investment earnings on SWP revenues.

Line 21, Oroville-Thermalito Payments, shows payments from Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas and Electric Company for power generation at the

Oroville facilities. Those utilities purchased all power generation from Hyatt and Thermalito power plants before April 1, 1983, according to a power sale contract dated November 29, 1967. The 1952–2005 entry includes the amounts of final settlement of payments made according to the contract.

Line 22, Miscellaneous Revenues, includes all other operating revenues not included in Lines 2 through 21.

Line 23, Subtotal, Other Revenues, is the total of Lines 16 through 22.

Line 24, Total Operating Revenues, is the total of Lines 13, 14, 15, and 23.

Line 25, Total Operating Revenues and Capital Resources Revenues, is the total of Lines 1 and 24.

Project Expenses

Project expenses include the following:

- operations, maintenance, and power costs;
- deposits to replacement reserves;
- deposits to special reserves;
- capital resources expenditures; and
- debt service.

Revenue bond proceeds earmarked for debt service during construction and the first year's operating expenses are deposited in the Central Valley Water Project Construction Fund and disbursed according to resolutions authorizing the issuance of such bonds.

Water contractor revenues associated with operating costs and debt service attributable to projects financed by revenue bonds are deposited in the Central Valley Water Project Revenue Fund for appropriate disbursement. All other operating revenues are deposited in the California Water Resources Development Bond Fund-Systems Revenue Account and are disbursed according to the following four priorities of use, as specified in the Burns-Porter Act:

- SWP operations, maintenance, power, and replacement costs;
- general obligation bond debt service;
- repayment of expenditures from the California Water Fund; and
- deposits to a reserve for future SWP construction.

Project expenses are presented in Lines 26 through 36 of Table 14-2.

Line 26, Project Operations, Maintenance, Power, and Replacement Costs, shows the OMP&R portion of the historical and projected costs presented in Table 14-10 at the end of the chapter.

Table 14-10 and Line 26 of Table 14-2 also include the amounts of the operations and maintenance costs for the federal share of joint facilities and those OMP&R costs allocated to recreation, which are intended to be offset by revenues listed in Lines 16 and 17.

Allowances for cost escalations are included in OMP&R costs through 2008. Allowances for additional long-term price escalations in the future are not included in these estimates, because changes in OMP&R costs do not substantially affect

the overall results of the financial analysis. (For the most part, changes in OMP&R costs cause direct offsetting changes in operating revenues.)

Power costs make up the major item of annual operating expenses for the SWP. Assumptions about future power sources and costs are discussed in Chapter 10. Line 26 also includes costs associated with power transactions that result in the sale of power not required for the delivery of water.

Line 27, Deposits to Replacement Reserves, shows funds set aside as required by contract for replacing existing SWP facilities. By December 31, 2005, $93.7 million had been spent for replacement costs; the balance of the replacement reserve as of that date was $17.1 million.

Line 28, Deposits to Special Reserves Under Revenue Bond Financing, includes two significant components: special reserve deposits related to revenue bonds; and capital resources revenue carryover from prior years used for construction in the current year. Special reserve deposits are the net of several income and expenditure items. Income items related to revenue bonds are as follows:

- proceeds set aside to pay bond interest during construction (capitalized interest);
- proceeds set aside for first year operating costs (capitalized operations and maintenance);
- water contractor payments or bond proceeds set aside for debt service reserves;
- water contractor payments for revenue bond cover requirements; and
- deposits to and withdrawals from operating reserves to meet day-to-day cash flow requirements.

The 1952–2005 column also includes advances to DWR's revolving fund for working funds to purchase mobile equipment and to meet day-to-day operating expenses.

The expenditure items related to revenue bonds are as follows:

- debt service cover payments returned to water contractors;
- debt service reserve interest payments returned to water contractors;
- surplus account funds returned to water contractors or applied to meet expenses;
- total capitalized interest paid out; and
- total capitalized operations and maintenance paid out.

Special reserves, reduced over time as reserved amounts, are used for their respective purposes. The amount indicated each year in Line 25 indicates the change from the previous year. A negative number indicates a withdrawal of special reserves to meet expenses, while a positive number indicates a deposit.

Line 29, Capital Resources Expenditures, includes the amount of capital resources revenues applied to construction that is shown in Line 34 of Table 14-1. In Table 14-2, these expenditures are funded out of withdrawals from the reserves in Line 28 and do not affect net revenues shown in Line 38.

Lines 30 and 31, Payment of Debt Service on Bonds Sold through December 31, 2005, show the total principal and interest payments on bonds sold to date. Table 14-11, at the end of this chapter, summarizes payments on general obligation bonds (Series A through Y water bonds), power revenue bonds by project, and water system revenue bonds (Series A through AD).

Lines 32 and 33, Payments on Projected Future Water Bonds, include the projected annual debt service amounts for future water revenue bonds included on Lines 24, 26, and 28 of Table 14-1 for the East Branch Extension, South Bay Aqueduct Enlargement, and other water system facilities. Assumptions about the service on these future bonds are that interest costs for the water revenue bonds average 5.5 percent; and that bonds are to be repaid by the end of the project repayment period (2035) or sooner with maturities commencing in the year following the date of sale and with equal annual bond service for the principal repayment period.

Lines 34 and 35, Total Payments of Bond Debt Service, show the total of principal payments indicated on Lines 30 and 32, and the total of interest repayments indicated on Lines 31 and 33.

Line 36, Subtotal, Debt Service, is the total of Lines 34 and 35.

Line 37, Total Operating Expenses and Debt Service, is the total of Lines 26, 27, 28, 29, and 36.

Line 38, Net System Revenues, shows the annual amounts of revenues remaining after the payment of operating costs and bond debt service costs.

Line 39, California Water Fund Repayment, shows the total amount of repayments made to the California Water Fund to reimburse the fund for monies expended for construction of the State Water Resources Development System.

Repayment of the California Water Fund was completed in 1998 after reimbursements totaling $508 million. In addition to the $296 million of repayments shown in Line 39, $211 million of reimbursement were credited to the SWP as offsets for recreation and fish and wildlife enhancement expenditures.

Line 40, Revenues Used for Capital Expenditures, includes the amounts required annually for financing scheduled capital expenditures. Revenues not needed for operating costs or debt services are available for financing SWP capital expenditures.

Future Costs of Water Service

Estimates of future water costs are useful to SWP contractors for short-range and long-range planning of water needs, operations, and budgets. Unit water charges shown in Table 14-12 represent both unescalated and escalated costs of water according to service areas for years 2007 and 2012. The unit rates include costs of existing and future SWP facilities accounted for in Table 14-1 and Table 14-7. The unit charges are based on the assumption that in 2007 and 2012, the SWP will be able to deliver the entire amounts of water requested by contractors. The unit water charges included in Table 14-12 are listed both as

unescalated 2005 dollars and as escalated rates reflecting assumed future inflation.

DWR's estimates of future capital expenditures include allowances for escalation of construction costs at 3 percent per year for 2006 through 2020. The escalation rates for future power sources vary, depending on the source of energy.

Table 14-12. Estimated Unit Water Charges for 2007 and 2012, by Service Area (Dollars per Acre-Foot)

	2007		2012	
Service Area and Charge	*Unescalated*	*Escalated*	*Unescalated*	*Escalated*
Feather River Area				
Capital; Operations, Maintenance, and Replacement (OM&R)	36	36	28	29
North Bay Area				
Capital; OM&R	204	204	154	154
Power	41	41	25	26
Total	**245**	**245**	**179**	**180**
South Bay Area				
Capital; OM&R	113	113	105	105
Power	52	52	53	55
Total	**165**	**165**	**158**	**160**
Coastal Area				
Capital; OM&R	719	719	494	494
Power	151	153	146	153
Total	**870**	**872**	**640**	**647**
San Joaquin Area				
Capital; OM&R	55	55	53	53
Power	25	25	24	25
Total	**80**	**80**	**77**	**78**
Southern California Area				
Capital; OM&R	160	160	126	126
Power	184	184	166	173
Total	**344**	**344**	**292**	**299**

Table 14-1. Capital Requirements and Financing, December 31, 2005 (Thousands of Dollars)

	Calendar Year																	
Line Number/Item	**1952-2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2006-2020**	**1952-2020**
Capital Requirements																		
1. Initial Project Facilities	2,202,316	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,202,316
2. North Bay Aqueduct	90,363	620	5,123	5,123	0	0	0	0	0	0	0	0	0	0	0	0	10,866	101,229
3. Delta and Suisun Marsh Facilities	249,571	10,260	10,260	10,260	3,660	3,660	3,660	0	0	0	0	0	0	0	0	0	41,760	291,331
4. Final 4 Units at Banks Pumping Plant	43,673	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43,673
5. Coastal Branch Aqueduct	507,048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	507,048
6. West Branch Aqueduct	193,498	11	45	600	332	4,195	480	220	0	0	0	0	0	0	0	0	5,883	199,381
7. East Branch Enlargement	453,459	603	4,381	6,921	23,618	23,807	60,302	67,620	70,792	70,796	70,723	52,132	4,076	0	0	0	455,771	909,230
8. East Branch Improvements	270,420	33,705	4,451	3,120	4,320	2,300	0	0	0	0	0	0	0	0	0	0	47,896	318,316
9. East Branch Extension	128,473	2,710	4,855	44,685	77,270	36,740	11,670	0	0	0	0	0	0	0	0	0	177,930	306,403
10. South Bay Aqueduct	18,102	25,910	62,647	25,843	10,000	0	0	0	0	0	0	0	0	0	0	0	124,400	142,502
11. Power Generation and Transmission Facilities	684,678	5,544	10,000	2,500	2,500	2,500	2,500	2,500	2,500	0	0	0	0	0	0	0	30,544	715,222
12. Additional Conservation Facilities	145,886	3,849	3,894	4,144	4,144	4,144	4,144	4,144	4,144	4,144	4,144	4,144	4,144	4,144	4,144	4,144	61,615	207,501
13. Agricultural Drainage Facilities	66,440	2,934	3,063	3,198	3,339	3,486	3,486	3,486	3,486	3,486	3,486	3,486	3,486	3,486	3,486	3,486	50,880	117,320
14. Other Costs	256,841	18,527	24,480	15,681	19,275	20,775	8,275	3,625	0	0	0	0	0	0	0	0	110,638	367,479
15. Total Project Construction Expenditures	**5,310,768**	**104,673**	**133,199**	**122,075**	**148,458**	**101,607**	**94,517**	**81,595**	**80,922**	**78,426**	**78,353**	**59,762**	**11,706**	**7,630**	**7,630**	**7,630**	**1,118,183**	**6,428,951**
16. Davis-Grunsky Act Program Costs	130,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130,000.0
17. Special Capital Requirements Under Revenue Bond Financing	597,040	18,191	7,498	19,928	9,730	17,105	1,330	17,258	0	16,752	0	16,189	0	0	0	0	123,981	721,021.0
18. Total Capital Requirements	**6,037,808**	**122,864**	**140,697**	**142,003**	**158,188**	**118,712**	**95,847**	**98,853**	**80,922**	**95,178**	**78,353**	**75,951**	**11,706**	**7,630**	**7,630**	**7,630**	**1,242,164**	**7,279,972**
19. Power Facilities Capital Requirements	684,678	5,544	10,000	2,500	2,500	2,500	2,500	2,500	2,500	0	0	0	0	0	0	0	30,544	715,222
20. Water Facilities Capital Requirements	5,353,130	117,320	130,697	139,503	155,688	116,212	93,347	96,353	78,422	95,178	78,353	75,951	11,706	7,630	7,630	7,630	1,211,620	6,564,750
Financing Of Capital Requirements																		
Power Revenue Bond Proceeds																		
21. Power Revenue Bonds through Series H	1,162,458	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,162,458
Water Revenue Bond Proceeds																		
22. East Branch Enlargement, Current Bonds	473,606	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	473,606
23. East Branch Extension, Current Bonds	139,520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139,520
24. East Branch Extension, Future Bonds		5,200	5,400	49,700	85,900	40,800	13,000	0	0	0	0	0	0	0	0	0	200,000	200,000
25. South Bay Aqueduct Improvement and Enlargement, Current Bonds	16,938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,938
26. South Bay Aqueduct Improvement and Enlargement, Future Bonds		31,500	69,600	28,700	11,100	0	0	0	0	0	0	0	0	0	0	0	140,900	140,900
27. Water System Facilities, Current Bonds	1,455,083	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,455,083
28. Water System Facilities, Future Bonds	0	146,200	0	120,300	0	130,100	0	172,700	0	167,100	0	161,900	0	0	0	0	898,300	898,300
29. Subtotal, Water Revenue Bonds	*2,085,147*	*182,900*	*75,000*	*198,700*	*97,000*	*170,900*	*13,000*	*172,700*	*0*	*167,100*	*0*	*161,900*	*0*	*0*	*0*	*0*	*1,239,200*	*3,324,347*
Other Capital Financing																		
30. Initial Project Facilities Bond Proceeds	1,452,452	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,452,452
31. Davis-Grunsky Act Program Bond Proceeds	130,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130,000
32. Application of California Water Fund Monies (Tideland Oil Revenues)	508,056	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	508,056
33. Interim Financing	64,536	(64,536)	61,197	(61,197)	56,688	(56,688)	78,347	(78,347)	76,422	(76,422)	73,853	(90,449)	7,206	3,130	3,130	3,130	(64,536)	0
34. Application of Capital Resources Revenues to Construction	566,269	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	566,269
35. Revenue Transfers Applied	68,890	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	67,500	136,390
36. Subtotal, Other Capital Financing	*2,790,203*	*(60,036)*	*65,697*	*(56,697)*	*61,188*	*(52,188)*	*82,847*	*(73,847)*	*80,922*	*(71,922)*	*78,353*	*(85,949)*	*11,706*	*7,630*	*7,630*	*7,630*	*2,964*	*2,793,167*
37. Total Financing Of Capital Requirements	**6,037,808**	**122,864**	**140,697**	**142,003**	**158,188**	**118,712**	**95,847**	**98,853**	**80,922**	**95,178**	**78,353**	**75,951**	**11,706**	**7,630**	**7,630**	**7,630**	**1,242,164**	**7,279,972**

Table 14-2. State Water Project Revenues and Expenditures, December 31, 2005 (Thousands of Dollars)

	Calendar Year																	
Line Number/Item	**1952-2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2006-2020**	**1952-2020**
PROJECT REVENUES																		
1. Capital resources revenues	814,701	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	814,701
Water Contractor Payments																		
2. Transportation capital	3,504,827	136,238	137,991	141,014	145,609	146,080	146,319	146,546	145,092	144,003	142,218	139,700	134,528	125,852	116,235	107,043	2,054,468	5,559,295
3. Transportation minimum	2,712,564	146,684	134,773	157,919	131,165	130,946	131,628	131,350	131,259	132,323	130,891	132,823	132,138	132,030	133,744	131,777	2,021,450	4,734,014
4. Transportation variable	3,314,516	238,873	312,665	349,613	300,014	327,478	323,698	348,515	398,092	429,383	441,875	470,301	443,417	474,352	495,864	460,855	5,814,995	9,129,511
5. Off-Aqueduct power facilities	2,200,965	106,859	124,268	135,600	135,835	136,657	133,497	133,707	78,185	20,080	11,901	10,195	9,909	4,210	4,175	4,498	1,049,576	3,250,541
6. Delta water charge	2,015,022	111,009	108,112	108,622	108,848	109,078	109,312	109,552	109,563	109,576	109,599	109,619	109,635	109,651	109,668	109,683	1,641,527	3,656,549
7. East Branch Enlargement	582,138	44,623	44,961	42,664	43,602	43,331	44,417	44,479	44,004	44,194	45,233	45,341	46,335	45,362	46,520	44,764	669,830	1,251,968
8. East Branch Extension	39,018	10,376	10,793	8,418	14,429	22,363	26,080	27,318	28,858	28,119	28,286	28,810	29,583	29,082	29,138	29,291	350,944	389,962
9. Coastal Extension	21,790	3,094	4,051	2,935	2,931	6,174	4,090	4,093	4,383	4,966	5,026	4,961	4,700	3,686	2,903	3,902	61,895	83,685
10. South Bay Aqueduct Enlargement	310	706	3,646	9,830	12,406	13,420	13,420	13,420	13,425	13,423	13,422	13,427	13,423	13,422	13,420	13,426	174,236	174,546
11. Tehachapi East Afterbay	185	259	260	260	260	260	260	260	260	260	260	260	260	260	260	260	3,899	4,084
12. Water revenue bond surcharge	392,609	62,374	62,400	58,712	59,603	57,031	61,565	61,630	64,960	67,362	70,842	71,562	70,510	62,181	67,055	61,746	959,533	1,352,142
13. Subtotal, water contractor payments	*14,783,944*	*861,095*	*943,920*	*1,015,587*	*954,702*	*992,818*	*994,286*	*1,020,870*	*1,018,081*	*993,689*	*999,553*	*1,026,999*	*994,438*	*1,000,088*	*1,018,982*	*967,245*	*14,802,353*	*29,586,297*
14. Revenue bond cover adjustments	(500,958)	(41,599)	(42,565)	(44,159)	(46,461)	(47,928)	(49,835)	(50,170)	(45,357)	(45,132)	(45,086)	(45,009)	(44,860)	(40,332)	(42,427)	(40,136)	(671,056)	(1,172,014)
15. Rate management adjustments	(259,514)	(24,746)	0	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(550,856)	(810,370)
Other Revenues																		
16. Federal payments for project operating costs	236,681	11,827	11,827	11,827	11,827	11,827	11,839	11,839	11,839	11,839	11,839	11,839	11,839	11,839	11,839	11,839	177,525	414,206
17. Appropriations for operating costs allocated to recreation	16,657	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,657
18. Davis-Grunsky loan repayments	54,187	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	21,000	75,187
19. Revenue bond proceeds	652,977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652,977
20. Interest earnings on operating revenues	572,493	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	60,000	632,493
21. Oroville-Thermalito payments	249,279	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	249,279
22. Miscellaneous revenues	184,264	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	184,264
23. Subtotal, other revenues	*1,966,538*	*17,227*	*17,227*	*17,227*	*17,227*	*17,227*	*17,239*	*17,239*	*17,239*	*17,239*	*17,239*	*17,239*	*17,239*	*17,239*	*17,239*	*17,239*	*258,525*	*2,225,063*
24. Total operating revenues	**15,990,010**	**811,977**	**918,582**	**948,185**	**884,998**	**921,647**	**921,220**	**947,469**	**949,493**	**925,326**	**931,236**	**958,759**	**926,347**	**936,525**	**953,324**	**903,878**	**13,838,966**	**29,828,976**
25. Total operating revenues and capital resources revenues	**16,804,711**	**811,977**	**918,582**	**948,185**	**884,998**	**921,647**	**921,220**	**947,469**	**949,493**	**925,326**	**931,236**	**958,759**	**926,347**	**936,525**	**953,324**	**903,878**	**13,838,966**	**30,643,677**
PROJECT EXPENSES																		
26. Project operations, maintenance, power, and replacement costs	7,887,020	522,292	638,078	666,096	572,871	599,314	595,205	618,274	645,606	623,789	632,905	666,879	638,506	669,763	691,873	652,490	9,433,941	17,320,961
27. Deposits to replacement reserves	132,950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132,950
28. Deposits to special reserves	755,953	16,696	(6,603)	(15,601)	(9,104)	(12,025)	(25,482)	(23,388)	(45,434)	(42,914)	(53,152)	(49,870)	(57,906)	(44,685)	(47,590)	(47,877)	(464,935)	291,018
29. Capital resources expenditures	686,932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	686,932
Payments of Debt Service																		
30. Principal repayments on bonds sold through December 31, 2005 (current bonds)	1,936,270	119,134	125,298	131,475	141,339	147,005	155,434	162,364	153,940	156,265	157,070	154,917	152,547	125,862	129,773	126,600	2,139,023	4,075,293
31. Interest on bonds sold through December 31, 2005 (current bonds)	5,035,909	149,355	143,601	137,386	131,125	124,388	117,315	109,495	101,242	94,048	86,662	79,081	71,500	63,886	57,569	50,965	1,517,618	6,553,527
32. Future water bond principal repayments	0	0	3,825	6,369	11,377	15,489	20,436	22,061	27,143	28,586	34,528	36,373	43,360	45,685	48,136	50,719	394,087	394,087
33. Future water bond interest payments	0	0	9,883	17,960	32,890	42,976	53,812	54,163	62,496	61,052	68,723	66,879	73,840	71,514	69,063	66,481	751,732	751,732
34. Total principal	**1,936,270**	**119,134**	**129,123**	**137,844**	**152,716**	**162,494**	**175,870**	**184,425**	**181,083**	**184,851**	**191,598**	**191,290**	**195,907**	**171,547**	**177,909**	**177,319**	**2,533,110**	**4,469,380**
35. Total interest	**5,035,909**	**149,355**	**153,484**	**155,346**	**164,015**	**167,364**	**171,127**	**163,658**	**163,738**	**155,100**	**155,385**	**145,960**	**145,340**	**135,400**	**126,632**	**117,446**	**2,269,350**	**7,305,259**
36. Subtotal, debt service	*6,972,179*	*268,489*	*282,607*	*293,190*	*316,731*	*329,858*	*346,997*	*348,083*	*344,821*	*339,951*	*346,983*	*337,250*	*341,247*	*306,947*	*304,541*	*294,765*	*4,802,460*	*11,774,639*
NET REVENUES																		
37. Total Operating Expenses and Debt Service	**16,435,034**	**807,477**	**914,082**	**943,685**	**880,498**	**917,147**	**916,720**	**942,969**	**944,993**	**920,826**	**926,736**	**954,259**	**921,847**	**932,025**	**948,824**	**899,378**	**13,771,466**	**30,206,500**
38. Net system revenues	369,677	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	67,500	437,177
Application of Net System Revenues																		
39. California Water Fund repayment	296,287	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	296,287
40. Revenues used for capital expenditures	73,390	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	67,500	140,890

Table 14-10. Operations, Maintenance, Power, and Replacement Costs, by Facility, Composition, and Purpose (Thousands of Dollars)

	Calendar year												
Feature	**1962-2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016-2035**	**TOTAL**
Project Facility													
Feather River facilities	748,383	28,943	28,551	32,398	26,251	26,098	26,416	26,442	26,438	26,374	26,228	592,560	1,615,083
North Bay Aqueduct	41,849	3,179	3,963	4,355	3,580	3,628	3,674	3,736	3,881	3,998	4,032	86,453	166,329
Delta facilities	576	0	0	0	0	0	0	0	0	0	0	0	576
Suisun Marsh	24,854	2,387	2,988	3,390	2,747	2,731	2,223	2,225	2,224	2,217	2,205	49,817	100,009
South Bay Aqueduct	134,825	12,335	15,309	16,605	13,663	13,867	13,999	14,233	14,871	15,357	15,395	315,965	596,424
California Aqueduct													
Delta to Edmonston	2,875,008	179,806	222,540	240,389	196,159	211,063	208,477	213,122	239,695	246,660	253,379	5,449,361	10,535,658
Edmonston to Perris	2,509,685	206,730	258,374	265,635	228,045	238,926	239,939	255,926	281,567	304,523	306,696	6,440,233	11,536,278
West Branch	(69,791)	(8,162)	(12,495)	(13,706)	(11,639)	(11,338)	(10,921)	(9,098)	(10,365)	(10,550)	(10,304)	(316,757)	(495,125)
Coastal Branch	189,185	12,877	15,845	17,014	14,048	14,321	14,450	14,741	15,548	16,173	16,236	334,847	675,285
East Branch Enlargement	38,491	4,830	5,025	4,968	4,968	4,968	4,968	4,968	4,968	4,968	4,968	99,369	187,461
Off-Aqueduct power-generating facilities	1,090,115	62,815	80,983	78,053	78,053	78,053	78,013	78,013	52,813	103	103	515	1,677,632
Recreation, planning, and CVP negotiations	3,298	683	683	683	683	683	683	683	683	683	683	13,669	23,797
Water quality monitoring	349,887	15,270	15,712	15,712	15,712	15,712	12,683	12,683	12,683	12,683	12,683	227,572	718,992
Davis-Grunsky Act Program	10,505	600	600	600	600	600	600	600	600	600	600	12,000	28,505
Subtotal	*7,946,868*	*522,292*	*638,078*	*666,096*	*572,871*	*599,314*	*595,205*	*618,274*	*645,606*	*623,789*	*632,905*	*13,305,605*	*27,366,903*
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	**7,887,020**	**522,292**	**638,078**	**666,096**	**572,871**	**599,314**	**595,205**	**618,274**	**645,606**	**623,789**	**632,905**	**13,305,605**	**27,307,055**
Composition													
Salaries and expenses of headquarters personnel	2,223,395	72,503	112,779	139,101	90,759	89,819	87,532	93,774	92,912	92,375	90,153	1,629,495	4,814,598
Salaries and expenses of field personnel	3,283,348	77,213	135,939	170,330	115,756	114,955	112,046	120,534	119,323	120,575	117,604	2,853,538	7,341,161
Pumping power													
Used by pumping plants	1,846,651	363,373	362,682	355,476	357,343	386,374	389,475	396,786	453,346	485,061	499,835	10,401,133	16,297,536
Produced by generation plants	(387,188)	(53,890)	(54,581)	(77,141)	(69,317)	(70,165)	(72,138)	(71,110)	(73,065)	(74,602)	(75,067)	(1,585,028)	(2,663,294)
Payments to\credits from PG&E under Comprehensive Agreement	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Off-Aqueduct power generating facilities requirement	1,090,117	62,815	80,983	78,053	78,053	78,053	78,013	78,013	52,813	103	103	927	1,678,046
Oroville-Thermalito insurance premiums	11,597	277	277	277	277	277	277	277	277	277	277	5,540	19,907
Less: Portion of costs incurred during construction	(121,051)	0	0	0	0	0	0	0	0	0	0	0	(121,051)
Total OMP&R Costs	**7,887,020**	**522,292**	**638,078**	**666,096**	**572,871**	**599,314**	**595,205**	**618,274**	**645,606**	**623,789**	**632,905**	**13,305,605**	**27,307,055**
Project Purpose													
Water supply and power generation	7,571,002	499,369	615,155	643,172	549,947	576,391	572,281	595,349	622,680	600,860	609,976	12,847,025	26,303,207
Payments to\credits from PG&E under Comprehensive Agreement	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Recreation and fish and wildlife enhancement	151,839	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	200,000	451,839
Flood control	4,714	323	323	324	324	323	324	325	326	329	329	6,580	14,544
Miscellaneous purposes													
Federal share, San Luis, and Delta facilities	208,808	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	240,000	568,808
Other (Davis-Grunsky, drainage, City of Los Angeles)	10,505	600	600	600	600	600	600	600	600	600	600	12,000	28,505
Total OMP&R Costs	**7,887,020**	**522,292**	**638,078**	**666,096**	**572,871**	**599,314**	**595,205**	**618,274**	**645,606**	**623,789**	**632,905**	**13,305,605**	**27,307,055**

Table 14-11. Annual Debt Service on Bonds Sold through December 31, 2005 (Thousands of Dollars)

Calendar Year	Series A through Y Water Bonds		Oroville Revenue Bonds[a]		Pyramid Project Revenue Bonds[b]		Alamo Project Revenue Bonds[b]		Small Hydro Project Revenue Bonds[b]		Water System Facilities Water System Revenue Bonds[c]		*Subtotal*		Devil Canyon-Castaic Project Revenue Bonds		Reid Gardner Project Revenue Bonds[b,c]		South Geysers Project Revenue Bonds[b]		Bottle Rock Project Revenue Bonds[b]		East Branch Enlargement Project Water System Revenue Bonds[c]		Coastal Extension Facilities Water System Revenue Bonds		East Branch Extension Facilities Water System Revenue Bonds[c]		South Bay Enlargement Facilities Water System Revenue Bonds[c]		Tehachapi 2nd Afterbay Facilities Water System Revenue Bonds[c]		Grand Total	
	Principal	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*	*Principal*	*Interest*
1964	0	3,333	0	0	0	0	0	0	0	0	0	0	*0*	*3,333*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,333
1965	0	11,114	0	0	0	0	0	0	0	0	0	0	*0*	*11,114*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,114
1966	0	18,764	0	0	0	0	0	0	0	0	0	0	*0*	*18,764*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,764
1967	0	26,911	0	0	0	0	0	0	0	0	0	0	*0*	*26,911*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,911
1968	0	37,761	0	3,876	0	0	0	0	0	0	0	0	*0*	*41,637*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41,637
1969	0	47,460	0	10,448	0	0	0	0	0	0	0	0	*0*	*57,908*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57,908
1970	0	53,290	0	13,145	0	0	0	0	0	0	0	0	*0*	*66,435*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66,435
1971	0	63,035	0	13,145	0	0	0	0	0	0	0	0	*0*	*76,180*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76,180
1972	0	69,149	1,260	13,112	0	0	0	0	0	0	0	0	*1,260*	*82,261*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,260	82,261
1973	1,200	69,347	1,330	13,042	0	0	0	0	0	0	0	0	*2,530*	*82,389*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,530	90,097
1974	3,000	69,533	1,400	12,969	0	0	0	0	0	0	0	0	*4,400*	*82,502*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,400	90,210
1975	5,000	69,366	1,475	12,893	0	0	0	0	0	0	0	0	*6,475*	*82,259*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,475	89,967
1976	7,000	69,657	1,555	12,811	0	0	0	0	0	0	0	0	*8,555*	*82,468*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,555	90,176
1977	10,200	69,298	1,635	12,727	0	0	0	0	0	0	0	0	*11,835*	*82,025*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,835	89,733
1978	12,700	69,286	5,775	12,537	0	0	0	0	0	0	0	0	*18,475*	*81,823*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,475	89,531
1979	13,650	68,660	11,585	12,275	0	0	0	0	0	0	0	0	*25,235*	*80,935*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,235	88,643
1980	16,050	67,941	3,265	11,739	0	7,900	0	0	0	0	0	0	*19,315*	*87,580*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,315	95,288
1981	18,050	67,078	4,885	11,444	0	7,292	0	0	0	0	0	0	*22,935*	*85,814*	0	7,708	0	5,312	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22,935	98,834
1982	19,250	66,130	17,920	10,968	0	7,292	0	0	0	0	0	0	*37,170*	*84,390*	0	7,708	0	14,347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37,170	106,445
1983	20,520	65,111	21,110	10,147	0	7,292	0	2,449	0	3,727	0	0	*41,630*	*88,726*	900	7,708	0	35,719	0	4,777	0	6,017	0	0	0	0	0	0	0	0	0	0	42,530	142,947
1984	21,785	64,036	10,005	9,013	640	7,292	0	4,198	0	3,727	0	0	*32,430*	*88,266*	955	7,647	0	35,719	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	0	33,385	147,594
1985	22,555	62,892	12,700	8,628	675	7,238	0	4,198	0	3,727	0	0	*35,930*	*86,683*	1,010	7,583	9,425	27,209	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	0	46,365	137,437
1986	23,830	61,705	11,435	7,859	715	7,377	0	4,263	0	3,537	0	0	*35,980*	*84,741*	1,070	7,515	3,805	32,882	0	5,516	1,240	10,315	0	4,021	0	0	0	0	0	0	0	0	42,095	144,990
1987	25,495	60,452	11,715	7,188	790	7,513	265	4,329	0	3,348	0	4,952	*38,265*	*87,782*	1,135	7,442	4,860	32,605	0	5,386	1,305	10,253	0	9,651	0	0	0	0	0	0	0	0	45,565	153,119
1988	26,770	59,120	6,685	6,664	830	7,447	280	4,314	345	3,348	710	11,037	*35,620*	*91,930*	1,205	7,366	5,065	32,295	580	5,521	1,390	10,849	995	9,875	0	0	0	0	0	0	0	0	44,855	157,836
1989	28,145	57,790	33,705	5,513	875	7,378	295	4,298	365	3,328	1,148	14,373	*64,533*	*92,680*	1,275	7,284	7,820	27,557	709	5,646	1,565	11,592	1,078	10,104	0	0	0	0	0	0	0	0	76,980	154,863
1990	29,385	56,436	10,385	4,301	930	7,305	320	4,279	405	3,304	1,227	19,555	*42,652*	*95,180*	1,355	7,198	6,675	29,781	761	5,596	1,678	11,491	1,134	10,048	0	0	0	0	0	0	0	0	54,255	159,294
1991	30,365	55,034	12,055	3,922	980	7,227	335	4,257	430	3,276	2,129	27,569	*46,294*	*101,285*	1,435	7,107	7,170	29,302	818	5,535	1,791	11,376	1,197	16,856	0	0	0	0	0	0	0	0	58,705	171,461
1992	31,745	54,193	14,135	2,985	2,395	5,308	1,260	3,086	960	2,553	5,108	28,411	*55,603*	*96,536*	1,520	7,010	8,950	27,188	1,934	4,136	4,575	7,942	2,583	22,241	0	0	0	0	0	0	0	0	75,165	165,053
1993	33,390	52,670	13,755	2,237	1,525	5,688	755	3,300	445	2,640	4,577	29,965	*54,447*	*96,500*	1,610	6,907	8,820	26,953	901	4,256	3,264	8,385	3,040	21,428	0	0	0	0	0	0	0	0	72,082	164,429
1994	35,075	51,231	35,225	934	1,580	5,634	780	3,274	695	2,569	5,910	38,223	*79,265*	*101,865*	1,705	6,799	77,105	26,273	1,588	4,072	3,374	8,270	4,567	20,752	0	0	0	0	0	0	0	0	167,604	168,031
1995	36,280	49,703	0	0	1,635	5,570	805	3,242	745	2,536	8,064	37,879	*47,529*	*98,930*	1,810	6,684	5,420	19,230	1,695	4,004	3,521	8,133	4,979	20,499	0	0	0	0	0	0	0	0	64,954	157,480
1996	37,520	48,024	0	0	2,320	5,486	1,055	3,203	3,135	2,464	10,459	58,170	*54,489*	*117,347*	1,920	6,561	49,465	18,130	3,043	3,908	3,682	7,974	4,771	23,240	0	0	0	0	0	0	0	0	117,370	177,160
1997	37,215	46,365	0	0	1,695	5,274	875	3,073	585	2,283	14,375	67,910	*54,745*	*124,905*	2,035	6,432	7,515	15,255	1,825	3,696	3,861	7,741	6,300	23,702	0	1,981	0	76	0	0	0	0	76,281	183,788
1998	37,295	44,736	0	0	1,770	5,237	910	3,059	625	2,258	16,754	68,585	*57,354*	*123,875*	2,155	6,295	5,045	16,144	1,935	3,637	4,030	7,508	6,760	23,966	0	1,829	0	229	0	0	0	0	77,279	183,483
1999	38,220	43,132	0	0	1,845	5,141	960	3,005	680	2,229	18,701	68,085	*60,406*	*121,592*	2,285	6,160	9,310	11,659	2,081	3,549	4,240	7,318	7,518	25,033	0	1,808	65	2,931	0	0	0	0	85,905	180,050
2000	39,510	41,469	0	0	1,925	5,045	1,010	2,955	610	2,197	19,536	66,901	*62,591*	*118,567*	2,420	6,040	9,870	11,194	1,950	3,448	4,470	7,096	8,974	24,652	0	1,808	915	2,928	0	0	0	0	91,190	175,733
2001	40,600	39,751	0	0	2,250	4,949	1,155	2,901	780	2,272	20,944	66,418	*65,729*	*116,291*	2,565	5,912	10,365	10,757	2,045	3,344	4,720	6,855	9,425	24,187	0	2,131	950	2,889	0	0	0	0	95,799	172,366
2002	41,740	37,984	0	0	2,460	4,619	1,280	2,758	950	2,192	23,918	63,128	*70,348*	*110,681*	2,720	5,773	11,185	10,011	2,225	3,075	5,265	6,323	9,817	23,098	335	2,311	1,245	3,481	0	0	0	0	103,140	164,753
2003	43,590	36,159	0	0	2,500	4,429	1,315	2,672	940	2,110	23,442	60,439	*71,787*	*105,809*	2,885	5,626	2,135	9,314	2,335	2,890	5,445	5,939	9,988	18,444	245	2,310	1,105	4,277	0	0	0	0	95,925	154,609
2004	45,730	34,244	0	0	2,500	4,291	1,330	2,598	970	2,059	26,396	60,952	*76,926*	*104,144*	3,055	5,470	2,210	9,228	2,425	2,758	5,610	5,634	9,883	20,820	220	2,298	2,045	5,538	0	232	0	139	102,374	156,261
2005	46,985	32,242	0	0	2,727	3,992	1,461	2,406	1,327	1,963	23,064	57,886	*75,564*	*98,489*	3,240	5,305	8,825	9,127	2,759	2,563	5,959	5,237	3,669	20,105	305	2,155	2,124	5,968	0	559	0	197	102,445	149,705
2006	48,275	30,186	0	0	2,868	3,986	1,527	2,437	1,371	1,924	28,901	60,190	*82,942*	*98,723*	3,435	5,130	9,340	8,624	2,920	2,453	6,326	4,958	11,627	20,469	240	2,235	2,222	6,105	82	734	0	209	119,134	149,640
2007	49,765	28,060	0	0	3,023	3,817	1,622	2,346	1,451	1,846	30,342	58,856	*86,203*	*94,925*	3,640	4,945	9,835	8,083	3,101	2,278	6,731	4,578	12,229	19,899	1,015	2,225	2,305	6,028	239	734	0	210	125,298	143,905
2008	51,755	25,871	0	0	2,794	3,639	1,618	2,251	1,161	1,763	26,432	57,337	*83,760*	*90,861*	3,860	4,749	23,839	7,507	2,765	2,092	5,637	4,176	11,062	19,274	179	2,169	126	5,925	247	727	0	210	131,475	137,690
2009	54,095	23,583	0	0	2,945	3,481	1,740	2,155	1,168	1,699	28,949	56,225	*88,897*	*87,143*	4,090	4,540	25,334	6,198	2,906	1,938	5,975	3,853	12,339	18,749	185	2,159	1,364	5,919	249	720	0	210	141,339	131,429
2010	55,785	21,206	0	0	3,525	3,315	2,078	2,051	1,399	1,635	25,958	54,892	*88,745*	*83,099*	4,335	4,319	26,851	4,894	3,221	1,776	6,611	3,512	12,718	18,153	2,790	2,149	1,478	5,867	256	713	0	210	147,005	124,692
2011	57,275	18,749	0	0	2,599	3,121	1,465	1,933	1,045	1,561	35,151	53,644	*97,535*	*79,008*	4,595	4,085	26,835	3,511	2,917	1,598	6,366	3,138	14,212	17,527	1,237	2,034	1,473	5,803	264	705	0	210	155,434	117,619
2012	58,615	16,199	0	0	2,761	2,941	1,574	1,831	1,060	1,491	36,995	51,929	*101,005*	*74,391*	4,875	3,837	28,461	2,023	3,116	1,396	6,845	2,695	14,957	16,831	1,294	1,980	1,539	5,740	272	696	0	210	162,364	109,799
2013	60,455	13,650	0	0	4,223	2,748	2,615	1,720	2,191	1,419	42,770	50,070	*112,254*	*69,607*	5,165	3,574	515	413	4,831	1,177	11,125	2,215	15,339	16,071	1,587	1,920	2,839	5,671	285	688	0	210	153,940	101,546
2014	57,985	11,222	0	0	4,859	2,522	3,137	1,583	2,404	1,299	48,292	47,943	*116,677*	*64,569*	5,475	3,303	215	387	4,177	913	8,643	1,624	16,276	15,285	2,130	1,842	2,377	5,543	295	676	0	210	156,265	94,352
2015	53,775	8,806	0	0	5,274	2,265	3,123	1,419	2,745	1,169	56,012	45,567	*120,929*	*59,226*	5,805	3,015	810	376	3,833	689	2,553	1,155	17,936	14,456	2,281	1,740	2,618	5,435	305	664	0	210	157,070	86,966
2016	46,215	6,588	0	0	5,712	1,980	3,228	1,251	3,110	1,019	59,898	42,683	*118,163*	*53,521*	6,150	2,710	1,020	332	2,237	482	2,964	1,019	18,954	13,526	2,344	1,625	2,764	5,308	321	652	0	210	154,917	79,385
2017	38,145	4,652	0	0	6,414	1,672	3,586	1,080	3,299	849	61,112	39,597	*112,556*	*47,850*	6,520	2,388	1,185	277	1,452	361	3,598	858	20,732	12,541	2,255	1,506	3,917	5,174	332	639	0	210	152,547	71,804
2018	25,435	3,011	0	0	4,928	1,329	2,882	889	2,563	669	52,739	36,419	*88,547*	*42,317*	6,910	2,045	50	212	705	284	1,242	666	22,793	11,464	1,559	1,389	3,708	4,981	348	622	0	210	125,862	64,190
2019	16,975	1,804	0	0	4,639	1,081	2,812	744	2,256	540	63,464	33,745	*90,146*	*37,914*	7,325	1,682	50	209	754	249	1,277	603	24,908	10,294	1,013	1,309	3,936	4,798	364	605	0	210	129,773	57,873
2020	17,405	956	0	0	5,651	838	3,403	599	2,863	420	57,749	30,530	*87,071*	*33,343*	7,765	1,298	55	207	887	212	1,488	539	22,828	9,016	1,865	1,257	4,255	4,601	386	586	0	210	126,600	51,269
2021	8,595	318	0	0	2,789	548	1,741	425	1,317	271	64,232	27,692	*78,674*	*29,254*	8,230	890	1,010	204	972	167	2,457	463	24,690	7,887	2,260	1,162	4,667	4,389	403	567	0	210	123,363	45,193
2022	1,885	60	0	0	5,556	408	5,218	338	1,378	205	61,749	24,545	*75,786*	*25,556*	8,725	458	1,060	154	909	118	2,420	341	25,624	6,665	3,070	1,048	4,866	4,155	425	547	0	210	122,885	39,252
2023	85	7	0	0	1,122	128	594	75	764	134	68,724	21,501	*71,289*	*21,845*	0	0	550	99	589	71	2,006	217	21,529	5,394	2,303	890	4,885	3,909	443	526	0	210	103,594	33,161
2024	35	3	0	0	716	70	404	45	534	95	68,843	18,045	*70,532*	*18,258*	0	0	310	71	460	40	1,567	104	23,518	4,329	2,420	771	5,092	3,662	466	506	0	210	104,365	27,951
2025	0	0	0	0	144	35	102	25	247	68	63,906	14,589	*64,399*	*14,717*	0	0	65	55	60	15	59	14	28,618	3,166	2,007	647	5,192	3,408	485	485	0	210	100,885	22,717
2026	0	0	0	0	151	28	108	20	259	55	58,784	11,496	*59,302*	*11,599*	0	0	185	52	63	12	61	11	10,180	1,754	2,115	542	11,385	3,148	1,569	460	630	210	85,490	17,788
2027	0	0	0	0	405	20	289	14	353	42	69,425	8,742	*70,472*	*8,818*	0	0	255	45	170	8	165	8	10,862	1,268	2,085	432	15,333	2,638	2,223	393	1,005	185	102,570	13,795
2028	0	0	0	0	0	0	0	0	230	24	51,907	5,512	*52,137*	*5,536*	0	0	370	34	0	0	0	0	7,106	755	3,160	327	21,093	1,966	3,273	298	1,615	145	88,754	9,061
2029	0	0	0	0	0	0	0	0	245	13	60,491	3,117	*60,736*	*3,130*	0	0	380	18	0	0	0	0	7,774	412	3,340	168	21,987	1,063	3,404	162	1,685	80	99,306	5,033
Total	**1,582,400**	**2,386,523**	**244,995**	**246,522**	**108,660**	**199,188**	**61,312**	**103,348**	**50,405**	**83,857**	**1,449,287**	**1,705,299**	*3,497,059*	*4,724,737*	**139,165**	**283,872**	**419,620**	**567,184**	**74,654**	**116,936**	**157,101**	**229,625**	**505,489**	**637,902**	**45,839**	**52,157**	**139,870**	**139,558**	**16,936**	**14,892**	**4,935**	**5,155**	**5,000,668**	**6,772,019**

[a]Principal and interest schedule adjusted to reflect early redemption of bonds.
[b]Allocated portions of Power Facilities Revenue Bonds and Water System Revenue Bonds.
[c]Interest includes a minimum fee for Water System Revenue Bonds Series AB.

Chapter 15
SWP Education and Information

Vista del Lago Visitors Center

Significant Events in 2005

The Department of Water Resources (DWR) welcomed 27 foreign tours with 362 visitors to State Water Project (SWP) and other facilities; there also were a number of domestic and school tours to the SWP Delta Facilities. Tour groups came from all over the United States and nine foreign countries.

The Public Affairs Office (PAO) began coverage of the historic process to renew the federal license to operate Oroville facilities, the heart of the SWP. Director Snow signed the application, which was the culmination of five years of collaboration between stakeholders.

During May, DWR observed Water Awareness Month for the eighteenth consecutive year, highlighting activities at DWR facilities and answering media inquiries regarding water awareness.

DWR NEWS/People initiated the State Water Contractors Profile feature.

Brochures for Lake Oroville Recreation, Lake Oroville Recreation Sports Version, and the California State Water Project were revised and reprinted.

Information for this chapter was provided by the Public Affairs Office

The Public Affairs Office (PAO) serves as liaison between the Department of Water Resources (DWR), the news media and the public. One role of the PAO is to provide education to those from the outside about DWR's mission and programs. Sophisticated graphics, video, and photography units play an important role in the outreach process, as do publications, websites, visitors centers, tours, exhibits, and special events.

Media Outreach

Relicensing Oroville Facilities

PAO began coverage of the historic process to renew its federal license to operate the Oroville Facilities, the heart of the State Water Project (SWP). Director Snow signed the application, which was the culmination of five years of collaboration between stakeholders.

Snow Surveys

PAO continued to provide media outreach for the Division of Flood Management Snow Surveys Section.

California Bay-Delta Authority

PAO assisted the California Bay-Delta Authority (CBDA) in media and outreach activities. This included providing public address system support for public hearings, meetings, and conferences.

News Events

- In January, DWR increased the 2005 allocation to 60 percent for water delivery to the SWP contractors. The initial allocation was 40 percent of requested water delivery amounts.
- In February, DWR accepted 168 of 174 proposals seeking grants through the 2004 Water Use Efficiency Proposal Solicitation Package.
- In March, DWR was forced to delay the re-opening of Vista del Lago Visitors Center at Pyramid Lake because of a landslide. It had been closed temporarily to repair damage due to previous mudslides.
- In April, DWR announced the results of the final snow survey for 2005. Snow depth and water content ranged from 168 percent to 190 percent of average.
- In May, DWR closely monitored river conditions throughout Northern California. Heavy rainfall and snowmelt pushed many rivers to near or above flood stage.
- In June, DWR and the Oroville Area Chamber of Commerce held a ribbon-cutting ceremony for the Oroville Forebay Aquatic Center grand opening. The Aquatic Center offers aquatic programs for the public, including boat rentals and camps for kids.
- In July, DWR provided emergency response assistance at Wheeler Island, in the Suisun Marsh, following a levee break. The marshy area is under the jurisdiction of Reclamation District 2127, and there were no residences or other significant structures affected during the incident.
- In August, DWR launched the Salton Sea Ecosystem Restoration website to document the development of a restoration plan for the Salton Sea ecosystem, and accompanying Environmental Impact Report (EIR).
- In early September, DWR co-sponsored the Sacramento Flood Conference.

Officials from California, Nevada, and Hawaii gathered to discuss structural and non-structural solutions to flood challenges.

- In October, DWR and the Department of Fish and Game (DFG) released the Delta Smelt Action Plan, prepared to identify causes and find solutions for pelagic organism decline in the Delta. DWR also announced it would move forward with plans to repair seismic instability found in Perris Dam. This decision was made after an independent panel concurred with DWR's findings.
- In November, DWR launched the South Delta Improvements Program (SDIP) website to provide information and a means for the public to provide feedback on hearings held through January 2006.
- On December 27, DWR announced a flood alert. By New Year's Eve, major storms forced evacuations on Twitchell Island.

Community Relations

Oroville

PAO staff continued to provide media outreach for Oroville community meetings related to DWR's application for a new federal license to operate Oroville facilities. PAO maintained the Lake Oroville recreation website, http://www.lakeoroville.water.ca.gov, which provides information about the lake's recreational opportunities and other area facilities and attractions. In addition, PAO provided photography for the City of Oroville and the Oroville Area Chamber of Commerce for various community events.

The PAO design group produced promotional materials for Oroville area activities including the Fourth of July community celebration, Feather River Fiesta Days, and September Salmon Festival. Products included posters, interactive educational displays, promotional displays, and informative handouts. The photography unit captured event activities for use in various publications, including DWR NEWS/People. Audio-visual staff assisted the public in using a fishing simulator (an interactive device complete with fishing pole and video screen that provided participants with a virtual reality fishing experience). The video group created public service announcements about events and distributed them to radio and television stations in the Oroville and Chico areas.

California Lakes and Reservoirs Appreciation Week

DWR collaborated with the Department of Boating and Waterways (DBW) to share expenses in publicizing California Lakes and Reservoirs Appreciation Week. DWR distributed promotional flyers and wristbands designed to highlight the week and educate water users at California state parks and reservoirs operated by DWR, U.S. Army Corps of Engineers (the Corps), and U.S. Bureau of Reclamation (Reclamation). The message for 2005 focused on clean water.

SWP Publications

In 2005, brochures for Lake Oroville Recreation, Lake Oroville Recreation Sports Version, and the California State Water Project were revised and reprinted.

E-News

PAO continued to distribute "clips" of newspaper articles on California water

issues, via e-mail. These clips were e-mailed to DWR employees under the heading of California Water News. DWR answered a wide range of questions from the public and government agencies through its web-based "comment line." PAO administered Recent News at http://www.dwr.water.ca.gov; posted news releases; news advisories; and new web sites.

DWR NEWS/People

DWR's quarterly magazine, *DWR NEWS/People,* spotlighted DWR programs, projects, individual and team accomplishments, skills, awards, promotions, retirements, and other news items. In addition to initiating the State Water Contractors Profile feature, articles featured in 2005 included the Eureka Flood Center, Federal Energy Regulatory Commission (FERC) Seventh Part 12 Dam Safety Inspection Report, Oroville Relicensing Application Signing, New Runner at Oroville's Hyatt Power Plant, Skinner Fish Facility Trash Racks, Mudslides and Oil Spill in Southern California, South Bay Enlargement Project, Colorado River Basin Drought, Lower Yuba River Accord, McCune Station Open House, Global Warming's Possible Impacts, Lake Kaweah Project, and Oroville's Aquatic Boathouse Opening. In summer 2005, staff began story selection and photo research for DWR's 50th Anniversary edition, to be printed in 2006.

DWR NEWS/People is circulated to all elements of the California water community, including SWP contractors and current and retired employees of DWR. All 2005 issues of *DWR NEWS/People* magazine were placed on DWR's website at http://www.publicaffairs.water.ca.gov/dwrnewsletter/.

Video

The video group released *Water for Tomorrow*, a companion video to California Water Plan Update 2005, and *Rough Water Ahead* to complement the 2005 Flood White Paper, Flood Warnings: Responding to California's Flood Crisis. *The Power of Water* was produced for the Division of SWP Planning and Management. In addition, a 30-second public service announcement (PSA) was produced for the annual salmon festival in Oroville, as well as an educational piece on the Oroville Fish Hatchery, which ran eight minutes. The video group worked with DWR's webmaster to place video clips on DWR's "Aquanet" website, including a promotional video for the "Catch A Special Thrill for Kids" (C.A.S.T.) program. The Aquatic Adventure Camps at San Luis, Oroville, and Lake Perris were also documented on film. In and ongoing effort, the video group continued transitioning the video tape library to DVD.

Photography

Photographs were taken throughout the State to supplement articles for *DWR NEWS/People*. Photos were taken of the Salton Sea and Colorado River for use in departmental reports and presentations. In addition, photographs were taken to document the December 2005 New Year's Eve flood event.

Also continuing in 2005 were digital imaging and photographic support for Oroville facilities relicensing.

Audio-Visual

PAO's audio-visual unit provided public address system support for numerous meetings.

Community Outreach

As one of the agencies supporting the C.A.S.T. program, DWR employees continued to promote and volunteer at events throughout the state.

SWP Tours

During 2005, DWR welcomed 27 foreign tours with 362 visitors to the SWP and other facilities; there also were a number of domestic and school tours to the SWP Delta Facilities. Tour groups came from all over the United States and nine foreign countries: Afghanistan, Argentina, Australia, Brazil, China, Germany, Iraq, Japan, and South Korea. The Delta Tour program for DWR employees, part of the DWR Training Program, was suspended for 2005 because of the lack of 15 passenger vans in the General Services Garage. Figure 15-1 shows SWP visitors centers.

Displays and Exhibits

Oroville Field Division

In 2005, new aluminum based interpretive display panels were installed at the fish hatchery. These panels replaced the previous ones damaged through material failure. Displays offer the hatchery visitor a self-guided tour of the facility and facility operations.

Bidwell Toll House was converted into a small museum with artifacts, and low-tech and static displays on the history of the toll house and bridge. The work was done for the Department of Parks and Recreation (DPR) under the FERC relicensing agreement.

Delta Field Division

In 2005, PAO staff installed Phase 1 exhibits for the Delta Field Division Administration. The exhibit features the history of the Sacramento-San Joaquin Delta, SWP, Banks Pumping Plant, hydropower, environmental programs, Skinner Fish Facility, and salinity control. Phase 2 is expected to be completed in 2006, and will include a new map of the Delta.

San Luis Field Division

In 2005, PAO staff installed Phase 1 exhibits for DPR at Romero Visitors Center. Display panels and cabinetry featured artifacts of local California Native Americans in and around the San Luis area and recreation and wildlife in the San Luis Recreation Area. Phase 2 is expected to be completed in 2006. Replicated Native American artifacts and a diorama for wildlife display will be included.

Oral History Program

Retired annuitants Art Winslow and Ernie James have traveled hundreds of miles to compile oral histories of persons significant in DWR's development and history. PAO staff continues work on this project by writing biographies and completing a catalog from 150 interviews.

School Education Program

The School Education Program's goal is to provide students and educators with a statewide perspective on water issues such as conservation, conveyance systems, and the water cycle. PAO staff develops and promotes high quality materials, and provides them free of charge to schools, educators, and water districts.

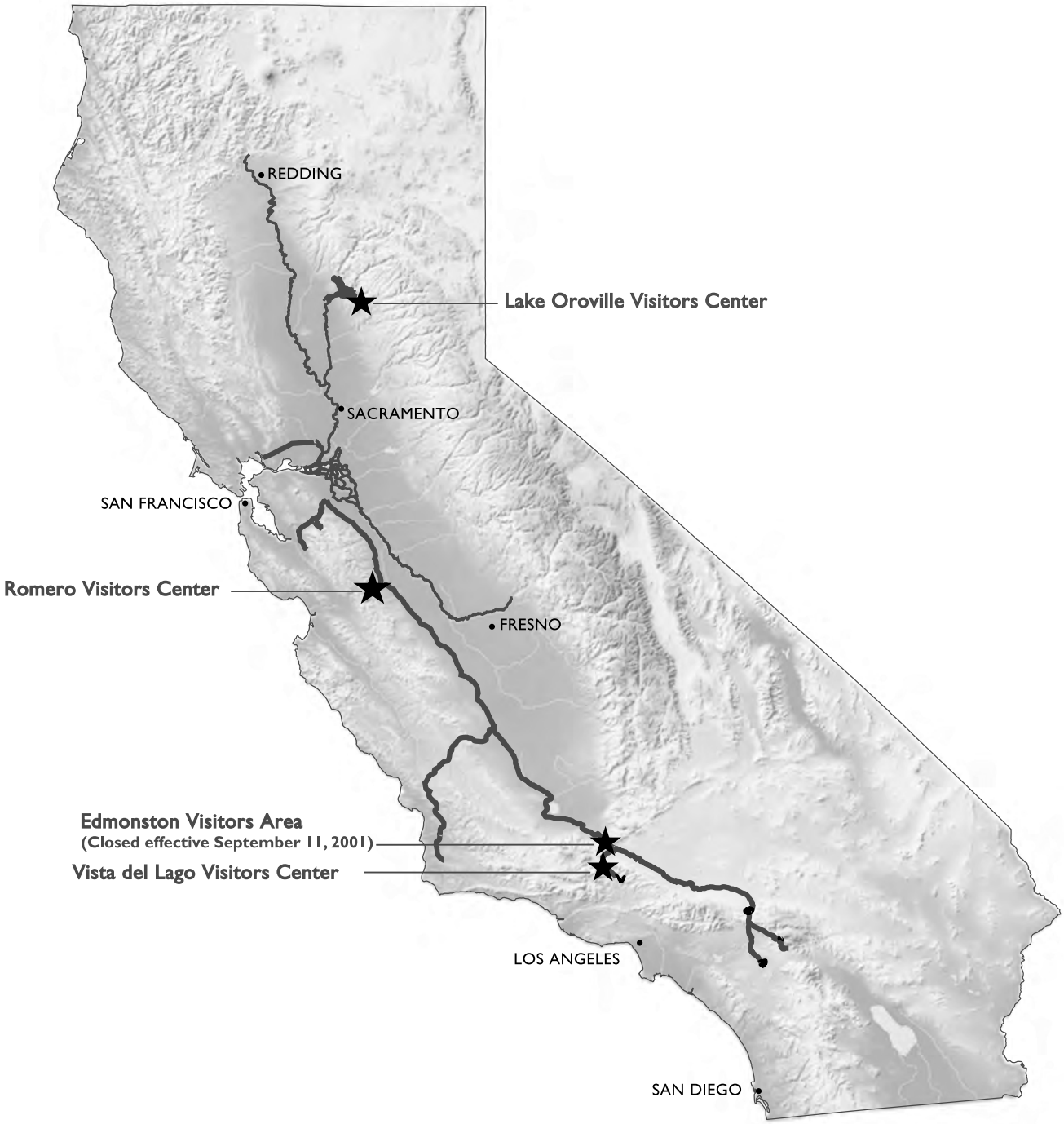

Figure 15-1. Visitors Centers on the SWP

Program achievements for 2005 include providing a display of DWR's Interactive Children's Exhibits at the Urban Creeks Council's Creek Week event held at the Sacramento Discovery Center (April); assisting at DWR's Oroville Fourth of July booth; State Fair booth (August/ September); and Salmon Festival (September); conducting water safety activities for children at Preparedness Day Event at Office of Emergency Services (September); staffing exhibit for the California Native American Days event at the Sacramento Convention Center (September); and exhibiting DWR's educational materials and videos at the California Science Teachers Association Conference in Palm Springs (October).

Additional program achievements for 2005 include providing curriculum materials and children's videos to California teachers and water agencies through the Water Facts and Fun online ordering catalog and promotional events; revising and reprinting the *Water Facts and Fun* catalog of materials for teachers and students; purchasing 12,000 Captain Hydro Water Conservation books and 10,000 Water Fun books for students; reprinting 10,000 *California Water Works and Why It Does…* books for students; providing Project WET books to teachers who participate in Project WET training workshops.

In 2005, the School Education Program was actively involved in presenting DWR's School Education Program to the California Regional Environmental Education Community (CREEC) Conference in Santa Barbara (January); participating on the Water Awareness Education Subcommittee and providing the printing of Unit #4 on Water Use Efficiency for elementary students; participating and assisting at Water Education Committee meeting, hosted by the Contra Costa Water District in April, and the Marina Coast Water District in October; and participating on the Project Water Education for Teachers (WET) Advisory Committee, the Creek Week Planning Committee, and CEEIN Committee.

In 2005, PAO staff worked on producing brochures for the California Environmental Education Interagency Network (CEEIN) and providing artwork for a poster, brochures, and a bookmark for the Creek Week Event.

The School Education Program also co-sponsored and provided support for the following:

- the development of the Discover Storm Water booklet for students in cooperation with Project WET and others;
- the Environmentality Campaign for fifth grade students, in conjunction with the State of California and the Walt Disney Corporation;
- the California Department of Education's Regional Environmental Education Coordinators Network; and
- the Delta Studies Institute for teachers, co-sponsored with the San Joaquin County Office of Education.

Water Awareness Month Activities

During May 2005, DWR observed Water Awareness Month for the eighteenth consecutive year. PAO news releases highlighted activities at DWR facilities, and public information officers answered media inquiries regarding water awareness.

Appendix B
Data and Computations
Used to
Determine 2007 Water Charges

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Appendix B

Data and Computations

Used to

Determine 2007 Water Charges

Appendix B
Data and Computations Used to Determine 2007 Water Charges

The Department of Water Resources (DWR) annually furnishes Statements of Charges to the 29 long-term State Water Project (SWP) water supply contractors. Article 29(e) of the Standard Provisions for Water Supply Contracts, approved August 3, 1962, describes those statements:

> *All such statements shall be accompanied by the latest revised copies of the document amendatory to Article 22 and of Tables B, C, D, E, F, and G of this contract, together with such other data and computations used by the State in determining the amounts of the above charges as the State deems appropriate.*

To comply with Article 29(e), DWR performs an annual comprehensive review and redetermination of all water supply and financial aspects of the SWP for the entire project repayment period. This annual redetermination is performed in accordance with Article 22(f) and Article 28 of the water supply contracts, which concern the Delta Water Rate and annual transportation charges, respectively.

Appendix B includes data used to document the redetermination of water charges to be paid by contractors during calendar year 2007. The information is based on established data about the SWP, both known and projected, as of June 30, 2006.

The computational procedures and interrelationships between tabulations in this appendix are outlined in Figure B-1 and Figure B-2. All tables referenced in Figures B-1 and B-2 follow this text.

Types of Water Charges

Charges to SWP water supply contractors include the costs of facilities for the conservation and development of a water supply and the conveyance of such supply to SWP service areas. These facilities are classified as "Project Conservation Facilities" and "Project Transportation Facilities" in the Standard Provisions for Water Supply Contract. The names of the main facilities in each classification follow.

Project Conservation Facilities

- Frenchman Dam and Lake
- Grizzly Valley Dam and Lake Davis
- Antelope Dam and Lake
- Oroville Dam and Lake Oroville
- Oroville power facilities
- Delta Facilities
- A portion of the California Aqueduct from the Delta to Dos Amigos Pumping Plant
- Sisk Dam, San Luis Reservoir, and Gianelli Pumping-Generating Plant

Project Transportation Facilities

- Grizzly Valley Pipeline
- North Bay Aqueduct
- South Bay Aqueduct, including Del Valle Dam and Lake Del Valle
- Remainder of the California Aqueduct from the Delta to Dos Amigos Pumping Plant and all facilities south, including dams and lakes in Southern California
- Off-Aqueduct Power Facilities (Reid Gardner Unit No. 4, Bottle Rock Power Plant, and South Geysers Power Plant)

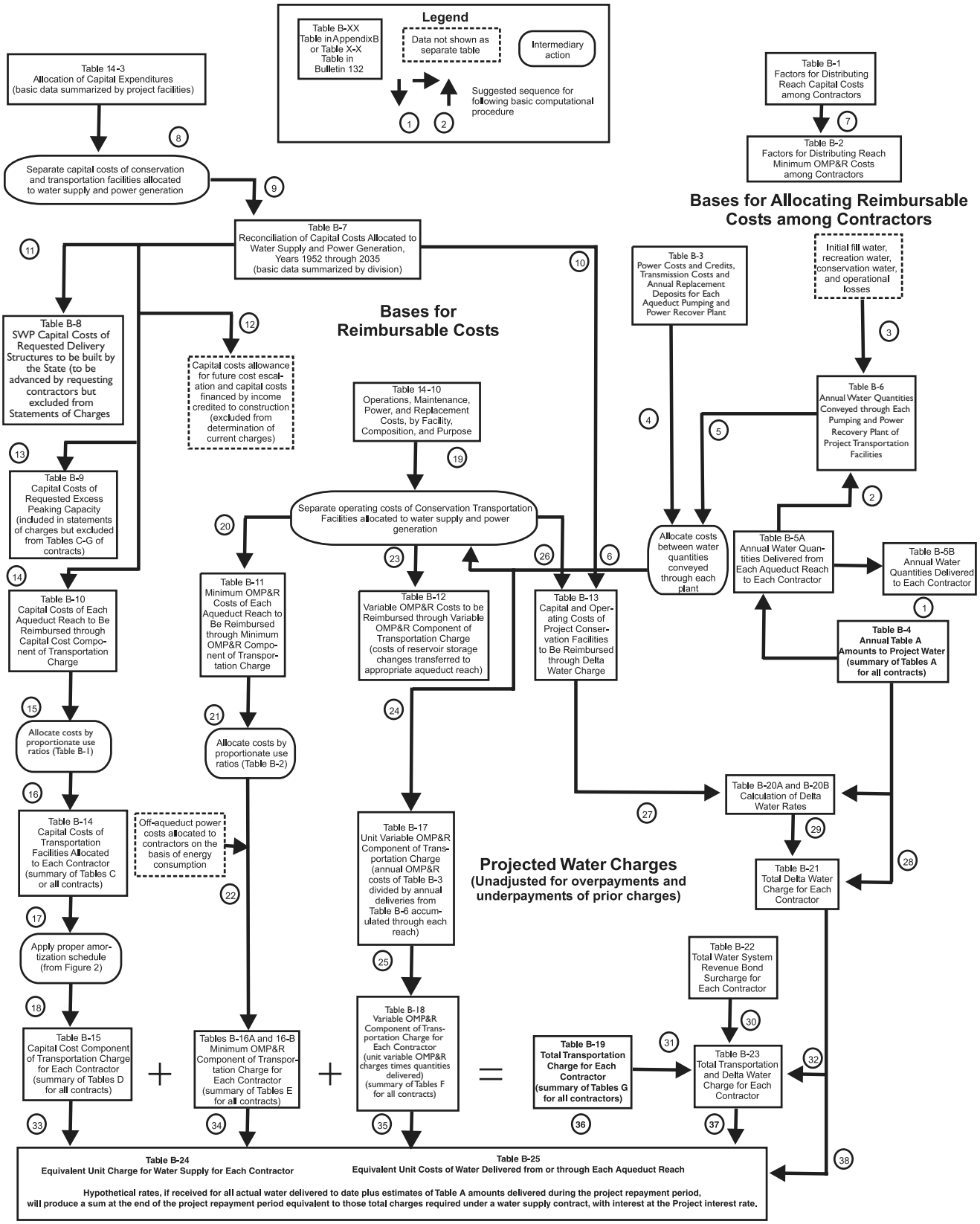


Figure B-1. Relationships of Data Used to Substantiate Statements of Charges

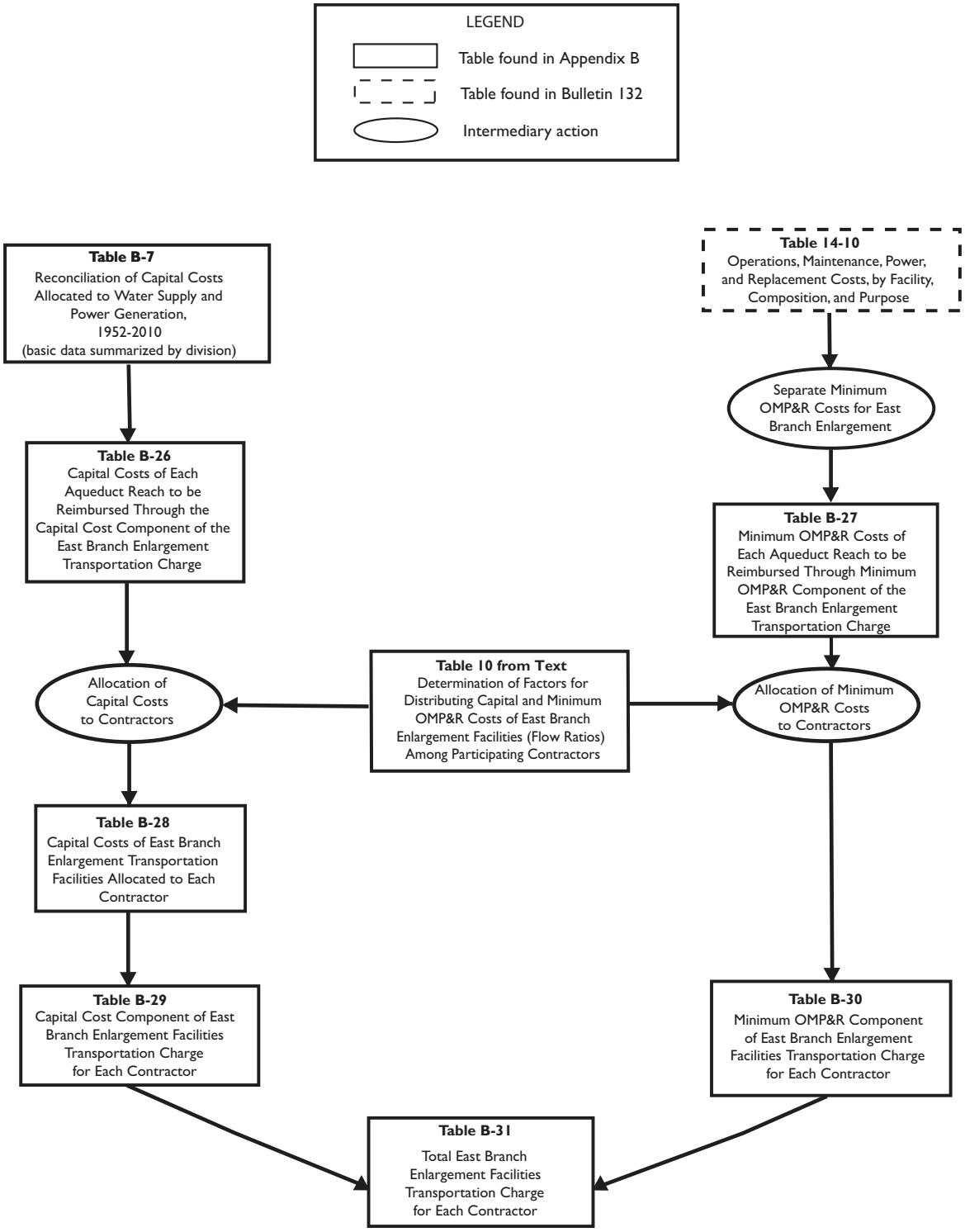


Figure B-2. Relationships of Data Used to Substantiate East Branch Enlargement Charges

The standard provisions provide for a Delta Water Charge and a Transportation Charge for project water.

The Delta Water Charge is a unit charge applied to each acre-foot of SWP water the contractors are entitled to receive according to their contracts. The unit charge, if applied to each acre-foot of all such allocations for the remainder of the project repayment period, is calculated to result in repayment of all outstanding reimbursable costs of the Project Conservation Facilities, with appropriate interest, by the end of the repayment period (2035).

The Transportation Charge is for use of facilities to transport water to the vicinity of each contractor's turnout. Generally, the annual charge represents each contractor's proportionate share of the reimbursable capital costs and operating costs of the Project Transportation Facilities.

Each contractor's allocated share of those reimbursable capital costs is amortized for repayment to the State; and certain variations are allowed in the amortization methods. Essentially, the contractors' shares of reimbursable operating costs are repaid in the year such costs are incurred by the State.

The East Branch Enlargement Transportation Charge is paid by the seven Southern California contractors participating in the enlargement. San Bernardino Valley Municipal Water District advanced funds to pay the district's allocated capital costs for the East Branch Enlargement. The remaining six contractors pay an allocated share of the debt service on revenue bonds sold to finance the enlargement. Each contractor also will pay an allocated share of the minimum operation, maintenance, power, and replacement costs of the East Branch Enlargement.

Transportation charges for the Coastal Branch Extension, East Branch Extension, and South Bay Enlargement are being repaid by contractors in their respective service areas.

Transportation charges for the Tehachapi Afterbay is repaid by those contractors using electrical power for delivery of their Table A water.

Composition and Timing of Water Charges

As shown in Figure B-3, the Delta Water Charge and the Transportation Charge consist of the following three components:

(1) Conservation and Transportation capital cost components, which will return to the State all reimbursable capital costs;
(2) Conservation and Transportation minimum OMP&R components, which will return to the State all reimbursable operating costs that do not depend on or vary with quantities of water actually delivered to the contractors; and
(3) A Transportation variable OMP&R component, which will return to the State all reimbursable operating costs that depend on, and vary with, quantities of water actually delivered to the contractors.

The formula for computing the Delta Water Rate, Article 22(f) of the Standard Provisions for Water Supply Contract, was designed to ensure that all adjustments for prior overpayments or underpayments of the Delta Water Charge are accounted for in a redetermination of the rate. Since the redetermined rate applies to all future allocations, such adjustments are amortized during the remainder of the project repayment period. This appendix includes a redetermination of the Delta Water Rate for 2007.

Article 28 of the standard provisions stipulates that Transportation Charges be redetermined each year. The tables in Appendix B include the numerical data used in this redetermination. Transportation Charges for prior years through 2005 included in those tables are the redetermined amounts and do not equal the amounts actually paid by contractors.

As provided under the Water System Revenue Bond Amendment to the water supply contracts, differences between actual payments under the Transportation capital cost component and amounts computed in this redetermination are accumulated with interest and

Delta Water Charge

Capital Cost Component

1. Planning, design, right-of-way, and construction costs of Conservation Facilities
2. Operations and maintenance costs for newly constructed Conservation Facilities prior to initial operations
3. Activation costs for newly constructed Conservation Facilities
4. Power costs allocated to initial filling of San Luis Reservoir
5. Capitalized O&M costs (major repair work and so forth) for Conservation Facilities
6. Program costs (portion) to mitigate impacts on current Delta fishery population due to SWP pumping prior to 1986 (Department of Water Resources-Department of Fish and Game agreement)

Minimum OMP&R Component

1. Direct O&M costs of Conservation Facilities
   a. Headquarters and field divisions (portion)
   b. Insurance and FERC costs (portion)
2. General O&M costs allocated to Conservation Facilities
   a. Contractor Accounting Office (portion)
   b. Financial and contract administration (portion)
   c. Water rights
   d. Power planning for SWP facilities (portion)
3. Replacement deposits for SWP control centers (portion)
4. Credits for a portion of Hyatt-Thermalito power generation
5. Power costs and credits related to pumping water to San Luis Reservoir for project operations (storage changes)
6. Value of power used and generated by Gianelli Pumping-Generating Plant
7. Program costs (portion) to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Game agreement)

Transportation Charge

Capital Cost Component

1. Planning, design, right-of-way, and construction costs of Transportation Facilities
2. O&M costs for newly constructed Transportation Facilities prior to initial operation
3. Activation costs for newly constructed Transportation Facilities
4. Power costs allocated to initial filling of Southern California reservoirs
5. Capitalized O&M costs (major repair work and so forth) for Transportation Facilities
6. Program costs (portion) to mitigate impacts on current Delta fishery population due to SWP pumping prior to 1986 (Department of Water Resources-Department of Fish and Game agreement)

Minimum OMP&R Component

1. Direct O&M costs of Transportation Facilities
   a. Headquarters and field divisions (portion)
   b. Insurance and FERC costs (portion)
2. General O&M costs related to Transportation Facilities
   a. Contractor Accounting Office (portion)
   b. Financial and contract administration (portion)
   c. Power planning for SWP facilities (portion)
3. Power costs and credits related to pumping water to Southern California reservoirs for project operations (storage changes)
4. Power costs for pumping water to replenish losses from Transportation Facilities
5. Other power costs
   a. Station service at Transportation Facility power and pumping plants
   b. Transmission service costs related to “backbone” Transportation Facilities
6. Replacement deposits for SWP control centers (portion)
7. Off-Aqueduct Power Facility costs–bond service, bond cover costs (25 percent of bond service), bond reserves, transmission costs to provide service to “backbone,” fuel costs taxes, and O&M-less power sales allocated to Off-Aqueduct Power Facilities
8. Program costs (portion) to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Game agreement)

Variable OMP&R Component

1. Power purchase costs
   a. Capacity
   b. Energy
   c. Pine Flat bond service, O&M, and transmission costs allocated to aqueduct pumping plants
2. Alamo, Devil Canyon, Warne, and Castaic power generation credited at the power plant reach and charged to aqueduct pumping plants
3. Hyatt-Thermalito Diversion Dam power plant generation charged to aqueduct pumping plants (credits for this generation are reflected in the Delta Water Rate)
4. Replacement deposits for equipment at pumping plants and power plants
5. Credits from sale of excess SWP system power
6. Program costs (portion) to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Game agreement)

Note: Excludes costs recovered under the East Branch Enlargement Transportation Charge.

Figure B-3. Composition of Delta Water Charge and Transportation Charge

amortized during the remaining years of the contract repayment period. All computations for adjustments are included in the attachments accompanying each contractor's Statement of Charges and are reflected in revised copies of Table C through Table G of the contract, which are also furnished to each long-term water supply contractor in the annual Statements of Charges.

These redeterminations exclude four charges associated with water service other than the Delta Water Charge and the Transportation Charge. The excluded charges (and the manner in which such excluded charges are treated in this appendix) are:

(1) Advances of funds pursuant to Article 24(d) of the standard provisions for excess capacity constructed by the State at the request of contractors.

(2) Advances of funds pursuant to Article 10(d) of the standard provisions for delivery structures (turnouts) constructed by the State at the request of contractors. Partial information concerning actual and projected capital costs of such delivery structures is included in this appendix. Statements concerning these costs and data are furnished to the appropriate contractors at various times and are not part of the annual statements.

(3) Payments for sale and service of surplus water to entities other than contractors, pursuant to Article 21 of the standard provisions, are also excluded. Those payments are generally based on the unit rates shown in Table B-25. Net revenues resulting from noncontractor service are applied as indicated on page 24 of Bulletin 132-71.

(4) Payments under the Devil Canyon-Castaic contract for costs of the Devil Canyon-Castaic facilities allocable to power generation. Charges billed as a result of the contract are billed separately from those billed as a result of the water supply contract. Information about the treatment of such charges in relation to redetermined Transportation Charges is included in special attachments to the bills of the six participating contractors.

The time and method of payment for corresponding components of the Delta Water Charge and the Transportation Charge are as follows:

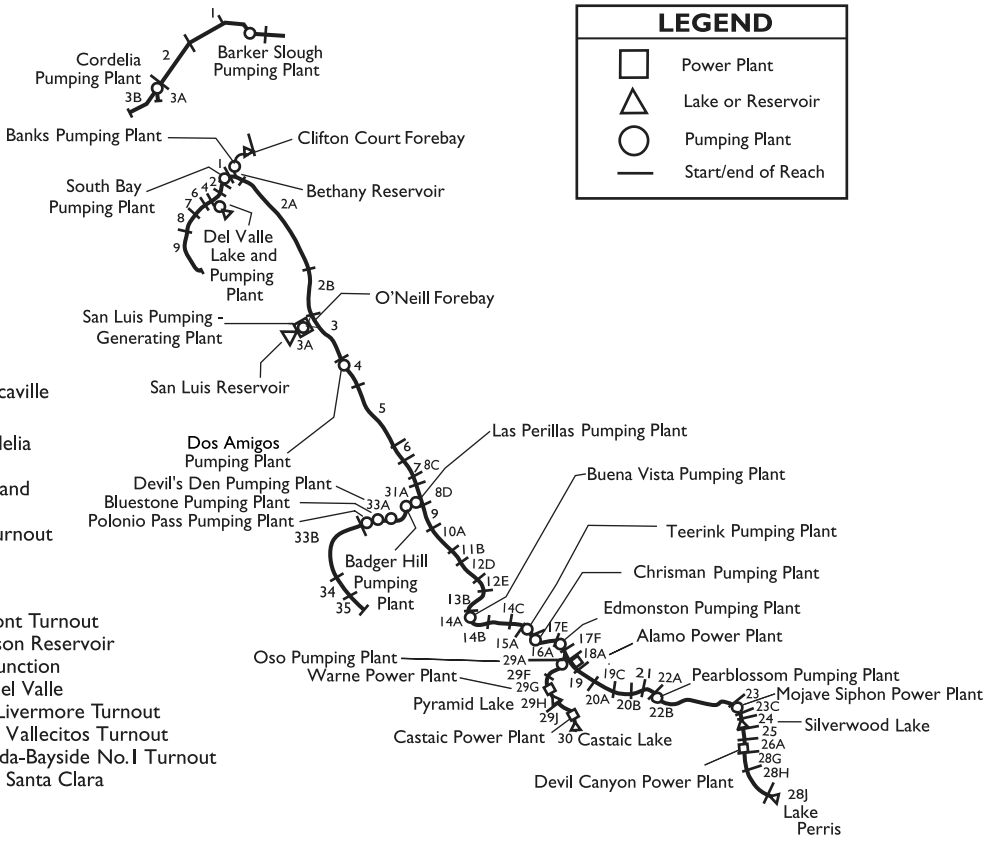
(1) The capital cost components of the Delta Water Charge and the Transportation Charge are paid in two semiannual installments, due January 1 and July 1 of each year, based on statements furnished by the State on or before July 1 of the preceding year.

(2) The minimum OMP&R components of the Delta Water Charge and the Transportation Charge are paid in 12 equal installments, due the first of each month and based on statements furnished by the State on or before July 1 of the preceding year.

(3) The variable OMP&R component of the Transportation Charge is paid in varying monthly amounts and is due the fifteenth day of the second month following actual water delivery. The charges are projected based on a unit charge per acre-foot established on or before July 1 of the preceding year. Those unit charges may be revised during the year to reflect current power costs and revenues. The unit charges are applied to actual monthly delivery quantities as determined by the State on or before the fifteenth day of the month following actual delivery.

Bases for Allocating Reimbursable Costs Among Contractors

This section describes the procedures for allocating reimbursable costs of Project Transportation Facilities among contractors (see upper right portion of Figure B-1). Those costs do not include annual costs of Off-Aqueduct Power Facilities, which are explained in the section "Project Water Charges."



North Bay Aqueduct

1 Barker Slough through Fairfield/Vacaville Turnout
2 Fairfield/Vacaville Turnout to Cordelia Forebay
3A Cordelia Forebay through Benicia and Vallejo Turnouts
3B Cordelia Forebay through Napa Turnout Reservoir

South Bay Aqueduct

1 Bethany Reservoir through Altamont Turnout
2 Altamont Turnout through Patterson Reservoir
4 Patterson Reservoir to Del Valle Junction
5 Del Valle Junction through Lake Del Valle
6 Del Valle Junction through South Livermore Turnout
7 South Livermore Turnout through Vallecitos Turnout
8 Vallecitos Turnout through Alameda-Bayside No. 1 Turnout
9 Alameda-Bayside Turnout through Santa Clara Terminal Facilities

California Aqueduct

North San Joaquin Division

1 Delta through Bethany Reservoir
2A Bethany Reservoir to Orestimba Creek
2B Orestimba Creek to O'Neill Forebay

San Luis Division

3A Sisk Dam, San Luis Reservoir, Gianelli Pumping-Generating Plant
3 O'Neill Forebay to Dos Amigos Pumping Plant
4 Dos Amigos Pumping Plant to Panoche Creek
5 Panoche Creek to Five Points
6 Five Points to Arroyo Pasajero
7 Arroyo Pasajero to Kettleman City

South San Joaquin Division

8C Kettleman City through Milham Avenue
8D Milham Avenue through Avenal Gap
9 Avenal Gap through Twisselman Road
10A Twisselman Road through Lost Hills
11B Lost Hills to 7th Standard Road
12D 7th Standard Road through Elk Hills Road
12E Elk Hills Road through Tupman Road
13B Tupman Road to Buena Vista Pumping Plant
14A Buena Vista Pumping Plant through Santiago Creek
14B Santiago Creek through Old River Road
14C Old River Road to Teerink Pumping Plant
15A Teerink Pumping Plant to Chrisman Pumping Plant
16A Chrisman Pumping Plant to Edmonston Pumping Plant

Tehachapi Division

17E Edmonston Pumping Plant to Porter Tunnel
17F Porter Tunnel to Junction, West Branch

Mojave Division

18A Junction, West Branch through Alamo Power Plant
19 Alamo Power Plant to Fairmont
19C Buttes Junction through Buttes Reservoir
20A Fairmont through 70th Street West
20B 70th Street West to Palmdale
21 Palmdale to Littlerock Creek
22A Littlerock Creek to Pearblossom Pumping Plant
22B Pearblossom Pumping Plant to West Fork Mojave River
23 West Fork Mojave River to Silverwood Lake
23C Mojave Siphon Power Plant
24 Cedar Springs Dam and Silverwood Lake

Santa Ana Division

25 Silverwood Lake to South Portal, San Bernardino Tunnel
26A South Portal, San Bernardino Tunnel through Devil Canyon Power Plant
28G Devil Canyon Power Plant to Barton Road
28H Barton Road to Lake Perris
28J Perris Dam and Lake Perris

West Branch, California Aqueduct

29A Junction, California Aqueduct through Oso Pumping Plant
29F Oso Pumping Plant through Quail Embankment
29G Quail Embankment through Warne Power Plant
29H Pyramid Dam and Lake
29J Pyramid Lake through Castaic Power Plant
30 Castaic Dam and Lake

Coastal Branch, California Aqueduct

31A Avenal Gap to Devil's Den Pumping Plant
33A Devil's Den Pumping Plant through Tank 1
33B Tank 1 through Chorro Valley Turnout
34 Chorro Valley Turnout through Lopez Turnout
35 Lopez Turnout through Guadalupe Turnout

Figure B-4. Repayment Reaches and Descriptions

Capital and Minimum OMP&R Costs

Figure B-4 includes information about the repayment reaches that form the basis for allocating reimbursable costs of the Project Transportation Facilities among contractors.

Allocations of reimbursable capital costs and minimum OMP&R costs of each reach are based on the proportionate maximum use of that reach by respective contractors under planned conditions of full development.

The derivation of ratios that represent the proportionate maximum use of each aqueduct reach by the respective contractors was first reported in Bulletin 132-70. The ratios in Bulletin 132-70 were subsequently revised for the North Bay Aqueduct, the South Bay Aqueduct, the California Aqueduct from the Delta to Castaic Lake, and the Coastal Branch.

All the revisions reported in previous bulletins regarding the derivation of ratios that represent the proportionate maximum use of each aqueduct reach by the respective contractors were last reported in Tables B-1 and B-2 of Bulletin 132-91. Under Article 53 of the Monterey Amendment, Agricultural contractors may sell up to 130,000 acre-feet of aqueduct capacity to Municipal and Industrial contractors. The first permanent transfer occurred in 1998. Currently, 114,000 acre-feet of the allowable capacity has been transferred. Table 1 shows the permanent capacity transfers that have taken place since 1995.

Table B-1 presents the reach ratios currently applicable to reimbursable capital costs.

Table B-2 presents corresponding ratios for allocating 2007 and after reimbursable minimum OMP&R costs among contractors. Requested excess capacity is omitted when deriving ratios applicable to capital costs because the capital costs for the excess capacity are paid on an incremental-cost basis and not a proportionate-use basis. However, requested excess capacity is accounted for in the ratios applicable to minimum OMP&R costs.

Variable OMP&R Costs

Article 26(a) includes provisions to ensure that the variable OMP&R component of the Transportation Charge will result in a return to the State of those costs that depend on and vary with the amount of SWP water deliveries. (The minimum OMP&R component results in a return of those operating costs that do not vary with deliveries.) Under Article 26(a) all such costs for a reach for a given year will be allocated among contractors in proportion to the actual annual use of that reach by the respective contractors.

Table B-3 summarizes the total power costs, credits, and transmission costs for each aqueduct pumping and power recovery plant. Those variable costs consist of:

- Costs of capacity and energy used exclusive of associated power transmission and station service charges (transmission and station service costs that <u>are not,</u> depend and vary with power usage classified as minimum OMP&R costs);
- Credits for capacity and energy produced at aqueduct power recovery plants (treated as negative costs);
- Payments for replacement of major plant machinery components having economic lives shorter than the project repayment period. In 1997, DWR discontinued charging for a sinking fund for replacements. Replacement costs for 1999 and thereafter are to be paid on an annual basis as the costs are incurred; and
- Starting in 2005, a portion of transmission expenditures will depend and vary with water and power usage; these costs will be included as part of the variable component.

Table 1. Summary of Permanent Aqueduct Capacity Transfers

Contractor		Capacity Transfer		
Seller	*Buyer*	*Amount (acre-feet)*	*Effective Year*	**Transfer Description**
Transfers under Monterey Amendment				
Kern	Mojave	25,000	1998	Purchased capacity upstream of Reach 31A
Kern	Castaic Lake	41,000	2000	Purchased capacity upstream of Reach 16A
Kern	Palmdale	4,000	2000	Purchased capacity upstream of Reach 11B
Kern	Alameda Zone-7	7,000	2000	Purchased capacity upstream of Reach 10A
Kern	Alameda Zone-7	15,000	2000	Purchased capacity upstream of Reach 10A
Kern	Alameda Zone-7	10,000	2001	Purchased capacity upstream of Reach 11B
Kern	Solano	5,756	2001	Purchased capacity upstream of Reach 11B and Reach 31A
Kern	Napa	4,025	2001	Purchased capacity upstream of Reach 11B and Reach 31A
Kern	Alameda Zone-7	2,219	2004	Purchased capacity upstream of Reach 11B
Subtotal Under Article 53		114,000		
Transfers outside of Monterey Amendment				
Tulare	Dudley Ridge	3,973	2002	Purchased capacity upstream of Reach 8D
Tulare	AVEK	3,000	2002	Purchased capacity upstream of Reach 8D
Tulare	Alameda Zone-7	400	2003	Purchased capacity upstream of Reach 8D
Tulare	Kings	5,000	2004	Purchased capacity upstream of Reach 8D
Tulare	Coachella	9,900	2004	Purchased capacity upstream of Reach 8D
MWDSC	Coachella	88,100	2005	Purchased capacity upstream of Reach 28J
MWDSC	Desert	11,900	2005	Purchased capacity upstream of Reach 28J
Tulare	Kings	305	2006	Purchased capacity upstream of Reach 31A
Subtotal Outside of Article 53		122,578		

Table B-3 excludes plant capacity and energy costs associated with surplus and unscheduled water service after May 1, 1973. Prior to that date, surplus water service was charged the same unit variable OMP&R component as allocated water service. An amendment to the long-term water supply contracts in 1973 significantly changed the rate structure for surplus water service. Capacity and energy costs for pumping surplus and unscheduled water were allocated directly to those water contractors receiving surplus and unscheduled water service. A contract amendment in 1991 again revised the rate structure to provide for payment of costs through a melded power rate. These revisions to charges for surplus and unscheduled water are effective from the date of the amendments and are not applied to past charges.

An interruptible water program was established in 1994. This program is based on individual annual contracts; costs for interruptible water actually delivered are included in Table B-3.

Water Conveyance

The water conveyance quantities that form the basis for allocating costs are presented in Tables B-4, B-5A, B-5B, and B-6.

Table B-4 presents the schedules of annual allocations as set forth in Table A and Article 6(a) of each water supply contract.

Table B-5A shows amounts of actual and projected allocated water quantities delivered from each aqueduct reach to each contractor. Projected deliveries for years 2006 through 2035 are based on contractors' requests for future water deliveries. The quantities included in Table B-5A also include nonproject water delivered to contractors and surplus water deliveries prior to May 1, 1973, and actual interruptible water deliveries in 1994 and after.

Table B-5B presents a summary of actual and projected annual allocated water quantities delivered or to be delivered to each contractor. The quantities also include amounts of nonproject water and surplus water delivered prior to May 1, 1973, and actual deliveries of interruptible water in 1994 and after.

Table B-6 summarizes the annual allocated water quantities conveyed or to be conveyed through each aqueduct pumping plant or power plant for each of the following functions:

- *Deliveries-Water Supply.* Water made available to contractors at down aqueduct delivery structures, including certain hypothetical quantities to facilitate cost allocations, for those years when deliveries are made from net annual storage withdrawals. The net annual amounts of storage withdrawals are hypothetically added to the actual amounts conveyed from the Delta to the reservoirs, since deliveries made from storage withdrawals bear the same variable OMP&R costs per acre-foot as they would if the deliveries were actually conveyed from the Delta in that year. The hypothetical increases in the deliveries made from reservoir storage withdrawals are offset by equal credits to the minimum OMP&R costs of the respective reservoirs. Thus, the variable OMP&R components per acre-foot (Table B-17) may be applied to the total annual quantities delivered either from aqueduct reservoir storage or from the Delta.
- *Initial Fill Water.* Water required for initial filling of down aqueduct reaches and reservoirs or for repayment of pre-consolidation water used during construction.
- *Deliveries-Recreation.* Water delivered to down-aqueduct recreation developments or used for fish and wildlife mitigation or enhancement.
- *Operational Losses.* Water lost through evaporation and seepage from all down aqueduct reaches.
- *Reservoir Storage Changes.* Water placed in down-aqueduct reservoir storage after initial filling of the reservoirs, including projected net annual storage accretions (positive values) and withdrawals (negative values) for all down-aqueduct reservoirs of the Project Transportation Facilities.

Those variable OMP&R costs (Table B-12) that are allocable to storage accretions are assigned to the minimum OMP&R costs of the respective reservoirs. With the exception of Banks Pumping Plant, "Reservoir Storage Changes" also includes SWP water placed into Southern California groundwater storage from 1978 through 1982 (as positive amounts); and water withdrawn from storage and delivered to contractors in 1979, 1982, 1987, 1988, and 1989 (as negative amounts). At Banks Pumping Plant, groundwater additions and withdrawals are included in "Conservation Water."

Table B-6 also summarizes the following two amounts under the heading "Conservation Water" (Column 25):

(1) net annual water amounts stored and projected to be stored in San Luis Reservoir; and

(2) water lost and projected to be lost through evaporation and seepage from San Luis Reservoir and from the water conservation portion of the California Aqueduct.

"Conservation Water" includes initial fill water, operational losses, and net annual storage changes associated with San Luis Reservoir and the portion of the California Aqueduct that is allocated to conservation. The same allocation procedure outlined above for Transportation Facilities also applies to water delivered from storage in Conservation Facilities, except that the hypothetical cost increases are added to the variable OMP&R cost to be reimbursed through the Transportation Charge and deducted from the minimum OMP&R costs to be reimbursed through the Delta Water Charge.

San Luis Reservoir is operated to conserve water for future delivery to downstream contractors. To account for costs associated with reservoir storage, those power and replacement costs of Banks Pumping Plant (a joint Transportation-Conservation Facility) that are allocated to the conveyance of annual conservation water quantities are transferred to the capital costs of San Luis Reservoir (during initial fill) or to the minimum OMP&R costs of San Luis Reservoir (subsequent to initial fill).

In years of net storage withdrawal from San Luis Reservoir, a portion of the minimum OMP&R cost of

Table 2. Project Purpose Cost Allocation Factors (Percentages)

Project Facilities	Water Supply and Power Generation		All Other Purposes (Nonreimbursable)	
	Capital Costs	*Minimum OMP&R Costs*	*Capital Costs*	*Minimum OMP&R Costs*
Project Conservation Facilities				
Frenchman Dam and Lake	21.5	0.0	78.5	100.0
Antelope Dam and Lake	0.0	0.0	100.0	100.0
Grizzly Valley Dam and Lake Davis	1.0	1.8	99.0	98.2
Oroville Division[a]	97.1	99.5	2.9	0.5
California Aqueduct, Delta to Dos Amigos Pumping Plant	96.6	96.7	3.4	3.3
Delta Facilities	86.0	86.0	14.0	14.0
Transportation Facilities				
Grizzly Valley Pipeline	100.0	100.0	0.0	0.0
North Bay Aqueduct	100.0	100.0	0.0	0.0
South Bay Aqueduct				
Del Valle Dam and Lake Del Valle	25.2	22.0	74.8 [b]	78.0 [c]
Remainder of South Bay Aqueduct	100.0	100.0	0.0	0.0
California Aqueduct				
Delta to Dos Amigos Pumping Plant	96.6	96.7	3.4	3.3
Dos Amigos Pumping Plant to termini (excluding Coastal Branch)	94.3	96.9	5.7	3.1
Coastal Branch	100.0	100.0	0.0	0.0

[a] Percentages indicated are applicable to the remaining costs of division after excluding costs allocated to flood control that are reimbursed by the federal government (22 percent of capital costs) and excluding specific power costs of Hyatt and Thermalito power plants and switchyards.
[b] Percentage indicated consists of 48.8 percent of costs allocated to recreation and 26.8 percent to flood control.
[c] Percentage indicated consists of 44.9 percent of costs allocated to recreation and 33.1 percent to flood control.

the reservoir is transferred to the variable OMP&R cost of Banks Pumping Plant. That transfer is equal to the variable OMP&R cost per acre-foot of delivery through Banks Pumping Plant for that year, multiplied by the acre-feet of deliveries derived from San Luis Reservoir storage for that year. Table B-6 also includes amounts of nonproject water and surplus water delivered prior to May 1, 1973, and actual deliveries of interruptible water in 1994 and after.

Bases for Reimbursable Costs

This section describes the methods used to derive the costs allocated by the procedures outlined in the preceding section. A diagram of the cost derivation process is shown in the upper-left quadrant of Figure B-1.

First, the capital and minimum OMP&R costs of all SWP facilities are allocated among the various project purposes according to the allocation percentages in Table 2. Those percentages may be subject to revision in the future.

The redeterminations in this appendix involve only the SWP costs that are allocated to water supply and power generation.

Capital Costs

Capital costs used in the redeterminations in this appendix reflect prices prevailing on December 31, 2005; future cost escalation will be reflected in subsequent bulletins.

Table B-7 presents a reconciliation of estimated total capital costs of each Project Conservation Facility and each Project Transportation Facility. This table shows the relationship of Project Conservation and Transportation costs allocated to contractors (Tables B-8, B-9, B-10, and B-13) to the total SWP capital costs projected by DWR.

Table B-8 shows costs incurred and projected to be incurred by the State in connection with each contractor's turnouts. Costs incurred by the State for both State-constructed and contractor-constructed delivery structures are paid directly by the contractors for which the structures are

built. (The State incurs design review and construction inspection costs in connection with contractor-constructed turnouts.)

Table B-9 lists costs and payments for excess capacity built into SWP Transportation Facilities according to amendments to contracts with Metropolitan Water District of Southern California, San Gabriel Valley Municipal Water District, and AVEK as follows:

- additional costs incurred by the State for requested excess capacity;
- advances by water contractors of funds for such costs; and
- credits for advances in excess of costs, which were applied to respective contractors' installments of the capital cost component of the Transportation Charge in 1981.

Under Amendment 2 of Metropolitan's contract, 809 cfs of excess capacity was originally constructed in reaches of the West Branch at Metropolitan's request. That capacity was reclassified as basic capacity of SWP Transportation Facilities under Amendment 7. Metropolitan paid $16.3 million as a prepayment of the capital cost component of the Transportation Charge in lieu of advancing funds for the original requested capacity.

Amendment 5 to Metropolitan's contract requires that additional costs for modifications to the Santa Ana Pipeline (required for enlargement of Lake Perris) will be allocated to Metropolitan and returned to the State through payments of the Transportation Charge. The additional costs to be repaid through Metropolitan's capital cost component for the aqueduct reach from Devil Canyon Power Plant to Barton Road total about $6.7 million (see Bulletin 132-72, page 98).

Table B-10 presents the actual and projected annual capital costs of each aqueduct reach that will eventually be returned to the State, with interest, through contractors' payments of the capital cost component of the Transportation Charge and payment of debt service under the Devil Canyon-Castaic contracts.

Annual Operating Costs

Annual operating costs allocable to water supply and power generation are returned to the State through the minimum and variable OMP&R components of Delta Water and Transportation Charges and through a portion of the revenues from energy sales. All reimbursable operating costs of Conservation Facilities are included in the minimum OMP&R component of the Delta Water Charge.

Transportation and Devil Canyon-Castaic Contract Costs

Table B-11 shows the amounts of the actual and projected costs to be reimbursed through payments of the minimum OMP&R component of the Transportation Charge and allocated operating costs under the Devil Canyon-Castaic contract. The table includes the following seven types of operating costs incurred annually that do not vary with water quantities delivered to the contractors:

(1) all direct labor charges for field operation and maintenance personnel, including associated indirect costs;

(2) a distributed share of general operating costs that cannot be identified solely with one facility or aqueduct reach;

(3) all of electric power transmission and station service costs up to 2004, and electric power transmission and station service costs for 2005 and after that do not vary with power usage allocable to aqueduct pumping and recovery plants;

(4) all costs for equipment, materials, and supplies;

(5) portions of the power and replacement costs of all up-aqueduct pumping plants and power plants that are allocable to the annual conveyance of water lost to evaporation and seepage from respective aqueduct reaches or placed into storage in

respective reservoirs of the project transportation facilities (after initial fill);

(6) credits, which offset those costs in (5) above, for deliveries drawn from reservoir storage; and

(7) escalation of projected operating costs at 5 percent per year for 2006, 2007, and 2008.

Table B-12 shows the portions of variable OMP&R costs in Table B-3 that are allocable to the water supply delivery quantities included in Table B-6 and reimbursed through payments of the variable OMP&R component of the Transportation Charge.

The following five adjustments are made to Table B-3 costs to derive Table B-12 costs:

(1) Part of the variable OMP&R costs of each plant is allocated to recreation. The allocation to recreation is in proportion to the quantity of water conveyed through each plant each year for delivery to on-shore recreational developments.That portion of variable plant costs attributable to the initial fill of aqueduct reaches is allocated to the joint capital costs of respective down-aqueduct reaches and reservoirs.

(2) That portion of costs attributable to evaporation and seepage is allocated to the joint minimum OMP&R costs of respective down-aqueduct reaches and reservoirs.

(3) Adjustments are made for additions or withdrawals from storage in aqueduct reservoirs. In years when water is added to storage in aqueduct reservoirs, the cost of conveying this water into storage is charged to the minimum OMP&R costs of the corresponding reservoir. In years when storage in aqueduct reservoirs is decreased for the purpose of making deliveries, a credit is applied to the minimum OMP&R costs of the reservoir from which the storage is released. This credit is equal to the number of acre-feet of storage reduction times the variable OMP&R unit rate for the year storage is released. The unit rate is equal to the variable OMP&R unit rate for the year the water is taken from storage.

(4) That portion of costs attributable to pumping water to replace evaporation and seepage losses and for additions or withdrawals from storage in San Luis Reservoir is charged to the minimum OMP&R component of the Delta Water Rate.

The remaining costs are allocated to Transportation water supply and repaid by the contractors.

Conservation Capital and Operating Costs

Table B-13 is a summary of actual and projected capital and operating costs of the initial Project Conservation Facilities. These costs are reimbursed through payments by contractors under the Delta Water Charge, Oroville power sales, and Gianelli Generating Plant credits. Table B-13 also shows credits applied to the reimbursable capital costs of the Project Conservation Facilities according to negotiated settlements concerning incurred planning costs for the period from 1952 through 1978.

Project Water Charges

This section describes the redetermination of past and projected components of the Transportation Charge for annual revision of Tables C through G of each water supply contract. This section also describes the derivation of the unit Delta Water Rates and the Water System Revenue Bond Surcharge.

A summary of equivalent unit charges for each acre-foot of allocated water service is also included for each contractor and each aqueduct reach. A diagram of all calculations may be found in the lower half of Figure B-1.

Transportation Charges

The accumulation of allocated costs of each aqueduct reach to each contractor is the basis for the Transportation Charge components.

Table B-14 summarizes each contractor's share of the capital costs of aqueduct reaches presented in Table B-10. Those amounts are determined by applying proportionate-use ratios set forth in Table B-1 to the costs in Table

B-10. The resulting allocated costs are set forth in Table C of the respective water supply contracts.

Prepayments of the capital cost component, required under Metropolitan's Amendment 7, are included as negative capital costs in Table B-14 and Table C of Metropolitan's Statement of Charges. Solano, Empire-West Side Irrigation District, and Crestline also prepaid capital costs (see Table B-14 footnotes). Table B-14 includes costs of the planned East Branch Extension to provide water service to San Bernardino Valley Municipal Water District and San Gorgonio Pass Water Agency.

Both Table B-14 and Table C of the six contractors for project water service below Devil Canyon Power Plant and Castaic Power Plant include the capital costs reimbursable under the Devil Canyon-Castaic contract.

Table B-15 summarizes capital cost components of the Transportation Charge for each contractor for each year of the project repayment period. By the year 2035, the capital cost components shown in Table B-15 will recover the costs shown in Table B-14, with interest at the Project Interest Rate of 4.608 percent per annum and based on the amortization schedules included in Table 3.

Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table D of the water supply contracts. Costs of excess capacity are billed separately and are not included in Table B-15.

Table B-15 includes the debt service payments due from the six contractors down aqueduct from Devil Canyon Power Plant and Castaic Power Plant according to terms of the Devil Canyon-Castaic contract.

Table B-16A summarizes the minimum OMP&R components of the Transportation Charge for each year of the project repayment period. Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table E of the respective contracts.

The total amounts included in Table B-16A are determined by applying the proportionate-use ratios in Table B-2 to the reach costs in Table B-11.

Table 3. Criteria for Amortizing Capital Costs of Transportation Facilities

Contractor	Year of Initial Payment [a]
Alameda County Flood Control and Water Conservation District - Zone 7	1963 [b]
Alameda County Water District	1963
Antelope Valley-East Kern Water Agency	1963
Castaic Lake Water Agency	1964
City of Yuba City	[c]
Coachella Valley Water District	1964
County of Butte	[c]
County of Kings	1968
Crestline-Lake Arrowhead Water Agency	1964
Desert Water Agency	1963 [d]
Dudley Ridge Water District	1968 [e]
Empire-West Side Irrigation District	1968 [e]
Kern County Water Agency	
Agricultural Use	1968 [e]
Municipal and Industrial Use	1965
Littlerock Creek Irrigation District	1964
Metropolitan Water District of Southern California	1963
Mojave Water Agency	1964
Napa County Flood Control and Water Conservation District	1966
Oak Flat Water District	1968 [e]
Palmdale Water District	1964
Plumas County Flood Control and Water Conservation District	1970
San Bernardino Valley Municipal Water District	1963
San Gabriel Valley Municipal Water District	1963 [d]
San Gorgonio Pass Water Agency	1963 [d]
San Luis Obispo County Flood Control and Water Conservation District	1964 [f]
Santa Barbara County Flood Control and Water Conservation District	1964
Santa Clara Valley Water District	1963
Solano County Water Agency	1973
Tulare Lake Basin Water Storage District	1968 [e]
Ventura County Flood Control District	1964

[a] Allocated capital costs of transportation facilities amortized in equal annual installments unless otherwise noted.
[b] Principal payments on each annual capital cost prior to 1971 delayed until calendar year 1972, except payments for 1963.
[c] For Yuba City and Butte County payments for Delta Water Charge only.
[d] Payment deferred for 1963 and added to 1964 payment with accrued interest.
[e] For Dudley Ridge, Empire, Kern (agricultural use), Oak Flat, and Tulare, according to Article 45 of the contracts for supply of agricultural water, capital costs of transportation facilities allocated to agricultural water supply are amortized by using an equivalent unit rate per acre-foot applied to the annual allocations (Table B-4) through the project repayment period.
[f] For San Luis Obispo and Santa Barbara County, all principal and interest payments for costs of the Coastal Stub were deferred until 1976.

Table B-16A excludes charges for Off-Aqueduct Power Facilities, which are included separately in Table B-16B. Both Table B-16A and Table E include the operating costs payable under the Devil Canyon-Castaic contract for the six

contractors down aqueduct from Devil Canyon Power Plant and Castaic Power Plant.

Table 4. Minimum OMP&R Costs of Reach 31A Assigned Directly to Kern County Water Agency (in dollars)

Year	Direct Charges
1969	46,511
1970	46,302
1971	140,074
1972	95,017
1973	72,454
1974	100,692
1975	127,456
1976	138,504
1977	120,753
1978	157,652
1979	121,231
1980	150,728
1981	75,866
1982	82,805
1983	90,007
1984	107,468
1985	159,406
1986	137,241
1987	127,073
1988	130,924
1989	128,468
1990	138,234
1991	139,527
1992	185,370
1993	219,344
1994	364,196
1995	272,341
1996	322,123
Total	**3,997,767**

As part of operating agreements with DWR, Kern was billed from 1963 through 1987 for any additional operating costs caused by early installation of units in Las Perillas and Badger Hill Pumping Plants by Berrenda Mesa Water Storage District (see Bulletin 132-71, page 7). Under those agreements, a portion of minimum OMP&R costs of Reach 31A were assigned directly to Kern, as shown in Table 4, with the remaining reach costs allocated by application of the proportionate-use ratios. DWR purchased the last unit, Unit No. 6, at Las Perillas and Badger Hill Pumping Plants in early 1997 to provide pumping capacity for deliveries to Coastal Area contractors, which began in 1997. As a result of the Monterey Amendment Litigation, the costs related to this settlement are to be allocated among all SWP contractors in proportion to their maximum Table A. As costs are incurred, related charges will be included in the contractors' annual Statements of Charges as part of the minimum. It is estimated that between 2002 and 2010, the total Monterey Amendment Litigation costs will be just under $16 million.

Table B16-B summarizes the annual charges for Off-Aqueduct Power Facilities allocated to each water contractor, adjusted for prior overpayments or underpayments of charges. Those charges are to repay all Off-Aqueduct Power costs, including bond service, deposits for reserves, operation and maintenance costs, fuel costs, taxes, and insurance.

Adopted October 1, 1979, the General Bond Resolution requires that sufficient revenues be collected each year to repay all of those costs. In addition, an amount totaling 25 percent of the annual bond service is collected each year to ensure that sufficient funds are available to cover all annual costs. Any revenues collected and not needed during the year are refunded to the contractors in the next year.

Table 5 summarizes Off-aqueduct Power Facility charges and credits related to deliveries for 2005.

Table 5. Summary of Off-Aqueduct Power Facility Charges and Credits (in dollars)

Charges by Item	
Reid Gardner Power Plant	83,573,694
Bottle Rock Power Plant	14,147,680
South Geysers Power Plant	6,662,758
Subtotal	*104,384,132*
Credits by Item	
Power sales	21,323,935
Miscellaneous water (wheeling)	0
Subtotal	21,323,935
Net Total Charge	**83,060,197**

Table 6 shows projected charges for Off-Aqueduct Power Facilities and an amount equal to 25 percent of annual bond service for 2006 and each year thereafter.

The annual charges for Off-Aqueduct Power Facilities are allocated among contractors in

proportion to the electrical energy required to pump allocated water for the year. The initial allocation for the Statements of Charges is based on estimates of energy to pump requested allocated water deliveries.

Table 6. Projected Charges for Off-Aqueduct Power Facilities (in dollars)

Year	Total Annual Cost	25% Bond Cover
2006	110,217,000	8,629,583
2007	124,268,132	8,677,943
2008	135,600,482	11,530,413
2009	135,835,148	11,577,346
2010	136,657,372	11,741,790
2011	133,497,475	11,117,811
2012	133,706,645	11,159,645
2013	78,184,633	5,095,243
2014	20,080,442	4,016,404
2015	11,900,893	2,380,495
2016	10,195,501	2,039,416
2017	9,909,157	2,074,413
2018	4,210,068	947,183
2019	4,175,070	927,936
2020	4,498,201	1,007,352
2021	6,696,392	1,318,209
2022	6,354,573	1,249,845
2023	4,520,053	882,941
2024	3,292,943	637,519
2025	244,343	48,399
2026	390,273	77,585
2027	596,893	118,909
2028	504,350	100,400
2029	497,350	99,000

An interim adjustment in the allocation of Off-Aqueduct Power costs may be made in May of each year based on updated cost estimates and April revisions in water delivery schedules. An additional adjustment is made the following year based on actual water deliveries and actual costs for the year.

The energy required to pump each contractor's water is calculated using the kilowatt-hour per acre-foot factors (shown in Table 7) for the pumping plants upstream from the delivery turnouts. The amounts include transmission losses.

Table B-17 presents a summary of actual and projected total variable OMP&R costs for each acre-foot of water conveyed through each aqueduct pumping plant and power plant for each year of the project repayment period. Those data are derived according to the following

Table 7. Kilowatt-Hour per Acre-Foot Factors for Allocating Off-Aqueduct Power Facility Costs

	kWh per acre-foot[a]	
Pumping Plant	*At Plant*	*Cumulative from Delta*
Barker Slough	223	223
Cordelia-Benicia	434	657
Cordelia-Vallejo	178	401
Cordelia-Napa	563	786
Banks	296	296
South Bay (including Del Valle)	869	1,165
Dos Amigos	138	434
Buena Vista	242	676
Teerink	295	971
Chrisman	639	1,610
Edmonston	2,236	3,846
Pearblossom	703	4,549
Greenspot	871	5,420
Crafton Hills	1,087	6,507
Cherry Valley	224	6,731
Oso	280	4,126
Las Perillas	77	511
Badger Hill	200	711
Devil's Den	705	1,416
Bluestone	705	2,121
Polonio Pass	705	2,826

[a] Includes transmission losses

procedures specified in Article 26(a) of the Standard Provisions for calculating the variable OMP&R component of the Transportation Charge:

- An annual charge per acre-foot of projected water deliveries to all contractors served from or through each reach is determined so the projected variable OMP&R costs to be incurred for each reach will be returned to the State.
- The total annual variable OMP&R component for any contractor for a given reach is obtained by multiplying the unit charge associated with that reach by the quantity of water actually delivered from or through the reach to the contractor.

The data summarized in Table B-17 are derived by dividing the costs shown in Table B-3 by the quantities of water shown in Table B-6. However, certain costs included in Table B-3 for

extra peaking service, which would otherwise constitute variable OMP&R costs, are assigned directly to contractors requesting this type of service (see Bulletin 132-71, page 21, and Water Service Contractors Council Memo No. 593, July 10, 1970). Those costs are excluded from the unit charges shown in Table B-17. Peaking charges based on additional capacity ceased in 1983. Since 1984, costs are based on market energy rates. The amounts of extra peaking charges for additional power costs are shown in Tables 8 and 9 on pages B-18 and B-19.

The unit rates shown in Table B-17 constitute the rates for the pumping plants and power plants listed. The cumulative rates constitute the total rates, cumulative from the Sacramento-San Joaquin Delta, and are applicable to deliveries from or downstream of the pumping plants and power plants. Extra peaking service costs are excluded.

Table B-18 shows the variable OMP&R components of the Transportation Charge for each contractor for each year of the project repayment period. Table B-18 is developed from the costs per acre-foot included in Table B-17 and the delivery quantities for each contractor from each reach as indicated in Table B-5A, plus any costs for extra peaking service. Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table F of the respective water supply contracts.

Table B-19 summarizes the annual Transportation Charges for each contractor (the sums of the corresponding amounts included in Tables B-15, B-16A, B-16B, and B-18). Those estimated payments, subsequently adjusted for prior overpayments or underpayments, are set forth in Table G of the respective water supply contracts.

Both Table B-19 and Table G for the six contractors down-aqueduct from Devil Canyon Power Plant and Castaic Power Plant include amounts of debt service and operating cost payments due according to provisions of the Devil Canyon-Castaic contract.

Delta Water Charges

Table B-20A presents the calculation of the Delta Water Rate for the initial Conservation Facilities applicable in 2007 according to the amended Article 22(e) and 22(g) of all 29 contracts. The Delta Water Rate was calculated at a Project Interest Rate of 4.608 percent based on Conservation Facility costs shown in Table B-13. That Delta Water Rate is used to compute projected Delta Water Charges under Article 53(i) for the contractors who have executed the Monterey Amendment. Included in Table B-20A is the Delta Water Rate for the two contractors who have not executed the Monterey Amendment (Plumas County and Empire).

Table B-20B shows each component of the 2007 Delta Water Rate from Table B-20A.

Table B-21 summarizes the annual Delta Water Charge for each contractor. The projected charges in Table B-21 are developed by multiplying the total rate per acre-foot, as shown in Table B-20A, by the amount of allocated water for each contractor as shown in Table B-4.

Water System Revenue Bond Surcharge

Table B-22 summarizes the Water System Revenue Bond Surcharge to the Delta Water Charge and the Transportation capital cost component of each contractor. The surcharge shown in Table B-22 includes the financing costs of WSRB Series B through AD. This surcharge is levied according to an amendment to the water supply contracts for repaying WSRB Surcharge financing costs. All long-term water supply contractors signed that amendment.

Total Water Charges

Table B-23 summarizes the total annual charges to each contractor (the sum of the Transportation Charge in Table B-19, the Delta Water Charge in Table B-21, and the Water System Revenue Bond Surcharge in Table B-22). The charges do not reflect past payments by contractors and are unadjusted for prior overpayments or underpayments.

Table 8. Extra Peaking Charges for Additional Power, by Pumping Plant (Dollars)

Year	Cordelia Napa	Cordelia Solano	Barker Slough	South Bay	Banks	Dos Amigos	Las Perillas and Badger Hill	Buena Vista	Teerink	Chrisman	Edmonston	Pearblossom	Oso	Total
1972	0	0	0	0	0	10,579	24,700	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	6,016	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	7,140	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	494	6,397	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	1,981	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	45,145	3,680	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	3,306	0	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	12,126	0	0	0	0	0	0	0	12,126
1982	0	0	0	0	0	89,339	0	0	0	0	0	0	0	89,339
1983	0	0	0	35	7,594	3,534	152	0	0	0	0	0	0	11,315
1984	0	0	0	2,096	84,396	38,607	7,203	11,173	3,823	3,593	0	0	0	150,891
1985	0	0	0	1,480	19,612	8,841	763	4,488	4,412	8,929	28,353	0	0	76,878
1986	0	0	0	0	1,864	863	0	291	354	766	2,683	0	0	6,821
1987	0	0	0	604	17,129	7,838	835	2,295	1,806	3,460	11,058	0	0	45,025
1988	639	39	287	894	43,475	20,082	2,213	5,792	4,367	8,272	25,886	0	0	111,946
1989	2,491	566	1,483	70	40,251	18,642	1,935	3,401	1,531	2,058	3,793	0	0	76,221
1990	45	0	18	343	19,524	9,044	0	150	145	314	643	0	0	30,226
1991	903	0	281	0	21	8	0	15	17	39	139	41	0	1,464
1992	208	117	203	0	7,070	2,502	0	182	190	435	0	0	0	10,907
1993	0	681	889	4,483	123,080	54,741	0	8,898	5,458	10,900	35,068	11,139	0	255,337
1994	0	366	393	679	6,566	2,795	454	1,083	155	357	1,121	0	132	14,101
1995	0	0	0	1,717	24,464	9,422	27	1,865	3,475	782	1,104	400	0	43,256
1996	4	0	1	1,983	10,031	4,976	0	391	432	1,015	3,404	1,160	0	23,397
1997	0	1,780	2,152	3,107	337,357	165,774	1,753	34,604	12,296	15,910	21,028	0	0	595,761
1998	0	0	0	20,966	235,693	106,251	2,354	697	848	1,836	6,426	0	0	375,071
1999	0	0	0	0	63,196	26,235	0	3,394	4,136	8,959	31,350	7,740	0	145,010
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**4,290**	**3,549**	**5,707**	**38,457**	**1,041,323**	**637,838**	**70,909**	**78,719**	**43,445**	**67,625**	**172,056**	**20,480**	**132**	**2,184,530**

Table 9. Extra Peaking Charges for Additional Power, by Contractor (Dollars)

Year	Napa	Solano	Alameda Zone 7	Alameda County	Santa Clara	Dudley Ridge	Empire	Kern County	Kings	Oak Flat	Tulare	AVEK	Castaic Lake	Coachella	Desert	Littlerock	Palmdale	San Gabriel	Total
1972	0	0	0	0	0	0	0	35,269	0	0	10	0	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	0	6,016	0	0	0	0	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	0	7,140	0	0	0	0	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	0	0	6,891	0	0	0	0	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	0	1,981	0	0	0	0	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	2,035	0	44,484	42	0	0	2,264	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	0	2,821	0	0	0	0	485	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	11,951	0	0	0	0	0	0	0	175	0	0	12,126
1982	0	0	0	0	0	2,173	0	80,945	0	0	0	4,671	1,128	0	0	0	0	422	89,339
1983	0	0	0	0	48	9,511	0	0	1,365	0	0	0	391	0	0	0	0	0	11,315
1984	0	0	0	0	2,874	0	0	144,021	281	809	0	0	2,906	0	0	0	0	0	150,891
1985	0	0	0	2,029	0	0	64	25,664	0	98	0	48,767	256	0	0	0	0	0	76,878
1986	0	0	0	0	0	0	0	0	0	13	2,194	4,614	0	0	0	0	0	0	6,821
1987	0	0	229	0	599	313	84	24,141	0	95	0	18,207	545	0	0	812	0	0	45,025
1988	892	73	665	561	0	1,853	1,404	58,905	0	72	2,368	44,526	627	0	0	0	0	0	111,946
1989	3,478	1,062	96	0	0	13	403	55,085	0	239	8,278	0	1,043	0	0	1,035	5,489	0	76,221
1990	63	0	470	0	0	0	0	28,587	0	0	0	0	0	0	0	81	1,025	0	30,226
1991	1,184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	0	0	1,464
1992	271	257	0	0	0	0	49	10,109	221	0	0	0	0	0	0	0	0	0	10,907
1993	0	1,570	6,122	0	0	0	3,757	97,812	504	0	74,577	0	0	24,983	41,156	0	4,856	0	255,337
1994	0	759	896	0	0	0	7	9,933	0	0	0	0	2,450	0	0	56	0	0	14,101
1995	0	0	2,353	0	0	10,197	0	28,085	310	0	0	0	27	0	0	0	2,284	0	43,256
1996	5	0	81	2,612	0	334	205	4,552	969	0	7,809	0	0	0	0	0	3,598	3,232	23,397
1997	0	3,932	3,999	0	0	6,190	0	546,733	0	40	0	0	0	0	0	0	34,867	0	595,761
1998	0	0	19,666	8,442	0	22,631	1	312,626	0	651	0	0	0	0	0	0	11,054	0	375,071
1999	0	0	0	0	0	0	0	76,425	0	0	6,922	0	0	0	0	0	11,576	50,087	145,010
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**5,893**	**7,653**	**34,577**	**13,644**	**3,521**	**55,250**	**5,974**	**1,620,176**	**3,692**	**2,017**	**102,158**	**123,049**	**9,858**	**24,983**	**41,156**	**2,439**	**74,749**	**53,741**	**2,184,530**

Equivalent Total Water Charges

Table B-24 presents the Transportation Charge and Delta Water Charge in terms of the equivalent unit charge for each acre-foot of allocated water now projected for delivery to the respective contractors.

These equivalent charges would provide the same principal sum at the end of the project repayment period as annual payments to be made as part of the Delta Water Charge and Transportation Charge, plus interest at the Project Interest Rate, if applied to each acre-foot of allocated water delivered to date; all surplus water delivered prior to May 1, 1973; all interruptible water deliveries in 1994 and after; and all allocated water now projected to be delivered during the remainder of the project repayment period (Table B-5B).

The equivalent unit Delta Water Charges included in Table B-24 are greater than those in Table B-20A because current projections of allocated water service are less for most contractors than the amounts shown in Table A.

Equivalent Water Costs by Reach

Table B-25 presents a summary of the equivalent unit Transportation cost of conveying allocated water through respective aqueduct reaches of the Project Transportation Facilities.

Those unit costs provide the basis of charges assessed for extra service (such as for delivery of allocations down-aqueduct from a contractor's turnout) and for wheeling service to entities other than the long-term water supply contractors.

The cumulative unit conveyance costs indicated for reaches in Table B-25 do not necessarily equal the equivalent unit Transportation Charges to contractors served from such reaches. The unit charges in Table B-24 account for the rate of water demand buildup and cost allocation factors of the individual contractors; however, the unit costs included in Table B-25 reflect the effect of melding the respective buildups and allocation criteria of all contractors whose allocations are conveyed through a given reach. Table B-25 also includes surplus water delivered prior to May 1, 1973, and interruptible water deliveries in 1994 and after.

East Branch Enlargement Facility Charges

Table B-26 reflects DWR's projection of annual capital costs of the East Branch Enlargement Facilities for each aqueduct reach. Those projections will be redetermined in future bulletins to include:

- a reallocation of costs of constructing the present east branch facilities between Alamo Power Plant and Silverwood Lake;
- a reallocation of costs of Silverwood Lake to reflect additional use as a result of East Branch Enlargement operation;
- reallocation of costs of San Bernardino Tunnel to reflect redistribution of flow capacities necessary for the East Branch Enlargement facilities; and
- actual construction costs of the enlargement.

These costs will be recovered with interest from the seven Southern California water contractors participating in the enlargement, according to their amended water supply contracts (see Table 10).

Table B-27 lists the projected minimum OMP&R costs for each reach of the enlargement to be repaid by the seven contractors participating in the East Branch Enlargement. Currently, this table includes only minimum OMP&R costs attributable to the East Branch Enlargement. According to Article 49(e)(1), the contractors participating in the East Branch Enlargement will also share in the remaining minimum OMP&R costs of the affected reaches according to a formula developed by DWR in consultation with the affected contractors.

Table B-28 shows each participating contractor's share of the estimated capital costs of the East Branch Enlargement shown in Table B-26.

Table 10. Determination of Factors for Distributing Capital and Minimum OMP&R Costs of East Branch Enlargement Facilities among Participating Contractors

Reach Number	Description
18A	Junction, West Branch, California Aqueduct, through Alamo Power Plant
19	Alamo Power Plant to Fairmont
20A	Fairmont through 70th Street West
20B	70th Street West to Palmdale
21	Palmdale to Littlerock Creek
22A	Littlerock Creek to Pearblossom Pumping Plant
22B	Pearblossom Pumping Plant to West Fork Mojave River
23B	West Fork Mojave River to Silverwood Lake (excluding Mojave Siphon Power Plant facilities)
23C	Mojave Siphon Power Plant facilities
24	Cedar Springs Dam and Silverwood Lake
25	Silverwood Lake to South Portal, San Bernardino Tunnel
26A	South Portal, San Bernardino Tunnel through Devil Canyon Power Plant
26B	Devil Canyon Power Plant Bypass

Share of Enlargement Capacity (cfs)

Reach Number	Antelope Valley-East Kern Water Agency	Coachella Valley Water District	Desert Water Agency	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	Metropolitan Water District of Southern California	Total
18A		151	13	136	6		1,200	1,506
19		151	13	136	6		1,200	1,506
20A	35	151	13	136	6		1,200	1,541
20B	35	151	13	136	6		1,200	1,541
21	35	151	13	136			1,200	1,535
22A	35	151	13	136			1,200	1,535
22B		151	13	136			1,200	1,500
23B		184	67	212			1,200	1,663
23C		184	67				1,200	1,451
24		190	78				1,200	1,468
25		193	83			63	1,200	1,539
26A		193	83			63	1,200	1,539
26B							300	300

Factors for Distributing Capital and Minimum OMP&R Costs of East Branch Enlargement Facilities (flow ratios)

Reach Number	Antelope Valley-East Kern Water Agency	Coachella Valley Water District	Desert Water Agency	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	Metropolitan Water District of Southern California	Total
18A	0.00000000	0.10026560	0.00863214	0.09030544	0.00398406	0.00000000	0.79681276	1.00000000
19	0.00000000	0.10026560	0.00863214	0.09030544	0.00398406	0.00000000	0.79681276	1.00000000
20A	0.02271252	0.09798832	0.00843608	0.08825438	0.00389358	0.00000000	0.77871512	1.00000000
20B	0.02271252	0.09798832	0.00843608	0.08825438	0.00389358	0.00000000	0.77871512	1.00000000
21	0.02280130	0.09837134	0.00846906	0.08859935	0.00000000	0.00000000	0.78175895	1.00000000
22A	0.02280130	0.09837134	0.00846906	0.08859935	0.00000000	0.00000000	0.78175895	1.00000000
22B	0.00000000	0.10066667	0.00866667	0.09066667	0.00000000	0.00000000	0.79999999	1.00000000
23B	0.00000000	0.11064342	0.04028863	0.12748046	0.00000000	0.00000000	0.72158749	1.00000000
23C	0.00000000	0.12680910	0.04617505	0.00000000	0.00000000	0.00000000	0.82701585	1.00000000
24	0.00000000	0.12942779	0.05313351	0.00000000	0.00000000	0.00000000	0.81743870	1.00000000
25	0.00000000	0.12540611	0.05393112	0.00000000	0.00000000	0.04093567	0.77972710	1.00000000
26A	0.00000000	0.12540611	0.05393112	0.00000000	0.00000000	0.04093567	0.77972710	1.00000000
26B	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	1.00000000	1.00000000

Table B-29 shows the amounts of the annual capital cost components of the East Branch Enlargement Transportation Charge for each participating contractor. This component consists of each contractor's allocated share of debt service on bonds sold to finance the enlargement.

Table B-30 shows the minimum OMP&R components of the East Branch Enlargement Transportation Charge for each participating contractor for each year of the project repayment period. The amounts shown in Table B-30 will recover the minimum OMP&R costs shown in Table B-27.

Table B-31 shows the annual East Branch Enlargement Transportation charges for each participating contractor (the sum of the corresponding amounts included in Tables B-29 and B-30).

Short-Term Agreements

The long-term water supply contractors and DWR have executed short-term agreements that affects the contractors' charges. A 5-year agreement was executed in late 1997 between DWR and 16 Municipal and Industrial contractors, who agreed to pay their allocated shares of Municipal Water Quality Investigations costs. In 2002 and 2006, additional amendments were executed extending the program. The MWQI charges under this agreement are included in the Transportation minimum OMP&R components shown in Table B-16A.

Nine contractors executed a short-term agreement (1997 and 1998) to participate in the feasibility study for the American Basin conjunctive-use program. Costs of the feasibility study are included in Table B-16A.

Contractors have agreed to participate in the Delta Vision Improvement programs, which will initially incur costs for the next two to four years. Associated cost will be charged as part of Conservation.

Tables B-1 through B-6 Follow

TABLE B-1. Factors for Distributing Reach Capital Costs Among Contractors

Reach No.	Reach Description	NORTH BAY AREA		SOUTH BAY AREA				Total
		Napa County FC&WCD	Solano County WA	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Future Contractor	
	NORTH BAY AQUEDUCT							
1	Barker Slough thru Fairfield/Vacaville Turnout	0.29667896	0.70332104					1.00000000
2	Fairfield/Vacaville Turnout to Cordelia Forebay	0.38414552	0.61585448					1.00000000
3A	Cordelia Forebay thru Benicia and Vallejo Turnouts		1.00000000					1.00000000
3B	Cordelia Forebay thru Napa Turnout Reservoir	1.00000000						1.00000000
	SOUTH BAY AQUEDUCT							
1	Bethany Reservoir thru Altamont Turnout			0.22599612	0.20663021	0.49237700	0.07499667	1.00000000
2	Altamont Turnout thru Patterson Reservoir			0.22599658	0.20663059	0.49237783	0.07499500	1.00000000
4	Patterson Reservoir to Del Valle Junction			0.19504795	0.21450017	0.51113249	0.07931939	1.00000000
5	Del Valle Junction thru Lake Del Valle			0.14436367	0.12972254	0.33715573	0.38875806	1.00000000
6	Del Valle Junction thru South Livermore Turnout			0.14599918	0.21144710	0.50574745	0.13680627	1.00000000
7	South Livermore Turnout thru Vallecitos Turnout				0.25176680	0.60218448	0.14604872	1.00000000
8	Vallecitos Turnout thru Alameda-Bayside Turnout				0.27934645	0.72065355		1.00000000
9	Alameda-Bayside Turnout thru Santa Clara Terminal Facilities					1.00000000		1.00000000
	CALIFORNIA AQUEDUCT							
1	Delta thru Bethany Reservoir			0.00954737	0.00872917	0.02080118	0.00342507	N/A

Reach No.	Reach Description	CENTRAL COASTAL AREA		SOUTHERN CALIFORNIA AREA				
		San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency
	CALIFORNIA AQUEDUCT							
1	Delta thru Bethany Reservoir	0.00533010	0.00983337	0.02939084	0.01285827	0.00528315	0.00133612	0.00871300
2A	Bethany Reservoir to Orestimba Creek	0.00557213	0.01027988	0.03072531	0.01343201	0.00552068	0.00139620	0.00910474
2B	Orestimba Creek to O'Neill Forebay	0.00557824	0.01029119	0.03075915	0.01345351	0.00552831	0.00139814	0.00911733
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557719	0.01028923	0.03075332	0.01345294	0.00552772	0.00139798	0.00911637
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557607	0.01028717	0.03074719	0.01345233	0.00552710	0.00139784	0.00911536
5	Panoche Creek to Five Points	0.00557467	0.01028462	0.03073954	0.01345157	0.00552633	0.00139763	0.00911409
6	Five Points to Arroyo Pasajero	0.00557257	0.01028074	0.03072799	0.01345042	0.00552517	0.00139733	0.00911216
7	Arroyo Pasajero to Kettleman City	0.00557189	0.01027949	0.03072428	0.01345006	0.00552480	0.00139723	0.00911154
8C	Kettleman City thru Milham Avenue	0.00557103	0.01027792	0.03071961	0.01344960	0.00552432	0.00139712	0.00911076
8D	Milham Avenue thru Avenal Gap	0.00568611	0.01049020	0.03135418	0.01373353	0.00563986	0.00142632	0.00930130
9	Avenal Gap thru Twisselman Road			0.03426625	0.01356094	0.00616886	0.00156011	0.01017373
10A	Twisselman Road thru Lost Hills			0.03481391	0.01377767	0.00626946	0.00158556	0.01033963
11B	Lost Hills to 7th Standard Road			0.03835043	0.01517717	0.00691699	0.00174933	0.01140749
12D	7th Standard Road thru Elk Hills Road			0.04031661	0.01595523	0.00727790	0.00184059	0.01200265
12E	Elk Hills Road thru Tupman Road			0.04037074	0.01597665	0.00728878	0.00184332	0.01202059
13B	Tupman Road to Buena Vista Pumping Plant			0.04379882	0.01733322	0.00791595	0.00200194	0.01305492
14A	Buena Vista Pumping Plant thru Santiago Creek			0.04599268	0.01820137	0.00831952	0.00210399	0.01372049
14B	Santiago Creek thru Old River Road			0.04682530	0.01853084	0.00847388	0.00214303	0.01397505
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04825217	0.01909545	0.00873768	0.00220973	0.01441013
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04905609	0.01941356	0.00888679	0.00224744	0.01465600
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.05089794	0.02014241	0.00922722	0.00233351	0.01521742
17E	Edmonston Pumping Plant to Porter Tunnel			0.05329388	0.02109050	0.00967107	0.00244575	0.01594937
17F	Porter Tunnel to Junction, West Branch, Calif. Aqueduct			0.05340725	0.02113537	0.00969176	0.00245098	0.01598349
18A	Junction, West Branch, Calif. Aqueduct thru Alamo Pwp.			0.13238112		0.02399391	0.00606795	0.03957043
19	Alamo Powerplant to Fairmont			0.13237766		0.02399451	0.00606811	0.03957141
19C	Buttes Junction thru Buttes Reservoir			1.00000000				
20A	Fairmont thru 70th Street West			0.06847931		0.02576425	0.00651573	0.04249001
20B	70th Street West to Palmdale			0.02276024		0.02702917	0.00683555	0.04457607
21	Palmdale to Littlerock Creek			0.02318952		0.02754716	0.00696651	0.04543034
22A	Littlerock Creek to Pearblossom Pumping Plant			0.01181870		0.02794143	0.00706621	0.04608043
22B	Pearblossom Pumping Plant to West Fork Mojave River					0.02827552	0.00715074	0.04663153
23	West Fork Mojave River to Silverwood Lake					0.00324449	0.00818122	0.00535117
24	Cedar Springs Dam and Silverwood Lake					0.01024605	0.01251569	0.01690478
25	Silverwood Lake to South Portal San Bernardino Tunnel							
26A	South Portal, San Bernardino Tunnel thru Devil Canyon Pwp.							
28G	Devil Canyon Powerplant to Barton Road							
28H	Barton Road to Lake Perris							
28J	Perris Dam and Lake Perris							
29A	Junction, West Branch, Calif. Aqueduct thru Oso P. P.				0.03544337			
29F	Oso Pumping Plant thru Quail Embankment				0.03544339			
29G	Quail Embankment thru Warne Powerplant				0.03544339			
29H	Pyramid Dam and Lake				0.02817144			
29J	Pyramid Lake thru Castaic Powerplant				0.03544338			
30	Castaic Dam and Lake				0.02927284			
31A	Avenal Gap to Devil's Den Pumping Plant	0.10560301	0.19482503		0.07364766			
33A	Devil's Den Pumping Plant through Tank 1	0.10101221	0.89898779					
33B	Tank 1 through Chorro Valley Turnout	0.09912818	0.90087182					
34	Chorro Valley Turnout through Lopez Turnout	0.05479573	0.94520427					
35	Lopez Turnout through Guadalupe Turnout		1.00000000					

Note: Proportionate use factors **do not** reflect permanent water transfer as a result of the Monterey Amendment.

TABLE B-1. Factors for Distributing Reach Capital Costs Among Contractors

Reach No.	SAN JOAQUIN VALLEY AREA							
				Kern County Water Agency				
	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District
	CALIFORNIA AQUEDUCT							
1	0.01707770	0.00088678	0.00254693	0.02741768	0.30629913	0.00090695	0.00167121	0.03504975
2A	0.01781031	0.00092482	0.00266258	0.02864263	0.31945188	0.00094747	0.00174288	0.03655331
2B	0.01785838	0.00092731	0.00266550	0.02868743	0.32030556	0.00094896		0.03665201
3	0.01786337	0.00092757	0.00266499	0.02868589	0.32039254	0.00094892		0.03666225
4	0.01786863	0.00092785	0.00266446	0.02868428	0.32048398	0.00094886		0.03667303
5	0.01787517	0.00092819	0.00266380	0.02868227	0.32059816	0.00094879		0.03668649
6	0.01788508	0.00092870	0.00266279	0.02867923	0.32077093	0.00094868		0.03670685
7	0.01788826	0.00092887	0.00266246	0.02867825	0.32082633	0.00094864		0.03671338
8C	0.01789228	0.00092909	0.00266205	0.02867702	0.32089625	0.00094859		0.03672162
8D	0.01828779		0.00271703	0.02928147	0.32798200			0.01820857
9				0.03204523	0.32739538			
10A				0.03257442	0.31658608			
11B				0.03597398	0.24684668			
12D				0.03787171	0.20804762			
12E				0.03793198	0.20695175			
13B				0.01458796	0.16600071			
14A				0.00620338	0.13319181			
14B				0.00632023	0.11741558			
14C				0.00651962	0.09039633			
15A				0.00663252	0.07516317			
16A				0.00688973	0.04028829			
17E				0.00212516				
31A			0.05046240		0.57546190			

Reach No.	SOUTHERN CALIFORNIA AREA (continued)								Total
	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Municipal Water District	San Gabriel Valley Municipal Water District	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	
1	0.00049180	0.01101147	0.00369131	0.02362857	0.00650354	0.00398392	0.43929350	0.00429212	1.00000000
2A	0.00051413	0.01151136	0.00385891	0.02469101	0.00679699	0.00416304	0.45921072	0.00448701	1.00000000
2B	0.00051469	0.01152409	0.00386317	0.02472511	0.00680570	0.00416880	0.45973548	0.00449194	1.00000000
3	0.00051461	0.01152193	0.00386244	0.02472246	0.00680478	0.00416835	0.45965407	0.00449108	1.00000000
4	0.00051451	0.01151965	0.00386167	0.02471968	0.00680380	0.00416787	0.45956848	0.00449019	1.00000000
5	0.00051440	0.01151681	0.00386070	0.02471620	0.00680259	0.00416730	0.45946161	0.00448907	1.00000000
6	0.00051419	0.01151251	0.00385926	0.02471095	0.00680076	0.00416640	0.45929991	0.00448738	1.00000000
7	0.00051413	0.01151113	0.00385879	0.02470927	0.00680016	0.00416612	0.45924807	0.00448685	1.00000000
8C	0.00051405	0.01150938	0.00385821	0.02470716	0.00679941	0.00416576	0.45918261	0.00448616	1.00000000
8D	0.00052466	0.01174718	0.00393793	0.02522383	0.00694100	0.00425288	0.46868533	0.00457883	1.00000000
9	0.00057339	0.01283841	0.00430367	0.02758959	0.00758975	0.00465175	0.51227887	0.00500407	1.00000000
10A	0.00058254	0.01304366	0.00437246	0.02803943	0.00771262	0.00472760	0.52049091	0.00508405	1.00000000
11B	0.00064171	0.01436906	0.00481665	0.03093503	0.00850448	0.00521581	0.57349473	0.00560046	1.00000000
12D	0.00067463	0.01510596	0.00506361	0.03254889	0.00894541	0.00548790	0.60297374	0.00588755	1.00000000
12E	0.00067553	0.01512626	0.00507040	0.03259749	0.00895830	0.00549608	0.60379667	0.00589546	1.00000000
13B	0.00073290	0.01641098	0.00550099	0.03540212	0.00972547	0.00596896	0.65516902	0.00639604	1.00000000
14A	0.00076961	0.01723325	0.00577656	0.03720681	0.01021819	0.00627322	0.68807273	0.00671639	1.00000000
14B	0.00078354	0.01754538	0.00588113	0.03789703	0.01040613	0.00638960	0.70057530	0.00683798	1.00000000
14C	0.00080743	0.01808019	0.00606036	0.03907670	0.01072763	0.00658850	0.72199174	0.00704634	1.00000000
15A	0.00082089	0.01838154	0.00616135	0.03974336	0.01090913	0.00670088	0.73406357	0.00716371	1.00000000
16A	0.00085171	0.01907194	0.00639271	0.04126559	0.01132404	0.00695754	0.76170731	0.00743264	1.00000000
17E	0.00089182	0.01997003	0.00669365	0.04325018	0.01186455	0.00729213	0.79767940	0.00778251	1.00000000
17F	0.00089372	0.02001251	0.00670788	0.04334270	0.01188988	0.00730773	0.79937767	0.00779906	1.00000000
18A	0.00221525	0.04960424	0.01662680	0.10730448	0.02944860	0.01809192	0.57469530		1.00000000
19	0.00221522	0.04960300	0.01662640	0.10730707	0.02944876	0.01809230	0.57469556		1.00000000
19C									1.00000000
20A	0.00237800	0.05324853	0.01784830	0.11522152	0.03161798	0.01942666	0.61700971		1.00000000
20B	0.00249470	0.05586076	0.01872390	0.12087843	0.03316986	0.02038045	0.64729087		1.00000000
21	0.00254199	0.05692053		0.12319480	0.03380324	0.02077093	0.65963498		1.00000000
22A		0.05773082		0.12495766	0.03428605	0.02106816	0.66905054		1.00000000
22B		0.05842136		0.12645207	0.03469614	0.02132008	0.67705256		1.00000000
23				0.14467451	0.03969010	0.02439237	0.77446614		1.00000000
24				0.22243002	0.04339444	0.02843498	0.66607404		1.00000000
25				0.14947726	0.03997502	0.02520426	0.78534346		1.00000000
26A				0.14947726	0.03997502	0.02520426	0.78534346		1.00000000
28G				0.05126137			0.94873863		1.00000000
28H							1.00000000		1.00000000
28J							1.00000000		1.00000000
29A							0.95147783	0.01307880	1.00000000
29F							0.95147785	0.01307876	1.00000000
29G							0.95147785	0.01307876	1.00000000
29H							0.96278381	0.00904475	1.00000000
29J							0.95147787	0.01307875	1.00000000
30							0.96212388	0.00860328	1.00000000
31A									1.00000000
33A									1.00000000
									1.00000000
34									1.00000000
35									1.00000000

TABLE B-2. Factors for Distributing Reach Minimum OMP&R Costs Among Contractors

Reach No.	Reach Description	NORTH BAY AREA		SOUTH BAY AREA				Total
		Napa County FC&WCD	Solano County WA	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Future Contractor	
	NORTH BAY AQUEDUCT							
1	Barker Slough thru Fairfield/Vacaville Turnout	0.29251728	0.70748272					1.00000000
2	Fairfield/Vacaville Turnout to Cordelia Forebay	0.42000793	0.57999207					1.00000000
3A	Cordelia Forebay thru Benicia and Vallejo Turnouts		1.00000000					1.00000000
3B	Cordelia Forebay thru Napa Turnout Reservoir	1.00000000						1.00000000
	SOUTH BAY AQUEDUCT							
1	Bethany Reservoir thru Altamont Turnout			0.33980110	0.19515838	0.46504052		1.00000000
2	Altamont Turnout thru Patterson Reservoir			0.33978741	0.19516252	0.46505007		1.00000000
4	Patterson Reservoir to Del Valle Junction			0.31610985	0.20216089	0.48172926		1.00000000
5	Del Valle Junction thru Lake Del Valle			0.53312173	0.12972254	0.33715573		1.00000000
6	Del Valle Junction thru South Livermore Turnout			0.32478705	0.19906896	0.47614399		1.00000000
7	South Livermore Turnout thru Vallecitos Turnout			0.14604872	0.25176680	0.60218448		1.00000000
8	Vallecitos Turnout thru Alameda-Bayside Turnout				0.27934645	0.72065355		1.00000000
9	Alameda-Bayside Turnout thru Santa Clara Terminal Facilities					1.00000000		1.00000000
	CALIFORNIA AQUEDUCT							
1	Delta thru Bethany Reservoir				0.00870649	0.02074717		N/A

Reach No.	Reach Description	CENTRAL COASTAL AREA		SOUTHERN CALIFORNIA AREA				
		San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency
	CALIFORNIA AQUEDUCT							
1	Delta thru Bethany Reservoir	0.00531803	0.00981112	0.03024584	0.02544226	0.02816849	0.00133276	0.01137611
2A	Bethany Reservoir to Orestimba Creek	0.00557057	0.01027704	0.03167950	0.02660598	0.02949522	0.00139543	0.01191224
2B	Orestimba Creek to O'Neill Forebay	0.00557667	0.01028833	0.03171597	0.02666336	0.02953453	0.00139736	0.01192791
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557562	0.01028637	0.03171043	0.02666656	0.02953095	0.00139720	0.01192641
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557450	0.01028431	0.03170463	0.02666994	0.02952719	0.00139705	0.01192482
5	Panoche Creek to Five Points	0.00557309	0.01028175	0.03169736	0.02667416	0.02952249	0.00139687	0.01192284
6	Five Points to Arroyo Pasajero	0.00557099	0.01027787	0.03168637	0.02668054	0.02951539	0.00139656	0.01191985
7	Arroyo Pasajero to Kettleman City	0.00557031	0.01027662	0.03168285	0.02668259	0.02951311	0.00139646	0.01191888
8C	Kettleman City thru Milham Avenue	0.00551445	0.01017357	0.03136136	0.02635185	0.02920164	0.00138158	0.01179354
8D	Milham Avenue thru Avenal Gap	0.00562665	0.01038055	0.03200083	0.02691146	0.02980153	0.00141001	0.01203564
9	Avenal Gap thru Twisselman Road			0.03436980	0.02785985	0.03125286	0.00153069	0.01306310
10A	Twisselman Road thru Lost Hills			0.03490578	0.02831966	0.03174218	0.00155504	0.01326985
11B	Lost Hills to 7th Standard Road			0.03824176	0.03115437	0.03478569	0.00170600	0.01455350
12D	7th Standard Road thru Elk Hills Road			0.04009312	0.03274031	0.03647572	0.00179001	0.01526741
12E	Elk Hills Road thru Tupman Road			0.04014397	0.03279589	0.03652306	0.00179253	0.01528847
13B	Tupman Road to Buena Vista Pumping Plant			0.04343323	0.03558110	0.03952321	0.00194122	0.01655295
14A	Buena Vista Pumping Plant thru Santiago Creek			0.04552298	0.03718058	0.04143137	0.00203618	0.01735961
14B	Santiago Creek thru Old River Road			0.04617191	0.03342424	0.04202703	0.00206642	0.01761493
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04735241	0.03220394	0.04310736	0.00212063	0.01807432
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04804398	0.03267426	0.04374004	0.00215235	0.01834317
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.04964403	0.03376234	0.04520241	0.00222537	0.01896287
17E	Edmonston Pumping Plant to Porter Tunnel			0.05163545	0.03511660	0.04702307	0.00231640	0.01973513
17F	Porter Tunnel to Junction, West Branch, Calif. Aqueduct			0.05173926	0.03518719	0.04711769	0.00232108	0.01977493
18A	Junction, West Branch, Calif. Aqueduct thru Alamo Pwp.			0.13485569		0.11344457	0.00605083	0.05154915
19	Alamo Powerplant to Fairmont			0.13485222		0.11344290	0.00605098	0.05154980
19C	Buttes Junction thru Buttes Reservoir			1.00000000				
20A	Fairmont thru 70th Street West			0.06847930		0.12213523	0.00651583	0.05550703
20B	70th Street West to Palmdale			0.02276024		0.12812785	0.00683566	0.05823170
21	Palmdale to Littlerock Creek			0.02318952		0.13056387	0.00696663	0.05934507
22A	Littlerock Creek to Pearblossom Pumping Plant			0.01181870		0.13242454	0.00706632	0.06019328
22B	Pearblossom Pumping Plant to West Fork Mojave River					0.13400843	0.00715085	0.06091324
23	West Fork Mojave River to Silverwood Lake					0.12416451	0.00818135	0.02168414
24	Cedar Springs Dam and Silverwood Lake					0.02651510	0.01251569	0.01910229
25	Silverwood Lake to South Portal San Bernardino Tunnel					0.09751351		0.01317145
26A	South Portal, San Bernardino Tunnel thru Devil Canyon Pwp.					0.12013473		0.01622697
28G	Devil Canyon Powerplant to Barton Road					0.30672992		0.04143095
28H	Barton Road to Lake Perris					0.32330286		0.04366951
28J	Perris Dam and Lake Perris					0.32330202		0.04366970
29A	Junction, West Branch, Calif. Aqueduct thru Oso P. P.			0.00296720	0.05726734			
29F	Oso Pumping Plant thru Quail Embankment			0.00296796	0.05726649			
29G	Quail Embankment thru Warne Powerplant				0.05742327			
29H	Pyramid Dam and Lake				0.03349572			
29J	Pyramid Lake thru Castaic Powerplant				0.05740996			
30	Castaic Dam and Lake				0.03248607			
31A	Avenal Gap to Devil's Den Pumping Plant	0.10542164	0.19449108		0.07351496			
33A	Devil's Den Pumping Plant thru Tank 1	0.10101221	0.89898779					
33B	Tank 1 thru Chorro Valley Turnout	0.10101221	0.89898779					
34	Chorro Valley Turnout through Lopez Turnout	0.05271277	0.94728723					
35	Lopez Turnout throu Guadalupe Turnout		1.00000000					

Note: Proportionate use factors reflect permanent capacity water transfer that have been signed as of February 1, 2006.

TABLE B-2. Factors for Distributing Reach Minimum OMP&R Costs Among Contractors

	SAN JOAQUIN VALLEY AREA										
							Kern County Water Agency				
Reach No.	Napa County FC&WCD	Solano County WA	Alameda County FC&WCD, Zone 7	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District
	CALIFORNIA AQUEDUCT										
1	0.00101503	0.00145926	0.02320270	0.01822142	0.00088480	0.00254117	0.02735295	0.27469072	0.00247193	0.00166749	0.02830375
2A	0.00106167	0.00152624	0.00868437	0.01903859	0.00092448	0.00266184	0.02863089	0.28700500	0.00258450	0.00174223	0.02957310
2B	0.00106383	0.00152939	0.00870009	0.01908995	0.00092696	0.00266476	0.02867562	0.28778222	0.00259040		0.02965288
3	0.00106393	0.00152954	0.00870024	0.01909529	0.00092722	0.00266425	0.02867409	0.28786344	0.00259080		0.02966116
4	0.00106401	0.00152968	0.00870041	0.01910089	0.00092749	0.00266370	0.02867248	0.28794882	0.00259124		0.02966986
5	0.00106413	0.00152986	0.00870062	0.01910789	0.00092783	0.00266303	0.02867046	0.28805544	0.00259177		0.02968073
6	0.00106431	0.00153014	0.00870096	0.01911848	0.00092835	0.00266203	0.02866740	0.28821677	0.00259258		0.02969716
7	0.00106438	0.00153022	0.00870107	0.01912188	0.00092852	0.00266169	0.02866642	0.28826851	0.00259284		0.02970244
8C	0.00105148	0.00151159	0.00859994	0.01886176	0.00091590	0.00263501	0.02834912	0.28434072	0.00255999		0.02929844
8D	0.00107370	0.00154358	0.00878005	0.01927090		0.00268862	0.02893698	0.29051094	0.00165734		0.01089124
9	0.00079826	0.00110157	0.00786471				0.03143148	0.29263291			
10A	0.00081139	0.00111953	0.00799211				0.03193731	0.28144288			
11B	0.00065052	0.00095254	0.00354792				0.03506894	0.21771722			
12D							0.03681479	0.18486151			
12E							0.03687019	0.18374304			
13B							0.01413733	0.14208658			
14A							0.00599913	0.10936622			
14B							0.00609042	0.10066378			
14C							0.00625275	0.07940837			
15A							0.00634765	0.06578229			
16A							0.00656553	0.03434119			
17E							0.00201100				
31A	0.00628695	0.00977801	0.02617705			0.05037550		0.43917148	0.00176551		

	SOUTHERN CALIFORNIA AREA (continued)								
Reach No.	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Municipal Water District	San Gabriel Valley Municipal Water District	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total
1	0.00049056	0.01818303	0.00458550	0.02356891	0.00648711	0.00397380	0.41547239	0.00427921	1.00000000
2A	0.00051386	0.01902951	0.00480271	0.02467716	0.00679322	0.00416065	0.43517158	0.00448242	1.00000000
2B	0.00051442	0.01906116	0.00480833	0.02471121	0.00680191	0.00416639	0.43566900	0.00448735	1.00000000
3	0.00051433	0.01906070	0.00480752	0.02470855	0.00680098	0.00416594	0.43559198	0.00448650	1.00000000
4	0.00051424	0.01906023	0.00480668	0.02470576	0.00680000	0.00416546	0.43551100	0.00448561	1.00000000
5	0.00051412	0.01905962	0.00480562	0.02470229	0.00679878	0.00416487	0.43540988	0.00448450	1.00000000
6	0.00051392	0.01905870	0.00480402	0.02469702	0.00679694	0.00416399	0.43525686	0.00448280	1.00000000
7	0.00051385	0.01905842	0.00480349	0.02469533	0.00679634	0.00416372	0.43520780	0.00448226	1.00000000
8C	0.00050870	0.01884315	0.00475451	0.02443210	0.00672541	0.00411933	0.44227753	0.00443733	1.00000000
8D	0.00051904	0.01923550	0.00485156	0.02493497	0.00686329	0.00420412	0.45134389	0.00452761	1.00000000
9	0.00056296	0.01845645	0.00526337	0.02706903	0.00744835	0.00456392	0.48981993	0.00491076	1.00000000
10A	0.00057175	0.01874332	0.00534585	0.02749934	0.00756597	0.00463648	0.49755423	0.00498733	1.00000000
11B	0.00062640	0.02052979	0.00585888	0.03016888	0.00829640	0.00508658	0.54559067	0.00546394	1.00000000
12D	0.00065673	0.02152073	0.00605960	0.03165452	0.00870248	0.00533707	0.57229756	0.00572844	1.00000000
12E	0.00065758	0.02154749	0.00606732	0.03169920	0.00871431	0.00534461	0.57307663	0.00573571	1.00000000
13B	0.00071145	0.02330931	0.00656455	0.03432822	0.00943394	0.00578787	0.62040339	0.00620565	1.00000000
14A	0.00074569	0.02442760	0.00688049	0.03600736	0.00989269	0.00607098	0.65057491	0.00650421	1.00000000
14B	0.00075633	0.02477336	0.00697864	0.03654173	0.01003745	0.00616108	0.66009578	0.00659690	1.00000000
14C	0.00077566	0.02540391	0.00715715	0.03750028	0.01029837	0.00632270	0.67725661	0.00676554	1.00000000
15A	0.00078697	0.02577340	0.00726173	0.03806102	0.01045107	0.00641723	0.68730050	0.00686434	1.00000000
16A	0.00081317	0.02662897	0.00750366	0.03935225	0.01080332	0.00663493	0.71046704	0.00709292	1.00000000
17E	0.00084580	0.02769354	0.00780477	0.04096189	0.01124220	0.00690630	0.73933042	0.00737743	1.00000000
17F	0.00084750	0.02774917	0.00782046	0.04104458	0.01126486	0.00692025	0.74082077	0.00739226	1.00000000
18A	0.00220895	0.04946256	0.01657935	0.10699871	0.02936451	0.01804030	0.47144538		1.00000000
19	0.00220892	0.04946131	0.01657891	0.10700135	0.02936470	0.01804074	0.47144817		1.00000000
19C									1.00000000
20A	0.00237800	0.05324853	0.01784830	0.11522152	0.03161788	0.01942666	0.50762172		1.00000000
20B	0.00249470	0.05586076	0.01872390	0.12087843	0.03316974	0.02038045	0.53253657		1.00000000
21	0.00254199	0.05692053		0.12319479	0.03380312	0.02077093	0.54270355		1.00000000
22A		0.05773082		0.12495766	0.03428593	0.02106816	0.55045459		1.00000000
22B		0.05842136		0.12645207	0.03469602	0.02132008	0.55703795		1.00000000
23				0.14467451	0.03969010	0.02439237	0.63721302		1.00000000
24				0.22243002	0.04339445	0.02843498	0.64760747		1.00000000
25				0.11825184	0.03722720	0.01993915	0.71389685		1.00000000
26A				0.14947726	0.03997501	0.02520426	0.64898177		1.00000000
28G				0.05126136			0.60057777		1.00000000
28H							0.63302763		1.00000000
28J							0.63302828		1.00000000
29A							0.92702291	0.01274255	1.00000000
29F							0.92702302	0.01274253	1.00000000
29G							0.92979606	0.01278067	1.00000000
29H							0.95753173	0.00897255	1.00000000
29J							0.92980918	0.01278086	1.00000000
30							0.95895422	0.00855971	1.00000000
31A		0.09301782							1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

TABLE B-3. Power Costs and Credits, Transmission Costs, and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant [a]

(in dollars)

	NORTH BAY AQUEDUCT			SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT					
	Reach 1	Reach 3A	Reach 3B	Reach 1 [c]	Reach 1	Reach 4	Reach 14A	Reach 15A	Reach 16A	Reach 17E
Calendar Year	Barker Slough Pumping P.	Cordelia Pumping P. Solano	Cordelia Pumping P. Napa [b]	South Bay & Del Valle Pumping P.	Banks Pumping P.	Dos Amigos Pumping P.	Buena Vista Pumping P.	Teerink Pumping P.	Chrisman Pumping P.	Edmonston Pumping P.
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	37,731	0	0	0	0	0	0
1963	0	0	0	56,414	0	0	0	0	0	0
1964	0	0	0	71,745	0	0	0	0	0	0
1965	0	0	0	138,653	0	0	0	0	0	0
1966	0	0	0	189,402	0	0	0	0	0	0
1967	0	0	0	220,327	28,554	0	0	0	0	0
1968	0	0	7,128	339,261	1,286,777	227,505	0	0	0	0
1969	0	0	8,557	274,851	817,304	119,303	0	0	0	0
1970	0	0	13,666	439,983	330,508	193,720	2,940	0	0	0
1971	0	0	10,626	413,657	559,946	205,206	134,340	7,921	0	0
1972	0	0	14,430	615,164	1,072,833	541,628	305,868	159,125	348,235	1,179,787
1973	0	0	14,453	477,134	880,234	469,676	469,104	472,187	829,325	2,961,697
1974	0	0	17,508	502,473	959,269	536,361	514,168	553,285	993,796	3,522,973
1975	0	0	14,801	373,706	1,315,916	536,495	607,981	664,738	1,340,518	4,675,938
1976	0	0	20,867	580,607	878,728	572,326	658,261	645,377	1,360,502	4,740,176
1977	0	0	22,640	534,087	631,578	178,904	139,856	138,714	291,196	977,258
1978	0	0	21,670	559,981	3,833,011	653,606	966,756	926,444	1,728,268	6,104,186
1979	0	0	16,240	614,117	3,394,344	994,921	805,839	788,539	1,612,105	5,564,009
1980	0	0	19,936	523,445	1,981,918	818,368	857,033	846,757	1,808,192	6,269,482
1981	0	0	23,863	639,976	1,975,220	1,640,814	1,197,553	1,189,437	2,731,775	9,388,367
1982	0	0	12,078	484,808	3,405,761	1,148,258	1,159,605	1,212,973	2,557,070	9,355,533
1983	0	0	2,339	77,394	1,264,426	140,742	276,289	264,076	545,887	1,827,188
1984	0	0	4,797	289,827	1,390,432	555,409	551,468	508,111	1,044,264	3,507,659
1985	0	0	10,220	456,051	2,830,593	1,283,981	1,336,378	1,378,587	2,994,227	10,459,919
1986	0	0	15,484	827,079	7,180,656	2,282,364	2,290,023	2,343,903	5,062,706	17,643,403
1987	0	0	27,223	901,077	3,924,603	1,996,638	1,851,663	1,885,638	4,119,308	14,361,151
1988	18,112	19,927	23,868	932,456	5,377,272	2,072,091	2,100,427	2,142,121	4,724,696	16,562,202
1989	30,783	45,783	26,501	1,211,118	10,887,880	3,334,006	3,427,675	3,553,496	7,936,397	27,756,045
1990	53,484	67,109	40,793	1,881,178	9,523,541	4,754,649	5,990,489	6,327,687	14,254,357	50,152,078
1991	11,254	10,442	5,983	365,808	3,463,154	723,518	1,263,736	1,445,729	3,363,863	12,019,190
1992	14,484	13,070	9,398	327,309	2,700,240	808,067	1,071,702	1,121,273	2,503,167	8,677,102
1993	(12,340)	(8,753)	(5,393)	(159,836)	(333,548)	(609,139)	(461,719)	(459,965)	(1,018,142)	(3,558,718)
1994	54,407	39,608	29,189	823,317	4,438,900	1,938,280	2,325,005	2,375,321	5,337,101	18,723,854
1995	20,699	20,620	11,791	253,482	4,009,296	1,076,372	924,147	887,105	1,948,905	6,847,537
1996	59,545	47,288	23,483	645,189	9,531,541	3,449,781	2,444,752	2,341,848	5,156,434	18,332,558
1997	69,837	52,935	21,955	963,877	7,625,930	3,064,281	2,847,907	2,788,387	6,217,434	22,057,503
1998	(11,058)	(9,488)	(4,554)	(124,695)	296,016	(362,362)	(316,705)	(304,065)	(673,122)	(2,350,976)
1999	30,114	25,288	10,024	516,703	4,988,797	2,287,161	1,553,244	1,241,104	3,232,010	12,564,772
2000	58,591	42,543	15,078	860,785	8,018,823	3,043,577	2,963,119	3,035,444	6,985,916	25,206,823
2001	358,726	248,919	213,001	4,045,747	24,049,006	9,826,265	14,784,423	15,166,621	34,168,448	126,253,823
2002	186,186	102,222	60,093	2,190,992	16,807,227	6,740,615	8,238,545	8,538,761	19,287,643	70,880,768
2003	175,952	115,069	95,023	2,487,701	20,922,559	8,769,499	10,363,118	10,792,509	24,604,453	90,561,341
2004	242,315	134,187	103,360	2,412,375	21,053,063	9,018,396	11,887,828	12,476,791	28,497,369	104,778,231
2005	278,132	143,598	145,812	2,734,374	28,939,713	12,758,363	12,347,806	12,701,242	28,859,501	102,413,846
2006	434,350	542,507	505,614	4,307,767	33,549,833	14,706,333	16,350,132	19,169,010	40,671,891	144,330,419
2007	590,980	738,139	687,942	5,027,189	38,871,852	17,446,618	22,077,197	25,851,676	54,939,980	195,095,796
2008	690,253	862,132	803,503	5,847,863	45,999,986	19,268,723	24,159,113	28,321,071	60,145,210	213,516,519
2009	471,915	374,214	388,904	6,372,608	37,179,973	17,754,325	21,507,786	21,347,482	49,937,709	187,149,290
2010	493,421	391,422	416,605	6,650,471	46,873,631	18,790,901	22,865,042	22,693,320	53,122,285	199,115,814
2011	496,491	391,567	424,332	6,652,823	43,287,706	19,052,728	23,317,369	23,158,954	54,239,007	203,345,555
2012	514,195	404,948	448,548	6,869,338	40,874,428	19,615,395	23,942,931	23,762,637	55,653,070	208,626,569
2013	560,407	444,221	504,428	7,504,849	53,285,819	21,971,197	27,002,796	26,794,891	62,827,735	235,583,646
2014	600,883	476,875	556,466	8,033,282	48,006,529	23,899,101	29,494,794	29,262,346	68,663,917	257,507,932
2015	616,026	484,040	586,096	8,149,207	53,829,633	24,362,286	30,108,161	29,872,480	70,109,581	262,944,031
2016	628,039	488,983	611,913	8,229,208	61,030,991	24,867,340	30,858,377	30,630,396	71,914,894	269,754,725
2017	626,188	481,926	621,252	8,114,990	55,012,291	24,555,395	30,503,508	30,286,455	71,107,577	266,736,485
2018	648,839	495,855	661,961	8,340,400	53,261,487	25,033,184	30,965,041	30,719,149	72,110,589	270,457,478
2019	669,869	508,101	701,793	8,538,566	63,216,351	26,673,162	33,496,642	33,290,481	78,247,055	293,634,371
2020	642,697	480,276	679,785	8,088,278	55,552,002	24,870,075	31,095,807	30,901,927	72,588,036	272,353,992
2021	642,959	479,487	681,858	8,075,528	54,611,697	24,931,695	31,222,790	31,035,297	72,909,894	273,577,740
2022	624,138	463,956	657,583	7,824,210	50,456,450	24,097,177	30,183,194	30,011,662	70,493,638	264,512,334
2023	627,484	466,716	661,896	7,868,867	54,262,566	24,264,404	30,400,110	30,226,692	71,002,595	266,424,794
2024	649,302	484,720	690,036	8,160,210	59,907,056	25,270,792	31,673,659	31,483,793	73,972,371	277,572,996
2025	646,528	482,429	686,457	8,123,162	50,025,808	25,035,573	31,325,609	31,132,100	73,134,690	274,412,906
2026	650,736	485,903	691,887	8,179,360	62,589,049	25,404,461	31,874,475	31,686,968	74,456,792	279,401,955
2027	641,415	478,212	679,865	8,054,893	55,603,610	24,907,148	31,213,982	31,030,218	72,900,791	273,550,492
2028	645,640	481,697	685,313	8,111,316	55,081,163	27,017,012	31,407,606	31,218,882	73,344,757	275,212,510
2029	637,836	475,259	675,250	8,007,124	54,176,019	24,732,992	30,989,057	30,807,296	72,373,724	271,570,563
2030	642,716	479,286	681,543	8,072,261	56,833,870	24,952,106	31,264,952	31,079,264	73,015,818	273,980,140
2031	634,372	472,401	670,781	7,960,854	50,070,394	24,041,101	29,859,163	29,651,745	69,609,093	261,113,474
2032	646,360	482,292	686,244	8,120,937	56,884,724	25,379,100	31,928,310	31,753,716	74,626,050	280,062,751
2033	677,228	507,762	726,051	8,533,081	57,859,184	26,115,385	32,533,252	32,298,632	75,868,894	284,627,172
2034	653,549	488,224	695,514	8,216,921	56,349,428	25,704,409	32,338,344	32,158,092	75,580,908	283,646,528
2035	640,870	477,760	679,160	8,047,612	55,222,480	24,950,395	31,300,312	31,120,579	73,118,589	274,378,059
TOTAL	19,984,909	15,881,677	19,972,511	261,090,005	1,782,008,031	787,460,158	965,140,135	972,914,432	2,257,440,944	8,404,613,741

a) Starting with 2005 transmission costs that vary and depend on Power usage are included, therefore recovered through the variable component.

b) Power costs for the period 1968 through 1987 are for an interim facility.

c) The costs of Del Valle Pumping Plant are combined with those of South Bay Pumping Plant to simplify the cost allocations.

TABLE B-3. Power Costs and Credits, Transmission Costs, and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued) Reach 18A Alamo Powerplant	Reach 22B Pearblossom Pumping Plant	Reach 23 Mojave Siphon Powerplant	Reach 26A Devil Canyon Powerplant	Reach 29A Oso Pumping Plant	Reach 29G Warne Powerplant	Reach 29J Castaic Powerplant	Reach 31A Las Perillas and Badger Hill Pumping Plants	Reach 33A Devil's Den, Bluestone and Polonio Pass Pumping Plants	GRAND TOTAL
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	37,731
1963	0	0	0	0	0	0	0	0	0	56,414
1964	0	0	0	0	0	0	0	0	0	71,745
1965	0	0	0	0	0	0	0	0	0	138,653
1966	0	0	0	0	0	0	0	0	0	189,402
1967	0	0	0	0	0	0	0	0	0	248,881
1968	0	0	0	0	0	0	0	118,578	0	1,979,249
1969	0	0	0	0	0	0	0	76,920	0	1,296,935
1970	0	0	0	0	0	0	0	134,749	0	1,115,566
1971	0	0	0	0	0	0	0	168,689	0	1,500,385
1972	0	81,484	0	(3,112)	157,005	0	(385,696)	213,251	0	4,300,002
1973	0	586,209	0	(956,197)	238,650	0	(1,193,216)	120,014	0	5,369,270
1974	0	566,546	0	(963,572)	286,640	0	(1,823,397)	119,505	0	5,785,555
1975	0	587,227	0	(1,125,945)	421,687	0	(2,835,302)	92,012	0	6,669,772
1976	0	871,540	0	(1,567,312)	278,869	0	(2,512,021)	146,530	0	6,674,450
1977	0	275,980	0	(1,262,960)	17,319	0	(1,701,284)	84,225	0	327,513
1978	0	1,758,473	0	(3,345,147)	215,573	0	(2,361,377)	190,745	0	11,252,189
1979	0	1,770,844	0	(3,381,969)	122,134	0	(2,752,003)	203,143	0	9,752,263
1980	0	1,769,468	0	(3,508,195)	86,893	0	(2,728,494)	182,996	0	8,927,799
1981	0	2,049,947	0	(3,743,153)	382,330	0	(2,854,192)	189,573	0	14,811,510
1982	0	1,614,895	0	(3,149,352)	444,009	(973,898)	(3,476,126)	182,427	0	13,978,041
1983	0	301,180	0	(5,905,161)	59,561	(1,314,237)	(3,904,690)	18,936	0	(6,346,070)
1984	0	633,223	0	(7,865,341)	135,658	(2,285,362)	844,120	117,585	0	(568,150)
1985	0	1,140,057	0	(10,664,136)	739,708	(8,476,552)	(19,162,735)	155,931	0	(15,517,771)
1986	(1,080,970)	2,482,042	0	(12,235,312)	1,037,512	(6,269,528)	(11,462,662)	317,622	0	10,434,322
1987	(1,062,392)	1,822,523	0	(10,871,342)	914,642	(6,757,040)	(11,630,562)	266,825	0	1,749,955
1988	(810,907)	2,373,442	0	(14,772,519)	951,580	(7,448,747)	(12,677,211)	237,272	0	1,826,082
1989	(822,973)	4,130,250	0	(19,098,882)	1,543,985	(8,790,866)	(14,657,167)	309,851	0	20,823,882
1990	(845,641)	6,810,694	0	(21,336,948)	3,032,334	(11,692,826)	(19,863,014)	466,262	0	49,616,226
1991	(351,262)	1,306,263	0	(5,781,948)	778,874	(5,250,121)	(8,731,129)	17,608	0	4,660,962
1992	(997,736)	1,116,809	0	(9,903,370)	541,093	(5,955,563)	(9,599,392)	111,742	0	(7,440,605)
1993	(84,856)	(370,935)	0	(7,956,659)	(244,261)	(4,607,075)	(9,740,511)	(122,190)	0	(29,754,040)
1994	(93,031)	2,529,462	0	(12,122,861)	1,039,474	(6,228,273)	(10,867,596)	226,378	(1,127)	10,567,408
1995	(1,297,179)	951,513	0	(10,256,635)	342,312	(3,827,718)	(7,403,219)	261,423	0	(5,229,549)
1996	(2,959,744)	2,725,712	(941,959)	(13,155,960)	908,180	(5,026,221)	(8,969,945)	321,137	0	14,933,619
1997	(2,876,697)	3,431,693	(1,932,337)	(13,519,660)	990,932	(5,184,788)	(9,027,058)	322,753	208,816	18,123,700
1998	(2,244,105)	(439,496)	(1,385,473)	(10,955,475)	(66,088)	(1,888,975)	(4,963,075)	(56,675)	(87,016)	(25,947,387)
1999	(2,811,928)	1,779,376	(2,482,354)	(14,772,635)	666,901	(5,526,541)	(9,954,674)	156,194	234,077	(6,262,367)
2000	(5,129,549)	3,965,245	(4,429,149)	(25,857,029)	1,215,093	(9,464,490)	(17,958,033)	231,108	380,555	(6,815,550)
2001	(3,298,048)	18,936,837	(3,649,034)	(19,510,279)	6,409,025	(7,987,833)	(13,981,232)	1,080,182	2,152,324	209,266,921
2002	(4,926,146)	10,444,621	(5,255,302)	(24,676,762)	3,719,061	(10,286,902)	(18,455,024)	529,085	1,320,943	85,446,626
2003	(3,431,664)	14,432,726	(6,760,773)	(28,047,969)	4,378,568	(10,281,922)	(17,307,974)	621,149	1,482,405	123,971,770
2004	(6,227,543)	16,376,616	(7,691,607)	(31,246,141)	5,297,989	(12,033,953)	(20,022,179)	651,104	1,718,113	137,426,314
2005	(6,140,331)	18,183,010	(6,778,759)	(30,599,808)	4,111,678	(8,251,156)	(13,698,272)	826,136	1,669,939	160,644,824
2006	(3,764,700)	23,462,935	(7,175,900)	(26,680,000)	7,428,524	(11,210,000)	(19,709,600)	1,163,771	2,964,936	241,047,822
2007	(4,373,715)	30,115,761	(6,756,637)	(25,406,557)	10,742,147	(11,778,965)	(20,915,620)	1,615,020	4,711,056	339,279,859
2008	(6,189,900)	33,639,787	(9,073,900)	(34,110,000)	11,452,528	(15,487,500)	(26,930,000)	1,714,091	4,269,285	358,898,764
2009	(5,582,798)	28,046,158	(6,526,500)	(31,566,025)	10,798,203	(15,056,975)	(25,235,050)	2,060,870	5,630,664	305,052,753
2010	(5,630,503)	30,037,151	(6,596,625)	(31,860,925)	11,368,480	(15,179,275)	(25,547,250)	2,147,558	5,889,638	336,041,161
2011	(5,676,281)	30,367,489	(6,650,250)	(32,188,175)	11,735,942	(15,783,600)	(26,489,900)	2,148,291	5,891,827	337,721,875
2012	(5,769,388)	31,832,503	(6,829,725)	(32,405,200)	11,743,121	(15,166,000)	(25,589,750)	2,215,693	6,093,187	346,836,500
2013	(5,758,155)	35,872,660	(6,846,000)	(32,831,750)	13,191,807	(15,745,900)	(26,533,450)	2,413,537	6,684,231	406,926,969
2014	(5,782,172)	38,710,496	(6,862,800)	(32,782,050)	14,533,787	(16,350,900)	(27,474,150)	2,578,042	7,175,687	440,248,065
2015	(5,871,801)	40,142,387	(7,063,725)	(33,390,200)	14,599,172	(16,195,075)	(27,196,050)	2,614,131	7,283,496	455,983,876
2016	(5,934,499)	41,397,662	(7,156,875)	(34,005,575)	14,899,964	(16,378,000)	(27,521,050)	2,639,035	7,357,905	474,313,433
2017	(5,889,990)	40,650,842	(7,174,350)	(33,978,600)	14,859,536	(16,553,625)	(27,844,950)	2,603,479	7,251,675	461,970,084
2018	(5,952,829)	42,026,567	(7,497,975)	(34,012,075)	14,716,265	(15,866,450)	(26,739,700)	2,673,652	7,461,317	469,502,755
2019	(5,999,923)	44,031,274	(7,434,300)	(34,727,425)	16,605,791	(17,564,050)	(29,744,150)	2,735,345	7,645,616	514,524,569
2020	(5,968,950)	41,544,900	(7,439,925)	(34,666,150)	15,186,007	(16,962,875)	(28,605,000)	2,595,164	7,226,835	470,162,881
2021	(5,995,458)	41,657,103	(7,505,625)	(34,811,350)	15,289,894	(17,103,250)	(28,864,150)	2,591,196	7,214,975	470,642,280
2022	(6,023,188)	40,097,764	(7,496,625)	(34,809,700)	14,887,951	(17,179,400)	(28,996,400)	2,512,957	6,981,242	449,298,943
2023	(6,038,651)	40,457,982	(7,534,575)	(34,804,325)	14,963,422	(17,170,050)	(28,980,700)	2,526,859	7,022,777	456,648,863
2024	(6,012,989)	42,254,501	(7,548,000)	(34,803,550)	15,507,613	(17,174,325)	(28,988,450)	2,617,557	7,293,730	483,011,022
2025	(5,984,836)	41,481,835	(7,450,050)	(34,514,225)	15,438,958	(17,174,375)	(28,988,500)	2,606,023	7,259,276	467,679,368
2026	(6,048,709)	42,714,696	(7,632,075)	(35,124,800)	15,543,198	(17,174,325)	(28,988,450)	2,623,519	7,311,547	488,646,187
2027	(6,006,644)	41,537,726	(7,471,275)	(34,768,475)	15,336,903	(17,206,350)	(29,039,650)	2,584,773	7,195,788	471,223,422
2028	(5,985,400)	41,864,710	(7,494,675)	(34,815,075)	15,392,376	(17,146,300)	(28,938,450)	2,602,335	7,248,262	475,933,679
2029	(5,995,317)	41,260,171	(7,507,125)	(34,810,950)	15,223,639	(17,174,300)	(28,988,500)	2,569,899	7,151,359	466,173,996
2030	(5,985,494)	41,638,163	(7,494,825)	(34,815,050)	15,344,555	(17,174,350)	(28,988,550)	2,590,178	7,211,943	473,328,526
2031	(5,989,113)	40,640,717	(7,813,125)	(34,452,000)	14,252,885	(16,066,325)	(27,113,650)	2,555,496	7,108,328	447,206,591
2032	(6,059,237)	41,989,327	(7,908,300)	(34,774,175)	15,906,565	(17,670,050)	(29,942,350)	2,605,331	7,257,209	481,974,804
2033	(6,024,927)	44,226,118	(7,942,800)	(34,611,900)	15,488,615	(16,256,200)	(27,577,100)	2,733,636	7,640,513	497,422,596
2034	(6,054,396)	42,483,681	(7,981,350)	(34,688,400)	16,111,895	(17,689,125)	(29,983,550)	2,635,212	7,346,477	488,012,361
2035	(6,056,370)	41,725,361	(7,716,375)	(35,001,675)	15,365,079	(17,192,050)	(29,116,400)	2,582,504	7,189,011	471,714,901
TOTAL	(221,899,035)	1,284,903,903	(262,889,034)	(1,390,336,103)	465,069,742	(643,640,552)	(1,123,386,862)	82,145,929	211,048,821	13,887,523,352

TABLE B-4. Annual Table A Amounts to Project Water

(in acre-feet)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA [a]				CENTRAL COASTAL AREA		
	Napa [b] County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	507	5,248	5,783	11,538	0	0	0
1968	0	0	0	6,900	15,000	88,000	109,900	0	0	0
1969	0	0	0	8,200	15,500	75,000	98,700	0	0	0
1970	0	0	0	10,000	16,200	88,000	114,200	0	0	0
1971	0	0	0	11,200	17,000	88,000	116,200	0	0	0
1972	0	0	0	12,400	17,900	88,000	118,300	0	0	0
1973	0	0	0	13,600	18,800	88,000	120,400	0	0	0
1974	0	0	0	14,800	19,600	88,000	122,400	0	0	0
1975	0	0	0	16,000	20,500	88,000	124,500	0	0	0
1976	0	0	0	17,200	21,300	88,000	126,500	0	0	0
1977	0	0	0	18,400	22,200	88,000	128,600	0	0	0
1978	0	0	0	19,600	23,100	88,000	130,700	0	0	0
1979	0	0	0	20,800	23,900	88,000	132,700	0	0	0
1980	0	500	500	22,000	24,800	88,000	134,800	1,000	946	1,946
1981	0	650	650	23,000	26,000	88,000	137,000	1,000	1,813	2,813
1982	0	800	800	24,000	27,200	88,000	139,200	2,000	3,626	5,626
1983	0	950	950	25,000	28,400	88,000	141,400	3,000	5,439	8,439
1984	0	1,100	1,100	26,000	29,600	88,000	143,600	4,500	8,198	12,698
1985	0	1,250	1,250	27,000	30,800	88,000	145,800	7,500	13,638	21,138
1986	0	1,400	1,400	28,000	32,100	88,000	148,100	10,000	18,210	28,210
1987	0	1,550	1,550	29,000	33,300	88,000	150,300	12,500	22,704	35,204
1988	5,745	9,726	15,471	30,000	34,500	88,000	152,500	15,500	28,222	43,722
1989	6,195	18,420	24,615	31,000	35,700	90,000	156,700	20,000	36,342	56,342
1990	6,940	21,250	28,190	32,000	36,900	92,000	160,900	25,000	45,486	70,486
1991	7,290	22,300	29,590	34,000	38,400	94,000	166,400	25,000	45,486	70,486
1992	7,840	24,170	32,010	36,000	39,900	96,000	171,900	25,000	45,486	70,486
1993	8,490	26,130	34,620	38,000	41,400	98,000	177,400	25,000	45,486	70,486
1994	9,135	28,080	37,215	40,000	42,000	100,000	182,000	25,000	45,486	70,486
1995	9,780	34,250	44,030	42,000	42,000	100,000	184,000	25,000	45,486	70,486
1996	10,425	37,800	48,225	44,000	42,000	100,000	186,000	25,000	45,486	70,486
1997	11,065	38,250	49,315	46,000	42,000	100,000	188,000	6,215	38,986	45,201
1998	11,710	38,710	50,420	46,000	42,000	100,000	188,000	6,215	38,986	45,201
1999	15,850	39,170	55,020	46,000	42,000	100,000	188,000	25,000	45,486	70,486
2000	16,325	39,620	55,945	68,000	42,000	100,000	210,000	25,000	45,486	70,486
2001	20,725	45,836	66,561	78,000	42,000	100,000	220,000	25,000	45,486	70,486
2002	21,100	46,296	67,396	78,000	42,000	100,000	220,000	25,000	45,486	70,486
2003	21,475	46,756	68,231	78,400	42,000	100,000	220,400	25,000	45,486	70,486
2004	21,850	47,206	69,056	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2005	22,225	47,256	69,481	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2006	22,550	47,306	69,856	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2007	22,875	47,356	70,231	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2008	23,200	47,406	70,606	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2009	23,525	47,456	70,981	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2010	23,850	47,506	71,356	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2011	24,175	47,556	71,731	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2012	24,500	47,606	72,106	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2013	24,775	47,656	72,431	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2014	25,150	47,706	72,856	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2015	25,825	47,756	73,581	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2016	26,450	47,756	74,206	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2017	27,075	47,756	74,831	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2018	27,700	47,756	75,456	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2019	28,325	47,756	76,081	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2020	28,925	47,756	76,681	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2021	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2022	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2023	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2024	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2025	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2026	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2027	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2028	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2029	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2030	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2031	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2032	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2033	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2034	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2035	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
TOTAL	1,048,440	2,049,856	3,098,296	3,720,815	2,459,248	6,510,783	12,690,846	1,189,430	2,218,494	3,407,924

a) Table A amounts for the South Bay area were supplied by non-Project water from June 1962 through November 1967. Actual delivery quantities of Project water are shown for 1967.

b) District's Table A amounts exclude the amounts supplied by non-Project water from 1968 through 1987.

TABLE B-4. Annual Table A Amounts to Project Water

(in acre-feet)

Calendar Year	SAN JOAQUIN VALLEY AREA								
			Kern County Water Agency						
	Dudley Ridge Water District	Empire West Side Irrigation District	Municipal and Industrial	Agricultural	Total	County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	14,300	1,000	0	46,600	46,600	900	2,300	12,250	77,350
1969	14,325	3,000	0	95,700	95,700	1,200	2,500	46,350	163,075
1970	15,700	3,000	28,700	116,400	145,100	1,300	2,600	34,300	202,000
1971	17,900	3,000	35,700	154,600	190,300	1,300	2,800	36,500	251,800
1972	20,000	3,000	39,200	231,500	270,700	1,400	5,366	112,600	413,066
1973	22,000	3,000	43,500	267,000	310,500	1,500	3,100	43,552	383,652
1974	33,390	3,000	48,000	299,000	347,000	1,500	3,471	72,289	460,650
1975	40,555	3,000	52,700	358,120	410,820	1,600	3,576	86,258	545,809
1976	30,921	3,000	56,100	386,050	442,150	1,600	4,039	61,707	543,417
1977	30,400	3,000	60,600	423,000	483,600	1,700	3,700	59,000	581,400
1978	32,500	0	64,100	470,200	534,300	1,900	3,900	63,300	635,900
1979	38,544	3,000	67,600	516,300	583,900	2,000	4,000	71,241	702,685
1980	41,000	3,000	71,100	563,400	634,500	2,200	5,700	71,700	758,100
1981	41,000	3,000	74,800	616,600	691,400	2,300	4,300	76,000	818,000
1982	41,000	3,000	79,600	665,700	745,300	2,500	4,500	80,200	876,500
1983	42,900	3,000	83,500	721,600	805,100	2,800	3,770	9,548	867,118
1984	45,100	3,000	103,600	757,000	860,600	3,100	4,800	62,611	979,211
1985	47,200	3,000	108,900	806,100	915,000	3,400	4,900	45,549	1,019,049
1986	49,300	3,000	113,400	820,246	933,646	3,700	5,100	97,200	1,091,946
1987	51,400	3,000	119,100	904,400	1,023,500	4,000	5,200	101,400	1,188,500
1988	53,500	3,000	123,900	950,700	1,074,600	4,000	5,400	105,600	1,246,100
1989	55,600	3,000	128,200	984,100	1,112,300	4,000	5,600	109,900	1,290,400
1990	28,850	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,313,450
1991	53,411	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,338,011
1992	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1993	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1994	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1995	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1996	53,370	3,000	134,600	982,460	1,117,060	4,000	5,700	118,500	1,301,630
1997	53,370	3,000	134,600	978,130	1,112,730	4,000	5,700	118,500	1,297,300
1998	53,370	3,000	134,600	953,130	1,087,730	4,000	5,700	118,500	1,272,300
1999	53,370	3,000	134,600	953,130	1,087,730	4,000	5,700	118,500	1,272,300
2000	53,370	3,000	134,600	886,130	1,020,730	4,000	5,700	118,500	1,205,300
2001	53,370	3,000	134,600	866,349	1,000,949	4,000	5,700	118,500	1,185,519
2002	57,343	3,000	134,600	866,349	1,000,949	4,000	5,700	111,527	1,182,519
2003	57,343	3,000	134,600	866,349	1,000,949	4,000	5,700	111,127	1,182,119
2004	57,343	3,000	134,600	864,130	998,730	9,000	5,700	96,227	1,170,000
2005	57,343	3,000	134,600	864,130	998,730	9,000	5,700	96,227	1,170,000
2006	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2007	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2008	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2009	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2010	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2011	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2012	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2013	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2014	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2015	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2016	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2017	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2018	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2019	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2020	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2021	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2022	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2023	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2024	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2025	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2026	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2027	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2028	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2029	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2030	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2031	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2032	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2033	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2034	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2035	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
TOTAL	3,361,478	199,000	7,693,900	52,271,303	59,965,203	403,050	352,822	6,173,823	70,455,376

TABLE B-4. Annual Table A Amounts to Project Water

(in acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	3,700	0	0	0	0	0	0	0	0
1969	0	5,000	0	0	0	0	0	0	0	0
1970	0	5,700	0	0	0	0	0	0	0	0
1971	0	6,700	0	0	0	0	0	0	0	0
1972	20,000	8,936	5,200	526	8,000	170	8,400	1,620	1,677	122
1973	25,000	12,400	5,800	870	9,000	290	10,700	2,940	48,000	11,500
1974	30,000	15,400	6,400	1,160	10,000	400	13,100	4,260	50,000	12,300
1975	35,000	18,200	7,000	1,450	11,000	520	15,400	5,580	52,500	13,100
1976	44,000	21,200	7,600	1,740	12,000	640	17,800	6,900	55,000	14,000
1977	50,000	24,100	8,421	2,030	13,000	730	20,200	8,220	57,500	14,800
1978	57,000	24,762	9,242	2,320	14,000	920	0	9,340	60,000	15,700
1979	63,000	28,000	10,063	2,610	15,000	1,040	24,900	10,260	62,500	16,600
1980	69,200	30,400	10,884	2,900	17,000	1,150	27,200	11,180	65,500	17,400
1981	75,000	32,800	12,105	3,190	19,000	1,270	23,100	11,700	68,500	18,300
1982	81,300	34,800	13,326	3,480	21,000	1,380	22,843	12,320	71,500	19,100
1983	87,700	37,300	14,547	3,770	23,000	1,500	34,300	12,940	74,500	19,900
1984	35,000	39,600	15,768	4,060	25,000	1,610	36,700	13,560	78,000	20,700
1985	40,000	41,800	16,989	4,350	27,000	1,730	39,000	14,180	81,500	21,800
1986	42,000	43,600	18,210	4,640	29,000	1,840	41,400	14,800	85,000	23,200
1987	44,000	45,600	19,431	4,930	31,500	1,960	43,700	15,420	89,000	24,600
1988	46,000	48,000	20,652	5,220	34,000	2,070	46,000	16,040	93,000	26,000
1989	125,700	50,100	21,873	5,510	36,500	2,190	48,500	16,660	97,000	27,400
1990	132,100	52,000	23,100	5,800	38,100	2,300	50,800	17,300	101,500	28,800
1991	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1992	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1993	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1994	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1995	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1996	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1997	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1998	138,400	54,200	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800
1999	138,400	54,200	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800
2000	138,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2001	138,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2002	141,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2003	141,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2004	141,400	95,200	33,000	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2005	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2006	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2007	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2008	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2009	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2010	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2011	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2012	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2013	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2014	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2015	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2016	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2017	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2018	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2019	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2020	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2021	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2022	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2023	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2024	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2025	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2026	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2027	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2028	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2029	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2030	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2031	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2032	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2033	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2034	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2035	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
TOTAL	7,432,000	4,545,098	4,334,011	321,556	2,476,500	127,210	3,760,043	1,127,720	5,909,177	1,641,322

TABLE B-4. Annual Table A Amounts to Project Water

(in acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	11,538
1968	0	0	0	3,700	0	300	250	550	0	191,500
1969	0	0	0	5,000	0	350	270	620	0	267,395
1970	0	0	0	5,700	0	400	300	700	0	322,600
1971	0	0	0	6,700	0	450	440	890	0	375,590
1972	0	154,772	0	209,423	0	500	470	970	0	741,759
1973	0	354,600	0	481,100	0	600	500	1,100	0	986,252
1974	0	454,900	0	597,920	0	700	530	1,230	0	1,182,200
1975	0	555,200	0	714,950	0	1,050	560	1,610	0	1,386,869
1976	0	655,600	0	836,480	0	1,400	590	1,990	0	1,508,387
1977	0	755,900	0	954,901	0	1,800	620	2,420	0	1,667,321
1978	0	856,300	0	1,049,584	0	1,200	650	1,850	0	1,818,034
1979	0	956,600	0	1,190,573	0	1,450	680	2,130	0	2,028,088
1980	6,800	1,057,000	1,000	1,317,614	0	1,100	710	1,810	0	2,214,770
1981	7,800	1,157,300	2,000	1,432,065	0	1,200	740	1,940	0	2,392,468
1982	8,800	1,257,600	3,000	1,550,449	0	1,200	770	1,970	0	2,574,545
1983	9,800	1,358,000	4,000	1,681,257	0	1,200	800	2,000	0	2,701,164
1984	10,800	1,458,300	5,000	1,744,098	1,600	1,200	830	3,630	0	2,884,337
1985	11,800	1,558,700	6,000	1,864,849	1,700	1,200	860	3,760	0	3,055,846
1986	12,900	1,659,300	8,000	1,983,890	2,100	1,200	890	4,190	0	3,257,736
1987	14,000	1,759,800	10,000	2,103,941	2,500	1,200	920	4,620	0	3,484,115
1988	15,100	1,860,400	13,000	2,225,482	2,900	1,200	960	5,060	0	3,688,335
1989	16,200	1,961,000	16,000	2,424,633	3,300	1,200	1,000	5,500	0	3,958,190
1990	17,300	2,011,500	20,000	2,500,600	3,800	1,200	1,040	6,040	0	4,079,666
1991	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,080	11,880	0	4,126,567
1992	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,120	11,920	0	4,138,816
1993	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,160	11,960	0	4,146,966
1994	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,200	12,000	0	4,154,201
1995	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,250	12,050	0	4,163,066
1996	0	2,011,500	20,000	2,492,900	9,600	1,200	1,300	12,100	0	4,111,341
1997	0	2,011,500	20,000	2,492,900	9,600	1,200	1,350	12,150	0	4,084,866
1998	0	2,011,500	20,000	2,517,900	9,600	1,200	1,400	12,200	0	4,086,021
1999	2,000	2,011,500	20,000	2,519,900	9,600	2,890	1,450	13,940	0	4,119,646
2000	3,000	2,011,500	20,000	2,565,900	9,600	2,890	1,510	14,000	0	4,121,631
2001	4,000	2,011,500	20,000	2,566,900	9,600	3,500	1,570	14,670	0	4,124,136
2002	4,000	2,011,500	20,000	2,569,900	9,600	3,500	1,630	14,730	0	4,125,031
2003	5,000	2,011,500	20,000	2,570,900	9,600	3,500	1,690	14,790	0	4,126,926
2004	6,000	2,011,500	20,000	2,581,800	9,600	3,500	0	13,100	0	4,127,061
2005	6,500	1,911,500	20,000	2,582,300	9,600	1,200	0	10,800	0	4,125,686
2006	7,000	1,911,500	20,000	2,582,800	9,600	1,200	324	11,124	0	4,126,885
2007	7,500	1,911,500	20,000	2,583,300	9,600	27,500	720	37,820	0	4,154,456
2008	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,020	39,120	0	4,165,931
2009	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,090	39,190	0	4,166,376
2010	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,160	39,260	0	4,166,821
2011	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,240	39,340	0	4,167,276
2012	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,320	39,420	0	4,167,731
2013	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,410	39,510	0	4,168,146
2014	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,500	39,600	0	4,168,661
2015	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,600	39,700	0	4,169,486
2016	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,170,211
2017	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,170,836
2018	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,171,461
2019	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,086
2020	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,686
2021	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2022	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2023	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2024	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2025	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2026	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2027	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2028	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2029	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2030	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2031	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2032	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2033	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2034	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2035	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
TOTAL	747,200	109,260,272	988,000	142,670,109	449,900	852,580	106,474	1,408,954	0	233,731,505

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	Grizzly Valley Pipeline PC FC&WCD	NORTH BAY AQUEDUCT Reach 1 SCWA	Reach 3A SCWA	Reach 3B NC [a] FC&WCD	Total	SOUTH BAY AQUEDUCT Reach 1 ACWD	Reach 1 AC FC&WCD	Reach 2 AC FC&WCD	Reach 4 AC FC&WCD	Reach 5 ACWD	Reach 5 AC FC&WCD
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
1962	0	0	0	0	0	8,412	141	353	0	0	0
1963	0	0	0	0	0	10,914	814	917	0	0	0
1964	0	0	0	0	0	19,238	248	1,425	0	0	0
1965	0	0	0	0	0	15,280	637	1,830	138	0	0
1966	0	0	0	0	0	0	2,475	2,537	499	0	0
1967	0	0	0	0	0	0	1,527	2,391	862	0	0
1968	0	0	0	1,214	1,214	0	1,608	3,799	721	0	5
1969	0	0	0	2,687	2,687	0	1,165	3,459	1,851	0	160
1970	70	0	0	3,618	3,618	0	1,345	4,558	3,182	0	164
1971	64	0	0	2,521	2,521	0	546	1,908	2,403	0	160
1972	505	0	0	3,647	3,647	0	1,066	4,605	2,041	1,489	2,777
1973	679	0	0	3,792	3,792	0	430	1,123	1,193	0	229
1974	648	0	0	4,870	4,870	0	177	0	975	0	162
1975	405	0	0	6,840	6,840	0	137	1,783	1,864	0	120
1976	382	0	0	7,122	7,122	0	265	7,204	3,384	0	817
1977	303	0	0	8,226	8,226	0	210	4,491	2,213	0	524
1978	278	0	0	6,034	6,034	0	422	2,426	3,754	0	2,034
1979	329	0	0	6,561	6,561	0	197	4,283	5,567	0	3,937
1980	295	0	0	6,707	6,707	0	77	3,883	6,686	1,508	0
1981	355	0	0	9,001	9,001	0	1,250	4,648	5,273	5,752	1,157
1982	305	0	0	1,213	1,213	0	473	3,043	4,406	0	630
1983	262	0	0	2,287	2,287	0	179	2,712	1,714	0	50
1984	272	0	0	2,923	2,923	0	165	4,219	2,219	0	55
1985	254	0	0	4,039	4,039	0	213	5,199	2,060	0	63
1986	317	1,400	0	3,519	4,919	0	200	6,052	2,062	0	212
1987	452	1,550	0	7,693	9,243	0	218	7,538	2,372	0	285
1988	523	1	9,725	5,392	15,118	0	222	8,302	4,681	0	189
1989	486	10	17,246	6,195	23,451	0	222	8,051	6,562	0	418
1990	548	3,275	15,856	6,940	26,071	0	256	8,160	8,347	0	593
1991	420	3,117	3,855	1,380	8,352	0	162	3,676	3,269	0	359
1992	485	5,553	9,220	4,001	18,774	0	217	5,177	2,188	0	154
1993	444	14,709	14,471	5,286	34,466	0	190	5,843	8,430	1,650	5,964
1994	492	10,343	14,913	6,792	32,048	0	132	4,482	5,427	0	822
1995	308	5,452	15,893	5,182	26,527	0	278	6,236	7,195	0	955
1996	360	12,930	17,069	4,893	34,892	0	277	6,151	5,119	0	388
1997	231	16,029	17,501	4,341	37,871	0	138	6,647	6,501	1,323	1,582
1998	0	11,562	18,204	5,359	35,125	0	106	3,748	2,493	0	1,277
1999	0	15,191	19,562	5,304	40,057	0	148	3,048	8,227	0	1,444
2000	0	15,490	21,525	4,958	41,973	0	110	7,464	9,761	0	946
2001	0	14,849	19,737	9,345	43,931	0	105	7,822	4,879	0	3,010
2002	0	18,841	19,719	6,875	45,435	0	93	7,758	11,619	0	2,446
2003	0	17,260	16,691	7,646	41,597	0	108	7,916	11,348	0	2,887
2004	0	20,951	22,051	8,134	51,136	0	72	11,754	9,737	0	3,763
2005	0	18,290	19,529	7,669	45,488	0	1,430	11,520	10,100	0	1,826
2006	270	18,904	29,212	15,708	63,824	0	605	11,163	12,327	0	4,245
2007	600	19,870	20,975	17,000	57,845	0	112	12,960	17,492	0	4,327
2008	630	43,548	20,975	24,975	89,498	0	11,395	9,798	26,204	0	4,327
2009	2,090	40,831	6,625	23,525	70,981	0	11,395	9,798	26,204	0	4,327
2010	2,160	40,881	6,625	23,850	71,356	0	15,362	9,048	25,255	0	4,327
2011	2,240	29,406	18,150	24,175	71,731	0	2,994	15,717	33,132	0	2,552
2012	2,320	29,456	18,150	24,500	72,106	0	2,994	15,717	33,132	0	2,552
2013	2,410	29,506	18,150	24,775	72,431	0	2,994	15,717	33,132	0	2,552
2014	2,500	29,556	18,150	25,150	72,856	0	2,994	15,717	33,132	0	2,552
2015	2,600	29,606	18,150	25,825	73,581	0	2,994	15,717	33,132	0	2,552
2016	2,700	29,606	18,150	26,450	74,206	0	2,994	15,717	33,132	0	2,552
2017	2,700	29,606	18,150	27,075	74,831	0	2,994	15,717	33,132	0	2,552
2018	2,700	29,606	18,150	27,700	75,456	0	2,994	15,717	33,132	0	2,552
2019	2,700	29,606	18,150	28,325	76,081	0	2,994	15,717	33,132	0	2,552
2020	2,700	29,606	18,150	28,925	76,681	0	2,994	15,717	33,132	0	2,552
2021	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2022	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2023	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2024	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2025	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2026	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2027	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2028	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2029	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2030	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2031	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2032	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2033	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2034	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
2035	2,700	29,606	18,150	29,025	76,781	0	2,994	15,717	33,132	0	2,552
TOTAL	82,292	1,110,487	830,929	1,003,539	2,944,955	53,844	134,170	655,833	1,119,104	11,722	127,917

a) Non-Project water deliveries were pumped from an interim facility from 1968 through 1987.

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	SOUTH BAY AQUEDUCT[b] (Continued)						CALIFORNIA AQUEDUCT NORTH SAN JOAQUIN DIVISION				
	Reach 6	Reach 7		Reach 8	Reach 9	Total	Reach 1	Reach 2A			
	AC		AC				AC		KCWA		AC
	FC&WCD	ACWD	FC&WCD	ACWD	SCVWD		FC&WCD	OFWD[c]	(M&I)	(AG)	FC&WCD
	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
1962	0	0	0	0	0	8,906	0	0	0	0	0
1963	0	0	0	0	0	12,645	0	0	0	0	0
1964	0	0	0	0	0	20,911	0	0	0	0	0
1965	0	1,127	0	0	15,014	34,026	0	0	0	0	0
1966	0	14,864	0	0	34,538	54,913	0	0	0	0	0
1967	0	12,882	0	0	39,101	56,763	0	0	0	0	0
1968	0	24,817	0	0	70,105	101,055	0	3,084	0	0	0
1969	0	813	0	0	62,264	69,712	0	3,016	0	0	0
1970	0	0	0	0	80,311	89,560	0	5,911	0	0	0
1971	0	5,961	0	0	87,606	98,584	0	7,212	0	0	0
1972	0	26,182	0	0	100,266	138,426	0	8,166	0	0	0
1973	0	2,521	0	0	88,582	94,078	0	3,214	0	0	0
1974	0	0	0	4	88,000	89,318	0	3,471	0	0	0
1975	714	393	0	593	88,000	93,604	0	3,576	0	0	0
1976	5,461	13,774	0	7,526	88,000	126,431	0	4,112	0	0	0
1977	5,206	11,284	0	7,556	76,220	107,704	0	1,472	0	0	0
1978	2,348	854	0	5,009	95,727	112,574	0	3,906	0	0	0
1979	5,341	3,430	0	7,444	91,991	122,190	0	6,149	0	0	0
1980	6,144	2,824	0	6,702	88,000	115,824	0	5,700	0	0	0
1981	7,262	7,595	0	8,570	88,000	129,507	0	4,300	0	0	0
1982	4,571	1,776	0	4,540	88,000	107,439	0	3,838	0	0	0
1983	111	0	0	3,157	86,733	94,656	0	3,822	0	0	0
1984	126	0	0	3,338	88,000	98,122	0	5,700	0	0	0
1985	7,537	11,203	0	7,813	88,000	122,088	0	5,433	0	0	0
1986	2,083	5,311	0	7,068	88,000	110,988	0	5,107	0	0	0
1987	12,993	15,488	0	9,902	88,000	136,796	0	5,625	0	0	0
1988	12,436	24,259	0	9,205	87,961	147,255	0	4,412	0	0	0
1989	10,974	17,340	0	8,702	90,000	142,269	0	6,091	0	0	0
1990	15,678	22,149	0	9,554	91,800	156,537	0	2,922	0	0	0
1991	1,945	9,155	0	3,493	28,200	50,259	0	141	0	0	0
1992	6,933	12,621	0	6,532	42,839	76,661	0	2,239	0	0	0
1993	13,208	1,792	0	6,829	62,065	105,971	0	2,858	0	0	0
1994	9,679	3,379	0	19,532	57,115	100,568	0	3,071	0	0	0
1995	15,427	21	0	17,772	28,756	76,640	0	5,169	0	0	0
1996	6,968	1,871	0	11,591	44,850	77,215	0	4,904	0	0	0
1997	12,654	1,876	0	10,864	60,601	102,186	0	5,238	0	0	0
1998	8,347	3,817	0	11,478	39,610	70,876	0	4,401	0	0	0
1999	13,133	5,326	0	16,226	52,945	100,497	0	4,871	0	0	0
2000	16,396	4,498	0	18,100	78,258	135,533	0	4,508	0	0	0
2001	13,593	0	0	18,004	47,922	95,335	0	3,592	638	0	0
2002	17,058	5,112	0	20,616	58,875	123,577	0	4,885	773	0	0
2003	16,684	5,037	0	12,753	75,981	132,714	0	4,266	917	0	7
2004	21,260	4,968	0	14,916	59,458	125,928	0	4,629	786	0	38
2005	16,597	4,139	0	10,160	52,364	108,136	0	4,194	1,046	0	299
2006	18,505	7,309	0	21,502	60,608	136,264	0	4,928	72	2,760	53
2007	19,315	6,889	0	20,711	51,500	133,306	0	5,700	0	4,800	53
2008	13,102	7,118	0	23,482	59,500	154,926	0	5,700	0	4,800	53
2009	13,102	6,943	0	24,457	59,500	155,726	0	5,700	0	4,800	53
2010	10,834	6,943	0	24,457	59,500	155,726	0	5,700	0	4,800	53
2011	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2012	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2013	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2014	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2015	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2016	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2017	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2018	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2019	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2020	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2021	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2022	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2023	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2024	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2025	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2026	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2027	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2028	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2029	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2030	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2031	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2032	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2033	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2034	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
2035	19,706	4,000	0	30,500	100,000	208,601	50	5,700	0	4,800	0
TOTAL	856,375	425,661	-	1,182,658	5,658,666	10,225,950	1,250	335,433	4,232	141,960	609

b) Deliveries were supplied by non-Project water from June 1962 through November 1967.

c) Includes 425 AF of 1988 advance allocation and 141 AF of 1992 advance allocation.

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	NORTH SAN JOAQUIN DIVISION (contd.)		SAN LUIS DIVISION							
	Reach 2A		Reach 3							
							AC		KCWA	
	TLBWSD	SCVWD	MWDSC	DRWD	SCVWD	TLBWSD	FC&WCD	ACWD	(M&I)	(AG)
	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0
1989	300	0	0	602	0	0	0	0	0	0
1990	0	200	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0
1997	0	0	11,100	0	0	0	0	0	0	0
1998	0	0	(11,100)	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	.	0	3,320	57,825
2001	0	0	0	0	30,000	0	0	0	8,790	131,452
2002	0	0	0	0	0	0	0	0	21,050	50,346
2003	0	0	29,596	0	0	0	0	0	0	151,044
2004	0	0	0	0	0	0	0	0	0	44,877
2005	0	0	50,000	0	8,804	0	0	0	0	109,712
2006	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	30,000	0	0	0	0	0
2008	0	0	0	0	30,000	0	0	0	0	0
2009	0	0	0	0	30,000	0	0	0	0	0
2010	0	0	0	0	30,000	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	300	200	79,596	602	158,804	0	0	0	33,160	545,256

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SAN LUIS DIVISION (continued)										
	Reach 4				Reach 5						
	KCWA					KCWA					
	(M&I)	(AG)	DRWD	TLBWSD	DRWD	(M&I)	(AG)	MWDSC	CLWA	TLBWSD	OFWD
	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]	[41]	[42]	[43]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	1,550	0
1989	0	12,647	1,898	0	0	0	18,831	0	0	0	0
1990	0	0	0	1,500	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	10,823	0	0	0	0	0	0
1993	0	0	0	0	27,200	0	28,200	0	5,095	1,624	2,000
1994	0	0	0	0	0	0	0	0	0	0	0
1995	0	3,500	14,446	0	0	0	21,776	0	0	0	0
1996	1,125	4,162	0	0	0	1,125	81,507	0	0	4,000	0
1997	0	0	0	0	0	9,080	154,940	0	0	3,500	0
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	1,300	0	0	0	21,500	0	8,000	0
2000	1,517	(11,928)	0	0	0	8,130	57,647	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	2,457	0
2002	0	0	0	0	0	0	0	0	0	3,000	0
2003	0	1,351	0	0	0	0	0	0	0	3,900	0
2004	0	0	0	0	0	0	0	0	0	3,850	0
2005	0	7,000	0	0	0	0	0	0	0	1,000	0
2006	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2,642	16,732	16,344	2,800	38,023	18,335	362,901	21,500	5,095	32,881	2,000

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SAN LUIS DIVISION (continued)										
	Reach 6					Reach 7					
		KCWA				KCWA					
	CK	(M&I)	(AG)	MWDSC	TLBWSD	(M&I)	(AG)	CLWA	DRWD	TLBWSD	MWDSC
	[44]	[45]	[46]	[47]	[48]	[49]	[50]	[51]	[52]	[53]	[54]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	8,260	0	0	0	5,262	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	31,200	0	0	18,157	10,043	0	0	0	0
1994	0	0	0	0	0	0	0	2,100	0	0	0
1995	0	0	3,932	0	0	10,875	20,595	0	0	0	0
1996	0	0	0	0	0	3,424	69,704	0	0	0	0
1997	0	0	0	0	0	27,079	32,463	0	0	0	0
1998	0	20,400	33,340	0	3,000	3,998	62,081	0	200	0	0
1999	0	0	33,776	11,000	23,000	7,923	19,500	0	0	4,470	500
2000	0	1,457	35,847	0	3,000	0	20,970	1,200	0	17,519	20,000
2001	0	0	0	0	600	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	12,067	0
2003	0	0	0	0	0	0	0	0	0	15,103	0
2004	0	0	0	0	0	0	0	0	0	0	0
2005	6,954	0	0	0	0	0	0	0	0	4,000	0
2006	0	0	0	0	0	0	0	0	0	9,600	0
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6,954	21,857	146,355	11,000	29,600	71,456	240,618	3,300	200	62,759	20,500

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued) SOUTH SAN JOAQUIN DIVISION										
	Reach 7	Reach 8C						Reach 8D			
		KCWA						KCWA			
	CK	(M&I)	(AG)	DRWD	TLBWSD	EWSID	CK	(M&I)	(AG)	DRWD	CK
	[55]	[56]	[57]	[58]	[59]	[60]	[61]	[62]	[63]	[64]	[65]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	25,100	1,978	900	0	0	26,360	0
1969	0	0	0	0	7,081	56	100	0	0	31,375	0
1970	0	0	0	0	0	3,942	0	0	0	40,407	0
1971	0	0	0	0	80,906	5,990	3,700	0	0	41,053	0
1972	0	0	0	0	144,843	5,795	1,400	0	0	42,443	0
1973	0	0	0	0	26,317	3,000	1,500	0	1,500	22,057	0
1974	0	0	0	0	32,603	3,000	1,500	0	0	33,390	0
1975	0	0	0	0	41,536	3,000	1,600	0	0	40,555	0
1976	0	0	0	0	26,595	3,000	1,600	0	0	41,421	0
1977	0	0	0	0	12,984	738	1,530	0	0	11,153	0
1978	0	0	0	0	3,934	454	2,070	0	0	51,747	0
1979	0	0	0	0	74,758	1,739	2,000	0	0	38,544	0
1980	0	0	0	0	35,140	894	2,200	0	0	41,000	0
1981	0	0	0	0	50,888	5,859	2,300	0	0	41,000	0
1982	0	0	0	0	4,405	361	1,536	0	0	41,000	214
1983	0	0	0	0	1,001	0	3,550	0	0	42,900	0
1984	0	0	0	0	3,677	0	3,100	0	0	45,100	0
1985	0	0	0	0	68,638	5,197	3,400	0	0	46,251	0
1986	0	0	0	0	40,017	1,170	3,700	0	0	50,249	0
1987	0	0	0	0	30,359	2,525	4,000	0	0	46,288	0
1988	0	0	0	0	46,281	3,475	4,000	0	0	47,994	0
1989	0	0	0	2,391	63,703	3,000	4,000	0	0	52,158	0
1990	0	0	0	0	23,504	1,279	2,000	0	161	36,296	0
1991	0	0	0	0	1,697	221	0	0	0	927	0
1992	0	0	0	280	15,982	1,354	1,806	0	0	12,667	0
1993	0	0	0	0	57,112	2,741	4,000	0	0	23,221	0
1994	0	0	0	0	21,510	1,666	2,116	0	1,726	28,793	0
1995	0	989	10,527	0	40,934	1,631	4,000	2,959	27,270	45,240	0
1996	0	0	1,500	95	84,130	1,868	4,000	0	1,455	52,722	0
1997	0	0	1,500	0	9,467	0	0	0	0	57,496	0
1998	0	0	1,000	90	8,956	542	15	0	20,000	49,435	0
1999	0	0	400	86	90,334	3,176	4,000	0	9,000	58,290	0
2000	0	0	400	166	63,842	1,799	3,600	0	0	57,920	0
2001	0	0	0	14	23,300	1,360	1,560	0	6,089	39,801	0
2002	0	0	0	0	34,009	1,405	2,854	0	7,522	47,434	0
2003	0	0	0	0	25,317	1,436	3,692	0	8,350	45,732	0
2004	0	0	0	0	30,546	3,562	5,803	0	4,979	45,823	3,250
2005	6,904	0	0	0	42,450	3,834	4,057	0	0	58,627	1,891
2006	0	0	0	0	39,051	4,236	9,445	0	0	55,098	0
2007	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2008	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2009	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2010	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2011	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2012	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2013	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2014	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2015	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2016	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2017	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2018	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2019	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2020	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2021	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2022	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2023	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2024	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2025	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2026	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2027	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2028	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2029	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2030	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2031	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2032	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2033	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2034	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
2035	0	0	0	0	38,369	3,000	9,000	0	0	57,343	0
TOTAL	6,904	989	15,327	3,122	2,545,608	174,283	363,634	2,959	88,052	3,252,914	5,355

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 8D				Reach 9				Reach 10A	
	SBC		SLOC			KCWA			KCWA	
	FC&WCD	SGVMWD	FC&WCD	TLBWSD	DRWD	(M&I)	(AG)	TLBWSD	(M&I)	(AG)
	[66]	[67]	[68]	[69]	[70]	[71]	[72]	[73]	[74]	[75]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	30,951	0	0	0
1969	0	0	0	0	0	0	24,489	0	0	0
1970	0	0	0	3,408	0	0	46,114	1,855	0	158
1971	0	0	0	41,579	0	0	58,356	0	0	9,973
1972	0	0	0	113,550	0	0	75,464	0	0	5,876
1973	0	0	0	24,147	0	0	54,583	0	0	22,948
1974	0	0	0	39,686	0	0	63,814	0	10,019	22,719
1975	0	0	0	44,722	0	0	50,021	0	2,791	72,121
1976	0	0	0	32,216	0	0	53,465	0	74	50,444
1977	0	0	0	5,097	0	0	24,668	0	201	34,451
1978	0	0	0	8,119	0	0	72,231	0	0	161,889
1979	0	0	0	80,363	0	0	74,524	0	285	153,245
1980	0	0	0	40,304	0	0	79,946	0	3,780	131,836
1981	0	0	0	32,550	0	0	76,508	0	341	133,500
1982	0	0	0	14,146	0	0	76,877	0	4,700	164,832
1983	0	0	0	5	0	2,217	84,573	0	0	146,493
1984	0	0	0	2,066	0	4,100	85,732	0	6,910	150,302
1985	0	0	0	41,153	0	0	67,696	0	6,495	153,473
1986	0	0	0	39,338	0	0	79,943	0	5,065	198,099
1987	0	0	0	62,725	0	0	97,732	0	900	226,521
1988	0	0	0	48,035	0	1,100	83,858	0	9,529	212,495
1989	0	0	0	63,947	0	0	91,134	0	21,038	251,979
1990	0	0	0	32,066	0	0	83,108	0	25,189	47,472
1991	0	0	0	483	0	13,683	601	0	1,142	6,820
1992	0	0	0	30,746	0	28	40,183	0	3,685	89,390
1993	0	0	0	65,732	197	5,945	53,597	0	775	233,862
1994	0	0	0	40,852	0	0	44,994	0	5,227	126,792
1995	0	0	0	57,435	0	0	64,076	0	366	229,448
1996	0	0	100	148,745	0	2,236	89,291	0	6,666	199,854
1997	0	0	100	9,402	4,900	0	72,013	0	3,577	157,385
1998	0	0	0	8,721	0	0	57,530	0	2,603	163,587
1999	0	0	0	162,631	0	0	72,734	0	1,657	190,787
2000	0	0	0	113,952	0	2,000	71,562	0	16,880	274,000
2001	0	0	0	58,369	0	0	54,198	0	160	97,623
2002	745	0	0	47,426	0	0	60,957	0	7,645	163,998
2003	0	0	0	61,521	0	0	54,724	0	2,648	172,243
2004	0	0	0	55,625	0	0	54,330	0	65,743	122,099
2005	0	0	0	92,552	0	0	53,206	0	22,087	210,657
2006	0	0	0	50,120	0	0	70,365	0	0	272,186
2007	0	0	0	57,553	0	0	97,971	0	0	210,478
2008	0	0	0	57,553	0	0	104,771	0	0	211,678
2009	0	0	0	57,553	0	0	104,771	0	0	211,678
2010	0	0	0	57,553	0	0	104,771	0	0	211,678
2011	0	0	0	57,553	0	0	104,771	0	0	213,678
2012	0	0	0	57,553	0	0	104,771	0	0	213,678
2013	0	0	0	57,553	0	0	104,771	0	0	213,678
2014	0	0	0	57,553	0	0	104,771	0	0	213,678
2015	0	0	0	57,553	0	0	104,771	0	0	213,678
2016	0	0	0	57,553	0	0	104,771	0	0	213,678
2017	0	0	0	57,553	0	0	104,771	0	0	213,678
2018	0	0	0	57,553	0	0	104,771	0	0	213,678
2019	0	0	0	57,553	0	0	104,771	0	0	213,678
2020	0	0	0	57,553	0	0	104,771	0	0	213,678
2021	0	0	0	57,553	0	0	104,771	0	0	213,678
2022	0	0	0	57,553	0	0	104,771	0	0	213,678
2023	0	0	0	57,553	0	0	104,771	0	0	213,678
2024	0	0	0	57,553	0	0	104,771	0	0	213,678
2025	0	0	0	57,553	0	0	104,771	0	0	213,678
2026	0	0	0	57,553	0	0	104,771	0	0	213,678
2027	0	0	0	57,553	0	0	104,771	0	0	213,678
2028	0	0	0	57,553	0	0	104,771	0	0	213,678
2029	0	0	0	57,553	0	0	104,771	0	0	213,678
2030	0	0	0	57,553	0	0	104,771	0	0	213,678
2031	0	0	0	57,553	0	0	104,771	0	0	213,678
2032	0	0	0	57,553	0	0	104,771	0	0	213,678
2033	0	0	0	57,553	0	0	104,771	0	0	213,678
2034	0	0	0	57,553	0	0	104,771	0	0	213,678
2035	0	0	0	57,553	0	0	104,771	0	0	213,678
TOTAL	745	0	200	3,442,571	5,097	31,309	5,481,707	1,855	238,178	11,249,019

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 10A								Reach 11B		
		AC							KCWA		
	DRWD	FC&WCD	CLWA	SCVWD	ACWD	MWDSC	AVEKWA	TLBWSD	(M&I)	(AG)	DRWD
	[76]	[77]	[78]	[79]	[80]	[81]	[82]	[83]	[84]	[85]	[86]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	24,776	0
1969	0	0	0	0	0	0	0	2,842	0	64,682	0
1970	0	0	0	0	0	0	0	4,315	0	72,279	0
1971	0	0	0	0	0	0	0	0	0	63,773	0
1972	0	0	0	0	0	0	0	0	0	72,358	0
1973	0	0	0	0	0	0	0	0	0	67,544	0
1974	0	0	0	0	0	0	0	0	0	87,476	0
1975	0	0	0	0	0	0	0	0	0	85,675	0
1976	0	0	0	0	0	0	0	0	0	85,067	0
1977	0	0	0	0	0	0	0	0	3,981	29,603	0
1978	0	0	0	0	0	0	0	0	0	88,753	0
1979	0	0	0	0	0	0	0	0	484	108,379	0
1980	0	0	0	0	0	0	0	0	3,112	103,207	0
1981	0	0	0	0	0	0	0	0	494	104,395	0
1982	0	0	0	0	0	0	0	0	798	99,081	0
1983	0	0	0	0	0	0	0	0	2,069	94,117	0
1984	0	0	0	0	0	0	0	0	2,349	124,819	0
1985	0	0	0	0	0	0	0	0	10,666	118,646	0
1986	0	0	0	0	0	0	0	0	8,673	124,836	0
1987	0	0	0	0	0	0	0	0	13,074	111,877	0
1988	0	0	0	0	0	0	0	0	13,509	114,031	0
1989	0	0	0	0	0	0	0	0	9,986	127,058	0
1990	0	0	0	0	0	0	0	0	9,319	104,107	0
1991	0	0	0	0	0	0	0	0	6,099	118	0
1992	0	0	0	0	0	0	0	0	7,419	35,093	0
1993	0	0	0	0	0	44,496	0	0	2,696	72,645	0
1994	0	0	0	0	0	0	0	0	3,506	71,202	0
1995	0	0	0	0	0	50,000	0	0	1,154	97,072	0
1996	0	0	0	45,000	6,200	95,000	0	0	1,185	96,250	0
1997	900	0	0	35,000	10,000	125,000	0	0	1,111	104,823	0
1998	0	1,970	0	23,800	3,780	39,500	0	0	1,311	72,646	0
1999	0	22,910	0	30,000	16,100	75,850	0	0	2,127	92,262	0
2000	0	23,940	0	23,730	13,380	9,208	0	0	3,793	89,623	1,500
2001	0	5,000	0	0	0	0	0	0	636	73,105	0
2002	0	14,287	24,000	3,311	2,083	0	0	0	1,457	91,123	0
2003	0	6,500	0	33,000	18,800	70,940	0	0	1,379	87,174	0
2004	0	5,740	32,522	0	8,000	0	0	0	1,299	97,722	0
2005	0	0	0	55,448	28,422	31,210	0	0	824	93,554	0
2006	0	197	0	10,500	13,853	115,434	0	0	94	100,696	0
2007	0	0	0	10,500	14,400	0	1,000	0	1,390	101,500	0
2008	0	5,740	0	10,500	11,400	0	1,000	0	1,390	101,500	0
2009	0	5,740	0	10,500	10,600	0	1,000	0	1,390	101,500	0
2010	0	5,740	0	10,500	10,600	0	1,000	0	1,390	101,500	0
2011	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2012	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2013	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2014	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2015	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2016	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2017	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2018	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2019	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2020	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2021	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2022	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2023	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2024	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2025	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2026	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2027	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2028	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2029	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2030	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2031	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2032	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2033	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2034	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
2035	0	6,468	0	0	7,500	0	0	0	1,390	101,500	0
TOTAL	900	259,464	56,522	301,789	355,118	656,638	4,000	7,157	154,914	6,295,147	1,500

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 12D		Reach 12E							
	KCWA		KCWA			AC				
	(M&I)	(AG)	(M&I)	(AG)	ACWD	FC&WCD	CLWA	SCVWD	DRWD	MWDSC
	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]	[95]	[96]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	9,279	0	0	0	0	0	0
1971	0	0	0	28,056	0	0	0	0	0	0
1972	0	0	0	62,342	0	0	0	0	0	0
1973	0	0	0	13,082	0	0	0	0	0	0
1974	0	0	2,651	4,248	0	0	0	0	0	0
1975	0	0	0	10,787	0	0	0	0	0	0
1976	0	0	37,519	20,555	0	0	0	0	0	0
1977	0	0	20,280	1,737	0	0	0	0	0	0
1978	0	0	47,133	15,011	0	0	0	0	0	0
1979	0	0	50,740	61,567	0	0	0	0	0	0
1980	0	0	32,039	22,252	0	0	0	0	0	0
1981	0	0	59,917	58,470	0	0	0	0	0	0
1982	0	0	36,139	75,587	0	0	0	0	0	0
1983	0	0	0	10,950	0	0	0	0	0	0
1984	0	0	63,941	39,929	0	0	0	0	0	0
1985	0	0	69,839	84,117	0	0	0	0	0	0
1986	0	0	62,109	51,540	0	0	0	0	0	0
1987	0	0	95,297	86,223	0	0	0	0	0	0
1988	0	0	86,390	123,249	0	0	0	0	0	0
1989	0	0	83,965	146,544	0	0	0	0	0	0
1990	0	0	82,164	38,973	0	0	0	0	0	0
1991	0	0	8,842	303	0	0	0	0	0	0
1992	0	0	47,181	57,048	0	0	0	0	0	0
1993	0	0	84,822	285,554	0	0	0	0	0	5,504
1994	0	0	66,188	77,839	0	0	0	0	0	0
1995	0	0	107,130	181,097	0	0	0	0	1,000	0
1996	0	0	89,257	134,138	0	0	0	0	4,131	0
1997	0	0	32,061	128,329	0	0	0	0	8,012	1,486
1998	0	0	28,258	88,998	0	0	0	0	5,925	24,234
1999	0	0	110,161	255,343	0	0	0	0	1,321	62,162
2000	21	0	78,285	89,702	0	0	0	0	953	159,731
2001	41	0	5,256	46,205	0	0	0	0	0	0
2002	760	6	39,104	96,231	0	0	0	0	0	0
2003	2,431	152	64,196	87,339	0	0	0	0	0	45,989
2004	3,419	768	52,303	95,893	0	0	0	0	1,600	0
2005	2,841	644	43,835	340,281	1,878	3,419	20,000	2,619	1,154	15,384
2006	5,647	544	65,200	249,906	0	10,000	10,550	0	0	115,435
2007	6,500	0	90,390	148,412	0	10,000	0	0	0	0
2008	6,500	0	90,390	148,412	0	10,000	20,000	0	0	0
2009	6,500	0	104,600	134,202	0	10,000	20,000	0	0	0
2010	6,500	0	104,600	134,202	0	10,000	20,000	0	0	0
2011	6,500	0	104,600	134,202	0	0	0	0	0	0
2012	6,500	0	104,600	134,202	0	0	0	0	0	0
2013	6,500	0	104,600	134,202	0	0	0	0	0	0
2014	6,500	0	104,600	134,202	0	0	0	0	0	0
2015	6,500	0	104,600	134,202	0	0	0	0	0	0
2016	6,500	0	104,600	134,202	0	0	0	0	0	0
2017	6,500	0	104,600	134,202	0	0	0	0	0	0
2018	6,500	0	104,600	134,202	0	0	0	0	0	0
2019	6,500	0	104,600	134,202	0	0	0	0	0	0
2020	6,500	0	104,600	134,202	0	0	0	0	0	0
2021	6,500	0	104,600	134,202	0	0	0	0	0	0
2022	6,500	0	104,600	134,202	0	0	0	0	0	0
2023	6,500	0	104,600	134,202	0	0	0	0	0	0
2024	6,500	0	104,600	134,202	0	0	0	0	0	0
2025	6,500	0	104,600	134,202	0	0	0	0	0	0
2026	6,500	0	104,600	134,202	0	0	0	0	0	0
2027	6,500	0	104,600	134,202	0	0	0	0	0	0
2028	6,500	0	104,600	134,202	0	0	0	0	0	0
2029	6,500	0	104,600	134,202	0	0	0	0	0	0
2030	6,500	0	104,600	134,202	0	0	0	0	0	0
2031	6,500	0	104,600	134,202	0	0	0	0	0	0
2032	6,500	0	104,600	134,202	0	0	0	0	0	0
2033	6,500	0	104,600	134,202	0	0	0	0	0	0
2034	6,500	0	104,600	134,202	0	0	0	0	0	0
2035	6,500	0	104,600	134,202	0	0	0	0	0	0
TOTAL	203,660	2,114	4,757,182	7,098,982	1,878	53,419	90,550	2,619	24,096	429,925

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 13B							Reach 14A		Reach 14B	
	KCWA		AC					KCWA		KCWA	
	(M&I)	(AG)	FC&WCD	SCVWD	MWDSC	DRWD	TLBWSD	(M&I)	(AG)	(M&I)	(AG)
	[97]	[98]	[99]	[100]	[101]	[102]	[103]	[104]	[105]	[106]	[107]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	4,891	0	0	0	0	0	0	0	0	3
1971	0	0	0	0	0	0	0	0	23,844	0	49,929
1972	0	17,388	0	0	0	0	0	0	26,621	0	77,034
1973	0	9,297	0	0	0	0	0	0	15,328	0	47,040
1974	8,038	4,246	0	0	0	0	0	0	7,794	0	32,356
1975	8,538	7,059	0	0	0	0	0	0	10,306	0	27,736
1976	5,626	8,855	0	0	0	0	0	0	268	0	35,296
1977	0	5,024	0	0	0	0	0	0	8,299	0	13,539
1978	21,773	7,601	0	0	0	0	0	0	34,029	0	72,351
1979	5,663	17,766	0	0	0	0	0	3,012	27,356	0	59,413
1980	0	22,515	0	0	0	0	0	4,312	16,876	0	40,513
1981	7,844	14,037	0	0	0	0	0	4,511	13,007	8	42,753
1982	0	25,553	0	0	0	0	0	3,735	24,240	184	57,739
1983	0	3,491	0	0	0	0	0	1,168	20,302	0	57,922
1984	12,117	26,178	0	0	0	0	0	137	35,369	10	79,179
1985	0	67,711	0	0	0	0	0	206	33,103	0	72,855
1986	0	66,551	0	0	0	0	0	180	26,384	0	70,864
1987	5,609	40,374	0	0	0	0	0	610	30,098	9	67,710
1988	9,298	47,167	0	0	0	0	0	622	32,778	19	75,968
1989	5,504	57,114	0	0	0	0	0	721	29,292	7	82,201
1990	7,645	20,423	0	0	0	0	0	673	26,800	13	81,076
1991	0	0	0	0	0	0	0	768	0	0	0
1992	789	17,449	0	0	0	0	0	673	16,238	464	41,143
1993	12,798	88,157	0	0	0	0	0	629	17,832	0	62,493
1994	2,494	33,148	0	0	0	0	0	2,513	16,760	3,000	54,011
1995	8,751	110,685	0	0	0	0	3,500	3	21,234	0	67,391
1996	28,063	64,849	0	0	0	0	0	0	26,978	0	85,936
1997	43,803	49,312	0	0	0	0	0	0	23,035	0	79,790
1998	29,444	40,085	0	0	5,500	0	0	0	15,706	0	58,132
1999	12,969	92,998	0	0	0	0	0	0	21,153	0	67,576
2000	4,066	98,136	0	0	0	0	0	0	19,264	0	70,585
2001	4,044	29,881	0	0	0	1,733	0	1	12,451	0	49,602
2002	15,951	55,493	0	0	0	736	0	0	11,161	0	52,762
2003	35,239	91,739	0	0	1,865	350	0	0	13,685	0	44,576
2004	1,922	73,801	0	0	0	1,657	0	0	13,030	0	52,012
2005	21,781	269,631	2,321	9,014	192	14,540	0	0	15,663	0	56,739
2006	30,297	142,006	0	0	10,500	3,554	0	0	10,352	0	48,570
2007	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2008	18,500	48,050	0	0	0	0	0	0	16,820	0	56,200
2009	18,500	48,050	0	0	0	0	0	0	16,820	0	56,200
2010	18,500	48,050	0	0	0	0	0	0	16,820	0	56,200
2011	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2012	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2013	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2014	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2015	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2016	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2017	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2018	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2019	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2020	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2021	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2022	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2023	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2024	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2025	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2026	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2027	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2028	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2029	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2030	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2031	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2032	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2033	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2034	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
2035	18,500	48,050	0	0	0	0	0	0	16,400	0	55,500
TOTAL	886,566	3,124,061	2,321	9,014	18,057	22,570	3,500	24,474	1,173,496	3,714	3,646,395

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION								MOJAVE DIVISION		
	Reach 14C			Reach 15A		Reach 16A			Reach 18A	Reach 19	
	KCWA			KCWA		KCWA					
	(M&I)	(AG)	MWDSC	(M&I)	(AG)	(M&I)	(AG)	AVEKWA	AVEKWA	MWA	AVEKWA
	[108]	[109]	[110]	[111]	[112]	[113]	[114]	[115]	[116]	[117]	[118]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	24,187	0	0	3,552	0	0	0	0	0	0
1972	0	35,016	0	0	6,064	0	4,768	0	0	0	0
1973	0	19,043	0	0	19,916	0	1,961	0	0	0	0
1974	0	12,601	0	0	18,000	3,000	1,564	0	0	0	1,223
1975	0	12,783	0	0	35,420	3,200	9,867	0	0	0	7,622
1976	0	9,005	0	0	39,551	3,500	11,667	0	3,808	0	23,063
1977	0	3,757	0	0	6,158	3,420	685	0	1,231	0	8,927
1978	0	24,542	0	0	31,148	7,989	1,655	0	1,321	0	36,333
1979	0	22,372	0	0	38,602	2,813	15,808	0	2,098	0	49,910
1980	0	19,953	0	0	37,817	2,700	16,145	0	2,610	0	61,534
1981	7	18,729	0	0	39,033	2,636	18,156	0	2,340	0	65,690
1982	0	26,479	0	0	47,782	1,921	16,577	0	1,669	0	41,127
1983	0	26,613	0	0	37,426	1,400	17,907	0	43	0	26,377
1984	2	34,996	0	0	49,848	1,338	24,246	0	90	0	22,462
1985	0	31,758	0	0	44,078	1,309	16,820	0	8	0	23,440
1986	0	34,566	0	0	42,461	1,213	15,559	0	8	0	16,898
1987	10	31,019	0	0	34,748	1,665	10,170	0	0	0	15,958
1988	1	37,165	0	16	41,978	1,925	8,987	0	0	0	13,471
1989	5	37,800	0	2	43,239	2,668	8,649	0	0	0	18,007
1990	9	34,174	0	6	36,347	2,819	8,608	0	0	0	17,281
1991	0	0	0	0	0	2,588	343	2,000	0	0	728
1992	0	18,084	0	0	24,243	2,087	8,275	0	0	0	7,238
1993	0	28,103	0	0	27,997	2,494	9,167	0	0	0	13,340
1994	1,000	22,624	0	0	29,511	3,011	13,877	0	0	0	19,122
1995	0	31,285	0	0	26,134	3,188	15,042	0	0	0	20,222
1996	0	38,879	0	0	36,186	2,573	18,142	0	0	0	23,919
1997	0	33,512	0	0	36,281	3,997	17,048	0	0	64	28,834
1998	0	23,097	0	0	28,712	3,751	17,032	0	0	1,345	22,466
1999	0	31,489	0	0	36,801	3,316	24,071	0	0	1,439	30,944
2000	0	33,716	0	0	40,063	3,015	20,919	0	0	1,361	34,786
2001	0	23,557	0	0	31,192	1,894	13,476	0	0	1,385	24,370
2002	0	27,138	0	0	41,552	4,227	14,520	0	0	1,370	14,297
2003	0	24,783	12,911	0	36,602	1,168	16,799	0	0	1,285	12,145
2004	0	30,313	0	0	40,184	2,239	19,714	0	0	1,223	11,201
2005	27	21,952	0	0	39,870	167	18,353	0	11	1,051	11,804
2006	0	23,313	0	0	46,555	2,825	17,808	0	45	1,346	26,517
2007	0	26,800	0	0	48,300	3,610	19,500	0	0	1,235	10,646
2008	0	27,680	0	0	48,300	3,610	19,500	0	0	1,500	81,666
2009	0	27,680	0	0	48,300	3,610	19,500	0	0	1,657	95,048
2010	0	27,680	0	0	48,300	3,610	19,500	0	0	1,235	93,688
2011	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2012	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2013	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2014	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2015	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2016	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2017	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2018	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2019	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2020	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2021	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2022	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2023	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2024	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2025	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2026	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2027	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2028	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2029	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2030	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2031	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2032	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2033	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2034	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
2035	0	26,800	0	0	48,300	3,610	19,500	0	0	1,500	38,329
TOTAL	1,061	1,688,243	12,911	24	2,575,751	192,746	1,019,885	2,000	15,282	54,996	1,990,529

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	MOJAVE DIVISION (continued)										
	Reach 20A			Reach 20B		Reach 21			Reach 22A		Reach 22B
	PWD	MWA	AVEKWA	PWD	AVEKWA	LCID	PWD	AVEKWA	AVEKWA	LCID	MWDSC(d
	[119]	[120]	[121]	[122]	[123]	[124]	[125]	[126]	[127]	[128]	[129]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	338	0	0	0	0	0
1973	0	0	0	0	0	290	0	0	0	0	(14.800)
1974	0	0	0	0	0	400	0	0	0	0	(16.400)
1975	0	0	420	0	0	520	0	0	0	0	(18.000)
1976	0	0	471	0	416	589	0	0	0	0	(19.600)
1977	0	0	773	0	271	111	0	0	0	0	0
1978	0	0	5.549	0	934	208	0	0	0	0	(25,384)
1979	0	0	7.555	0	930	133	0	0	0	0	(25,063)
1980	0	0	7.605	0	655	191	0	0	3	0	(27,884)
1981	0	0	10.333	0	966	1,270	0	0	46	0	(31,105)
1982	0	0	7.313	0	8	0	0	0	174	0	(34,326)
1983	0	0	6.253	0	20	38	0	0	268	0	(37,547)
1984	0	0	9.558	0	2	1	0	0	550	0	(40,768)
1985	1,510	0	11,613	32	217	0	16	0	1,786	0	(43,989)
1986	3,041	0	13,808	45	0	163	10	0	1,735	0	(47,210)
1987	2,389	0	15,493	1,624	151	1,080	1,366	0	2,273	5	(50,931)
1988	366	0	17,117	1,261	281	419	143	0	3,210	0	(54,652)
1989	381	0	23,481	7,848	112	971	780	0	3,591	0	(58,373)
1990	282	0	25,843	8,292	84	1,747	34	0	3,988	0	(61,200)
1991	84	1,391	4,282	3,830	131	522	0	0	2,427	0	(18,360)
1992	185	1,310	18,518	3,850	650	251	0	0	3,859	0	(27,624)
1993	164	1,514	23,662	7,597	996	734	0	0	5,098	0	0
1994	299	1.399	25.250	8.119	124	1.098	0	0	4.657	0	0
1995	328	1.227	22.385	6.633	0	480	0	0	4.679	0	0
1996	354	1.316	26.979	11.080	0	494	0	0	5.458	0	0
1997	313	1.272	27.999	11.548	0	444	0	0	5.549	0	0
1998	195	0	25,985	8.557	0	404	0	0	4,468	0	0
1999	377	0	32,409	12,901	36	342	0	0	5,684	0	0
2000	0	0	37,819	9,060	80	0	0	5,002	5,890	0	0
2001	0	0	33,216	10,427	282	0	0	0	4,989	0	0
2002	0	0	36,311	18,496	1.662	0	0	0	5.404	0	0
2003	0	0	39,532	11,547	2,289	0	0	0	6,063	0	0
2004	0	0	40,408	12,139	1,774	0	23	0	6,095	0	0
2005	0	0	41,496	11,678	1,336	0	34	0	5,184	0	5,942
2006	222	0	41,674	18,062	1,608	800	0	0	4,617	0	0
2007	0	0	36,805	21,300	1,454	2,300	0	0	4,491	0	0
2008	0	0	37.906	21,300	1,498	2,300	0	0	4,625	0	0
2009	0	0	39,043	21,300	1,544	2,300	0	0	4,765	0	0
2010	0	0	40,216	21,300	1,588	2,300	0	0	4,908	0	0
2011	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2012	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2013	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2014	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2015	0	0	88.822	21.300	1.569	2.300	0	0	12.680	0	0
2016	0	0	88.822	21.300	1.569	2.300	0	0	12.680	0	0
2017	0	0	88.822	21.300	1.569	2.300	0	0	12.680	0	0
2018	0	0	88.822	21.300	1.569	2.300	0	0	12.680	0	0
2019	0	0	88.822	21.300	1.569	2,300	0	0	12,680	0	0
2020	0	0	88.822	21,300	1,569	2,300	0	0	12,680	0	0
2021	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2022	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2023	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2024	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2025	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2026	0	0	88.822	21,300	1,569	2,300	0	0	12,680	0	0
2027	0	0	88.822	21,300	1,569	2,300	0	0	12,680	0	0
2028	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2029	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2030	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2031	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2032	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2033	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2034	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
2035	0	0	88,822	21,300	1,569	2,300	0	0	12,680	0	0
TOTAL	10,490	9,429	3,015,630	802,326	61,324	80,738	2,406	5,002	433,534	5	(647,274)

d) In accordance with the Exchange Agreement between the noted agencies, MWDSC assumed responsibility for payment of variable OMP&R costs on the exchange water in reaches beyond Reach 22B, and Desert Water Agency and Coachella Valley Water District for such costs from the Delta through Reach 22B.
The adjustment in deliveries in Reach 22B provides for compliance with provisions for the repayment of costs under the agreement.
In 1993 and after the exchange takes place in Reach 26A.

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	MOJAVE DIVISION (continued)									SANTA ANA DIV	
	Reach 22B					Reach 23	Reach 24			Reach 26A	
	SCWA	MWA	CVWD(e	DWA(e	AVEKWA(f	MWA	CLAWA	MWA	MWDSC(e	MWDSC(e	SBVMWD(g
	[130]	[131]	[132]	[133]	[134]	[135]	[136]	[137]	[138]	[139]	[140]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	55	0	0	0	0	464	0	0	0	1,275
1973	0	0	5,800	9,000	0	0	389	0	0	444	32,426
1974	0	0	6,400	10,000	0	14	627	0	0	84,981	16,605
1975	0	0	7,000	11,000	0	0	825	0	0	169,960	13,865
1976	0	0	7,600	12,000	0	0	1,002	0	0	215,312	12,273
1977	0	22	0	0	0	58	1,109	0	0	64,823	24,833
1978	0	0	10,084	15,300	0	0	1,209	0	0	297,708	4,055
1979	0	4,000	10,063	15,000	0	0	1,260	0	0	260,903	18
1980	0	4,000	10,884	17,000	0	0	1,239	0	0	300,345	0
1981	0	4,000	12,105	19,000	0	0	1,485	0	0	395,678	16,021
1982	0	10,500	13,326	21,000	0	0	1,238	0	0	214,566	8,409
1983	0	0	14,547	23,000	0	0	911	0	0	175,288	5,994
1984	0	0	15,768	25,000	0	0	1,128	0	0	122,311	5,556
1985	0	0	16,989	27,000	0	0	1,422	0	0	147,599	7,390
1986	0	0	18,210	29,000	0	0	1,506	0	0	215,265	6,421
1987	0	17	19,431	31,500	214	0	1,849	0	0	175,012	18,751
1988	0	9	20,652	34,000	0	0	2,006	0	0	247,101	21,386
1989	0	0	21,873	36,500	89	200	2,170	0	0	326,217	20,782
1990	0	0	23,100	38,100	10	0	1,827	0	0	399,387	18,831
1991	0	0	6,930	11,430	0	0	849	2,032	0	107,182	3,661
1992	0	42	10,427	17,197	0	0	519	9,334	0	219,524	3,358
1993	0	0	0	0	0	0	439	10,000	0	98,291	4,361
1994	0	14,634	0	0	0	0	785	819	0	192,979	9,135
1995	0	7,495	0	0	0	0	409	0	0	107,299	696
1996	0	6,111	0	0	0	0	485	0	0	73,438	6,064
1997	0	9,038	0	0	0	0	651	0	0	157,215	9,654
1998	0	2,580	0	0	0	0	187	0	0	36,770	1,878
1999	0	6,705	0	0	0	0	1,132	0	0	139,752	12,874
2000	0	10,019	0	0	0	0	1,194	0	0	326,647	18,399
2001	0	3,048	0	0	0	0	1,057	0	0	284,007	26,488
2002	0	2,976	0	0	497	0	2,189	0	0	303,127	63,468
2003	0	13,150	0	0	0	0	1,563	0	17,249	532,198	27,415
2004	0	11,953	0	0	253	0	2,006	0	0	548,654	56,150
2005	0	12,169	0	0	0	0	205	341	14,058	361,976	18,835
2006	0	38,072	0	0	0	0	2,900	0	0	509,933	75,002
2007	0	17,220	0	0	0	0	3,340	0	0	535,737	72,600
2008	0	64,985	0	0	0	0	5,920	0	0	21,593	102,600
2009	0	74,143	0	0	0	0	5,800	0	0	21,593	102,600
2010	0	74,565	0	0	0	0	5,800	0	0	21,593	102,600
2011	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2012	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2013	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2014	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2015	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2016	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2017	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2018	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2019	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2020	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2021	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2022	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2023	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2024	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2025	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2026	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2027	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2028	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2029	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2030	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2031	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2032	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2033	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2034	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
2035	0	74,300	0	0	0	0	5,800	0	0	535,737	102,600
TOTAL	0	2,249,008	251,189	402,027	1,063	272	206,096	22,526	31,307	21,805,833	3,517,729

e) In accordance with the Exchange Agreement between the noted agencies, MWDSC assumed responsibility for payment of variable OMP&R costs on the exchange water in reaches beyond Reach 22B, and Desert Water Agency and Coachella Valley Water District for such costs from the Delta through Reach 22B. The adjustment in deliveries in Reach 22B provides for compliance with provisions for the repayment of costs under the agreement. In 1993 and after the exchange takes place in Reach 26A.

f) 1988 advance allocation.

g) Includes 1,650 AF recaptured from ground water storage in 1982, 10,000 AF in 1987, and 8,749 AF in 1988. This water was stored under DWR's Ground Water Demonstration Program.

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SANTA ANA DIVISION (continued)										
	Reach 26A				Reach 28G	Reach 28H			Reach 28J		
	SGVMWD	SGPWA	CVWD(e	DWA(e	MWDSC	CVWD	DWA	MWDSC	CVWD	DWA	MWDSC
	[141]	[142]	[143]	[144]	[145]	[146]	[147]	[148]	[149]	[150]	[151]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	18,942	0	0	0	0	0	0
1974	612	0	0	0	0	0	0	0	0	0	0
1975	5,450	0	0	0	0	0	0	0	0	0	251
1976	6,071	0	0	0	0	0	0	55	0	0	2,000
1977	8,996	0	0	0	0	0	0	43	0	0	2,442
1978	7,771	0	0	0	0	0	0	48	0	0	64,054
1979	290	0	0	0	0	0	0	1,290	0	0	94,353
1980	1,085	0	0	0	0	0	0	3,013	0	0	91,532
1981	3,619	0	0	0	0	0	0	4,365	0	0	149,405
1982	12,599	0	0	0	0	0	0	3,961	0	0	155,629
1983	734	0	0	0	0	0	0	6,645	0	0	41,616
1984	7,656	0	0	0	0	0	0	109,743	0	0	5,672
1985	5,028	0	0	0	0	0	0	182,781	0	0	6,538
1986	9,454	0	0	0	0	0	0	131,439	0	0	30,071
1987	10,630	0	0	0	0	0	0	144,743	0	0	26,315
1988	8,948	0	0	0	0	0	0	199,641	0	0	22,209
1989	12,839	0	0	0	0	0	0	247,430	0	0	51,462
1990	16,649	0	0	0	0	0	0	257,796	0	0	36,060
1991	5,399	0	0	0	0	0	0	38,832	0	0	5,958
1992	7,908	0	0	0	0	0	0	85,341	0	0	12,223
1993	14,397	0	23,100	38,100	0	0	0	61,841	0	0	4,588
1994	15,230	0	14,102	23,257	0	0	0	134,262	0	0	4,725
1995	12,922	0	23,100	38,100	0	0	0	117,762	0	0	21,099
1996	15,989	0	62,219	102,622	0	0	0	144,906	0	0	12,418
1997	18,175	0	58,100	53,100	0	0	0	107,853	0	0	47,777
1998	9,310	0	78,100	58,100	0	6,582	7,708	77,473	1,027	4,839	50,411
1999	21,729	0	50,480	58,100	0	0	0	206,689	0	0	8,163
2000	15,140	0	42,323	58,234	0	0	0	379,713	0	0	7,864
2001	2,360	0	9,100	15,010	0	0	0	260,984	0	0	33,414
2002	24,851	0	16,755	27,640	0	0	0	340,635	0	0	41,552
2003	21,934	116	14,443	23,819	0	0	0	246,485	0	0	50,776
2004	12,541	841	15,465	21,190	0	0	0	357,995	0	0	20,437
2005	13,984	692	34,356	49,089	0	0	0	242,245	0	0	114,499
2006	15,160	2,690	60,550	25,000	0	0	0	154,125	0	0	323,562
2007	12,000	7,500	104,600	30,950	0	0	0	124,048	0	0	224,480
2008	28,800	17,300	121,100	50,000	0	0	0	136,378	0	0	279,350
2009	28,800	17,300	121,100	50,000	0	0	0	136,378	0	0	279,350
2010	28,800	17,300	121,100	50,000	0	0	0	136,378	0	0	279,350
2011	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2012	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2013	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2014	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2015	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2016	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2017	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2018	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2019	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2020	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2021	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2022	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2023	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2024	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2025	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2026	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2027	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2028	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2029	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2030	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2031	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2032	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2033	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2034	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
2035	28,800	17,300	121,100	50,000	0	0	0	124,048	0	0	224,480
TOTAL	1,163,860	496,239	3,997,593	2,022,311	18,942	6,582	7,708	7,884,516	1,027	4,839	8,213,605

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	WEST BRANCH									COASTAL BRANCH	
	Reach 29F	Reach 29H	Reach 30							Reach 31A	
	AVEKWA	VCFCD	CVWD	DWA	MWDSC(h	VCFCD	SBVMWD(g	CLWA	SBCFC&WCD	DRWD	CK
	[152]	[153]	[154]	[155]	[156]	[157]	[158]	[159]	[160]	[161]	[162]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	53	0	0	0	71,938	0	0	0	0	0	0
1973	20	0	0	0	155,297	0	0	0	0	0	0
1974	36	0	0	0	209,136	0	0	0	0	0	0
1975	26	0	0	0	374,280	0	0	0	0	0	0
1976	24	0	0	0	420,684	0	0	0	0	0	0
1977	0	0	0	0	122,447	0	0	0	0	0	0
1978	0	0	0	0	171,139	0	0	0	0	0	0
1979	0	0	0	0	145,591	0	0	7	0	0	0
1980	0	0	0	0	164,721	0	0	1,210	0	0	0
1981	0	0	0	0	277,503	0	0	5,761	0	0	0
1982	0	0	0	0	351,362	0	0	9,516	0	0	0
1983	0	0	0	0	157,519	0	0	9,476	0	0	0
1984	0	0	0	0	260,624	0	0	11,477	0	0	0
1985	0	0	0	0	390,696	0	0	12,401	0	0	0
1986	0	0	0	0	379,275	0	0	13,928	0	0	0
1987	0	0	0	0	417,285	0	0	16,167	0	0	0
1988	0	0	0	0	488,265	0	0	18,904	0	0	0
1989	0	0	0	0	589,962	0	0	21,719	0	0	0
1990	0	4,836	0	0	764,380	0	0	22,139	0	0	0
1991	0	988	0	0	257,835	0	0	3,846	1,240	0	0
1992	0	0	0	0	420,849	0	0	14,812	0	0	0
1993	6	0	0	0	437,470	0	0	13,787	0	0	0
1994	0	0	0	0	475,900	0	0	14,919	0	0	0
1995	0	0	0	0	139,882	0	0	17,747	0	0	0
1996	0	0	0	0	267,618	0	0	18,448	0	0	0
1997	11	0	10,240	16,890	271,379	1,850	0	22,842	0	0	0
1998	7	0	0	0	187,277	1,850	0	19,782	0	0	0
1999	0	0	0	0	327,001	1,850	0	28,813	0	0	0
2000	0	2,200	0	0	632,991	1,850	0	31,085	0	0	0
2001	0	0	0	0	444,764	1,850	0	30,701	0	0	0
2002	0	3,148	0	0	723,605	1,850	8,601	42,080	0	0	0
2003	0	3,150	0	0	678,964	1,850	0	51,735	0	0	0
2004	0	4,047	0	0	797,294	1,203	0	47,463	0	0	0
2005	0	0	0	0	538,839	1,665	0	36,747	0	4,684	0
2006	0	0	0	0	755,908	5,000	0	42,877	0	0	305
2007	0	3,150	0	0	827,235	16,850	0	50,000	0	0	305
2008	0	3,150	0	0	926,068	16,850	0	69,200	0	0	305
2009	0	3,150	0	0	926,068	16,850	0	69,200	0	0	305
2010	0	3,150	0	0	926,068	16,850	0	69,200	0	0	305
2011	0	3,150	0	0	1,027,235	16,850	0	89,177	0	0	305
2012	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2013	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2014	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2015	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2016	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2017	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2018	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2019	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2020	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2021	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2022	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2023	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2024	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2025	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2026	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2027	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2028	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2029	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2030	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2031	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2032	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2033	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2034	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
2035	0	3,150	0	0	1,027,235	16,850	0	95,200	0	0	305
TOTAL	183	109,719	10,240	16,890	42,555,994	509,468	8,601	3,211,966	1,240	4,684	9,150

h) Deliveries exclude 6,171 AF of 1982 exchange water.

TABLE B-5A. Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								GRAND TOTAL
	COASTAL BRANCH							TOTAL	
	Reach 31A				Reach 34	Reach 35			
	KCWA (M&I)	KCWA (AG)	CLWA	MWDSC	SLOCFC&WCD	SLOCFC&WCD	SBCFC&WCD		
	[163]	[164]	[165]	[166]	[167]	[168]	[169]	[170]	[171]
1962	0	0	0	0	0	0	0	0	8,906
1963	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	56,763
1968	0	71,657	7,382	0	0	0	0	192,188	294,457
1969	0	52,094	9,970	0	0	0	0	195,705	268,104
1970	0	71,910	11,739	0	0	0	0	276,211	369,459
1971	0	98,481	12,490	0	0	0	0	553,081	654,250
1972	0	107,850	13,905	0	0	0	0	895,006	1,037,584
1973	0	69,227	9,418	0	0	0	0	638,930	737,479
1974	0	68,474	9,700	0	0	0	0	783,984	878,820
1975	0	74,516	10,700	0	0	0	0	1,129,728	1,230,577
1976	0	78,358	11,700	0	0	0	0	1,245,662	1,379,597
1977	0	35,504	5,075	0	0	0	0	465,442	581,675
1978	0	81,242	11,362	0	0	0	0	1,339,268	1,458,154
1979	0	104,017	19,138	0	0	0	0	1,537,075	1,666,155
1980	0	97,497	13,882	0	0	0	0	1,413,363	1,536,189
1981	0	97,054	12,700	0	0	0	0	1,779,479	1,918,342
1982	0	83,076	12,700	0	0	0	0	1,641,571	1,750,528
1983	0	87,859	12,659	0	0	0	0	1,089,626	1,186,831
1984	0	119,098	12,741	0	0	0	0	1,489,814	1,591,131
1985	0	110,124	12,099	0	0	0	0	1,863,544	1,989,925
1986	0	118,298	13,301	0	0	0	0	1,882,290	1,998,514
1987	0	116,259	11,821	0	0	0	0	1,984,570	2,131,061
1988	0	109,435	11,534	0	0	0	0	2,221,538	2,384,434
1989	0	102,156	14,645	0	0	0	0	2,686,838	2,853,044
1990	0	103,362	6,440	0	0	0	0	2,398,121	2,581,277
1991	0	780	716	0	0	0	0	489,489	548,520
1992	0	73,748	5,887	0	0	0	0	1,374,775	1,470,695
1993	0	90,764	4,157	0	0	0	0	2,173,352	2,314,233
1994	200	77,536	9,422	0	0	0	0	1,727,504	1,860,612
1995	0	85,050	9,486	0	0	0	0	1,926,835	2,030,310
		1,996							
1996	0	100,578	14,052	0	0	0	0	2,429,928	2,542,395
1997	0	97,020	4,870	0	1,099	0	7,439	2,263,966	2,404,254
1998	0	86,879	311	0	3,592	0	18,618	1,657,381	1,763,382
1999	0	92,095	4,086	0	0	3,743	20,137	2,755,025	2,895,579
2000	0	87,554	8,395	5,662	0	3,962	22,741	3,360,734	3,538,240
2001	0	63,448	1,238	0	0	4,283	18,946	2,033,444	2,172,710
2002	0	65,055	2,737	0	0	4,355	27,636	2,742,315	2,911,327
2003	0	65,691	4,001	0	0	4,453	26,968	3,138,285	3,312,596
2004	0	66,498	3,776	0	4,165	0	29,705	3,054,577	3,231,641
2005	0	68,190	2,709	0	0	4,251	23,344	3,422,451	3,576,075
2006	0	78,771	5,089	0	0	25,528	34,664	3,801,777	4,002,135
2007	0	90,629	6,000	0	0	4,824	45,486	3,390,204	3,581,955
2008	0	90,629	6,000	0	0	25,000	45,486	3,329,268	3,574,322
2009	0	90,629	6,000	0	0	25,000	45,486	3,352,368	3,581,165
2010	0	90,629	6,000	0	0	25,000	45,486	3,352,368	3,581,610
2011	0	90,629	6,023	0	0	25,000	45,486	3,847,604	4,130,176
2012	0	90,629	0	0	0	25,000	45,486	3,847,604	4,130,631
2013	0	90,629	0	0	0	25,000	45,486	3,847,604	4,131,046
2014	0	90,629	0	0	0	25,000	45,486	3,847,604	4,131,561
2015	0	90,629	0	0	0	25,000	45,486	3,847,604	4,132,386
2016	0	90,629	0	0	0	25,000	45,486	3,847,604	4,133,111
2017	0	90,629	0	0	0	25,000	45,486	3,847,604	4,133,736
2018	0	90,629	0	0	0	25,000	45,486	3,847,604	4,134,361
2019	0	90,629	0	0	0	25,000	45,486	3,847,604	4,134,986
2020	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,586
2021	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2022	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2023	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2024	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2025	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2026	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2027	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2028	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2029	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2030	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2031	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2032	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2033	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2034	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
2035	0	90,629	0	0	0	25,000	45,486	3,847,604	4,135,686
TOTAL	200	5,887,442	378,056	5662	8,856	755,399	1,549,292	177,669,180	190,922,377

TABLE B-5B. Annual Water Quantities Delivered to Each Contractor

(in acre-feet)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA [b]				CENTRAL COASTAL AREA		
	Napa [a] County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	494	8,412	0	8,906	0	0	0
1963	0	0	0	1,731	10,914	0	12,645	0	0	0
1964	0	0	0	1,673	19,238	0	20,911	0	0	0
1965	0	0	0	2,605	16,407	15,014	34,026	0	0	0
1966	0	0	0	5,511	14,864	34,538	54,913	0	0	0
1967	0	0	0	4,780	12,882	39,101	56,763	0	0	0
1968	1,214	0	1,214	6,133	24,817	70,105	101,055	0	0	0
1969	2,687	0	2,687	6,635	813	62,264	69,712	0	0	0
1970	3,618	0	3,618	9,249	0	80,311	89,560	0	0	0
1971	2,521	0	2,521	5,017	5,961	87,606	98,584	0	0	0
1972	3,647	0	3,647	10,489	27,671	100,266	138,426	0	0	0
1973	3,792	0	3,792	2,975	2,521	88,582	94,078	0	0	0
1974	4,870	0	4,870	1,314	4	88,000	89,318	0	0	0
1975	6,840	0	6,840	4,618	986	88,000	93,604	0	0	0
1976	7,122	0	7,122	17,131	21,300	88,000	126,431	0	0	0
1977	8,226	0	8,226	12,644	18,840	76,220	107,704	0	0	0
1978	6,034	0	6,034	10,984	5,863	95,727	112,574	0	0	0
1979	6,561	0	6,561	19,325	10,874	91,991	122,190	0	0	0
1980	6,707	0	6,707	16,790	11,034	88,000	115,824	0	0	0
1981	9,001	0	9,001	19,590	21,917	88,000	129,507	0	0	0
1982	1,213	0	1,213	13,123	6,316	88,000	107,439	0	0	0
1983	2,287	0	2,287	4,766	3,157	86,733	94,656	0	0	0
1984	2,923	0	2,923	6,784	3,338	88,000	98,122	0	0	0
1985	4,039	0	4,039	15,072	19,016	88,000	122,088	0	0	0
1986	3,519	1,400	4,919	10,609	12,379	88,000	110,988	0	0	0
1987	7,693	1,550	9,243	23,406	25,390	88,000	136,796	0	0	0
1988	5,392	9,726	15,118	25,830	33,464	87,961	147,255	0	0	0
1989	6,195	17,256	23,451	26,227	26,042	90,000	142,269	0	0	0
1990	6,940	19,131	26,071	33,034	31,703	92,000	156,737	0	0	0
1991	1,380	6,972	8,352	9,411	12,648	28,200	50,259	0	1,240	1,240
1992	4,001	14,773	18,774	14,669	19,153	42,839	76,661	0	0	0
1993	5,286	29,180	34,466	33,635	10,271	62,065	105,971	0	0	0
1994	6,792	25,256	32,048	20,542	22,911	57,115	100,568	0	0	0
1995	5,182	21,345	26,527	30,091	17,793	28,756	76,640	0	0	0
1996	4,893	29,999	34,892	18,903	19,662	89,850	128,415	100	0	100
1997	4,341	33,530	37,871	27,522	24,063	95,601	147,186	1,199	7,439	8,638
1998	5,359	29,766	35,125	17,941	19,075	63,410	100,426	3,592	18,618	22,210
1999	5,304	34,753	40,057	48,910	37,652	82,945	169,507	3,743	20,137	23,880
2000	4,958	37,015	41,973	58,617	35,978	101,988	196,583	3,962	22,741	26,703
2001	9,345	34,586	43,931	34,409	18,004	77,922	130,335	4,283	18,946	23,229
2002	6,875	38,560	45,435	53,261	27,811	62,186	143,258	4,355	28,381	32,736
2003	7,646	33,951	41,597	45,450	36,590	108,981	191,021	4,453	26,968	31,421
2004	8,134	43,002	51,136	52,364	27,884	59,458	139,706	4,165	29,705	33,870
2005	7,669	37,819	45,488	47,512	44,599	128,249	220,360	4,251	23,344	27,595
2006	15,708	48,116	63,824	57,095	42,664	71,108	170,867	25,528	34,664	60,192
2007	17,000	40,845	57,845	64,259	42,000	92,000	198,259	4,824	45,486	50,310
2008	24,975	64,523	89,498	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2009	23,525	47,456	70,981	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2010	23,850	47,506	71,356	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2011	24,175	47,556	71,731	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2012	24,500	47,606	72,106	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2013	24,775	47,656	72,431	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2014	25,150	47,706	72,856	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2015	25,825	47,756	73,581	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2016	26,450	47,756	74,206	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2017	27,075	47,756	74,831	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2018	27,700	47,756	75,456	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2019	28,325	47,756	76,081	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2020	28,925	47,756	76,681	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2021	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2022	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2023	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2024	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2025	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2026	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2027	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2028	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2029	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2030	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2031	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2032	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2033	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2034	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2035	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
TOTAL	1,003,539	1,941,416	2,944,955	3,210,462	2,030,881	6,131,092	11,372,435	764,455	1,551,277	2,315,732

a) Non-Project water deliveries were pumped through an interim facility from 1968 through 1987.

b) Non-Porject water deliveries were supplied from June 1962 through November 1967.

TABLE B-5B. Annual Water Quantities Delivered to Each Contractor

(in acre-feet)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge Water District	Empire West Side Irrigation District	Kern County Water Agency			County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
			Municipal and Industrial	Agricultural	Total				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	26,360	1,978	0	127,384	127,384	900	3,084	25,100	184,806
1969	31,375	56	0	141,265	141,265	100	3,016	9,923	185,735
1970	40,407	3,942	0	204,634	204,634	0	5,911	9,578	264,472
1971	41,053	5,990	0	360,151	360,151	3,700	7,212	122,485	540,591
1972	42,443	5,795	0	490,781	490,781	1,400	8,166	258,393	806,978
1973	22,057	3,000	0	341,469	341,469	1,500	3,214	50,464	421,704
1974	33,390	3,000	23,708	323,292	347,000	1,500	3,471	72,289	460,650
1975	40,555	3,000	14,529	396,291	410,820	1,600	3,576	86,258	545,809
1976	41,421	3,000	46,719	392,531	439,250	1,600	4,112	58,811	548,194
1977	11,153	738	27,882	163,425	191,307	1,530	1,472	18,081	224,281
1978	51,747	454	76,895	590,452	667,347	2,070	3,906	12,053	737,577
1979	38,544	1,739	62,997	683,049	746,046	2,000	6,149	155,121	949,599
1980	41,000	894	45,943	588,557	634,500	2,200	5,700	75,444	759,738
1981	41,000	5,859	75,758	615,642	691,400	2,300	4,300	83,438	828,297
1982	41,000	361	47,477	697,823	745,300	1,750	3,838	18,551	810,800
1983	42,900	0	6,854	587,653	594,507	3,550	3,822	1,006	645,785
1984	45,100	0	90,904	769,696	860,600	3,100	5,700	5,743	920,243
1985	46,251	5,197	88,515	800,381	888,896	3,400	5,433	109,791	1,058,968
1986	50,249	1,170	77,240	829,101	906,341	3,700	5,107	79,355	1,045,922
1987	46,288	2,525	117,174	852,731	969,905	4,000	5,625	93,084	1,121,427
1988	47,994	3,475	122,409	887,111	1,009,520	4,000	4,412	95,866	1,165,267
1989	57,049	3,000	123,896	1,022,166	1,146,062	4,000	6,091	127,950	1,344,152
1990	36,296	1,279	127,837	584,611	712,448	2,000	2,922	57,070	812,015
1991	927	221	33,122	8,965	42,087	0	141	2,180	45,556
1992	23,770	1,354	62,326	420,894	483,220	1,806	2,239	46,728	559,117
1993	50,618	2,741	128,316	1,039,614	1,167,930	4,000	4,858	124,468	1,354,615
1994	28,793	1,666	87,139	570,020	657,159	2,116	3,071	62,362	755,167
1995	60,686	1,631	135,415	1,016,114	1,151,529	4,000	5,169	101,869	1,324,884
1996	56,948	1,868	135,654	1,049,409	1,185,063	4,000	4,904	236,875	1,489,658
1997	71,308	0	120,708	987,451	1,108,159	0	5,238	22,369	1,207,074
1998	55,650	542	89,765	768,825	858,590	15	4,401	20,677	939,875
1999	59,697	3,176	138,153	1,039,985	1,178,138	4,000	4,871	289,735	1,539,617
2000	60,539	1,799	122,484	1,055,885	1,178,369	3,600	4,508	198,313	1,447,128
2001	41,548	1,360	21,460	632,279	653,739	1,560	3,592	84,726	786,525
2002	48,170	1,405	90,967	737,864	828,831	2,854	4,885	96,502	982,647
2003	46,082	1,436	107,978	856,252	964,230	3,692	4,266	105,841	1,125,547
2004	49,080	3,562	127,711	716,220	843,931	9,053	4,629	90,021	1,000,276
2005	79,005	3,834	92,608	1,305,452	1,398,060	19,806	4,194	140,002	1,644,901
2006	58,652	4,236	104,135	1,063,832	1,167,967	9,750	4,928	98,771	1,344,304
2007	57,343	3,000	120,390	868,340	988,730	9,305	5,700	95,922	1,160,000
2008	57,343	3,000	120,390	878,340	998,730	9,305	5,700	95,922	1,170,000
2009	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2010	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2011	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2012	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2013	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2014	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2015	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2016	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2017	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2018	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2019	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2020	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2021	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2022	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2023	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2024	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2025	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2026	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2027	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2028	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2029	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2030	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2031	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2032	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2033	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2034	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2035	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
TOTAL	3,370,052	174,283	6,649,658	50,797,447	57,447,105	391,997	337,433	6,129,031	67,849,901

TABLE B-5B. Annual Water Quantities Delivered to Each Contractor

(in acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency [c]	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	7,382	0	0	0	0	0	0	0	0
1969	0	9,970	0	0	0	0	0	0	0	0
1970	0	11,739	0	0	0	0	0	0	0	0
1971	0	12,490	0	0	0	0	0	0	0	0
1972	53	13,905	0	464	0	338	55	0	1,275	0
1973	20	9,418	5,800	389	9,000	290	0	0	32,426	0
1974	1,259	9,700	6,400	627	10,000	400	14	0	16,605	612
1975	8,068	10,700	7,000	825	11,000	520	0	0	13,865	5,450
1976	27,782	11,700	7,600	1,002	12,000	589	0	0	12,273	6,071
1977	11,202	5,075	0	1,109	0	111	80	0	24,833	8,996
1978	44,137	11,362	10,084	1,209	15,300	208	0	0	4,055	7,771
1979	60,493	19,145	10,063	1,260	15,000	133	4,000	0	18	290
1980	72,407	15,092	10,884	1,239	17,000	191	4,000	0	0	1,085
1981	79,375	18,461	12,105	1,485	19,000	1,270	4,000	0	16,021	3,619
1982	50,291	22,216	13,326	1,238	21,000	0	10,500	0	8,409	12,599
1983	32,961	22,135	14,547	911	23,000	38	0	0	5,994	734
1984	32,662	24,218	15,768	1,128	25,000	1	0	0	5,556	7,656
1985	37,064	24,500	16,989	1,422	27,000	0	0	1,558	7,390	5,028
1986	32,449	27,229	18,210	1,506	29,000	163	0	3,096	6,421	9,454
1987	34,089	27,988	19,431	1,849	31,500	1,085	17	5,379	18,751	10,630
1988	34,079	30,438	20,652	2,006	34,000	419	9	1,770	21,386	8,948
1989	45,280	36,364	21,873	2,170	36,500	971	200	9,009	20,782	12,839
1990	47,206	28,579	23,100	1,827	38,100	1,747	0	8,608	18,831	16,649
1991	9,568	4,562	6,930	849	11,430	522	3,423	3,914	3,661	5,399
1992	30,265	20,699	10,427	519	17,197	251	10,686	4,035	3,358	7,908
1993	43,102	23,039	23,100	439	38,100	734	11,514	7,761	4,361	14,397
1994	49,153	26,441	14,102	785	23,257	1,098	16,852	8,418	9,135	15,230
1995	47,286	27,233	23,100	409	38,100	480	8,722	6,961	696	12,922
1996	56,356	32,500	62,219	485	102,622	494	7,427	11,434	6,064	15,989
1997	62,393	27,712	68,340	651	69,990	444	10,374	11,861	9,654	18,175
1998	52,926	20,093	85,709	187	70,647	404	3,925	8,752	1,878	9,310
1999	69,073	32,899	50,480	1,132	58,100	342	8,144	13,278	12,874	21,729
2000	83,577	40,680	42,323	1,194	58,234	0	11,380	9,060	18,399	15,140
2001	62,857	31,939	9,100	1,057	15,010	0	4,433	10,427	26,488	2,360
2002	58,171	68,817	16,755	2,189	27,640	0	4,346	18,496	72,069	24,851
2003	60,029	55,736	14,443	1,563	23,819	0	14,435	11,547	27,415	21,934
2004	59,731	83,761	15,465	2,006	21,190	0	13,176	12,162	56,150	12,541
2005	59,831	59,456	34,356	205	49,089	0	13,561	11,712	18,835	13,984
2006	74,461	58,516	60,550	2,900	25,000	800	39,418	18,284	75,002	15,160
2007	54,396	56,000	104,600	3,340	30,950	2,300	18,455	21,300	72,600	12,000
2008	126,695	95,200	121,100	5,920	50,000	2,300	66,485	21,300	102,600	28,800
2009	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2010	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2011	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2012	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2013	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2014	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2015	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2016	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2017	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2018	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2019	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2020	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2021	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2022	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2023	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2024	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2025	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2026	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2027	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2028	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2029	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2030	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2031	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2032	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2033	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2034	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2035	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
TOTAL	5,528,547	3,745,489	4,266,631	206,096	2,453,775	80,743	2,336,231	815,222	3,526,330	1,163,860

c) Devil's Den Water District merged with Castaic Lake Water Agency effective January 1, 1992.

TABLE B-5B. Annual Water Quantities Delivered to Each Contractor

(in acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA (contd.)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	8,906
1963	0	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	0	56,763
1968	0	0	0	7,382	0	0	0	0	0	294,457
1969	0	0	0	9,970	0	0	0	0	0	268,104
1970	0	0	0	11,739	0	0	70	70	0	369,459
1971	0	0	0	12,490	0	0	64	64	0	654,250
1972	0	71,938	0	88,028	0	0	505	505	0	1,037,584
1973	0	159,883	0	217,226	0	0	679	679	0	737,479
1974	0	277,717	0	323,334	0	0	648	648	0	878,820
1975	0	526,491	0	583,919	0	0	405	405	0	1,230,577
1976	0	618,451	0	697,468	0	0	382	382	0	1,379,597
1977	0	189,755	0	241,161	0	0	303	303	0	581,675
1978	0	507,565	0	601,691	0	0	278	278	0	1,458,154
1979	0	477,074	0	587,476	0	0	329	329	0	1,666,155
1980	0	531,727	0	653,625	0	0	295	295	0	1,536,189
1981	0	795,846	0	951,182	0	0	355	355	0	1,918,342
1982	0	691,192	0	830,771	0	0	305	305	0	1,750,528
1983	0	343,521	0	443,841	0	0	262	262	0	1,186,831
1984	0	457,582	0	569,571	0	0	272	272	0	1,591,131
1985	0	683,625	0	804,576	0	0	254	254	0	1,989,925
1986	0	708,840	0	836,368	0	0	317	317	0	1,998,514
1987	0	712,424	0	863,143	0	0	452	452	0	2,131,061
1988	0	902,564	0	1,056,271	0	0	523	523	0	2,384,434
1989	0	1,156,698	0	1,342,686	0	0	486	486	0	2,853,044
1990	0	1,396,423	4,836	1,585,906	0	0	548	548	0	2,581,277
1991	0	391,447	988	442,693	0	0	420	420	0	548,520
1992	0	710,313	0	815,658	0	0	485	485	0	1,470,695
1993	0	652,190	0	818,737	0	0	444	444	0	2,314,233
1994	0	807,866	0	972,337	0	0	492	492	0	1,860,612
1995	0	436,042	0	601,951	0	0	308	308	0	2,030,310
1996	0	593,380	0	888,970	0	0	360	360	0	2,542,395
1997	0	721,810	1,850	1,003,254	0	0	231	231	0	2,404,254
1998	0	410,065	1,850	665,746	0	0	0	0	0	1,763,382
1999	0	852,617	1,850	1,122,518	1,096	286	0	1,382	0	2,896,961
2000	0	1,541,816	4,050	1,825,853	901	586	0	1,487	0	3,539,727
2001	0	1,023,169	1,850	1,188,690	1,065	513	0	1,578	0	2,174,288
2002	0	1,408,919	4,998	1,707,251	1,181	419	0	1,600	0	2,912,927
2003	116	1,686,973	5,000	1,923,010	1,324	551	0	1,875	0	3,314,471
2004	841	1,724,380	5,250	2,006,653	1,434	1,440	0	2,874	0	3,234,515
2005	692	1,374,345	1,665	1,637,731	1,894	527	0	2,421	0	3,578,496
2006	2,690	1,984,897	5,000	2,362,678	5,480	1,200	270	6,950	0	4,008,815
2007	7,500	1,711,500	20,000	2,114,941	9,600	1,183	600	11,383	0	3,592,738
2008	17,300	1,363,389	20,000	2,021,089	9,600	1,200	630	11,430	0	3,585,122
2009	17,300	1,363,389	20,000	2,044,989	9,600	27,500	2,090	39,190	0	3,618,265
2010	17,300	1,363,389	20,000	2,044,989	9,600	27,500	2,160	39,260	0	3,618,710
2011	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,240	39,340	0	4,167,276
2012	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,320	39,420	0	4,167,731
2013	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,410	39,510	0	4,168,146
2014	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,500	39,600	0	4,168,661
2015	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,600	39,700	0	4,169,486
2016	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,170,211
2017	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,170,836
2018	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,171,461
2019	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,086
2020	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,686
2021	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2022	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2023	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2024	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2025	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2026	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2027	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2028	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2029	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2030	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2031	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2032	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2033	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2034	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
2035	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,700	39,800	0	4,172,786
TOTAL	496,239	81,118,712	619,187	106,357,062	292,775	750,405	82,292	1,125,472	0	191,965,557

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	NORTH BAY AQUEDUCT											
	Barker Slough Pumping Plant				Cordelia Pumping Plant Solano County WA				Cordelia Pumping Plant Napa County FC&WCD			
	Initial Fill Water	Opera-tional Losses	Water Supply Delivery	Total	Initial Fill Water	Opera-tional Losses	Water Supply Delivery	Total	Initial Fill Water	Opera-tional Losses	Water Supply Delivery [a]	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	24	(10)	1,214	1,228
1969	0	0	0	0	0	0	0	0	0	2	2,687	2,689
1970	0	0	0	0	0	0	0	0	0	18	3,618	3,636
1971	0	0	0	0	0	0	0	0	0	4	2,521	2,525
1972	0	0	0	0	0	0	0	0	0	(10)	3,647	3,637
1973	0	0	0	0	0	0	0	0	0	1	3,792	3,793
1974	0	0	0	0	0	0	0	0	0	10	4,870	4,880
1975	0	0	0	0	0	0	0	0	0	10	6,840	6,850
1976	0	0	0	0	0	0	0	0	0	4	7,122	7,126
1977	0	0	0	0	0	0	0	0	0	2	8,226	8,228
1978	0	0	0	0	0	0	0	0	0	(6)	6,034	6,028
1979	0	0	0	0	0	0	0	0	0	1	6,561	6,562
1980	0	0	0	0	0	0	0	0	0	(3)	6,707	6,704
1981	0	0	0	0	0	0	0	0	0	8	9,001	9,009
1982	0	0	0	0	0	0	0	0	0	(8)	1,213	1,205
1983	0	0	0	0	0	0	0	0	0	(12)	2,287	2,275
1984	0	0	0	0	0	0	0	0	0	(15)	2,923	2,908
1985	0	0	0	0	0	0	0	0	0	13	4,039	4,052
1986	0	0	0	0	0	0	0	0	0	(4)	3,519	3,515
1987	0	0	0	0	0	0	0	0	0	0	7,693	7,693
1988	1	283	15,118	15,402	0	0	9,725	9,725	1	(1)	5,392	5,392
1989	0	758	23,451	24,209	0	0	17,246	17,246	0	(4)	6,195	6,191
1990	0	3	26,071	26,074	0	(634)	15,856	15,222	0	3	6,940	6,943
1991	0	667	8,352	9,019	0	124	3,855	3,979	0	198	1,380	1,578
1992	0	1,643	18,774	20,417	0	0	9,220	9,220	0	0	4,001	4,001
1993	0	1,153	34,466	35,619	0	0	14,471	14,471	0	0	5,286	5,286
1994	0	780	32,048	32,828	0	(6)	14,913	14,907	0	0	6,792	6,792
1995	0	908	26,527	27,435	0	0	15,893	15,893	0	0	5,182	5,182
1996	0	1,354	34,892	36,246	0	0	17,069	17,069	0	0	4,893	4,893
1997	0	1,422	37,871	39,293	0	0	17,501	17,501	0	0	4,341	4,341
1998	0	1,343	35,125	36,468	0	0	18,204	18,204	0	0	5,359	5,359
1999	0	2,522	40,057	42,579	0	0	19,562	19,562	0	0	5,304	5,304
2000	0	1,853	41,973	43,826	0	4	21,525	21,529	0	180	4,958	5,138
2001	0	1,760	43,931	45,691	0	0	19,737	19,737	0	0	9,345	9,345
2002	0	496	45,435	45,931	0	0	19,719	19,719	0	0	6,875	6,875
2003	0	3,991	41,597	45,588	0	0	16,691	16,691	0	0	7,646	7,646
2004	0	2,181	51,136	53,317	0	0	22,051	22,051	0	0	8,134	8,134
2005	0	935	45,488	46,423	0	0	19,189	19,189	0	0	8,009	8,009
2006	0	51	63,824	63,875	0	0	29,212	29,212	0	5	15,708	15,713
2007	0	51	57,845	57,896	0	0	20,975	20,975	0	5	17,000	17,005
2008	0	51	89,498	89,549	0	0	20,975	20,975	0	5	24,975	24,980
2009	0	51	70,981	71,032	0	0	6,625	6,625	0	5	23,525	23,530
2010	0	51	71,356	71,407	0	0	6,625	6,625	0	5	23,850	23,855
2011	0	51	71,731	71,782	0	0	18,150	18,150	0	5	24,175	24,180
2012	0	51	72,106	72,157	0	0	18,150	18,150	0	5	24,500	24,505
2013	0	51	72,431	72,482	0	0	18,150	18,150	0	5	24,775	24,780
2014	0	51	72,856	72,907	0	0	18,150	18,150	0	5	25,150	25,155
2015	0	51	73,581	73,632	0	0	18,150	18,150	0	5	25,825	25,830
2016	0	51	74,206	74,257	0	0	18,150	18,150	0	5	26,450	26,455
2017	0	51	74,831	74,882	0	0	18,150	18,150	0	5	27,075	27,080
2018	0	51	75,456	75,507	0	0	18,150	18,150	0	5	27,700	27,705
2019	0	51	76,081	76,132	0	0	18,150	18,150	0	5	28,325	28,330
2020	0	51	76,681	76,732	0	0	18,150	18,150	0	5	28,925	28,930
2021	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2022	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2023	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2024	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2025	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2026	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2027	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2028	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2029	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2030	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2031	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2032	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2033	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2034	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030
2035	0	51	76,781	76,832	0	0	18,150	18,150	0	5	29,025	29,030

a) Non-Project water deliveries were pumped through an interim facility from 1968 through 1987.

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	SOUTH BAY AQUEDUCT						CALIFORNIA AQUEDUCT							
	South Bay Pumping Plant						North San Joaquin Division Banks Pumping Plant Transportation Water							
	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply [b]	Deliveries: Recrea-tion	Total	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total	Conser-vation Water	Total
	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	9	272	0	8,906	0	9,187	0	0	0	0	0	0	0	0
1963	71	185	0	12,645	0	12,901	0	0	0	0	0	0	0	0
1964	171	152	0	20,911	0	21,234	0	0	0	0	0	0	0	0
1965	93	729	0	34,026	0	34,848	0	0	0	0	0	0	0	0
1966	0	1,746	0	54,913	0	56,659	0	0	0	0	0	0	0	0
1967	0	1,677	0	56,763	0	58,440	5,746	1,183	0	11,538	0	18,467	2,957	21,424
1968	0	1,847	0	101,055	0	102,902	11,079	74,464	0	293,243	0	378,786	531,275	910,061
1969	3,449	2,668	0	69,712	0	75,829	7,336	44,287	0	265,417	0	317,040	531,185	848,225
1970	16,279	1,086	(5,355)	89,560	0	101,570	23,947	20,767	(5,355)	365,771	0	405,130	(12,995)	392,135
1971	0	1,815	8,854	98,584	0	109,253	23,207	(10,754)	8,854	651,665	8	672,980	7,708	680,688
1972	0	3,557	2,273	138,426	0	144,256	145,066	9,057	(4,285)	1,033,432	6,489	1,189,759	48,300	1,238,059
1973	0	(33)	(1,510)	94,078	0	92,535	214,941	(4,951)	2,902	733,008	1,155	947,055	55,846	1,002,901
1974	0	1,287	(10,056)	89,318	0	80,549	247,894	(11,526)	(32,510)	873,302	2,118	1,079,278	54,683	1,133,961
1975	0	320	8,550	93,604	0	102,474	110,149	(8,092)	16,101	1,223,332	3,377	1,344,867	(102,625)	1,242,242
1976	0	2,431	1,391	126,431	141	130,394	67,834	5,443	(244,124)	1,372,093	1,745	1,202,991	(442,348)	760,643
1977	0	2,866	2,685	107,704	112	113,367	0	39,897	(157,543)	573,146	1,111	456,611	(13,507)	443,104
1978	0	2,165	(11,249)	112,574	126	103,616	67,457	(36,898)	35,129	1,451,842	1,177	1,518,707	752,075	2,270,782
1979	0	2,401	1,069	122,190	89	125,749	17,397	60,958	(32,307)	1,659,265	1,398	1,706,711	(112,053)	1,594,658
1980	0	1,758	(6,563)	115,824	123	111,142	3,159	58,484	(275,538)	1,529,187	2,131	1,317,423	186,601	1,504,024
1981	0	2,627	13,742	129,507	121	145,997	46,060	85,350	40,536	1,908,986	4,974	2,085,906	(931,878)	1,154,028
1982	0	2,344	(23,928)	107,439	129	85,984	5,979	61,556	99,897	1,743,145	4,646	1,915,223	347,983	2,263,206
1983	0	2,151	(22,886)	94,656	132	74,053	6,071	47,022	(310,477)	1,184,282	7,853	934,751	835,771	1,770,522
1984	0	2,088	8,442	98,122	158	108,810	38,649	97,143	(108,548)	1,587,936	5,874	1,621,054	21,875	1,642,929
1985	0	2,817	(1,607)	122,088	152	123,450	0	110,469	137,783	1,985,632	5,452	2,239,336	(110,569)	2,128,767
1986	0	2,299	(1,850)	110,988	130	111,567	0	90,799	20,177	1,993,278	3,865	2,108,119	200,298	2,308,417
1987	0	2,625	(584)	136,796	137	138,974	0	91,427	(23,116)	2,121,366	7,672	2,197,349	(458,725)	1,738,624
1988	0	2,884	(698)	147,255	142	149,583	0	107,249	(35,484)	2,368,793	4,889	2,445,447	(303,583)	2,141,864
1989	0	2,673	3,296	142,269	152	148,390	0	117,603	(38,058)	2,829,107	8,135	2,916,787	421,131	3,337,918
1990	0	894	1,982	156,537	168	159,581	0	99,059	(290,965)	2,554,658	9,262	2,372,014	(374,027)	1,997,987
1991	0	2,637	(4,532)	50,259	150	48,514	0	80,106	(79,038)	539,748	4,879	545,695	554,904	1,100,599
1992	0	2,881	756	76,661	147	80,445	0	91,391	(218,170)	1,451,436	2,605	1,327,262	61,343	1,388,605
1993	0	1,940	(20,051)	105,971	143	88,003	0	149,372	(273,789)	2,279,323	2,609	2,157,515	849,249	3,006,764
1994	0	1,981	1,714	100,568	168	104,431	0	148,712	(120,985)	1,828,072	3,803	1,859,602	(324,640)	1,534,962
1995	0	1,188	(12,333)	76,640	146	65,641	0	173,074	(397,605)	2,003,475	2,575	1,781,519	293,159	2,074,678
1996	0	981	(1,990)	77,215	150	76,356	0	123,502	78,123	2,507,143	3,902	2,712,670	288,576	3,001,246
1997	0	1,575	5,016	102,186	155	108,932	527	135,106	(98,334)	2,366,152	2,594	2,406,045	(50,000)	2,356,045
1998	0	1,551	3,595	70,876	114	76,136	0	91,319	(346,039)	1,728,257	2,107	1,475,644	120,886	1,596,530
1999	0	2,166	12,313	100,497	139	115,115	0	135,809	(17,569)	2,855,522	4,301	2,978,063	(307,839)	2,670,224
2000	0	2,346	(20,958)	135,533	145	117,066	0	115,895	(13,232)	3,471,397	5,182	3,579,242	(15,487)	3,563,755
2001	0	2,784	1,301	95,335	196	99,616	0	222,144	(17,529)	1,903,190	1,978	2,109,783	86,928	2,196,711
2002	0	2,534	(13,938)	123,577	146	112,319	0	225,032	36,404	2,807,771	4,672	3,073,879	(151,719)	2,922,160
2003	0	2,920	(1,399)	132,714	131	134,366	0	226,713	(49,580)	3,198,537	11,362	3,387,032	328,334	3,715,366
2004	0	2,982	(7,240)	125,928	150	121,820	0	40,711	(4,079)	2,979,181	1,337	3,017,150	146,888	3,164,038
2005	0	2,823	(3,565)	108,136	154	107,548	0	120,419	(163,243)	3,667,793	1,270	3,626,239	571,155	4,197,394
2006	0	3,301	(2,807)	136,264	400	137,158	0	136,198	(63,771)	3,938,041	8,660	4,019,128	0	4,019,128
2007	0	3,298	193	133,306	400	137,197	0	132,919	80,228	3,523,510	8,660	3,745,317	0	3,745,317
2008	0	3,298	193	154,926	400	158,817	0	125,910	190	3,484,194	8,660	3,618,954	30,977	3,649,931
2009	0	3,351	0	155,726	400	159,477	0	129,619	(15,186)	3,508,094	8,660	3,631,187	(140,708)	3,490,479
2010	0	3,351	0	155,726	400	159,477	0	128,523	4,288	3,508,094	8,660	3,649,565	182,970	3,832,535
2011	0	3,351	0	208,601	400	212,352	0	128,364	64,678	4,056,205	8,660	4,257,907	137,242	4,395,149
2012	0	3,351	0	208,601	400	212,352	0	128,100	(67,943)	4,056,205	8,660	4,125,022	(260,827)	3,864,195
2013	0	3,351	0	208,601	400	212,352	0	128,264	9,749	4,056,205	8,660	4,202,878	145,525	4,348,403
2014	0	3,351	0	208,601	400	212,352	0	130,280	16,625	4,056,205	8,660	4,211,770	(186,678)	4,025,092
2015	0	3,351	0	208,601	400	212,352	0	130,445	32,003	4,056,205	8,660	4,227,313	(31,516)	4,195,797
2016	0	3,351	0	208,601	400	212,352	0	128,415	(28,401)	4,056,205	8,660	4,164,879	205,134	4,370,013
2017	0	3,351	0	208,601	400	212,352	0	128,602	61,309	4,056,205	8,660	4,254,776	119,885	4,374,661
2018	0	3,351	0	208,601	400	212,352	0	128,369	(80,817)	4,056,205	8,660	4,112,417	(194,534)	3,917,883
2019	0	3,351	0	208,601	400	212,352	0	128,613	50,179	4,056,205	8,660	4,243,657	77,224	4,320,881
2020	0	3,351	0	208,601	400	212,352	0	128,690	(366)	4,056,205	8,660	4,193,189	(8,687)	4,184,502
2021	0	3,351	0	208,601	400	212,352	0	128,769	10,725	4,056,205	8,660	4,204,359	(1,095)	4,203,264
2022	0	3,351	0	208,601	400	212,352	0	128,846	(3,483)	4,056,205	8,660	4,190,228	(185,907)	4,004,321
2023	0	3,351	0	208,601	400	212,352	0	128,818	(18,971)	4,056,205	8,660	4,174,712	115,791	4,290,503
2024	0	3,351	0	208,601	400	212,352	0	128,625	11,289	4,056,205	8,660	4,204,779	79,858	4,284,637
2025	0	3,351	0	208,601	400	212,352	0	130,380	(12,518)	4,056,205	8,660	4,182,727	(247,205)	3,935,522
2026	0	3,351	0	208,601	400	212,352	0	128,700	24,308	4,056,205	8,660	4,217,873	246,850	4,464,723
2027	0	3,351	0	208,601	400	212,352	0	128,692	(17,799)	4,056,205	8,660	4,175,758	(12,304)	4,163,454
2028	0	3,351	0	208,601	400	212,352	0	128,783	12,291	4,056,205	8,660	4,205,939	15,430	4,221,369
2029	0	3,351	0	208,601	400	212,352	0	128,671	(9,046)	4,056,205	8,660	4,184,490	(10,778)	4,173,712
2030	0	3,351	0	208,601	400	212,352	0	128,777	20,756	4,056,205	8,660	4,214,398	124,586	4,338,984
2031	0	3,351	0	208,601	400	212,352	0	128,134	(97,726)	4,056,205	8,660	4,095,273	(259,831)	3,835,442
2032	0	3,351	0	208,601	400	212,352	0	128,005	84,999	4,056,205	8,660	4,277,869	138,527	4,416,396
2033	0	3,351	0	208,601	400	212,352	0	127,876	(94,652)	4,056,205	8,660	4,098,089	(184,372)	3,913,717
2034	0	3,351	0	208,601	400	212,352	0	127,725	69,593	4,056,205	8,660	4,262,183	120,375	4,382,558
2035	0	3,351	0	208,601	400	212,352	0	127,379	(242,659)	4,056,205	8,660	3,949,585	(587,531)	3,362,054

b) Non-Project water deliveries were supplied from June 1962 through November 1967.

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	San Luis Division						South San Joaquin Division					
	Dos Amigos Pumping Plant						Buena Vista Pumping Plant					
	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total
	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	11,079	25,126	0	189,104	0	225,309	0	0	0	0	0	0
1969	3,887	9,922	0	192,689	0	206,498	0	0	0	0	0	0
1970	7,668	1,901	0	270,300	0	279,869	4,779	1,012	0	3	0	5,794
1971	23,207	(12,030)	0	545,869	0	557,046	7,853	8,399	0	101,512	0	117,764
1972	145,066	(6,635)	(6,558)	886,840	6,481	1,025,194	100,274	20,044	(6,558)	223,626	6,481	343,867
1973	214,941	(6,778)	1,329	635,716	1,147	846,355	204,638	35,695	1,329	311,096	1,147	553,905
1974	247,894	(16,765)	(15,295)	780,513	2,108	998,455	237,554	19,672	(15,295)	388,949	2,108	632,988
1975	110,149	(12,144)	(693)	1,126,152	3,358	1,226,822	103,352	26,342	(693)	672,531	3,358	804,890
1976	67,834	(456)	(152,171)	1,241,550	1,581	1,158,338	61,122	29,428	(152,171)	785,055	1,581	725,015
1977	0	26,359	(116,219)	463,970	737	374,847	0	25,173	(116,219)	271,944	560	181,458
1978	67,457	1,905	79,308	1,335,362	680	1,484,712	65,027	17,751	121,904	762,043	674	967,399
1979	17,397	33,884	(51,299)	1,530,926	685	1,531,593	12,302	46,157	(51,299)	737,714	502	745,376
1980	3,159	34,391	(272,825)	1,407,663	1,514	1,173,902	0	49,025	(134,009)	778,059	1,262	694,337
1981	46,060	36,962	23,359	1,775,179	4,348	1,885,908	0	38,942	23,359	1,077,322	4,112	1,143,735
1982	5,979	57,146	116,086	1,631,868	4,205	1,815,284	0	29,059	117,174	990,863	4,045	1,141,141
1983	6,071	63,583	(101,155)	1,085,804	7,475	1,061,778	0	40,205	(101,155)	593,920	7,291	540,261
1984	38,649	109,263	(112,744)	1,484,114	5,391	1,524,673	0	38,487	(114,984)	781,955	5,244	710,702
1985	0	86,772	138,898	1,858,111	4,936	2,088,717	0	42,838	139,689	992,606	4,804	1,179,937
1986	0	51,963	19,989	1,877,183	3,426	1,952,561	0	36,751	37,546	1,014,294	3,285	1,091,876
1987	0	64,827	(25,707)	1,978,945	7,121	2,025,186	0	30,495	(25,522)	1,027,361	6,937	1,039,271
1988	0	72,679	(34,592)	2,217,126	4,490	2,259,703	0	38,804	(29,747)	1,244,196	4,360	1,257,613
1989	0	90,090	(29,411)	2,679,845	7,652	2,748,176	0	29,594	(60,826)	1,532,625	7,490	1,508,883
1990	0	115,074	(11,323)	2,394,999	8,922	2,507,672	0	46,865	(15,092)	1,769,991	8,879	1,810,643
1991	0	92,227	9,325	489,348	4,605	595,505	0	39,274	96,506	446,916	4,560	587,256
1992	0	118,796	(225,603)	1,372,536	2,079	1,267,808	0	28,138	(98,271)	920,978	1,995	852,840
1993	0	136,432	(220,537)	2,170,494	1,864	2,088,253	0	14,186	(128,363)	908,200	1,676	795,699
1994	0	152,414	(78,957)	1,724,433	3,098	1,800,988	0	35,083	(88,211)	1,107,122	2,918	1,056,912
1995	0	137,937	(12,473)	1,921,666	1,711	2,048,841	0	33,963	(16,431)	706,742	1,669	725,943
1996	0	45,591	14,927	2,425,024	2,998	2,488,540	0	31,304	15,438	988,612	2,928	1,038,282
1997	527	107,033	(66,814)	2,247,628	2,090	2,290,464	0	42,670	40,852	1,054,461	2,076	1,140,059
1998	0	95,185	(338,076)	1,664,080	1,589	1,422,778	0	41,910	(106,487)	753,731	1,585	690,739
1999	0	95,262	(2,778)	2,750,154	3,285	2,845,923	0	48,502	(2,807)	1,131,826	3,279	1,180,800
2000	0	134,231	7,726	3,270,211	4,222	3,416,390	0	37,514	7,726	1,809,219	4,216	1,858,675
2001	0	150,830	(18,830)	1,614,870	1,218	1,748,088	0	31,361	(18,830)	1,318,987	1,211	1,332,729
2002	0	92,905	50,342	2,625,006	3,968	2,772,221	0	41,565	50,342	1,831,874	3,961	1,927,742
2003	0	85,360	(48,181)	2,879,993	10,656	2,927,828	0	43,352	(48,181)	1,895,852	10,645	1,901,668
2004	0	25,865	3,161	2,807,789	652	2,837,467	0	41,551	3,161	2,102,335	649	2,147,696
2005	0	62,569	(159,678)	3,425,394	581	3,328,866	0	35,020	(159,678)	1,848,005	559	1,723,906
2006	0	73,012	(60,964)	3,793,964	7,210	3,813,222	0	43,550	(60,964)	2,255,093	7,010	2,244,689
2007	0	72,986	80,035	3,349,651	7,210	3,509,882	0	43,524	80,035	2,278,051	7,010	2,408,620
2008	0	73,635	(3)	3,288,715	7,210	3,369,557	0	44,173	(3)	2,166,199	7,010	2,217,379
2009	0	70,102	(15,186)	3,311,815	7,210	3,373,941	0	40,640	(15,186)	2,190,099	7,010	2,222,563
2010	0	70,198	4,288	3,311,815	7,210	3,393,511	0	40,736	4,288	2,190,099	7,010	2,242,133
2011	0	70,389	64,678	3,837,054	7,210	3,979,331	0	40,927	64,678	2,757,187	7,010	2,869,802
2012	0	70,279	(67,943)	3,837,054	7,210	3,846,600	0	40,817	(67,943)	2,763,210	7,010	2,743,094
2013	0	70,217	9,749	3,837,054	7,210	3,924,230	0	40,755	9,749	2,763,210	7,010	2,820,724
2014	0	70,525	16,625	3,837,054	7,210	3,931,414	0	41,063	16,625	2,763,210	7,010	2,827,908
2015	0	70,654	32,003	3,837,054	7,210	3,946,921	0	41,192	32,003	2,763,210	7,010	2,843,415
2016	0	70,354	(28,401)	3,837,054	7,210	3,886,217	0	40,892	(28,401)	2,763,210	7,010	2,782,711
2017	0	70,586	61,309	3,837,054	7,210	3,976,159	0	41,124	61,309	2,763,210	7,010	2,872,653
2018	0	70,740	(80,817)	3,837,054	7,210	3,834,187	0	41,278	(80,817)	2,763,210	7,010	2,730,681
2019	0	70,564	50,179	3,837,054	7,210	3,965,007	0	41,102	50,179	2,763,210	7,010	2,861,501
2020	0	70,628	(366)	3,837,054	7,210	3,914,526	0	41,166	(366)	2,763,210	7,010	2,811,020
2021	0	70,711	10,725	3,837,054	7,210	3,925,700	0	41,249	10,725	2,763,210	7,010	2,822,194
2022	0	70,705	(3,483)	3,837,054	7,210	3,911,486	0	41,243	(3,483)	2,763,210	7,010	2,807,980
2023	0	70,696	(18,971)	3,837,054	7,210	3,895,989	0	41,234	(18,971)	2,763,210	7,010	2,792,483
2024	0	70,575	11,289	3,837,054	7,210	3,926,128	0	41,113	11,289	2,763,210	7,010	2,822,622
2025	0	70,638	(12,518)	3,837,054	7,210	3,902,384	0	41,176	(12,518)	2,763,210	7,010	2,798,878
2026	0	70,650	24,308	3,837,054	7,210	3,939,222	0	41,188	24,308	2,763,210	7,010	2,835,716
2027	0	70,563	(17,799)	3,837,054	7,210	3,897,028	0	41,101	(17,799)	2,763,210	7,010	2,793,522
2028	0	70,703	12,291	3,837,054	7,210	3,927,258	0	41,241	12,291	2,763,210	7,010	2,823,752
2029	0	70,630	(9,046)	3,837,054	7,210	3,905,848	0	41,168	(9,046)	2,763,210	7,010	2,802,342
2030	0	70,694	20,756	3,837,054	7,210	3,935,714	0	41,232	20,756	2,763,210	7,010	2,832,208
2031	0	70,566	(97,726)	3,837,054	7,210	3,817,104	0	41,104	(97,726)	2,763,210	7,010	2,713,598
2032	0	70,168	84,999	3,837,054	7,210	3,999,431	0	40,706	84,999	2,763,210	7,010	2,895,925
2033	0	70,373	(94,652)	3,837,054	7,210	3,819,985	0	40,911	(94,652)	2,763,210	7,010	2,716,479
2034	0	69,865	69,593	3,837,054	7,210	3,983,722	0	40,403	69,593	2,763,210	7,010	2,880,216
2035	0	69,205	(242,659)	3,837,054	7,210	3,670,810	0	39,743	(242,659)	2,763,210	7,010	2,567,304

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	South San Joaquin Division (continued)											
	Teerink Pumping Plant						Chrisman Pumping Plant					
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recreation	Total
	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]	[50]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	198	2	0	0	0	200	0	0	0	0	0	0
1971	7,533	(112)	0	3,552	0	10,973	7,366	(159)	0	0	0	7,207
1972	100,274	12,765	(6,558)	84,955	6,481	197,917	100,274	13,160	(6,558)	78,891	6,481	192,248
1973	204,638	21,543	1,329	229,685	1,147	458,342	204,638	32,414	1,329	209,769	1,147	449,297
1974	237,554	11,843	(15,295)	336,198	2,108	572,408	237,554	17,655	(15,295)	318,198	2,108	560,220
1975	103,352	19,763	(693)	621,706	3,358	747,486	103,352	25,326	(693)	586,286	3,358	717,629
1976	61,122	18,552	(152,171)	740,486	1,581	669,570	61,122	21,468	(152,171)	700,935	1,581	632,935
1977	0	16,415	(116,219)	246,349	560	147,105	0	15,698	(116,219)	240,191	560	140,230
1978	65,027	28,820	121,904	631,121	674	847,546	65,027	26,705	121,904	599,973	674	814,283
1979	12,302	50,663	(51,299)	625,561	502	637,729	12,302	50,580	(51,299)	586,959	502	599,044
1980	0	48,825	(134,009)	696,405	1,262	612,483	0	58,085	(134,009)	658,588	1,262	583,926
1981	0	51,600	23,359	998,307	4,112	1,077,378	0	48,844	23,359	959,274	4,112	1,035,589
1982	0	44,353	117,332	878,486	4,045	1,044,216	0	33,541	117,277	830,704	4,045	985,567
1983	0	43,961	(101,155)	487,915	7,291	438,012	0	34,698	(101,155)	450,489	7,291	391,323
1984	0	45,999	(115,088)	632,262	5,244	568,417	0	33,132	(115,092)	582,414	5,244	505,698
1985	0	50,106	139,973	854,684	4,804	1,049,567	0	54,831	139,954	810,606	4,804	1,010,195
1986	0	38,747	37,546	882,300	3,285	961,878	0	41,421	37,546	839,839	3,285	922,091
1987	0	47,815	(25,522)	897,905	6,937	927,135	0	33,195	(25,522)	863,157	6,937	877,767
1988	0	53,815	(29,747)	1,097,643	4,360	1,126,071	0	39,775	(29,747)	1,055,649	4,360	1,070,037
1989	0	49,088	(60,826)	1,382,599	7,490	1,378,351	0	42,307	(60,826)	1,339,358	7,490	1,328,329
1990	0	66,868	(15,092)	1,627,246	8,879	1,687,901	0	56,663	(15,092)	1,590,893	8,879	1,641,343
1991	0	40,564	105,176	446,148	4,560	596,448	0	34,016	105,176	446,148	4,560	589,900
1992	0	31,820	(92,123)	844,376	1,995	786,068	0	34,477	(92,123)	820,133	1,995	764,482
1993	0	27,158	(127,738)	799,143	1,676	700,239	0	28,614	(127,738)	771,146	1,676	673,698
1994	0	50,802	(88,211)	1,007,214	2,918	972,723	0	57,203	(88,211)	977,703	2,918	949,613
1995	0	48,705	(16,431)	586,829	1,669	620,772	0	36,309	(16,431)	560,695	1,669	582,242
1996	0	58,437	15,438	836,819	2,928	913,622	0	43,710	15,438	800,633	2,928	862,709
1997	0	73,656	40,852	918,124	2,076	1,034,708	0	62,275	40,852	881,843	2,076	987,046
1998	0	61,137	(106,487)	656,796	1,585	613,031	0	47,523	(106,487)	628,084	1,585	570,705
1999	0	77,334	(2,807)	1,011,608	3,279	1,089,414	0	55,514	(2,807)	974,807	3,279	1,030,793
2000	0	87,084	7,726	1,685,654	4,216	1,784,680	0	49,690	7,726	1,645,591	4,216	1,707,223
2001	0	71,588	(18,830)	1,234,014	1,211	1,287,983	0	54,742	(18,830)	1,202,822	1,211	1,239,945
2002	0	108,309	50,342	1,740,813	3,961	1,903,425	0	69,443	50,342	1,699,261	3,961	1,823,007
2003	0	106,973	(48,181)	1,812,277	10,645	1,881,714	0	57,291	(48,181)	1,775,675	10,645	1,795,430
2004	0	122,559	3,161	2,032,492	649	2,158,861	0	60,847	3,161	1,992,308	649	2,056,965
2005	0	99,523	(159,678)	1,753,624	559	1,694,028	0	53,502	(159,678)	1,713,754	559	1,608,137
2006	0	39,920	(60,964)	2,172,858	7,010	2,158,824	0	39,670	(60,964)	2,126,303	7,010	2,112,019
2007	0	39,894	80,035	2,179,351	7,010	2,306,290	0	39,644	80,035	2,131,051	7,010	2,257,740
2008	0	40,543	(3)	2,065,499	7,010	2,113,049	0	40,293	(3)	2,017,199	7,010	2,064,499
2009	0	37,010	(15,186)	2,089,399	7,010	2,118,233	0	36,760	(15,186)	2,041,099	7,010	2,069,683
2010	0	37,106	4,288	2,089,399	7,010	2,137,803	0	36,856	4,288	2,041,099	7,010	2,089,253
2011	0	37,297	64,678	2,658,487	7,010	2,767,472	0	37,047	64,678	2,610,187	7,010	2,718,922
2012	0	37,187	(67,943)	2,664,510	7,010	2,640,764	0	36,937	(67,943)	2,616,210	7,010	2,592,214
2013	0	37,125	9,749	2,664,510	7,010	2,718,394	0	36,875	9,749	2,616,210	7,010	2,669,844
2014	0	37,433	16,625	2,664,510	7,010	2,725,578	0	37,183	16,625	2,616,210	7,010	2,677,028
2015	0	37,562	32,003	2,664,510	7,010	2,741,085	0	37,312	32,003	2,616,210	7,010	2,692,535
2016	0	37,262	(28,401)	2,664,510	7,010	2,680,381	0	37,012	(28,401)	2,616,210	7,010	2,631,831
2017	0	37,494	61,309	2,664,510	7,010	2,770,323	0	37,244	61,309	2,616,210	7,010	2,721,773
2018	0	37,648	(80,817)	2,664,510	7,010	2,628,351	0	37,398	(80,817)	2,616,210	7,010	2,579,801
2019	0	37,472	50,179	2,664,510	7,010	2,759,171	0	37,222	50,179	2,616,210	7,010	2,710,621
2020	0	37,536	(366)	2,664,510	7,010	2,708,690	0	37,286	(366)	2,616,210	7,010	2,660,140
2021	0	37,619	10,725	2,664,510	7,010	2,719,864	0	37,369	10,725	2,616,210	7,010	2,671,314
2022	0	37,613	(3,483)	2,664,510	7,010	2,705,650	0	37,363	(3,483)	2,616,210	7,010	2,657,100
2023	0	37,604	(18,971)	2,664,510	7,010	2,690,153	0	37,354	(18,971)	2,616,210	7,010	2,641,603
2024	0	37,483	11,289	2,664,510	7,010	2,720,292	0	37,233	11,289	2,616,210	7,010	2,671,742
2025	0	37,546	(12,518)	2,664,510	7,010	2,696,548	0	37,296	(12,518)	2,616,210	7,010	2,647,998
2026	0	37,558	24,308	2,664,510	7,010	2,733,386	0	37,308	24,308	2,616,210	7,010	2,684,836
2027	0	37,471	(17,799)	2,664,510	7,010	2,691,192	0	37,221	(17,799)	2,616,210	7,010	2,642,642
2028	0	37,611	12,291	2,664,510	7,010	2,721,422	0	37,361	12,291	2,616,210	7,010	2,672,872
2029	0	37,538	(9,046)	2,664,510	7,010	2,700,012	0	37,288	(9,046)	2,616,210	7,010	2,651,462
2030	0	37,602	20,756	2,664,510	7,010	2,729,878	0	37,352	20,756	2,616,210	7,010	2,681,328
2031	0	37,474	(97,726)	2,664,510	7,010	2,611,268	0	37,224	(97,726)	2,616,210	7,010	2,562,718
2032	0	37,076	84,999	2,664,510	7,010	2,793,595	0	36,826	84,999	2,616,210	7,010	2,745,045
2033	0	37,281	(94,652)	2,664,510	7,010	2,614,149	0	37,031	(94,652)	2,616,210	7,010	2,565,599
2034	0	36,773	69,593	2,664,510	7,010	2,777,886	0	36,523	69,593	2,616,210	7,010	2,729,336
2035	0	36,113	(242,659)	2,664,510	7,010	2,464,974	0	35,863	(242,659)	2,616,210	7,010	2,416,424

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	Tehachapi Division						Mojave Divsion					
	Edmonston Pumping Plant						Alamo Powerplant					
	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total
	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]	[60]	[61]	[62]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	5,446	8	0	0	0	5,454	0	0	0	0	0	0
1972	100,274	16,067	(6,558)	74,123	6,481	190,387	0	0	0	0	0	0
1973	204,638	34,051	1,329	207,808	1,147	448,973	0	0	0	0	0	0
1974	237,554	18,181	(15,295)	313,634	2,108	556,182	0	0	0	0	0	0
1975	103,352	20,183	(693)	573,219	3,358	699,419	0	0	0	0	0	0
1976	61,122	21,096	(152,171)	685,768	1,581	617,396	0	0	0	0	0	0
1977	0	18,424	(116,219)	236,086	560	138,851	0	0	0	0	0	0
1978	65,027	20,887	121,904	590,329	674	798,821	0	0	0	0	0	0
1979	12,302	46,332	(51,299)	568,338	502	576,175	0	0	0	0	0	0
1980	0	52,967	(134,009)	639,743	1,262	559,963	0	0	0	0	0	0
1981	0	40,602	23,359	938,482	4,112	1,006,555	0	0	0	0	0	0
1982	0	37,244	117,296	812,206	4,045	970,791	0	0	0	0	0	0
1983	0	40,690	(101,155)	431,182	7,291	378,008	0	0	0	0	0	0
1984	0	42,112	(115,214)	556,830	5,244	488,972	0	0	0	0	0	0
1985	0	45,265	139,988	792,477	4,804	982,534	0	0	0	0	0	0
1986	0	36,918	37,546	823,067	3,285	900,816	0	14,735	12,258	429,864	1,508	458,365
1987	0	29,580	(25,522)	851,322	6,937	862,317	0	11,665	(15,270)	417,870	1,239	415,504
1988	0	42,017	(29,747)	1,044,737	4,360	1,061,367	0	21,696	1,101	537,568	971	561,336
1989	0	32,270	(60,826)	1,328,041	7,490	1,306,975	0	4,686	(20,363)	716,360	1,407	702,090
1990	0	42,198	(15,092)	1,579,466	8,879	1,615,451	0	8,898	(5,916)	788,111	1,388	792,481
1991	0	33,999	105,176	441,217	4,560	584,952	0	17,908	34,422	177,308	394	230,032
1992	0	23,121	(92,123)	809,771	1,995	742,764	0	14,873	(17,115)	374,110	423	372,291
1993	0	11,946	(127,738)	759,485	1,676	645,369	0	9,304	(3,455)	308,222	443	314,514
1994	0	40,808	(88,211)	960,815	2,918	916,330	0	21,837	3,395	469,996	430	495,658
1995	0	36,001	(16,431)	542,465	1,669	563,704	0	14,139	(30,761)	384,836	427	368,641
1996	0	37,357	15,438	779,918	2,928	835,641	0	7,247	(11,410)	493,852	565	490,254
1997	0	51,475	40,852	860,798	2,076	955,201	0	20,725	38,960	537,586	507	597,778
1998	0	48,601	(106,487)	607,301	1,585	551,000	0	21,456	16,361	398,385	363	436,565
1999	0	52,726	(2,807)	947,420	3,279	1,000,618	0	26,644	(8,486)	589,756	396	608,310
2000	0	43,072	7,726	1,621,657	4,216	1,676,671	0	8,983	(10,472)	953,531	449	952,491
2001	0	39,544	(18,830)	1,187,452	1,211	1,209,377	0	14,526	3,478	710,137	452	728,593
2002	0	60,037	50,342	1,680,514	3,961	1,794,854	0	15,190	8,398	901,230	490	925,308
2003	0	53,320	(48,181)	1,757,708	10,645	1,773,492	0	13,676	(20,787)	1,022,009	355	1,015,253
2004	0	57,962	3,161	1,970,355	649	2,032,127	0	15,581	17,207	1,120,348	171	1,153,307
2005	0	40,949	(159,678)	1,695,234	559	1,577,064	0	2,561	(50,014)	1,117,983	84	1,070,614
2006	0	38,120	(60,964)	2,105,670	7,010	2,089,836	0	20,809	2,964	1,301,885	1,630	1,327,288
2007	0	38,094	80,035	2,107,941	7,010	2,233,080	0	20,811	(39)	1,210,706	1,630	1,233,108
2008	0	38,743	(3)	1,994,089	7,010	2,039,839	0	21,350	(73)	978,821	1,630	1,001,728
2009	0	35,210	(15,186)	2,017,989	7,010	2,045,023	0	20,905	(9,404)	1,002,721	1,630	1,015,852
2010	0	35,306	4,288	2,017,989	7,010	2,064,593	0	21,001	3,921	1,002,721	1,630	1,029,273
2011	0	35,497	64,678	2,587,077	7,010	2,694,262	0	20,971	26,001	1,450,665	1,630	1,499,267
2012	0	35,387	(67,943)	2,593,100	7,010	2,567,554	0	20,962	(41,797)	1,450,665	1,630	1,431,460
2013	0	35,325	9,749	2,593,100	7,010	2,645,184	0	20,835	4,742	1,450,665	1,630	1,477,872
2014	0	35,633	16,625	2,593,100	7,010	2,652,368	0	21,002	2,759	1,450,665	1,630	1,476,056
2015	0	35,762	32,003	2,593,100	7,010	2,667,875	0	21,066	22,604	1,450,665	1,630	1,495,965
2016	0	35,462	(28,401)	2,593,100	7,010	2,607,171	0	20,829	(21,084)	1,450,665	1,630	1,452,040
2017	0	35,694	61,309	2,593,100	7,010	2,697,113	0	20,895	33,266	1,450,665	1,630	1,506,456
2018	0	35,848	(80,817)	2,593,100	7,010	2,555,141	0	20,998	(50,078)	1,450,665	1,630	1,423,215
2019	0	35,672	50,179	2,593,100	7,010	2,685,961	0	20,924	31,508	1,450,665	1,630	1,504,727
2020	0	35,736	(366)	2,593,100	7,010	2,635,480	0	20,947	(3,398)	1,450,665	1,630	1,469,844
2021	0	35,819	10,725	2,593,100	7,010	2,646,654	0	20,946	(1,117)	1,450,665	1,630	1,472,124
2022	0	35,813	(3,483)	2,593,100	7,010	2,632,440	0	20,940	(3,434)	1,450,665	1,630	1,469,801
2023	0	35,804	(18,971)	2,593,100	7,010	2,616,943	0	20,939	(18,638)	1,450,665	1,630	1,454,596
2024	0	35,683	11,289	2,593,100	7,010	2,647,082	0	20,881	21,309	1,450,665	1,630	1,494,485
2025	0	35,746	(12,518)	2,593,100	7,010	2,623,338	0	20,965	(11,624)	1,450,665	1,630	1,461,636
2026	0	35,758	24,308	2,593,100	7,010	2,660,176	0	20,930	13,030	1,450,665	1,630	1,486,255
2027	0	35,671	(17,799)	2,593,100	7,010	2,617,982	0	20,861	(6,161)	1,450,665	1,630	1,466,995
2028	0	35,811	12,291	2,593,100	7,010	2,648,212	0	20,961	4,006	1,450,665	1,630	1,477,262
2029	0	35,738	(9,046)	2,593,100	7,010	2,626,802	0	20,955	(913)	1,450,665	1,630	1,472,337
2030	0	35,802	20,756	2,593,100	7,010	2,656,668	0	20,930	8,528	1,450,665	1,630	1,481,753
2031	0	35,674	(97,726)	2,593,100	7,010	2,538,058	0	20,956	(31,057)	1,450,665	1,630	1,442,194
2032	0	35,276	84,999	2,593,100	7,010	2,720,385	0	20,865	43,953	1,450,665	1,630	1,517,113
2033	0	35,481	(94,652)	2,593,100	7,010	2,540,939	0	20,854	(37,929)	1,450,665	1,630	1,435,220
2034	0	34,973	69,593	2,593,100	7,010	2,704,676	0	20,769	28,588	1,450,665	1,630	1,501,652
2035	0	34,313	(242,659)	2,593,100	7,010	2,391,764	0	20,892	(49,219)	1,450,665	1,630	1,423,968

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	Mojave Division (continued)											
	Pearblossom Pumping Plant						Mojave Siphon Powerplant					
	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total
	[63]	[64]	[65]	[66]	[67]	[68]	[69]	[70]	[71]	[72]	[73]	[74]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	21	0	0	0	0	21	0	0	0	0	0	0
1972	35,243	5,282	(153)	1,794	0	42,166	0	0	0	0	0	0
1973	80,177	21,522	(2,700)	52,201	72	151,272	0	0	0	0	0	0
1974	76,694	10,847	(11,149)	102,839	44	179,275	0	0	0	0	0	0
1975	10,000	2,364	(8,397)	190,351	70	194,388	0	0	0	0	0	0
1976	4,168	7,040	(16,055)	236,713	152	232,018	0	0	0	0	0	0
1977	0	11,398	(17,534)	102,326	580	96,770	0	0	0	0	0	0
1978	19,922	5,696	69,130	374,845	498	470,091	0	0	0	0	0	0
1979	12,302	6,836	(32,518)	362,114	502	349,236	0	0	0	0	0	0
1980	0	16,200	6,159	401,214	781	424,354	0	0	0	0	0	0
1981	0	4,992	(36,278)	574,573	933	544,220	0	0	0	0	0	0
1982	0	5,251	55,232	401,037	1,919	463,439	0	0	0	0	0	0
1983	0	11,745	(26,847)	231,188	1,180	217,266	0	0	0	0	0	0
1984	0	18,228	23,230	252,066	1,494	295,018	0	0	0	0	0	0
1985	0	25,292	(2,815)	350,758	1,076	374,311	0	0	0	0	0	0
1986	0	30,876	12,258	394,156	1,508	438,798	0	0	0	0	0	0
1987	0	27,552	(15,270)	377,531	1,239	391,052	0	0	0	0	0	0
1988	0	32,209	1,101	501,300	971	535,581	0	1,977	1,101	501,291	971	505,340
1989	0	31,500	(20,363)	661,189	1,407	673,733	0	29,110	(20,363)	661,100	1,407	671,254
1990	0	32,672	(5,916)	730,560	1,388	758,704	0	23,692	(5,916)	730,550	1,388	749,714
1991	0	15,209	34,774	163,913	394	214,290	0	(543)	34,774	163,913	394	198,538
1992	0	13,989	(17,451)	338,249	423	335,210	0	(13,193)	(17,451)	338,207	423	307,986
1993	0	9,779	(3,455)	255,117	443	261,884	0	(11,922)	(3,455)	255,117	443	240,183
1994	0	150	3,395	409,928	430	413,903	0	1,601	3,395	395,294	430	400,720
1995	0	6,820	(29,282)	328,882	427	306,847	0	10,458	(29,282)	321,387	427	302,990
1996	0	9,514	(11,410)	424,252	565	422,921	0	(5,577)	(11,410)	418,141	565	401,719
1997	0	(1,124)	38,960	461,563	507	499,906	0	5,171	38,960	452,525	507	497,163
1998	0	(2,087)	16,361	334,965	363	349,602	0	11,496	16,361	332,385	363	360,605
1999	0	(1,154)	(8,486)	505,624	396	496,380	0	11,065	(8,486)	498,919	396	501,894
2000	0	(23,296)	(10,472)	859,533	449	826,214	0	4,896	(10,472)	849,514	449	844,387
2001	0	(9,304)	3,478	635,468	452	630,094	0	7,403	3,478	632,420	452	643,753
2002	0	3,810	8,398	823,690	490	836,388	0	9,300	8,398	820,217	490	838,405
2003	0	2,814	(20,787)	949,148	355	931,530	0	(6,586)	(20,787)	935,998	355	908,980
2004	0	(15,558)	17,207	1,047,485	171	1,049,305	0	5,034	17,207	1,035,279	171	1,057,691
2005	0	(18,967)	(50,014)	1,045,389	84	976,492	0	827	(50,014)	1,027,278	84	978,175
2006	0	15,459	2,964	1,206,994	1,430	1,226,847	0	11,989	2,964	1,168,922	1,430	1,185,305
2007	0	15,461	(39)	1,132,475	1,430	1,149,327	0	11,991	(39)	1,115,255	1,430	1,128,637
2008	0	16,000	(73)	828,026	1,430	845,383	0	12,530	(73)	763,041	1,430	776,928
2009	0	15,555	(9,404)	837,064	1,430	844,645	0	12,085	(9,404)	762,921	1,430	767,032
2010	0	15,651	3,921	837,486	1,430	858,488	0	12,181	3,921	762,921	1,430	780,453
2011	0	15,621	26,001	1,284,165	1,430	1,327,217	0	12,151	26,001	1,209,865	1,430	1,249,447
2012	0	15,612	(41,797)	1,284,165	1,430	1,259,410	0	12,142	(41,797)	1,209,865	1,430	1,181,640
2013	0	15,485	4,742	1,284,165	1,430	1,305,822	0	12,015	4,742	1,209,865	1,430	1,228,052
2014	0	15,652	2,759	1,284,165	1,430	1,304,006	0	12,182	2,759	1,209,865	1,430	1,226,236
2015	0	15,716	22,604	1,284,165	1,430	1,323,915	0	12,246	22,604	1,209,865	1,430	1,246,145
2016	0	15,479	(21,084)	1,284,165	1,430	1,279,990	0	12,009	(21,084)	1,209,865	1,430	1,202,220
2017	0	15,545	33,266	1,284,165	1,430	1,334,406	0	12,075	33,266	1,209,865	1,430	1,256,636
2018	0	15,648	(50,078)	1,284,165	1,430	1,251,165	0	12,178	(50,078)	1,209,865	1,430	1,173,395
2019	0	15,574	31,508	1,284,165	1,430	1,332,677	0	12,104	31,508	1,209,865	1,430	1,254,907
2020	0	15,597	(3,398)	1,284,165	1,430	1,297,794	0	12,127	(3,398)	1,209,865	1,430	1,220,024
2021	0	15,596	(1,117)	1,284,165	1,430	1,300,074	0	12,126	(1,117)	1,209,865	1,430	1,222,304
2022	0	15,590	(3,434)	1,284,165	1,430	1,297,751	0	12,120	(3,434)	1,209,865	1,430	1,219,981
2023	0	15,589	(18,638)	1,284,165	1,430	1,282,546	0	12,119	(18,638)	1,209,865	1,430	1,204,776
2024	0	15,531	21,309	1,284,165	1,430	1,322,435	0	12,061	21,309	1,209,865	1,430	1,244,665
2025	0	15,615	(11,624)	1,284,165	1,430	1,289,586	0	12,145	(11,624)	1,209,865	1,430	1,211,816
2026	0	15,580	13,030	1,284,165	1,430	1,314,205	0	12,110	13,030	1,209,865	1,430	1,236,435
2027	0	15,511	(6,161)	1,284,165	1,430	1,294,945	0	12,041	(6,161)	1,209,865	1,430	1,217,175
2028	0	15,611	4,006	1,284,165	1,430	1,305,212	0	12,141	4,006	1,209,865	1,430	1,227,442
2029	0	15,605	(913)	1,284,165	1,430	1,300,287	0	12,135	(913)	1,209,865	1,430	1,222,517
2030	0	15,580	8,528	1,284,165	1,430	1,309,703	0	12,110	8,528	1,209,865	1,430	1,231,933
2031	0	15,606	(31,057)	1,284,165	1,430	1,270,144	0	12,136	(31,057)	1,209,865	1,430	1,192,374
2032	0	15,515	43,953	1,284,165	1,430	1,345,063	0	12,045	43,953	1,209,865	1,430	1,267,293
2033	0	15,504	(37,929)	1,284,165	1,430	1,263,170	0	12,034	(37,929)	1,209,865	1,430	1,185,400
2034	0	15,419	28,588	1,284,165	1,430	1,329,602	0	11,949	28,588	1,209,865	1,430	1,251,832
2035	0	15,542	(49,219)	1,284,165	1,430	1,251,918	0	12,072	(49,219)	1,209,865	1,430	1,174,148

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	Santa Ana Division						West Branch, California Aqueduct					
	Devil Canyon Powerplant						Oso Pumping Plant					
	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total
	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]	[83]	[84]	[85]	[86]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	2,444	133	0	0	0	2,577
1972	37	0	0	1,275	0	1,312	63,883	6,557	(6,405)	71,991	6,481	142,507
1973	40,848	14,745	0	51,812	0	107,405	124,461	16,995	4,029	155,317	1,075	301,877
1974	74,666	8,367	(4,925)	102,198	0	180,306	160,860	12,702	(4,146)	209,172	2,064	380,652
1975	10,000	1,995	(6,719)	189,526	0	194,802	93,352	23,008	7,704	374,306	3,288	501,658
1976	4,168	5,180	(9,182)	235,711	23	235,900	56,954	15,845	(136,116)	420,708	1,429	358,820
1977	0	8,082	(5,235)	101,137	469	104,453	0	4,407	(98,685)	122,447	(20)	28,149
1978	14,820	3,754	21,686	373,636	481	414,377	45,105	9,061	52,774	171,139	176	278,255
1979	12,302	5,620	(27,107)	356,854	485	348,154	0	25,355	(18,781)	145,598	0	152,172
1980	0	9,468	12,714	395,975	742	418,899	0	24,576	(140,168)	165,931	481	50,820
1981	0	8,401	(23,448)	569,088	807	554,848	0	15,254	59,637	283,264	3,179	361,334
1982	0	6,012	44,469	399,799	1,798	452,078	0	23,824	61,685	360,878	2,126	448,513
1983	0	8,597	5,188	230,277	1,078	245,140	0	23,601	(74,308)	166,995	6,111	122,399
1984	0	12,861	(850)	250,938	1,414	264,363	0	12,461	(138,146)	272,101	3,750	150,166
1985	0	14,325	(8,791)	349,336	956	355,826	0	28,257	142,219	403,097	3,728	577,301
1986	0	9,486	8,339	392,650	1,378	411,853	0	22,387	25,288	393,203	1,777	442,655
1987	0	7,923	(11,335)	375,451	1,118	373,157	0	18,164	(10,252)	433,452	5,698	447,062
1988	0	11,090	2,238	499,285	861	513,474	0	20,461	(30,848)	507,169	3,389	500,171
1989	0	13,116	(5,487)	658,730	1,301	667,660	0	27,914	(40,463)	611,681	6,083	605,215
1990	0	13,439	(4,622)	728,723	1,281	738,821	0	33,666	(9,176)	791,355	7,491	823,336
1991	0	10,836	18,308	161,032	340	190,516	0	16,460	70,754	263,909	4,166	355,289
1992	0	9,157	(9,084)	328,354	371	328,798	0	8,238	(75,008)	435,661	1,572	370,463
1993	0	5,602	5,593	244,678	364	256,237	0	2,674	(124,283)	451,263	1,233	330,887
1994	0	10,915	(11,045)	393,690	357	393,917	0	18,688	(91,606)	490,819	2,488	420,389
1995	0	11,268	2,331	320,978	358	334,935	0	21,775	14,330	157,629	1,242	194,976
1996	0	9,496	13,015	417,656	494	440,661	0	30,121	26,848	286,066	2,363	345,398
1997	0	8,087	(19,685)	451,874	416	440,692	0	30,468	1,892	323,212	1,569	357,141
1998	0	6,700	16,643	332,198	310	355,851	0	26,851	(122,848)	208,916	1,222	114,141
1999	0	9,784	(4,177)	497,787	341	503,735	0	25,690	5,679	357,664	2,883	391,916
2000	0	7,407	(11,040)	848,320	375	845,062	0	33,658	18,198	668,126	3,767	723,749
2001	0	9,324	8,183	631,363	374	649,244	0	24,551	(22,308)	477,315	759	480,317
2002	0	10,315	9,682	818,028	413	838,438	0	44,692	41,944	779,284	3,471	869,391
2003	0	9,198	(18,298)	917,186	260	908,346	0	39,495	(27,394)	735,699	10,290	758,090
2004	0	11,166	15,150	1,033,273	85	1,059,674	0	41,947	(14,046)	850,007	478	878,386
2005	0	4,500	(63,441)	1,012,674	0	953,733	0	37,432	(109,664)	577,251	475	505,494
2006	0	7,806	3,964	1,166,022	1,250	1,179,042	0	17,261	(63,928)	803,785	5,380	762,498
2007	0	7,809	(39)	1,111,915	1,250	1,120,935	0	17,233	80,074	897,235	5,380	999,922
2008	0	8,348	(73)	757,121	1,250	766,646	0	17,343	70	1,015,268	5,380	1,038,061
2009	0	8,508	3,506	757,121	1,250	770,385	0	14,255	(5,782)	1,015,268	5,380	1,029,121
2010	0	8,504	10,523	757,121	1,250	777,398	0	14,255	367	1,015,268	5,380	1,035,270
2011	0	8,519	1,352	1,204,065	1,250	1,215,186	0	14,476	38,677	1,136,412	5,380	1,194,945
2012	0	8,482	(22,894)	1,204,065	1,250	1,190,903	0	14,375	(26,146)	1,142,435	5,380	1,136,044
2013	0	8,499	16,733	1,204,065	1,250	1,230,547	0	14,440	5,007	1,142,435	5,380	1,167,262
2014	0	8,522	(4,585)	1,204,065	1,250	1,209,252	0	14,581	13,866	1,142,435	5,380	1,176,262
2015	0	8,499	2,964	1,204,065	1,250	1,216,778	0	14,646	9,399	1,142,435	5,380	1,171,860
2016	0	8,483	(1,269)	1,204,065	1,250	1,212,529	0	14,583	(7,317)	1,142,435	5,380	1,155,081
2017	0	8,502	9,828	1,204,065	1,250	1,223,645	0	14,749	28,043	1,142,435	5,380	1,190,607
2018	0	8,484	(19,777)	1,204,065	1,250	1,194,022	0	14,800	(30,739)	1,142,435	5,380	1,131,876
2019	0	8,492	17,408	1,204,065	1,250	1,231,215	0	14,698	18,671	1,142,435	5,380	1,181,184
2020	0	8,483	(17,305)	1,204,065	1,250	1,196,493	0	14,739	3,032	1,142,435	5,380	1,165,586
2021	0	8,486	(398)	1,204,065	1,250	1,213,403	0	14,823	11,842	1,142,435	5,380	1,174,480
2022	0	8,486	13,735	1,204,065	1,250	1,227,536	0	14,823	(49)	1,142,435	5,380	1,162,589
2023	0	8,482	(8,417)	1,204,065	1,250	1,205,380	0	14,815	(333)	1,142,435	5,380	1,162,297
2024	0	8,462	689	1,204,065	1,250	1,214,466	0	14,752	(10,020)	1,142,435	5,380	1,152,547
2025	0	8,489	4,591	1,204,065	1,250	1,218,395	0	14,731	(894)	1,142,435	5,380	1,161,652
2026	0	8,475	(3,819)	1,204,065	1,250	1,209,971	0	14,778	11,278	1,142,435	5,380	1,173,871
2027	0	8,479	745	1,204,065	1,250	1,214,539	0	14,760	(11,638)	1,142,435	5,380	1,150,937
2028	0	8,481	(5,355)	1,204,065	1,250	1,208,441	0	14,800	8,285	1,142,435	5,380	1,170,900
2029	0	8,481	2,909	1,204,065	1,250	1,216,705	0	14,733	(8,133)	1,142,435	5,380	1,154,415
2030	0	8,480	296	1,204,065	1,250	1,214,091	0	14,822	12,228	1,142,435	5,380	1,174,865
2031	0	8,475	(1,976)	1,204,065	1,250	1,211,814	0	14,668	(66,669)	1,142,435	5,380	1,095,814
2032	0	8,449	18,821	1,204,065	1,250	1,232,585	0	14,361	41,046	1,142,435	5,380	1,203,222
2033	0	8,449	(23,419)	1,204,065	1,250	1,190,345	0	14,577	(56,723)	1,142,435	5,380	1,105,669
2034	0	8,443	21,651	1,204,065	1,250	1,235,409	0	14,154	41,005	1,142,435	5,380	1,202,974
2035	0	8,451	(31,434)	1,204,065	1,250	1,182,332	0	13,371	(193,440)	1,142,435	5,380	967,746

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (contiued)											
	West Branch, California Aqueduct (continued)											
	Warne Powerplant						Castaic Powerplant					
	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total	Initial Fill Water	Opera-tional Losses	Reservoir Storage Changes	Deliveries: Water Supply	Deliveries: Recrea-tion	Total
	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]	[95]	[96]	[97]	[98]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	57,364	1,788	(6,162)	71,938	6,481	131,409
1973	0	0	0	0	0	0	37,198	6,430	4,542	155,297	1,075	204,542
1974	0	0	0	0	0	0	82,364	1,772	(950)	209,136	541	292,863
1975	0	0	0	0	0	0	90,460	5,002	(1,534)	374,280	1,563	469,771
1976	0	0	0	0	0	0	55,990	(7,695)	(132,036)	420,684	1,429	338,372
1977	0	0	0	0	0	0	0	(1,485)	(102,532)	122,447	(20)	18,410
1978	0	0	0	0	0	0	45,105	(2,264)	129,523	171,139	176	343,679
1979	0	0	0	0	0	0	0	(2,339)	(20,400)	145,598	0	122,859
1980	0	0	0	0	0	0	0	991	(118,026)	165,931	481	49,377
1981	0	0	0	0	0	0	0	(44,416)	47,244	283,264	2,704	288,796
1982	0	24,468	61,169	360,878	2,126	448,641	0	(60,135)	59,069	360,878	1,187	360,999
1983	0	20,780	(74,308)	166,995	6,111	119,578	0	(33,418)	(46,904)	166,995	2,618	89,291
1984	0	13,572	(139,219)	275,212	2,208	151,773	0	(29,618)	(139,545)	275,212	2,201	108,250
1985	0	29,286	141,492	403,097	874	574,749	0	(4,622)	135,007	403,097	844	534,326
1986	0	21,579	25,288	393,203	1,777	441,847	0	(6,664)	21,520	393,203	623	408,682
1987	0	20,885	(10,252)	433,452	5,698	449,783	0	(519)	(6,241)	433,452	2,734	429,426
1988	0	23,253	(31,453)	507,169	3,389	502,358	0	12,650	(28,498)	507,169	1,359	492,680
1989	0	27,131	(40,463)	611,681	6,083	604,432	0	634	(40,154)	611,681	3,161	575,322
1990	0	34,208	(9,176)	791,355	7,491	823,878	0	(14,012)	(15,101)	786,519	3,419	760,825
1991	0	16,908	70,754	263,909	4,166	355,737	0	(871)	89,637	262,921	2,283	353,970
1992	0	9,638	(75,008)	435,661	1,572	371,863	0	(609)	(71,795)	435,661	1,543	364,800
1993	0	1,922	(124,283)	451,257	1,233	330,129	0	21,959	(77,428)	451,257	1,211	396,999
1994	0	23,151	(91,606)	490,819	2,488	424,852	0	5,205	(95,738)	490,819	2,465	402,751
1995	0	15,860	14,330	157,629	1,242	189,061	0	20,400	75,863	157,629	1,223	255,115
1996	0	21,191	26,848	286,066	2,363	336,468	0	(5,621)	19,088	286,066	2,362	301,895
1997	0	23,437	1,892	323,201	1,569	350,099	0	11,119	(1,802)	323,201	1,566	334,084
1998	0	26,864	(122,848)	208,909	1,222	114,147	0	24,544	(57,726)	208,909	1,222	176,949
1999	0	21,822	8,120	357,664	2,883	390,489	0	(3,670)	6,280	357,664	2,865	363,139
2000	0	27,237	18,198	668,126	3,767	717,328	0	(19,645)	9,320	665,926	1,556	657,157
2001	0	17,404	(22,308)	477,315	759	473,170	0	(5,949)	(16,588)	477,315	746	455,524
2002	0	35,058	41,944	779,284	3,471	859,757	0	10,071	35,623	776,136	305	822,135
2003	0	28,167	(27,394)	735,699	10,290	746,762	0	9,075	(17,034)	732,549	356	724,946
2004	0	31,034	(14,046)	850,007	478	867,473	0	9,120	(11,440)	845,960	456	844,096
2005	0	29,111	(109,664)	577,251	475	497,173	0	21,155	(61,490)	577,251	472	537,388
2006	0	15,351	(63,928)	803,785	5,380	760,588	0	9,626	(63,928)	803,785	2,330	751,813
2007	0	15,323	80,074	897,235	5,380	998,012	0	9,598	80,074	894,085	2,330	986,087
2008	0	15,433	70	1,015,268	5,380	1,036,151	0	9,708	70	1,012,118	2,330	1,024,226
2009	0	12,345	(5,782)	1,015,268	5,380	1,027,211	0	6,060	(5,782)	1,012,118	2,330	1,014,726
2010	0	12,345	367	1,015,268	5,380	1,033,360	0	6,060	367	1,012,118	2,330	1,020,875
2011	0	12,566	38,677	1,136,412	5,380	1,193,035	0	6,281	38,677	1,133,262	2,330	1,180,550
2012	0	12,465	(26,146)	1,142,435	5,380	1,134,134	0	6,180	(26,146)	1,139,285	2,330	1,121,649
2013	0	12,530	5,007	1,142,435	5,380	1,165,352	0	6,245	5,007	1,139,285	2,330	1,152,867
2014	0	12,671	13,866	1,142,435	5,380	1,174,352	0	6,386	13,866	1,139,285	2,330	1,161,867
2015	0	12,736	9,399	1,142,435	5,380	1,169,950	0	6,451	9,399	1,139,285	2,330	1,157,465
2016	0	12,673	(7,317)	1,142,435	5,380	1,153,171	0	6,388	(7,317)	1,139,285	2,330	1,140,686
2017	0	12,839	28,043	1,142,435	5,380	1,188,697	0	6,554	28,043	1,139,285	2,330	1,176,212
2018	0	12,890	(30,739)	1,142,435	5,380	1,129,966	0	6,605	(30,739)	1,139,285	2,330	1,117,481
2019	0	12,788	18,671	1,142,435	5,380	1,179,274	0	6,503	18,671	1,139,285	2,330	1,166,789
2020	0	12,829	3,032	1,142,435	5,380	1,163,676	0	6,544	3,032	1,139,285	2,330	1,151,191
2021	0	12,913	11,842	1,142,435	5,380	1,172,570	0	6,628	11,842	1,139,285	2,330	1,160,085
2022	0	12,913	(49)	1,142,435	5,380	1,160,679	0	6,628	(49)	1,139,285	2,330	1,148,194
2023	0	12,905	(333)	1,142,435	5,380	1,160,387	0	6,620	(333)	1,139,285	2,330	1,147,902
2024	0	12,842	(10,020)	1,142,435	5,380	1,150,637	0	6,557	(10,020)	1,139,285	2,330	1,138,152
2025	0	12,821	(894)	1,142,435	5,380	1,159,742	0	6,536	(894)	1,139,285	2,330	1,147,257
2026	0	12,868	11,278	1,142,435	5,380	1,171,961	0	6,583	11,278	1,139,285	2,330	1,159,476
2027	0	12,850	(11,638)	1,142,435	5,380	1,149,027	0	6,565	(11,638)	1,139,285	2,330	1,136,542
2028	0	12,890	8,285	1,142,435	5,380	1,168,990	0	6,605	8,285	1,139,285	2,330	1,156,505
2029	0	12,823	(8,133)	1,142,435	5,380	1,152,505	0	6,538	(8,133)	1,139,285	2,330	1,140,020
2030	0	12,912	12,228	1,142,435	5,380	1,172,955	0	6,627	12,228	1,139,285	2,330	1,160,470
2031	0	12,758	(66,669)	1,142,435	5,380	1,093,904	0	6,473	(66,669)	1,139,285	2,330	1,081,419
2032	0	12,451	41,046	1,142,435	5,380	1,201,312	0	6,166	41,046	1,139,285	2,330	1,188,827
2033	0	12,667	(56,723)	1,142,435	5,380	1,103,759	0	6,382	(56,723)	1,139,285	2,330	1,091,274
2034	0	12,244	41,005	1,142,435	5,380	1,201,064	0	5,959	41,005	1,139,285	2,330	1,188,579
2035	0	11,461	(193,440)	1,142,435	5,380	965,836	0	5,176	(193,440)	1,139,285	2,330	953,351

TABLE B-6. Annual Water Quantities Conveyed Through Each Pumping and Power Recovery Plant of Project Transportation Facilities

(in acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Coastal Branch, California Aqueduct							
	Las Perillas and Badger Hill Pumping Plants				Devil's Den, Bluestone, and Polonio Pass Pumping Plants			
	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
	[99]	[100]	[101]	[102]	[103]	[104]	[105]	[106]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	210	873	79,039	80,122	0	0	0	0
1969	0	1,042	62,064	63,106	0	0	0	0
1970	0	638	83,649	84,287	0	0	0	0
1971	0	3,455	110,971	114,426	0	0	0	0
1972	0	1,745	121,755	123,500	0	0	0	0
1973	0	5,479	78,645	84,124	0	0	0	0
1974	0	7,344	78,174	85,518	0	0	0	0
1975	0	5,819	85,216	91,035	0	0	0	0
1976	0	6,562	90,058	96,620	0	0	0	0
1977	0	5,777	40,579	46,356	0	0	0	0
1978	0	9,085	92,604	101,689	0	0	0	0
1979	0	10,896	123,155	134,051	0	0	0	0
1980	0	9,449	111,379	120,828	0	0	0	0
1981	0	13,232	109,754	122,986	0	0	0	0
1982	0	7,984	95,776	103,760	0	0	0	0
1983	0	5,710	100,518	106,228	0	0	0	0
1984	0	5,740	126,387	132,127	0	0	0	0
1985	0	7,563	120,823	128,386	0	0	0	0
1986	0	8,719	131,599	140,318	0	0	0	0
1987	0	11,363	128,080	139,443	0	0	0	0
1988	0	12,831	120,969	133,800	0	0	0	0
1989	0	11,454	116,801	128,255	0	0	0	0
1990	0	13,022	109,802	122,824	0	0	0	0
1991	0	5,802	1,496	7,298	0	0	0	0
1992	0	7,893	79,635	87,528	0	0	0	0
1993	0	9,282	94,921	104,203	0	0	0	0
1994	0	8,515	87,158	95,673	0	0	0	0
1995	0	6,986	94,536	101,522	0	0	0	0
1996	0	9,663	114,630	124,293	0	0	0	0
1997	527	8,343	110,428	119,298	527	0	8,538	9,065
1998	0	8,415	109,400	117,815	0	0	22,210	22,210
1999	0	2,453	120,061	122,514	0	303	23,880	24,183
2000	0	(429)	122,652	122,223	0	0	26,703	26,703
2001	0	(742)	87,915	87,173	0	0	23,229	23,229
2002	0	638	99,783	100,421	0	(151)	31,991	31,840
2003	0	161	101,113	101,274	0	284	31,421	31,705
2004	0	492	104,144	104,636	0	480	33,870	34,350
2005	0	1,484	103,178	104,662	0	573	27,595	28,168
2006	0	802	144,357	145,159	0	212	60,192	60,404
2007	0	802	147,244	148,046	0	212	50,310	50,522
2008	0	802	167,420	168,222	0	212	70,486	70,698
2009	0	802	167,420	168,222	0	212	70,486	70,698
2010	0	802	167,420	168,222	0	212	70,486	70,698
2011	0	802	167,443	168,245	0	212	70,486	70,698
2012	0	802	161,420	162,222	0	212	70,486	70,698
2013	0	802	161,420	162,222	0	212	70,486	70,698
2014	0	802	161,420	162,222	0	212	70,486	70,698
2015	0	802	161,420	162,222	0	212	70,486	70,698
2016	0	802	161,420	162,222	0	212	70,486	70,698
2017	0	802	161,420	162,222	0	212	70,486	70,698
2018	0	802	161,420	162,222	0	212	70,486	70,698
2019	0	802	161,420	162,222	0	212	70,486	70,698
2020	0	802	161,420	162,222	0	212	70,486	70,698
2021	0	802	161,420	162,222	0	212	70,486	70,698
2022	0	802	161,420	162,222	0	212	70,486	70,698
2023	0	802	161,420	162,222	0	212	70,486	70,698
2024	0	802	161,420	162,222	0	212	70,486	70,698
2025	0	802	161,420	162,222	0	212	70,486	70,698
2026	0	802	161,420	162,222	0	212	70,486	70,698
2027	0	802	161,420	162,222	0	212	70,486	70,698
2028	0	802	161,420	162,222	0	212	70,486	70,698
2029	0	802	161,420	162,222	0	212	70,486	70,698
2030	0	802	161,420	162,222	0	212	70,486	70,698
2031	0	802	161,420	162,222	0	212	70,486	70,698
2032	0	802	161,420	162,222	0	212	70,486	70,698
2033	0	802	161,420	162,222	0	212	70,486	70,698
2034	0	802	161,420	162,222	0	212	70,486	70,698
2035	0	802	161,420	162,222	0	212	70,486	70,698

Tables B–7 through B–31 Follow

TABLE B-7. Reconciliation of Capital Costs Allocated to Water Supply and Power Generation

(in thousands of dollars)

Item	Project Costs Allocated to Water Supply and Power Generation							Capital Costs Allocated to Other Purposes	Total State Water Project Capital Cost
	Misc. Income Credited to Construction a	Allowance for Future Price Escalation b	Costs of Construc-tion of Delivery Structures c	Costs of Requested Excess Capacity and Future Enlargement d	Capital Cost Component of Delta Water Charge e	Capital Cost Component of Trans-portation Water Charge f	Water Supply and Power Total		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
CONSERVATION FACILITIES									
Upper Feather Division									
Frenchman Dam and Lake	180	0	0	0	599	0	779	2,888	3,667
Grizzly Valley Dam and Lake Davis	65	0	0	0	39	0	104	7,378	7,482
Antelope Dam and Lake	1	0	0	0	0	0	1	5,534	5,535
Abbey Bridge Dam and Reservoir	0	0	0	0	0	0	0	519	519
Dixie Refuge Dam and Reservoir	0	0	0	0	0	0	0	236	236
Total, Upper Feather Division	246	0	0	0	638	0	884	16,555	17,439
Oroville Division									
Multipurpose Facilities	3,152	0	0	0	366,418	0	369,570	86,922	456,492
Specific Power Facilities	29,463	0	0	0	101,274	0	130,737	6,558	137,295
Total, Oroville Division	32,615	0	0	0	467,692	0	500,307	93,480	593,787
California Aqueduct									
North San Joaquin Division	1,210	0	0	0	79,995	0	81,205	2,880	84,085
San Luis Division	13,152	0	0	0	104,953	0	118,105	3,827	121,932
Total, California Aqueduct	14,362	0	0	0	184,948	0	199,310	6,707	206,017
Delta Facilities	37,311	0	0	0	286,347	0	323,658	42,268	365,926
Planning and Pre-operation	5,302	0	0	0	72,731	0	78,033	0	78,033
TOTAL, CONSERVATION FACILITIES	89,836	0	0	0	1,012,356	0	1,102,192	159,010	1,261,202
TRANSPORTATION FACILITIES									
Upper Feather Division									
Grizzly Valley Pipeline	305	0	190	0	0	342	837	0	837
North Bay Aqueduct	150	0	676	0	0	104,619	105,445	0	105,445
South Bay Aqueduct	107,766	0	1,768	0	0	112,386	221,920	21,466	243,386
California Aqueduct									
North San Joaquin Division	(46,894)	0	81	0	0	188,009	141,196	6,417	147,613
San Luis Division	8,187	0	0	0	0	133,799	141,986	6,513	148,499
South San Joaquin Division	(23,154)	0	3,733	2,093	0	293,172	275,844	17,329	293,173
Tehachapi Division	(4,955)	0	0	5,230	0	319,247	319,522	18,290	337,812
Mojave Division	(38,754)	0	813	0	0	305,858	267,917	37,941	305,858
Santa Ana Division	(1,966)	0	6,022	5,331	0	267,922	277,309	31,396	308,705
West Branch	(57,451)	0	455	37	0	502,107	445,148	31,326	476,474
Coastal Branch	(182)	0	181	0	0	494,908	494,907	0	494,907
Total, California Aqueduct	(165,169)	0	11,285	12,691	0	2,505,022	2,363,829	149,212	2,513,041
TOTAL, TRANSPORTATION FACILITIES	(56,948)	0	13,919	12,691	0	2,722,369	2,692,031	170,678	2,862,709
EAST BRANCH ENLARGEMENT	0	0	0	0	0	909,230	909,230	0	909,230
EAST BRANCH EXTENSION	0	0	0	0	0	306,403	306,403	0	306,403
COASTAL POWER ALLOCATION	0	0	0	0	0	30,708	30,708	0	30,708
SAN JOAQUIN DRAINAGE FACILITIES	0	0	0	0	0	0	0	117,320	117,320
OFF-AOUEDUCT POWER GENERATION FACILITIES	0	0	0	0	0	485,913	485,913	.	485,913
SMALL HYDRO POWER GENERATION FACILITIES	0	0	0	0	14,095	83,273	97,368	0	97,368
LAND PURCHASE - KERN WATER BANK	0	0	0	0	34,686	0	34,686	0	34,686
UNASSIGNED/MISCELLANEOUS	0	0	0	0	0	0	0	152,339	152,339
DAVIS- GRUNSKY	0	0	0	0	0	0	0	130,000	130,000
Subtotal	0	0	0	0	48,781	1,815,527	1,864,308	399,659	2,263,967
TOTAL THROUGH 2015	32,888	0	13,919	12,691	1,061,137	4,537,896	5,658,531	729,347	6,387,878

a) Miscellaneous project receipts that are applied for accounting purposes to reduce the capital costs of the particular facilities.
b) These allowances are included for planning the future financial program, but not for determining current water charges.
c) See Table B-8.
d) See Table B-9.
e) See Table B-13.
f) See Table B-10. Mojave Division total reduced by $83,273,000 for costs included in "Small Hydro Power Generation Facilities" line

TABLE B-8. SWP Capital Costs of Requested Delivery Structures

(in dollars)

Project Service Area and Water Supply Contractor	Calendar Year Capital Costs [a]						
	1952-2003	2004	2005	2006	2007	2008	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
FEATHER RIVER AREA							
County of Butte	136,546	0	0	0	0	0	136,546
Plumas County Flood Control and Water Conservation District	645	0	0	8,000	1,000	0	9,645
Thermalito Irrigation District [b]	43,939	0	0	0	0	0	43,939
Subtotal	181,130	0	0	8,000	1,000	0	190,130
NORTH BAY AREA							
Napa County Flood Control and Water Conservation District	13,590	0	0	0	0	0	13,590
Solano County Water Agency	662,113	0	0	0	0	0	662,113
Subtotal	675,703	0	0	0	0	0	675,703
SOUTH BAY AREA							
Alameda County Flood Control and Water Conservation District, Zone 7	378,023	6,142	11,515	34,800	10,000	0	440,480
Alameda County Water District	239,579	0	0	0	0	0	239,579
Santa Clara Valley Water District	21,500	0	0	0	0	0	21,500
San Francisco Water Department [b]	1,066,680	0	0	0	0	0	1,066,680
Subtotal	1,705,782	6,142	11,515	34,800	10,000	0	1,768,239
CENTRAL COASTAL AREA							
San Luis Obispo County Flood Control and Water Conservation District	26,204	0	0	0	0	0	26,204
Santa Barbara County Flood Control and Water Conservation District	67,058	0	0	0	0	0	67,058
Subtotal	93,262	0	0	0	0	0	93,262
SAN JOAQUIN VALLEY AREA							
Castaic Lake Water Agency	82,567	0	0	0	0	0	82,567
Dudley Ridge Water District	304,541	0	0	0	0	0	304,541
Empire West Side Irrigation District	6,358	0	0	0	0	0	6,358
Green Valley Water District [c]	5,292	0	0	0	0	0	5,292
Kern County Water Agency	3,017,846	12,082	30,054	59,950	25,000	0	3,144,932
Oak Flat Water District	46,882	0	0	18,400	5,000	0	70,282
Tracy Golf and Country Club [c]	6,932	0	0	0	0	0	6,932
Tulare Lake Basin Water Storage District	277,483	0	0	0	0	0	277,483
Veterans Administration Cemetery (b	3,342	0	0	0	0	0	3,342
Subtotal	3,751,243	12,082	30,054	78,350	30,000	0	3,901,729
SOUTHERN CALIFORNIA AREA							
Antelope Valley-East Kern Water Agency	402,882	13,029	3,003	30,000	31,000	0	479,914
Castaic Lake Water Agency	354,745	4,830	15,518	500	0	0	375,593
Coachella Valley Water District	14,206	0	0	0	0	0	14,206
Crestline-Lake Arrowhead Water Agency	25,298	0	0	0	0	0	25,298
Desert Water Agency	23,438	0	0	0	0	0	23,438
Littlerock Creek Irrigation District	23,732	0	0	0	0	0	23,732
Mojave Water Agency	211,765	0	0	0	0	0	211,765
Palmdale Water District	34,173	0	0	0	0	0	34,173
San Bernardino Valley Municipal Water District	960,685	0	0	0	0	0	960,685
San Gabriel Valley Municipal Water District	131,052	0	0	0	0	0	131,052
San Gorgonio Pass Water Agency	66,530	0	0	30,000	20,000	0	116,530
The Metropolitan Water District of Southern California	4,814,078	0	0	0	0	0	4,814,078
Ventura County Flood Control District	79,699	0	0	0	0	0	79,699
Subtotal	7,142,283	17,859	18,521	60,500	51,000	0	7,290,163
TOTAL	13,549,403	36,083	60,090	181,650	92,000	0	13,919,226

a) Approximate only, not to be construed as invoice amounts.
b) Not a SWP water supply contractor.
c) Not a SWP water supply contractor, but has contracted for water.

TABLE B-9. Capital Costs of Requested Excess Peaking Capacity

(in dollars unless otherwise indicated)

Calendar Year	Total Advance Payments and Credits for Excess Capacity	Total Incremental Costs for Excess Capacity	Over payment (+) or Under payment (-) [a]	Annual Surplus Money Investment Fund Interest Rate [b]		Net Over or Underpayment with Interest [c]
				Jan-Jun	Jul-Dec	
	[1]	[2]	[3]	[4]	[5]	[6]
			THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA			
1965	0	158,000	(158,000)	3.968%	4.184%	(163,412)
1966	8,056,000	435,800	7,620,200	4.540%	5.057%	7,701,103
1967	9,094,963	1,878,270	7,216,693	4.815%	4.744%	15,524,533
1968	1,523,252	2,887,351	(1,364,099)	5.330%	5.540%	14,959,187
1969	8,310,651	3,059,310	5,251,341	5.946%	6.389%	21,369,973
1970	3,426,736	2,397,102	1,029,634	7.071%	7.125%	23,986,083
1971	1,086,045	1,146,648	(60,603)	5.154%	5.580%	25,238,017
1972	(4,244,807)	487,394	(4,732,201)	4.477%	4.977%	21,532,965
1973	(15,913,829)	25,041	(15,938,870)	6.023%	8.717%	6,014,116
1974	0	37,775	(37,775)	9.222%	10.351%	6,576,393
1975	0	2,085	(2,085)	7.089%	6.791%	7,038,515
1976	0	0	0	6.048%	6.021%	7,469,662
1977	0	0	0	5.788%	6.182%	7,923,403
1978	0	0	0	7.171%	8.096%	8,539,736
1979	0	0	0	8.979%	9.671%	9,354,605
1980	0	0	0	11.500%	11.500%	10,461,314
Total	11,339,011	12,514,776	(1,175,765)	-	-	10,461,314
			SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT			
1967	0	25,730	(25,730)	4.815%	4.744%	(26,611)
1968	184,422	44,053	140,369	5.330%	5.540%	117,587
1969	49,052	38,075	10,977	5.946%	6.389%	136,751
1970	44,911	17,959	26,952	7.071%	7.125%	175,186
1971	61,588	5,900	55,688	5.154%	5.580%	242,927
1972	(20,263)	6,835	(27,098)	4.477%	4.977%	226,230
1973	(180,465)	0	(180,465)	6.023%	8.717%	49,198
1974	0	0	0	9.222%	10.351%	54,130
1975	0	0	0	7.089%	6.791%	57,952
1976	0	0	0	6.048%	6.021%	61,501
1977	0	0	0	5.788%	6.182%	65,237
1978	0	0	0	7.171%	8.096%	70,312
1979	0	0	0	8.979%	9.671%	77,021
1980	0	0	0	11.500%	11.500%	86,133
Total	139,245	138,552	693	-	-	86,133
			ANTELOPE VALLEY-EAST KERN WATER AGENCY			
1968	85,495	1,645	83,850	5.330%	5.540%	86,962
1969	52,625	6,326	46,299	5.946%	6.389%	140,964
1970	101,648	15,076	86,572	7.071%	7.125%	243,222
1971	34,062	11,748	22,314	5.154%	5.580%	279,673
1972	(12,794)	2,018	(14,812)	4.477%	4.977%	277,552
1973	(205,354)	308	(205,662)	6.023%	8.717%	77,288
1974	0	96	(96)	9.222%	10.351%	84,933
1975	0	0	0	7.089%	6.791%	90,929
1976	0	190	(190)	6.048%	6.021%	96,300
1977	0	0	0	5.788%	6.182%	102,150
1978	0	0	0	7.171%	8.096%	110,096
1979	0	0	0	8.979%	9.671%	120,601
1980	0	0	0	11.500%	11.500%	134,869
Total	55,682	37,407	18,275	-	-	134,869

a) Overpayment or underpayment for each calendar year - column [1] minus column [2].
b) Interest rates shown are annual rates. Interest is credited daily at applicable rates on funds depositec in the State's Surplus Money Investment Fund.
c) Amounts shown are end-of-year balances. Interest on overpayments is credited at applicable Surplus Money Investment Fund Interest Rates Shown in columns [4] and [5]. Interest on underpayments is charged at the 1980 Project Interest Rate of 4.584 percent.

TABLE B-9. Capital Costs of Requested Excess Peaking Capacity

(in dollars)

Reach Number	ANNUAL REQUIRED ADVANCE OF FUNDS Incremental Costs and Advance Payments by Calendar Year 1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1981	Reach Total
	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
	THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA													
	Incremental Costs													
8C		1,000	1,000											2,000
8D		43,500	43,500											87,000
9		27,000	27,000	13,500										67,500
10A		29,700	29,700	14,800										74,200
11B	10,100	18,300	18,300	9,200										55,900
12D	1,800		19,300	25,800	12,900									59,800
12E	1,800		12,400	18,800	10,800									43,800
13B			12,600	37,800	31,600									82,000
14A	2,500	500	11,100	80,216	107,504	124,069	37,519	6,413	381	87				370,289
14B	1,200	1,800		19,100	19,100	12,800								54,000
14C	1,800	900		13,500	13,500	9,000								38,700
15A	700		14,000	66,947	133,357	128,099	54,821	5,327	946	2,076				406,273
16A	700		18,900	137,894	182,000	211,608	133,927	26,203	5,767	6,156				723,155
17E		51,500	444,600	537,247	860,024	998,985	699,281	193,286	17,947	29,456	2,085			3,834,411
17F	109,100	261,600	261,600	261,600	261,600	239,500								1,395,000
25			964,270	1,650,947	1,426,925	673,041	221,100	256,165						5,192,448
28J		304,612	13,706	296,668	65,966	230,169	1,209,586	2,017,134	235,900	4,900				4,378,641
Total	129,700	740,412	1,891,976	3,184,019	3,125,276	2,627,271	2,356,234	2,504,528	260,941	42,675	2,085			16,865,117
	Current Adjustment													
8C through 25	1. Advance Payments Applied to Incremental Costs Amendment 2 [d]													
	0	8,056,000	9,094,963	1,523,252	8,310,651	3,426,736	1,086,045	(4,244,807)	(14,381,396)				(356,668)	12,514,776
28J	2. Interest Credits-Amendment 2 [e]													
									(1,532,433)				(10,104,646)	(11,637,079)
	3. Advance Payments Applied to Incremental Costs Amendment 5 [f]													
	0	1,240,000	1,483,180	2,469,325	(927,035)	1,729,160	3,215,258	2,967,475	1,690,000	(9,488,722)				4,378,641
	4. Interest Credits-Amendment 5 [g]													
										(2,721,803)				(2,721,803)
	5. Net Required Advance of Funds													
	0	9,296,000	10,578,143	3,992,577	7,383,616	5,155,896	4,301,303	(1,277,332)	(14,233,829)	(12,210,525)			(10,461,314)	2,524,535
	SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT													
	Incremental Costs													
25			25,730	44,053	38,075	17,959	5,900	6,835						138,552
	Total Unadjusted Incremental Costs for Past Payments													
			25,730	44,053	38,075	17,959	5,900	6,835						138,552
	Current Adjustments													
	1. Advance Payments Applied to Incremental Costs [d]													
			0	184,422	49,052	44,911	61,588	(20,263)	(174,133)				(7,025)	138,552
	2. Interest Credit													
									(6,332)				(79,108)	(85,440)
	3. Net Required Advance of Funds													
			0	184,422	49,052	44,911	61,588	(20,263)	(180,465)				(86,133) [h]	53,112
	ANTELOPE VALLEY-EAST KERN WATER AGENCY													
	Incremental Costs													
29A				1,645	6,326	13,376	10,048	2,018	308	96		190		34,007
29F						1,700	1,700							3,400
	Total Unadjusted Incremental Costs for Past Payments													
				1,645	6,326	15,076	11,748	2,018	308	96		190		37,407
	Current Adjustments													
	1. Advance Payments Applied to Incremental Costs [d]													
				85,495	52,625	101,648	34,062	(12,794)	(189,120)	0		0	(34,509)	37,407
	2. Interest Credit													
									(16,234)				(100,360)	(116,594)
	3. Net Required Advance of Funds													
				85,495	52,625	101,648	34,062	(12,794)	(205,354)	0		0	(134,869) [h]	(79,187)

d) Actual payments are shown for 1965 through 1976 with 1981 adjusted to reflect overpayments and underpayments without interest for prior years.
e) Interest for overpayments and underpayments under provisions of Amendment 2 of the contract.
f) Actual payments are shown for 1965 through 1973 with 1974 adjusted to reflect overpayments and underpayments without interest for prior years
g) Interest for overpayments and underpayments under provisions of Amendment 5 of the contract.
h) Amounts in excess of incremental costs, under the provisions of the contract, reduce the Transportation Charge capital cost component of the Agency's Statement of Charges for January 1981.

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	UPPER FEATHER DIVISION	NORTH BAY AQUEDUCT					SOUTH BAY AQUEDUCT			
		Reach 1	Reach 2	Reach 3A	Reach 3B	Total	Reach 1	Reach 2	Reach 4	Reach 5
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	0	0	0	97	34	30	57
1953	0	0	0	0	0	0	477	166	144	297
1954	0	0	0	0	0	0	1,466	508	437	959
1955	0	0	0	0	0	0	1,944	674	560	1,266
1956	0	0	0	0	0	0	18,789	6,515	5,090	12,545
1957	0	13,290	3,391	0	9,953	26,634	45,090	15,639	12,285	33,218
1958	2	19,202	5,011	0	25,798	50,011	195,985	80,961	7,714	21,930
1959	14	7,517	2,118	0	17,653	27,288	496,140	148,516	24,945	17,118
1960	28	8,797	4,292	0	4,838	17,927	1,130,378	67,351	71,779	68,028
1961	10	1,551	10,318	0	2,526	14,395	3,273,247	180,596	307,885	74,398
1962	32	217	(1,751)	0	414	(1,120)	1,548,884	203,535	695,446	35,102
1963	51	2,510	(1,063)	0	983	2,430	480,716	69,182	2,284,291	206,587
1964	7,791	39,879	12,046	0	21,934	73,859	2,549,118	15,903	181,900	264,410
1965	3,139	72,793	17,900	0	170,361	261,054	807,505	153,454	85,425	447,830
1966	(48)	59,615	12,972	0	438,949	511,536	898,074	149,529	142,096	1,690,200
1967	47	47,257	11,597	0	1,551,023	1,609,877	607,614	50,423	293,304	3,496,284
1968	51,573	70,586	19,560	0	831,158	921,304	965,119	19,543	89,300	2,931,101
1969	234,232	63,650	23,628	0	46,428	133,706	455,173	9,618	3,860	896,727
1970	16,227	59,090	42,733	0	9,415	111,238	52,481	3,380	10,517	154,358
1971	27,204	20,819	31,516	0	8,480	60,815	24,505	4,645	5,035	20,395
1972	9	15,538	12,952	0	10,058	38,548	26,918	825	2,945	26,090
1973	25	18,488	29,018	0	39,878	87,384	24,468	4,010	6,016	12,708
1974	45	67,352	29,978	0	134,332	231,662	17,108	1,192	1,765	65,587
1975	21	62,855	73,112	0	45,091	181,058	57,619	561	1,165	7,291
1976	51	52,419	75,611	218	13,168	141,416	104,242	2,846	8,915	12,701
1977	28	53,274	65,662	2,240	23,138	144,314	176,062	3,625	3,225	16,158
1978	38	61,936	57,158	2,955	28,987	151,036	264,581	4,494	3,668	14,028
1979	23	316,620	91,367	3,953	62,240	474,180	111,106	17,151	8,515	31,725
1980	26	422,804	111,600	19,910	96,125	650,439	368,942	17,708	8,249	38,045
1981	34	430,992	147,295	(10,752)	43,157	610,692	(145,428)	3,600	6,533	12,448
1982	11	934,812	357,720	(7,165)	134,408	1,419,775	(44,778)	18,971	7,451	37,824
1983	19	1,091,091	1,076,627	2,628	517,615	2,687,961	429,225	73,925	38,185	72,415
1984	26	1,875,968	2,317,661	3,290	1,068,363	5,265,282	506,951	36,354	9,610	92,846
1985	29	2,248,491	7,849,886	27,815	3,416,370	13,542,562	34,103	2,822	5,034	27,138
1986	31	16,420,238	10,020,277	1,309,599	1,819,349	29,569,463	85,732	14,715	17,144	13,982
1987	32	11,873,826	7,214,307	1,628,932	1,670,596	22,387,661	126,377	15,693	27,881	32,931
1988	55	3,287,756	1,648,431	1,015,971	686,821	6,638,979	290,505	36,744	51,786	25,078
1989	44	1,056,583	950,985	224,567	374,886	2,607,021	130,609	16,848	35,518	12,582
1990	63	493,522	537,881	145,694	71,938	1,249,035	275,732	32,387	99,251	40,263
1991	54	76,599	17,130	24,846	70,542	189,117	1,153,109	26,900	53,613	21,889
1992	42	56,492	6,525	18,333	37,778	119,128	401,906	53,036	61,799	51,386
1993	30	104,317	24,579	40,129	82,032	251,057	313,476	55,679	79,149	39,293
1994	14	68,065	13,463	27,107	45,909	154,544	(211,712)	29,017	362,585	36,350
1995	3	26,002	5,920	7,337	20,617	59,876	265,751	42,516	48,189	21,436
1996	0	14,790	3,334	6,614	14,606	39,344	139,573	13,049	25,751	10,677
1997	3	67,264	35,545	38,585	(13,571)	127,823	203,476	31,135	36,986	16,906
1998	7	15,410	6,392	6,797	10,396	38,995	67,974	6,120	14,731	4,616
1999	2	71,817	35,374	33,879	32,533	173,603	162,077	25,320	35,680	24,336
2000	24	29,750	8,069	11,711	4,012	53,542	100,502	15,672	24,079	19,630
2001	20	8,959	2,162	3,892	980	15,993	435,729	4,161	118,393	4,062
2002	14	25,376	17,224	15,254	3,637	61,491	3,067,506	5,536	328,799	64,277
2003	0	11,131	5,411	4,658	44,172	65,372	4,463,309	199,879	198,483	360,063
2004	0	22,864	973	2,387	144,614	170,838	6,088,707	120,308	291,114	99,170
2005	0	89,100	4	9	33,810	122,923	6,791,256	119,278	260,833	(1,426)
2006	209	30,103	15,358	12,976	1,487,637	1,546,074	3,261,067	12,810	29,641	50,685
2007	201	37,620	19,430	16,614	4,278,278	4,351,942	9,688,368	15,705	35,528	63,814
2008	196	35,478	18,299	15,622	5,007,944	5,077,343	6,882,024	14,853	33,646	60,137
2009	190	14,880	7,261	5,782	5,700	33,623	81,529	6,953	16,594	24,485
2010	190	14,880	7,261	5,782	5,700	33,623	81,529	6,953	16,594	24,485
2011	190	14,880	7,261	5,782	5,700	33,623	81,529	6,953	16,594	24,485
2012	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0
TOTAL	342,301	42,107,115	33,118,771	4,673,951	24,719,459	104,619,296	59,911,561	2,296,476	6,653,680	11,985,406

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1952	8	66	72	132	496	4,012	3,279	1,499	8,790
1953	38	327	336	640	2,425	10,559	8,589	3,964	23,112
1954	123	1,005	1,003	1,954	7,455	13,796	11,163	5,179	30,138
1955	160	1,293	1,149	2,454	9,500	7,370	5,952	2,760	16,082
1956	1,559	11,959	11,043	28,372	95,872	9,880	5,020	2,398	17,298
1957	3,659	28,675	27,385	563,114	729,065	11,953	5,456	2,612	20,021
1958	2,243	17,872	17,385	560,904	904,994	18,585	17,191	7,994	43,770
1959	357	3,200	3,568	149,874	843,718	123,170	100,306	45,510	268,986
1960	1,102	2,944	4,498	359,749	1,705,829	191,408	102,136	48,968	342,512
1961	4,726	18,325	22,765	(1,367)	3,880,575	153,765	195,947	42,843	392,555
1962	17,295	160,939	178,242	209,042	3,048,485	612,258	491,225	168,218	1,271,701
1963	265,414	1,250,386	939,832	129,902	5,626,310	1,993,284	1,525,734	684,095	4,203,113
1964	100,603	1,716,371	2,327,770	2,947,522	10,103,597	4,674,280	2,369,858	700,074	7,744,212
1965	42,345	368,476	637,266	1,921,844	4,464,145	5,877,189	6,873,699	2,975,719	15,726,607
1966	17,663	34,915	140,350	777,887	3,850,714	8,553,362	14,112,820	5,677,099	28,343,281
1967	(41,567)	137,856	147,183	379,764	5,070,861	9,678,607	10,672,113	6,646,739	26,997,459
1968	84,553	2,130	68,057	253,152	4,412,955	6,392,664	891,681	1,303,186	8,587,531
1969	4,279	11,572	162,300	32,000	1,575,529	3,542,767	792,259	443,924	4,778,950
1970	2,487	6,820	20,086	(15,718)	234,411	2,236,607	149,692	115,578	2,501,877
1971	4,350	6,923	17,750	39,084	122,687	98,138	215,512	69,410	383,060
1972	1,084	203	4,800	32,199	95,064	159,608	43,721	7,744	211,073
1973	288	989	7,449	9,693	65,621	105,581	25,496	22,418	153,495
1974	527	6,020	30,628	11,433	134,260	177,700	16,627	45,707	240,034
1975	126	679	1,086	3,464	71,991	239,144	14,680	169,676	423,500
1976	701	3,529	8,362	26,186	167,482	641,860	45,533	65,943	753,336
1977	270	1,310	8,651	24,938	234,239	274,381	20,283	22,568	317,232
1978	231	1,204	1,631	17,123	306,960	801,265	36,221	9,714	847,200
1979	1,367	1,721	2,134	7,322	181,041	1,051,792	59,695	26,106	1,137,593
1980	1,321	1,718	2,182	7,102	445,267	4,173,603	96,760	38,789	4,309,152
1981	308	1,462	1,398	5,077	(114,602)	(502,921)	1,487,516	38,451	1,023,046
1982	716	1,561	1,746	6,074	29,565	700,738	46,501	22,308	769,547
1983	407	5,721	8,143	23,367	651,388	706,104	84,435	211,619	1,002,158
1984	269	1,853	1,667	13,301	662,851	1,559,539	41,352	48,478	1,649,369
1985	402	1,657	2,129	6,750	80,035	677,955	24,812	19,404	722,171
1986	1,119	2,744	3,313	12,234	150,983	398,788	63,830	35,420	498,038
1987	1,496	3,081	3,560	21,842	232,861	799,672	88,945	41,659	930,276
1988	5,706	6,689	7,603	33,728	457,839	2,898,156	(128,051)	(56,448)	2,713,657
1989	2,641	3,878	4,755	14,489	221,320	6,898,872	346,589	173,993	7,419,454
1990	5,092	19,899	36,584	87,796	597,004	13,483,785	112,002	2,446,232	16,042,019
1991	1,942	5,059	7,357	31,682	1,301,551	13,914,632	133,121	114,981	14,162,734
1992	1,184	2,042	2,250	35,464	609,067	6,260,482	241,456	239,437	6,741,375
1993	3,618	6,028	8,873	42,200	548,316	2,542,869	257,330	200,072	3,000,271
1994	2,897	4,781	5,346	89,991	319,255	1,145,666	148,396	88,357	1,382,419
1995	11,556	3,635	14,769	24,750	432,602	1,462,211	217,940	131,995	1,812,146
1996	3,092	2,271	2,699	12,522	209,634	874,227	74,153	41,215	989,595
1997	1,454	4,141	3,655	20,589	318,342	2,064,446	146,851	84,303	2,295,600
1998	363	1,134	(6,005)	5,776	94,709	729,475	33,695	16,670	779,840
1999	1,530	3,283	12,698	31,555	296,479	2,208,773	88,790	90,527	2,388,090
2000	2,400	4,907	5,279	10,611	183,080	(706,522)	57,209	39,982	(609,331)
2001	91,681	68,598	403,873	1,189,678	2,316,175	371,372	89,809	7,549	468,730
2002	229,369	453,007	1,107,226	2,976,962	8,232,682	388,747	42,554	21,259	452,560
2003	67,127	509,412	477,150	1,407,084	7,682,507	178,078	18,416	10,537	207,031
2004	3,176	2,933	39,088	3,276,225	9,920,721	878,781	7,621	73,527	959,929
2005	5,237	5,239	4,803	731,389	7,916,609	226,629	11,640	84,213	322,482
2006	1,892	3,535	3,179	12,542	3,375,351	535,047	68,719	1,198,638	1,802,404
2007	2,718	4,522	4,035	14,606	9,829,296	1,168,391	80,838	2,872,533	4,121,762
2008	2,527	4,264	3,808	13,900	7,015,159	1,130,011	76,827	1,703,897	2,910,735
2009	433	1,757	1,648	7,976	141,375	259,632	42,324	16,952	318,908
2010	433	1,757	1,648	7,976	141,375	259,632	42,324	16,952	318,908
2011	433	1,757	1,648	7,976	141,375	259,632	42,324	16,952	318,908
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0
TOTAL	970,530	4,942,034	6,970,888	18,655,877	112,386,452	115,601,487	42,998,916	29,408,098	188,008,501

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION		
	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8C	Reach 8D	Reach 9
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1952	2,492	3,549	3,987	1,010	1,390	12,428	13	727	1,109
1953	6,999	10,144	10,986	2,834	3,869	34,832	45	2,671	4,185
1954	8,704	12,545	13,693	3,520	4,766	43,228	50	2,719	4,026
1955	4,273	6,055	6,813	1,728	2,325	21,194	19	888	1,100
1956	3,295	5,600	5,857	1,445	3,556	19,753	98	3,850	4,376
1957	3,543	6,115	6,357	1,565	3,998	21,578	234	10,604	13,209
1958	11,927	19,393	22,037	5,509	7,512	66,378	375	19,033	25,073
1959	21,979	37,358	39,689	9,813	19,679	128,518	436	20,578	25,697
1960	207,025	45,419	41,044	12,074	37,633	343,195	1,673	44,565	25,290
1961	184,443	292,639	170,559	38,338	70,068	756,047	3,949	75,726	30,852
1962	495,836	549,984	252,698	22,397	26,967	1,347,882	6,131	159,481	62,375
1963	2,772,189	2,034,351	2,498,712	66,353	30,647	7,402,252	5,861	161,252	81,343
1964	4,348,311	4,932,301	1,053,227	161,422	251,461	10,746,722	4,014	90,622	117,907
1965	3,860,997	5,688,252	2,869,931	1,072,111	667,768	14,159,059	15,049	491,042	564,036
1966	2,312,372	8,527,843	5,765,798	4,230,221	7,708,334	28,544,568	201,274	5,197,322	2,539,278
1967	(44,527)	2,062,305	6,942,522	222,885	6,675,398	15,858,583	212,285	4,982,844	3,363,650
1968	119,884	395,689	973,956	179,917	461,031	2,130,477	64,234	611,192	940,074
1969	(6,065)	126,946	98,492	107,486	160,668	487,527	58,960	116,146	85,130
1970	32,387	(20,243)	105,385	(827,457)	1,215,966	506,038	23,011	106,810	84,116
1971	99,945	230,624	305,227	26,995	341,010	1,003,801	8,813	33,099	23,088
1972	15,990	90,852	17,053	14,621	281,343	419,859	10,818	13,349	16,603
1973	6,753	103,707	41,549	13,810	41,427	207,246	5,145	11,089	13,249
1974	6,618	117,165	55,978	16,199	71,796	267,756	5,434	24,433	16,567
1975	18,921	107,275	23,671	8,797	152,574	311,238	5,424	15,960	12,966
1976	17,485	79,554	13,041	5,138	41,687	156,905	19,931	76,280	62,164
1977	35,707	84,669	9,412	4,028	9,655	143,471	21,096	70,005	97,952
1978	8,539	428,395	7,006	3,536	6,994	454,470	7,584	40,453	17,395
1979	(35,394)	543,225	19,463	9,485	(242,253)	294,526	10,474	6,181	6,227
1980	66,622	3,450,695	191,307	75,209	185,384	3,969,217	2,158	17,492	17,706
1981	28,491	(2,244,127)	(44,017)	(15,456)	918,984	(1,356,125)	1,151	9,642	9,541
1982	100,629	(1,616,569)	20,184	10,359	3,525,738	2,040,341	2,469	8,283	6,956
1983	75,639	33,881	11,785	6,638	1,811,638	1,939,581	7,955	13,782	11,090
1984	31,748	87,083	26,712	12,754	3,053,662	3,211,959	26,489	9,959	6,268
1985	53,251	56,732	13,685	6,934	582,910	713,512	7,220	9,762	7,688
1986	73,979	201,509	50,668	19,223	1,282,469	1,627,848	8,902	25,011	20,503
1987	(7,829)	116,268	40,009	15,946	518,349	682,743	12,744	18,927	56,042
1988	(149,385)	224,154	(406,398)	(137,353)	923,622	454,640	9,833	(119,741)	(60,639)
1989	39,652	594,894	232,852	80,090	575,855	1,523,343	5,279	91,501	278,061
1990	39,270	259,895	79,589	29,606	461,219	869,579	5,814	41,345	2,016,434
1991	4,916,134	397,959	98,847	35,860	511,519	5,960,319	4,588	43,140	41,348
1992	(757,001)	545,729	211,854	74,544	396,398	471,524	3,546	103,695	109,225
1993	110,233	724,929	186,271	70,815	720,283	1,812,531	15,016	101,634	90,929
1994	1,151,976	288,018	63,862	27,812	710,770	2,242,438	6,770	42,455	40,696
1995	285,776	441,479	130,761	58,640	1,914,186	2,830,842	12,548	49,963	43,251
1996	31,942	(110,471)	34,529	12,219	588,712	556,931	6,444	29,863	27,050
1997	73,224	513,793	(277,781)	42,881	5,016,215	5,368,332	11,497	49,111	43,799
1998	19,692	304,115	34,319	16,542	2,819,556	3,194,224	2,562	11,115	8,955
1999	18,187	158,843	99,981	41,672	1,901,201	2,219,884	5,706	25,138	23,475
2000	101,618	373,593	77,891	36,152	1,138,744	1,727,998	3,922	23,516	29,216
2001	(10,513)	(47,832)	518,046	(3,777)	59,373	515,297	2,279	16,521	20,761
2002	12,237	23,712	6,078,355	3,222	(2,455,712)	3,661,814	3,626	43,500	19,786
2003	8,863	78,058	(5,374,663)	7,414	2,178,907	(3,101,421)	2,127	17,675	15,759
2004	(15,306)	(18,715)	(55,386)	(4,006)	(463,578)	(556,991)	22,527	3,056	2,185
2005	261	(9,056)	110,561	(2,763)	982,735	1,081,738	26,296	0	0
2006	50,316	504,426	63,461	31,691	93,337	743,231	4,116	21,572	21,434
2007	177,611	894,201	86,954	41,652	102,944	1,303,362	5,172	31,382	30,106
2008	183,909	713,879	93,667	44,176	104,627	1,140,258	5,442	34,236	32,595
2009	27,741	190,182	38,070	21,795	75,769	353,557	2,905	11,643	12,384
2010	27,741	190,182	38,070	21,795	75,769	353,557	2,905	11,643	12,384
2011	27,741	190,182	38,070	21,795	75,769	353,557	2,905	11,643	12,384
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0
TOTAL	21,315,077	34,033,332	23,886,258	6,119,861	48,444,623	133,799,151	935,343	13,197,385	11,246,409

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SOUTH SAN JOAQUIN DIVISION (continued)								
	Reach 10A	Reach 11B	Reach 12D	Reach 12E	Reach 13B	Reach 14A	Reach 14B	Reach 14C	Reach 15A
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1952	695	1,279	1,980	995	1,663	794	212	212	1,911
1953	2,569	4,790	7,480	3,745	6,236	2,599	733	741	7,016
1954	2,821	4,855	7,565	3,792	6,319	2,880	810	817	7,073
1955	1,097	1,557	2,404	1,211	2,025	1,183	325	327	2,253
1956	4,428	6,223	9,233	4,737	8,054	7,026	1,638	1,584	9,939
1957	13,269	18,772	29,082	14,615	24,411	15,651	3,834	3,864	26,871
1958	25,086	48,191	78,564	39,087	61,715	33,726	12,330	11,813	49,499
1959	25,787	67,246	107,781	53,836	86,478	64,824	22,102	21,828	70,838
1960	47,492	66,317	77,936	39,867	63,517	84,363	23,260	22,305	73,305
1961	68,505	46,073	88,274	51,457	28,015	242,753	91,290	65,565	150,205
1962	57,705	56,056	69,189	44,851	49,179	208,180	61,489	47,608	133,653
1963	52,585	91,914	173,985	86,405	67,733	425,626	104,436	77,970	102,072
1964	124,014	333,621	291,013	174,469	86,271	1,093,795	684,005	485,033	571,173
1965	622,257	1,053,029	1,524,848	1,044,851	196,487	3,385,205	1,655,024	1,436,258	476,830
1966	2,800,056	3,709,779	673,429	466,228	418,141	4,916,319	974,862	724,354	1,829,852
1967	3,652,342	4,636,627	1,881,333	1,244,265	1,238,428	2,788,299	525,653	400,183	1,721,304
1968	1,025,969	1,323,302	4,726,074	3,145,775	8,343,706	10,210,266	1,330,361	1,405,117	7,522,015
1969	145,111	229,185	706,272	529,080	3,704,065	15,112,041	1,223,457	1,134,395	9,523,012
1970	74,366	85,151	70,725	72,798	320,797	11,031,255	987,213	738,955	8,836,897
1971	15,595	45,006	43,988	42,624	339,078	2,925,191	193,255	36,514	3,275,227
1972	19,736	32,657	43,939	24,748	81,937	1,388,348	101,784	20,165	1,003,380
1973	14,283	16,448	9,980	16,320	25,090	680,834	19,584	13,469	798,805
1974	22,111	14,951	19,555	32,240	29,582	524,504	30,735	16,333	778,696
1975	15,865	13,479	10,793	13,678	25,827	269,197	25,164	21,048	370,265
1976	76,202	54,217	37,464	59,842	105,332	507,519	59,753	42,776	434,574
1977	75,628	52,919	22,826	54,444	81,293	301,515	49,972	30,152	235,514
1978	48,754	16,469	(2,816)	27,331	43,126	348,674	(653)	1,500	297,817
1979	241	6,906	13,401	14,229	25,411	293,786	9,846	7,856	245,590
1980	18,165	18,813	15,608	27,498	34,190	1,676,267	29,169	23,023	1,719,775
1981	10,309	14,885	26,473	20,972	25,515	(1,076,221)	27,551	33,674	(1,142,721)
1982	8,237	6,608	7,680	8,346	16,339	(745,914)	9,886	29,393	(804,147)
1983	14,488	9,792	14,174	13,050	35,872	419,650	17,389	24,933	115,983
1984	7,533	27,613	87,907	49,271	22,732	54,590	75,453	63,060	63,537
1985	9,215	6,949	5,263	8,013	8,875	(49,408)	9,523	5,867	54,782
1986	22,335	16,664	16,014	25,031	20,483	140,642	25,960	13,913	154,089
1987	16,704	13,512	12,369	20,023	15,435	101,453	20,411	8,581	227,047
1988	(159,357)	(73,648)	(151,040)	(51,401)	(120,104)	161,077	(75,276)	(75,307)	144,369
1989	70,153	65,216	63,382	120,925	73,037	2,778,880	119,559	36,660	2,952,046
1990	34,841	29,230	27,269	49,082	34,048	715,031	44,187	14,537	440,017
1991	36,888	32,195	30,146	55,119	34,144	423,235	50,345	12,116	353,596
1992	103,321	99,765	98,178	192,455	97,638	991,603	185,311	9,210	387,615
1993	90,291	70,131	63,247	118,440	80,530	687,462	109,792	38,960	942,211
1994	65,737	29,221	26,997	50,234	35,154	400,534	44,481	17,426	324,942
1995	435,909	32,487	25,516	49,885	41,733	524,524	48,740	29,125	450,952
1996	253,433	19,489	15,020	30,202	29,333	403,125	26,945	16,405	253,622
1997	73,458	30,890	25,368	48,767	40,900	451,910	47,815	29,878	809,848
1998	14,618	7,107	5,773	10,697	9,676	288,667	10,799	6,819	119,562
1999	47,323	16,974	13,322	34,382	31,525	260,362	24,603	14,842	264,415
2000	43,393	21,100	32,408	40,128	25,095	168,350	15,186	11,034	151,288
2001	42,281	13,886	21,836	34,646	7,862	68,435	4,153	4,177	65,401
2002	87,355	19,039	6,666	78,249	47,340	272,942	22,247	35,169	163,075
2003	21,957	7,992	7,857	17,345	14,945	129,370	5,827	10,101	107,153
2004	3,575	1,471	1,013	5,388	4,371	45,849	2,510	1,698	47,933
2005	0	0	0	0	0	0	0	0	0
2006	36,461	12,947	7,140	21,229	23,190	196,493	11,021	11,615	160,943
2007	47,943	17,228	9,007	29,956	30,297	266,442	13,657	16,470	217,043
2008	51,096	18,401	9,461	32,484	32,213	285,919	14,246	17,841	232,275
2009	23,708	8,333	5,159	12,059	15,375	122,272	8,329	6,756	102,938
2010	23,708	8,333	5,159	12,059	15,375	122,272	8,329	6,756	102,938
2011	23,708	8,333	5,159	12,059	15,375	122,272	8,329	6,756	102,938
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0
TOTAL	10,613,355	12,647,975	11,265,828	8,484,113	16,268,409	67,274,438	9,158,951	7,250,230	47,841,051

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SOUTH SAN JOAQUIN (contd.)		TEHACHAPI DIVISION			MOJAVE DIVISION			
	Reach 16A	Subtotal	Reach 17E	Reach 17F	Subtotal	Reach 18A	Reach 19	Reach 19C	Reach 20A
	[38]	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
1952	4,440	16,030	9,703	4,072	13,775	4,090	1,520	0	2,561
1953	16,513	59,323	31,337	13,284	44,621	12,610	4,685	0	7,246
1954	16,601	60,328	46,243	20,010	66,253	16,642	6,184	0	9,506
1955	5,223	19,612	25,880	11,362	37,242	5,612	2,086	0	2,529
1956	21,754	82,940	47,487	17,609	65,096	6,038	2,244	0	2,440
1957	62,657	237,073	119,673	49,130	168,803	22,348	8,304	0	9,035
1958	133,083	537,575	164,056	72,091	236,147	37,917	14,166	123	15,391
1959	205,748	773,179	151,389	57,883	209,272	38,620	23,450	1,102	23,605
1960	204,788	774,678	203,222	45,323	248,545	21,356	26,093	5,318	40,523
1961	206,305	1,148,969	387,819	85,558	473,377	35,664	32,281	2,262	34,918
1962	171,396	1,127,293	353,119	82,610	435,729	68,508	266,284	1,841	10,323
1963	481,941	1,913,123	1,191,633	124,757	1,316,390	37,379	435,881	4,137	39,706
1964	1,778,952	5,834,889	1,866,000	775,005	2,641,005	95,693	706,369	8,564	43,342
1965	1,268,176	13,733,092	2,574,824	2,284,869	4,859,693	121,060	716,092	9,156	108,519
1966	2,896,274	27,347,168	5,537,412	9,323,517	14,860,929	366,116	1,644,699	13,373	159,282
1967	3,442,021	30,089,234	26,239,390	12,398,708	38,638,098	1,312,022	903,880	24,103	645,078
1968	7,578,498	48,226,583	33,363,479	7,416,464	40,779,943	136,804	7,109,653	71,388	1,889,601
1969	13,136,056	45,702,910	40,368,425	6,883,206	47,251,631	213,805	2,465,641	7,423	5,939,151
1970	13,890,751	36,322,845	35,446,706	6,786,231	42,232,937	2,211,077	1,210,665	6,217	3,652,478
1971	7,903,937	14,885,415	20,141,395	6,835,303	26,976,698	1,496,843	284,738	6,994	1,074,759
1972	3,025,555	5,783,019	10,002,935	34,791	10,037,726	129,417	409,903	3,620	471,963
1973	1,472,313	3,096,609	3,090,140	36,207	3,126,347	23,931	75,638	2,539	88,416
1974	1,031,843	2,546,984	4,798,348	152,494	4,950,842	28,399	205,581	2,703	138,673
1975	489,545	1,289,211	2,144,178	411,404	2,555,582	44,774	70,652	5,066	68,157
1976	618,049	2,154,103	1,124,357	174,629	1,298,986	121,043	84,593	6,786	59,967
1977	580,209	1,673,525	655,047	31,512	686,559	261,400	133,767	7,521	117,878
1978	582,775	1,428,409	1,900,843	27,956	1,928,799	553,014	57,150	5,872	51,615
1979	542,554	1,182,702	2,099,385	61,381	2,160,766	626,615	339,536	10,831	37,085
1980	3,772,498	7,372,362	17,433,610	6,046	17,439,656	1,130,429	1,073,430	3,604	308,188
1981	(2,527,211)	(4,566,440)	(3,848,206)	6,908	(3,841,298)	1,218,824	845,702	4,498	48,625
1982	(1,850,736)	(3,296,600)	11,370,112	6,054	11,376,166	6,968,683	746,900	3,920	33,869
1983	166,232	864,390	8,862,914	8,269	8,871,183	10,909,386	64,660	2,596	40,793
1984	119,387	613,799	3,227,937	31,701	3,259,638	8,340,371	309,491	3,124	17,505
1985	82,117	165,866	1,926,289	10,460	1,936,749	5,264,156	227,986	3,885	68,422
1986	186,348	675,895	1,381,955	33,788	1,415,743	2,049,111	2,069,663	4,261	2,331,707
1987	194,936	718,184	671,183	13,807	684,990	1,347,722	(6,453)	4,684	562,540
1988	262,334	(308,900)	1,408,760	(49,734)	1,359,026	847,954	(104,961)	13,409	(159,892)
1989	5,955,356	12,610,055	504,715	64,660	569,375	376,980	207,150	50,953	31,173
1990	640,283	4,092,118	783,219	25,218	808,437	202,065	(402,573)	61,192	(637,062)
1991	774,129	1,890,989	691,578	33,405	724,983	273,021	22,218	81,545	(188,732)
1992	731,512	3,113,074	741,986	24,369	766,355	620,962	384,568	86,644	225,398
1993	857,038	3,265,681	1,223,402	35,370	1,258,772	1,131,166	248,287	72,746	110,869
1994	853,328	1,937,975	806,213	16,681	822,894	998,126	164,096	60,147	51,340
1995	628,941	2,373,574	1,538,497	19,443	1,557,940	390,433	157,481	45,990	92,925
1996	388,064	1,498,995	2,571,039	10,797	2,581,836	91,593	69,281	22,188	35,656
1997	481,458	2,144,699	1,009,249	18,265	1,027,514	135,402	92,607	13,590	65,433
1998	440,746	937,096	925,574	6,843	932,417	47,486	36,170	4,164	29,900
1999	361,308	1,123,375	661,104	12,023	673,127	113,032	49,062	5,329	171,867
2000	372,619	937,255	406,462	14,073	420,535	119,903	89,985	936	83,355
2001	165,140	467,378	254,030	9,132	263,162	63,118	185,890	2,223	342,940
2002	284,187	1,083,181	235,166	7,823	242,989	33,319	(140,419)	1,374	(112,511)
2003	154,356	512,464	160,899	8,472	169,371	79,020	(21,430)	0	(13,203)
2004	311,101	452,677	362,265	2,069	364,334	14,426	12,464	0	12,567
2005	0	26,296	2,264,058	0	2,264,058	10,573	0	0	0
2006	249,519	777,680	3,582,288	10,828	3,593,116	95,272	23,633	0	35,480
2007	331,047	1,045,750	4,200,581	15,205	4,215,786	161,318	29,968	0	43,217
2008	353,513	1,119,722	4,224,879	16,470	4,241,349	181,619	31,545	0	44,996
2009	160,332	492,193	308,861	6,214	315,075	32,088	16,820	0	26,694
2010	160,332	492,193	308,861	6,214	315,075	32,088	16,820	0	26,694
2011	160,332	492,193	308,861	6,214	315,075	32,088	16,820	0	26,694
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0
TOTAL	76,988,503	293,171,990	264,592,766	54,654,453	319,247,219	51,360,531	23,758,596	759,941	18,501,194

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	MOJAVE DIVISION (continued)							SANTA ANA DIVISION	
	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23	Reach 24	Subtotal	Reach 25	Reach 26A
	[47]	[48]	[49]	[50]	[51]	[52]	[53]	[54]	[55]
1952	892	5,788	35	2,013	2,074	2,413	21,386	3,334	5,599
1953	3,402	17,846	71	5,752	6,886	7,438	65,936	10,275	17,264
1954	4,548	23,558	369	8,560	7,849	9,820	87,036	13,566	22,790
1955	2,213	7,947	178	2,754	2,725	3,313	29,357	4,575	7,687
1956	2,655	8,542	216	2,905	2,961	3,561	31,562	4,917	8,264
1957	9,826	31,616	800	10,757	10,962	13,177	116,825	18,205	30,586
1958	16,752	53,569	1,397	18,717	18,578	22,627	199,237	31,001	52,019
1959	18,604	56,724	1,844	25,421	20,372	45,646	255,388	39,325	58,137
1960	37,179	43,893	11,029	136,751	17,152	109,816	449,110	65,655	93,700
1961	37,102	21,532	14,517	215,859	9,546	373,473	777,154	26,979	56,734
1962	10,730	8,197	4,186	164,168	4,336	279,421	817,994	9,964	36,235
1963	40,865	26,670	17,081	237,695	7,228	358,503	1,205,145	31,013	112,271
1964	71,116	33,912	22,793	262,996	6,863	244,003	1,495,651	69,669	202,642
1965	343,506	91,095	65,689	827,655	11,836	621,566	2,916,174	279,237	206,356
1966	1,311,628	160,388	178,538	1,746,245	31,078	1,018,628	6,629,975	415,066	364,004
1967	1,718,942	498,257	367,961	3,146,128	62,135	2,331,106	11,009,612	3,184,296	638,539
1968	2,291,691	1,141,929	1,145,768	4,588,850	102,207	2,600,293	21,078,184	8,264,126	1,268,194
1969	5,626,284	2,358,737	1,515,147	7,750,478	260,659	11,131,406	37,268,731	6,807,783	1,768,456
1970	5,304,372	3,232,911	2,081,810	23,451,612	1,240,798	16,885,193	59,277,133	2,169,051	7,229,429
1971	1,091,123	825,070	432,464	16,772,680	1,922,115	5,385,721	29,292,507	1,135,248	9,811,736
1972	635,507	484,772	324,865	3,788,894	48,049	788,479	7,085,469	1,095,740	5,528,987
1973	83,840	63,774	36,179	1,623,274	24,333	4,225,877	6,247,801	136,994	1,810,729
1974	118,639	103,545	54,198	5,699,605	130,567	766,562	7,248,472	68,180	1,922,999
1975	169,294	167,240	19,453	4,793,580	19,467	373,783	5,731,466	166,653	3,787,797
1976	102,909	44,896	24,732	3,103,916	84,188	204,705	3,837,735	475,176	1,494,750
1977	120,160	71,389	49,445	1,654,122	60,112	232,230	2,708,024	76,255	776,085
1978	68,838	32,855	18,183	677,448	36,484	210,198	1,711,657	57,463	131,076
1979	36,225	18,948	10,675	560,506	10,634	103,615	1,754,670	29,960	80,482
1980	284,545	133,526	121,171	2,239,224	60,229	559,963	5,914,309	31,462	181,638
1981	32,214	13,223	6,466	(774,614)	138,917	203,941	1,737,796	5,864	69,031
1982	77,988	13,158	14,459	432,274	346,905	79,819	8,717,975	9,224	159,280
1983	58,714	25,900	10,363	451,428	2,029,405	58,989	13,652,234	4,304	528,764
1984	35,378	845,423	6,052	(83,811)	1,290,740	34,764	10,799,037	3,850	270,455
1985	(232,549)	(481,017)	1,945,477	608,583	966,160	51,634	8,422,737	5,555	62,571
1986	(2,046,222)	(1,334,975)	3,260,280	1,097,122	230,510	51,994	7,713,451	9,927	114,561
1987	(344,829)	55,519	64,264	3,631,282	146,850	91,223	5,552,802	4,908	27,208
1988	(147,290)	(70,564)	351,489	552,546	558,557	197,761	2,039,009	7,358	161,957
1989	60,657	30,217	534,658	4,161,037	1,496,776	433,072	7,382,673	8,092	(2,297,399)
1990	(403,413)	(635,623)	(97,841)	8,794,258	1,394,698	344,367	8,620,068	176,854	(1,657,576)
1991	(18,809)	(147,369)	(17,234)	7,985,326	3,624,824	139,105	11,753,895	202,286	(1,316,160)
1992	338,098	(263,897)	75,210	4,849,560	8,364,426	127,829	14,808,798	333,934	(1,878,502)
1993	180,598	133,941	49,144	2,094,764	15,390,366	159,211	19,571,092	1,506,787	3,979,221
1994	114,273	65,260	26,546	933,021	8,082,401	81,869	10,577,079	2,104,588	2,493,097
1995	121,499	66,503	30,918	1,096,953	5,924,175	123,653	8,050,530	3,310,564	500,791
1996	48,699	44,953	17,787	1,736,686	2,181,669	96,339	4,344,851	19,019,751	(100,474)
1997	39,973	55,881	27,865	809,666	(342,563)	102,390	1,000,244	7,645,602	(662,524)
1998	27,626	20,285	12,816	273,139	3,392,776	36,135	3,880,497	993,619	1,613,505
1999	58,327	37,630	18,087	1,007,117	2,208,411	123,902	3,792,764	223,882	843,461
2000	75,113	44,803	20,567	725,557	1,251,238	84,653	2,496,110	128,725	1,285,316
2001	121,114	77,432	57,140	555,712	339,949	32,066	1,777,584	70,116	445,110
2002	(83,458)	(7,737)	(40,809)	275,268	266,115	77,094	268,236	51,893	1,751,376
2003	(9,309)	(4,047)	2,740	392,726	140,027	41,878	608,402	80,322	346,217
2004	7,838	7,871	6,249	254,106	43,526	17,075	376,122	11,503	268,226
2005	0	0	0	0	90,480	143,825	244,878	16,594	90,632
2006	35,613	25,438	7,538	1,312,062	1,107,218	886,767	3,529,021	87,637	230,110
2007	42,004	30,933	11,099	4,259,811	1,135,686	855,785	6,569,821	87,528	314,044
2008	43,514	32,285	12,119	3,422,639	231,707	72,627	4,073,051	86,351	337,965
2009	26,897	18,651	4,078	260,725	81,164	35,159	502,276	77,036	139,078
2010	26,897	18,651	4,078	260,725	81,164	35,159	502,276	77,036	139,078
2011	26,897	18,651	4,078	260,725	81,164	35,159	502,276	77,036	139,078
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0
TOTAL	17,877,439	8,506,505	12,946,477	135,154,958	66,497,864	53,767,780	389,131,285	61,149,894	46,102,682

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SANTA ANA DIVISION (continued)				WEST BRANCH				
	Reach 28G (a	Reach 28H	Reach 28J	Subtotal	Reach 29A	Reach 29F	Reach 29G	Reach 29H	Reach 29J
	[56]	[57]	[58]	[59]	[60]	[61]	[62]	[63]	[64]
1952	4,785	4,055	3,020	20,793	2,924	136	175	459	553
1953	15,580	11,511	9,476	64,106	9,093	344	237	1,754	1,683
1954	18,015	18,100	12,160	84,631	7,389	1,201	2,229	2,350	4,162
1955	6,052	6,081	4,151	28,546	1,019	585	1,086	1,147	2,029
1956	6,496	6,525	4,480	30,682	490	698	1,297	1,366	2,420
1957	24,044	24,156	16,585	113,576	1,809	2,583	4,792	5,057	8,952
1958	40,844	41,033	28,470	193,367	3,256	4,516	8,714	8,878	15,847
1959	45,746	45,946	44,331	233,485	7,953	9,150	19,414	18,243	35,583
1960	59,102	58,548	118,969	395,974	21,753	14,990	34,447	29,764	69,752
1961	32,226	34,382	674,787	825,108	22,442	12,775	21,559	20,086	39,761
1962	21,383	20,530	47,484	135,596	40,237	28,729	86,938	58,215	108,962
1963	43,884	41,698	1,506,440	1,735,306	91,959	69,162	163,347	110,015	211,592
1964	89,710	45,762	98,569	506,352	150,670	66,420	207,977	143,340	291,404
1965	96,956	76,899	146,095	805,543	361,811	77,914	403,115	127,430	589,638
1966	170,878	308,756	589,107	1,847,811	489,512	203,497	1,233,640	348,918	3,231,797
1967	233,968	283,126	987,832	5,327,761	1,589,715	882,096	1,117,243	891,607	31,088,491
1968	871,337	266,295	780,587	11,450,539	3,899,363	300,921	396,190	1,104,832	36,157,768
1969	1,117,873	1,444,654	756,442	11,895,208	6,592,580	336,480	693,348	1,184,454	9,655,871
1970	1,843,621	1,013,468	2,829,523	15,085,092	7,986,733	6,089,401	2,624,747	3,002,968	8,463,475
1971	16,095,702	6,401,303	12,111,623	45,555,612	4,247,037	3,768,699	1,120,231	8,244,651	5,844,024
1972	1,537,880	11,960,791	21,542,747	41,666,145	1,871,831	426,932	985,512	18,787,722	(23,015,734)
1973	209,664	247,769	3,673,344	6,078,500	775,824	168,064	399,856	9,408,706	1,821,206
1974	162,178	101,638	1,980,991	4,235,986	560,657	168,878	169,717	3,901,261	(3,454,239)
1975	157,365	124,399	1,626,274	5,862,488	353,670	421,176	925,693	664,113	609,891
1976	178,287	118,748	1,497,465	3,764,426	396,809	650,417	1,274,484	706,244	650,209
1977	127,106	89,036	323,091	1,391,573	390,637	3,018,637	2,152,961	196,012	1,135,148
1978	147,112	153,867	347,482	837,000	1,427,190	2,219,135	6,694,615	57,817	149,932
1979	29,723	19,225	225,947	385,337	940,013	2,168,382	19,813,742	597,858	331,313
1980	137,833	154,821	1,077,900	1,583,654	1,276,793	4,108,143	24,537,814	550,337	204,751
1981	28,815	22,654	61,349	187,713	(711,751)	2,699,873	19,806,531	94,944	28,852
1982	16,069	58,900	55,841	299,314	(465,217)	351,251	17,964,617	215,678	42,587
1983	18,213	89,581	(264,804)	376,058	100,394	180,971	6,751,649	220,029	24,295
1984	14,462	12,259	49,547	350,573	71,759	68,930	2,870,259	335,942	17,285
1985	17,816	11,481	54,070	151,493	142,244	25,386	2,126,670	102,366	21,971
1986	31,564	25,037	86,794	267,883	133,914	62,294	274,660	141,894	36,149
1987	17,141	8,005	45,528	102,790	13,936	453,949	711,773	192,511	27,931
1988	41,892	21,113	90,784	323,104	427,544	118,010	1,660,959	203,130	95,930
1989	28,708	12,619	51,556	(2,196,424)	207,067	430,662	584,186	241,811	97,472
1990	27,478	12,817	55,408	(1,385,019)	197,428	355,480	386,882	813,211	54,269
1991	142,139	15,524	62,794	(893,417)	219,321	344,386	453,336	1,132,520	55,176
1992	34,185	13,422	69,479	(1,427,482)	541,026	295,312	464,421	4,402,524	47,182
1993	44,300	27,047	162,854	5,720,209	464,987	320,182	643,189	3,361,457	74,198
1994	16,351	11,673	54,581	4,680,290	203,666	231,527	362,717	306,148	33,758
1995	35,402	28,202	164,254	4,039,213	344,358	392,647	536,253	468,656	34,007
1996	76,723	73,629	344,747	19,414,376	150,901	161,394	427,223	203,201	15,357
1997	50,662	20,720	268,293	7,322,753	298,002	71,310	432,940	276,180	50,095
1998	10,268	8,970	479,138	3,105,500	346,973	21,003	2,028,979	181,951	49,377
1999	84,563	45,203	324,045	1,521,154	296,367	37,791	1,080,369	125,121	50,944
2000	63,878	41,167	113,901	1,632,987	211,896	34,019	238,107	116,129	12,752
2001	18,724	12,527	86,471	632,948	41,401	8,288	100,282	107,743	7,430
2002	52,314	11,508	194,758	2,061,849	169,305	32,612	249,057	57,031	4,565
2003	1,093,434	2,479,743	174,660	4,174,376	46,382	13,185	94,703	50,878	43,728
2004	1,735,372	855,876	23,119	2,894,096	47,098	5,681	22,334	104,380	213,639
2005	2,049,472	409,829	270,555	2,837,082	273,707	0	39,668	0	51,947
2006	1,087,474	2,031,708	380,558	3,817,487	1,419,133	729,392	194,358	162,832	437,982
2007	32,550	1,681,603	11,474,286	13,590,011	1,411,290	733,691	750,501	1,107,857	17,711
2008	33,901	32,041	30,809,223	31,299,481	195,625	27,426	508,894	1,119,740	18,805
2009	20,076	22,233	35,511	293,934	101,394	16,805	4,052,486	76,090	9,112
2010	20,076	22,233	35,511	293,934	101,394	16,805	549,241	76,090	9,112
2011	20,076	22,233	35,511	293,934	101,394	16,805	304,061	76,090	9,112
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0
TOTAL	30,489,448	31,264,679	98,915,694	267,922,397	40,624,107	33,477,128	131,766,425	66,249,738	75,948,971

a) Includes excess capacity costs (not shown in Table B-9) allocated to MWDSC in the following years and repaid under Article 24(c) of its contract: 1970 - $362,000; 1971 - $6,198,000; 1972 - $139,000.

TABLE B-10. Capital Costs of Each Aqueduct Reach to be Reimbursed Through Capital Cost Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											GRAND TOTAL
	WEST BRANCH (cont.)		COASTAL BRANCH								Total	
	Reach 30	Subtotal	Reach 31A	Reach 33A	Reach 33B	Reach 34	Reach 35	Reach 37	Reach 38	Subtotal		
	[65]	[66]	[67]	[68]		[69]	[70]	[71]	[72]	[73]	[74]	[75]
1952	1,408	5,655	0	0	0	0	0	0	0	0	98,857	99,353
1953	4,346	17,457	0	0	0	0	0	0	0	0	309,387	311,812
1954	5,743	23,074	0	0	0	0	0	0	0	0	394,688	402,143
1955	1,943	7,809	0	0	0	0	0	0	0	0	159,842	169,342
1956	2,077	8,348	0	0	0	0	0	0	0	0	255,679	351,551
1957	7,684	30,877	0	0	0	0	0	0	0	0	708,753	1,464,452
1958	13,931	55,142	0	0	0	0	0	0	0	0	1,331,616	2,286,623
1959	44,384	134,727	28,046	49,114	0	7,441	8,236	0	0	92,837	2,096,392	2,967,412
1960	84,703	255,409	34,404	70,450	0	8,507	14,265	0	0	127,626	2,937,049	4,660,833
1961	123,330	239,953	13,801	17,868	0	1,501	3,931	0	0	37,101	4,650,264	8,545,244
1962	348,366	671,447	10,121	7,798	0	524	1,689	0	0	20,132	5,827,774	8,875,171
1963	521,491	1,167,566	20,470	14,299	0	880	2,943	0	0	38,592	18,981,487	24,610,278
1964	1,372,464	2,232,275	315,418	26,963	0	1,687	5,639	0	0	349,707	31,550,813	41,736,060
1965	3,383,950	4,943,858	747,023	36,178	0	2,118	7,060	0	0	792,379	57,936,405	62,664,743
1966	9,364,753	14,872,117	2,258,915	35,864	0	1,736	5,764	0	0	2,302,279	124,748,128	129,110,330
1967	17,618,827	53,187,979	6,310,419	38,331	0	1,891	6,213	0	0	6,356,854	187,465,580	194,146,365
1968	15,736,691	57,595,765	2,707,580	30,784	0	1,324	4,369	0	0	2,744,057	192,593,079	197,978,911
1969	16,228,175	34,690,908	423,797	26,549	0	907	2,905	0	0	454,158	182,530,023	184,473,490
1970	22,330,328	50,497,652	269,194	24,368	0	851	2,787	0	0	297,200	206,720,774	207,082,650
1971	16,890,503	40,115,145	164,446	32,230	0	1,315	3,804	0	0	201,795	158,414,033	158,624,739
1972	3,818,001	2,874,264	131,332	17,601	0	522	1,660	0	0	151,115	68,228,670	68,362,291
1973	13,426,222	25,999,878	182,493	16,154	0	542	1,758	0	0	200,947	45,110,823	45,263,853
1974	2,988,318	4,334,592	190,866	18,799	0	463	1,405	0	0	211,533	24,036,199	24,402,166
1975	1,808,235	4,782,778	64,582	36,012	0	2,255	6,656	0	0	109,505	21,065,768	21,318,838
1976	1,253,067	4,931,230	198,266	68,898	0	5,088	14,988	0	0	287,240	17,183,961	17,492,910
1977	345,023	7,238,418	918,473	81,305	0	1,834	5,387	0	0	1,006,999	15,165,801	15,544,382
1978	763,445	11,312,134	52,994	83,300	0	1,302	3,852	0	0	141,448	18,661,117	19,119,151
1979	282,145	24,133,453	38,182	108,951	0	1,505	4,433	0	0	153,071	31,202,118	31,857,362
1980	2,055,206	32,733,044	189,070	376,036	0	1,152	3,449	0	0	569,707	73,891,101	74,986,833
1981	275,460	22,193,909	19,897	(157,537)	0	1,427	4,261	0	0	(131,952)	15,246,649	15,742,773
1982	351,376	18,460,292	(16,381)	(96,449)	0	588	1,787	0	0	(110,455)	38,256,580	39,705,931
1983	566,545	7,843,883	85,496	67,106	0	794	2,398	0	0	155,794	34,705,281	38,044,649
1984	1,118,954	4,483,129	28,568	54,074	0	986	2,959	0	0	86,587	24,454,091	30,382,250
1985	284,243	2,702,880	36,834	54,314	0	2,111	6,263	0	0	99,522	14,914,930	28,537,556
1986	213,353	862,264	82,358	223,134	0	17,458	51,279	0	0	374,229	13,435,351	43,155,828
1987	158,313	1,558,413	53,817	1,061,939	0	92,506	272,968	0	0	1,481,230	11,711,428	34,331,982
1988	222,068	2,727,641	183,853	1,141,272	0	99,456	293,612	0	0	1,718,193	11,026,370	18,123,243
1989	148,674	1,709,872	84,678	893,765	0	77,283	228,038	0	0	1,283,764	30,302,112	33,130,497
1990	119,438	1,926,708	133,868	1,100,167	0	103,785	277,889	0	0	1,615,709	32,589,619	34,435,721
1991	229,315	2,434,054	164,610	1,635,283	0	123,603	363,889	0	0	2,287,385	38,320,942	39,811,664
1992	206,495	5,956,960	183,240	1,220,510	1,495,646	566,230	240,553	102,051	74,162	3,882,392	34,312,996	35,041,233
1993	296,349	5,160,362	344,928	5,274,657	5,052,431	1,345,211	688,935	268,937	358,367	13,333,467	53,122,385	53,921,788
1994	168,426	1,306,242	282,150	15,905,886	21,341,196	8,915,445	2,363,238	678,753	1,315,559	50,802,227	73,751,564	74,225,377
1995	304,983	2,080,904	1,196,326	45,172,271	62,947,362	23,975,738	20,849,939	7,029,108	7,117,197	168,287,940	191,033,089	191,525,570
1996	98,522	1,056,598	948,730	42,987,442	54,300,990	26,475,298	18,790,572	7,213,823	6,616,310	157,333,164	187,776,346	188,025,324
1997	233,956	1,362,483	562,583	11,209,633	13,893,576	10,456,863	4,149,105	545,378	798,606	41,615,744	62,137,369	62,583,537
1998	67,874	2,696,157	248,671	2,355,322	4,159,441	3,368,320	952,615	192,567	280,779	11,557,715	27,083,446	27,217,157
1999	117,470	1,708,062	288,155	2,913,031	4,398,199	2,617,504	357,331	36,680	51,648	10,662,548	24,089,004	24,559,088
2000	186,940	799,843	132,288	241,661	2,964,598	2,747,810	19,670	0	0	6,106,027	13,511,424	13,748,070
2001	17,175	282,319	102,285	79,245	559,917	15,389	11,334	0	0	768,170	5,175,588	7,507,776
2002	55,993	568,563	97,023	234,364	96,896	88,726	25,599	0	0	542,608	8,881,800	17,175,987
2003	19,607	268,483	39,881	233,536	11,802	50,867	33,642	0	0	369,728	3,208,434	10,956,313
2004	9,071	402,203	26,208	80,285	14,941	13,081	12,548	0	0	147,063	5,039,433	15,130,992
2005	580,754	946,076	29,204	(287,866)	37,518	0	0	0	0	(221,144)	7,501,466	15,540,998
2006	347,830	3,291,527	157,641	431,914	0	113,900	45,723	0	0	749,178	18,303,644	23,225,278
2007	4,804,679	8,825,729	196,592	448,845	0	109,735	44,051	0	0	799,223	40,471,444	54,652,883
2008	11,871,602	13,742,092	206,890	448,894	0	106,875	42,903	0	0	805,562	59,332,250	71,424,948
2009	46,715	4,302,602	109,984	365,173	0	103,363	41,493	0	0	620,013	7,198,558	7,373,746
2010	46,715	799,357	109,984	365,173	0	103,363	41,493	0	0	620,013	3,695,313	3,870,501
2011	46,715	554,177	109,984	365,173	0	103,363	41,493	0	0	620,013	1,174,190	1,174,190
2012	0	0	0	0	0	0	0	0	0	0	2,275,943	2,451,131
2013	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	154,040,369	502,106,738	21,500,237	137,240,069	171,274,513	81,842,423	50,370,773	16,067,297	16,612,628	494,907,940	2,588,295,221	2,805,643,270

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	UPPER FEATHER DIVISION	NORTH BAY AQUEDUCT					SOUTH BAY AQUEDUCT			
		Reach 1	Reach 2	Reach 3A	Reach 3B	Total	Reach 1	Reach 2	Reach 4	Reach 5
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	37,396	5,522	0	0
1963	0	0	0	0	0	0	147,719	20,639	0	0
1964	0	0	0	0	0	0	149,750	15,574	19,405	0
1965	0	0	0	0	0	0	259,939	45,718	46,485	0
1966	0	0	0	0	0	0	270,890	23,799	63,921	0
1967	0	0	0	0	0	0	438,050	32,798	108,127	0
1968	0	0	0	0	130	130	410,919	44,277	66,973	706
1969	0	0	0	0	80,875	80,875	487,377	48,339	75,644	706
1970	0	0	0	0	94,872	94,872	381,734	44,852	64,833	71,376
1971	54	0	0	0	45,579	45,579	357,850	25,666	50,344	38,735
1972	40	0	0	0	37,895	37,895	347,941	30,606	56,800	100,106
1973	1	0	0	0	32,993	32,993	386,897	36,172	58,288	28,810
1974	143	0	0	0	46,498	46,498	456,381	57,081	83,120	61,623
1975	1,069	0	0	0	37,707	37,707	624,989	46,111	81,361	36,682
1976	139	0	0	0	60,786	60,786	614,362	47,862	123,838	91,096
1977	892	0	0	0	78,400	78,400	511,065	48,926	104,280	102,083
1978	39	0	0	0	56,318	56,318	671,195	125,224	176,855	50,289
1979	3,235	0	0	0	73,852	73,852	650,826	76,849	212,826	91,380
1980	416	0	0	0	81,769	81,769	1,128,840	212,974	242,118	110,786
1981	3,847	0	0	0	101,340	101,340	884,763	130,126	167,118	204,772
1982	11,075	0	0	0	191,987	191,987	1,156,605	141,718	249,447	96,020
1983	1,928	0	0	0	80,215	80,215	1,258,144	84,360	373,875	152,255
1984	3,765	0	0	0	139,121	139,121	1,998,984	113,797	340,344	34,461
1985	2,888	0	0	0	259,515	259,515	2,044,121	207,478	427,930	247,308
1986	2,787	0	0	0	229,508	229,508	1,834,838	285,908	305,149	159,054
1987	2,388	0	0	0	310,683	310,683	2,118,974	163,714	400,547	283,067
1988	545	0	(94)	0	330,156	330,062	2,068,655	186,275	299,934	370,212
1989	1,800	473,408	178,069	237,480	373,427	1,262,384	2,164,688	163,481	320,734	497,038
1990	788	556,610	244,897	123,144	427,257	1,351,908	2,233,036	251,434	355,022	571,415
1991	3,654	651,307	302,327	205,516	428,470	1,587,620	1,806,699	152,509	95,745	93,986
1992	647	443,912	189,330	265,462	280,505	1,179,209	2,064,907	405,932	409,435	363,964
1993	3,630	435,240	294,416	213,267	289,206	1,232,129	3,925,050	621,712	480,832	399,558
1994	2,279	430,112	198,322	206,594	365,646	1,200,674	4,673,275	302,115	404,709	408,066
1995	2,906	428,313	282,898	151,703	295,326	1,158,240	3,849,620	316,905	566,447	330,706
1996	8,007	796,526	272,743	240,106	260,001	1,569,376	3,526,989	254,075	664,485	493,300
1997	7,449	504,476	210,763	213,211	315,374	1,243,824	3,010,809	189,269	591,540	230,371
1998	798	405,029	227,562	204,964	251,183	1,088,738	2,965,468	426,872	532,042	303,325
1999	416	668,954	326,989	296,605	288,169	1,580,717	3,701,631	472,798	429,082	414,830
2000	505	920,906	255,241	658,168	414,700	2,249,015	3,817,480	542,905	442,515	552,538
2001	319	1,072,623	229,820	455,870	181,522	1,939,835	2,909,692	272,876	290,330	391,186
2002	3,627	1,588,349	416,749	411,379	399,274	2,815,751	3,865,610	343,132	468,352	543,895
2003	3,393	1,777,686	545,908	567,866	354,483	3,245,943	2,352,996	366,393	576,229	964,901
2004	3,455	1,602,507	635,773	738,104	818,511	3,794,895	3,345,983	511,123	747,800	701,961
2005	3,451	1,059,738	323,279	774,767	414,332	2,572,116	3,330,782	263,543	428,970	813,898
2006	3,100	1,521,394	504,829	709,233	531,591	3,267,047	2,992,891	400,332	616,170	905,468
2007	3,200	1,584,868	530,095	739,756	554,856	3,409,575	3,194,621	430,935	658,467	1,072,722
2008	3,250	1,643,049	551,084	770,722	574,417	3,539,272	3,383,584	455,510	692,695	1,126,744
2009	3,300	926,412	258,366	462,833	390,187	2,037,798	4,099,129	478,799	772,701	667,221
2010	3,300	926,147	258,396	462,691	390,135	2,037,369	4,099,299	478,827	772,712	666,869
2011	3,300	929,708	259,272	464,465	391,454	2,044,899	4,112,664	480,495	775,451	672,068
2012	3,300	929,963	259,311	464,597	391,544	2,045,415	4,113,390	480,578	775,597	672,302
2013	3,300	930,782	259,328	465,023	391,775	2,046,908	4,114,257	480,663	775,808	673,220
2014	3,300	931,443	259,183	465,382	391,870	2,047,878	4,112,906	480,483	775,632	674,205
2015	3,300	932,136	259,387	465,727	392,165	2,049,415	4,116,091	480,855	776,230	674,691
2016	3,300	930,864	259,113	465,084	391,676	2,046,737	4,111,515	480,326	775,348	673,647
2017	3,300	931,398	259,210	465,356	391,871	2,047,835	4,113,197	480,519	775,676	674,112
2018	3,300	932,358	259,229	465,857	392,141	2,049,585	4,114,217	480,620	775,926	675,191
2019	3,300	930,957	258,990	465,142	391,633	2,046,722	4,109,973	480,134	775,091	673,944
2020	3,300	931,721	259,262	465,521	391,989	2,048,493	4,114,125	480,623	775,861	674,407
2021	3,300	932,052	259,463	465,676	392,188	2,049,379	4,116,993	480,968	776,377	674,478
2022	3,300	932,124	259,191	465,737	392,056	2,049,108	4,113,513	480,539	775,788	674,979
2023	3,300	930,912	259,147	465,106	391,710	2,046,875	4,111,990	480,384	775,433	673,648
2024	3,300	931,429	259,145	465,377	391,846	2,047,797	4,112,376	480,417	775,539	674,247
2025	3,300	932,362	259,444	465,839	392,259	2,049,904	4,116,988	480,959	776,399	674,863
2026	3,300	930,683	258,916	465,005	391,520	2,046,124	4,108,800	479,998	774,870	673,741
2027	3,300	933,603	259,817	466,458	392,799	2,052,677	4,122,843	481,646	777,498	675,719
2028	3,300	930,658	258,849	464,998	391,478	2,045,983	4,107,909	479,889	774,715	673,815
2029	3,300	931,724	259,312	465,515	392,016	2,048,567	4,114,779	480,704	775,973	674,331
2030	3,300	930,740	259,116	465,018	391,646	2,046,520	4,111,450	480,319	775,327	673,498
2031	3,300	934,100	259,761	466,721	392,901	2,053,483	4,122,521	481,594	777,482	676,377
2032	3,300	930,149	258,691	464,746	391,253	2,044,839	4,105,445	479,599	774,254	673,474
2033	3,300	931,719	259,421	465,506	392,077	2,048,723	4,116,210	480,878	776,218	674,155
2034	3,300	932,090	259,340	465,706	392,128	2,049,264	4,115,432	480,775	776,112	674,709
2035	3,300	930,268	258,736	464,803	391,309	2,045,116	4,106,118	479,681	774,381	673,542
TOTAL	181,025	43,703,509	13,718,396	20,743,806	20,766,075	98,931,786	195,849,145	22,417,488	34,909,562	31,698,852

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	42,918	0	0	0	0
1963	0	0	0	0	168,358	0	0	0	0
1964	0	0	0	0	184,729	0	0	0	0
1965	2,634	6,490	4,704	12,904	378,874	0	0	0	0
1966	4,707	10,328	9,233	25,519	408,397	0	0	0	0
1967	2,712	7,659	10,812	34,347	634,505	0	0	0	0
1968	3,109	7,960	10,166	40,372	584,482	1,001,998	228,359	103,116	1,333,473
1969	3,944	5,975	8,795	38,566	669,346	933,116	301,596	188,194	1,422,906
1970	2,464	(1,991)	6,870	28,210	598,348	971,602	306,198	151,539	1,429,339
1971	3,116	9,394	9,895	31,068	526,068	1,103,021	254,786	113,694	1,471,501
1972	5,125	10,247	12,054	44,699	607,578	1,107,855	230,906	110,109	1,448,870
1973	4,178	7,500	4,890	43,816	570,551	1,150,864	221,445	100,221	1,472,530
1974	7,812	7,564	5,523	48,054	727,158	1,272,034	231,383	117,156	1,620,573
1975	18,120	14,683	18,325	68,377	908,648	1,434,736	455,110	201,075	2,090,921
1976	10,873	5,557	19,920	49,921	963,429	1,519,801	217,348	453,400	2,190,549
1977	(240)	2,228	8,391	89,579	866,312	1,913,643	292,380	196,564	2,402,587
1978	(1,404)	16,766	(5,313)	104,078	1,137,690	1,860,456	306,503	188,214	2,355,173
1979	1,269	29,294	7,351	106,835	1,176,630	1,848,109	231,339	145,205	2,224,653
1980	3,621	24,270	17,404	110,852	1,850,865	2,365,292	472,660	247,608	3,085,560
1981	4,038	20,109	17,586	98,143	1,526,655	2,649,730	435,226	154,191	3,239,147
1982	2,236	22,870	21,919	202,590	1,893,405	3,192,710	599,793	244,664	4,037,167
1983	(2,047)	48,781	45,573	216,434	2,177,375	4,244,937	802,908	273,081	5,320,926
1984	4,449	44,017	23,563	455,054	3,014,669	4,373,157	808,917	290,728	5,472,802
1985	13,097	74,565	57,920	238,067	3,310,486	4,717,323	629,825	189,199	5,536,347
1986	11,614	31,084	46,864	363,350	3,037,861	5,217,491	929,919	359,365	6,506,775
1987	15,273	25,182	37,949	416,375	3,461,081	5,292,200	958,927	362,065	6,613,192
1988	30,207	41,047	49,156	335,408	3,380,894	5,329,317	822,300	360,336	6,511,953
1989	9,740	54,881	114,203	179,323	3,504,088	5,753,966	851,745	907,609	7,513,320
1990	31,161	69,416	119,309	247,781	3,878,574	6,788,986	1,066,314	883,822	8,739,122
1991	22,434	(18,690)	99,577	262,052	2,514,312	6,796,247	1,067,078	585,008	8,448,333
1992	26,787	332,012	98,670	186,640	3,888,347	9,415,121	1,419,603	673,833	11,508,557
1993	24,845	181,592	94,169	316,045	6,043,803	10,274,070	1,371,074	900,996	12,546,140
1994	28,383	90,791	80,942	416,061	6,404,342	8,451,199	1,325,511	802,217	10,578,927
1995	29,298	64,012	80,278	373,657	5,610,923	10,406,784	2,386,507	959,685	13,752,976
1996	(1,020)	60,610	11,672	312,097	5,322,208	10,246,985	2,604,651	628,177	13,479,813
1997	18,428	95,321	15,691	335,566	4,486,995	10,429,338	1,098,381	2,084,859	13,612,578
1998	26,323	54,255	611,290	658,090	5,577,665	11,410,436	1,449,411	5,364,368	18,224,215
1999	49,762	34,829	426,694	2,030,604	7,560,230	11,446,675	1,365,947	1,301,570	14,114,192
2000	135,909	87,815	185,985	641,445	6,406,592	12,637,999	905,934	648,421	14,192,354
2001	112,970	188,989	197,745	1,048,191	5,411,979	17,559,077	1,375,177	752,734	19,686,988
2002	143,886	171,491	501,630	2,781,431	8,819,427	14,429,951	861,125	622,521	15,913,597
2003	78,084	97,968	248,068	987,782	5,672,421	16,535,948	1,724,007	749,673	19,009,628
2004	156,691	179,277	205,603	454,479	6,302,917	14,177,440	1,308,095	733,356	16,218,891
2005	143,175	202,435	135,636	224,528	5,542,967	12,551,578	1,935,671	873,917	15,361,166
2006	131,191	165,321	204,183	581,861	5,997,417	14,805,852	1,332,319	703,409	16,841,580
2007	136,411	172,607	222,778	630,651	6,519,192	15,666,838	1,434,005	804,192	17,905,035
2008	140,856	178,739	237,550	669,594	6,885,272	16,586,177	1,515,807	882,669	18,984,653
2009	90,837	84,173	102,317	502,075	6,797,252	11,356,421	2,164,030	721,285	14,241,736
2010	90,848	84,184	102,329	502,136	6,797,204	11,355,782	2,163,388	721,092	14,240,262
2011	91,155	84,471	102,675	503,834	6,822,813	11,392,790	2,171,770	723,555	14,288,115
2012	91,169	84,483	102,690	503,909	6,824,118	11,394,497	2,172,253	723,710	14,290,460
2013	91,171	84,488	102,696	503,934	6,826,237	11,398,180	2,174,015	724,252	14,296,447
2014	91,120	84,439	102,636	503,642	6,825,063	11,398,634	2,175,753	724,759	14,299,146
2015	91,190	84,503	102,717	504,036	6,830,313	11,404,761	2,176,876	725,136	14,306,773
2016	91,096	84,416	102,610	503,507	6,822,465	11,395,071	2,174,621	724,401	14,294,093
2017	91,129	84,448	102,646	503,693	6,825,420	11,398,842	2,175,604	724,716	14,299,162
2018	91,135	84,452	102,652	503,721	6,827,914	11,403,168	2,177,675	725,352	14,306,195
2019	91,051	84,374	102,558	503,260	6,820,385	11,393,469	2,175,070	724,519	14,293,058
2020	91,146	84,463	102,668	503,793	6,827,086	11,401,016	2,176,213	724,910	14,302,139
2021	91,218	84,529	102,748	504,185	6,831,496	11,405,600	2,176,536	725,043	14,307,179
2022	91,121	84,439	102,637	503,645	6,826,661	11,401,546	2,177,233	725,213	14,303,992
2023	91,107	84,428	102,622	503,571	6,823,183	11,395,800	2,174,655	724,416	14,294,871
2024	91,105	84,425	102,620	503,563	6,824,292	11,397,931	2,175,800	724,766	14,298,497
2025	91,209	84,522	102,738	504,144	6,831,822	11,406,579	2,177,255	725,260	14,309,094
2026	91,025	84,352	102,530	503,117	6,818,433	11,391,153	2,174,611	724,366	14,290,130
2027	91,342	84,645	102,887	504,872	6,841,452	11,417,750	2,179,250	725,929	14,322,929
2028	91,002	84,330	102,502	502,985	6,817,147	11,389,977	2,174,690	724,378	14,289,045
2029	91,164	84,480	102,688	503,891	6,828,010	11,401,827	2,176,111	724,889	14,302,827
2030	91,097	84,417	102,611	503,512	6,822,231	11,394,591	2,174,340	724,315	14,293,246
2031	91,322	84,626	102,864	504,757	6,841,543	11,418,937	2,180,445	726,284	14,325,666
2032	90,945	84,277	102,440	502,676	6,813,110	11,385,321	2,173,886	724,107	14,283,314
2033	91,203	84,516	102,732	504,109	6,830,021	11,403,573	2,175,884	724,838	14,304,295
2034	91,174	84,489	102,697	503,941	6,829,329	11,403,798	2,176,862	725,124	14,305,784
2035	90,961	84,292	102,458	502,763	6,814,196	11,386,528	2,174,058	724,166	14,284,752
TOTAL	4,056,263	5,214,911	7,112,191	30,137,767	331,396,179	597,563,601	96,855,074	45,973,541	740,392,216

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION		
	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8C	Reach 8D	Reach 9
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	120,038	428,308	130,105	44,591	104,033	827,075	0	0	0
1969	90,033	460,907	184,467	35,696	235,322	1,006,425	22,013	134,760	86,103
1970	89,547	484,300	226,002	66,070	192,582	1,058,501	26,207	156,981	128,273
1971	99,917	541,574	175,592	64,193	158,170	1,039,446	32,312	190,753	118,372
1972	116,708	647,979	174,519	73,670	154,783	1,167,659	35,031	187,242	130,396
1973	116,791	611,705	158,145	58,344	153,955	1,098,940	51,150	225,747	127,530
1974	120,309	671,455	150,835	63,905	150,230	1,156,734	34,752	199,127	131,298
1975	133,593	839,285	178,974	81,478	157,586	1,390,916	78,523	250,377	159,006
1976	54,938	883,956	220,832	90,305	174,835	1,424,866	39,348	133,933	123,424
1977	73,331	1,114,465	270,734	98,132	196,311	1,752,973	38,086	121,348	178,078
1978	45,867	898,992	203,261	106,938	203,079	1,458,137	45,552	178,805	129,928
1979	223,973	842,508	144,055	99,670	180,734	1,490,940	69,973	150,679	129,756
1980	243,507	1,176,463	222,942	127,625	281,860	2,052,397	57,726	274,848	185,155
1981	265,766	1,065,358	193,048	90,533	1,612,157	3,226,862	80,121	198,256	144,187
1982	279,250	1,241,285	209,371	114,421	1,433,180	3,277,507	59,424	269,086	233,494
1983	214,468	1,949,017	339,809	131,377	2,143,678	4,778,349	49,448	383,476	223,078
1984	241,273	2,233,969	335,166	163,858	2,111,386	5,085,652	42,062	458,489	300,924
1985	322,068	2,882,583	360,431	176,577	1,603,532	5,345,191	58,820	495,500	213,368
1986	416,027	2,996,792	472,551	252,188	601,250	4,738,808	90,730	478,786	596,800
1987	362,738	3,104,592	424,107	236,349	439,232	4,567,018	113,962	412,042	446,067
1988	365,209	2,954,186	456,864	231,754	639,242	4,647,255	96,728	379,073	417,991
1989	263,171	3,182,472	393,589	332,986	633,419	4,805,637	83,282	389,698	400,853
1990	397,353	4,011,110	579,073	464,639	729,132	6,181,307	111,019	436,849	515,611
1991	256,473	4,388,184	543,760	728,156	765,765	6,682,338	104,414	496,794	465,940
1992	302,021	3,792,401	795,587	363,134	815,590	6,068,733	118,315	511,982	417,871
1993	439,725	4,337,616	1,008,394	551,849	734,796	7,072,380	230,338	745,885	490,159
1994	282,579	4,376,461	816,129	396,768	492,860	6,364,797	125,398	602,404	572,557
1995	107,995	5,026,076	1,066,971	440,006	1,356,668	7,997,716	185,681	657,282	432,072
1996	1,003,229	4,738,221	931,944	683,323	1,034,376	8,391,093	112,062	416,294	472,350
1997	859,665	5,761,996	924,289	254,934	646,209	8,447,093	128,190	449,316	728,436
1998	690,845	5,522,567	1,242,589	534,931	654,538	8,645,470	115,748	457,845	429,433
1999	697,893	5,684,969	1,219,793	531,972	670,006	8,804,633	104,822	396,623	409,411
2000	712,071	5,849,518	1,033,992	528,537	876,030	9,000,148	104,381	467,347	513,824
2001	(558,917)	7,151,253	851,983	373,030	679,856	8,497,205	58,436	553,295	603,147
2002	1,071,739	5,193,633	673,240	255,190	738,467	7,932,269	55,252	729,942	417,109
2003	1,026,535	6,040,701	750,339	304,182	620,749	8,742,506	62,618	674,449	643,946
2004	655,509	7,033,601	725,042	344,853	606,863	9,365,868	37,161	484,074	337,980
2005	543,326	6,052,036	975,929	396,253	792,532	8,760,076	26,876	389,759	285,162
2006	900,505	6,872,937	1,103,796	449,812	801,602	10,128,652	44,509	512,149	416,311
2007	922,828	7,049,871	1,482,975	462,406	826,715	10,744,795	46,041	529,672	430,539
2008	896,429	7,428,878	1,857,947	473,214	848,446	11,504,914	47,371	544,972	442,974
2009	809,554	4,574,988	979,216	461,417	630,100	7,455,275	273,491	1,039,646	852,726
2010	808,748	4,572,037	979,333	461,182	629,812	7,451,112	273,514	1,039,295	852,382
2011	817,259	4,598,204	984,364	463,987	633,594	7,497,408	274,454	1,043,544	855,949
2012	817,614	4,599,964	984,515	464,147	633,802	7,500,042	274,500	1,043,847	856,215
2013	819,431	4,607,370	984,564	464,760	634,579	7,510,704	274,532	1,044,873	857,169
2014	821,880	4,615,848	983,992	465,409	635,372	7,522,501	274,404	1,045,783	858,090
2015	822,253	4,619,118	984,762	465,747	635,834	7,527,714	274,618	1,046,556	858,720
2016	820,960	4,611,545	983,728	465,032	634,882	7,516,147	274,320	1,045,085	857,469
2017	821,615	4,615,016	984,091	465,350	635,301	7,521,373	274,427	1,045,713	858,011
2018	823,752	4,623,708	984,148	466,070	636,214	7,533,892	274,466	1,046,917	859,134
2019	821,949	4,614,380	983,247	465,223	635,101	7,519,900	274,201	1,045,267	857,700
2020	822,057	4,617,229	984,284	465,549	635,562	7,524,681	274,484	1,046,096	858,345
2021	821,583	4,617,139	985,053	465,607	635,673	7,525,055	274,689	1,046,410	858,547
2022	823,438	4,622,114	984,000	465,926	636,024	7,531,502	274,422	1,046,638	858,890
2023	820,859	4,611,441	983,857	465,034	634,893	7,516,084	274,355	1,045,125	857,492
2024	822,093	4,616,339	983,839	465,438	635,398	7,523,107	274,364	1,045,784	858,112
2025	822,430	4,620,342	984,972	465,864	635,991	7,529,599	274,677	1,046,809	858,931
2026	821,758	4,612,973	982,968	465,084	634,912	7,517,695	274,122	1,044,956	857,442
2027	823,033	4,626,057	986,396	466,461	636,813	7,538,760	275,069	1,048,193	860,051
2028	822,116	4,613,794	982,710	465,130	634,956	7,518,706	274,057	1,044,959	857,478
2029	821,744	4,616,444	984,478	465,500	635,508	7,523,674	274,535	1,046,069	858,299
2030	820,649	4,610,335	983,740	464,932	634,758	7,514,414	274,321	1,044,929	857,318
2031	824,537	4,631,567	986,172	466,894	637,350	7,546,520	275,024	1,048,846	860,692
2032	821,903	4,611,536	982,108	464,892	634,626	7,515,065	273,890	1,044,396	857,023
2033	821,051	4,614,662	984,905	465,390	635,391	7,521,399	274,642	1,046,010	858,190
2034	822,432	4,619,425	984,579	465,755	635,836	7,528,027	274,570	1,046,519	858,707
2035	821,905	4,611,945	982,278	464,939	634,696	7,515,763	273,936	1,044,523	857,120
TOTAL	37,624,928	262,049,700	50,771,470	23,834,568	45,394,734	419,675,400	10,431,966	43,948,727	36,785,115

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SOUTH SAN JOAQUIN DIVISION (continued)								
	Reach 10A	Reach 11B	Reach 12D	Reach 12E	Reach 13B	Reach 14A	Reach 14B	Reach 14C	Reach 15A
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	83,706	59,077	0	0	0	0	0	0	0
1970	118,046	85,758	94,171	123,374	152,424	0	0	0	0
1971	129,811	80,282	95,075	91,389	167,142	691,791	151,979	111,623	529,723
1972	117,625	84,287	98,647	115,592	146,096	877,535	124,831	101,479	609,058
1973	117,706	92,257	74,238	114,843	221,385	961,855	120,106	99,429	692,748
1974	141,658	98,103	74,914	193,523	141,540	898,272	143,866	115,649	853,098
1975	207,908	124,105	61,799	117,194	108,154	1,156,757	180,614	119,889	988,045
1976	139,134	69,715	33,655	147,908	134,063	1,124,051	177,086	114,133	1,037,799
1977	194,086	108,644	91,547	175,039	137,975	1,397,006	203,837	119,467	1,339,196
1978	168,634	106,702	72,585	170,578	151,120	1,254,043	139,662	132,224	1,265,813
1979	175,107	85,942	56,331	174,147	150,029	1,490,461	201,935	260,981	1,216,126
1980	284,207	120,896	123,120	167,249	164,749	1,988,619	189,132	238,607	1,437,614
1981	199,927	76,965	33,322	113,202	171,669	1,741,488	163,934	161,182	1,799,832
1982	264,947	158,178	142,631	224,170	224,051	1,793,867	195,086	15,768	1,933,859
1983	308,801	136,350	124,724	203,733	217,324	2,421,794	199,708	181,879	2,550,842
1984	396,448	163,331	108,212	188,724	245,764	3,312,127	329,490	204,332	3,215,901
1985	298,337	198,368	154,995	194,327	360,308	3,463,178	237,127	180,068	3,427,049
1986	422,493	248,170	242,660	346,410	349,369	3,781,427	320,984	360,156	3,574,451
1987	488,226	334,059	325,697	469,378	322,824	3,731,912	463,757	238,813	4,080,465
1988	532,489	290,881	220,658	374,653	318,253	3,451,893	411,110	313,806	3,746,920
1989	733,030	268,025	207,487	595,433	380,883	3,512,884	333,996	220,978	3,751,081
1990	651,465	363,652	225,171	480,738	677,729	4,021,727	439,953	212,851	4,381,643
1991	716,328	328,683	269,873	371,312	433,313	4,309,082	424,704	273,169	4,566,702
1992	574,145	334,579	270,768	409,314	423,717	4,734,368	729,211	571,412	4,270,793
1993	723,450	413,722	278,375	496,851	594,201	5,182,830	664,063	423,780	5,266,124
1994	703,493	346,600	239,873	482,301	445,909	4,012,614	414,899	254,393	3,727,019
1995	881,902	405,045	242,253	622,654	507,102	4,607,154	309,283	315,905	3,973,757
1996	984,784	367,570	238,622	519,560	604,736	4,892,967	214,773	187,784	4,331,630
1997	1,864,113	309,696	254,080	516,115	429,771	5,094,202	261,221	275,610	4,011,366
1998	1,011,284	295,927	170,556	384,226	484,072	4,753,508	309,440	248,178	4,695,541
1999	1,125,514	373,814	171,495	399,331	504,020	5,041,004	351,551	231,583	4,753,855
2000	924,210	407,081	329,756	651,715	567,781	5,957,878	343,438	141,041	5,385,171
2001	870,742	413,016	893,071	519,027	660,369	4,701,148	(133,796)	(94,419)	6,007,151
2002	1,309,728	381,311	295,967	959,788	862,655	5,969,394	39,304	256,180	5,598,378
2003	817,168	338,931	233,756	690,414	612,296	6,183,504	(128,254)	24,819	6,974,920
2004	609,367	244,096	173,363	623,894	584,409	7,283,893	(107,944)	(142,634)	8,848,430
2005	884,677	212,724	119,691	851,556	469,679	6,312,322	(169,616)	(182,745)	5,900,809
2006	779,349	259,016	155,809	735,600	545,429	6,846,089	247,423	208,109	7,734,486
2007	806,084	267,872	161,061	760,885	564,124	7,300,049	255,825	215,190	8,166,971
2008	829,373	275,610	165,708	782,871	580,421	7,614,095	263,210	221,403	8,471,420
2009	866,629	648,969	589,638	917,194	964,134	5,962,564	813,829	562,199	5,679,840
2010	866,734	648,784	589,284	917,029	963,862	5,961,567	813,474	561,935	5,679,527
2011	869,659	651,382	591,931	920,549	967,722	5,982,017	816,922	564,345	5,698,023
2012	869,791	651,562	592,153	920,774	967,987	5,983,449	817,184	564,530	5,699,191
2013	869,834	652,136	593,057	921,383	968,832	5,987,257	818,153	565,239	5,701,520
2014	869,331	652,595	594,073	921,725	969,511	5,989,245	819,123	565,970	5,701,391
2015	870,011	653,081	594,495	922,420	970,233	5,993,763	819,721	566,380	5,705,755
2016	869,096	652,189	593,538	921,234	968,909	5,986,134	818,504	565,526	5,698,987
2017	869,418	652,564	593,976	921,717	969,465	5,989,210	819,036	565,900	5,701,594
2018	869,467	653,235	595,034	922,432	970,459	5,993,680	820,176	566,731	5,704,324
2019	868,670	652,253	593,868	921,186	969,002	5,985,694	818,763	565,732	5,697,646
2020	869,589	652,792	594,250	922,000	969,801	5,991,023	819,366	566,138	5,703,082
2021	870,267	653,021	594,262	922,430	970,145	5,993,891	819,529	566,227	5,706,485
2022	869,338	653,069	594,837	922,223	970,213	5,992,338	819,934	566,562	5,703,212
2023	869,210	652,221	593,530	921,303	968,959	5,986,573	818,523	565,532	5,699,534
2024	869,194	652,585	594,127	921,678	969,496	5,988,900	819,152	565,994	5,700,845
2025	870,196	653,238	594,650	922,634	970,465	5,995,155	819,923	566,521	5,707,038
2026	868,425	652,063	593,689	920,917	968,716	5,983,950	818,519	565,560	5,696,003
2027	871,452	654,109	595,393	923,892	971,761	6,003,344	820,983	567,249	5,715,005
2028	868,196	652,044	593,780	920,835	968,689	5,983,375	818,567	565,604	5,695,087
2029	869,759	652,789	594,158	922,048	969,802	5,991,375	819,306	566,088	5,703,726
2030	869,107	652,101	593,390	921,149	968,781	5,985,586	818,351	565,411	5,698,695
2031	871,255	654,454	596,057	924,201	972,270	6,005,198	821,648	567,742	5,715,582
2032	867,665	651,687	593,487	920,316	968,158	5,979,986	818,139	565,312	5,691,760
2033	870,136	652,788	593,957	922,150	969,803	5,992,119	819,173	565,974	5,705,117
2034	869,848	653,047	594,526	922,340	970,181	5,993,218	819,717	566,386	5,705,023
2035	867,814	651,770	593,539	920,444	968,282	5,980,831	818,229	565,374	5,692,634
TOTAL	46,059,593	26,941,568	23,354,395	40,437,221	40,982,493	305,530,230	31,120,872	22,204,233	299,022,412

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to Be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SOUTH SAN JOAQUIN DIVISION (continued)		TEHACHAPI DIVISION			MOJAVE DIVISION			
	Reach 16A	Subtotal	Reach 17E	Reach 17F	Subtotal	Reach 18A	Reach 19	Reach 19C	Reach 20A
	[38]	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	385,659	0	0	0	0	0	0	0
1970	0	885,234	0	0	0	0	0	0	0
1971	10,291	2,400,543	3,471	0	3,471	0	0	0	0
1972	1,106,884	3,734,703	1,424,782	28,127	1,452,909	36,699	135,675	0	130,711
1973	1,243,941	4,142,935	1,777,260	49,949	1,827,209	36,207	146,739	0	161,838
1974	1,343,972	4,369,772	2,298,091	16,259	2,314,350	30,525	90,404	0	115,571
1975	1,537,862	5,090,233	2,403,430	35,193	2,438,623	40,588	122,584	0	137,684
1976	1,727,428	5,001,677	2,776,194	126,653	2,902,847	118,610	201,215	0	182,927
1977	1,961,081	6,065,390	3,845,464	83,936	3,929,400	93,565	226,906	0	180,884
1978	1,922,950	5,738,596	2,954,313	42,637	2,996,950	91,815	200,759	0	215,673
1979	1,798,566	5,960,033	3,539,402	45,997	3,585,399	99,670	307,386	0	261,205
1980	2,231,456	7,463,378	4,749,245	54,806	4,804,051	116,487	446,175	0	290,719
1981	2,762,773	7,646,858	5,485,957	64,886	5,550,843	316,590	585,003	0	325,112
1982	2,961,383	8,475,944	6,349,080	55,997	6,405,077	447,739	638,615	0	275,763
1983	4,302,165	11,303,322	14,153,033	96,397	14,249,430	345,229	564,698	0	368,139
1984	5,077,824	14,043,628	18,448,383	77,201	18,525,584	267,497	563,588	0	413,443
1985	5,683,454	14,964,899	18,134,698	137,928	18,272,626	298,932	475,028	0	450,444
1986	5,780,666	16,593,102	19,297,129	109,938	19,407,067	703,413	350,906	0	347,690
1987	5,636,043	17,063,245	17,398,908	98,355	17,497,263	1,261,056	558,996	0	818,475
1988	5,150,238	15,704,693	17,697,838	138,405	17,836,243	1,242,139	560,911	0	585,014
1989	5,458,633	16,336,263	17,641,151	88,488	17,729,639	1,049,615	283,065	0	366,590
1990	6,440,643	18,959,051	19,995,760	99,868	20,095,628	1,298,537	229,083	0	469,502
1991	5,805,189	18,565,503	19,903,346	131,558	20,034,904	1,432,360	665,443	0	1,025,089
1992	6,471,964	19,838,439	18,194,788	279,610	18,474,398	1,167,898	738,238	0	666,181
1993	7,583,165	23,092,943	19,051,939	199,640	19,251,579	1,868,745	606,763	0	1,232,409
1994	7,142,378	19,069,838	17,354,702	204,963	17,559,665	1,699,479	763,493	0	1,145,700
1995	6,540,575	19,680,665	19,360,033	191,516	19,551,549	1,284,146	614,314	0	1,941,939
1996	7,065,052	20,408,184	19,041,451	237,846	19,279,297	1,163,708	576,674	0	1,335,804
1997	7,387,904	21,710,020	19,724,881	176,120	19,901,001	1,330,450	730,628	0	1,401,562
1998	7,531,886	20,887,644	23,229,552	182,754	23,412,306	1,513,824	309,052	0	7,568,901
1999	8,717,679	22,580,702	19,690,120	152,644	19,842,764	3,104,013	632,659	0	5,313,388
2000	12,484,909	28,278,532	23,258,426	245,010	23,503,436	1,876,491	740,777	0	1,382,646
2001	15,785,706	30,836,893	24,056,649	618,258	24,674,907	2,440,376	2,549,692	0	1,843,160
2002	11,475,179	28,350,187	20,789,485	472,793	21,262,278	1,405,443	800,065	0	758,244
2003	11,512,641	28,641,208	20,865,522	283,196	21,148,718	3,734,791	673,419	0	707,540
2004	14,644,290	33,620,379	26,619,990	244,908	26,864,898	1,819,685	1,349,413	0	1,303,773
2005	13,904,817	29,005,711	16,556,912	1,498,186	18,055,098	5,650,484	1,487,019	0	1,529,919
2006	14,204,922	32,689,201	20,116,620	656,919	20,773,539	2,752,334	900,927	0	1,109,718
2007	14,101,850	33,606,163	20,806,857	679,568	21,486,425	2,844,236	930,542	0	1,142,027
2008	14,750,686	34,990,114	21,274,592	699,209	21,973,801	2,839,232	938,819	0	1,013,192
2009	8,201,150	27,372,009	23,256,250	341,348	23,597,598	1,962,373	1,050,623	0	1,579,321
2010	8,199,684	27,367,071	23,256,149	341,282	23,597,431	1,961,828	1,047,087	0	1,577,159
2011	8,226,121	27,462,618	23,304,514	342,599	23,647,113	1,969,724	1,056,301	0	1,586,117
2012	8,228,118	27,469,301	23,308,938	342,681	23,651,619	1,970,265	1,057,664	0	1,587,131
2013	8,233,567	27,487,552	23,316,044	342,915	23,658,959	1,971,983	1,065,412	0	1,592,155
2014	8,236,619	27,497,860	23,311,776	343,048	23,654,824	1,973,346	1,076,576	0	1,598,802
2015	8,242,826	27,518,579	23,329,727	343,305	23,673,032	1,974,816	1,077,135	0	1,599,872
2016	8,232,265	27,483,256	23,302,969	342,865	23,645,834	1,972,133	1,073,227	0	1,596,406
2017	8,236,547	27,497,578	23,313,034	343,045	23,656,079	1,973,267	1,075,547	0	1,598,231
2018	8,242,934	27,518,989	23,321,377	343,313	23,664,690	1,975,275	1,084,522	0	1,604,048
2019	8,231,814	27,481,796	23,295,770	342,851	23,638,621	1,972,326	1,078,278	0	1,599,207
2020	8,239,084	27,506,050	23,318,682	343,151	23,661,833	1,973,950	1,077,200	0	1,599,467
2021	8,242,925	27,518,828	23,333,830	343,308	23,677,138	1,974,659	1,074,112	0	1,598,194
2022	8,241,075	27,512,751	23,317,116	343,239	23,660,355	1,974,789	1,083,652	0	1,603,354
2023	8,232,861	27,485,218	23,305,439	342,890	23,648,329	1,972,243	1,072,786	0	1,596,241
2024	8,236,206	27,496,437	23,309,134	343,032	23,652,166	1,973,334	1,078,099	0	1,599,637
2025	8,244,760	27,524,997	23,334,887	343,388	23,678,275	1,975,305	1,077,834	0	1,600,513
2026	8,229,421	27,473,783	23,289,094	342,752	23,631,846	1,971,751	1,077,994	0	1,598,766
2027	8,255,986	27,562,487	23,367,789	343,854	23,711,643	1,977,940	1,078,352	0	1,602,155
2028	8,228,694	27,471,365	23,284,670	342,722	23,627,392	1,971,686	1,079,782	0	1,599,678
2029	8,239,518	27,507,472	23,321,879	343,169	23,665,048	1,973,964	1,075,709	0	1,598,693
2030	8,231,489	27,480,628	23,302,201	342,832	23,645,033	1,971,888	1,072,108	0	1,595,696
2031	8,258,726	27,571,695	23,367,952	343,972	23,711,924	1,978,972	1,085,146	0	1,606,316
2032	8,224,049	27,455,868	23,270,866	342,529	23,613,395	1,970,607	1,079,715	0	1,599,079
2033	8,240,433	27,510,492	23,328,840	343,203	23,672,043	1,973,967	1,072,173	0	1,596,812
2034	8,242,126	27,516,208	23,326,347	343,278	23,669,625	1,974,727	1,078,449	0	1,600,545
2035	8,225,194	27,459,690	23,274,570	342,578	23,617,148	1,970,870	1,079,690	0	1,599,218
TOTAL	473,573,237	1,400,392,062	1,179,639,298	17,864,867	1,197,504,165	101,080,596	51,680,846	0	81,631,389

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	MOJAVE DIVISION (continued)							SANTA ANA DIVISION	
	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23	Reach 24	Subtotal	Reach 25	Reach 26A
	[47]	[48]	[49]	[50]	[51]	[52]	[53]	[54]	[55]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0
1972	120,271	75,768	80,436	1,036,831	51,520	362,153	2,030,064	26	578
1973	148,631	60,641	66,539	1,283,816	65,475	353,262	2,323,148	20,541	679,328
1974	88,200	65,007	77,667	1,477,946	96,340	334,302	2,375,962	24,380	799,400
1975	118,898	135,462	77,825	1,630,554	111,141	419,450	2,794,186	29,337	885,021
1976	151,555	106,314	131,007	1,598,071	107,787	304,638	2,902,124	51,356	1,103,139
1977	112,589	98,757	86,279	1,882,080	71,228	48,359	2,800,647	62,584	1,412,740
1978	120,584	109,271	71,763	2,211,965	72,179	637,401	3,731,410	67,186	1,159,950
1979	194,104	203,078	121,586	2,104,832	76,960	202,566	3,571,387	84,462	1,235,189
1980	237,250	156,794	117,274	2,670,387	147,009	688,605	4,870,700	72,651	1,532,535
1981	292,081	181,062	119,602	3,030,407	134,895	47,750	5,032,502	35,662	1,575,444
1982	330,502	186,109	125,429	3,248,883	299,712	623,755	6,176,507	26,852	1,822,250
1983	326,767	219,943	140,523	3,899,769	223,626	384,292	6,472,986	19,017	1,663,599
1984	329,933	266,919	146,866	4,783,997	59,337	1,104,149	7,935,729	11,319	2,325,661
1985	388,327	799,514	125,780	5,330,501	261,135	811,346	8,941,007	17,764	2,707,662
1986	315,566	242,158	178,847	6,190,812	156,053	515,945	9,001,390	31,012	2,768,728
1987	357,971	298,190	236,263	5,731,239	151,796	732,607	10,146,593	19,362	2,847,390
1988	400,005	331,099	149,876	6,910,472	253,833	970,052	11,403,401	36,576	3,087,873
1989	345,614	194,047	138,825	5,963,386	349,544	1,242,144	9,932,830	30,881	3,190,809
1990	202,412	273,748	49,174	6,905,442	436,785	1,891,053	11,755,736	25,518	3,330,913
1991	516,257	478,555	231,223	7,488,366	263,723	1,561,051	13,662,067	32,172	3,847,589
1992	696,623	585,072	168,251	7,076,997	317,042	622,116	12,038,418	55,819	4,043,878
1993	818,675	509,309	207,818	7,765,751	359,632	1,708,915	15,078,017	72,464	5,638,325
1994	957,350	873,215	241,679	7,691,548	1,220,795	1,245,936	15,839,195	105,373	5,139,991
1995	2,411,412	355,198	179,930	6,994,639	842,041	746,371	15,369,990	96,781	4,357,648
1996	1,713,145	790,618	136,397	8,590,347	889,842	(78,782)	15,117,753	156,395	4,051,744
1997	2,043,179	640,177	189,241	8,138,580	1,586,227	3,355,446	19,415,490	177,217	4,585,198
1998	508,030	297,621	115,100	8,888,912	1,925,089	1,134,837	22,261,366	142,703	4,857,213
1999	1,583,887	1,344,804	158,127	9,548,762	2,027,154	1,340,712	25,053,506	189,880	5,957,072
2000	1,437,269	974,362	165,942	9,541,048	1,711,994	1,520,219	19,350,748	353,640	4,203,640
2001	1,526,739	1,071,309	476,330	7,684,613	1,893,231	25,579	19,511,029	298,329	2,435,173
2002	583,717	1,157,056	281,096	11,281,918	1,694,767	946,719	18,909,025	509,094	3,423,421
2003	621,363	467,741	278,116	13,347,106	2,096,392	(411,897)	21,514,571	368,565	3,749,154
2004	1,025,345	1,043,564	404,058	10,436,430	2,128,942	947,017	20,458,227	427,842	5,453,713
2005	867,477	670,615	347,499	7,415,415	2,415,177	2,156,058	22,539,663	451,980	5,594,543
2006	618,066	609,184	240,529	13,667,694	2,190,675	1,792,091	23,881,218	435,685	4,578,654
2007	637,847	629,324	248,333	14,686,551	2,255,878	1,986,231	25,360,969	450,706	4,712,702
2008	626,462	630,664	247,891	13,796,170	2,187,071	1,974,832	24,254,333	463,733	4,828,948
2009	926,052	696,094	383,756	8,316,496	451,120	2,170,794	17,536,629	68,306	6,085,251
2010	923,812	694,848	382,756	8,307,583	450,520	1,775,016	17,120,609	68,315	6,085,115
2011	930,638	699,270	385,699	8,345,989	451,944	2,235,186	17,660,868	68,546	6,104,073
2012	931,553	699,811	386,101	8,350,443	452,211	1,908,890	17,344,069	68,556	6,105,268
2013	936,542	702,638	388,309	8,371,551	453,573	1,006,099	16,488,262	68,559	6,107,354
2014	943,569	706,510	391,443	8,398,521	455,389	2,632,579	18,176,735	68,519	6,106,589
2015	944,125	706,963	391,670	8,404,267	455,681	1,000,463	16,554,992	68,573	6,111,280
2016	941,349	705,210	390,467	8,387,862	454,696	2,869,710	18,391,060	68,501	6,104,183
2017	942,933	706,170	391,159	8,396,115	455,195	1,675,966	17,214,583	68,527	6,106,876
2018	948,712	709,447	393,719	8,420,663	456,791	1,975,079	17,568,256	68,530	6,109,328
2019	944,469	706,889	391,865	8,398,670	455,425	2,854,227	18,401,356	68,469	6,102,459
2020	944,039	706,829	391,645	8,401,609	455,527	1,745,801	17,296,067	68,539	6,108,398
2021	942,256	705,956	390,834	8,397,575	455,194	775,758	16,314,538	68,593	6,112,249
2022	948,116	709,083	393,458	8,417,307	456,556	1,825,161	17,411,476	68,519	6,108,184
2023	941,099	705,093	390,353	8,387,266	454,624	2,819,195	18,338,900	68,510	6,104,808
2024	944,506	707,014	391,864	8,401,458	455,545	1,670,166	17,221,623	68,509	6,105,934
2025	944,627	707,279	391,885	8,407,161	455,826	1,857,600	17,418,030	68,588	6,112,639
2026	944,215	706,698	391,762	8,396,251	455,276	2,922,216	18,464,929	68,449	6,100,706
2027	945,323	707,929	392,159	8,416,516	456,304	1,505,034	17,081,712	68,686	6,121,228
2028	945,300	707,263	392,247	8,399,700	455,536	808,664	16,359,856	68,431	6,099,614
2029	943,136	706,353	391,237	8,398,604	455,302	2,758,754	18,301,752	68,553	6,109,182
2030	940,632	704,809	390,148	8,384,751	454,465	2,869,648	18,384,145	68,502	6,103,943
2031	949,631	710,321	394,072	8,433,538	457,424	225,891	15,841,311	68,671	6,121,476
2032	945,101	707,047	392,174	8,396,167	455,363	2,733,783	18,279,036	68,388	6,096,014
2033	940,970	705,204	390,267	8,391,431	454,792	1,439,736	16,965,352	68,584	6,110,886
2034	944,922	707,382	392,030	8,406,578	455,816	1,234,473	16,794,922	68,560	6,110,430
2035	945,129	707,092	392,182	8,396,890	455,368	4,221,893	19,768,332	68,400	6,096,973
TOTAL	49,196,859	36,177,471	17,104,382	468,463,199	43,413,490	87,765,062	936,513,294	7,304,747	280,437,255

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	SANTA ANA DIVISION (continued)				WEST BRANCH				
	Reach 28G	Reach 28H	Reach 28J	Subtotal	Reach 29A	Reach 29F	Reach 29G	Reach 29H	Reach 29J
	[56]	[57]	[58]	[59]	[60]	[61]	[62]	[63]	[64]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0
1972	109	30	0	743	719,255	159,249	199,145	234,196	88,198
1973	136,352	79	0	836,300	779,949	339,363	122,664	264,850	119,743
1974	155,262	34,693	854,637	1,868,372	883,312	158,366	112,458	350,160	(4,525)
1975	110,729	69,082	723,814	1,817,983	1,049,990	176,676	194,724	801,457	75,870
1976	138,575	100,400	635,853	2,029,323	1,220,429	215,588	202,591	624,614	98,268
1977	127,543	92,647	825,880	2,521,394	1,268,813	116,939	218,129	684,679	184
1978	166,919	68,363	835,082	2,297,500	1,174,708	342,479	267,308	415,641	17,764
1979	142,586	92,812	265,525	1,820,574	1,366,942	285,575	284,188	972,584	29,850
1980	158,340	129,897	1,120,131	3,013,554	1,698,215	224,472	455,619	874,259	288,303
1981	160,053	111,722	333,550	2,216,431	1,783,405	123,264	615,047	2,305,110	8,794
1982	205,350	135,463	1,518,759	3,708,674	1,919,979	190,500	702,265	2,208,264	414,230
1983	244,720	124,651	412,806	2,464,793	2,739,814	149,333	888,475	745,939	579,882
1984	240,496	190,924	769,068	3,537,468	3,463,038	81,260	2,358,495	537,207	719,282
1985	451,600	182,242	871,492	4,230,760	3,866,946	295,836	3,047,591	975,729	614,735
1986	439,048	256,526	982,332	4,477,646	3,791,427	457,604	2,893,171	1,480,015	1,032,216
1987	278,094	218,717	1,118,529	4,482,092	3,423,494	213,106	2,933,342	944,604	459,398
1988	271,868	200,811	1,176,659	4,773,787	3,447,403	255,113	3,017,463	883,714	446,468
1989	230,953	281,861	1,130,035	4,864,539	4,025,641	405,583	2,738,143	1,398,165	865,738
1990	437,812	308,144	1,538,449	5,640,836	4,088,481	383,655	3,232,445	3,153,869	777,713
1991	843,388	632,912	1,630,321	6,986,382	3,862,056	304,143	3,550,063	639,527	763,037
1992	281,864	5,636,464	1,102,519	11,120,544	4,286,050	327,802	3,892,480	1,014,551	872,953
1993	382,195	570,563	994,721	7,658,268	3,969,075	343,304	4,515,385	1,670,952	852,208
1994	617,136	415,603	1,022,412	7,300,515	3,649,861	293,376	3,359,381	1,879,417	872,624
1995	1,308,828	704,154	894,338	7,361,749	4,137,046	883,315	4,750,275	1,588,080	754,904
1996	1,001,063	1,041,697	1,316,493	7,567,392	4,511,858	966,044	3,593,671	4,208,195	877,111
1997	493,841	949,188	953,590	7,159,034	4,543,506	1,030,809	2,429,066	3,755,901	1,597,361
1998	379,997	991,426	(67,444)	6,303,895	4,872,244	464,376	3,474,463	2,398,630	1,996,114
1999	493,493	1,964,137	845,343	9,449,925	4,768,390	4,338,174	4,924,176	1,391,028	1,000,370
2000	844,558	1,004,569	1,130,423	7,536,830	5,460,691	782,887	4,277,874	2,361,194	171,261
2001	1,668,195	811,163	5,688,912	10,901,772	5,908,798	1,533,322	5,137,414	4,393,983	240,853
2002	1,251,118	424,389	2,197,952	7,805,974	5,341,880	1,480,328	4,082,857	4,442,291	(51,885)
2003	535,209	376,265	1,279,384	6,308,577	4,461,737	1,289,703	3,728,632	3,336,304	(627,530)
2004	1,206,016	440,811	3,465,088	10,993,470	8,918,901	1,317,754	3,491,206	5,059,781	(615,239)
2005	1,439,765	684,382	(1,750,113)	6,420,557	5,794,901	2,491,755	9,043,269	(472,624)	2,762,038
2006	1,098,598	517,408	2,723,264	9,353,609	6,248,004	681,464	4,474,550	3,919,482	(84,714)
2007	1,136,475	535,247	2,390,346	9,225,476	6,445,534	703,745	4,623,674	4,053,603	(93,667)
2008	1,169,322	550,717	2,525,195	9,537,915	6,705,848	724,003	4,753,040	4,172,827	(101,430)
2009	634,233	442,191	2,019,362	9,249,343	6,147,456	657,334	2,999,231	3,633,656	725,264
2010	634,310	442,245	2,338,564	9,568,549	6,147,397	653,418	2,998,377	3,620,567	725,352
2011	636,345	443,739	1,924,294	9,176,997	6,165,794	661,813	3,009,000	3,654,696	726,900
2012	636,442	443,805	2,106,287	9,360,358	6,166,978	663,140	3,009,826	3,659,334	727,012
2013	636,473	443,827	2,370,896	9,627,109	6,168,928	671,448	3,012,470	3,687,862	727,048
2014	636,104	443,569	1,985,769	9,240,550	6,167,911	683,884	3,014,603	3,729,713	726,625
2015	636,603	443,917	2,237,728	9,498,101	6,172,657	684,032	3,016,840	3,731,264	727,193
2016	635,933	443,451	1,919,345	9,171,413	6,165,550	680,234	3,012,726	3,716,661	726,429
2017	636,170	443,614	2,528,148	9,783,335	6,168,236	682,533	3,014,453	3,725,033	726,699
2018	636,205	443,640	2,047,929	9,305,632	6,170,525	692,263	3,017,555	3,758,325	726,741
2019	635,622	443,233	2,549,057	9,798,840	6,163,704	685,834	3,013,021	3,734,828	726,074
2020	636,294	443,701	1,797,397	9,054,329	6,169,746	684,223	3,015,494	3,730,397	726,841
2021	636,790	444,047	2,110,597	9,372,276	6,173,717	680,499	3,016,564	3,718,810	727,409
2022	636,110	443,573	2,931,790	10,188,176	6,169,394	691,181	3,016,786	3,754,039	726,632
2023	636,018	443,509	2,052,381	9,305,226	6,166,203	679,589	3,012,873	3,714,193	726,526
2024	636,004	443,501	2,371,214	9,625,162	6,167,233	685,315	3,014,549	3,733,777	726,512
2025	636,737	444,010	1,725,337	8,987,311	6,174,031	684,551	3,017,557	3,732,354	727,348
2026	635,442	443,108	2,852,622	10,100,327	6,161,939	685,557	3,012,131	3,733,285	725,868
2027	637,657	444,652	1,456,605	8,728,828	6,182,724	684,375	3,021,589	3,733,648	728,400
2028	635,276	442,991	2,290,598	9,536,910	6,160,787	687,755	3,012,056	3,741,004	725,679
2029	636,418	443,788	2,163,631	9,421,572	6,170,572	682,392	3,015,494	3,724,111	726,985
2030	635,942	443,456	2,228,881	9,480,724	6,165,344	678,871	3,012,320	3,711,540	726,440
2031	637,514	444,552	2,973,431	10,245,644	6,182,830	691,773	3,023,185	3,758,886	728,234
2032	634,886	442,720	1,636,352	8,878,360	6,157,143	688,001	3,010,408	3,741,030	725,234
2033	636,694	443,980	2,407,724	9,667,868	6,172,375	678,343	3,015,485	3,710,942	727,299
2034	636,483	443,834	2,181,758	9,441,065	6,171,781	685,364	3,016,683	3,735,014	727,060
2035	634,997	442,797	2,893,328	10,136,495	6,158,117	687,633	3,010,783	3,739,342	725,359
TOTAL	37,421,172	32,825,609	103,556,370	461,545,153	303,106,693	42,901,620	183,946,798	170,032,489	37,437,643

TABLE B-11. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									GRAND TOTAL
	WEST BRANCH (cont.)		COASTAL BRANCH							
	Reach 30	Subtotal	Reach 31A [a]	Reach 33A	Reach 33B	Reach 34	Reach 35	Subtotal	Total	
	[65]	[66]	[67]	[68]	[69]	[70]	[71]	[72]	[73]	[74]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	42,918
1963	0	0	0	0	0	0	0	0	0	168,358
1964	0	0	0	0	0	0	0	0	0	184,729
1965	0	0	0	0	0	0	0	0	0	378,874
		0								
1966	0	0	0	0	0	0	0	0	0	408,397
1967	0	0	0	0	0	0	0	0	0	634,505
1968	0	0	0	0	0	0	0	0	2,160,548	2,745,160
1969	0	0	509,728	0	0	0	0	509,728	3,324,718	4,074,939
1970	0	0	609,988	0	0	0	0	609,988	3,983,062	4,676,282
1971	0	0	699,052	0	0	0	0	699,052	5,614,013	6,185,714
1972	420,789	1,820,832	697,576	0	0	0	0	697,576	12,353,356	12,998,869
1973	621,431	2,248,000	641,626	0	0	0	0	641,626	14,590,688	15,194,233
1974	723,949	2,223,720	669,279	0	0	0	0	669,279	16,598,762	17,372,561
1975	841,991	3,140,708	806,429	0	0	0	0	806,429	19,569,999	20,517,423
1976	(650,944)	1,710,546	840,927	0	0	0	0	840,927	19,002,859	20,027,213
1977	634,581	2,923,325	872,169	0	0	0	0	872,169	23,267,885	24,213,489
1978	3,088,954	5,306,854	934,119	0	0	0	0	934,119	24,818,739	26,012,786
1979	958,068	3,897,207	871,688	0	0	0	0	871,688	23,421,881	24,675,598
1980	222,549	3,763,417	1,047,396	4,790	0	30	75	1,052,291	30,105,348	32,038,398
1981	1,093,897	5,929,517	1,037,469	4,790	0	30	75	1,042,364	33,884,524	35,516,366
1982	978,624	6,413,862	1,015,555	4,790	0	30	75	1,020,450	39,515,188	41,611,655
1983	3,698,681	8,802,124	1,146,269	4,957	0	30	77	1,151,333	54,543,263	56,802,781
1984	755,136	7,914,418	1,427,192	5,051	0	31	78	1,432,352	63,947,633	67,105,188
1985	1,753,355	10,554,192	1,849,827	5,051	0	31	78	1,854,987	69,700,009	73,272,898
1986	1,338,657	10,993,090	1,714,723	5,051	0	31	78	1,719,883	73,437,761	76,707,917
1987	1,406,519	9,380,463	1,689,141	4,324	0	26	67	1,693,558	71,443,424	75,217,576
1988	1,452,589	9,502,750	1,964,428	4,509	0	28	70	1,969,035	72,349,117	76,060,618
1989	1,505,029	10,938,299	1,768,942	4,509	0	28	70	1,773,549	73,894,076	78,662,348
1990	847,500	12,483,663	2,274,772	0	0	0	0	2,274,772	86,130,115	91,361,385
1991	1,191,090	10,309,916	2,187,841	0	0	0	0	2,187,841	86,877,284	90,982,870
1992	2,259,032	12,652,868	2,465,364	0	0	0	0	2,465,364	94,167,321	99,235,524
1993	1,157,876	12,508,800	2,811,441	0	0	0	0	2,811,441	100,019,568	107,299,130
1994	1,674,576	11,729,235	3,894,639	0	0	0	0	3,894,639	92,336,811	99,944,106
1995	(421,879)	11,691,741	3,481,049	0	0	0	0	3,481,049	98,887,435	105,659,504
1996	1,574,098	15,730,977	5,144,684	0	0	0	0	5,144,684	105,119,193	112,018,784
1997	1,521,491	14,878,134	2,523,741	(33)	0	0	0	2,523,708	107,647,058	113,385,326
1998	1,291,185	14,497,012	4,303,206	1,878,551	1,386	160,400	88,026	6,431,569	120,663,477	127,330,678
1999	2,059,968	18,482,106	4,186,890	1,950,758	16,646	184,325	87,373	6,425,992	124,753,820	133,895,183
2000	1,529,054	14,582,961	2,887,384	2,533,121	20,756	253,532	109,322	5,804,115	122,249,124	130,905,236
2001	(942,708)	16,271,662	3,113,399	2,241,933	14,426	153,879	58,875	5,582,512	135,962,968	143,315,101
2002	3,419,111	18,714,582	3,187,937	2,686,101	49,670	189,442	81,720	6,194,870	125,082,782	136,721,587
2003	968,853	13,157,699	3,338,003	2,777,886	41,188	200,985	85,013	6,443,075	124,965,982	133,887,739
2004	1,515,533	19,687,936	3,542,320	2,668,727	70,179	240,426	109,830	6,631,482	143,841,151	153,942,418
2005	(1,119,961)	18,499,378	3,871,812	2,984,019	120,182	292,253	137,816	7,406,082	126,047,731	134,166,265
2006	(3,426,344)	11,812,442	3,712,424	2,953,567	15,191	272,839	132,183	7,086,204	132,566,445	141,834,009
2007	2,605,969	18,338,858	3,837,608	3,047,983	15,714	282,227	136,691	7,320,223	143,987,944	153,919,911
2008	2,702,596	18,956,884	3,961,204	3,159,814	16,169	290,383	140,638	7,568,208	147,770,822	158,198,616
2009	3,018,521	17,181,462	4,006,112	1,941,533	0	1,680	4,465	5,953,790	122,587,842	131,426,192
2010	2,926,467	17,071,578	4,005,748	1,941,422	0	1,619	4,303	5,953,092	122,369,704	131,207,577
2011	3,094,243	17,312,446	4,020,078	1,946,835	0	1,721	4,576	5,973,210	123,018,775	131,889,787
2012	2,922,167	17,148,457	4,020,945	1,947,235	0	1,740	4,629	5,974,549	122,738,855	131,611,688
2013	3,330,006	17,597,762	4,022,885	1,948,040	0	1,869	4,969	5,977,763	122,644,558	131,521,003
2014	3,015,532	17,338,268	4,023,255	1,948,014	0	2,067	5,490	5,978,826	123,708,710	132,584,951
2015	2,875,790	17,207,776	4,026,318	1,949,503	0	2,062	5,478	5,983,361	122,270,328	131,153,356
2016	3,433,233	17,734,833	4,021,431	1,947,186	0	2,010	5,345	5,975,972	124,212,608	133,085,110
2017	3,255,898	17,572,852	4,023,343	1,948,080	0	2,042	5,429	5,978,894	123,523,856	132,400,411
2018	3,165,776	17,531,185	4,025,617	1,949,026	0	2,193	5,829	5,982,665	123,411,504	132,292,303
2019	3,704,072	18,027,533	4,020,694	1,946,734	0	2,102	5,583	5,975,113	125,136,217	134,006,624
2020	3,508,436	17,835,137	4,024,449	1,948,592	0	2,067	5,493	5,980,601	123,160,837	132,039,716
2021	2,722,842	17,039,841	4,026,696	1,949,749	0	2,003	5,323	5,983,771	121,738,626	130,622,801
2022	2,744,304	17,102,336	4,024,795	1,948,644	0	2,177	5,787	5,981,403	123,691,991	132,571,060
2023	3,102,909	17,402,293	4,021,786	1,947,373	0	2,000	5,312	5,976,471	123,967,392	132,840,750
2024	3,877,069	18,204,455	4,022,920	1,947,827	0	2,088	5,545	5,978,380	123,999,827	132,875,216
2025	2,117,073	16,452,914	4,027,233	1,949,942	0	2,067	5,493	5,984,735	121,884,955	130,769,981
2026	3,905,316	18,224,096	4,019,533	1,946,174	0	2,099	5,577	5,973,383	125,676,189	134,544,046
2027	37,231	14,387,967	4,032,815	1,952,665	0	2,051	5,454	5,992,985	119,327,311	128,224,740
2028	7,076,969	21,404,250	4,018,969	1,945,866	0	2,133	5,671	5,972,639	126,180,163	135,046,593
2029	1,775,892	16,095,446	4,024,832	1,948,809	0	2,036	5,417	5,981,094	122,798,885	131,678,762
2030	3,122,256	17,416,771	4,021,173	1,947,085	0	1,989	5,287	5,975,534	124,190,495	133,062,546
2031	95,358	14,480,266	4,033,494	1,952,866	0	2,170	5,761	5,994,291	119,717,317	128,615,643
2032	7,059,493	21,381,309	4,016,646	1,944,728	0	2,143	5,696	5,969,213	127,375,560	136,236,809
2033	2,083,681	16,388,125	4,025,658	1,949,280	0	1,969	5,236	5,982,143	122,011,717	130,893,761
2034	3,035,981	17,371,883	4,025,852	1,949,255	0	2,083	5,534	5,982,724	122,610,238	131,492,131
2035	3,962,643	18,283,877	4,017,243	1,945,027	0	2,137	5,677	5,970,084	127,036,141	135,898,753
TOTAL	126,220,053	863,645,296	196,139,761	81,517,739	381,507	2,575,303	1,312,589	281,926,899	6,301,594,485	6,732,103,475

a) Includes certain costs to be assigned directly to Kern County Water Agency. Refer to Appendix B text discussion of Table B-16A under "Project Water Charges."

TABLE B-12. Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge [a]

(in dollars)

Calendar Year	NORTH BAY AQUEDUCT				SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT			
	Reach 1 Barker Slough Pumping Plant	Reach 3A Cordelia Pumping Plant (Solano)	Reach 3B Cordelia Pumping Plant (Napa) [b]	Total	Reach 1 South Bay & Del Valle Pumping Plants [c]	Reach 1 Banks Pumping Plant	Reach 4 Dos Amigos Pumping Plant	Reach 14A Buena Vista Pumping Plant	Reach 15A Wheeler Ridge Pumping Plant
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
1962	0	0	0	0	36,970	0	0	0	0
1963	0	0	0	0	57,711	0	0	0	0
1964	0	0	0	0	74,134	0	0	0	0
1965	0	0	0	0	142,609	0	0	0	0
1966	0	0	0	0	192,605	0	0	0	0
1967	0	0	0	0	223,117	13,881	0	0	0
1968	0	0	6,989	6,989	336,671	452,630	202,947	0	0
1969	0	0	8,551	8,551	257,579	293,741	135,425	0	0
1970	0	0	13,598	13,598	396,358	346,215	211,197	1	0
1971	0	0	10,609	10,609	381,662	574,015	225,188	138,001	17,664
1972	0	0	14,434	14,434	598,702	933,292	502,196	241,714	97,004
1973	0	0	14,449	14,449	493,490	688,030	381,232	306,268	278,923
1974	0	0	17,473	17,473	565,575	783,562	447,772	358,739	367,266
1975	0	0	14,779	14,779	349,758	1,341,019	518,816	550,860	595,252
1976	0	0	20,856	20,856	571,361	1,638,453	641,115	755,747	756,175
1977	0	0	22,635	22,635	512,996	1,013,307	284,828	298,300	337,889
1978	0	0	21,692	21,692	586,355	2,339,502	607,042	732,036	658,404
1979	0	0	16,237	16,237	605,136	3,554,256	1,008,564	818,816	791,488
1980	0	0	19,945	19,945	523,369	2,083,336	1,129,152	1,051,629	1,047,495
1981	0	0	23,842	23,842	567,692	3,952,931	1,939,189	1,336,867	1,319,739
1982	0	0	12,157	12,157	605,780	3,082,031	1,363,705	1,200,226	1,213,660
1983	0	0	2,342	2,342	82,222	879,916	343,597	341,584	304,715
1984	0	0	4,822	4,822	271,543	1,695,568	885,941	678,307	602,408
1985	0	0	10,188	10,188	451,020	3,171,920	1,613,745	1,397,490	1,397,098
1986	0	0	15,501	15,501	807,984	6,601,752	2,627,407	2,405,224	2,432,322
1987	0	0	27,223	27,223	886,956	5,753,132	2,523,544	2,240,552	2,223,371
1988	17,813	0	24,020	41,833	909,300	6,280,898	2,611,297	2,562,330	2,560,462
1989	29,819	43,846	26,519	100,184	1,161,160	9,748,180	3,910,492	3,964,188	3,974,290
1990	52,210	67,109	40,775	160,094	1,834,626	10,467,177	4,501,309	5,785,069	6,019,952
1991	10,429	10,118	5,252	25,799	378,966	1,923,595	490,766	903,923	1,031,345
1992	13,319	13,070	9,406	35,795	311,251	3,211,086	1,168,304	1,255,567	1,314,358
1993	(11,941)	(8,753)	(5,392)	(26,086)	(158,214)	532,899	345,215	(124,821)	(102,311)
1994	46,538	39,910	29,105	115,553	799,370	5,658,038	2,298,300	2,504,629	2,516,185
1995	20,014	20,620	11,791	52,425	247,645	4,017,881	1,513,362	919,965	841,178
1996	57,320	47,288	23,483	128,091	718,807	8,112,547	3,969,388	2,430,979	2,231,167
1997	67,416	52,935	21,955	142,306	1,038,568	6,900,694	2,845,506	2,589,077	2,417,154
1998	(10,647)	(9,488)	(4,554)	(24,689)	(121,313)	238,073	(314,172)	(245,259)	(219,762)
1999	31,618	25,288	10,570	67,476	514,166	5,319,699	2,316,189	1,587,062	1,295,067
2000	58,591	42,543	15,078	116,212	860,785	8,018,823	3,043,577	2,963,119	3,035,444
2001	358,726	248,919	213,001	820,646	4,045,747	24,049,006	9,826,265	14,784,423	15,166,621
2002	186,186	102,222	60,093	348,501	2,190,992	16,807,227	6,740,615	8,238,545	8,538,761
2003	175,952	115,069	95,023	386,044	2,487,701	20,922,559	8,769,499	10,363,118	10,792,509
2004	242,315	134,187	103,360	479,862	2,412,375	21,059,461	9,018,396	11,887,828	12,476,791
2005	278,132	143,598	145,812	567,542	2,734,374	28,939,713	12,758,363	12,347,806	12,701,242
2006	434,003	542,507	505,453	1,481,963	4,279,689	32,872,956	14,632,061	16,425,914	19,293,623
2007	590,459	738,139	687,740	2,016,338	4,884,615	36,569,764	16,650,156	20,880,413	24,428,791
2008	689,860	862,132	803,342	2,355,334	5,704,591	44,287,072	18,806,430	23,601,489	27,683,761
2009	471,576	374,214	388,821	1,234,611	6,222,720	35,919,615	17,427,406	21,193,631	21,056,894
2010	493,069	391,422	416,518	1,301,009	6,494,048	45,056,631	18,338,525	22,334,405	22,179,499
2011	496,138	391,567	424,244	1,311,949	6,535,307	41,237,117	18,371,517	22,402,363	22,246,938
2012	513,832	404,948	448,456	1,367,236	6,747,998	40,192,527	19,566,716	24,118,512	23,976,313
2013	560,013	444,221	504,326	1,508,560	7,372,283	51,426,238	21,483,111	26,452,214	26,263,763
2014	600,463	476,875	556,355	1,633,693	7,891,382	46,233,371	23,325,486	28,820,000	28,606,708
2015	615,599	484,040	585,983	1,685,622	8,005,259	51,650,783	23,684,134	29,258,892	29,037,962
2016	627,608	488,983	611,797	1,728,388	8,083,847	59,438,512	24,552,753	30,642,124	30,449,028
2017	625,762	481,926	621,137	1,728,825	7,971,646	52,444,860	23,696,330	29,341,378	29,129,658
2018	648,401	495,855	661,842	1,806,098	8,193,075	52,533,464	25,051,903	31,333,909	31,141,761
2019	669,420	508,101	701,669	1,879,190	8,387,740	60,423,941	25,812,404	32,346,051	32,148,359
2020	642,270	480,276	679,668	1,802,214	7,945,406	53,737,217	24,377,874	30,566,928	30,397,902
2021	642,532	479,487	681,741	1,803,760	7,932,881	52,687,280	24,368,714	30,570,232	30,403,674
2022	623,724	463,956	657,470	1,745,150	7,686,003	48,842,618	23,638,630	29,701,958	29,555,328
2023	627,067	466,716	661,782	1,755,565	7,729,871	52,722,222	23,897,354	30,081,432	29,938,566
2024	648,871	484,720	689,917	1,823,508	8,016,067	57,790,267	24,697,461	31,006,976	30,838,190
2025	646,099	482,429	686,339	1,814,867	7,979,674	48,512,593	24,616,451	30,926,406	30,762,216
2026	650,304	485,903	691,768	1,827,975	8,034,879	60,190,056	24,745,569	31,059,481	30,888,518
2027	640,989	478,212	679,748	1,798,949	7,912,611	54,011,665	24,523,835	30,875,285	30,722,567
2028	645,211	481,697	685,195	1,812,103	7,968,037	53,120,240	26,396,467	30,734,219	30,566,014
2029	637,413	475,259	675,134	1,787,806	7,865,686	52,515,131	24,297,368	30,556,325	30,402,216
2030	642,289	479,286	681,426	1,803,001	7,929,672	54,700,535	24,326,610	30,503,278	30,335,059
2031	633,951	472,401	670,665	1,777,017	7,820,233	49,592,734	24,166,751	30,405,070	30,256,324
2032	645,931	482,292	686,126	1,814,349	7,977,488	53,937,159	24,348,708	30,465,093	30,286,457
2033	676,778	507,762	725,926	1,910,466	8,382,352	57,267,841	26,232,078	33,092,914	32,920,858
2034	653,115	488,224	695,394	1,836,733	8,071,777	53,626,236	24,758,054	31,024,630	30,845,599
2035	640,445	477,760	679,043	1,797,248	7,905,458	56,713,224	26,080,351	33,688,778	33,639,744
TOTAL	19,957,002	15,859,791	19,968,644	55,785,437	256,877,956	1,733,653,914	780,276,480	953,980,209	961,433,616

a) Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."
b) Costs for 1968 through 1987 are for an interim facility.
c) The relatively minor costs of Del Valle Pumping Plant have been combined with those of South Bay Pumping Plant to simplify the allocation procedures.

TABLE B-12. Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge [a]

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	Reach 16A Chrisman Pumping Plant	Reach 17E Edmonston Pumping Plant	Reach 18A Alamo Powerplant	Reach 22B Pearblossom Pumping Plant	Reach 23 Mojave Siphon Powerplant	Reach 24 Silverwood Lake [d]	Reach 26A Devil Canyon Powerplant	Reach 28J Lake Perris [d]	Reach 29A Oso Pumping Plant
	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0
1972	180,602	542,625	0	25,568	0	0	(3,024)	0	102,315
1973	441,598	1,548,428	0	231,389	0	0	(436,768)	0	158,587
1974	618,864	2,164,223	0	354,093	0	0	(521,656)	0	193,311
1975	1,149,731	4,010,395	0	604,161	0	0	(1,071,023)	0	350,436
1976	1,561,385	5,443,936	0	932,444	0	0	(1,519,156)	0	362,767
1977	703,802	2,360,624	0	358,028	0	0	(1,175,966)	0	111,135
1978	1,186,696	4,180,131	0	1,551,015	0	0	(3,038,194)	0	125,183
1979	1,581,250	5,475,688	0	1,881,587	0	0	(3,419,581)	0	138,384
1980	2,102,439	7,028,235	0	1,762,063	0	0	(3,318,152)	0	236,768
1981	2,838,773	9,351,931	0	2,296,771	0	0	(3,842,971)	0	444,280
1982	2,424,920	8,352,207	0	1,498,620	0	0	(2,736,072)	0	539,245
1983	540,330	1,582,582	0	341,957	0	384,275	(5,478,830)	0	71,197
1984	1,129,131	3,448,759	0	622,123	0	0	(7,326,265)	(10,080)	240,134
1985	2,781,953	9,261,674	0	1,195,768	0	0	(10,477,567)	(56,570)	874,069
1986	4,999,949	16,956,023	(1,013,756)	2,359,599	0	0	(11,484,996)	0	1,269,590
1987	4,456,059	14,684,476	(1,026,193)	1,831,238	0	131,606	(10,814,483)	53,242	1,325,936
1988	5,126,229	16,819,159	(744,374)	2,375,784	0	0	(14,495,967)	0	1,421,097
1989	8,369,623	28,090,313	(766,443)	4,102,557	0	686,468	(18,532,961)	89,890	2,013,335
1990	13,630,073	48,369,421	(834,673)	6,504,876	0	89,075	(20,911,839)	147,163	2,857,409
1991	2,426,220	8,641,086	(269,625)	996,352	0	0	(4,884,013)	0	534,818
1992	2,642,161	8,854,347	(934,311)	1,167,670	0	156,847	(9,513,281)	(61,233)	717,740
1993	(582,580)	(2,649,876)	(56,908)	(253,503)	0	(34,870)	(7,502,549)	0	68,719
1994	5,276,189	18,302,830	(58,712)	2,572,826	0	0	(11,662,318)	147,989	1,203,006
1995	1,677,210	5,571,517	(1,242,189)	1,025,717	0	467,095	(9,742,248)	0	247,869
1996	4,723,600	16,483,976	(2,644,648)	2,487,165	(857,876)	1,959,474	(12,358,465)	0	895,929
1997	5,424,334	19,413,834	(2,488,338)	3,037,087	(1,680,469)	0	(13,293,791)	111,776	897,657
1998	(488,690)	(1,683,606)	(1,969,187)	(402,338)	(1,217,950)	(144,207)	(10,183,555)	0	(25,895)
1999	3,326,334	12,889,920	(2,811,928)	1,795,375	(2,482,354)	(4)	(14,772,635)	(4)	677,032
2000	6,985,918	25,206,821	(5,129,549)	3,965,245	(4,429,149)	(4)	(25,857,029)	(4)	1,215,093
2001	34,168,450	126,253,821	(3,298,048)	18,936,837	(3,649,034)	(3)	(19,510,279)	(3)	6,409,025
2002	19,287,645	70,880,766	(4,926,146)	10,444,621	(5,255,302)	(2)	(24,676,762)	(2)	3,719,061
2003	24,604,455	90,561,339	(3,431,664)	14,432,726	(6,760,773)	(1)	(28,047,969)	(1)	4,378,568
2004	28,497,371	104,778,229	(6,227,543)	16,376,616	(7,691,607)	0	(31,246,141)	0	5,297,989
2005	28,859,498	102,413,847	(6,140,331)	18,183,010	(6,778,759)	0	(30,599,808)	0	4,111,678
2006	40,946,961	145,423,964	(3,692,647)	23,083,255	(7,076,716)	0	(26,385,376)	0	7,830,756
2007	51,857,122	184,162,871	(4,294,257)	29,674,189	(6,676,525)	0	(25,202,114)	0	9,638,982
2008	58,767,212	208,727,721	(6,048,353)	32,949,111	(8,911,711)	0	(33,686,209)	0	11,201,062
2009	49,248,027	184,675,289	(5,510,634)	27,794,433	(6,491,520)	0	(31,022,541)	0	10,652,848
2010	51,897,900	194,621,177	(5,485,254)	29,302,324	(6,448,439)	0	(31,029,891)	0	11,148,835
2011	52,069,886	195,255,920	(5,492,272)	29,382,434	(6,439,573)	0	(31,893,599)	0	11,161,070
2012	56,168,246	210,702,310	(5,846,792)	32,458,204	(6,992,862)	0	(32,763,346)	0	11,809,184
2013	61,565,599	230,944,976	(5,652,150)	35,277,714	(6,744,613)	0	(32,125,194)	0	12,911,225
2014	67,103,976	251,753,837	(5,682,708)	38,121,500	(6,771,177)	0	(32,641,434)	0	14,115,824
2015	68,122,187	255,574,256	(5,693,994)	38,937,128	(6,858,073)	0	(33,041,336)	0	14,232,592
2016	71,488,045	268,298,853	(5,928,879)	41,532,691	(7,202,386)	0	(33,768,201)	0	14,736,837
2017	68,349,692	256,449,909	(5,671,857)	39,120,319	(6,907,326)	0	(33,434,896)	0	14,258,319
2018	73,128,292	274,475,377	(6,067,643)	43,135,035	(7,731,018)	0	(34,298,153)	0	14,853,549
2019	75,521,711	283,482,631	(5,784,357)	42,428,451	(7,167,463)	0	(33,961,637)	0	16,061,034
2020	71,389,307	267,974,386	(5,891,065)	41,108,609	(7,377,974)	0	(34,885,535)	0	14,884,381
2021	71,405,903	268,042,003	(5,908,063)	41,147,345	(7,429,243)	0	(34,543,452)	0	14,872,718
2022	69,408,812	260,559,379	(5,944,769)	39,677,985	(7,434,464)	0	(34,144,124)	0	14,629,862
2023	70,320,061	263,997,398	(6,022,332)	40,509,053	(7,566,401)	0	(34,766,355)	0	14,707,718
2024	72,434,864	271,912,441	(5,836,681)	41,031,696	(7,336,963)	0	(34,505,483)	0	15,371,555
2025	72,256,736	271,249,878	(5,939,914)	41,307,459	(7,438,056)	0	(34,108,290)	0	15,183,554
2026	72,553,633	272,356,870	(5,903,866)	41,738,327	(7,468,068)	0	(34,953,352)	0	15,126,955
2027	72,171,632	270,950,594	(5,939,780)	41,191,938	(7,426,405)	0	(34,468,637)	0	15,223,609
2028	71,789,931	269,485,056	(5,877,637)	41,189,627	(7,387,351)	0	(34,689,003)	0	15,018,182
2029	71,411,489	268,086,300	(5,907,069)	40,748,594	(7,429,433)	0	(34,449,309)	0	15,065,655
2030	71,242,576	267,424,422	(5,859,915)	40,826,257	(7,360,568)	0	(34,527,546)	0	14,920,997
2031	71,062,053	266,776,153	(6,024,291)	41,089,346	(7,927,736)	0	(34,231,695)	0	14,859,269
2032	71,123,577	266,958,800	(5,793,849)	40,088,252	(7,549,932)	0	(33,969,558)	0	15,102,962
2033	77,365,540	290,470,067	(6,089,764)	44,961,195	(8,106,728)	0	(35,010,839)	0	16,003,647
2034	72,448,217	271,945,261	(5,848,825)	41,031,870	(7,713,779)	0	(33,808,308)	0	15,301,073
2035	79,163,918	297,474,893	(6,169,917)	42,800,126	(7,951,103)	0	(35,645,057)	0	18,138,648
TOTAL	2,226,434,627	8,285,802,673	(217,824,100)	1,269,239,514	(260,126,879)	3,695,749	(1,372,416,784)	422,163	462,206,369

d) These values represent a proportionate allocation of the total variable OMP&R costs of pumping and recovery plants (Table B-3) associated with net annual withdrawals from storage for Project Transportation Facilities. The allocation is determined annually by applying the following ratio, calculated from the data shown in Table B-6: "Reservoir Storage Changes" (withdrawals, as a positive value) conveyed through each plant, divided by "Total" annual quantity conveyed through each plant, in acre-feet. The costs so determined are accumulated for all upstream plants for each year, for each respective reservoir.

TABLE B-12. Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge [a]

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	Reach 29G	Reach 29H	Reach 29J	Reach 30	Reach 31A	Reach 33A		
	Warne Powerplant	Pyramid Lake [d]	Castaic Powerplant	Castaic Lake [d]	Las Perillas & Badger Hill Pumping Plants	Devil's Den, Bluestone & Polonio Pumping Plants	Total	
	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]
1962	0	0	0	0	0	0	0	36,970
1963	0	0	0	0	0	0	0	57,711
1964	0	0	0	0	0	0	0	74,134
1965	0	0	0	0	0	0	0	142,609
1966	0	0	0	0	0	0	0	192,605
1967	0	0	0	0	0	0	13,881	236,998
1968	0	0	0	0	118,676	0	774,253	1,117,913
1969	0	0	0	0	78,350	0	507,516	773,646
1970	0	0	0	0	136,429	0	693,842	1,103,798
1971	0	0	0	0	166,296	0	1,121,164	1,513,435
1972	0	0	(211,144)	0	237,638	0	2,648,786	3,261,922
1973	0	0	(1,057,564)	0	120,913	0	2,661,036	3,168,975
1974	0	0	(1,547,884)	0	118,582	0	3,336,872	3,919,920
1975	0	0	(2,455,461)	0	94,848	0	5,689,034	6,053,571
1976	0	0	(2,827,557)	0	141,260	0	7,886,569	8,478,786
1977	0	0	(3,734,462)	0	71,311	0	628,796	1,164,427
1978	0	0	(1,542,479)	0	179,925	0	6,979,261	7,587,308
1979	0	0	(2,773,323)	0	192,126	0	9,249,255	9,870,628
1980	0	0	(3,408,863)	0	168,458	0	9,882,560	10,425,874
1981	0	0	(2,834,322)	0	169,177	0	16,972,365	17,563,899
1982	(783,626)	0	(3,463,971)	0	168,390	0	12,859,335	13,477,272
1983	(495,041)	65,741	(3,260,764)	(3,176,515)	17,920	0	(7,537,336)	(7,452,772)
1984	(2,027,345)	0	(2,336,089)	(2,151,129)	112,679	0	(4,435,858)	(4,159,493)
1985	(5,930,176)	0	(15,698,638)	0	146,843	0	(10,322,391)	(9,861,183)
1986	(5,579,301)	0	(11,072,448)	0	297,886	0	10,799,251	11,622,736
1987	(6,304,539)	68,410	(11,562,269)	(41,897)	245,082	0	5,787,267	6,701,446
1988	(6,993,235)	54,038	(12,292,638)	(211,526)	214,519	0	5,288,073	6,239,206
1989	(8,235,085)	14,390	(14,514,469)	126,791	282,180	0	23,323,739	24,585,083
1990	(11,011,065)	0	(20,116,506)	245,180	416,832	0	46,159,453	48,154,173
1991	(3,600,495)	439,068	(6,579,194)	0	3,610	0	2,057,456	2,462,221
1992	(5,508,780)	0	(9,493,502)	(935,650)	101,665	0	(5,857,012)	(5,509,966)
1993	(4,525,955)	(13,291)	(9,266,007)	(446,527)	(111,306)	0	(24,723,671)	(24,907,971)
1994	(5,813,538)	20,518	(10,547,914)	(86,993)	206,258	0	12,537,293	13,452,216
1995	(1,934,202)	0	(4,049,615)	0	243,434	0	(443,026)	(142,956)
1996	(4,248,531)	0	(8,457,232)	0	296,170	0	15,023,643	15,870,541
1997	(4,797,589)	0	(8,727,328)	(897)	298,483	208,816	13,156,006	14,336,880
1998	(740,480)	(931,305)	(3,360,851)	(2,108,804)	(51,634)	(87,016)	(23,936,638)	(24,082,640)
1999	(5,526,541)	(4)	(9,954,674)	(4)	159,358	234,077	(5,948,035)	(5,366,393)
2000	(9,464,490)	(4)	(17,958,033)	(4)	231,108	380,555	(7,792,563)	(6,815,566)
2001	(7,987,833)	(3)	(13,981,232)	(3)	1,080,182	2,152,324	204,400,516	209,266,909
2002	(10,286,902)	(2)	(18,455,024)	(2)	529,085	1,320,943	82,907,125	85,446,618
2003	(10,281,922)	(1)	(17,307,974)	(1)	621,149	1,482,525	121,098,141	123,971,886
2004	(12,033,953)	0	(20,022,179)	0	651,104	1,718,113	134,540,475	137,432,712
2005	(8,251,156)	0	(13,698,272)	0	826,136	1,669,939	157,342,906	160,644,822
2006	(11,846,663)	0	(21,072,103)	0	1,157,341	2,954,530	234,547,856	240,309,508
2007	(10,589,552)	0	(18,964,191)	0	1,606,271	4,691,288	314,433,208	321,334,161
2008	(15,175,359)	0	(26,611,644)	0	1,705,919	4,256,483	341,552,984	349,612,909
2009	(14,881,913)	0	(25,170,192)	0	2,051,045	5,613,779	292,556,167	300,013,498
2010	(14,913,517)	0	(25,328,107)	0	2,137,319	5,871,977	319,683,384	327,478,441
2011	(15,034,490)	0	(25,428,823)	0	2,138,050	5,874,159	315,850,697	323,697,953
2012	(15,277,004)	0	(25,992,105)	0	2,204,739	6,074,916	340,399,558	348,514,792
2013	(15,436,252)	0	(26,220,858)	0	2,401,605	6,664,187	389,211,565	398,092,408
2014	(15,906,509)	0	(26,940,164)	0	2,565,297	7,154,169	419,858,176	429,383,251
2015	(15,814,198)	0	(26,768,889)	0	2,601,207	7,261,655	432,184,306	441,875,187
2016	(16,225,521)	0	(27,487,248)	0	2,625,988	7,335,841	460,488,437	470,300,672
2017	(15,909,387)	0	(26,970,762)	0	2,590,608	7,229,930	433,716,775	443,417,246
2018	(16,041,534)	0	(27,261,438)	0	2,660,434	7,438,943	464,352,881	474,352,054
2019	(17,015,372)	0	(29,043,009)	0	2,721,822	7,622,689	485,597,255	495,864,185
2020	(16,653,246)	0	(28,309,158)	0	2,582,334	7,205,164	451,107,124	460,854,744
2021	(16,663,697)	0	(28,346,624)	0	2,578,386	7,193,340	450,378,516	460,115,157
2022	(16,909,368)	0	(28,771,413)	0	2,500,533	6,960,308	432,271,275	441,702,428
2023	(16,904,417)	0	(28,763,149)	0	2,514,367	7,001,718	441,667,235	451,152,671
2024	(17,051,903)	0	(29,017,307)	0	2,604,616	7,271,859	461,211,588	471,051,163
2025	(16,918,079)	0	(28,787,066)	0	2,593,139	7,237,508	451,454,535	461,249,076
2026	(16,741,641)	0	(28,483,648)	0	2,610,549	7,289,622	465,009,005	474,871,859
2027	(17,107,637)	0	(29,109,736)	0	2,571,994	7,174,210	455,365,134	465,076,694
2028	(16,756,801)	0	(28,507,565)	0	2,589,469	7,226,527	454,897,375	464,677,515
2029	(17,024,240)	0	(28,969,810)	0	2,557,194	7,129,914	448,990,325	458,643,817
2030	(16,727,478)	0	(28,459,349)	0	2,577,373	7,190,317	451,112,568	460,845,241
2031	(16,779,107)	0	(28,564,483)	0	2,542,862	7,087,012	444,310,262	453,907,512
2032	(16,804,031)	0	(28,694,562)	0	2,592,451	7,235,447	449,326,974	459,118,811
2033	(16,825,821)	0	(28,790,365)	0	2,720,121	7,617,602	493,828,346	504,121,164
2034	(16,825,644)	0	(28,740,041)	0	2,622,184	7,324,447	457,990,974	467,899,484
2035	(20,335,543)	0	(34,795,031)	0	2,569,737	7,167,454	492,540,222	502,242,928
TOTAL	(625,457,704)	(282,445)	(1,112,938,722)	(8,787,981)	81,476,076	210,437,271	13,371,224,046	13,683,887,439

TABLE B-13. Capital and Operating Costs of Project Conservation Facilities to be Reimbursed through Delta Water Charge

(in dollars)

Calendar Year	Initial Project Conservation Facilities (Portions of Upper Feather Lakes, Oroville-Thermalito and California Aqueduct Facilities)					Planning and Pre-operating Costs [a f]	Total
				Application of Oroville Power Revenues to:			
	Capital Costs [a]	Capital Cost Credits [b]	Operating Costs [c]	Capital Costs [d]	Operating Costs [e]		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
1952	171.322	0	0	0	0	0	171.322
1953	312.190	0	0	0	0	0	312.190
1954	308.624	0	0	0	0	0	308.624
1955	194,645	0	0	0	0	0	194,645
1956	1,357,077	0	0	0	0	0	1,357,077
1957	6,210,709	0	0	0	0	0	6,210,709
1958	9,510,916	0	0	0	0	0	9,510,916
1959	11,390,586	0	0	0	0	0	11,390,586
1960	14,456,356	(4,850,000)	0	0	0	0	9,606,356
1961	18,682,616	(431,527)	0	0	0	0	18,251,089
1962	9,012,960	(479,280)	0	0	0	0	8,533,680
1963	72,965,728	(478,743)	(14,000)	0	0	0	72,472,985
1964	62,493,755	(751,330)	(14,000)	0	0	107,780	61,836,205
1965	70,920,988	(763,541)	(14,000)	0	0	551,850	70,695,297
1966	125,265,788	(748,649)	(14,000)	0	0	1,081,023	125,584,162
1967	94,374,172	(812,145)	(13,446)	0	0	1,189,212	94,737,793
1968	39,889,088	(431,574)	1,303,821	(951,000)	0	793,399	40,603,734
1969	5,279,981	(259,015)	2,890,772	(11,007,000)	0	601,867	(2,493,395)
1970	4,130,490	(203,733)	4,818,634	(14,650,000)	(1,500,000)	516,659	(6,887,950)
1971	3,877,493	(193,631)	6,026,480	(14,650,000)	(1,500,000)	408,754	(6,030,904)
1972	4,569,024	(196,361)	5,393,011	(14,650,000)	(1,500,000)	287,374	(6,096,952)
1973	3,985,414	(136,997)	6,135,774	(14,650,000)	(1,500,000)	203,384	(5,962,425)
1974	6,660,000	(137,503)	6,944,723	(17,950,000)	(1,500,000)	201,907	(5,780,873)
1975	8,084,450	(234,567)	7,697,390	(14,650,000)	(1,500,000)	146,188	(456,539)
1976	5,870,531	(204,944)	7,067,037	(14,650,000)	(1,500,000)	205,234	(3,212,142)
1977	21,285,849	(150,214)	10,547,977	(14,650,000)	(1,500,000)	857,419	16,391,031
1978	7,713,252	(64,566)	12,851,158	(14,650,000)	(1,500,000)	2,131,286	6,481,130
1979	9,030,801	0	9,547,014	(14,650,000)	(1,500,000)	2,131,884	4,559,699
1980	10,372,763	0	13,258,298	(14,650,000)	(1,500,000)	3,638,851	11,119,912
1981	11,194,479	0	10,326,538	(14,650,000)	(1,500,000)	4,597,474	9,968,491
1982	16,634,428	0	16,154,872	(14,650,000)	(1,500,000)	4,594,682	21,233,982
1983	12,037,206	0	22,253,515	(34,705,000)	(8,735,000)	3,751,993	(5,397,286)
1984	8,706,748	0	22,700,224	(14,650,000)	(10,348,000)	2,979,126	9,388,098
1985	11,921,382	0	23,464,019	(14,650,000)	(8,198,000)	2,069,024	14,606,425
1986	20,464,281	0	26,479,379	(14,650,000)	(9,107,000)	1,602,419	24,789,079
1987	30,814,266	0	23,514,665	(14,650,000)	(9,451,000)	1,762,179	31,990,110
1988	31,587,615	0	26,003,911	(14,650,000)	(8,677,000)	1,808,899	36,073,425
1989	10,125,424	0	28,442,946	(14,650,000)	(8,102,000)	2,678,007	18,494,377
1990	27,882,191	0	37,255,751	(14,650,000)	(8,498,000)	1,436,712	43,426,654
1991	35,966,870	0	76,428,061	(14,650,000)	(9,487,000)	1,727,664	89,985,595
1992	27,622,044	0	32,284,164	(14,650,000)	(8,526,000)	1,707,822	38,438,030
1993	21,156,123	0	36,071,890	(14,650,000)	(8,768,000)	1,708,490	35,518,503
1994	13,755,771	0	39,321,477	(14,650,000)	(7,484,000)	2,134,392	33,077,640
1995	14,253,704	0	44,519,764	(14,650,000)	(4,976,939)	2,042,481	41,189,010
1996	10,536,189	0	49,167,138	(14,650,000)	(5,503,289)	2,448,692	41,998,730
1997	13,959,817	0	50,303,842	(14,650,000)	(5,740,515)	1,699,730	45,572,874
1998	3,706,236	0	53,230,282	(14,650,000)	(8,155,000)	1,193,198	35,324,716
1999	5,756,399	0	54,083,724	(14,650,000)	(9,198,000)	9,686	36,001,809
2000	8,946,372	0	55,770,292	(14,650,000)	(10,452,028)	13,491	39,628,127
2001	7,763,464	0	75,262,091	(14,650,000)	(15,231,433)	23,866	53,167,988
2002	13,395,718	0	67,824,612	(14,650,000)	(22,034,770)	24,426	44,559,986
2003	14,733,270	0	77,483,994	(14,650,000)	(30,910,299)	9,833	46,666,798
2004	12,424,830	0	91,278,920	(14,650,000)	(34,155,125)	7,548	54,906,173
2005	(7,126,781)	0	99,112,650	(14,650,000)	(23,020,957)	0	54,314,912
2006	20,564,429	0	77,707,728	(14,650,000)	(16,279,103)	3,129,000	70,472,054
2007	23,840,166	0	81,207,038	(14,650,000)	(15,464,828)	3,129,000	78,061,376
2008	22,544,551	0	81,634,854	(14,650,000)	(15,646,347)	3,129,000	77,012,058
2009	6,810,473	0	58,176,083	(14,650,000)	(9,040,000)	3,129,000	44,425,556
2010	3,800,473	0	57,374,045	(14,650,000)	(9,040,000)	3,129,000	40,613,518
2011	1,736,473	0	56,401,919	(14,650,000)	(9,040,000)	0	34,448,392
2012	396,699	0	54,930,760	(14,650,000)	(9,040,000)	0	31,637,459
2013	396,699	0	57,975,624	(14,650,000)	(9,040,000)	0	34,682,323
2014	396,699	0	56,510,610	(14,650,000)	(9,040,000)	0	33,217,309
2015	396,699	0	54,566,848	(14,650,000)	(9,040,000)	0	31,273,547
2016	396,699	0	58,183,091	(14,650,000)	(9,040,000)	0	34,889,790
2017	396,699	0	57,379,283	(14,650,000)	(9,040,000)	0	34,085,982
2018	396,699	0	57,808,862	(14,650,000)	(9,040,000)	0	34,515,561
2019	396,699	0	56,691,638	(14,650,000)	(9,040,000)	0	33,398,337
2020	396,699	0	54,284,698	(14,650,000)	(9,040,000)	0	30,991,397
2021	396,699	0	58,353,702	(14,650,000)	(9,040,000)	0	35,060,401
2022	396,699	0	57,148,280	(14,650,000)	(9,040,000)	0	33,854,979
2023	396,699	0	54,244,306	(14,650,000)	(9,040,000)	0	30,951,005
2024	396,699	0	55,164,940	(14,650,000)	(9,040,000)	0	31,871,639
2025	396,699	0	59,588,504	(14,650,000)	(9,040,000)	0	36,295,203
2026	396,699	0	57,021,041	(14,650,000)	(9,040,000)	0	33,727,740
2027	396,699	0	53,832,562	(14,650,000)	(9,040,000)	0	30,539,261
2028	396,699	0	54,279,666	(14,650,000)	(9,040,000)	0	30,986,365
2029	396,699	0	60,178,188	(14,650,000)	(9,040,000)	0	36,884,887
2030	396,699	0	56,025,284	(14,650,000)	(9,040,000)	0	32,731,983
2031	396,699	0	54,186,355	(14,650,000)	(9,040,000)	0	30,893,054
2032	396,699	0	53,706,811	(14,650,000)	(9,040,000)	0	30,413,510
2033	396,699	0	58,612,551	(14,650,000)	(9,040,000)	0	35,319,250
2034	396,699	0	55,440,673	(14,650,000)	(9,040,000)	0	32,147,372
2035	396,699	0	55,972,771	(14,650,000)	(9,040,000)	0	32,679,470
TOTAL	1,095,412,955	(11,528,320)	2,997,740,079	(1,002,213,000)	(585,729,633)	72,730,905	2,566,412,986

a) Reimbursed through the capital cost component of the Delta Water Charge.

b) Negotiated settlements as to the magnitude of SWP planning costs from 1952 through 1978.

c) Reimbursed through the minimum OMP&R component of the Delta Water Charge. Credits for Gianelli power generation are reflected in these net costs.

d) Revenues credited through the capital cost component of the Delta Water Charge.

e) Revenues credited through the minimum OMP&R component of the Delta Water Charge.

f) Under amendments of Articles 22(e) and 22(g), planning and pre-operating costs of additional Project Conservation Facilities incurred through the previous year (2005) reflected in the Delta Water Charge.

TABLE B-14. Capital Costs of Transportation Facilities Allocated to Each Contractor

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA (a	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	83	114	410	607	122	224	346
1953	0	0	0	323	479	1,808	2,610	336	620	956
1954	0	0	0	819	1,306	5,150	7,275	421	777	1,198
1955	0	0	0	977	1,570	6,297	8,844	211	390	601
1956	0	0	0	8,844	14,459	63,816	87,119	227	418	645
1957	15,199	11,436	26,635	21,564	35,240	649,596	706,400	291	536	827
1958	33,420	16,591	50,011	67,764	71,717	733,414	872,895	720	1,328	2,048
1959	20,697	6,591	27,288	154,255	143,730	493,050	791,035	10,636	69,139	79,775
1960	9,097	8,830	17,927	296,492	275,610	1,018,661	1,590,763	15,255	99,794	115,049
1961	6,950	7,445	14,395	853,506	802,675	1,914,709	3,570,890	10,163	36,681	46,844
1962	(194)	(926)	(1,120)	545,123	615,141	1,686,041	2,846,305	17,281	39,570	56,851
1963	1,319	1,111	2,430	657,426	1,281,271	3,243,838	5,182,535	68,821	140,841	209,662
1964	38,393	35,466	73,859	712,650	1,747,783	7,251,800	9,712,233	138,614	282,003	420,617
1965	198,833	62,221	261,054	360,779	606,025	3,414,457	4,381,261	250,706	497,152	747,858
1966	461,619	49,917	511,536	592,714	592,598	2,245,215	3,430,527	587,951	1,117,486	1,705,437
1967	1,569,498	40,379	1,609,877	796,995	803,951	2,401,862	4,002,808	936,412	1,762,694	2,699,106
1968	859,613	61,691	921,304	736,470	696,075	1,997,924	3,430,469	351,131	675,220	1,026,351
1969	74,388	59,318	133,706	269,698	293,275	764,950	1,327,923	76,966	164,583	241,549
1970	43,361	67,877	111,238	58,676	61,200	135,569	255,445	47,891	109,224	157,115
1971	26,763	34,052	60,815	12,086	18,227	84,089	114,402	28,638	80,715	109,353
1972	19,643	18,905	38,548	12,293	12,763	63,610	88,666	19,289	50,230	69,519
1973	56,510	30,874	87,384	10,494	12,136	39,380	62,010	23,010	56,178	79,188
1974	165,830	65,832	231,662	15,722	24,402	73,119	113,243	25,037	61,383	86,420
1975	91,824	89,234	181,058	16,730	15,806	41,394	73,930	14,740	61,416	76,156
1976	57,765	83,651	141,416	34,004	34,663	109,610	178,277	33,638	130,440	164,078
1977	64,167	80,147	144,314	46,229	45,115	133,375	224,719	108,324	264,720	373,044
1978	69,319	81,717	151,036	71,234	66,008	174,898	312,140	21,415	103,822	125,237
1979	191,273	282,907	474,180	45,468	42,943	110,665	199,076	22,941	125,669	148,610
1980	264,433	386,006	650,439	134,522	124,352	304,614	563,488	103,258	462,895	566,153
1981	227,606	383,086	610,692	(33,738)	(29,856)	(65,637)	(129,231)	(15,416)	(135,240)	(150,656)
1982	549,164	870,611	1,419,775	7,876	8,321	27,065	43,262	4,102	(58,882)	(54,780)
1983	1,254,900	1,433,061	2,687,961	138,413	131,515	339,246	609,174	32,196	110,287	142,483
1984	2,547,878	2,750,040	5,297,918	152,992	140,971	351,921	645,884	35,448	107,723	143,171
1985	7,143,123	6,443,613	13,586,736	19,776	19,245	53,491	92,512	17,424	78,896	96,320
1986	10,565,937	16,926,630	27,492,567	32,034	31,581	88,070	151,685	44,135	306,452	350,587
1987	7,979,832	12,599,507	20,579,339	50,153	48,675	138,959	237,787	126,995	1,342,116	1,469,111
1988	2,312,909	4,343,513	6,656,422	116,181	112,294	302,461	530,936	156,473	1,479,545	1,636,018
1989	1,224,538	1,553,352	2,777,890	108,320	102,804	260,092	471,216	152,173	1,210,940	1,363,113
1990	443,002	824,055	1,267,057	224,283	224,188	625,213	1,073,684	222,208	1,559,457	1,781,665
1991	99,848	89,269	189,117	413,426	383,368	946,246	1,743,040	298,398	2,184,088	2,482,486
1992	57,045	62,083	119,128	182,231	169,968	442,055	794,254	361,210	3,504,755	3,865,965
1993	122,423	128,634	251,057	129,344	125,312	342,416	597,072	1,170,649	11,997,954	13,168,603
1994	71,274	83,270	154,544	46,042	58,050	229,649	333,741	4,260,734	46,401,596	50,662,330
1995	30,605	29,271	59,876	97,808	97,063	257,484	452,355	12,268,787	155,255,849	167,524,636
1996	20,275	19,069	39,344	49,854	48,056	127,493	225,403	11,284,548	145,409,409	156,693,957
1997	20,039	107,784	127,823	82,598	78,996	209,517	371,111	3,184,506	38,158,718	41,343,224
1998	17,309	21,447	38,756	27,114	23,949	62,646	113,709	883,014	10,563,182	11,446,196
1999	67,542	106,333	173,875	74,358	73,714	208,601	356,673	929,800	9,604,289	10,534,089
2000	15,937	37,603	53,540	27,390	28,767	80,015	136,172	489,386	5,542,764	6,032,150
2001	4,469	11,525	15,994	140,023	269,536	1,854,608	2,264,167	80,654	631,609	712,263
2002	17,782	43,709	61,491	805,106	1,189,094	5,874,598	7,868,798	71,502	468,992	540,494
2003	49,553	15,819	65,372	1,156,057	1,330,130	4,614,252	7,100,439	15,686	280,419	296,105
2004	151,772	19,068	170,840	1,483,165	1,378,279	6,565,455	9,426,899	15,251	119,668	134,919
2005	60,245	62,677	122,922	1,615,351	1,489,435	4,280,795	7,385,581	(14,358)	(204,694)	(219,052)
2006	1,502,468	43,606	1,546,074	758,367	696,264	1,673,269	3,127,900	80,728	598,596	679,324
2007	4,296,903	55,039	4,351,942	2,220,777	2,034,093	4,863,653	9,118,523	102,289	645,252	747,541
2008	5,025,499	51,844	5,077,343	1,585,069	1,452,657	3,477,332	6,515,058	95,587	629,360	724,947
2009	12,904	20,719	33,623	29,310	28,279	76,145	133,734	57,933	495,857	553,790
2010	12,904	20,719	33,623	29,310	28,279	76,145	133,734	57,933	495,857	553,790
2011	12,904	20,719	33,623	29,310	28,279	76,145	133,734	57,933	495,857	553,790
2012	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0
TOTAL	50,258,309	50,758,947	101,017,256	18,332,240	20,241,940	67,622,721	106,196,901	39,442,353	445,676,820	485,119,173

Note: Allocated capital costs as a result of permanent water transfes under Monterey are not reflected on this Table

a) Costs from Table B-10 allocated to Solano County Water Agency are reduced herein by $2,102,700 in 1986 and $1,823,500 in 1987 under provisions of Amendment No. 10 to its water supply contract.

TABLE B-14. Capital Costs of Transportation Facilities Allocated to Each Contractor

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA									
	Dudley Ridge Water District	Empire West Side Irrigation District (b	Future Contractor San Joaquin Valley	Kern County Water Agency			County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
				Municipal and Industrial	Municipal and (c Industrial	Agri-cultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1952	389	20	58	938	119	9,129	20	12	785	11,470
1953	1,076	53	161	2,887	345	27,383	55	33	2,157	34,150
1954	1,350	68	201	3,373	417	32,369	69	43	2,718	40,608
1955	677	34	101	1,497	197	14,721	35	23	1,371	18,656
1956	726	34	108	2,702	273	24,255	35	25	1,416	29,574
1957	932	38	139	6,048	494	49,932	39	29	1,707	59,358
1958	2,308	102	344	14,374	1,153	119,049	104	61	4,368	141,863
1959	7,384	364	2,517	26,218	2,597	253,891	372	381	14,757	308,481
1960	12,940	630	3,666	34,054	4,155	352,166	644	498	25,696	434,449
1961	21,848	1,063	3,954	51,407	6,500	538,707	1,087	598	43,377	668,541
1962	49,320	2,410	7,867	94,933	13,834	1,017,146	2,465	1,879	98,141	1,287,995
1963	208,757	10,687	32,172	364,014	55,715	3,934,636	10,932	5,990	425,330	5,048,233
1964	328,286	16,961	64,890	600,152	88,904	6,636,279	17,350	11,942	672,013	8,436,777
1965	538,215	27,481	117,996	1,098,999	152,930	11,999,892	28,116	21,802	1,095,126	15,080,557
1966	1,107,757	52,586	279,172	2,218,832	339,222	24,857,487	53,789	38,891	2,173,090	31,120,826
1967	852,537	39,537	445,562	2,012,744	286,990	23,629,026	40,444	34,775	1,653,429	28,995,044
1968	198,739	9,739	166,267	1,104,132	70,086	11,544,942	9,962	12,238	396,075	13,512,180
1969	94,436	4,793	35,473	616,516	27,216	6,416,147	4,903	7,302	191,574	7,398,360
1970	54,344	2,720	21,686	414,659	15,520	4,145,046	2,782	3,999	109,470	4,770,226
1971	25,462	1,291	12,094	190,552	7,114	1,622,274	1,320	540	51,618	1,912,265
1972	11,589	589	8,354	82,886	3,409	723,623	602	343	23,526	854,921
1973	6,657	335	10,201	39,973	1,980	458,527	343	221	13,448	531,685
1974	9,478	469	11,044	45,420	2,766	483,866	479	326	18,979	572,827
1975	13,329	677	5,246	36,467	3,710	382,743	692	425	27,048	470,337
1976	17,506	837	12,615	53,085	5,621	654,026	856	1,152	34,455	780,153
1977	9,672	436	47,790	36,478	3,753	886,672	446	494	18,497	1,004,238
1978	23,499	(30,406)	6,178	54,219	6,579	575,169	1,209	1,402	47,446	685,295
1979	25,051	1,295	5,664	53,866	6,610	559,746	1,325	1,862	51,293	706,712
1980	144,980	(4,617)	31,160	321,890	38,126	3,211,810	7,682	7,144	297,215	4,055,390
1981	(5,427)	(15,464)	200	(44,773)	(1,223)	(385,275)	(296)	1,752	(11,324)	(461,830)
1982	49,916	2,584	6,600	83,283	13,142	654,692	2,638	1,252	102,287	916,394
1983	52,429	(35,295)	12,125	110,465	13,872	1,073,500	2,769	1,327	107,337	1,338,529
1984	86,345	4,474	14,303	154,799	22,764	1,617,225	4,572	2,678	177,020	2,084,180
1985	25,435	1,311	5,649	47,055	6,766	484,485	1,341	1,176	52,013	625,231
1986	38,309	(41,067)	9,862	71,661	10,320	796,097	2,009	778	78,142	966,111
1987	28,769	1,476	7,004	55,537	7,969	616,845	1,509	1,491	58,679	779,279
1988	52,329	2,831	17,078	70,572	12,049	909,046	2,894	4,620	109,713	1,181,132
1989	156,099	8,019	27,551	352,103	42,943	3,834,481	8,201	12,134	318,604	4,760,135
1990	292,361	15,142	50,360	553,394	87,199	6,094,021	15,487	22,729	599,233	7,729,926
1991	349,413	18,103	60,419	580,572	91,765	6,447,565	18,515	23,486	716,292	8,306,130
1992	125,891	6,439	28,019	241,559	34,559	2,711,639	6,585	10,883	256,370	3,421,944
1993	86,113	4,375	30,245	174,630	23,840	2,059,168	4,474	4,698	174,772	2,562,315
1994	64,762	3,323	23,894	124,518	17,633	1,488,418	3,398	2,173	132,095	1,860,214
1995	82,969	(1,000)	72,734	167,698	24,390	2,472,332	4,355	2,824	169,318	2,995,620
1996	27,611	(61,913)	51,990	68,870	8,812	1,233,548	1,437	1,590	56,092	1,388,037
1997	136,503	7,041	48,721	241,400	36,417	2,951,687	7,195	3,706	279,205	3,711,875
1998	70,585	(121,012)	23,037	122,493	18,582	1,470,316	3,734	1,278	144,651	1,733,664
1999	82,290	4,249	26,824	144,882	21,945	1,736,415	4,343	3,856	168,404	2,193,208
2000	21,067	1,072	9,811	45,646	6,006	547,273	1,094	(1,081)	42,783	673,671
2001	17,632	900	7,790	35,687	5,017	428,254	920	777	35,867	532,844
2002	74,060	3,804	15,942	132,582	20,004	1,494,264	3,891	724	151,158	1,896,429
2003	(51,492)	(2,691)	(5,668)	(76,971)	(13,187)	(832,512)	(2,752)	330	(106,022)	(1,090,965)
2004	6,953	358	2,362	15,272	1,853	164,896	367	1,482	14,211	207,754
2005	25,401	1,319	5,257	45,551	6,627	465,754	1,348	399	52,133	603,789
2006	45,518	2,343	14,745	88,610	12,259	977,008	2,397	1,014	93,003	1,236,897
2007	96,650	4,989	24,340	174,767	25,731	1,931,510	5,104	2,094	197,755	2,462,940
2008	72,196	3,716	21,210	136,295	19,388	1,513,050	3,802	2,022	147,511	1,919,190
2009	12,075	616	7,350	25,027	3,391	328,279	630	508	24,557	402,433
2010	12,075	616	7,350	25,027	3,391	328,279	630	508	24,557	402,433
2011	12,075	616	7,350	25,027	3,391	328,279	630	508	24,557	402,433
2012	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0
TOTAL	5,916,156	(38,500)	1,967,134	13,576,553	1,733,950	151,101,198	301,378	268,146	11,887,098	186,713,113

b) Costs from Table B-10 allocated to Empire West Side Irrigation District are reduced herein by $31,588 in 1978; $12,129 in 1980; $15,173 in 1981; $38,004 in 1983; $43,033 in 1986; $5,261 in 1995; $63,318 in 1996 and $124,667 in 1998 in accordance with letters of agreement with the district.

c) Costs related to maximum annual entitlement of 15,000 acre-feet under Amendment No. 18 of the water supply contract with Kern County Water Agency.

TABLE B-14. Capital Costs of Transportation Facilities Allocated to Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency (d	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1952	3,158	1,042	850	254	1,402	70	1,695	418	6,079	1,550
1953	10,026	3,327	2,668	799	4,401	222	5,318	1,328	19,058	4,852
1954	12,742	4,193	3,465	1,031	5,714	285	6,908	1,691	24,608	6,290
1955	5,411	1,881	1,374	401	2,267	115	2,756	715	9,229	2,377
1956	9,775	3,590	2,196	612	3,622	191	4,449	1,267	13,138	3,438
1957	26,306	9,255	6,343	1,816	10,461	540	12,767	3,450	40,646	10,534
1958	49,204	17,599	11,581	3,290	19,099	991	23,360	6,414	72,708	18,898
1959	70,247	29,740	15,869	4,616	26,171	1,347	31,759	9,030	98,596	25,519
1960	84,552	38,760	22,068	6,797	36,395	1,547	43,260	10,772	147,170	37,469
1961	126,542	54,262	34,613	12,530	57,086	2,245	63,709	16,437	236,164	57,707
1962	198,558	85,352	43,719	13,861	72,102	3,344	84,709	24,943	253,435	64,330
1963	580,138	255,252	116,797	33,149	192,624	9,828	234,926	73,256	610,277	160,624
1964	1,094,365	501,858	209,462	55,445	345,446	18,442	429,605	137,769	1,026,066	276,118
1965	1,908,076	947,523	385,533	103,757	635,825	32,819	786,986	244,587	1,913,090	512,862
1966	3,960,302	2,150,972	812,655	215,858	1,340,235	69,325	1,664,584	517,269	3,943,586	1,062,417
1967	4,976,538	4,100,531	1,077,422	296,069	1,776,892	88,301	2,182,240	653,250	5,821,681	1,550,239
1968	5,924,474	3,998,942	1,350,742	368,156	2,227,646	107,350	2,738,009	783,940	7,982,824	2,122,940
1969	5,822,708	3,079,426	1,690,259	539,851	2,787,631	121,303	3,256,507	865,455	10,898,185	2,769,647
1970	5,032,959	3,277,778	2,050,788	695,345	3,382,251	106,381	3,872,367	736,775	13,795,809	3,457,109
1971	2,577,507	2,146,954	1,071,523	338,581	1,767,179	48,337	2,087,223	347,057	8,137,053	1,987,120
1972	973,436	283,257	331,759	92,079	547,138	19,134	668,550	134,360	2,691,137	697,957
1973	354,407	914,303	158,579	82,223	261,557	6,304	238,094	46,102	1,760,570	403,582
1974	451,450	280,861	259,175	74,113	427,433	8,143	518,453	59,145	1,617,394	425,927
1975	253,438	246,492	193,632	52,821	319,337	4,954	392,110	33,995	1,533,664	407,913
1976	237,539	255,238	136,751	37,235	225,529	4,245	277,807	31,002	962,280	255,901
1977	199,554	371,469	91,384	25,858	150,711	3,757	183,609	26,834	591,445	155,537
1978	302,111	470,176	78,573	22,226	129,584	5,233	157,815	38,654	428,989	111,769
1979	357,678	938,985	81,807	21,795	134,915	5,965	166,931	44,410	403,569	108,408
1980	1,867,517	1,777,294	423,755	113,166	698,855	32,435	864,104	240,899	2,040,757	548,085
1981	(158,728)	610,795	(47,102)	(8,865)	(77,678)	(2,576)	(102,568)	(19,588)	(143,875)	(43,557)
1982	1,557,934	861,928	298,770	78,903	492,728	26,237	613,587	196,672	1,421,407	388,261
1983	2,062,512	521,349	396,033	115,678	653,134	34,699	803,945	259,939	2,126,313	581,672
1984	1,518,361	295,783	297,559	85,097	490,731	27,272	606,124	188,562	1,546,628	423,408
1985	896,226	158,810	217,115	62,532	358,064	13,104	441,299	107,533	1,115,498	304,903
1986	841,555	104,860	221,194	58,152	364,790	9,038	454,702	93,309	1,048,625	286,302
1987	333,052	105,625	166,099	43,992	273,928	5,566	340,485	40,716	783,725	213,202
1988	259,234	174,155	65,831	22,723	108,570	3,384	128,339	26,743	429,498	113,644
1989	1,045,999	434,394	323,138	97,036	532,920	16,777	649,616	125,344	1,375,722	372,048
1990	678,053	374,313	332,566	97,789	548,468	7,335	672,344	67,179	1,509,745	409,710
1991	831,687	401,961	367,196	120,925	605,579	11,966	733,443	92,625	1,979,364	540,210
1992	633,272	356,952	270,826	131,328	446,647	9,556	501,634	76,760	2,093,387	573,386
1993	634,283	332,089	222,347	171,095	366,700	10,194	353,470	73,955	3,848,084	1,046,752
1994	467,409	165,607	132,599	93,839	218,685	7,255	218,494	53,209	2,347,599	637,733
1995	459,990	293,308	132,690	78,390	218,835	7,436	232,377	54,544	1,959,986	530,656
1996	299,764	206,742	110,520	44,965	182,270	4,885	211,872	35,808	4,004,066	972,829
1997	438,898	249,699	103,382	24,640	170,497	7,397	214,534	54,452	2,819,566	397,103
1998	231,375	201,318	61,853	40,974	102,009	3,938	104,688	29,174	3,547,590	302,471
1999	272,187	177,666	88,999	38,450	146,777	4,878	169,400	35,895	5,453,212	228,739
2000	138,739	77,710	54,773	23,902	90,332	2,660	103,134	19,109	13,635,919	171,058
2001	128,753	43,584	50,665	15,634	83,557	2,951	101,850	20,674	19,270,173	95,921
2002	165,050	106,305	34,254	11,387	56,492	2,415	67,803	18,275	9,602,339	126,093
2003	(50,046)	(14,093)	2,633	2,112	4,342	(883)	3,341	(6,547)	3,747,303	26,514
2004	57,468	36,689	18,594	5,192	30,665	1,009	37,809	7,426	2,043,583	36,088
2005	165,714	98,956	31,766	10,127	52,389	2,773	62,093	20,813	920,041	50,953
2006	324,880	248,999	110,655	44,935	182,498	5,609	202,678	41,612	1,952,465	215,406
2007	468,605	470,067	220,171	72,533	363,110	8,048	429,711	59,815	1,345,304	353,266
2008	434,273	584,819	179,499	47,821	296,029	7,482	368,180	55,538	910,903	247,820
2009	69,451	184,392	22,065	6,526	36,389	1,291	44,381	9,336	148,784	39,713
2010	69,451	60,225	22,065	6,526	36,389	1,291	44,381	9,336	148,784	39,713
2011	69,451	51,535	22,065	6,526	36,389	1,291	44,381	9,336	148,784	39,713
2012	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0
TOTAL	52,815,570	34,222,854	15,196,162	4,864,598	25,061,743	947,431	29,858,137	6,948,778	160,219,728	26,968,849

d) Costs from Table B-10 allocated to Castaic Lake Water Agency are reduced herein by $14,088 in 1978 in accordance with a letter of agreement with the district.

TABLE B-14. Capital Costs of Transportation Facilities Allocated to Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California (e	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total	South Bay Area Future Contractor	GRAND TOTAL
	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
1952	962	69,020	370	86,870	0	0	0	0	59	99,352
1953	3,011	217,634	1,187	273,831	0	0	0	0	264	311,811
1954	3,904	279,967	1,496	352,294	0	0	0	0	766	402,141
1955	1,474	111,602	670	140,272	0	0	0	0	969	169,342
1956	2,127	179,335	1,299	225,039	0	0	0	0	9,172	351,549
1957	6,526	516,050	3,367	648,061	0	0	0	0	23,172	1,464,453
1958	11,701	945,684	6,390	1,186,919	0	0	2	2	32,888	2,286,626
1959	15,815	1,364,298	9,894	1,702,901	0	0	14	14	57,918	2,967,412
1960	23,307	1,914,521	12,798	2,379,416	0	0	28	28	123,202	4,660,834
1961	36,153	3,212,125	18,770	3,928,343	0	0	10	10	316,220	8,545,243
1962	40,012	3,543,471	29,069	4,456,905	0	0	32	32	228,202	8,875,170
1963	99,266	11,185,928	86,807	13,638,872	0	0	51	51	528,496	24,610,279
1964	170,012	18,065,455	164,709	22,494,752	0	0	7,791	7,791	590,034	41,736,063
1965	316,082	33,763,577	307,475	41,858,192	0	0	3,139	3,139	332,680	62,664,741
1966	654,194	74,485,027	681,898	91,558,322	0	0	(48)	(48)	783,728	129,110,328
1967	958,406	130,599,417	1,279,076	155,360,062	0	0	47	47	1,479,421	194,146,365
1968	1,314,841	147,502,290	1,360,687	177,782,841	0	0	51,573	51,573	1,254,192	197,978,910
1969	1,726,891	140,096,646	1,085,026	174,739,535	0	0	234,232	234,232	398,183	184,473,488
1970	2,160,122	161,983,078	1,147,609	201,698,371	0	0	16,227	16,227	74,028	207,082,650
1971	1,237,573	133,903,316	738,822	156,388,245	0	0	27,204	27,204	12,457	158,624,741
1972	434,507	43,931,880	66,878	50,872,072	0	0	9	9	13,182	51,936,917
1973	256,711	39,723,010	290,020	44,495,462	0	0	25	25	8,099	45,263,853
1974	264,349	18,896,593	86,362	23,369,398	0	0	45	45	28,570	24,402,165
1975	253,838	16,732,939	83,975	20,509,108	0	0	21	21	8,226	21,318,836
1976	158,850	13,545,451	84,623	16,212,451	0	0	51	51	16,486	17,492,912
1977	96,517	11,769,352	110,833	13,776,860	0	0	28	28	21,181	15,544,384
1978	69,152	15,781,696	174,876	17,770,854	0	0	38	38	28,876	19,073,476
1979	66,847	27,627,424	343,361	30,302,095	0	0	23	23	26,668	31,857,364
1980	337,811	59,493,774	641,586	69,080,038	0	0	26	26	59,169	74,974,703
1981	(26,356)	15,661,179	224,257	15,865,338	0	0	34	34	(6,746)	15,727,601
1982	238,792	30,873,857	316,107	37,365,183	0	0	11	11	16,086	39,705,931
1983	357,812	25,056,047	187,121	33,156,254	0	0	19	19	72,225	38,006,645
1984	260,327	16,317,441	103,160	22,160,453	0	0	26	26	83,252	30,414,884
1985	187,454	10,236,155	56,162	14,154,855	0	0	29	29	16,338	28,572,021
1986	176,057	8,365,310	34,777	12,058,671	0	0	31	31	16,248	41,035,900
1987	131,163	6,955,356	36,142	9,429,051	0	0	32	32	29,062	32,523,661
1988	70,260	6,626,545	57,117	8,086,043	0	0	55	55	50,083	18,140,689
1989	227,772	18,531,680	153,200	23,885,646	0	0	44	44	43,324	33,301,368
1990	251,185	17,430,869	125,376	22,504,932	0	0	63	63	96,419	34,453,746
1991	331,235	20,792,168	132,558	26,940,917	0	0	54	54	149,922	39,811,666
1992	351,492	21,196,762	116,999	26,759,001	0	0	42	42	80,900	35,041,234
1993	646,980	29,471,748	105,693	37,283,390	0	0	30	30	59,324	53,921,791
1994	394,936	16,392,019	50,941	21,180,325	0	0	14	14	34,208	74,225,376
1995	331,399	16,078,395	72,214	20,450,220	0	0	3	3	42,395	191,525,105
1996	1,100,219	23,237,696	49,282	30,460,918	0	0	0	0	21,388	188,829,047
1997	1,987,864	13,530,777	72,335	20,071,144	0	0	3	3	34,976	65,660,156
1998	3,351,560	11,234,515	65,270	19,276,735	0	0	7	7	11,162	32,620,229
1999	6,135,848	8,999,050	55,105	21,806,206	0	0	2	2	34,683	35,098,736
2000	17,011,956	5,386,696	23,952	36,739,940	0	0	0	0	16,879	43,652,352
2001	24,660,997	2,944,670	12,652	47,432,081	0	0	0	0	67,794	51,025,143
2002	11,951,414	5,253,452	34,427	27,429,706	0	0	0	0	380,408	38,177,326
2003	4,685,945	3,859,509	(5,032)	12,255,098	0	0	0	0	589,637	19,215,686
2004	2,390,732	4,170,999	12,482	8,848,736	0	0	0	0	531,172	19,320,320
2005	837,616	6,245,799	33,769	8,532,809	0	0	0	0	540,659	16,966,708
2006	1,504,446	13,869,050	85,407	18,788,640	0	0	0	0	270,193	25,649,028
2007	218,782	33,048,396	153,495	37,211,303	0	0	0	0	760,434	54,652,683
2008	152,630	53,174,437	180,654	56,640,085	0	0	0	0	548,129	71,424,752
2009	24,594	5,579,851	64,527	6,231,300	0	0	0	0	18,676	7,373,556
2010	24,594	2,246,591	18,709	2,728,055	0	0	0	0	18,676	3,870,311
2011	24,594	2,013,308	15,502	2,482,875	0	0	0	0	18,676	3,625,131
2012	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0
TOTAL	90,715,261	1,566,220,887	11,464,293	2,025,504,291	0	0	341,067	341,067	11,103,090	2,915,994,891

e) Costs from Table B-10 allocated to MWDSC are reduced herein by $16,425,374 in 1972 under provisions of Amendment No. 7 to its water contract.

TABLE B-15. Capital Cost Component of Transportation Charge for Each Contractor [a b c]

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	153,725	105,637	364,698	624,060	0	0	0
1964	0	0	0	216,131	170,872	529,854	916,857	6,694	21,659	28,353
1965	0	0	0	284,275	259,858	899,072	1,443,205	13,751	36,017	49,768
1966	18,057	0	18,057	320,279	290,714	1,072,916	1,683,909	26,516	61,329	87,845
1967	41,560	0	41,560	391,134	320,885	1,187,229	1,899,248	56,450	118,225	174,675
1968	121,469	0	121,469	507,646	361,817	1,309,517	2,178,980	104,127	207,970	312,097
1969	165,236	0	165,236	609,761	397,257	1,411,240	2,418,258	122,004	242,348	364,352
1970	169,023	0	169,023	644,078	412,189	1,450,186	2,506,453	125,923	250,728	376,651
1971	171,231	0	171,231	650,897	415,305	1,457,089	2,523,291	128,361	256,289	384,650
1972	172,593	0	172,593	652,206	416,233	1,461,370	2,529,809	129,819	260,399	390,218
1973	173,593	31,353	204,946	653,539	416,883	1,464,608	2,535,030	130,802	262,956	393,758
1974	176,471	32,924	209,395	654,523	417,501	1,466,613	2,538,637	131,973	265,816	397,789
1975	184,914	36,276	221,190	656,819	418,743	1,470,336	2,545,898	133,248	268,941	402,189
1976	189,589	40,819	230,408	658,140	419,548	1,472,444	2,550,132	133,998	272,068	406,066
1977	192,530	45,078	237,608	660,803	421,313	1,478,024	2,560,140	135,711	278,710	414,421
1978	195,797	49,159	244,956	664,373	423,610	1,484,815	2,572,798	141,226	292,188	433,414
1979	199,326	53,320	252,646	669,666	426,971	1,493,720	2,590,357	142,316	297,474	439,790
1980	209,065	67,724	276,788	673,449	429,157	1,499,354	2,601,960	143,484	303,872	447,356
1981	222,528	87,377	309,905	683,589	435,488	1,514,863	2,633,940	148,742	327,440	476,182
1982	234,116	106,881	340,997	681,463	433,968	1,511,522	2,626,953	147,957	320,554	468,511
1983	262,076	151,207	413,284	682,698	434,392	1,512,899	2,629,989	148,166	317,556	465,722
1984	325,968	224,170	550,139	693,786	441,088	1,530,172	2,665,046	149,805	323,171	472,976
1985	455,691	364,186	819,877	706,190	448,265	1,548,090	2,702,545	151,610	328,656	480,266
1986	819,376	692,256	1,511,632	708,078	449,245	1,550,813	2,708,136	152,497	332,673	485,170
1987	1,360,258	1,558,749	2,919,007	710,649	450,862	1,555,321	2,716,832	154,756	348,360	503,116
1988	1,771,094	2,207,426	3,978,520	714,860	453,368	1,562,476	2,730,704	161,294	417,458	578,752
1989	1,890,890	2,432,396	4,323,286	723,738	459,184	1,578,141	2,761,063	169,399	494,091	663,490
1990	1,954,717	2,513,362	4,468,079	731,780	464,542	1,591,698	2,788,020	177,331	557,209	734,540
1991	1,977,962	2,556,601	4,534,563	748,884	476,306	1,624,504	2,849,694	188,990	639,036	828,026
1992	1,983,238	2,561,318	4,544,556	779,473	496,563	1,674,504	2,950,540	204,758	754,445	959,203
1993	1,986,275	2,564,623	4,550,898	793,829	505,611	1,698,036	2,997,476	223,986	941,012	1,164,998
1994	1,992,843	2,571,524	4,564,367	804,257	512,334	1,716,406	3,032,997	286,790	1,584,690	1,871,480
1995	1,996,698	2,576,028	4,572,726	808,731	515,474	1,728,829	3,053,034	517,259	4,094,617	4,611,876
1996	1,998,368	2,577,625	4,575,993	816,633	520,770	1,742,877	3,080,280	1,186,671	12,565,710	13,752,381
1997	1,999,484	2,578,675	4,578,160	820,682	523,416	1,749,898	3,093,996	1,808,036	20,572,448	22,380,484
1998	2,000,598	2,584,668	4,585,266	827,410	527,808	1,761,546	3,116,764	1,985,088	22,693,988	24,679,076
1999	2,001,570	2,585,873	4,587,443	829,627	529,153	1,765,065	3,123,845	2,034,685	23,287,300	25,321,985
2000	2,005,405	2,591,910	4,597,315	987,275	533,338	1,776,909	3,297,522	2,087,476	23,832,603	25,920,079
2001	2,324,657	2,779,862	5,104,519	1,115,353	534,991	1,781,504	3,431,848	2,115,581	24,150,915	26,266,496
2002	2,324,954	2,780,566	5,105,521	1,129,701	550,658	1,889,305	3,569,664	2,120,269	24,187,628	26,307,897
2003	2,326,155	2,783,237	5,109,392	1,214,305	620,665	2,235,168	4,070,138	2,124,478	24,215,240	26,339,718
2004	2,329,518	2,784,225	5,113,743	1,347,155	700,044	2,510,537	4,557,736	2,125,415	24,231,974	26,357,389
2005	2,339,962	2,785,469	5,125,431	1,491,998	783,488	2,908,024	5,183,510	2,126,338	24,239,219	26,365,557
2006	2,343,771	2,789,399	5,133,170	1,621,784	875,049	3,171,180	5,668,013	2,125,455	24,226,636	26,352,091
2007	2,450,415	2,792,246	5,242,661	1,698,190	918,551	3,275,725	5,892,466	2,130,499	24,264,036	26,394,535
2008	2,760,691	2,795,901	5,556,592	1,924,110	1,047,852	3,584,892	6,556,854	2,137,001	24,305,052	26,442,053
2009	3,130,307	2,799,408	5,929,715	2,088,650	1,141,906	3,810,036	7,040,592	2,143,190	24,345,801	26,488,991
2010	3,131,281	2,800,840	5,932,121	2,092,244	1,143,773	3,815,063	7,051,080	2,147,015	24,378,541	26,525,556
2011	3,132,276	2,802,303	5,934,579	2,095,911	1,145,680	3,820,197	7,061,788	2,150,921	24,411,973	26,562,894
2012	3,133,294	2,803,798	5,937,092	2,099,663	1,147,630	3,825,447	7,072,740	2,154,916	24,446,161	26,601,077
2013	3,133,294	2,803,798	5,937,092	1,926,260	1,041,992	3,460,749	6,429,001	2,154,916	24,446,161	26,601,077
2014	3,133,294	2,803,798	5,937,092	1,856,328	976,758	3,295,593	6,128,679	2,148,222	24,424,502	26,572,724
2015	3,133,294	2,803,798	5,937,092	1,781,030	887,771	2,926,375	5,595,176	2,141,164	24,410,144	26,551,308
2016	3,112,728	2,803,798	5,916,526	1,742,211	856,916	2,752,531	5,351,658	2,128,400	24,384,832	26,513,232
2017	3,086,015	2,803,798	5,889,813	1,667,974	826,744	2,638,218	5,132,936	2,098,465	24,327,936	26,426,401
2018	2,995,233	2,803,798	5,799,031	1,548,440	785,812	2,515,930	4,850,182	2,050,789	24,238,191	26,288,980
2019	2,945,498	2,803,798	5,749,296	1,442,997	750,372	2,414,207	4,607,576	2,032,911	24,203,813	26,236,724
2020	2,941,177	2,803,798	5,744,975	1,407,235	735,440	2,375,261	4,517,936	2,028,992	24,195,433	26,224,425
2021	2,938,646	2,803,798	5,742,444	1,400,048	732,324	2,368,358	4,500,730	2,026,554	24,189,872	26,216,426
2022	2,937,086	2,803,798	5,740,884	1,398,683	731,396	2,364,077	4,494,156	2,025,096	24,185,762	26,210,858
2023	2,935,944	2,770,280	5,706,224	1,397,277	730,747	2,360,839	4,488,863	2,024,114	24,183,205	26,207,319
2024	2,932,664	2,768,646	5,701,310	1,396,224	730,129	2,358,834	4,485,187	2,022,942	24,180,345	26,203,287
2025	2,923,052	2,765,070	5,688,122	1,393,891	728,886	2,355,111	4,477,888	2,021,668	24,177,220	26,198,888
2026	2,917,710	2,760,318	5,678,028	1,392,419	728,082	2,353,003	4,473,504	2,020,917	24,174,093	26,195,010
2027	2,914,339	2,755,885	5,670,224	1,389,439	726,317	2,347,423	4,463,179	2,019,205	24,167,451	26,186,656
2028	2,910,601	2,751,627	5,662,228	1,385,439	724,020	2,340,632	4,450,091	2,013,689	24,153,973	26,167,662
2029	2,906,565	2,747,261	5,653,826	1,379,455	720,659	2,331,727	4,431,841	2,012,599	24,148,687	26,161,286
2030	2,895,412	2,731,803	5,627,215	1,375,300	718,473	2,326,093	4,419,866	2,011,431	24,142,289	26,153,720
2031	2,880,000	2,710,744	5,590,744	1,363,861	712,141	2,310,584	4,386,586	2,006,174	24,118,721	26,124,895
2032	2,866,708	2,689,805	5,556,513	1,366,387	713,661	2,313,925	4,393,973	2,006,959	24,125,607	26,132,566
2033	2,834,658	2,642,370	5,477,028	1,365,189	713,238	2,312,548	4,390,975	2,006,750	24,128,605	26,135,355
2034	2,761,585	2,565,777	5,327,362	1,352,945	706,542	2,295,275	4,354,762	2,005,111	24,122,990	26,128,101
2035	2,613,488	2,419,522	5,033,010	1,339,187	699,364	2,277,357	4,315,908	2,003,306	24,117,505	26,120,811
TOTAL	130,995,881	133,057,851	264,053,732	78,962,360	44,423,739	149,689,382	273,075,481	86,503,151	966,780,519	1,053,283,670

a) Unadjusted for prior overpayments or underpayments of charges.
b) Determined at the current Project Interest Rate of 4.608 percent per annum.
c) Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-15. Capital Cost Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA									
	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Kern County Water Agency			County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
				Municipal and Industrial	Municipal and Industrial [d]	Agri-cultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	2,724	0	0	0	0	0	0	2,724
1965	0	0	6,027	64,262	9,281	0	0	0	0	79,570
1966	0	0	12,035	120,217	17,068	0	0	0	0	149,320
1967	0	0	26,249	233,186	34,339	0	0	0	0	293,774
1968	77,385	1,747	48,934	335,663	48,951	423,377	9,404	4,715	65,265	1,015,441
1969	77,520	5,241	57,399	391,879	52,519	869,466	10,154	5,125	246,939	1,716,243
1970	84,961	5,241	59,206	423,268	53,905	1,057,532	10,442	5,330	182,739	1,882,625
1971	96,866	5,241	60,310	444,380	54,695	1,404,594	10,608	5,740	194,461	2,276,896
1972	108,230	5,241	60,925	454,082	55,057	2,103,256	10,690	11,000	599,896	3,408,378
1973	119,053	5,241	61,351	458,302	55,231	2,425,783	10,733	6,355	232,030	3,374,079
1974	180,691	5,241	61,870	460,337	55,331	2,716,516	10,766	7,116	385,132	3,883,000
1975	219,464	5,241	62,432	462,650	55,472	3,253,641	10,808	7,331	459,555	4,536,594
1976	167,329	5,241	62,700	464,506	55,661	3,507,395	10,849	8,280	328,756	4,610,718
1977	164,510	5,241	63,342	467,209	55,947	3,843,095	10,911	7,585	314,333	4,932,173
1978	175,874	0	65,775	469,066	56,138	4,271,925	11,016	7,995	337,242	5,395,031
1979	208,581	5,241	66,090	471,827	56,473	4,690,758	11,082	8,200	379,551	5,897,803
1980	221,872	5,241	66,378	474,569	56,810	5,118,678	11,153	11,685	381,996	6,348,383
1981	221,872	5,241	67,964	490,958	58,751	5,602,017	11,561	8,815	404,903	6,872,083
1982	221,872	5,241	67,975	488,679	58,689	6,048,107	11,548	9,225	427,281	7,338,617
1983	232,154	5,241	68,311	492,919	59,358	6,555,977	11,681	7,728	50,869	7,484,239
1984	244,059	5,241	68,928	498,543	60,064	6,877,598	11,830	9,840	333,572	8,109,675
1985	255,424	5,241	69,656	506,425	61,223	7,323,689	12,065	10,045	242,672	8,486,440
1986	266,788	5,241	69,944	508,820	61,568	7,452,205	12,137	10,455	517,853	8,905,011
1987	278,152	5,241	70,449	512,489	62,096	8,216,777	12,247	10,660	540,229	9,708,340
1988	289,516	5,241	70,809	515,348	62,506	8,637,427	12,330	11,070	562,606	10,166,853
1989	300,880	5,241	71,694	519,003	63,130	8,940,876	12,497	11,480	585,513	10,510,314
1990	156,122	5,241	73,130	537,356	65,369	9,256,140	12,932	11,685	631,333	10,749,308
1991	289,034	5,241	75,772	566,393	69,944	9,256,140	13,757	11,685	631,333	10,919,300
1992	312,244	5,241	78,965	597,071	74,793	9,256,140	14,752	11,685	631,333	10,982,224
1993	312,244	5,241	80,456	609,930	76,633	9,256,140	15,120	11,685	631,333	10,998,782
1994	312,244	5,241	82,079	619,299	77,912	9,256,140	15,392	11,685	631,333	11,011,325
1995	312,244	5,241	83,371	626,034	78,865	9,256,140	15,603	11,685	631,333	11,020,517
1996	288,814	5,241	87,340	635,184	80,196	8,938,429	15,956	11,685	631,333	10,694,178
1997	288,814	5,241	90,203	638,976	80,681	8,872,915	16,128	11,685	631,333	10,635,976
1998	288,819	5,241	92,912	652,398	82,706	8,613,754	16,583	11,685	631,333	10,395,431
1999	288,819	5,241	94,205	659,278	83,750	8,613,754	16,818	11,685	631,333	10,404,882
2000	288,819	5,241	95,728	667,504	84,996	7,970,205	17,093	11,685	631,333	9,772,604
2001	288,819	5,241	96,292	670,125	85,341	7,841,428	17,169	11,685	631,333	9,647,434
2002	310,715	5,241	96,745	672,199	85,632	7,841,428	17,233	11,685	592,910	9,633,789
2003	310,715	5,241	97,683	680,005	86,810	7,841,428	17,473	11,685	590,704	9,641,744
2004	310,715	5,241	97,345	675,412	86,023	7,829,467	44,666	11,685	508,926	9,569,479
2005	310,715	5,241	97,488	676,336	86,135	7,829,467	44,691	11,685	508,926	9,570,684
2006	310,715	5,241	97,811	679,136	86,543	7,829,467	46,442	11,685	507,258	9,574,299
2007	334,140	5,241	98,732	684,673	87,309	8,202,741	46,609	11,685	507,258	9,978,388
2008	334,140	5,241	100,280	695,782	88,944	8,202,740	46,956	11,685	507,258	9,993,026
2009	334,140	5,241	101,653	704,607	90,200	8,202,740	47,225	11,685	507,258	10,004,749
2010	334,140	5,241	102,138	706,259	90,423	8,202,740	47,280	11,685	507,258	10,007,164
2011	334,140	5,241	102,634	707,947	90,652	8,202,740	47,335	11,685	507,258	10,009,632
2012	334,140	5,241	103,141	709,672	90,886	8,202,740	47,393	11,685	507,258	10,012,156
2013	334,140	5,241	103,141	709,672	90,886	8,202,740	47,393	11,685	507,258	10,012,156
2014	334,140	5,241	100,417	709,672	90,886	8,202,740	47,393	11,685	507,258	10,009,432
2015	334,140	5,241	97,113	645,410	81,605	8,202,740	47,393	11,685	507,258	9,932,585
2016	334,140	5,241	91,105	589,455	73,818	8,202,740	47,393	11,685	507,258	9,862,835
2017	334,140	5,241	76,892	476,486	56,547	8,202,740	47,393	11,685	507,258	9,718,382
2018	334,140	5,241	54,206	374,009	41,935	8,202,740	37,989	11,685	507,258	9,569,203
2019	334,140	5,241	45,741	317,793	38,367	8,202,740	37,238	11,685	507,258	9,500,203
2020	334,140	5,241	43,935	286,404	36,981	8,202,740	36,951	11,685	507,258	9,465,335
2021	334,140	5,241	42,831	265,292	36,191	8,202,740	36,785	11,685	507,258	9,442,163
2022	334,140	5,241	42,215	255,590	35,829	8,202,740	36,703	11,685	507,258	9,431,401
2023	334,140	5,241	41,790	251,370	35,655	8,202,740	36,660	11,685	507,258	9,426,539
2024	334,140	5,241	41,270	249,335	35,555	8,202,740	36,627	11,685	507,258	9,423,851
2025	334,140	5,241	40,708	247,022	35,414	8,202,740	36,584	11,685	507,258	9,420,792
2026	334,140	5,241	40,441	245,166	35,225	8,202,740	36,544	11,685	507,258	9,418,440
2027	334,140	5,241	39,799	242,463	34,939	8,202,740	36,482	11,685	507,258	9,414,747
2028	334,140	5,241	37,366	240,606	34,748	8,202,740	36,377	11,685	507,258	9,410,161
2029	334,140	5,241	37,051	237,845	34,413	8,202,740	36,310	11,685	507,258	9,406,683
2030	334,140	5,241	36,763	235,103	34,076	8,202,740	36,240	11,685	507,258	9,403,246
2031	334,140	5,241	35,176	218,714	32,135	8,202,740	35,832	11,685	507,258	9,382,921
2032	334,140	5,241	35,166	220,994	32,197	8,202,740	35,845	11,685	507,258	9,385,266
2033	334,140	5,241	34,830	216,753	31,528	8,202,740	35,711	11,685	507,258	9,379,886
2034	334,140	5,241	34,213	211,129	30,822	8,202,740	35,563	11,685	507,258	9,372,791
2035	334,140	5,241	33,484	203,248	29,663	8,202,740	35,328	11,685	507,258	9,362,787
TOTAL	18,883,724	347,662	4,781,233	33,449,696	4,250,421	484,778,732	1,779,852	723,283	32,768,595	581,763,198

d) Charges under Amendment No. 18 of the water supply contract with Kern County Water Agency.

TABLE B-15. Capital Cost Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	33,309	0	0	0	0	0	0	0	51,711	0
1964	62,847	27,438	16,286	4,369	37,145	1,142	28,427	8,202	82,782	34,973
1965	118,565	52,989	28,459	7,191	40,756	2,081	50,300	15,217	135,023	35,333
1966	215,713	101,232	51,184	12,474	73,129	3,752	90,369	27,670	232,426	61,445
1967	417,348	210,746	98,904	23,464	141,365	7,282	175,119	54,006	433,210	115,536
1968	679,132	419,579	164,991	38,538	231,834	11,777	286,701	87,265	729,615	194,465
1969	986,308	623,243	249,378	57,283	345,252	17,243	426,589	127,179	1,136,053	302,553
1970	1,288,041	780,054	352,336	84,769	487,182	23,419	592,598	171,243	1,690,923	443,566
1971	1,548,953	946,985	471,194	120,171	659,386	28,835	790,147	208,755	2,394,267	619,582
1972	1,682,697	1,056,391	533,559	137,410	749,360	31,296	897,191	226,425	2,824,733	720,754
1973	1,733,186	1,070,858	553,392	142,098	777,217	32,271	931,585	233,266	2,962,112	756,290
1974	1,751,576	1,117,449	562,610	146,284	790,534	32,592	944,027	235,613	3,051,750	776,837
1975	1,774,997	1,131,822	577,197	150,058	812,296	33,006	971,021	238,624	3,134,098	798,523
1976	1,788,124	1,144,406	587,768	152,747	828,555	33,258	991,263	240,355	3,212,183	819,292
1977	1,800,420	1,157,448	595,329	154,643	840,037	33,475	1,005,782	241,933	3,261,176	832,321
1978	1,810,750	1,176,420	600,379	155,959	847,711	33,666	1,015,604	243,300	3,291,289	840,240
1979	1,826,394	1,200,415	604,990	157,091	854,308	33,932	1,024,100	245,268	3,313,131	845,930
1980	1,844,919	1,248,282	609,777	158,201	861,177	34,236	1,033,076	247,529	3,333,678	851,450
1981	1,941,660	1,338,837	636,015	163,962	896,759	35,887	1,077,612	259,794	3,437,581	879,355
1982	1,933,412	1,369,996	632,062	163,511	892,804	35,756	1,072,876	258,797	3,430,256	877,137
1983	2,014,262	1,413,950	648,871	167,528	917,891	37,092	1,104,681	268,810	3,502,625	896,905
1984	2,121,326	1,440,538	670,884	173,418	951,144	38,859	1,142,162	282,045	3,610,884	926,520
1985	2,200,039	1,455,659	686,764	177,751	976,129	40,247	1,173,518	291,645	3,689,629	948,078
1986	2,246,544	1,463,805	698,218	180,934	994,360	40,914	1,205,255	297,120	3,746,498	963,621
1987	2,290,309	1,469,235	709,928	183,911	1,013,034	41,377	1,220,251	301,897	3,800,178	978,277
1988	2,307,717	1,474,730	718,732	186,176	1,027,137	41,664	1,238,246	303,993	3,840,527	989,254
1989	2,321,324	1,483,792	722,401	187,353	1,032,760	41,839	1,245,234	305,378	3,862,773	995,140
1990	2,376,618	1,506,478	741,616	192,411	1,060,538	42,713	1,279,437	311,911	3,934,480	1,014,532
1991	2,412,406	1,526,119	759,874	197,542	1,089,317	43,098	1,314,716	315,436	4,013,699	1,036,030
1992	2,456,548	1,547,359	779,790	203,932	1,121,316	43,730	1,353,471	320,331	4,118,290	1,064,576
1993	2,490,605	1,566,360	794,895	210,923	1,145,092	44,239	1,380,175	324,417	4,229,726	1,095,098
1994	2,525,075	1,584,177	807,651	220,102	1,164,765	44,786	1,399,138	328,384	4,436,172	1,151,256
1995	2,550,681	1,593,135	815,344	225,178	1,176,594	45,178	1,410,957	331,262	4,563,157	1,185,751
1996	2,576,074	1,609,138	823,318	229,455	1,188,534	45,584	1,423,636	334,239	4,670,098	1,214,705
1997	2,592,836	1,620,522	830,201	231,931	1,198,571	45,853	1,435,302	336,210	4,890,575	1,268,272
1998	2,617,453	1,634,405	836,569	233,300	1,208,050	46,264	1,960,073	339,238	5,047,337	1,290,351
1999	2,630,574	1,645,712	840,426	235,602	1,213,780	46,486	1,966,884	340,876	5,246,597	1,307,340
2000	2,646,159	2,799,550	845,840	237,785	1,222,113	46,763	1,977,372	404,656	5,556,215	1,320,327
2001	2,654,237	2,805,476	849,253	239,158	1,227,301	46,915	1,983,935	405,856	6,339,304	1,330,150
2002	2,678,268	2,808,670	852,342	240,066	1,232,158	47,087	1,990,197	407,112	7,459,404	1,335,726
2003	2,688,045	2,816,210	854,621	240,737	1,235,484	47,229	1,994,810	408,286	8,024,736	1,343,149
2004	2,685,105	2,815,909	909,067	240,863	1,235,743	47,176	1,995,319	407,946	8,248,366	1,344,732
2005	2,688,639	2,819,157	6,519,065	241,177	1,995,193	47,238	1,998,034	408,466	8,372,090	1,346,917
2006	2,698,852	2,826,122	6,566,877	241,800	2,004,596	47,408	2,002,065	409,781	8,428,648	1,350,049
2007	2,719,463	2,849,642	6,678,936	244,607	2,030,065	47,758	2,017,179	412,786	8,550,637	1,363,507
2008	2,749,645	2,889,891	7,027,291	249,218	2,098,144	48,270	2,047,499	417,084	8,636,154	1,385,963
2009	2,778,172	2,936,665	7,734,783	252,314	2,211,133	48,754	2,074,440	421,192	8,695,131	1,402,009
2010	2,782,819	2,955,702	7,745,767	252,745	2,214,798	48,840	2,077,815	421,880	8,704,955	1,404,631
2011	2,787,566	2,961,387	7,756,984	253,185	2,218,540	48,927	2,081,262	422,584	8,714,986	1,407,308
2012	2,792,420	2,966,216	7,768,455	253,635	2,222,367	49,016	2,084,787	423,302	8,725,244	1,410,047
2013	2,759,111	2,966,216	7,706,625	253,635	2,200,654	49,016	2,084,787	423,302	8,673,534	1,396,950
2014	2,729,574	2,932,085	7,641,305	249,266	2,184,224	47,874	2,051,899	414,404	8,642,462	1,388,772
2015	2,673,855	2,901,274	7,583,859	246,444	2,160,520	46,935	2,026,381	406,811	8,590,221	1,374,714
2016	2,576,708	2,844,157	7,479,874	241,161	2,117,172	45,264	1,978,918	393,223	8,492,818	1,348,602
2017	2,375,073	2,710,302	7,255,521	230,171	2,025,076	41,734	1,879,436	364,792	8,292,034	1,294,510
2018	2,113,287	2,422,579	6,938,079	215,097	1,900,656	37,238	1,741,905	327,582	7,995,629	1,215,581
2019	1,806,113	2,126,632	6,509,468	196,352	1,740,742	31,773	1,564,632	281,489	7,589,192	1,107,494
2020	1,504,380	1,895,996	5,989,464	168,866	1,542,480	25,597	1,357,585	230,574	7,034,322	966,480
2021	1,243,467	1,648,994	5,342,622	133,464	1,298,959	20,180	1,125,176	187,197	6,330,978	790,465
2022	1,109,723	1,489,510	4,448,578	116,225	1,096,646	17,719	999,846	166,354	5,900,511	689,293
2023	1,059,234	1,481,787	3,750,167	111,537	977,130	16,745	958,630	158,320	5,763,132	653,757
2024	1,040,844	1,422,932	3,635,628	107,351	949,586	16,424	943,720	155,510	5,673,495	633,209
2025	1,017,422	1,405,074	3,522,836	103,577	914,558	16,010	913,930	151,935	5,591,147	611,523
2026	1,004,296	1,386,832	3,420,242	100,888	885,870	15,757	892,231	149,916	5,513,062	590,755
2027	992,000	1,368,326	3,344,957	98,992	865,239	15,541	876,645	148,105	5,464,068	577,726
2028	981,670	1,340,500	3,308,442	97,676	853,317	15,350	866,351	146,589	5,433,955	569,807
2029	966,026	1,302,198	3,277,187	96,544	843,120	15,084	856,834	144,377	5,412,114	564,116
2030	947,501	1,225,009	3,251,693	95,434	833,453	14,780	846,818	141,863	5,391,567	558,597
2031	850,761	1,082,000	3,121,249	89,673	783,797	13,128	791,447	127,705	5,287,663	530,692
2032	859,008	1,030,512	3,131,338	90,124	788,580	13,260	800,469	129,338	5,294,989	532,909
2033	778,157	957,984	3,052,617	86,107	755,131	11,924	765,333	118,675	5,222,619	513,142
2034	671,094	915,761	2,943,321	80,217	710,087	10,157	719,890	104,691	5,114,360	483,526
2035	592,381	894,047	2,860,693	75,884	676,086	8,769	687,252	94,796	5,035,615	461,969
TOTAL	133,969,812	119,211,005	192,436,341	11,939,645	81,896,536	2,362,469	90,712,349	19,042,107	365,536,588	65,730,392

TABLE B-15. Capital Cost Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	690,539	0	775,559	0	0	0	0	0	1,399,620
1964	21,728	1,260,042	9,375	1,594,755	0	0	0	0	0	2,542,689
1965	21,859	2,179,810	17,761	2,705,344	0	0	405	405	0	4,278,292
1966	37,952	3,898,819	33,415	4,839,578	0	0	564	564	0	6,779,273
1967	71,260	7,691,085	68,133	9,507,458	0	0	562	562	0	11,917,277
1968	120,056	14,340,331	133,256	17,437,540	0	0	564	564	0	21,066,091
1969	187,000	21,850,137	202,534	26,510,751	0	0	3,190	3,190	0	31,178,029
1970	274,923	28,982,865	257,777	35,429,696	0	0	15,116	15,116	0	40,379,563
1971	384,903	37,229,879	316,207	45,719,265	0	0	15,942	15,942	0	51,091,274
1972	447,913	44,047,132	353,823	53,708,683	0	0	17,327	17,327	0	60,227,008
1973	470,035	46,283,635	357,228	56,303,173	0	0	17,327	17,327	0	62,828,313
1974	483,106	48,306,053	371,994	58,570,424	0	0	17,329	17,329	0	65,616,575
1975	496,565	49,268,119	376,391	59,762,717	0	0	17,331	17,331	0	67,485,918
1976	509,488	50,120,026	380,667	60,808,133	0	0	17,332	17,332	0	68,622,789
1977	517,576	50,809,655	384,975	61,634,771	0	0	17,335	17,335	0	69,796,447
1978	522,490	51,408,868	390,618	62,337,293	0	0	17,336	17,336	0	71,000,828
1979	526,011	52,212,368	399,522	63,243,460	0	0	17,338	17,338	0	72,441,394
1980	529,414	53,618,983	417,004	64,787,725	0	0	17,339	17,339	0	74,479,550
1981	546,614	56,648,010	449,669	68,311,754	0	0	17,341	17,341	0	78,621,204
1982	545,272	57,445,385	461,087	69,118,350	0	0	17,342	17,342	0	79,910,771
1983	557,430	59,017,274	477,181	71,024,500	0	0	17,343	17,343	0	82,035,076
1984	575,647	60,292,946	486,708	72,713,081	0	0	17,344	17,344	0	84,528,260
1985	588,902	61,123,708	491,961	73,844,031	0	0	17,345	17,345	0	86,350,503
1986	598,458	61,644,854	494,820	74,575,401	0	0	17,347	17,347	0	88,202,697
1987	607,471	62,073,067	496,600	75,185,534	0	0	17,348	17,348	0	91,050,177
1988	614,224	62,431,147	498,461	75,672,007	0	0	17,350	17,350	0	93,144,185
1989	617,863	62,774,359	501,420	76,091,636	0	0	17,353	17,353	0	94,367,142
1990	629,735	63,740,269	509,405	77,340,143	0	0	17,355	17,355	0	96,097,445
1991	642,915	64,654,870	515,984	78,522,006	0	0	17,358	17,358	0	97,670,947
1992	660,417	65,753,514	522,988	79,946,261	0	0	17,361	17,361	0	99,400,146
1993	679,128	66,881,843	529,216	81,371,717	0	0	17,363	17,363	0	101,101,234
1994	713,838	68,462,914	534,886	83,373,145	0	0	17,365	17,365	0	103,870,679
1995	735,201	69,349,548	537,642	84,519,627	0	0	17,366	17,366	0	107,795,145
1996	753,283	70,226,791	541,582	85,636,436	0	0	17,366	17,366	0	117,756,635
1997	813,864	71,506,285	544,296	87,314,718	0	0	17,366	17,366	0	128,020,700
1998	924,386	72,258,544	548,317	88,944,285	0	0	17,366	17,366	0	131,738,189
1999	1,112,635	72,889,545	551,983	90,028,440	0	0	17,366	17,366	0	133,483,962
2000	1,461,010	73,400,470	555,112	92,473,372	0	0	17,367	17,367	0	136,078,258
2001	2,437,980	73,709,810	556,488	94,585,863	0	0	17,367	17,367	0	139,053,526
2002	3,871,429	73,880,967	557,223	97,360,648	0	0	17,367	17,367	0	141,994,884
2003	4,575,059	74,190,253	559,250	98,977,868	0	0	17,367	17,367	0	144,156,226
2004	4,854,707	74,420,558	558,950	99,764,440	0	0	17,367	17,367	0	145,380,154
2005	4,999,448	68,308,736	559,705	100,303,866	0	0	17,367	17,367	0	146,566,415
2006	5,050,938	68,640,735	561,781	100,829,652	0	0	17,367	17,367	0	147,574,592
2007	5,144,935	69,389,059	567,117	102,015,691	0	0	17,367	17,367	0	149,541,107
2008	5,158,843	71,435,700	576,875	104,720,577	0	0	17,367	17,367	0	153,286,469
2009	5,168,725	74,090,116	588,571	108,402,005	0	0	17,367	17,367	0	157,883,419
2010	5,170,349	74,447,933	592,832	108,821,066	0	0	17,367	17,367	0	158,354,354
2011	5,172,007	74,588,576	594,093	109,007,405	0	0	17,367	17,367	0	158,593,665
2012	5,173,702	74,716,314	595,162	109,180,667	0	0	17,367	17,367	0	158,821,099
2013	5,165,553	74,095,931	595,162	108,370,476	0	0	17,367	17,367	0	157,367,169
2014	5,160,499	73,582,068	585,787	107,610,219	0	0	17,367	17,367	0	156,275,513
2015	5,151,843	72,713,673	577,401	106,453,931	0	0	16,962	16,962	0	154,487,054
2016	5,135,750	71,086,870	561,747	104,302,264	0	0	16,802	16,802	0	151,963,317
2017	5,102,443	67,495,033	527,028	99,593,153	0	0	16,805	16,805	0	146,777,490
2018	5,053,646	61,131,002	461,906	91,554,187	0	0	16,802	16,802	0	138,078,385
2019	4,986,703	54,011,793	392,628	82,345,011	0	0	14,177	14,177	0	128,452,987
2020	4,898,780	47,352,292	337,385	73,304,201	0	0	2,251	2,251	0	119,259,123
2021	4,788,799	39,686,903	278,955	62,876,159	0	0	1,425	1,425	0	108,779,347
2022	4,725,790	33,513,981	241,339	54,515,515	0	0	40	40	0	100,392,854
2023	4,703,667	32,040,758	237,934	51,912,798	0	0	39	39	0	97,741,782
2024	4,690,597	30,137,849	223,168	49,630,313	0	0	38	38	0	95,443,986
2025	4,677,138	29,287,218	218,771	48,431,139	0	0	36	36	0	94,216,865
2026	4,664,214	28,539,731	214,495	47,378,289	0	0	34	34	0	93,143,305
2027	4,656,126	27,926,950	210,187	46,544,862	0	0	32	32	0	92,279,700
2028	4,651,212	27,363,438	204,544	45,832,851	0	0	30	30	0	91,523,023
2029	4,647,691	26,590,172	195,640	44,911,103	0	0	29	29	0	90,564,768
2030	4,644,288	25,207,056	178,158	43,336,217	0	0	27	27	0	88,940,291
2031	4,627,089	22,296,272	145,493	39,746,969	0	0	26	26	0	85,232,141
2032	4,628,431	21,491,934	134,075	38,924,967	0	0	24	24	0	84,393,309
2033	4,616,273	19,990,297	117,981	36,986,240	0	0	24	24	0	82,369,508
2034	4,598,055	18,813,667	108,453	35,273,279	0	0	23	23	0	80,456,318
2035	4,584,801	18,058,646	103,201	34,134,140	0	0	21	21	0	78,966,677
TOTAL	187,338,078	3,661,005,978	28,439,483	4,959,620,785	0	0	868,230	868,230	0	7,132,665,096

TABLE B-16A. Minimum OMP&R Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	9,699	8,868	21,132	39,699	0	0	0
1963	0	0	0	38,048	34,788	82,896	155,732	0	0	0
1964	0	0	0	41,148	38,323	91,320	170,791	0	0	0
1965	0	0	0	78,529	75,616	195,793	349,938	0	0	0
1966	0	0	0	79,753	78,779	218,543	377,075	0	0	0
1967	0	0	0	127,896	123,667	335,224	586,787	0	0	0
1968	130	0	130	126,058	120,563	333,506	580,127	11,800	21,770	33,570
1969	80,875	0	80,875	145,411	138,050	372,585	656,046	63,113	116,435	179,548
1970	94,872	0	94,872	128,993	120,245	320,664	569,902	74,187	136,867	211,054
1971	45,579	0	45,579	113,071	108,346	296,004	517,421	74,011	136,541	210,552
1972	37,895	0	37,895	122,407	117,483	334,366	574,256	79,196	146,107	225,303
1973	32,993	0	32,993	122,738	116,785	325,726	565,249	75,714	139,683	215,397
1974	46,498	0	46,498	154,435	146,929	403,080	704,444	76,530	141,189	217,719
1975	37,707	0	37,707	189,175	182,087	513,823	885,085	92,605	170,845	263,450
1976	60,786	0	60,786	203,064	193,435	524,813	921,312	94,935	175,144	270,079
1977	78,400	0	78,400	179,869	169,065	500,101	849,035	102,945	189,922	292,867
1978	56,318	0	56,318	239,301	228,855	647,828	1,115,984	104,060	191,978	296,038
1979	73,852	0	73,852	236,986	232,105	666,742	1,135,833	100,748	185,868	286,616
1980	81,769	0	81,769	389,575	372,185	1,010,830	1,772,590	126,328	233,105	359,433
1981	101,340	0	101,340	317,408	302,272	834,257	1,453,937	140,208	258,712	398,920
1982	191,987	0	191,987	386,742	369,633	1,098,844	1,855,219	142,045	262,101	404,146
1983	80,215	0	80,215	438,536	428,973	1,269,373	2,136,882	171,001	315,523	486,524
1984	106,485	0	106,485	591,243	565,721	1,817,629	2,974,593	201,768	372,284	574,052
1985	215,341	0	215,341	674,975	655,490	1,840,211	3,170,676	242,935	448,233	691,168
1986	203,704	0	203,704	613,273	583,077	1,784,056	2,980,406	233,000	429,904	662,904
1987	295,505	0	295,505	687,629	652,468	2,000,817	3,340,914	230,484	463,838	694,322
1988	312,677	(58)	312,619	676,847	655,274	1,910,092	3,242,213	258,807	561,030	819,837
1989	403,330	688,185	1,091,515	716,831	712,354	1,897,149	3,326,334	244,772	668,476	913,248
1990	658,942	674,944	1,333,886	782,589	780,305	2,129,966	3,692,860	310,222	677,025	987,247
1991	726,717	860,903	1,587,620	543,178	524,741	1,520,569	2,588,488	302,369	673,858	976,227
1992	483,580	712,313	1,195,893	796,058	855,050	2,253,496	3,904,604	346,220	736,477	1,082,697
1993	524,000	708,129	1,232,129	1,280,736	1,261,431	3,338,742	5,880,909	386,060	734,138	1,120,198
1994	573,815	658,277	1,232,092	1,368,651	1,312,740	3,560,294	6,241,685	481,022	888,288	1,369,310
1995	539,407	660,770	1,200,177	1,232,272	1,187,201	3,216,470	5,635,943	477,929	881,323	1,359,252
1996	604,992	1,011,298	1,616,290	1,185,220	1,124,968	3,007,330	5,317,518	649,161	1,197,179	1,846,340
1997	563,579	741,881	1,305,460	1,029,670	968,999	2,667,649	4,666,318	406,652	749,805	1,156,457
1998	461,929	661,478	1,123,407	1,064,804	1,174,966	3,502,898	5,742,668	810,178	2,963,766	3,773,944
1999	605,754	993,840	1,599,594	1,221,279	1,262,915	5,074,641	7,558,835	793,094	3,042,686	3,835,780
2000	776,091	1,492,976	2,269,067	2,174,362	1,295,738	3,755,201	7,225,301	714,603	3,446,638	4,161,241
2001	650,709	1,442,691	2,093,400	2,031,962	1,037,198	3,542,165	6,611,325	732,910	3,127,544	3,860,454
2002	1,097,797	1,872,282	2,970,079	2,451,182	1,358,411	6,061,824	9,871,417	770,413	3,588,248	4,358,661
2003	1,168,105	2,246,243	3,414,348	2,255,838	1,056,691	3,546,786	6,859,315	816,900	3,745,271	4,562,171
2004	1,618,445	2,345,386	3,963,831	2,583,387	1,278,759	3,533,253	7,395,399	821,144	3,751,765	4,572,909
2005	917,325	1,801,406	2,718,731	2,396,749	1,132,232	2,953,491	6,482,472	878,460	4,206,062	5,084,522
2006	1,256,135	2,187,625	3,443,760	2,510,725	1,184,819	3,442,338	7,137,882	871,307	4,057,667	4,928,974
2007	1,311,373	2,281,548	3,592,921	2,725,851	1,275,964	3,714,055	7,715,870	903,832	4,197,826	5,101,658
2008	1,344,867	2,339,566	3,684,433	2,821,795	1,319,240	3,858,521	7,999,556	922,744	4,353,138	5,275,882
2009	820,615	1,344,204	2,164,819	2,683,059	1,302,918	3,631,480	7,617,457	743,922	2,761,942	3,505,864
2010	820,489	1,343,879	2,164,368	2,682,874	1,302,916	3,631,526	7,617,316	743,836	2,761,491	3,505,327
2011	823,419	1,348,980	2,172,399	2,693,598	1,307,630	3,644,624	7,645,852	746,443	2,770,518	3,516,961
2012	823,611	1,349,332	2,172,943	2,694,148	1,307,873	3,645,284	7,647,305	746,605	2,771,171	3,517,776
2013	824,121	1,350,394	2,174,515	2,695,297	1,308,255	3,646,248	7,649,800	746,995	2,772,915	3,519,910
2014	824,368	1,351,165	2,175,533	2,695,377	1,308,014	3,645,404	7,648,795	747,127	2,773,829	3,520,956
2015	824,986	1,352,171	2,177,157	2,697,367	1,308,998	3,648,161	7,654,526	747,676	2,775,886	3,523,562
2016	823,950	1,350,379	2,174,329	2,694,239	1,307,533	3,644,106	7,645,878	746,781	2,772,407	3,519,188
2017	824,366	1,351,122	2,175,488	2,695,452	1,308,083	3,645,618	7,649,153	747,135	2,773,809	3,520,944
2018	824,963	1,352,369	2,177,332	2,696,804	1,308,534	3,646,751	7,652,089	747,594	2,775,856	3,523,450
2019	823,881	1,350,429	2,174,310	2,693,686	1,307,133	3,642,912	7,643,731	746,679	2,772,212	3,518,891
2020	824,615	1,351,567	2,176,182	2,696,150	1,308,392	3,646,465	7,651,007	747,342	2,774,640	3,521,982
2021	825,016	1,352,105	2,177,121	2,697,660	1,309,226	3,648,850	7,655,736	747,724	2,775,945	3,523,669
2022	824,782	1,352,045	2,176,827	2,696,283	1,308,301	3,646,113	7,650,697	747,441	2,775,246	3,522,687
2023	824,015	1,350,460	2,174,475	2,694,481	1,307,669	3,644,495	7,646,645	746,841	2,772,609	3,519,450
2024	824,321	1,351,124	2,175,445	2,695,140	1,307,867	3,644,975	7,647,982	747,074	2,773,670	3,520,744
2025	825,181	1,352,492	2,177,673	2,697,955	1,309,280	3,648,948	7,656,183	747,842	2,776,524	3,524,366
2026	823,643	1,350,034	2,173,677	2,692,935	1,306,768	3,641,891	7,641,594	746,469	2,771,418	3,517,887
2027	826,304	1,354,301	2,180,605	2,701,588	1,311,086	3,654,012	7,666,686	748,840	2,780,253	3,529,093
2028	823,561	1,349,965	2,173,526	2,692,540	1,306,523	3,641,176	7,640,239	746,380	2,771,157	3,517,537
2029	824,666	1,351,596	2,176,262	2,696,423	1,308,569	3,646,983	7,651,975	747,401	2,774,801	3,522,202
2030	823,880	1,350,220	2,174,100	2,694,090	1,307,492	3,644,009	7,645,591	746,728	2,772,160	3,518,888
2031	826,545	1,354,907	2,181,452	2,701,934	1,311,090	3,653,925	7,666,949	748,999	2,781,099	3,530,098
2032	823,095	1,349,222	2,172,317	2,691,025	1,305,765	3,639,048	7,635,838	745,966	2,769,615	3,515,581
2033	824,776	1,351,653	2,176,429	2,697,012	1,308,953	3,648,114	7,654,079	747,527	2,775,131	3,522,658
2034	824,912	1,352,084	2,176,996	2,697,047	1,308,811	3,647,621	7,653,479	747,599	2,775,641	3,523,240
2035	823,211	1,349,399	2,172,610	2,691,421	1,305,970	3,639,625	7,637,016	746,071	2,769,998	3,516,069
TOTAL	40,773,112	62,849,281	103,622,393	113,041,533	64,233,453	184,735,457	362,010,443	35,503,449	127,656,202	163,159,651

TABLE B-16A. Minimum OMP&R Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Kern County Water Agency		County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	37,806	1,963	5,639	60,701	678,086	2,008	2,073	77,591	865,867
1969	45,479	2,235	30,158	80,554	1,197,126	2,286	2,085	90,773	1,450,696
1970	46,969	2,292	35,450	96,673	1,381,493	2,344	2,158	93,408	1,660,787
1971	47,997	2,314	35,366	106,654	1,643,163	2,366	2,288	94,874	1,935,022
1972	49,866	2,414	37,844	122,313	1,729,169	2,469	2,254	98,777	2,045,106
1973	50,006	2,385	36,180	125,553	1,719,873	2,440	2,310	98,330	2,037,077
1974	52,818	2,556	36,570	135,661	1,823,065	2,614	2,529	104,609	2,160,422
1975	66,963	3,243	44,251	162,738	2,235,242	3,317	3,191	132,663	2,651,608
1976	66,504	3,328	45,364	159,303	2,215,999	3,404	2,919	133,940	2,630,761
1977	75,595	3,812	49,192	189,661	2,522,290	3,898	3,708	152,838	3,000,994
1978	70,688	3,503	49,725	174,897	2,427,163	3,583	3,644	141,672	2,874,875
1979	68,879	3,436	48,142	173,677	2,378,315	3,514	3,492	138,493	2,817,948
1980	95,898	4,722	59,551	235,741	3,146,570	4,830	4,777	191,582	3,743,671
1981	118,448	5,965	66,183	266,353	3,440,557	6,099	5,187	239,323	4,148,115
1982	134,083	6,711	67,061	311,879	3,848,922	6,862	6,382	270,061	4,651,961
1983	184,902	9,242	80,869	426,485	5,030,031	9,450	8,494	372,182	6,121,655
1984	194,228	9,656	95,555	471,854	5,636,134	9,874	8,719	389,892	6,815,912
1985	200,694	9,957	115,227	486,162	6,042,593	10,182	8,982	402,457	7,276,254
1986	207,028	10,302	110,479	530,803	6,372,710	10,536	10,341	415,776	7,667,975
1987	205,002	10,259	109,401	533,451	6,378,437	10,493	10,517	412,889	7,670,449
1988	203,711	10,223	122,903	516,432	6,388,497	10,455	10,341	410,868	7,673,430
1989	224,049	11,269	116,197	564,169	6,747,046	11,526	11,102	452,406	8,137,764
1990	271,051	13,666	148,238	664,040	8,111,616	13,976	13,206	547,974	9,783,767
1991	275,748	13,854	144,486	662,755	8,111,610	14,168	13,218	556,474	9,792,313
1992	317,889	16,027	162,466	764,224	9,115,453	16,393	18,209	642,672	11,053,333
1993	359,879	17,989	184,477	831,662	10,372,245	18,399	19,560	724,397	12,528,608
1994	309,099	15,487	224,254	738,622	9,789,905	15,840	16,434	622,912	11,732,553
1995	395,441	19,918	220,899	898,339	11,190,121	20,373	21,551	799,070	13,565,712
1996	392,055	19,968	301,835	902,162	12,199,788	20,424	21,664	796,711	14,654,607
1997	396,222	20,154	186,450	942,987	10,974,350	20,613	19,344	806,084	13,366,204
1998	489,209	24,563	288,941	1,098,336	12,675,458	25,125	21,596	995,325	15,618,553
1999	409,335	20,884	272,299	963,313	11,345,079	21,360	21,509	832,557	13,886,336
2000	414,557	21,089	207,531	1,020,792	10,386,585	21,569	22,694	841,923	12,936,740
2001	499,979	25,444	231,676	1,208,436	11,751,169	26,023	31,679	1,015,604	14,790,010
2002	457,889	21,551	224,731	1,079,700	10,693,217	22,041	25,564	812,862	13,337,555
2003	529,663	25,088	242,320	1,173,085	11,744,825	25,660	30,579	940,416	14,711,636
2004	486,184	23,155	246,564	1,139,332	11,300,426	63,079	25,920	748,385	14,033,045
2005	457,614	21,856	259,209	1,009,776	10,750,554	59,437	24,302	705,662	13,288,410
2006	512,780	24,420	258,532	1,170,293	11,786,416	75,629	27,010	786,760	14,641,840
2007	544,467	25,943	269,257	1,227,111	12,416,935	80,132	28,623	835,647	15,428,115
2008	579,116	27,611	280,315	1,204,684	13,090,546	85,037	30,298	889,177	16,186,784
2009	429,519	19,884	261,723	972,167	10,717,619	64,350	22,707	647,384	13,135,353
2010	429,406	19,879	261,689	971,939	10,715,267	64,334	22,705	647,215	13,132,434
2011	431,271	19,965	262,671	975,864	10,758,692	64,608	22,781	650,031	13,185,883
2012	431,371	19,970	262,729	976,094	10,761,201	64,623	22,785	650,181	13,188,954
2013	431,706	19,985	262,873	976,815	10,768,830	64,671	22,794	650,682	13,198,356
2014	431,997	19,998	262,932	977,374	10,774,432	64,710	22,798	651,117	13,205,358
2015	432,256	20,010	263,123	978,010	10,781,554	64,750	22,810	651,504	13,214,017
2016	431,768	19,988	262,808	976,855	10,768,811	64,677	22,790	650,773	13,198,470
2017	431,975	19,997	262,934	977,337	10,774,095	64,708	22,798	651,084	13,204,928
2018	432,369	20,015	263,103	978,183	10,783,051	64,764	22,809	651,672	13,215,966
2019	431,822	19,990	262,779	976,918	10,769,228	64,683	22,788	650,855	13,199,063
2020	432,102	20,003	263,007	977,628	10,777,270	64,726	22,803	651,273	13,208,812
2021	432,211	20,008	263,135	977,946	10,781,027	64,745	22,811	651,437	13,213,320
2022	432,276	20,011	263,049	977,969	10,780,720	64,750	22,805	651,534	13,213,114
2023	431,782	19,988	262,828	976,900	10,769,356	64,679	22,791	650,795	13,199,119
2024	431,996	19,998	262,915	977,355	10,774,152	64,710	22,797	651,116	13,205,039
2025	432,341	20,014	263,181	978,214	10,783,817	64,763	22,814	651,631	13,216,775
2026	431,719	19,986	262,706	976,667	10,766,430	64,667	22,783	650,700	13,195,658
2027	432,804	20,035	263,526	979,358	10,796,647	64,834	22,836	652,324	13,232,364
2028	431,717	19,985	262,677	976,636	10,765,959	64,666	22,781	650,697	13,195,118
2029	432,095	20,003	263,025	977,636	10,777,454	64,726	22,804	651,264	13,209,007
2030	431,716	19,985	262,788	976,746	10,767,665	64,669	22,789	650,696	13,197,054
2031	433,015	20,045	263,590	979,784	10,801,028	64,864	22,840	652,640	13,237,806
2032	431,528	19,977	262,534	976,167	10,760,690	64,637	22,772	650,415	13,188,720
2033	432,079	20,002	263,065	977,648	10,777,812	64,726	22,806	651,240	13,209,378
2034	432,242	20,010	263,097	977,961	10,780,938	64,748	22,808	651,484	13,213,288
2035	431,571	19,979	262,570	976,277	10,761,944	64,643	22,775	650,479	13,190,238
TOTAL	22,204,444	1,060,164	12,848,844	51,009,811	573,584,468	2,516,259	1,165,833	37,388,239	701,778,062

TABLE B-16A. Minimum OMP&R Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	65,074	28,085	11,697	2,958	19,291	1,089	24,380	8,173	52,315	14,399
1969	86,339	70,342	15,522	3,925	25,598	1,445	32,348	10,844	69,419	19,106
1970	107,807	84,577	19,392	4,904	31,981	1,804	40,391	13,540	86,727	23,865
1971	178,820	105,979	32,228	8,150	53,151	2,992	66,999	22,459	144,136	39,636
1972	363,555	202,625	106,740	30,967	176,037	6,601	213,032	48,102	548,123	144,113
1973	404,661	222,765	121,341	34,674	200,116	7,346	243,320	53,975	724,535	190,156
1974	434,868	235,528	130,627	37,062	215,432	7,677	262,735	56,383	786,107	207,019
1975	504,791	289,501	151,031	43,176	249,082	9,082	303,108	65,580	905,424	238,842
1976	559,013	262,420	160,686	44,454	265,004	10,030	325,512	73,253	964,524	256,570
1977	675,504	335,749	184,813	47,743	304,792	11,890	381,161	87,355	1,069,446	289,793
1978	600,343	376,946	187,028	54,156	308,449	10,711	373,192	78,304	1,148,279	300,751
1979	661,123	349,072	196,264	52,211	323,677	12,124	401,469	87,126	1,125,452	302,508
1980	858,039	415,571	253,090	71,921	417,398	15,435	508,379	112,853	1,518,405	401,223
1981	1,001,503	511,087	284,970	73,534	469,970	18,046	588,024	131,992	1,548,350	420,523
1982	1,128,643	557,494	320,938	89,560	529,292	20,193	649,204	148,012	1,870,559	497,871
1983	1,744,932	832,687	450,049	119,275	742,218	30,643	922,072	225,793	2,373,149	639,682
1984	2,105,780	943,524	548,784	150,179	905,055	36,810	1,112,196	271,187	3,018,294	803,394
1985	2,157,936	1,055,744	584,697	157,841	964,282	38,972	1,191,309	277,250	3,230,403	860,780
1986	2,311,841	1,102,466	618,750	162,748	1,020,438	40,051	1,268,806	295,987	3,318,638	893,069
1987	2,366,343	1,032,918	628,222	167,262	1,036,061	41,773	1,283,836	307,844	3,400,838	913,933
1988	2,303,274	1,042,113	649,276	175,694	1,070,784	40,604	1,321,553	298,438	3,587,873	960,968
1989	2,280,051	1,088,176	613,266	169,993	1,011,401	39,501	1,240,888	292,775	3,499,964	932,519
1990	2,636,186	1,275,150	708,829	201,242	1,169,006	45,472	1,424,445	336,069	4,084,211	1,078,392
1991	2,737,441	1,454,172	763,989	210,644	1,259,974	48,936	1,546,583	358,165	4,348,900	1,150,633
1992	2,781,586	1,579,025	750,248	198,232	1,237,307	49,829	1,538,733	362,844	4,131,745	1,115,632
1993	3,109,819	1,689,775	850,589	234,719	1,402,796	56,125	1,722,415	411,539	5,023,595	1,338,111
1994	2,825,181	1,609,511	795,078	225,270	1,311,244	51,258	1,634,795	376,175	4,797,440	1,268,058
1995	3,121,440	1,720,649	848,101	231,718	1,398,686	58,749	1,766,297	444,998	4,828,432	1,272,345
1996	3,093,678	1,966,634	862,720	228,008	1,422,789	56,813	1,817,427	423,444	4,707,473	1,256,549
1997	3,250,394	1,810,292	918,428	281,067	1,514,687	59,547	1,853,224	446,127	5,705,741	1,477,757
1998	3,876,893	2,050,491	1,070,620	299,667	1,765,661	73,841	3,208,176	561,294	6,077,011	1,635,115
1999	3,757,844	2,077,696	1,097,945	308,176	1,810,727	74,274	3,177,408	538,581	6,389,002	1,718,172
2000	3,753,245	3,381,437	1,035,666	291,684	1,708,021	68,473	3,000,250	594,938	5,873,262	1,571,225
2001	4,457,941	3,768,942	1,110,674	297,870	1,831,713	80,824	3,284,565	699,672	5,752,335	1,554,602
2002	3,642,409	3,495,416	1,018,470	282,635	1,679,659	62,597	3,002,723	549,856	5,635,219	1,511,997
2003	4,060,267	3,386,319	1,121,573	298,335	1,849,687	67,913	3,289,616	607,514	5,906,716	1,602,981
2004	4,454,661	4,040,877	1,440,024	320,549	1,902,951	76,867	3,426,241	678,148	6,597,217	1,755,989
2005	4,216,104	3,658,879	6,193,536	303,509	2,377,681	73,029	3,039,129	628,576	6,333,028	1,668,667
2006	4,155,326	3,540,504	8,022,820	335,035	2,828,454	70,084	3,418,049	626,718	6,718,868	1,776,711
2007	4,305,820	3,871,198	8,243,539	352,356	2,946,130	72,655	3,572,917	649,392	7,049,137	1,863,361
2008	4,355,289	3,961,701	8,308,309	347,258	2,948,669	74,742	3,559,581	655,662	6,979,549	1,862,020
2009	3,710,389	3,427,980	6,619,424	272,649	2,345,267	65,711	2,932,427	569,675	5,774,016	1,531,927
2010	3,709,181	3,423,932	6,709,202	267,539	2,350,345	65,682	2,931,072	569,465	5,683,199	1,513,987
2011	3,722,280	3,441,214	6,610,069	274,282	2,349,817	65,929	2,942,235	571,520	5,805,911	1,539,498
2012	3,723,342	3,436,554	6,662,295	270,294	2,352,362	65,951	2,943,211	571,692	5,735,213	1,525,852
2013	3,726,921	3,452,950	6,731,739	259,393	2,350,036	66,032	2,946,887	572,293	5,541,762	1,488,692
2014	3,730,088	3,445,500	6,658,603	280,205	2,368,037	66,114	2,950,672	572,857	5,911,448	1,561,448
2015	3,732,755	3,443,347	6,701,033	259,951	2,349,437	66,161	2,952,771	573,265	5,552,211	1,491,654
2016	3,727,717	3,456,931	6,638,770	282,950	2,367,753	66,065	2,948,453	572,473	5,959,891	1,570,563
2017	3,729,888	3,453,100	6,807,971	268,195	2,373,152	66,108	2,950,391	572,819	5,698,059	1,519,768
2018	3,734,063	3,453,858	6,669,766	272,402	2,361,809	66,202	2,954,673	573,519	5,773,155	1,535,096
2019	3,728,398	3,466,267	6,844,528	282,917	2,396,235	66,089	2,949,590	572,614	5,959,001	1,570,598
2020	3,731,220	3,462,467	6,576,107	269,188	2,343,605	66,135	2,951,607	573,033	5,715,931	1,523,437
2021	3,732,283	3,437,936	6,652,326	257,038	2,338,788	66,145	2,952,037	573,171	5,500,606	1,481,454
2022	3,733,151	3,439,304	6,949,885	270,450	2,396,880	66,184	2,953,869	573,375	5,738,286	1,528,175
2023	3,727,892	3,446,329	6,680,573	282,318	2,372,614	66,067	2,948,530	572,496	5,948,745	1,568,394
2024	3,730,185	3,473,492	6,758,310	268,200	2,366,805	66,119	2,950,928	572,883	5,697,992	1,519,856
2025	3,733,679	3,419,471	6,559,726	270,750	2,344,067	66,178	2,953,558	573,410	5,744,338	1,529,250
2026	3,727,361	3,471,847	6,942,802	283,698	2,410,165	66,071	2,948,764	572,455	5,972,623	1,573,140
2027	3,738,417	3,356,165	6,470,895	266,634	2,328,310	66,260	2,957,230	574,131	5,672,507	1,515,739
2028	3,727,360	3,574,905	6,705,602	257,288	2,345,568	66,076	2,948,984	572,469	5,503,084	1,481,586
2029	3,731,150	3,406,103	6,720,809	281,826	2,378,642	66,130	2,951,370	573,011	5,940,664	1,567,233
2030	3,727,210	3,446,341	6,737,723	282,892	2,380,786	66,054	2,947,926	572,388	5,958,822	1,570,271
2031	3,740,713	3,360,057	6,932,953	250,923	2,372,599	66,316	2,959,812	574,531	5,393,296	1,461,690
2032	3,725,426	3,572,598	6,542,151	281,265	2,352,690	66,042	2,947,503	572,175	5,928,645	1,564,409
2033	3,730,925	3,415,934	6,763,325	265,220	2,363,347	66,117	2,950,763	572,950	5,645,824	1,509,591
2034	3,732,695	3,448,436	6,689,450	262,906	2,351,661	66,163	2,952,883	573,266	5,604,599	1,501,904
2035	3,725,905	3,472,360	6,988,716	299,917	2,436,266	66,051	2,947,862	572,248	6,260,282	1,629,157
TOTAL	192,162,358	154,589,415	232,755,322	14,291,651	108,552,394	3,410,999	141,662,496	28,377,121	297,549,951	79,203,406

TABLE B-16A. Minimum OMP&R Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	42,918
1963	0	0	0	0	0	0	0	0	12,626	168,358
1964	0	0	0	0	0	0	0	0	13,938	184,729
1965	0	0	0	0	0	0	0	0	28,937	378,875
1966	0	0	0	0	0	0	0	0	31,321	408,396
1967	0	0	0	0	0	0	0	0	47,718	634,505
1968	8,821	972,734	9,504	1,218,520	0	0	0	0	46,945	2,745,159
1969	11,704	1,295,607	12,610	1,654,809	0	0	0	0	52,963	4,074,937
1970	14,623	1,624,569	15,746	2,069,926	0	0	0	0	69,744	4,676,285
1971	24,302	2,716,584	26,118	3,421,554	0	0	54	54	55,532	6,185,714
1972	89,131	8,038,463	68,369	10,035,858	0	0	40	40	80,412	12,998,870
1973	117,779	9,890,316	78,313	12,289,297	0	0	1	1	54,219	15,194,233
1974	128,169	11,581,491	83,453	14,166,551	0	0	143	143	76,783	17,372,560
1975	147,899	13,584,548	101,893	16,593,957	0	0	1,069	1,069	84,547	20,517,423
1976	158,664	12,862,489	94,799	16,037,418	0	0	139	139	106,717	20,027,212
1977	178,774	16,203,699	121,966	19,892,685	0	0	892	892	98,618	24,213,491
1978	186,384	17,811,770	132,435	21,568,748	0	0	39	39	100,786	26,012,788
1979	186,688	16,414,289	126,756	20,238,759	0	0	3,235	3,235	119,352	24,675,595
1980	248,399	20,926,898	154,096	25,901,707	0	0	416	416	178,812	32,038,398
1981	259,244	23,731,024	186,592	29,224,859	0	0	3,847	3,847	185,347	35,516,365
1982	307,955	27,994,510	209,141	34,323,372	0	0	11,075	11,075	173,894	41,611,654
1983	394,524	38,953,367	326,258	47,754,649	0	0	1,928	1,928	220,926	56,802,779
1984	496,808	45,597,671	382,104	56,371,786	0	0	3,765	3,765	225,959	67,072,552
1985	531,765	50,064,444	416,652	61,532,075	0	0	2,888	2,888	340,322	73,228,724
1986	551,066	52,858,915	442,334	64,885,109	0	0	2,787	2,787	279,227	76,682,112
1987	564,352	50,737,631	411,276	62,892,289	0	0	2,388	2,388	345,116	75,240,983
1988	593,787	51,262,231	406,248	63,712,843	0	0	545	545	365,207	76,126,694
1989	576,852	52,638,942	431,020	64,815,348	0	0	1,800	1,800	422,329	78,708,338
1990	667,687	61,053,824	494,721	75,175,234	0	0	788	788	474,284	91,448,066
1991	711,803	60,874,529	470,139	75,935,908	0	0	3,654	3,654	214,683	91,098,893
1992	688,558	67,460,598	502,131	82,396,468	0	0	647	647	443,676	100,077,318
1993	828,208	68,749,547	538,751	85,955,989	0	0	3,630	3,630	599,571	107,321,034
1994	784,017	63,928,225	474,133	80,080,385	0	0	2,279	2,279	609,932	101,268,236
1995	785,191	68,079,888	523,512	85,080,006	0	0	2,906	2,906	534,971	107,378,967
1996	773,653	72,757,439	561,100	89,927,727	0	0	8,007	8,007	571,857	113,942,346
1997	917,372	75,655,465	564,455	94,454,556	0	0	7,449	7,449	428,638	115,385,082
1998	1,000,665	80,549,464	608,366	102,777,264	0	0	798	798	465,140	129,501,774
1999	1,054,800	84,857,717	627,858	107,490,200	0	0	416	416	559,344	134,930,505
2000	964,052	82,467,206	635,833	105,345,292	0	0	505	505	0	131,938,146
2001	948,812	92,865,248	708,297	117,361,495	0	0	319	319	0	144,717,003
2002	923,393	85,334,068	657,014	107,795,456	0	0	3,627	3,627	0	138,336,795
2003	987,904	82,216,721	620,034	106,015,580	0	0	3,393	3,393	0	135,566,443
2004	1,086,161	99,273,497	762,493	125,815,675	0	0	3,455	3,455	0	155,784,314
2005	1,032,743	77,179,085	676,642	107,380,608	0	0	3,451	3,451	0	134,958,194
2006	1,100,491	80,245,197	641,197	113,479,454	0	0	3,100	3,100	0	143,635,010
2007	1,154,410	89,081,067	717,166	123,879,148	0	0	3,200	3,200	0	155,720,912
2008	1,148,769	90,101,936	745,224	125,048,709	0	0	3,250	3,250	0	158,198,614
2009	948,363	76,162,042	639,529	104,999,399	0	0	3,300	3,300	0	131,426,192
2010	936,639	75,986,086	638,505	104,784,834	0	0	3,300	3,300	0	131,207,579
2011	953,139	76,447,358	642,141	105,365,393	0	0	3,300	3,300	0	131,889,788
2012	944,176	76,209,618	640,852	105,081,412	0	0	3,300	3,300	0	131,611,690
2013	919,746	76,273,661	645,010	104,975,122	0	0	3,300	3,300	0	131,521,003
2014	967,331	76,875,747	642,960	106,031,010	0	0	3,300	3,300	0	132,584,952
2015	921,557	75,894,449	642,201	104,580,792	0	0	3,300	3,300	0	131,153,354
2016	973,350	77,332,925	646,104	106,543,945	0	0	3,300	3,300	0	133,085,110
2017	940,027	76,822,158	644,964	105,846,600	0	0	3,300	3,300	0	132,400,413
2018	949,976	76,730,676	644,973	105,720,168	0	0	3,300	3,300	0	132,292,305
2019	973,343	78,009,170	648,582	107,467,332	0	0	3,300	3,300	0	134,006,627
2020	942,405	76,675,943	647,355	105,478,433	0	0	3,300	3,300	0	132,039,716
2021	914,892	75,502,210	640,770	104,049,656	0	0	3,300	3,300	0	130,622,802
2022	945,457	76,768,224	641,195	106,004,435	0	0	3,300	3,300	0	132,571,060
2023	971,928	77,068,582	643,292	106,297,760	0	0	3,300	3,300	0	132,840,749
2024	940,069	77,327,515	650,350	106,322,704	0	0	3,300	3,300	0	132,875,214
2025	946,177	75,415,231	635,851	104,191,686	0	0	3,300	3,300	0	130,769,983
2026	975,025	78,417,853	650,126	108,011,930	0	0	3,300	3,300	0	134,544,046
2027	937,256	73,110,322	618,824	101,612,690	0	0	3,300	3,300	0	128,224,738
2028	915,025	79,741,621	677,305	108,516,873	0	0	3,300	3,300	0	135,046,593
2029	971,110	75,895,480	632,489	105,116,017	0	0	3,300	3,300	0	131,678,763
2030	973,170	77,216,694	643,337	106,523,614	0	0	3,300	3,300	0	133,062,547
2031	901,779	73,361,600	619,769	101,996,038	0	0	3,300	3,300	0	128,615,643
2032	969,323	80,521,985	676,840	109,721,052	0	0	3,300	3,300	0	136,236,808
2033	933,357	75,475,512	635,049	104,327,914	0	0	3,300	3,300	0	130,893,758
2034	928,269	76,166,029	643,565	104,921,826	0	0	3,300	3,300	0	131,492,129
2035	1,011,744	79,318,620	650,393	109,379,521	0	0	3,300	3,300	0	135,898,754
TOTAL	48,941,012	4,081,220,224	33,149,080	5,415,865,429	0	0	181,025	181,025	8,723,612	6,755,340,615

TABLE B-16B. Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	10,070	0	10,070	47,473	31,446	863,937	942,856	0	0	0
1984	29,957	0	29,957	157,280	77,388	2,040,188	2,274,856	0	0	0
1985	54,709	0	54,709	458,427	582,679	2,696,450	3,737,556	0	0	0
1986	45,887	0	45,887	312,938	365,147	2,595,765	3,273,850	0	0	0
1987	90,385	0	90,385	622,029	674,111	2,306,079	3,602,219	0	0	0
1988	115,970	114,196	230,166	616,865	804,606	2,116,236	3,537,707	0	0	0
1989	64,584	138,240	202,824	407,353	396,069	1,389,347	2,192,769	0	0	0
1990	77,126	138,805	215,931	535,269	514,372	1,490,250	2,539,891	0	0	0
1991	35,178	245,181	280,359	355,578	477,883	1,065,488	1,898,949	0	165,930	165,930
1992	74,573	230,716	305,289	405,244	529,119	1,183,466	2,117,829	0	0	0
1993	89,214	247,977	337,191	841,383	256,930	1,552,562	2,650,875	0	0	0
1994	111,942	229,598	341,540	501,812	559,683	1,395,238	2,456,733	0	0	0
1995	96,842	235,605	332,447	833,227	492,578	796,524	2,122,329	0	0	0
1996	63,698	205,414	269,112	367,297	304,845	1,189,291	1,861,433	711	105	816
1997	48,518	193,255	241,773	455,751	294,951	1,220,497	1,971,199	44,788	298,986	343,774
1998	82,317	251,217	333,534	380,321	380,282	1,103,662	1,864,265	198,376	1,028,220	1,226,596
1999	58,017	195,562	253,579	559,900	446,655	1,039,572	2,046,127	147,204	791,946	939,150
2000	28,759	128,393	157,152	374,808	237,138	748,820	1,360,766	82,628	474,268	556,896
2001	81,300	156,491	237,791	394,562	232,158	860,678	1,487,398	133,971	592,623	726,594
2002	40,384	128,219	168,603	384,774	230,122	521,729	1,136,625	91,976	586,079	678,055
2003	38,551	95,034	133,585	309,137	185,287	659,690	1,154,114	80,724	488,877	569,601
2004	50,258	128,102	178,360	447,529	209,965	546,009	1,203,503	92,779	661,706	754,485
2005	65,505	165,913	231,418	501,846	295,003	842,594	1,639,443	115,120	669,867	784,987
2006	119,936	226,400	346,336	573,936	384,893	730,995	1,689,824	701,594	952,682	1,654,276
2007	163,361	222,650	386,011	825,308	469,513	897,792	2,192,613	166,669	1,571,541	1,738,210
2008	277,105	331,613	608,718	1,162,734	573,067	1,168,174	2,903,975	997,305	1,814,537	2,811,842
2009	259,103	188,581	447,684	1,154,210	577,061	1,159,610	2,890,881	989,994	1,801,235	2,791,229
2010	264,257	189,869	454,126	1,161,129	580,520	1,166,562	2,908,211	995,929	1,812,033	2,807,962
2011	206,746	201,094	407,840	969,991	472,730	1,267,577	2,710,298	768,707	1,398,615	2,167,322
2012	209,498	201,189	410,687	969,864	472,668	1,267,411	2,709,943	768,606	1,398,432	2,167,038
2013	123,876	117,714	241,590	567,115	276,386	741,102	1,584,603	449,432	817,715	1,267,147
2014	32,296	30,250	62,546	145,651	70,984	190,335	406,970	115,426	210,011	325,437
2015	19,654	17,938	37,592	86,318	42,067	112,799	241,184	68,406	124,460	192,866
2016	17,244	15,367	32,611	73,945	36,038	96,631	206,614	58,601	106,621	165,222
2017	17,155	14,935	32,090	71,866	35,024	93,914	200,804	56,953	103,622	160,575
2018	7,457	6,345	13,802	30,532	14,880	39,899	85,311	24,196	44,024	68,220
2019	7,561	6,292	13,853	30,277	14,756	39,566	84,599	23,994	43,656	67,650
2020	8,319	6,779	15,098	32,619	15,897	42,626	91,142	25,850	47,033	72,883
2021	12,426	10,091	22,517	48,559	23,666	63,457	135,682	38,483	70,017	108,500
2022	11,792	9,576	21,368	46,081	22,458	60,218	128,757	36,518	66,443	102,961
2023	8,388	6,812	15,200	32,777	15,974	42,833	91,584	25,976	47,261	73,237
2024	6,111	4,962	11,073	23,879	11,638	31,205	66,722	18,924	34,431	53,355
2025	453	368	821	1,772	864	2,315	4,951	1,404	2,555	3,959
2026	724	588	1,312	2,830	1,379	3,698	7,907	2,243	4,081	6,324
2027	1,108	900	2,008	4,328	2,109	5,656	12,093	3,430	6,241	9,671
2028	936	760	1,696	3,657	1,782	4,779	10,218	2,898	5,273	8,171
2029	923	750	1,673	3,607	1,758	4,713	10,078	2,858	5,200	8,058
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	3,230,173	5,039,741	8,269,914	18,293,788	12,696,529	39,457,939	70,448,256	7,332,673	18,246,326	25,578,999

TABLE B-16B. Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA							
	Dudley Ridge Water District	Empire West Side Irrigation District	Kern County Water Agency		County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
			Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	159,191	0	34,366	2,964,185	13,174	9,673	3,733	3,184,322
1984	389,518	0	816,103	9,095,509	26,774	33,576	49,601	10,411,081
1985	527,952	59,322	1,053,957	11,978,046	38,810	42,297	1,253,257	14,953,641
1986	552,172	12,858	885,988	11,788,714	40,659	38,275	872,008	14,190,674
1987	450,941	24,936	1,192,388	10,448,063	39,134	37,538	911,938	13,104,938
1988	425,261	31,146	1,130,988	9,910,050	35,851	26,779	850,225	12,410,300
1989	331,852	17,226	607,908	7,400,983	22,959	24,306	754,007	9,159,241
1990	219,381	7,731	428,482	5,216,562	12,089	12,046	344,943	6,241,234
1991	13,048	3,111	570,942	146,276	0	1,354	30,685	765,416
1992	244,630	13,395	706,155	5,788,599	18,587	15,716	480,903	7,267,985
1993	471,706	25,543	1,202,455	11,405,212	37,276	36,803	1,159,908	14,338,903
1994	262,029	15,161	901,463	6,786,208	19,257	19,061	567,521	8,570,700
1995	626,214	16,830	1,486,494	12,489,555	41,275	36,377	1,051,178	15,747,923
1996	407,919	13,446	1,226,968	9,219,091	28,668	24,001	1,691,135	12,611,228
1997	423,144	(6)	794,476	7,471,645	(31)	22,025	137,304	8,848,557
1998	471,993	4,597	837,228	8,366,817	127	25,458	175,371	9,881,591
1999	360,554	19,182	874,948	7,723,883	24,159	20,065	1,749,925	10,772,716
2000	193,895	5,762	392,659	4,215,772	11,530	9,847	667,127	5,496,592
2001	201,286	6,533	226,283	2,840,015	7,494	11,768	286,120	3,579,499
2002	153,869	4,557	309,688	2,803,477	9,257	10,806	301,042	3,592,696
2003	128,292	3,998	255,374	2,744,723	10,279	8,100	292,016	3,442,782
2004	167,903	12,186	431,994	2,937,167	30,970	10,800	278,035	3,869,055
2005	333,319	15,889	390,336	5,934,322	78,555	11,863	567,567	7,331,851
2006	247,554	17,879	471,737	5,338,967	41,974	14,186	416,884	6,549,181
2007	304,261	15,918	690,690	5,795,693	50,405	20,627	508,960	7,386,554
2008	351,306	18,379	797,486	6,759,933	58,199	23,817	587,657	8,596,777
2009	348,731	18,244	878,058	6,623,961	57,772	23,642	583,349	8,533,757
2010	350,822	18,354	883,321	6,663,670	58,118	23,784	586,846	8,584,915
2011	270,781	14,166	681,791	5,138,080	44,859	18,358	452,956	6,620,991
2012	270,746	14,165	681,701	5,137,406	44,853	18,355	452,897	6,620,123
2013	158,315	8,283	398,616	3,004,030	26,227	10,733	264,826	3,871,030
2014	40,660	2,127	102,375	771,517	6,736	2,757	68,014	994,186
2015	24,096	1,261	60,671	457,228	3,992	1,634	40,308	589,190
2016	20,642	1,080	51,975	391,691	3,420	1,399	34,530	504,737
2017	20,062	1,050	50,513	380,675	3,324	1,360	33,559	490,543
2018	8,523	446	21,461	161,730	1,412	578	14,258	208,408
2019	8,452	442	21,281	160,379	1,400	573	14,138	206,665
2020	9,106	476	22,927	172,785	1,509	617	15,232	222,652
2021	13,556	709	34,131	257,220	2,246	919	22,676	331,457
2022	12,864	673	32,389	244,090	2,131	872	21,518	314,537
2023	9,150	479	23,039	173,623	1,516	620	15,306	223,733
2024	6,666	349	16,784	126,488	1,104	452	11,151	162,994
2025	495	26	1,245	9,386	82	34	827	12,095
2026	790	41	1,989	14,991	131	54	1,322	19,318
2027	1,208	63	3,042	22,928	200	82	2,021	29,544
2028	1,021	53	2,571	19,373	169	69	1,708	24,964
2029	1,007	53	2,535	19,104	167	68	1,684	24,618
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	9,996,883	448,119	22,689,971	207,519,822	958,799	654,124	18,628,176	260,895,894

TABLE B-16B. Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	1,083,881	411,247	565,798	35,432	894,572	1,250	0	0	233,134	28,548
1984	2,499,848	1,122,640	1,427,428	102,114	2,263,172	77	0	0	502,967	693,074
1985	3,749,257	1,572,025	2,032,672	170,137	3,230,451	0	0	157,601	884,188	601,583
1986	3,159,857	1,694,487	2,097,408	173,460	3,340,188	15,873	0	301,486	739,563	1,088,901
1987	3,167,759	1,694,698	1,991,841	190,149	3,230,424	95,994	1,786	258,719	1,951,799	1,091,691
1988	2,688,113	1,776,471	1,940,156	187,156	3,194,137	30,395	846	126,639	2,000,664	839,774
1989	2,357,669	1,348,806	1,326,863	132,076	2,218,516	50,948	13,206	493,424	1,257,332	792,087
1990	2,528,625	1,335,341	1,463,452	115,746	2,413,745	110,678	0	545,342	1,192,997	1,054,762
1991	1,048,414	531,160	1,022,405	125,256	1,686,304	65,111	473,291	488,207	540,119	796,531
1992	2,760,199	1,548,472	1,124,775	55,985	1,855,065	22,891	1,130,876	367,996	362,232	853,047
1993	3,559,487	1,332,392	2,256,338	29,498	3,721,492	60,615	1,101,799	640,919	425,969	1,406,255
1994	3,963,982	1,450,328	1,345,145	74,879	2,218,411	88,549	1,371,116	678,876	871,358	1,452,741
1995	4,324,009	1,901,361	2,498,462	44,237	4,120,837	43,892	881,146	636,541	75,278	1,397,623
1996	3,572,856	1,507,542	4,652,945	77,384	7,674,388	31,691	760,763	723,670	458,246	1,201,941
1997	3,411,379	1,468,949	4,294,703	42,135	4,319,206	24,319	891,191	648,652	625,340	1,175,556
1998	3,977,988	1,599,394	7,554,910	16,624	6,174,031	30,365	508,248	657,806	166,952	827,650
1999	3,696,973	1,694,851	3,195,685	71,662	3,678,076	18,305	501,486	710,674	815,001	1,375,575
2000	2,372,130	994,396	1,420,806	40,083	1,954,947	0	374,972	257,146	617,664	508,258
2001	2,668,867	1,411,816	458,191	53,221	755,763	0	212,427	443,872	1,333,688	118,828
2002	1,674,587	1,389,921	569,606	74,418	939,655	0	140,550	531,620	2,422,881	844,839
2003	1,480,979	1,405,892	488,863	47,681	806,231	0	637,929	284,877	807,486	640,047
2004	1,812,210	1,676,067	554,535	71,930	759,819	0	465,681	368,704	2,071,504	449,688
2005	2,242,606	1,592,527	2,076,562	21,114	2,095,696	2,433	587,884	433,365	1,931,459	599,331
2006	2,785,063	1,800,201	2,678,718	120,396	1,105,994	29,922	1,734,640	683,876	3,324,970	670,675
2007	2,516,000	2,574,329	5,817,326	185,754	1,721,283	108,147	1,015,760	1,001,532	4,424,193	667,380
2008	6,830,190	4,213,175	7,776,352	380,149	3,210,715	124,869	4,254,402	1,156,391	6,588,387	1,849,372
2009	7,572,613	4,182,290	7,719,347	369,713	3,187,179	123,953	4,815,440	1,147,914	6,540,091	1,835,815
2010	7,618,008	4,207,362	7,765,621	371,929	3,206,285	124,696	4,848,489	1,154,795	6,579,296	1,846,820
2011	5,917,075	4,050,008	5,993,886	287,073	2,474,767	96,247	3,740,273	891,327	5,078,222	1,425,466
2012	5,916,300	4,273,244	5,993,100	287,035	2,474,443	96,234	3,739,783	891,211	5,077,557	1,425,279
2013	3,459,478	2,498,722	3,504,386	167,840	1,446,898	56,272	2,186,789	521,124	2,969,034	833,413
2014	888,488	641,740	900,022	43,106	371,603	14,452	561,627	133,839	762,529	214,043
2015	526,549	380,317	533,384	25,546	220,225	8,565	332,840	79,317	451,901	126,849
2016	451,077	325,805	456,932	21,884	188,659	7,337	285,132	67,949	387,128	108,668
2017	438,391	316,642	444,081	21,269	183,353	7,131	277,113	66,038	376,241	105,611
2018	186,250	134,525	188,668	9,036	77,897	3,030	117,731	28,056	159,846	44,869
2019	184,694	133,402	187,092	8,961	77,247	3,004	116,748	27,822	158,511	44,494
2020	198,981	143,721	201,564	9,654	83,222	3,237	125,779	29,974	170,772	47,936
2021	296,218	213,953	300,063	14,371	123,891	4,818	187,244	44,621	254,224	71,361
2022	281,097	203,032	284,746	13,638	117,567	4,572	177,686	42,344	241,247	67,718
2023	199,947	144,418	202,542	9,701	83,626	3,252	126,389	30,119	171,600	48,169
2024	145,665	105,211	147,556	7,067	60,923	2,369	92,077	21,942	125,014	35,092
2025	10,809	7,807	10,949	524	4,521	176	6,832	1,628	9,276	2,604
2026	17,264	12,469	17,488	838	7,220	281	10,913	2,601	14,816	4,159
2027	26,404	19,071	26,747	1,281	11,043	429	16,690	3,977	22,661	6,361
2028	22,310	16,114	22,600	1,082	9,331	363	14,103	3,361	19,147	5,375
2029	22,001	15,891	22,286	1,067	9,202	358	13,907	3,314	18,882	5,300
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	110,312,547	63,074,232	97,555,005	4,311,291	84,002,220	1,517,100	38,853,584	17,791,208	66,213,366	31,331,159

TABLE B-16B. Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				TOTAL STATE WATER PROJECT [a]
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total	
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	12,791,358	0	16,045,220	0	0	0	0	20,182,468
1984	0	39,229,567	0	47,840,887	0	0	0	0	60,556,781
1985	0	77,446,523	0	89,844,437	0	0	0	0	108,590,343
1986	0	77,581,287	0	90,192,510	0	0	0	0	107,702,921
1987	0	68,939,195	0	82,614,055	0	0	0	0	99,411,597
1988	0	79,936,309	0	92,720,660	0	0	0	0	108,898,833
1989	0	68,311,546	0	78,302,473	0	0	0	0	89,857,307
1990	0	83,964,409	277,885	95,002,982	0	0	0	0	104,000,038
1991	0	54,214,229	132,209	61,123,236	0	0	0	0	64,233,890
1992	0	72,401,054	0	82,482,592	0	0	0	0	92,173,695
1993	0	55,312,615	0	69,847,379	0	0	0	0	87,174,348
1994	0	72,838,621	0	86,354,006	0	0	0	0	97,722,979
1995	0	40,862,813	0	56,786,199	0	0	0	0	74,988,898
1996	0	36,536,259	401	57,198,086	0	0	0	0	71,940,675
1997	0	37,121,379	108,559	54,131,368	0	0	0	0	65,536,671
1998	0	30,341,609	149,170	52,004,747	0	0	0	0	65,310,733
1999	0	42,257,580	106,226	58,122,094	0	0	0	0	72,133,666
2000	0	43,977,877	123,318	52,641,597	0	0	0	0	60,213,003
2001	0	49,183,605	84,487	56,724,765	0	0	0	0	62,756,047
2002	0	45,579,833	154,113	54,322,023	0	0	0	0	59,898,002
2003	3,385	42,982,970	132,336	49,718,676	0	0	0	0	55,018,758
2004	44,621	58,640,223	170,747	67,085,729	0	0	0	0	73,091,132
2005	62,042	61,362,119	65,360	73,072,498	0	0	0	0	83,060,197
2006	458,220	81,025,875	200,630	96,619,180	0	0	0	0	106,858,797
2007	617,187	90,906,983	1,008,870	112,564,744	0	0	0	0	124,268,132
2008	1,110,907	82,019,400	1,164,863	120,679,172	0	0	0	0	135,600,484
2009	1,102,764	81,418,153	1,156,324	121,171,596	0	0	0	0	135,835,147
2010	1,109,374	81,906,226	1,163,256	121,902,157	0	0	0	0	136,657,371
2011	856,269	89,882,553	897,858	121,591,024	0	0	0	0	133,497,475
2012	856,157	89,870,772	897,740	121,798,855	0	0	0	0	133,706,646
2013	500,627	52,550,742	524,942	71,220,267	0	0	0	0	78,184,637
2014	128,575	13,496,461	134,819	18,291,304	0	0	0	0	20,080,443
2015	76,198	7,998,472	79,899	10,840,062	0	0	0	0	11,900,894
2016	65,276	6,852,021	68,446	9,286,314	0	0	0	0	10,195,498
2017	63,440	6,659,314	66,521	9,025,145	0	0	0	0	9,909,157
2018	26,953	2,829,206	28,262	3,834,329	0	0	0	0	4,210,070
2019	26,727	2,805,575	28,026	3,802,303	0	0	0	0	4,175,070
2020	28,795	3,022,597	30,193	4,096,425	0	0	0	0	4,498,200
2021	42,866	4,499,658	44,948	6,098,236	0	0	0	0	6,696,392
2022	40,678	4,269,972	42,654	5,786,951	0	0	0	0	6,354,574
2023	28,935	3,037,261	30,340	4,116,299	0	0	0	0	4,520,053
2024	21,079	2,212,702	22,103	2,998,800	0	0	0	0	3,292,944
2025	1,564	164,187	1,640	222,517	0	0	0	0	244,343
2026	2,498	262,245	2,620	355,412	0	0	0	0	390,273
2027	3,821	401,084	4,007	543,576	0	0	0	0	596,892
2028	3,229	338,899	3,385	459,299	0	0	0	0	504,348
2029	3,184	334,196	3,338	452,926	0	0	0	0	497,353
2030	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0
TOTAL	7,285,371	1,960,577,534	9,110,495	2,491,935,112	0	0	0	0	2,857,128,175

a) Costs allocated to contractors in 1989 through 2002 are reduced by credits for Off-Aqueduct Power Facility costs allocated to the pumping of non-Project water.

TABLE B-17. Unit Variable OMP&R Component of Transportation Charge

(in dollars per acre-foot)

Calendar Year	NORTH BAY AQUEDUCT						SOUTH BAY AQUEDUCT		CALIFORNIA AQUEDUCT	
	Reach 1 Barker Slough Pumping Plant		Reach 3A Cordelia Pumping Plant Solano County WA		Reach 3B Cordelia Pumping Plant Napa County FC&WCD [a]		Reach 1 South Bay and Del Valle Pumping Plants [b]		Reach 1 Banks Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	4.1511341	4.1511341	0	0
1963	0	0	0	0	0	0	4.5639383	4.5639383	0	0
1964	0	0	0	0	0	0	3.5452154	3.5452154	0	0
1965	0	0	0	0	0	0	4.1911773	4.1911773	0	0
1966	0	0	0	0	0	0	3.5074573	3.5074573	0	0
1967	0	0	0	0	0	0	3.9306767	4.1752198	0.2445431	0.2445431
1968	0	0	0	0	5.7570016	5.7570016	3.3315620	4.8750942	1.5435322	1.5435322
1969	0	0	0	0	3.1823595	3.1823595	3.6949019	4.8016170	1.1067151	1.1067151
1970	0	0	0	0	3.7584301	3.7584301	4.4256141	5.3721490	0.9465349	0.9465349
1971	0	0	0	0	4.2082507	4.2082507	3.8714396	4.7522833	0.8808437	0.8808437
1972	0	0	0	0	3.9577735	3.9577735	4.3250690	5.2281686	0.9030996	0.9030996
1973	0	0	0	0	3.8103903	3.8103903	5.2455409	6.1841800	0.9386391	0.9386391
1974	0	0	0	0	3.5878850	3.5878850	6.3321503	7.2293909	0.8972406	0.8972406
1975	0	0	0	0	2.1606725	2.1606725	3.7365711	4.8327731	1.0962020	1.0962020
1976	0	0	0	0	2.9283909	2.9283909	4.5191527	5.7132795	1.1941268	1.1941268
1977	0	0	0	0	2.7516411	2.7516411	4.7630172	6.5309908	1.7679736	1.7679736
1978	0	0	0	0	3.5949619	3.5949619	5.2086183	6.8245097	1.6158914	1.6158914
1979	0	0	0	0	2.4747752	2.4747752	4.9524184	7.1045026	2.1520842	2.1520842
1980	0	0	0	0	2.9737588	2.9737588	4.5186576	5.8960239	1.3773663	1.3773663
1981	0	0	0	0	2.6488168	2.6488168	4.3834851	6.4662961	2.0828110	2.0828110
1982	0	0	0	0	10.0222589	10.0222589	5.6383622	7.4121096	1.7737474	1.7737474
1983	0	0	0	0	1.0240490	1.0240490	0.8686507	1.7250802	0.8564295	0.8564295
1984	0	0	0	0	1.6524119	1.6524119	2.7719370	3.9566693	1.1847323	1.1847323
1985	0	0	0	0	2.5219114	2.5219114	3.6942124	5.3128683	1.6186559	1.6186559
1986	0	0	0	0	4.4046604	4.4046604	7.2799131	10.6056639	3.3257508	3.3257508
1987	0	0	0	0	3.5386715	3.5386715	6.4837861	9.2421280	2.7583419	2.7583419
1988	1.1792022	1.1792022	0	1.1792022	4.4545623	5.6337645	6.1749958	8.7900561	2.6150603	2.6150603
1989	1.2712038	1.2712038	2.5418648	3.8130686	4.2795803	5.5507841	8.1600349	11.6976286	3.5375937	3.5375937
1990	2.0024548	2.0024548	4.2324041	6.2348589	5.8752161	7.8776709	11.7200790	15.8670513	4.1469723	4.1469723
1991	1.2488027	1.2488027	2.6241245	3.8729272	3.8050725	5.0538752	7.5402614	11.2642636	3.7240022	3.7240022
1992	0.7095451	0.7095451	1.4174620	2.1270071	2.3506623	3.0602074	4.0600957	6.4118184	2.3517227	2.3517227
1993	-0.3463994	-0.3463994	-0.6048649	-0.9512643	-1.0204313	-1.3668307	-1.4929839	-1.2402745	0.2527094	0.2527094
1994	1.4607776	1.4607776	2.6575471	4.1183247	4.2850412	5.7458188	7.9485622	11.2592004	3.3106382	3.3106382
1995	0.7544766	0.7544766	1.2974895	2.0519661	2.2753763	3.0298529	3.2312761	5.2800374	2.0487613	2.0487613
1996	1.6427835	1.6427835	2.7704025	4.4131860	4.7993051	6.4420886	8.0186492	11.3633990	3.3447498	3.3447498
1997	1.7801484	1.7801484	3.0246843	4.8048327	5.0575904	6.8377388	9.6521246	12.6148371	2.9627125	2.9627125
1998	-0.3031174	-0.3031174	-0.5212041	-0.8243215	-0.8497854	-1.1529028	-1.7656471	-1.6140875	0.1515596	0.1515596
1999	0.7893362	0.7893362	1.2927037	2.0820399	1.9928526	2.7821888	5.1162295	6.9791811	1.8629516	1.8629516
2000	1.3959233	1.3959233	1.9764390	3.3723623	3.0411557	4.4370790	6.3511103	8.6610803	2.3099700	2.3099700
2001	8.1656675	8.1656675	12.6117906	20.7774581	22.7930551	30.9587226	42.4371629	55.0733192	12.6361563	12.6361563
2002	4.0978448	4.0978448	5.1839120	9.2817568	8.7407898	12.8386346	17.7297693	23.7157370	5.9859677	5.9859677
2003	4.2299106	4.2299106	6.8941022	11.1240128	12.4277426	16.6576532	18.7448272	25.2861174	6.5412902	6.5412902
2004	4.7386444	4.7386444	6.0853109	10.8239553	12.7072043	17.4458487	19.1567803	26.2235278	7.0667475	7.0667475
2005	6.1143976	6.1143976	7.3530754	13.4674730	19.0132129	25.1276105	25.2864316	33.5767244	8.2902928	8.2902928
2006	6.8000000	6.8000000	18.5713748	25.3713748	32.1780691	38.9780691	31.4073332	39.7548735	8.3475403	8.3475403
2007	10.2076137	10.2076137	35.1913707	45.3989844	40.4552779	50.6628916	36.6421205	47.0209087	10.3787882	10.3787882
2008	7.7081039	7.7081039	41.1028367	48.8109406	32.1658527	39.8739566	36.8213919	49.5322432	12.7108513	12.7108513
2009	6.6436958	6.6436958	56.4851321	63.1288279	16.5280068	23.1717026	39.9594174	50.1984861	10.2390687	10.2390687
2010	6.9099808	6.9099808	59.0825660	65.9925468	17.4640537	24.3740345	41.7017564	54.5453778	12.8436214	12.8436214
2011	6.9166504	6.9166504	21.5739394	28.4905898	17.5488834	24.4655338	31.3292222	41.4956505	10.1664283	10.1664283
2012	7.1260585	7.1260585	22.3111846	29.4372431	18.3043461	25.4304046	32.3488265	42.2577259	9.9088994	9.9088994
2013	7.7316713	7.7316713	24.4749862	32.2066575	20.3562550	28.0879263	35.3415508	48.0199628	12.6784120	12.6784120
2014	8.2417738	8.2417738	26.2741047	34.5158785	22.1214868	30.3632606	37.8300275	49.2282114	11.3981839	11.3981839
2015	8.3662810	8.3662810	26.6688705	35.0351515	22.6905149	31.0567959	38.3759371	51.1097075	12.7337704	12.7337704
2016	8.4576404	8.4576404	26.9412121	35.3988525	23.1303345	31.5879749	38.7526748	53.4063997	14.6537249	14.6537249
2017	8.3623301	8.3623301	26.5523967	34.9147268	22.9413589	31.3036890	38.2148037	51.1443424	12.9295387	12.9295387
2018	8.5930973	8.5930973	27.3198347	35.9129320	23.8931962	32.4862935	39.2762960	52.2276789	12.9513829	12.9513829
2019	8.7987837	8.7987837	27.9945455	36.7933292	24.7720791	33.5708628	40.2094918	55.1061602	14.8966684	14.8966684
2020	8.3758667	8.3758667	26.4614876	34.8373543	23.4975804	31.8734471	38.0890126	51.3371638	13.2481512	13.2481512
2021	8.3683752	8.3683752	26.4180165	34.7863917	23.4880469	31.8564221	38.0289708	51.0182748	12.9893040	12.9893040
2022	8.1234121	8.1234121	25.5623141	33.6857262	22.6518429	30.7752550	36.8454736	48.8869305	12.0414569	12.0414569
2023	8.1669617	8.1669617	25.7143802	33.8813419	22.8004134	30.9673751	37.0557706	50.0536890	12.9979184	12.9979184
2024	8.4509319	8.4509319	26.7063361	35.1572680	23.7697554	32.2206873	38.4277520	52.6751253	14.2473733	14.2473733
2025	8.4148272	8.4148272	26.5801102	34.9949374	23.6464692	32.0612964	38.2532870	50.2133810	11.9600940	11.9600940
2026	8.4695960	8.4695960	26.7715152	35.2411112	23.8335171	32.3031131	38.5179325	53.3569400	14.8390075	14.8390075
2027	8.3482794	8.3482794	26.3477686	34.6960480	23.4193937	31.7676731	37.9317972	51.2476096	13.3158124	13.3158124
2028	8.4032695	8.4032695	26.5397796	34.9430491	23.6070617	32.0103312	38.1975023	51.2935465	13.0960442	13.0960442
2029	8.3016972	8.3016972	26.1850689	34.4867661	23.2604203	31.5621175	37.7068452	50.6537083	12.9468631	12.9468631
2030	8.3652124	8.3652124	26.4069422	34.7721546	23.4771960	31.8424084	38.0135859	51.4992296	13.4856437	13.4856437
2031	8.2566118	8.2566118	26.0276033	34.2842151	23.1064761	31.3630879	37.4889523	49.7153397	12.2263874	12.2263874
2032	8.4126406	8.4126406	26.5725620	34.9852026	23.6391319	32.0517725	38.2428091	51.5402532	13.2974441	13.2974441
2033	8.8144003	8.8144003	27.9758678	36.7902681	25.0103686	33.8247689	40.1836620	54.3022387	14.1185767	14.1185767
2034	8.5062084	8.5062084	26.8993939	35.4056023	23.9584568	32.4646652	38.6948133	51.9156037	13.2207904	13.2207904
2035	8.3411860	8.3411860	26.3228650	34.6640510	23.3951085	31.7362945	37.8975098	51.8793535	13.9818437	13.9818437

a) Rates are for an interim facility from 1968 through 1987.

b) The relatively minor costs of Del Valle Pumping Plant have been combined with those of South Bay Pumping Plant to simplify the allocation procedure.

TABLE B-17. Unit Variable OMP&R Component of Transportation Charge

(in dollars per acre-foot)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	Reach 4 Dos Amigos Pumping Plant		Reach 14A Buena Vista Pumping Plant		Reach 15A Teerink Pumping Plant		Reach 16A Chrisman Pumping Plant		Reach 17E Edmonston Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	1.0745886	2.6181208	0	0	0	0	0	0	0	0
1969	0.7051830	1.8118981	0	0	0	0	0	0	0	0
1970	0.7838143	1.7303492	0.3333333	2.0636825	0	0	0	0	0	0
1971	0.4151197	1.2959634	1.3603318	2.6562952	4.9729730	7.6292682	0	0	0	0
1972	0.5689843	1.4720839	1.0818018	2.5538857	1.1418280	3.6957137	2.2892599	5.9849736	7.3206022	13.3055758
1973	0.6025584	1.5411975	0.9854386	2.5266361	1.2143719	3.7410080	2.1051633	5.8461713	7.4512435	13.2974148
1974	0.5766848	1.4739254	0.9233319	2.3972573	1.0924098	3.4896671	1.9449022	5.4345693	6.9004732	12.3350425
1975	0.4638166	1.5600186	0.8201332	2.3801518	0.9574493	3.3376011	1.9610412	5.2986423	6.9962702	12.2949125
1976	0.5196472	1.7137740	0.9637643	2.6775383	1.0211874	3.6987257	2.2275746	5.9263003	7.9384515	13.8647518
1977	0.6172856	2.3852592	1.0980643	3.4833235	1.3715867	4.8549102	2.9301764	7.7850866	9.9990004	17.7840870
1978	0.4578324	2.0737238	0.9617095	3.0354333	1.0432294	4.0786627	1.9992416	6.0779043	7.1214594	13.1993637
1979	0.6624709	2.8145551	1.1111583	3.9257134	1.2652451	5.1909585	2.7288840	7.9198425	9.6837428	17.6035853
1980	0.8090774	2.1864437	1.3528383	3.5392820	1.5041463	5.0434283	3.2274062	8.2708345	11.0353314	19.3061659
1981	1.0965610	3.1793720	1.2422925	4.4216645	1.3219771	5.7436416	2.9988606	8.7425022	10.0207633	18.7632655
1982	0.8365509	2.6102983	1.2049224	3.8152207	1.3715109	5.1867316	2.9378063	8.1245379	10.2606361	18.3851740
1983	0.3691099	1.2255394	0.7604543	1.9859937	0.8857383	2.8717320	1.8026411	4.6743731	5.5653668	10.2397399
1984	0.6642414	1.8489737	1.0562168	2.9051905	1.2202995	4.1254900	2.5897300	6.7152200	8.3105777	15.0257977
1985	0.8780315	2.4966874	1.4221464	3.9188338	1.6516280	5.5704618	3.5176053	9.0880671	11.8858945	20.9739616
1986	1.4047267	4.7304775	2.3730496	7.1035271	2.7567993	9.8603264	6.0029982	15.8633246	20.6708919	36.5342165
1987	1.2966188	4.0549607	2.2362590	6.2912197	2.5459999	8.8372196	5.3658848	14.2031044	17.8358435	32.0389479
1988	1.2001961	3.8152564	2.1148911	5.9301475	2.4017135	8.3318610	5.0600095	13.3918705	16.6769503	30.0688208
1989	1.4991710	5.0367647	2.6962512	7.7330159	3.0078924	10.7409083	6.6054692	17.3463775	22.2552075	39.6015850
1990	1.9023461	6.0493184	3.3101004	9.3594188	3.7483042	13.1077230	8.7425943	21.8503173	31.1242008	52.9745181
1991	1.0592185	4.7832207	2.1212585	6.9044792	2.4222131	9.3266923	5.7602628	15.0869551	20.6196938	35.7066489
1992	0.9064819	3.2582046	1.4858303	4.7440349	1.7077285	6.4517634	3.6067199	10.0584833	12.1335007	22.1919840
1993	0.1664878	0.4191972	-0.1384508	0.2807464	-0.1312944	0.1494520	-0.7173389	-0.5678869	-3.5014056	-4.0692925
1994	1.4294391	4.7400773	2.5099528	7.2500301	2.7989861	10.0490162	6.1401376	16.1891538	21.5691939	37.7583477
1995	0.8047106	2.8534719	1.3496693	4.2031412	1.4945512	5.6976924	3.1864400	8.8841324	10.8322270	19.7163594
1996	1.6726383	5.0173881	2.5952092	7.6125973	2.8425227	10.4551200	6.3087407	16.7638607	22.6420778	39.4059385
1997	1.2769880	4.2397005	2.5012144	6.7409149	2.6893394	9.4302543	6.2890095	15.7192638	23.0714697	38.7907335
1998	-0.2050857	-0.0535261	-0.3945877	-0.4481138	-0.4188957	-0.8670095	-0.9854414	-1.8524509	-3.5434867	-5.3959376
1999	0.8422034	2.7051550	1.4022138	4.1073688	1.2802066	5.3875754	3.4122984	8.7998738	13.6052879	22.4051617
2000	0.9306975	3.2406675	1.6377891	4.8784566	1.8007516	6.6792082	4.2452324	10.9244406	15.5438684	26.4683090
2001	6.0848645	18.7210208	11.2089222	29.9299430	12.2904776	42.2204206	28.4069032	70.6273238	106.3233062	176.9506300
2002	2.5678475	8.5538152	4.4973316	13.0511468	4.9050420	17.9561888	11.3506067	29.3067955	42.1780286	71.4848241
2003	3.0449725	9.5862627	5.4662061	15.0524688	5.9552204	21.0076892	13.8563946	34.8640838	51.5224036	86.3864874
2004	3.2119300	10.2786775	5.6545833	15.9332608	6.1386667	22.0719275	14.3036966	36.3756241	53.1773366	89.5529607
2005	3.9275885	12.2178813	7.3894399	19.6073212	8.0559637	27.6632849	18.7794943	46.4427792	67.4558144	113.8985936
2006	3.8566685	12.2042088	7.2839186	19.4881274	8.8793760	28.3675034	19.2573509	47.6248543	69.0630361	116.6878904
2007	4.9707136	15.3495018	9.1659112	24.5154130	11.2092044	35.7246174	24.3340597	60.0586771	87.3662368	147.4249139
2008	5.7184737	18.4293250	10.8953467	29.3246717	13.4029410	42.7276127	29.1330778	71.8606905	104.6732213	176.5339118
2009	5.2621919	15.5012606	9.6770197	25.1782803	10.0779669	35.2562472	24.1281921	59.3844393	91.5145160	150.8989553
2010	5.5373037	18.3809251	10.1978973	28.5788224	10.6152531	39.1940755	25.4264491	64.6205246	96.4431314	161.0636560
2011	4.7879224	14.9543507	8.1250794	23.0794301	8.3682704	31.4477005	19.9487175	51.3964180	75.4735638	126.8699818
2012	5.0994112	15.0083106	8.7284399	23.7367505	8.9983948	32.7351453	21.4693193	54.2044646	81.2549878	135.4594524
2013	5.5988556	18.2772676	9.5730018	27.8502694	9.8568828	37.7071522	23.5323618	61.2395140	89.0613455	150.3008595
2014	6.0790090	17.4771929	10.4298987	27.9070916	10.7361983	38.6432899	25.6493085	64.2925984	97.0860499	161.3786483
2015	6.1724788	18.9062492	10.5887326	29.4949818	10.8980495	40.3930313	26.0385031	66.4315344	98.5593519	164.9908863
2016	6.3988552	21.0525801	11.0893215	32.1419016	11.4276276	43.5695292	27.3250425	70.8945717	103.4664489	174.3610206
2017	6.1756572	19.1051959	10.6185843	29.7237802	10.9324635	40.6562437	26.1254620	66.7817057	98.8970373	165.6787430
2018	6.5289419	19.4803248	11.3396772	30.8200020	11.6876129	42.5076149	27.9519967	70.4596116	105.8483575	176.3079691
2019	6.7271412	21.6238096	11.7059690	33.3297786	12.0653925	45.3951711	28.8668372	74.2620083	109.3219042	183.5839125
2020	6.3532788	19.6014300	11.0621081	30.6635381	11.4084399	42.0719780	27.2872992	69.3592772	103.3413238	172.7006010
2021	6.3508916	19.3401956	11.0633039	30.4034995	11.4106062	41.8141057	27.2936443	69.1077500	103.3673990	172.4751490
2022	6.1606195	18.2020764	10.7490773	28.9511537	11.0922189	40.0433726	26.5302917	66.5736643	100.4818093	167.0554736
2023	6.2280474	19.2259658	10.8864083	30.1123741	11.2360494	41.3484235	26.8786017	68.2270252	101.8076412	170.0346664
2024	6.4365686	20.6839419	11.2213605	31.9053024	11.5736814	43.4789838	27.6869440	71.1659278	104.8599915	176.0259193
2025	6.4154560	18.3755500	11.1922024	29.5677524	11.5451681	41.1129205	27.6188615	68.7317820	104.6044795	173.3362615
2026	6.4491062	21.2881137	11.2403622	32.5284759	11.5925698	44.1210457	27.7323427	71.8533884	105.0313795	176.8847679
2027	6.3913187	19.7071311	11.1737019	30.8808330	11.5302877	42.4111207	27.5863288	69.9974495	104.4890652	174.4865147
2028	6.8793576	19.9754018	11.1226503	31.0980521	11.4715329	42.5695850	27.4404300	70.0100150	103.9238966	173.9339116
2029	6.3322976	19.2791607	11.0582709	30.3374316	11.4100589	41.7474905	27.2957802	69.0432707	103.3844816	172.4277523
2030	6.3399185	19.8255622	11.0390734	30.8646356	11.3848546	42.2494902	27.2312145	69.4807047	103.1292356	172.6099403
2031	6.2982567	18.5246441	11.0035322	29.5281763	11.3553052	40.8834815	27.1622133	68.0456948	102.8792384	170.9249332
2032	6.3456777	19.6431218	11.0252545	30.6683763	11.3666140	42.0349903	27.1857292	69.2207195	102.9496748	172.1703943
2033	6.8365151	20.9550918	11.9762575	32.9313493	12.3553141	45.2866634	29.5716104	74.8582738	112.0165309	186.8748047
2034	6.4523601	19.6731505	11.2277496	30.9009001	11.5764621	42.4773622	27.6920496	70.1694118	104.8726457	175.0420575
2035	6.7969726	20.7788163	12.1918994	32.9707157	12.6251145	45.5958302	30.2590063	75.8548365	114.7178647	190.5727012

TABLE B-17. Unit Variable OMP&R Component of Transportation Charge

(in dollars per acre-foot)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	Reach 18A Alamo Powerplant		Reach 22B Pearblossom Pumping Plant		Reach 23 Mojave Siphon Powerplant		Reach 26A Devil Canyon Powerplant		Reach 29A Oso Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	14.2519509	27.5575267	0	0	-2.3717647	25.1857620	1.4212193	14.7267951
1973	0	0	4.4326545	17.7300693	0	0	-8.4298618	9.3002075	1.0210537	14.3184685
1974	0	0	3.4431782	15.7782207	0	0	-5.1043660	10.6738547	0.9241725	13.2592150
1975	0	0	3.1739313	15.4688438	0	0	-5.6510611	9.8177827	0.9362286	13.2311411
1976	0	0	3.9391330	17.8038848	0	0	-6.4449941	11.3588907	0.8622774	14.7270292
1977	0	0	3.4988957	21.2829827	0	0	-11.6274558	9.6555269	0.9076172	18.6917042
1978	0	0	4.1619043	17.3612680	0	0	-8.1314274	9.2298406	0.7314697	13.9308334
1979	0	0	5.2283922	22.8319775	0	0	-9.5825772	13.2494003	0.9509677	18.5545530
1980	0	0	4.4253989	23.7315648	0	0	-11.5446606	12.1869042	1.4272378	20.7334037
1981	0	0	4.0325337	22.7957992	0	0	-6.7528607	16.0429385	1.5690769	20.3323424
1982	0	0	3.7143664	22.0995404	0	0	-6.9141441	15.1853963	1.4949290	19.8801030
1983	0	0	1.7592652	11.9990051	0	0	-23.7923414	-11.7933363	1.2824635	11.5222034
1984	0	0	2.5203002	17.5460979	0	0	-29.2940447	-11.7479468	1.7818310	16.8076287
1985	0	0	3.5406919	24.5146535	0	0	-30.7672356	-6.2525821	2.1691578	23.1431194
1986	-2.3583180	34.1758985	6.0306655	40.2065640	0	0	-29.2499580	10.9566060	3.2296473	39.7638638
1987	-2.5482255	29.4907224	5.0997322	34.5904546	0	0	-29.7006533	4.8898013	3.1281318	35.1670797
1988	-1.3847067	28.6841141	4.7880132	33.4721273	0	0	-29.0334518	4.4386755	2.9887414	33.0575622
1989	-1.1019487	38.4996363	6.4559997	44.9556360	0	0	-28.3706997	16.5849363	3.5266078	43.1281928
1990	-1.0673268	51.9071913	9.0317647	60.9389560	0	0	-28.8797266	32.0592294	3.6820302	56.6565483
1991	-1.5206590	34.1859899	6.1338271	40.3198170	0	0	-30.3294563	9.9903607	2.1966277	37.9032766
1992	-2.6080003	19.5839837	3.6796265	23.2636102	0	0	-29.7938993	-6.5302891	1.9058052	24.0977892
1993	-0.1885524	-4.2578449	-0.9592579	-5.2171028	0	0	-30.6629489	-35.8800517	0.1578038	-3.9114887
1994	-0.1279266	37.6304211	6.5139903	44.1444114	0	0	-30.4781656	13.6662458	3.0574815	40.8158292
1995	-3.4425314	16.2738280	3.4305039	19.7043319	0	0	-30.3517624	-10.6474305	1.5732257	21.2895851
1996	-5.9839345	33.4220040	6.6794995	40.1015035	-2.3423415	37.7591620	-29.5900574	8.1691046	3.1318961	42.5378346
1997	-4.7847600	34.0059735	6.8397922	40.8457657	-3.8632009	36.9825648	-30.6066647	6.3759001	2.7928728	41.5836063
1998	-5.0614104	-10.4573480	-1.2355351	-11.6928831	-3.7700558	-15.4629389	-30.6550762	-46.1180151	-0.3008626	-5.6968002
1999	-4.7679511	17.6372106	3.5508098	21.1880204	-4.9754645	16.2125559	-29.6766184	-13.4640625	1.8929287	24.2980904
2000	-5.3795304	21.0887786	4.6132547	25.7020333	-5.2137446	20.4882887	-30.4802775	-9.9919888	1.8186581	28.2869671
2001	-4.6442419	172.3063881	29.7998271	202.1062152	-5.7699535	196.3362617	-30.9018409	165.4344208	13.4272431	190.3778731
2002	-5.4660253	66.0187988	12.6802813	78.6990801	-6.4072093	72.2918708	-30.1661581	42.1257127	4.7724074	76.2572315
2003	-3.3577630	83.0287244	15.2059804	98.2347048	-7.2230635	91.0116413	-30.5804591	60.4311822	5.9515747	92.3380621
2004	-5.5585791	83.9943816	15.6342250	99.6286066	-7.4295016	92.1991050	-30.2399666	61.9591384	6.2328767	95.7858374
2005	-6.5254292	107.3731644	20.9387356	128.3119000	-7.9723844	120.3395156	-36.6168324	83.7226832	7.1228596	121.0214532
2006	-2.8363852	113.8515052	19.1245811	132.9760863	-6.0540536	126.9220327	-22.6285408	104.2934919	9.7423521	126.4302425
2007	-3.5469034	143.8780105	26.2029527	170.0809632	-5.9865457	164.0944175	-22.6655042	141.4289133	10.7429850	158.1678989
2008	-6.1792223	170.3546895	39.7923628	210.1470523	-11.6792032	198.4678491	-44.4925037	153.9753454	11.0326156	187.5665274
2009	-5.4956805	145.4032748	33.2046694	178.6079442	-8.5087715	170.0991727	-40.9743505	129.1248222	10.4926466	161.3916019
2010	-5.4703689	155.5932871	34.9884343	190.5817214	-8.4523027	182.1294187	-40.9840584	141.1453603	10.9811740	172.0448300
2011	-3.7860374	123.0839444	22.8805757	145.9645201	-5.3225547	140.6419654	-26.4882701	114.1536953	9.8213240	136.6913058
2012	-4.0304221	131.4290303	25.2757267	156.7047570	-5.7798695	150.9248875	-27.2106125	123.7142750	10.3368540	145.7963064
2013	-3.8962474	146.4046121	27.4713246	173.8759367	-5.5746825	168.3012542	-26.6806144	141.6206398	11.3014962	161.6023557
2014	-3.9173121	157.4613362	29.6858266	187.1471628	-5.5966388	181.5505240	-27.1093618	154.4411622	12.3559097	173.7345580
2015	-3.9250925	161.0657938	30.3209700	191.3867638	-5.6684615	185.7183023	-27.4414889	158.2768134	12.4581196	177.4490059
2016	-4.0870079	170.2740127	32.3421761	202.6161888	-5.9530494	196.6631394	-28.0451643	168.6179751	12.8994971	187.2605177
2017	-3.9098321	161.7689109	30.4636235	192.2325344	-5.7091712	186.5233632	-27.7683479	158.7550153	12.4806389	178.1593819
2018	-4.1826632	172.1253059	33.5899478	205.7152537	-6.3899838	199.3252699	-28.4853001	170.8399698	13.0016583	189.3096274
2019	-3.9873831	179.5965294	33.0397193	212.6362487	-5.9241840	206.7120647	-28.2058170	178.5062477	14.0585980	197.6425105
2020	-4.0609412	168.6396598	32.0119372	200.6515970	-6.0981792	194.5534178	-28.9731323	165.5802855	13.0286457	185.7292467
2021	-4.0726583	168.4024907	32.0421015	200.4445922	-6.1405551	194.3040371	-28.6890258	165.6150113	13.0184371	185.4935861
2022	-4.0979616	162.9575120	30.8978872	193.8553992	-6.1448703	187.7105289	-28.3573761	159.3531528	12.8058592	179.8613328
2023	-4.1514283	165.8832381	31.5450534	197.4282915	-6.2539219	191.1743696	-28.8741517	162.3002179	12.8740090	182.9086754
2024	-4.0234522	172.0024671	31.9520438	203.9545109	-6.0642824	197.8902285	-28.6574923	169.2327362	13.4550808	189.4810001
2025	-4.0946145	169.2416470	32.1667845	201.4084315	-6.1478393	195.2605922	-28.3276154	166.9329768	13.2905190	186.6267805
2026	-4.0697653	172.8150026	32.5023082	205.3173108	-6.1726456	199.1446652	-29.0294561	170.1152091	13.2409762	190.1257441
2027	-4.0945225	170.3919922	32.0768264	202.4688186	-6.1382094	196.3306092	-28.6268905	167.7037187	13.3255799	187.8120946
2028	-4.0516848	169.8822268	32.0750269	201.9572537	-6.1059301	195.8513236	-28.8099088	167.0414148	13.1457648	187.0796764
2029	-4.0719733	168.3557790	31.7315877	200.0873667	-6.1407122	193.9466545	-28.6108383	165.3358162	13.1873191	185.6150714
2030	-4.0394681	168.5704722	31.7920651	200.3625373	-6.0837927	194.2787446	-28.6758159	165.6029287	13.0606963	185.6706366
2031	-4.1527790	166.7721542	31.9969366	198.7690908	-6.5525791	192.2165117	-28.4301056	163.7864061	13.0066645	183.9315977
2032	-3.9939260	168.1764683	31.2173683	199.3938366	-6.2403091	193.1535275	-28.2123951	164.9411324	13.2199752	185.3903695
2033	-4.1979118	182.6768929	35.0120079	217.6889008	-6.7005230	210.9883778	-29.0772003	181.9111775	14.0083651	200.8831698
2034	-4.0318236	171.0102339	31.9521789	202.9624128	-6.3757357	196.5866771	-28.0784744	168.5082027	13.3933859	188.4354434
2035	-4.2531644	186.3195368	33.3291486	219.6486854	-6.5718930	213.0767924	-29.6039310	183.4728614	15.8771816	206.4498828

TABLE B-17. Unit Variable OMP&R Component of Transportation Charge

(in dollars per acre-foot)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 29G Warne Powerplant		Reach 29J Castaic Powerplant		Reach 31A Las Perillas and Badger Hill Pumping Plants		Reach 33A Devil's Den, Bluestone, and Polonio Pass Pumping Plants	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	1.5014866	4.1196074	0	0
1969	0	0	0	0	1.2624065	3.0743046	0	0
1970	0	0	0	0	1.6309699	3.3613191	0	0
1971	0	0	0	0	1.4985537	2.7945171	0	0
1972	0	0	-2.9350830	11.7917121	1.9517720	3.4238559	0	0
1973	0	0	-6.8099448	7.5085237	1.5374531	3.0786506	0	0
1974	0	0	-7.4013274	5.8578876	1.5168982	2.9908236	0	0
1975	0	0	-6.5604921	6.6706490	1.1130304	2.6730490	0	0
						0.0000000		
1976	0	0	-6.7213324	8.0056968	1.5685447	3.2823187	0	0
1977	0	0	-30.4985994	-11.8068952	1.7573375	4.1425967	0	0
1978	0	0	-9.0130187	4.9178147	1.9429506	4.0166744	0	0
1979	0	0	-19.0478097	-0.4932567	1.5600341	4.3745892	0	0
1980	0	0	-7.4485479	13.2848558	1.5124754	3.6989191	0	0
1981	0	0	-10.0059379	10.3264045	1.5414199	4.7207919	0	0
1982	-2.1714430	17.7086600	-9.5987314	8.1099286	1.7581649	4.3684632	0	0
1983	-8.9130752	2.6091282	-39.8193120	-37.2101838	0.1783064	1.4038458	0	0
1984	-15.0246012	1.7830275	-17.3126964	-15.5296689	0.8560669	2.7050406	0	0
1985	-14.7115359	8.4315835	-38.9450653	-30.5134818	1.2075223	3.7042097	0	0
1986	-14.1893653	25.5744985	-28.1596224	-2.5851239	2.2635962	6.9940737	0	0
1987	-14.8696165	20.2974632	-27.0536484	-6.7561852	1.9135150	5.9684757	0	0
1988	-14.7032843	18.3542779	-25.6857024	-7.3314245	1.7733304	5.5885868	0	0
1989	-14.4231503	28.7050425	-25.3986130	3.3064295	2.4154074	7.4521721	0	0
1990	-14.1850383	42.4715100	-26.0776141	16.3938959	3.7962241	9.8455425	0	0
1991	-14.7813217	23.1219549	-25.1420394	-2.0200845	2.4124332	7.1956539	0	0
1992	-14.6199453	9.4778439	-25.1951380	-15.7172941	1.2766497	4.5348543	0	0
1993	-10.3386629	-14.2501516	-21.1218951	-35.3720467	-1.1726278	-0.7534306	0	0
1994	-14.7696788	26.0461504	-26.7435205	-0.6973701	2.3664953	7.1065726	0	0
1995	-12.2705911	9.0189940	-25.6908056	-16.6718116	2.5750190	5.4284909	0	0
1996	-14.8515762	27.6862584	-29.5639188	-1.8776604	2.5837041	7.6010922	0	0
1997	-14.9272063	26.6564000	-27.1541858	-0.4977858	2.7029648	6.9426653	24.4572499	31.3999152
1998	-8.6041243	-14.3009245	-22.2303491	-36.5312736	-0.4719744	-0.5255005	-3.9178748	-4.4433753
1999	-15.4517685	8.8463219	-27.8324731	-18.9861512	1.3273109	4.0324659	9.8021998	13.8346657
2000	-14.1657262	14.1212409	-26.9670099	-12.8457690	1.8842617	5.1249292	14.2514058	19.3763350
2001	-16.7349298	173.6429433	-29.2914155	144.3515278	12.2866597	31.0076805	92.6567756	123.6644561
2002	-13.2004532	63.0567783	-23.7780801	39.2786982	5.3023584	13.8561736	41.2910941	55.1472677
2003	-13.9757183	78.3623438	-23.6270529	54.7352909	6.1431169	15.7293796	47.1787833	62.9081629
2004	-14.1574752	81.6283622	-23.6679973	57.9603649	6.2519570	16.5306345	50.7266903	67.2573248
2005	-14.2938791	106.7275741	-23.7301832	82.9973909	8.0069021	20.2247834	60.5160134	80.7407968
2006	-14.7385970	111.6916455	-26.2160936	85.4755519	8.0172156	20.2214244	49.0850937	69.3065181
2007	-11.8024282	146.3654707	-21.2107248	125.1547459	10.9089067	26.2584085	93.2476149	119.5060234
2008	-14.9471457	172.6193817	-26.2930252	146.3263565	10.1894580	28.6187830	60.3876347	89.0064177
2009	-14.6581131	146.7334888	-24.8688316	121.8646572	12.2508947	27.7521553	79.6438938	107.3960491
2010	-14.6892419	157.3555881	-25.0248561	132.3307320	12.7662137	31.1471388	83.3069960	114.4541348
2011	-13.2297879	123.4615179	-22.4386091	101.0229088	12.7688252	27.7231759	83.3379586	111.0611345
2012	-13.3723176	132.4239888	-22.8144009	109.6095879	13.6584002	28.6667108	86.1861297	114.8528405
2013	-13.5117115	148.0906442	-23.0151874	125.0754568	14.8779882	33.1552558	94.5462531	127.7015089
2014	-13.9233382	159.8112198	-23.6465534	136.1646664	15.8920615	33.3692544	101.4977369	134.8669913
2015	-13.8425360	163.6064699	-23.4962180	140.1102519	16.1145282	35.0207774	103.0226598	138.0434372
2016	-14.2025771	173.0579406	-24.1267536	148.9311870	16.2680463	37.3206264	104.0751506	141.3957770
2017	-13.9258575	164.2335244	-23.6734109	140.5601135	16.0488651	35.1540610	102.5725622	137.7266232
2018	-14.0415287	175.2680987	-23.9285500	151.3395487	16.4814390	35.9617638	105.5378794	141.4996432
2019	-14.8939517	182.7485588	-25.4923127	157.2562461	16.8617389	38.4855485	108.1447283	146.6302768
2020	-14.5769742	171.1522725	-24.8481790	146.3040935	15.9976082	35.5990382	102.2212085	137.8202467
2021	-14.5861228	170.9074633	-24.8810648	146.0263985	15.9731479	35.3133435	102.0534527	137.3667962
2022	-14.8011638	165.0601690	-25.2539205	139.8062485	15.4908520	33.6929284	98.7473762	132.4403046
2023	-14.7968307	168.1118447	-25.2466674	142.8651773	15.5765494	34.8025152	99.3348751	134.1373903
2024	-14.9259280	174.5550721	-25.4697527	149.0853194	16.1356475	36.8195894	103.1674163	139.9870057
2025	-14.8087894	171.8179911	-25.2676602	146.5503309	16.0645474	34.4400974	102.6800758	137.1201732
2026	-14.6543486	175.4713955	-25.0013368	150.4700587	16.1723996	37.4605133	103.4194320	140.8799453
2027	-14.9747134	172.8373812	-25.5508815	147.2864997	15.9335540	35.6406851	101.7820589	137.4227440
2028	-14.6676191	172.4120573	-25.0223302	147.3897271	16.0418131	36.0172149	102.5242864	138.5415013
2029	-14.9017141	170.7133573	-25.4280627	145.2852946	15.8418649	35.1210256	101.1536253	136.2746509
2030	-14.6419513	171.0286853	-24.9800081	146.0486772	15.9668726	35.7924348	102.0105661	137.8030009
2031	-14.6871435	169.2444542	-25.0722893	144.1721649	15.7530791	34.2777232	100.5449659	134.8226891
2032	-14.7089599	170.6814096	-25.1864653	145.4949443	16.0602816	35.7034034	102.6508388	138.3542422
2033	-14.7280339	186.1551359	-25.2705553	160.8845806	16.8512039	37.8062957	108.0725480	145.8788437
2034	-14.7278788	173.7075646	-25.2263838	148.4811808	16.2444798	35.9176303	103.9135053	139.8311356
2035	-17.8001752	188.6497076	-30.5411124	158.1085952	15.9195670	36.6983833	101.6862005	138.3845838

TABLE B-18. Variable OMP&R Component of Transportation Charge for Each Contractor [a]

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	2,051	34,919	0	36,970	0	0	0
1963	0	0	0	7,900	49,811	0	57,711	0	0	0
1964	0	0	0	5,931	68,203	0	74,134	0	0	0
1965	0	0	0	10,918	68,765	62,926	142,609	0	0	0
1966	0	0	0	19,330	52,135	121,141	192,606	0	0	0
1967	0	0	0	19,958	53,785	163,255	236,998	0	0	0
1968	6,989	0	6,989	29,899	120,985	341,768	492,652	0	0	0
1969	8,551	0	8,551	31,859	3,904	298,968	334,731	0	0	0
1970	13,598	0	13,598	49,687	0	431,443	481,130	0	0	0
1971	10,609	0	10,609	23,842	28,328	416,329	468,499	0	0	0
1972	14,434	0	14,434	54,838	144,669	524,208	723,715	0	0	0
1973	14,449	0	14,449	18,398	15,590	547,807	581,795	0	0	0
1974	17,473	0	17,473	9,499	29	636,186	645,714	0	0	0
1975	14,779	0	14,779	22,318	4,765	425,284	452,367	0	0	0
1976	20,856	0	20,856	97,874	121,693	502,769	722,336	0	0	0
1977	22,635	0	22,635	82,578	123,044	497,792	703,414	0	0	0
1978	21,692	0	21,692	74,911	39,986	652,860	767,757	0	0	0
1979	16,237	0	16,237	137,101	77,145	652,629	866,875	0	0	0
1980	19,945	0	19,945	98,743	64,891	517,531	681,165	0	0	0
1981	23,842	0	23,842	126,437	141,456	567,968	835,861	0	0	0
1982	12,157	0	12,157	97,117	46,742	651,246	795,105	0	0	0
1983	2,342	0	2,342	8,171	5,412	148,743	162,326	0	0	0
1984	4,822	0	4,822	26,707	13,141	349,314	389,162	0	0	0
1985	10,188	0	10,188	79,863	102,790	466,291	648,944	0	0	0
1986	15,501	0	15,501	112,370	131,118	932,090	1,175,578	0	0	0
1987	27,223	0	27,223	216,211	234,290	812,631	1,263,132	0	0	0
1988	31,265	11,533	42,798	229,578	297,129	779,537	1,306,244	0	0	0
1989	37,874	66,850	104,724	306,533	304,275	1,051,562	1,662,370	0	0	0
1990	54,736	105,421	160,157	524,114	502,545	1,456,008	2,482,667	0	0	0
1991	8,159	18,824	26,983	105,736	142,105	316,839	564,680	0	(2,636)	(2,636)
1992	12,515	23,808	36,323	93,772	122,436	273,849	490,057	0	0	0
1993	(7,223)	(17,293)	(24,516)	(36,162)	(12,912)	(78,024)	(127,098)	0	0	0
1994	39,106	77,257	116,363	231,800	257,533	642,006	1,131,339	0	0	0
1995	15,701	36,724	52,425	160,663	93,610	151,287	405,560	0	0	0
1996	31,526	96,570	128,096	214,883	186,694	735,431	1,137,008	502	0	502
1997	29,683	116,555	146,238	351,185	219,799	912,861	1,483,845	34,932	233,584	268,516
1998	(6,178)	(18,511)	(24,689)	(6,218)	(16,448)	(65,208)	(87,874)	(15,961)	(82,727)	(98,688)
1999	14,757	52,720	67,477	243,434	193,968	450,667	888,069	51,783	278,589	330,372
2000	21,999	94,213	116,212	377,922	239,083	754,700	1,371,705	76,769	440,637	517,406
2001	289,309	531,337	820,646	1,679,427	991,540	2,835,762	5,506,729	529,655	2,342,947	2,872,602
2002	88,266	260,234	348,500	1,044,099	626,264	1,420,252	3,090,615	240,166	1,530,422	1,770,588
2003	127,364	258,679	386,043	1,047,074	630,062	2,237,611	3,914,747	280,147	1,696,611	1,976,758
2004	141,905	337,958	479,863	1,281,030	603,718	1,559,326	3,444,074	280,136	1,997,943	2,278,079
2005	192,704	374,839	567,543	1,465,137	850,315	2,484,981	4,800,433	343,229	1,884,813	2,228,042
2006	612,268	869,696	1,481,964	1,987,206	1,314,443	2,537,608	5,839,257	1,769,257	2,402,441	4,171,698
2007	861,269	1,155,069	2,016,338	2,702,860	1,518,810	2,894,110	7,115,780	576,497	5,435,851	6,012,348
2008	995,852	1,359,482	2,355,334	3,501,728	1,725,781	3,522,002	8,749,511	2,225,160	4,048,546	6,273,706
2009	545,114	689,497	1,234,611	3,498,700	1,740,546	3,456,745	8,695,991	2,684,901	4,885,017	7,569,918
2010	581,321	719,688	1,301,009	3,825,955	1,907,563	3,823,758	9,557,276	2,861,353	5,206,061	8,067,414
2011	591,454	720,495	1,311,949	3,172,102	1,543,758	4,149,565	8,865,425	2,776,528	5,051,727	7,828,255
2012	623,045	744,191	1,367,236	3,228,909	1,570,454	4,225,773	9,025,136	2,871,321	5,224,196	8,095,517
2013	695,878	812,682	1,508,560	3,677,179	1,793,768	4,801,996	10,272,943	3,192,538	5,808,631	9,001,169
2014	763,636	870,057	1,633,693	3,761,472	1,829,452	4,922,821	10,513,745	3,371,675	6,134,560	9,506,235
2015	802,042	883,580	1,685,622	3,910,203	1,905,082	5,110,971	10,926,256	3,451,086	6,279,044	9,730,130
2016	835,502	892,886	1,728,388	4,094,368	2,000,415	5,340,640	11,435,423	3,534,894	6,431,528	9,966,422
2017	847,547	881,277	1,728,824	3,914,066	1,907,769	5,114,434	10,936,269	3,443,166	6,264,633	9,707,799
2018	899,870	906,227	1,806,097	3,996,770	1,947,957	5,222,768	11,167,495	3,537,491	6,436,253	9,973,744
2019	950,895	928,296	1,879,191	4,224,029	2,063,341	5,510,616	11,797,986	3,665,757	6,669,625	10,335,382
2020	921,939	880,274	1,802,213	3,931,580	1,918,143	5,133,716	10,983,439	3,445,506	6,268,892	9,714,398
2021	924,633	879,127	1,803,760	3,906,247	1,905,182	5,101,827	10,913,256	3,434,170	6,248,266	9,682,436
2022	893,252	851,898	1,745,150	3,740,904	1,823,115	4,888,693	10,452,712	3,311,008	6,024,180	9,335,188
2023	898,828	856,737	1,755,565	3,834,032	1,871,047	5,005,369	10,710,448	3,353,435	6,101,373	9,454,808
2024	935,205	888,303	1,823,508	4,037,776	1,972,421	5,267,513	11,277,710	3,499,675	6,367,449	9,867,124
2025	930,579	884,287	1,814,866	3,840,313	1,870,178	5,021,338	10,731,829	3,428,004	6,237,048	9,665,052
2026	937,598	890,377	1,827,975	4,092,236	2,000,475	5,335,694	11,428,405	3,521,999	6,408,065	9,930,064
2027	922,057	876,892	1,798,949	3,925,631	1,915,846	5,124,761	10,966,238	3,435,569	6,250,811	9,686,380
2028	929,100	883,004	1,812,104	3,930,759	1,919,443	5,129,355	10,979,557	3,463,538	6,301,699	9,765,237
2029	916,090	871,715	1,787,805	3,878,835	1,892,147	5,065,371	10,836,353	3,406,866	6,198,589	9,605,455
2030	924,226	878,775	1,803,001	3,945,050	1,925,415	5,149,923	11,020,388	3,445,075	6,268,107	9,713,182
2031	910,314	866,704	1,777,018	3,804,385	1,854,114	4,971,534	10,630,033	3,370,567	6,132,545	9,503,112
2032	930,303	884,046	1,814,349	3,946,901	1,925,462	5,154,025	11,026,388	3,458,856	6,293,181	9,752,037
2033	981,764	928,702	1,910,466	4,160,094	2,030,590	5,430,224	11,620,908	3,646,971	6,635,445	10,282,416
2034	942,287	894,446	1,836,733	3,974,905	1,938,637	5,191,560	11,105,102	3,495,778	6,360,359	9,856,137
2035	921,146	876,102	1,797,248	3,979,408	1,945,679	5,187,935	11,113,022	3,459,615	6,294,561	9,754,176
TOTAL	26,846,804	28,952,230	55,799,034	123,203,121	63,456,345	171,433,271	358,092,737	96,959,614	186,988,866	283,948,480

a) Table B-18 includes extra peaking charges for additional power shown in Table 9.

TABLE B-18. Variable OMP&R Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Kern County Water Agency		County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	68,977	5,176	0	0	440,922	2,355	4,760	65,680	587,870
1969	56,774	101	0	0	321,387	181	3,338	17,956	399,737
1970	69,818	6,811	0	0	470,867	0	5,595	16,550	569,641
1971	53,097	7,747	0	0	769,054	4,785	6,353	158,419	999,455
1972	62,365	8,515	0	0	1,151,788	2,057	7,375	379,686	1,611,786
1973	33,931	4,615	0	0	770,121	2,307	3,017	77,630	891,621
1974	49,114	4,413	0	46,752	677,660	2,206	3,114	106,332	889,591
1975	63,140	4,671	0	34,580	848,249	2,491	3,920	134,295	1,091,346
1976	70,851	5,132	0	94,653	966,820	2,737	4,910	100,597	1,245,701
1977	26,565	1,758	0	84,875	498,624	3,644	2,602	43,067	661,135
1978	108,944	938	0	190,675	1,616,975	4,319	6,294	24,901	1,953,046
1979	107,956	4,871	0	194,048	2,371,175	5,602	13,172	434,472	3,131,297
1980	88,746	1,935	0	121,603	1,731,588	4,762	7,766	163,301	2,119,701
1981	129,687	18,533	0	263,077	2,398,339	7,275	8,904	263,922	3,089,737
1982	108,561	937	0	145,246	2,375,404	4,541	6,763	48,137	2,689,589
1983	61,443	0	0	13,954	929,183	5,662	3,232	1,218	1,014,692
1984	82,423	0	0	216,437	1,996,259	5,946	7,475	10,496	2,319,036
1985	114,571	12,938	0	242,645	2,567,184	8,422	8,815	271,970	3,226,545
1986	236,756	5,513	0	377,798	4,876,960	17,433	16,927	376,088	5,907,475
1987	187,090	10,273	0	504,168	4,230,949	16,140	15,529	375,604	5,339,753
1988	188,170	14,894	0	524,965	4,250,194	15,528	11,928	374,528	5,380,207
1989	285,261	15,450	0	681,238	6,158,648	20,063	21,693	649,604	7,831,957
1990	218,786	7,710	0	845,877	4,778,185	12,056	12,072	344,008	6,218,694
1991	4,393	1,047	0	185,013	47,869	0	521	10,331	249,174
1992	76,840	4,426	0	227,332	1,699,824	6,059	5,222	151,055	2,170,758
1993	20,064	4,843	0	78,585	340,588	2,090	1,467	123,913	571,550
1994	135,626	7,854	0	471,316	3,417,815	9,967	10,102	293,748	4,346,428
1995	181,772	4,611	0	409,656	3,437,735	11,619	10,492	288,010	4,343,895
1996	286,064	9,577	0	715,404	6,328,965	21,039	16,403	1,196,303	8,573,755
1997	308,515	0	0	650,416	5,627,735	0	15,559	94,838	6,697,063
1998	19,652	(28)	0	63,221	63,450	(1)	1,318	(1,107)	146,505
1999	161,490	8,592	0	470,360	3,349,552	10,821	9,074	790,700	4,800,589
2000	196,187	5,830	0	417,007	4,033,798	11,666	10,413	642,667	5,317,568
2001	777,821	25,461	0	442,707	11,535,052	29,205	45,389	1,115,061	13,970,696
2002	418,442	12,018	0	809,800	7,293,812	24,413	29,241	793,881	9,381,607
2003	441,754	13,766	0	1,061,838	9,252,120	35,392	27,905	1,014,620	11,847,395
2004	504,583	36,620	0	1,368,881	8,654,665	93,072	32,722	835,324	11,525,867
2005	998,003	46,843	0	1,133,280	17,846,799	241,987	34,769	1,710,528	22,012,209
2006	715,801	51,697	0	1,370,671	15,586,354	121,436	41,137	1,205,422	19,092,518
2007	880,186	46,049	0	2,009,327	17,054,013	146,154	59,159	1,472,355	21,667,243
2008	1,056,793	55,288	0	2,411,594	20,395,905	174,593	72,452	1,767,778	25,934,403
2009	888,889	46,504	0	2,244,888	17,264,496	147,976	58,363	1,486,912	22,138,028
2010	1,054,017	55,143	0	2,640,997	19,947,794	174,928	73,209	1,763,135	25,709,223
2011	857,527	44,863	0	2,144,411	16,365,941	143,045	57,949	1,434,451	21,048,187
2012	860,622	45,025	0	2,161,617	16,664,530	143,818	56,481	1,439,627	21,371,720
2013	1,048,073	54,832	0	2,615,214	19,836,520	174,608	72,267	1,753,192	25,554,706
2014	1,002,195	52,432	0	2,521,434	19,478,323	167,472	64,970	1,676,447	24,963,273
2015	1,084,141	56,719	0	2,716,347	20,777,935	180,838	72,582	1,813,525	26,702,087
2016	1,207,218	63,158	0	3,013,607	22,789,812	200,856	83,526	2,019,406	29,377,583
2017	1,095,549	57,316	0	2,743,672	20,952,884	182,669	73,698	1,832,609	26,938,397
2018	1,117,060	58,441	0	2,806,087	21,521,431	186,291	73,823	1,868,592	27,631,725
2019	1,239,974	64,871	0	3,100,589	23,511,636	206,352	84,911	2,074,199	30,282,532
2020	1,124,005	58,804	0	2,817,978	21,504,971	187,271	75,514	1,880,208	27,648,751
2021	1,109,025	58,021	0	2,782,851	21,277,495	184,832	74,039	1,855,150	27,341,413
2022	1,043,762	54,606	0	2,624,621	20,162,424	174,095	68,636	1,745,980	25,874,124
2023	1,102,475	57,678	0	2,764,709	21,094,050	183,648	74,088	1,844,193	27,120,841
2024	1,186,079	62,052	0	2,966,299	22,498,024	197,385	81,210	1,984,045	28,975,094
2025	1,053,709	55,127	0	2,655,135	20,488,816	175,884	68,173	1,762,620	26,259,464
2026	1,220,724	63,864	0	3,047,921	23,028,708	203,018	84,582	2,041,998	29,690,815
2027	1,130,066	59,121	0	2,834,128	21,622,995	188,235	75,900	1,890,347	27,800,792
2028	1,145,449	59,926	0	2,869,314	21,846,956	190,764	74,647	1,916,080	28,103,136
2029	1,105,525	57,837	0	2,774,623	21,212,110	184,224	73,797	1,849,296	27,257,412
2030	1,136,857	59,477	0	2,847,776	21,689,401	189,347	76,868	1,901,708	27,901,434
2031	1,062,259	55,574	0	2,672,188	20,536,796	177,177	69,690	1,776,921	26,350,605
2032	1,126,396	58,929	0	2,822,939	21,535,762	187,678	75,795	1,884,208	27,691,707
2033	1,201,628	62,865	0	3,015,146	23,010,700	200,127	80,476	2,010,054	29,580,996
2034	1,128,117	59,019	0	2,830,298	21,635,709	188,013	75,359	1,887,088	27,803,603
2035	1,191,520	62,336	0	2,995,653	22,841,732	198,202	79,697	1,993,146	29,362,286
TOTAL	39,179,873	2,021,965	0	92,909,441	748,260,537	6,008,777	2,589,149	67,329,025	958,298,768

TABLE B-18. Variable OMP&R Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	30.401	0	0	0	0	0	0	0	0
1969	0	30.627	0	0	0	0	0	0	0	0
1970	0	39.430	0	0	0	0	0	0	0	0
1971	0	34.871	0	0	0	0	0	0	0	0
1972	780	47.571	0	12.785	0	4.496	1.515	0	32.107	0
1973	286	28.968	102.812	6.896	159.536	3.855	0	0	301.444	0
1974	15.558	28.982	100.955	9.890	157.742	4.932	221	0	177.173	5.961
1975	99.186	28.568	108.253	12.758	170.111	6.391	0	0	136.066	50.723
1976	385.090	38.365	135.276	17.835	213.594	8.164	0	0	139.354	65.476
1977	199.166	21.006	0	23.598	0	1.974	1.702	0	239.663	74.838
1978	581.729	45.550	174.116	20.875	264.178	2.731	0	0	37.043	67.462
1979	1.058.904	83.940	228.437	28.603	340.510	2.328	90.803	0	236	3.668
1980	1.390.117	51.143	256.759	29.229	401.038	3.667	94.362	0	0	16.504
1981	1.480.362	118.583	274.149	33.632	430.304	23.861	90.590	0	254.649	57.523
1982	923.973	132.575	292.674	27.190	461.216	0	230.608	0	126.461	189.895
1983	333.772	(335.712)	172.336	10.792	272.477	385	0	0	(71.602)	(8.768)
1984	485.847	(142.910)	273.597	19.572	433.785	15	0	0	(66.353)	(91.433)
1985	821.069	(335.343)	413.406	34.603	657.011	0	0	32.464	(47.544)	(32.348)
1986	1.109.047	54.812	728.808	60.274	1.160.650	5.548	0	105.375	69.170	101.843
1987	1.019.605	(40.745)	668.383	63.601	1.083.530	32.651	585	157.843	88.076	49.930
1988	1.019.793	(74.006)	688.891	66.914	1.134.141	11.991	300	50.654	92.465	38.688
1989	1.736.901	178.359	978.885	97.114	1.633.489	38.269	8.951	350.953	340.460	210.334
1990	2.442.558	422.502	1.402.619	110.934	2.313.410	90.472	0	446.408	599.573	530.099
1991	286.485	(3.054)	277.078	33.945	456.999	17.978	128.405	132.700	35.339	52.116
1992	587.340	(208.900)	240.119	11.952	396.022	4.871	241.338	78.306	(22.718)	(53.500)
1993	(190.611)	(491.161)	(809.033)	(2.389)	(1.334.429)	(3.246)	(61.112)	(29.466)	(157.452)	(519.798)
1994	1.841.902	66.338	189.616	34.480	312.714	41.201	731.185	315.446	122.829	204.783
1995	761.209	(247.735)	(251.547)	7.960	(414.889)	7.727	165.622	114.342	(7.579)	(140.714)
1996	1.883.530	72.171	508.274	18.313	838.330	16.510	289.044	385.745	49.537	133.848
1997	2.121.818	22.440	365.342	24.076	330.153	15.099	414.596	438.212	61.553	115.882
1998	(553.432)	(722.825)	(3.952.729)	(2.892)	(3.258.099)	(4.225)	(44.233)	(80.469)	(86.610)	(429.359)
1999	1.218.255	(530.571)	(679.666)	18.353	(782.262)	6.032	167.446	245.763	(173.336)	(242.474)
2000	1.762.537	(352.398)	(422.891)	24.463	(581.873)	0	286.211	191.064	(183.843)	(151.279)
2001	10.827.817	4.470.124	1.505.453	207.527	2.483.171	0	854.664	1.796.639	4.382.027	390.425
2002	3.846.682	1.896.064	705.816	158.247	1.164.355	0	324.654	1.221.084	3.011.471	1.046.866
2003	4.984.131	2.894.664	872.808	142.251	1.439.410	0	1.398.478	958.733	1.656.721	1.325.498
2004	5.021.152	3.147.856	958.231	184.956	1.312.960	0	1.293.614	1.021.566	3.479.126	777.056
2005	6.424.244	3.349.052	2.876.377	24.670	4.109.863	0	1.715.312	1.257.555	1.576.917	1.170.778
2006	8.477.497	3.896.596	6.314.971	368.074	2.607.337	91.081	5.215.910	2.081.661	7.822.220	1.581.089
2007	7.697.860	6.415.288	14.793.464	548.075	4.377.225	330.919	3.106.484	3.064.602	10.267.739	1.697.147
2008	21.431.162	10.666.083	18.646.414	1.174.930	7.698.767	391.816	13.911.938	3.628.555	15.797.870	4.434.490
2009	20.430.121	8.909.572	15.637.016	986.575	6.456.241	334.428	13.483.462	3.097.090	13.248.207	3.718.795
2010	21.863.678	9.711.788	17.092.703	1.056.351	7.057.268	357.865	14.402.884	3.314.137	14.481.514	4.064.986
2011	17.404.070	9.175.897	13.824.012	815.723	5.707.685	283.093	11.029.790	2.621.688	11.712.169	3.287.626
2012	18.584.065	10.434.833	14.981.799	875.364	6.185.714	302.287	11.840.307	2.799.438	12.693.085	3.562.971
2013	20.701.612	11.907.183	17.150.259	976.147	7.081.032	336.731	13.138.589	3.118.418	14.530.278	4.078.674
2014	22.265.033	12.962.876	18.702.825	1.052.993	7.722.058	362.161	14.141.226	3.353.926	15.845.663	4.447.905
2015	22.774.703	13.338.496	19.167.322	1.077.166	7.913.841	370.451	14.461.635	3.430.701	16.239.201	4.558.372
2016	24.076.745	14.178.249	20.419.637	1.140.646	8.430.899	391.630	15.309.794	3.626.836	17.300.204	4.856.198
2017	22.874.124	13.381.323	19.225.232	1.081.836	7.937.751	372.069	14.525.531	3.445.678	16.288.265	4.572.144
2018	24.338.518	14.407.525	20.688.720	1.156.087	8.541.998	395.888	15.542.831	3.666.269	17.528.181	4.920.191
2019	25.394.949	14.970.795	21.617.107	1.198.930	8.925.312	413.072	16.068.268	3.825.406	18.314.741	5.140.980
2020	23.845.648	13.928.150	20.051.773	1.128.410	8.279.014	387.871	15.161.373	3.592.025	16.988.537	4.768.712
2021	23.812.112	13.901.713	20.055.978	1.126.963	8.280.751	387.326	15.145.637	3.586.973	16.992.100	4.769.712
2022	23.042.192	13.309.555	19.297.667	1.088.721	7.967.658	374.802	14.647.892	3.470.995	16.349.633	4.589.371
2023	23.455.890	13.600.765	19.654.556	1.108.811	8.115.011	381.531	14.917.747	3.533.313	16.652.002	4.674.246
2024	24.321.149	14.192.922	20.494.084	1.147.763	8.461.637	395.606	15.411.824	3.663.653	17.363.279	4.873.903
2025	23.930.769	13.951.592	20.215.583	1.132.511	8.346.649	389.256	15.218.509	3.604.847	17.127.323	4.807.670
2026	24.436.041	14.324.750	20.600.952	1.155.039	8.505.760	397.475	15.514.299	3.680.960	17.453.820	4.899.318
2027	24.093.428	14.021.675	20.308.920	1.138.718	8.385.186	391.902	15.299.021	3.629.349	17.206.402	4.829.867
2028	24.021.347	14.031.502	20.228.715	1.135.938	8.352.071	390.729	15.260.247	3.618.491	17.138.449	4.810.793
2029	23.805.507	13.831.160	20.022.167	1.124.891	8.266.791	387.218	15.119.025	3.585.978	16.963.455	4.761.672
2030	23.835.865	13.903.834	20.054.515	1.126.817	8.280.146	387.712	15.139.792	3.590.551	16.990.860	4.769.364
2031	23.581.583	13.725.190	19.834.534	1.114.856	8.189.320	383.576	15.018.702	3.552.247	16.804.485	4.717.048
2032	23.780.153	13.851.119	19.974.371	1.120.290	8.247.057	386.806	15.067.227	3.582.159	16.922.960	4.750.305
2033	25.830.513	15.316.212	22.029.444	1.223.733	9.095.559	420.157	16.448.301	3.891.018	18.664.087	5.239.042
2034	24.180.847	14.135.408	20.406.343	1.140.203	8.425.410	393.324	15.336.623	3.642.518	17.288.942	4.853.036
2035	26.345.582	15.051.938	22.218.564	1.235.845	9.173.643	428.535	16.599.377	3.968.606	18.824.316	5.284.018
TOTAL	720.559.566	393.283.591	573.093.251	33.331.413	248.773.939	11.360.994	429.909.106	112.459.005	493.992.410	137.330.168

TABLE B-18. Variable OMP&R Component of Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	36,970
1963	0	0	0	0	0	0	0	0	0	57,711
1964	0	0	0	0	0	0	0	0	0	74,134
1965	0	0	0	0	0	0	0	0	0	142,609
1966	0	0	0	0	0	0	0	0	0	192,606
1967	0	0	0	0	0	0	0	0	0	236,998
1968	0	0	0	30,401	0	0	0	0	0	1,117,912
1969	0	0	0	30,627	0	0	0	0	0	773,646
1970	0	0	0	39,430	0	0	0	0	0	1,103,799
1971	0	0	0	34,871	0	0	0	0	0	1,513,434
1972	0	848,011	0	947,266	0	0	0	0	0	3,297,202
1973	0	1,083,328	0	1,687,126	0	0	0	0	0	3,174,991
1974	0	1,872,297	0	2,373,712	0	0	0	0	0	3,926,489
1975	0	3,887,152	0	4,499,209	0	0	0	0	0	6,057,701
1976	0	5,485,263	0	6,488,418	0	0	0	0	0	8,477,311
1977	0	(796,686)	0	(234,739)	0	0	0	0	0	1,152,444
1978	0	3,696,428	0	4,890,112	0	0	0	0	0	7,632,606
1979	0	4,021,960	0	5,859,389	0	0	0	0	0	9,873,798
1980	0	5,362,245	0	7,605,064	0	0	0	0	0	10,425,875
1981	0	10,862,932	0	13,626,585	0	0	0	0	0	17,576,025
1982	0	7,685,168	0	10,069,760	0	0	0	0	0	13,566,611
1983	0	(8,994,497)	0	(8,620,817)	0	0	0	0	0	(7,441,457)
1984	0	(7,633,741)	0	(6,721,621)	0	0	0	0	0	(4,008,601)
1985	0	(15,213,299)	0	(13,669,981)	0	0	0	0	0	(9,784,304)
1986	0	1,135,478	0	4,531,005	0	0	0	0	0	11,629,559
1987	0	(3,007,097)	0	116,362	0	0	0	0	0	6,746,470
1988	0	(3,407,929)	0	(378,098)	0	0	0	0	0	6,351,151
1989	0	9,488,536	0	15,062,251	0	0	0	0	0	24,661,302
1990	0	30,759,725	204,582	39,322,882	0	0	0	0	0	48,184,400
1991	0	184,870	22,623	1,625,484	0	0	0	0	0	2,463,685
1992	0	(9,471,028)	0	(8,196,198)	0	0	0	0	0	(5,499,060)
1993	0	(21,473,875)	0	(25,072,572)	0	0	0	0	0	(24,652,636)
1994	0	4,059,683	0	7,920,177	0	0	0	0	0	13,514,307
1995	0	(4,895,977)	0	(4,901,581)	0	0	0	0	0	(99,701)
1996	0	1,859,275	0	6,054,577	0	0	0	0	0	15,893,938
1997	0	2,428,729	(921)	6,336,979	0	0	0	0	0	14,932,641
1998	0	(14,440,371)	(67,583)	(23,642,827)	0	0	0	0	0	(23,707,573)
1999	0	(10,520,287)	(35,124)	(11,307,871)	0	0	0	0	0	(5,221,364)
2000	0	(14,717,733)	7,302	(14,138,440)	0	0	0	0	0	(6,815,549)
2001	0	158,911,350	267,050	186,096,247	0	0	0	0	0	209,266,920
2002	0	57,208,907	271,168	70,855,314	0	0	0	0	0	85,446,624
2003	7,010	89,819,141	348,102	105,846,947	0	0	0	0	0	123,971,890
2004	52,109	102,056,117	400,088	119,704,831	0	0	0	0	0	137,432,714
2005	57,936	108,335,701	138,191	131,036,596	0	0	0	0	0	160,644,823
2006	280,549	170,559,710	427,378	209,724,073	0	0	0	0	0	240,309,510
2007	1,060,717	228,593,024	2,569,909	284,522,453	0	0	0	0	0	321,334,162
2008	2,663,773	202,844,808	3,009,350	306,299,956	0	0	0	0	0	349,612,910
2009	2,233,859	169,323,956	2,515,630	260,374,952	0	0	0	0	0	300,013,500
2010	2,441,815	184,273,086	2,725,443	282,843,518	0	0	0	0	0	327,478,440
2011	1,974,859	204,716,385	2,091,140	284,644,137	0	0	0	0	0	323,697,953
2012	2,140,257	221,991,008	2,264,057	308,655,185	0	0	0	0	0	348,514,794
2013	2,450,037	253,712,062	2,574,007	351,755,029	0	0	0	0	0	398,092,407
2014	2,671,832	276,440,025	2,797,780	382,766,303	0	0	0	0	0	429,383,249
2015	2,738,189	283,884,801	2,876,218	392,831,096	0	0	0	0	0	441,875,191
2016	2,917,091	302,090,302	3,054,623	417,792,854	0	0	0	0	0	470,300,670
2017	2,746,462	284,769,772	2,885,774	394,105,961	0	0	0	0	0	443,417,250
2018	2,955,531	306,529,087	3,102,166	423,772,992	0	0	0	0	0	474,352,053
2019	3,088,158	319,385,947	3,225,426	441,569,091	0	0	0	0	0	495,864,182
2020	2,864,539	296,705,536	3,004,354	410,705,942	0	0	0	0	0	460,854,743
2021	2,865,140	296,450,985	2,998,903	410,374,293	0	0	0	0	0	460,115,158
2022	2,756,810	284,524,287	2,875,675	394,295,258	0	0	0	0	0	441,702,432
2023	2,807,794	290,272,512	2,936,831	402,111,009	0	0	0	0	0	451,152,671
2024	2,927,726	302,792,243	3,061,936	419,107,725	0	0	0	0	0	471,051,161
2025	2,887,941	298,154,618	3,010,600	412,777,868	0	0	0	0	0	461,249,079
2026	2,942,993	304,995,036	3,088,155	421,994,598	0	0	0	0	0	474,871,857
2027	2,901,274	299,592,376	3,026,215	414,824,333	0	0	0	0	0	465,076,692
2028	2,889,816	299,112,763	3,026,615	414,017,476	0	0	0	0	0	464,677,510
2029	2,860,310	295,442,815	2,985,804	409,156,793	0	0	0	0	0	458,643,818
2030	2,864,931	296,463,187	2,999,661	410,407,235	0	0	0	0	0	460,845,240
2031	2,833,505	292,929,280	2,962,421	405,646,747	0	0	0	0	0	453,907,515
2032	2,853,482	295,309,169	2,989,236	408,834,334	0	0	0	0	0	459,118,815
2033	3,147,063	326,123,959	3,297,294	450,726,382	0	0	0	0	0	504,121,168
2034	2,915,192	301,530,972	3,049,087	417,297,905	0	0	0	0	0	467,899,480
2035	3,174,081	324,653,312	3,258,376	450,216,193	0	0	0	0	0	502,242,925
TOTAL	78,972,781	8,710,646,800	86,245,542	12,029,958,568	0	0	0	0	0	13,686,097,586

TABLE B-19. Total Transportation Charge for Each Contractor

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	11,750	43,787	21,132	76,669	0	0	0
1963	0	0	0	199,673	190,236	447,594	837,503	0	0	0
1964	0	0	0	263,210	277,398	621,174	1,161,782	6,694	21,659	28,353
1965	0	0	0	373,722	404,239	1,157,791	1,935,752	13,751	36,017	49,768
1966	18,057	0	18,057	419,362	421,628	1,412,600	2,253,590	26,516	61,329	87,845
1967	41,560	0	41,560	538,988	498,337	1,685,708	2,723,033	56,450	118,225	174,675
1968	128,588	0	128,588	663,603	603,365	1,984,791	3,251,759	115,927	229,740	345,667
1969	254,662	0	254,662	787,031	539,211	2,082,793	3,409,035	185,117	358,783	543,900
1970	277,493	0	277,493	822,758	532,434	2,202,293	3,557,485	200,110	387,595	587,705
1971	227,419	0	227,419	787,810	551,979	2,169,422	3,509,211	202,372	392,830	595,202
1972	224,922	0	224,922	829,451	678,385	2,319,944	3,827,780	209,015	406,506	615,521
1973	221,035	31,353	252,388	794,675	549,258	2,338,141	3,682,074	206,516	402,639	609,155
1974	240,442	32,924	273,366	818,457	564,459	2,505,879	3,888,795	208,503	407,005	615,508
1975	237,400	36,276	273,676	868,312	605,595	2,409,443	3,883,350	225,853	439,786	665,639
1976	271,231	40,819	312,050	959,078	734,676	2,500,026	4,193,780	228,933	447,212	676,145
1977	293,565	45,078	338,643	923,250	713,422	2,475,917	4,112,589	238,656	468,632	707,288
1978	273,807	49,159	322,966	978,585	692,451	2,785,503	4,456,539	245,286	484,166	729,452
1979	289,415	53,320	342,735	1,043,753	736,221	2,813,091	4,593,065	243,064	483,342	726,406
1980	310,779	67,724	378,502	1,161,767	866,233	3,027,715	5,055,715	269,812	536,977	806,789
1981	347,710	87,377	435,087	1,127,434	879,216	2,917,088	4,923,738	288,950	586,152	875,102
1982	438,260	106,881	545,141	1,165,322	850,343	3,261,612	5,277,277	290,002	582,655	872,657
1983	354,703	151,207	505,911	1,176,878	900,223	3,794,952	5,872,053	319,167	633,079	952,246
1984	467,232	224,170	691,403	1,469,016	1,097,338	5,737,303	8,303,657	351,573	695,455	1,047,028
1985	735,929	364,186	1,100,115	1,919,455	1,789,224	6,551,042	10,259,721	394,545	776,889	1,171,434
1986	1,084,468	692,256	1,776,724	1,746,659	1,528,587	6,862,724	10,137,970	385,497	762,577	1,148,074
1987	1,773,371	1,558,749	3,332,120	2,236,518	2,011,731	6,674,848	10,923,097	385,240	812,198	1,197,438
1988	2,231,006	2,333,097	4,564,103	2,238,150	2,210,377	6,368,341	10,816,868	420,101	978,488	1,398,589
1989	2,396,678	3,325,671	5,722,349	2,154,455	1,871,882	5,916,199	9,942,536	414,171	1,162,567	1,576,738
1990	2,745,521	3,432,532	6,178,053	2,573,752	2,261,764	6,667,922	11,503,438	487,553	1,234,234	1,721,787
1991	2,748,016	3,681,509	6,429,525	1,753,376	1,621,035	4,527,400	7,901,811	491,359	1,476,188	1,967,547
1992	2,553,906	3,528,155	6,082,061	2,074,547	2,003,168	5,385,315	9,463,030	550,978	1,490,922	2,041,900
1993	2,592,266	3,503,436	6,095,702	2,879,786	2,011,060	6,511,316	11,402,162	610,046	1,675,150	2,285,196
1994	2,717,706	3,536,656	6,254,362	2,906,520	2,642,290	7,313,944	12,862,754	767,812	2,472,978	3,240,790
1995	2,648,648	3,509,127	6,157,775	3,034,893	2,288,863	5,893,110	11,216,866	995,188	4,975,940	5,971,128
1996	2,698,584	3,890,907	6,589,491	2,584,033	2,137,277	6,674,929	11,396,239	1,837,045	13,762,994	15,600,039
1997	2,641,264	3,630,366	6,271,631	2,657,288	2,007,165	6,550,905	11,215,358	2,294,408	21,854,823	24,149,231
1998	2,538,666	3,478,852	6,017,518	2,266,317	2,066,608	6,302,898	10,635,823	2,977,681	26,603,247	29,580,928
1999	2,680,098	3,827,995	6,508,093	2,854,240	2,432,691	8,329,945	13,616,876	3,026,766	27,400,521	30,427,287
2000	2,832,254	4,307,492	7,139,746	3,914,367	2,305,297	7,035,630	13,255,294	2,961,476	28,194,146	31,155,622
2001	3,345,975	4,910,381	8,256,356	5,221,304	2,795,887	9,020,109	17,037,300	3,512,117	30,214,029	33,726,146
2002	3,551,401	5,041,301	8,592,703	5,009,756	2,765,455	9,893,110	17,668,321	3,222,824	29,892,377	33,115,201
2003	3,660,175	5,383,193	9,043,368	4,826,354	2,492,705	8,679,255	15,998,314	3,302,249	30,145,999	33,448,248
2004	4,140,126	5,595,671	9,735,797	5,659,101	2,792,486	8,149,125	16,600,712	3,319,474	30,643,388	33,962,862
2005	3,515,496	5,127,627	8,643,123	5,855,730	3,061,038	9,189,090	18,105,858	3,463,147	30,999,961	34,463,108
2006	4,332,110	6,073,120	10,405,230	6,693,651	3,759,204	9,882,121	20,334,976	5,467,613	31,639,426	37,107,039
2007	4,786,418	6,451,513	11,237,931	7,952,209	4,182,838	10,781,682	22,916,729	3,777,497	35,469,254	39,246,751
2008	5,378,515	6,826,562	12,205,077	9,410,367	4,665,940	12,133,589	26,209,896	6,282,210	34,521,273	40,803,483
2009	4,755,139	5,021,690	9,776,829	9,424,619	4,762,431	12,057,871	26,244,921	6,562,007	33,793,995	40,356,002
2010	4,797,348	5,054,276	9,851,624	9,762,202	4,934,772	12,436,909	27,133,883	6,748,133	34,158,126	40,906,259
2011	4,753,895	5,072,872	9,826,767	8,931,602	4,469,798	12,881,963	26,283,363	6,442,599	33,632,833	40,075,432
2012	4,789,448	5,098,510	9,887,958	8,992,584	4,498,625	12,963,915	26,455,124	6,541,448	33,839,960	40,381,408
2013	4,777,169	5,084,588	9,861,757	8,865,851	4,420,401	12,650,095	25,936,347	6,543,881	33,845,422	40,389,303
2014	4,753,594	5,055,270	9,808,864	8,458,828	4,185,208	12,054,153	24,698,189	6,382,450	33,542,902	39,925,352
2015	4,779,976	5,057,487	9,837,463	8,474,918	4,143,918	11,798,306	24,417,142	6,408,332	33,589,534	39,997,866
2016	4,789,424	5,062,430	9,851,854	8,604,763	4,200,902	11,833,908	24,639,573	6,468,676	33,695,388	40,164,064
2017	4,775,083	5,051,132	9,826,215	8,349,358	4,077,620	11,492,184	23,919,162	6,345,719	33,470,000	39,815,719
2018	4,727,523	5,068,739	9,796,262	8,272,546	4,057,183	11,425,348	23,755,077	6,360,070	33,494,324	39,854,394
2019	4,727,835	5,088,815	9,816,650	8,390,989	4,135,602	11,607,301	24,133,892	6,469,341	33,689,306	40,158,647
2020	4,696,050	5,042,418	9,738,468	8,067,584	3,977,872	11,198,068	23,243,524	6,247,690	33,285,998	39,533,688
2021	4,700,721	5,045,121	9,745,842	8,052,514	3,970,398	11,182,492	23,205,404	6,246,931	33,284,100	39,531,031
2022	4,666,912	5,017,317	9,684,229	7,881,951	3,885,270	10,959,101	22,726,322	6,120,063	33,051,631	39,171,694
2023	4,667,175	4,984,289	9,651,464	7,958,567	3,925,437	11,053,536	22,937,540	6,150,366	33,104,448	39,254,814
2024	4,698,301	5,013,035	9,711,336	8,153,019	4,022,055	11,302,527	23,477,601	6,288,615	33,355,895	39,644,510
2025	4,679,265	5,002,217	9,681,482	7,933,931	3,909,208	11,027,712	22,870,851	6,198,918	33,193,347	39,392,265
2026	4,679,675	5,001,317	9,680,992	8,180,420	4,036,704	11,334,286	23,551,410	6,291,628	33,357,657	39,649,285
2027	4,663,808	4,987,978	9,651,786	8,020,986	3,955,358	11,131,852	23,108,196	6,207,044	33,204,756	39,411,800
2028	4,664,198	4,985,356	9,649,554	8,012,395	3,951,768	11,115,942	23,080,105	6,226,505	33,232,102	39,458,607
2029	4,648,244	4,971,322	9,619,566	7,958,320	3,923,133	11,048,794	22,930,247	6,169,724	33,127,277	39,297,001
2030	4,643,518	4,960,798	9,604,316	8,014,440	3,951,380	11,120,025	23,085,845	6,203,234	33,182,556	39,385,790
2031	4,616,859	4,932,355	9,549,214	7,870,180	3,877,345	10,936,043	22,683,568	6,125,740	33,032,365	39,158,105
2032	4,620,106	4,923,073	9,543,179	8,004,313	3,944,888	11,106,998	23,056,199	6,211,781	33,188,403	39,400,184
2033	4,641,198	4,922,725	9,563,923	8,222,295	4,052,781	11,390,886	23,665,962	6,401,248	33,539,181	39,940,429
2034	4,528,784	4,812,307	9,341,091	8,024,897	3,953,990	11,134,456	23,113,343	6,248,488	33,258,990	39,507,478
2035	4,357,845	4,645,023	9,002,868	8,010,016	3,951,013	11,104,917	23,065,946	6,208,992	33,182,064	39,391,056
TOTAL	201,845,970	229,899,103	431,745,073	333,500,802	184,810,066	545,316,049	1,063,626,917	226,298,887	1,299,671,913	1,525,970,800

TABLE B-19. Total Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Kern County Water Agency		County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
				Municipal and Industrial	Agri-cultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	2,724	0	0	0	0	0	2,724
1965	0	0	6,027	73,543	0	0	0	0	79,570
1966	0	0	12,035	137,285	0	0	0	0	149,320
1967	0	0	26,249	267,525	0	0	0	0	293,774
1968	184,168	8,886	54,573	445,315	1,542,385	13,767	11,548	208,536	2,469,178
1969	179,773	7,577	87,557	524,952	2,387,979	12,621	10,548	355,668	3,566,676
1970	201,748	14,344	94,656	573,846	2,909,892	12,786	13,083	292,697	4,113,053
1971	197,960	15,302	95,676	605,729	3,816,811	17,759	14,381	447,754	5,211,373
1972	220,461	16,170	98,769	631,452	4,984,213	15,216	20,629	1,078,359	7,065,270
1973	202,990	12,241	97,531	639,086	4,915,777	15,480	11,682	407,990	6,302,777
1974	282,623	12,210	98,440	698,081	5,217,241	15,586	12,759	596,073	6,933,013
1975	349,567	13,155	106,683	715,440	6,337,132	16,616	14,442	726,513	8,279,548
1976	304,684	13,701	108,064	774,124	6,690,214	16,990	16,109	563,293	8,487,179
1977	266,670	10,811	112,534	797,692	6,864,009	18,453	13,895	510,238	8,594,301
1978	355,506	4,441	115,500	890,776	8,316,063	18,918	17,933	503,815	10,222,952
1979	385,416	13,548	114,232	896,025	9,440,248	20,198	24,864	952,516	11,847,048
1980	406,516	11,898	125,929	888,723	9,996,836	20,745	24,228	736,879	12,211,755
1981	470,007	29,739	134,147	1,079,139	11,440,913	24,935	22,906	908,148	14,109,935
1982	464,516	12,889	135,036	1,004,493	12,272,433	22,951	22,370	745,479	14,680,167
1983	637,690	14,483	149,180	1,027,082	15,479,376	39,967	29,127	428,002	17,804,908
1984	910,228	14,897	164,483	2,063,001	23,605,500	54,424	59,610	783,561	27,655,704
1985	1,098,641	87,458	184,883	2,350,412	27,911,512	69,479	70,139	2,170,356	33,942,880
1986	1,262,744	33,914	180,423	2,364,977	30,490,589	80,765	75,998	2,181,725	36,671,135
1987	1,121,185	50,709	179,850	2,804,592	29,274,226	78,014	74,244	2,240,660	35,823,480
1988	1,106,658	61,504	193,712	2,750,239	29,186,168	74,164	60,118	2,198,227	35,630,790
1989	1,142,042	49,186	187,891	2,435,448	29,247,553	67,045	68,581	2,441,530	35,639,276
1990	865,340	34,348	221,368	2,541,124	27,362,503	51,053	49,009	1,868,258	32,993,003
1991	582,223	23,253	220,258	2,055,047	17,561,895	27,925	26,778	1,228,823	21,726,203
1992	951,603	39,089	241,431	2,369,575	25,860,016	55,791	50,832	1,905,963	31,474,300
1993	1,163,893	53,616	264,933	2,799,265	31,374,185	72,885	69,515	2,639,551	38,437,843
1994	1,018,998	43,743	306,333	2,808,612	29,250,068	60,456	57,282	2,115,514	35,661,006
1995	1,515,671	46,600	304,270	3,499,388	36,373,551	88,870	80,105	2,769,591	44,678,047
1996	1,374,852	48,232	389,175	3,559,914	36,686,273	86,087	73,753	4,315,482	46,533,768
1997	1,416,695	25,389	276,653	3,107,536	32,946,645	36,710	68,613	1,669,559	39,547,800
1998	1,269,673	34,373	381,853	2,733,889	29,719,479	41,834	60,057	1,800,922	36,042,080
1999	1,220,198	53,899	366,504	3,051,649	31,032,268	73,158	62,333	4,004,515	39,864,523
2000	1,093,458	37,922	303,259	2,582,958	26,606,360	61,858	54,639	2,783,050	33,523,504
2001	1,767,905	62,679	327,968	2,632,892	33,967,664	79,891	100,521	3,048,118	41,987,639
2002	1,340,915	43,367	321,476	2,957,019	28,631,934	72,944	77,296	2,500,695	35,945,647
2003	1,410,424	48,093	340,003	3,257,112	31,583,096	88,804	78,269	2,837,756	39,643,557
2004	1,469,385	77,202	343,909	3,701,642	30,721,725	231,787	81,127	2,370,670	38,997,446
2005	2,099,651	89,829	356,697	3,295,863	42,361,142	424,670	82,619	3,492,683	52,203,154
2006	1,786,850	99,237	356,343	3,778,380	40,541,204	285,481	94,018	2,916,324	49,857,838
2007	2,063,054	93,151	367,989	4,699,110	43,469,382	323,300	120,094	3,324,220	54,460,300
2008	2,321,355	106,519	380,595	5,198,490	48,449,124	364,785	138,252	3,751,870	60,710,990
2009	2,001,279	89,873	363,376	4,889,920	42,808,816	317,323	116,397	3,224,903	53,811,887
2010	2,168,385	98,617	363,827	5,292,939	45,529,471	344,660	131,383	3,504,454	57,433,736
2011	1,893,719	84,235	365,305	4,600,665	40,465,453	299,847	110,773	3,044,696	50,864,693
2012	1,896,879	84,401	365,870	4,619,970	40,765,877	300,687	109,306	3,049,963	51,192,953
2013	1,972,234	88,341	366,014	4,791,203	41,812,120	312,899	117,479	3,175,958	52,636,248
2014	1,808,992	79,798	363,349	4,401,741	39,227,012	286,311	102,210	2,902,836	49,172,249
2015	1,874,633	83,231	360,236	4,482,043	40,219,457	296,973	108,711	3,012,595	50,437,879
2016	1,993,768	89,467	353,913	4,705,710	42,153,054	316,346	119,400	3,211,967	52,943,625
2017	1,881,726	83,604	339,826	4,304,555	40,310,394	298,094	109,541	3,024,510	50,352,250
2018	1,892,092	84,143	317,309	4,221,675	40,668,952	290,456	108,895	3,041,780	50,625,302
2019	2,014,388	90,544	308,520	4,454,948	42,643,983	309,673	119,957	3,246,450	53,188,463
2020	1,899,353	84,524	306,942	4,141,918	40,657,766	290,457	110,619	3,053,971	50,545,550
2021	1,888,932	83,979	305,966	4,096,411	40,518,482	288,608	109,454	3,036,521	50,328,353
2022	1,823,042	80,531	305,264	3,926,398	39,389,974	277,679	103,998	2,926,290	48,833,176
2023	1,877,547	83,386	304,618	4,051,673	40,239,769	286,503	109,184	3,017,552	49,970,232
2024	1,958,881	87,640	304,185	4,245,328	41,601,404	299,826	116,144	3,153,570	51,766,978
2025	1,820,685	80,408	303,889	3,917,030	39,484,759	277,313	102,706	2,922,336	48,909,126
2026	1,987,373	89,132	303,147	4,306,968	42,012,869	304,360	119,104	3,201,278	52,324,231
2027	1,898,218	84,460	303,325	4,093,930	40,645,310	289,751	110,503	3,051,950	50,477,447
2028	1,912,327	85,205	300,043	4,123,875	40,835,028	291,976	109,182	3,075,743	50,733,379
2029	1,872,767	83,134	300,076	4,027,052	40,211,408	285,427	108,354	3,009,502	49,897,720
2030	1,902,713	84,703	299,551	4,093,701	40,659,806	290,256	111,342	3,059,662	50,501,734
2031	1,829,414	80,860	298,766	3,902,821	39,540,564	277,873	104,215	2,936,819	48,971,332
2032	1,892,064	84,147	297,700	4,052,297	40,499,192	288,160	110,252	3,041,881	50,265,693
2033	1,967,847	88,108	297,895	4,241,075	41,991,252	300,564	114,967	3,168,552	52,170,260
2034	1,894,499	84,270	297,310	4,050,210	40,619,387	288,324	109,852	3,045,830	50,389,682
2035	1,957,231	87,556	296,054	4,204,841	41,806,416	298,173	114,157	3,150,883	51,915,311
TOTAL	90,264,924	3,877,910	17,630,077	204,309,340	2,014,143,559	11,263,687	5,132,389	156,114,035	2,502,735,921

TABLE B-19. Total Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline - Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	33,309	0	0	0	0	0	0	0	51,711	0
1964	62,847	27,438	16,286	4,369	37,145	1,142	28,427	8,202	82,782	34,973
1965	118,565	52,989	28,459	7,191	40,756	2,081	50,300	15,217	135,023	35,333
1966	215,713	101,232	51,184	12,474	73,129	3,752	90,369	27,670	232,426	61,445
1967	417,348	210,746	98,904	23,464	141,365	7,282	175,119	54,006	433,210	115,536
1968	744,206	478,065	176,688	41,496	251,125	12,866	311,081	95,438	781,930	208,864
1969	1,072,647	724,212	264,900	61,208	370,850	18,688	458,937	138,023	1,205,472	321,659
1970	1,395,848	904,061	371,728	89,673	519,163	25,223	632,989	184,783	1,777,650	467,431
1971	1,727,773	1,087,835	503,422	128,321	712,537	31,827	857,146	231,214	2,538,403	659,218
1972	2,047,032	1,306,587	640,299	181,162	925,397	42,393	1,111,738	274,527	3,404,963	864,867
1973	2,138,133	1,322,591	777,545	183,668	1,136,869	43,472	1,174,905	287,241	3,988,091	946,446
1974	2,202,002	1,381,959	794,192	193,236	1,163,708	45,201	1,206,983	291,996	4,015,030	989,817
1975	2,378,974	1,449,891	836,481	205,992	1,231,490	48,479	1,274,129	304,204	4,175,588	1,088,088
1976	2,732,227	1,445,191	883,730	215,036	1,307,153	51,452	1,316,775	313,608	4,316,061	1,141,338
1977	2,675,090	1,514,203	780,142	225,984	1,144,829	47,339	1,388,646	329,288	4,570,285	1,196,952
1978	2,992,822	1,598,916	961,523	230,990	1,420,338	47,108	1,388,796	321,604	4,476,611	1,208,453
1979	3,546,421	1,633,427	1,029,691	237,905	1,518,496	48,384	1,516,371	332,394	4,438,819	1,152,106
1980	4,093,075	1,714,996	1,119,626	259,351	1,679,613	53,338	1,635,817	360,382	4,852,083	1,269,177
1981	4,423,525	1,968,507	1,195,134	271,128	1,797,033	77,794	1,756,226	391,786	5,240,580	1,357,401
1982	3,986,028	2,060,065	1,245,674	280,261	1,883,312	55,949	1,952,688	406,809	5,427,276	1,564,903
1983	5,176,847	2,322,172	1,837,054	333,027	2,827,158	69,370	2,026,753	494,603	6,037,306	1,556,367
1984	7,212,801	3,363,792	2,920,693	445,283	4,553,156	75,761	2,254,358	553,232	7,065,792	2,331,555
1985	8,928,301	3,748,085	3,717,539	540,332	5,827,873	79,219	2,364,827	758,960	7,756,676	2,378,093
1986	8,827,289	4,315,570	4,143,184	577,416	6,515,636	102,386	2,474,061	999,968	7,873,869	3,047,434
1987	8,844,016	4,156,106	3,998,374	604,923	6,363,049	211,795	2,506,458	1,026,303	9,240,891	3,033,831
1988	8,318,897	4,219,308	3,997,055	615,940	6,426,199	124,654	2,560,945	779,724	9,521,529	2,828,684
1989	8,695,945	4,099,133	3,641,415	586,536	5,896,166	170,557	2,508,279	1,442,530	8,960,529	2,930,080
1990	9,983,987	4,539,471	4,316,516	620,333	6,956,699	289,335	2,703,882	1,639,730	9,811,261	3,677,785
1991	6,484,746	3,508,397	2,823,346	567,387	4,492,594	175,123	3,462,995	1,294,508	8,938,057	3,035,310
1992	8,585,673	4,465,956	2,894,932	470,101	4,609,710	121,321	4,264,418	1,129,477	8,589,549	2,979,755
1993	8,969,300	4,097,366	3,092,789	472,751	4,934,951	157,733	4,143,277	1,347,409	9,521,838	3,319,666
1994	11,156,140	4,710,354	3,137,490	554,731	5,007,134	225,794	5,136,234	1,698,881	10,227,799	4,076,838
1995	10,757,339	4,967,410	3,910,360	509,093	6,281,228	155,546	4,224,022	1,527,143	9,459,288	3,715,005
1996	11,126,138	5,155,485	6,847,257	553,160	11,124,041	150,598	4,290,870	1,867,098	9,885,354	3,807,043
1997	11,376,427	4,922,203	6,408,674	579,209	7,362,617	144,818	4,594,313	1,869,201	11,283,209	4,037,467
1998	9,918,902	4,561,465	5,509,370	546,699	5,889,643	146,245	5,632,264	1,477,869	11,204,690	3,323,757
1999	11,303,646	4,887,688	4,454,390	633,793	5,920,321	145,097	5,813,224	1,835,894	12,277,264	4,158,613
2000	10,534,071	6,822,985	2,879,421	594,015	4,303,208	115,236	5,638,805	1,447,804	11,863,298	3,248,531
2001	20,608,862	12,456,358	3,923,571	797,776	6,297,948	127,739	6,335,591	3,346,039	17,807,354	3,394,005
2002	11,841,946	9,590,071	3,146,234	755,366	5,015,827	109,684	5,458,124	2,709,672	18,528,975	4,739,428
2003	13,213,422	10,503,085	3,337,865	729,004	5,330,812	115,142	7,320,833	2,259,410	16,395,659	4,911,675
2004	13,973,128	11,680,709	3,861,857	818,298	5,211,473	124,043	7,180,855	2,476,364	20,396,213	4,327,465
2005	15,571,593	11,419,615	17,665,540	590,470	10,578,433	122,700	7,340,359	2,727,962	18,213,494	4,785,693
2006	18,116,738	12,063,423	23,583,386	1,065,305	8,546,381	238,495	12,370,664	3,802,036	26,294,706	5,378,524
2007	17,239,143	15,710,457	35,533,265	1,330,792	11,074,703	559,479	9,712,340	5,128,312	30,291,706	5,591,395
2008	35,366,286	21,730,850	41,758,366	2,151,555	15,956,295	639,697	23,773,420	5,857,692	38,001,960	9,531,845
2009	34,491,295	19,456,507	37,710,570	1,881,251	14,199,820	572,846	23,305,769	5,235,871	34,257,445	8,488,546
2010	35,973,686	20,298,784	39,313,293	1,948,564	14,828,696	597,083	24,260,260	5,460,277	35,448,964	8,830,424
2011	29,830,991	19,628,506	34,184,951	1,630,263	12,750,809	494,196	19,793,560	4,507,119	31,311,288	7,659,898
2012	31,016,127	21,110,847	35,405,649	1,686,328	13,234,886	513,488	20,608,088	4,685,643	32,231,099	7,924,149
2013	30,647,122	20,825,071	35,093,009	1,657,015	13,078,620	508,051	20,357,052	4,635,137	31,714,608	7,797,729
2014	29,613,183	19,982,201	33,902,755	1,625,570	12,645,922	490,601	19,705,424	4,475,026	31,162,102	7,612,168
2015	29,707,862	20,063,434	33,985,598	1,609,107	12,644,023	492,112	19,773,627	4,490,094	30,833,534	7,551,589
2016	30,832,247	20,805,142	34,995,213	1,686,641	13,104,483	510,296	20,522,297	4,660,481	32,140,041	7,884,031
2017	29,417,476	19,861,367	33,732,805	1,601,471	12,519,332	487,042	19,632,471	4,449,327	30,654,599	7,492,033
2018	30,372,118	20,418,487	34,485,233	1,652,622	12,882,360	502,358	20,357,140	4,595,426	31,456,811	7,715,737
2019	31,114,154	20,697,096	35,158,195	1,687,160	13,139,536	513,938	20,699,238	4,707,331	32,021,445	7,863,566
2020	29,280,229	19,430,334	32,818,908	1,576,118	12,248,321	482,840	19,596,344	4,425,606	29,909,562	7,306,565
2021	29,084,080	19,202,596	32,350,989	1,531,836	12,042,389	478,469	19,410,094	4,391,962	29,077,908	7,112,992
2022	28,166,163	18,441,401	30,980,876	1,489,034	11,578,751	463,277	18,779,293	4,253,068	28,229,677	6,874,557
2023	28,442,963	18,673,299	30,287,838	1,512,367	11,548,381	467,595	18,951,296	4,294,248	28,535,479	6,944,566
2024	29,237,843	19,194,557	31,035,578	1,530,381	11,838,951	480,518	19,398,549	4,413,988	28,859,780	7,062,060
2025	28,692,679	18,783,944	30,309,094	1,507,362	11,609,795	471,620	19,092,829	4,331,820	28,472,084	6,951,047
2026	29,184,962	19,195,898	30,981,484	1,540,463	11,809,015	479,584	19,366,207	4,405,932	28,954,321	7,067,372
2027	28,850,249	18,765,237	30,151,519	1,505,625	11,589,778	474,132	19,149,586	4,355,562	28,365,638	6,929,693
2028	28,752,687	18,963,021	30,265,359	1,491,984	11,560,287	472,518	19,089,685	4,340,910	28,094,635	6,867,561
2029	28,524,684	18,555,352	30,042,449	1,504,328	11,497,755	468,790	18,941,136	4,306,680	28,335,115	6,898,321
2030	28,510,576	18,575,184	30,043,931	1,505,143	11,494,385	468,546	18,934,536	4,304,802	28,341,249	6,898,232
2031	28,173,057	18,167,247	29,888,736	1,455,452	11,345,716	463,020	18,769,961	4,254,483	27,485,444	6,709,430
2032	28,364,587	18,454,229	29,647,860	1,491,679	11,388,327	466,108	18,815,199	4,283,672	28,146,594	6,847,623
2033	30,339,595	19,690,130	31,845,386	1,575,060	12,214,037	498,198	20,164,397	4,582,643	29,532,530	7,261,775
2034	28,584,636	18,499,605	30,039,114	1,483,326	11,487,158	469,644	19,009,396	4,320,475	28,007,901	6,838,466
2035	30,663,868	19,418,345	32,067,973	1,611,646	12,285,995	503,355	20,234,491	4,635,650	30,120,213	7,375,144
TOTAL	1,157,004,284	730,158,243	1,095,839,919	63,874,000	523,225,089	18,651,562	701,137,535	177,669,441	1,223,292,316	313,595,125

TABLE B-19. Total Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	79,888
1963	0	690,539	0	775,559	0	0	0	0	12,626	1,625,689
1964	21,728	1,260,042	9,375	1,594,755	0	0	0	0	13,938	2,801,552
1965	21,859	2,179,810	17,761	2,705,344	0	0	405	405	28,937	4,799,776
1966	37,952	3,898,819	33,415	4,839,578	0	0	564	564	31,321	7,380,275
1967	71,260	7,691,085	68,133	9,507,458	0	0	562	562	47,718	12,788,780
1968	128,877	15,313,065	142,760	18,686,461	0	0	564	564	46,945	24,929,162
1969	198,704	23,145,744	215,144	28,196,187	0	0	3,190	3,190	52,963	36,026,612
1970	289,546	30,607,434	273,523	37,539,052	0	0	15,116	15,116	69,744	46,159,647
1971	409,205	39,946,463	342,325	49,175,690	0	0	15,996	15,996	55,532	58,790,422
1972	537,044	52,933,606	422,192	64,691,808	0	0	17,367	17,367	80,412	76,523,080
1973	587,814	57,257,279	435,541	70,279,596	0	0	17,328	17,328	54,219	81,197,537
1974	611,275	61,759,841	455,447	75,110,687	0	0	17,472	17,472	76,783	86,915,624
1975	644,464	66,739,819	478,284	80,855,883	0	0	18,400	18,400	84,547	94,061,042
1976	668,152	68,467,779	475,466	83,333,969	0	0	17,471	17,471	106,717	97,127,311
1977	696,350	66,216,668	506,941	81,292,717	0	0	18,227	18,227	98,618	95,162,383
1978	708,874	72,917,066	523,053	88,796,153	0	0	17,375	17,375	100,786	104,646,223
1979	712,699	72,648,617	526,278	89,341,608	0	0	20,573	20,573	119,352	106,990,787
1980	777,813	79,908,126	571,100	98,294,496	0	0	17,755	17,755	178,812	116,943,823
1981	805,858	91,241,966	636,261	111,163,198	0	0	21,188	21,188	185,347	131,713,594
1982	853,227	93,125,063	670,228	113,511,482	0	0	28,417	28,417	173,894	135,089,036
1983	951,954	101,767,502	803,439	126,203,552	0	0	19,271	19,271	220,926	151,578,866
1984	1,072,455	137,486,443	868,812	170,204,133	0	0	21,109	21,109	225,959	208,148,992
1985	1,120,667	173,421,376	908,613	211,550,562	0	0	20,233	20,233	340,322	258,385,266
1986	1,149,524	193,220,534	937,154	234,184,025	0	0	20,134	20,134	279,227	284,217,289
1987	1,171,823	178,742,796	907,876	220,808,240	0	0	19,736	19,736	345,116	272,449,227
1988	1,208,011	190,221,758	904,709	231,727,412	0	0	17,895	17,895	365,207	284,520,863
1989	1,194,715	193,213,383	932,440	234,271,708	0	0	19,153	19,153	422,329	287,594,089
1990	1,297,422	239,518,227	1,486,593	286,841,241	0	0	18,143	18,143	474,284	339,729,949
1991	1,354,718	179,928,498	1,140,955	217,206,634	0	0	21,012	21,012	214,683	255,467,415
1992	1,348,975	196,144,138	1,025,119	236,629,123	0	0	18,008	18,008	443,676	286,152,099
1993	1,507,336	169,470,130	1,067,967	212,102,513	0	0	20,993	20,993	599,571	270,943,980
1994	1,497,855	209,289,443	1,009,019	257,727,713	0	0	19,644	19,644	609,932	316,376,201
1995	1,520,392	173,396,272	1,061,154	221,484,251	0	0	20,272	20,272	534,971	290,063,309
1996	1,526,936	181,379,764	1,103,083	238,816,826	0	0	25,373	25,373	571,857	319,533,594
1997	1,731,236	186,711,858	1,216,389	242,237,621	0	0	24,815	24,815	428,638	323,875,094
1998	1,925,051	168,709,246	1,238,270	220,083,469	0	0	18,164	18,164	465,140	302,843,123
1999	2,167,435	189,484,555	1,250,943	244,332,863	0	0	17,782	17,782	559,344	335,326,769
2000	2,425,062	185,127,820	1,321,565	236,321,821	0	0	17,872	17,872	0	321,413,858
2001	3,386,792	374,670,013	1,616,322	454,768,370	0	0	17,686	17,686	0	555,793,496
2002	4,794,822	262,003,775	1,639,518	330,333,441	0	0	20,994	20,994	0	425,676,305
2003	5,573,358	289,209,085	1,659,722	360,559,071	0	0	20,760	20,760	0	458,713,317
2004	6,037,598	334,390,395	1,892,278	412,370,675	0	0	20,821	20,821	0	511,688,314
2005	6,152,169	315,185,641	1,439,898	411,793,568	0	0	20,818	20,818	0	525,229,629
2006	6,890,198	400,471,517	1,830,986	520,652,359	0	0	20,467	20,467	0	638,377,909
2007	7,977,249	477,970,133	4,863,062	622,982,036	0	0	20,567	20,567	0	750,864,313
2008	10,082,292	446,401,844	5,496,312	656,748,414	0	0	20,617	20,617	0	796,698,477
2009	9,453,711	400,994,267	4,900,054	594,947,952	0	0	20,667	20,667	0	725,158,258
2010	9,658,177	416,613,331	5,120,036	618,351,575	0	0	20,667	20,667	0	753,697,744
2011	8,956,274	445,634,872	4,225,232	620,607,959	0	0	20,667	20,667	0	747,678,881
2012	9,114,292	462,787,712	4,397,811	644,716,119	0	0	20,667	20,667	0	772,654,229
2013	9,035,963	456,632,396	4,339,121	636,320,894	0	0	20,667	20,667	0	765,165,216
2014	8,928,237	440,394,301	4,161,346	614,698,836	0	0	20,667	20,667	0	738,324,157
2015	8,887,787	440,491,395	4,175,719	614,705,881	0	0	20,262	20,262	0	739,416,493
2016	9,091,467	457,362,118	4,330,920	637,925,377	0	0	20,102	20,102	0	765,544,595
2017	8,852,372	435,746,277	4,124,287	608,570,859	0	0	20,105	20,105	0	732,504,310
2018	8,986,106	447,219,971	4,237,307	624,881,676	0	0	20,102	20,102	0	748,932,813
2019	9,074,931	454,212,485	4,294,662	635,183,737	0	0	17,477	17,477	0	762,498,866
2020	8,734,519	423,756,368	4,019,287	593,585,001	0	0	5,551	5,551	0	716,651,782
2021	8,611,697	416,139,756	3,963,576	583,398,344	0	0	4,725	4,725	0	706,213,699
2022	8,468,735	399,076,464	3,800,863	560,602,159	0	0	3,340	3,340	0	681,020,920
2023	8,512,324	402,419,113	3,848,397	564,437,866	0	0	3,339	3,339	0	686,255,255
2024	8,579,471	412,470,309	3,957,557	578,059,542	0	0	3,338	3,338	0	702,663,305
2025	8,512,820	403,021,254	3,866,862	565,623,210	0	0	3,336	3,336	0	686,480,270
2026	8,584,730	412,214,865	3,955,396	577,740,229	0	0	3,334	3,334	0	702,949,481
2027	8,498,477	401,030,732	3,859,233	563,525,461	0	0	3,332	3,332	0	686,178,022
2028	8,459,282	406,556,721	3,911,849	568,826,499	0	0	3,330	3,330	0	691,751,474
2029	8,482,295	398,262,663	3,817,271	559,636,839	0	0	3,329	3,329	0	681,384,702
2030	8,482,389	398,886,937	3,821,156	560,267,066	0	0	3,327	3,327	0	682,848,078
2031	8,362,373	388,587,152	3,727,683	547,389,754	0	0	3,326	3,326	0	667,755,299
2032	8,451,236	397,323,088	3,800,151	557,480,353	0	0	3,324	3,324	0	679,748,932
2033	8,696,693	421,589,768	4,050,324	592,040,536	0	0	3,324	3,324	0	717,384,434
2034	8,441,516	396,510,668	3,801,105	557,493,010	0	0	3,323	3,323	0	679,847,927
2035	8,770,626	422,030,578	4,011,970	593,729,854	0	0	3,321	3,321	0	717,108,356
TOTAL	322,537,242	18,413,450,536	156,944,600	24,897,379,894	0	0	1,049,255	1,049,255	8,723,612	30,431,231,472

TABLE B-20A: Calculation of Delta Water Rates

Calculation in accordance with Article 53(i) of the Monterey Amendment

(Values in millions of dollars [$] or millions of acre-feet [AF] discounted to 2006 at 4.608 percent per annum)

Procedure	Capital Cost Component		Minimum Operation, Maintenance, Power and Replacement Component [a]		Total Delta Water Rate	
	[1]		[2]		[3]	
Commencing in 2007						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Entitlements during the Project Repayment Period.	$4,762.55 [b]	296.98 AF	$3,234.99 [c]	296.98 AF	$7,997.54	296.98 AF
Less, Project Power Revenues to be Realized During the Project Repayment Period.	(1,731.49)		(689.61)		(2,421.10)	
Less, Delta Water Charges Paid and Project Water Entitlements, Prior to 2007	(2,228.97) [d]	(231.00) AF	(1,630.64)	(231.00) AF	(3,859.61)	(231.00) AF
TOTAL	$802.09	65.98 AF	$914.74	65.98 AF	$1,716.83	65.98 AF
Rate Applicable in 2007	$12.16 per acre-foot		$13.86 per acre-foot		$26.02 per acre-foot	

Calculation under original provisions, without the Monterey Amendment

(for Plumas County and Empire)

Procedure	Capital Cost Component		Minimum Operation, Maintenance, Power and Replacement Component [a]		Total Delta Water Rate	
	[4]		[5]		[6]	
Commencing in 2007						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Entitlements during the Project Repayment Period.	$4,750.63 [b]	296.98 AF	$3,221.00 [c]	296.98 AF	$7,971.62	296.98 AF
Less, Project Power Revenues to be Realized During the Project Repayment Period.	(1,731.49)		(689.61)		(2,421.10)	
Less, Delta Water Charges Paid and Project Water Entitlements, Prior to 2007	(2,228.97) [d]	(231.00) AF	(1,630.64)	(231.00) AF	(3,859.61)	(231.00) AF
TOTAL	$790.17	65.98 AF	$900.75	65.98 AF	$1,690.91	65.98 AF
Rate Applicable in 2007	$11.98 per acre-foot		$13.65 per acre-foot		$25.63 per acre-foot	

a) Considering that all operating costs of Project Conservation Facilities will not vary with annual amounts of Project water delivered, and therefore are properly classified as "Minimum" OMP&R Costs. OMP&R costs exclude amounts for Conservation RAS.
b) Including net credits of $4,850,000 for settlements as to the magnitude of Project Capital costs incurred prior to December 31, 1960, and net credits of $6,678,320 for settlement as to the magnitude of Project Capital costs incurred from 1961 through 1978.
c) Includes conservation power costs and credits at San Luis.
d) Applying all Delta Water Charges paid prior to 1970 to reimburse Capital costs (the charge was not divided into components until 1970)

TABLE B-20B. Delta Water Rates, by Facility

(in dollars per acre-foot)

Item	Capital Cost Component	Minimum Operation, Maintenance, Power and Replacement Component	Total Delta Water Rate
	[1]	[2]	[3]
Initial Conservation Facilities			
Oroville Division			
Water Supply and power costs [a]	43.82	24.66	68.49
Less, Oroville Power Revenues	-26.24	-10.45	-36.69
Subtotal	17.58	14.21	31.79
Delta Facilities [b]	12.51	12.11	24.62
California Aqueduct, portion			
Reach 1	2.80	4.57	7.38
Reach 2A	1.67	0.74	2.41
Reach 2B	0.88	0.40	1.29
Reach 3	0.60	0.23	0.84
Subtotal	5.96	5.95	11.91
San Luis Facilities	8.44	6.10	14.54
Planning and preoperating costs through 2001	2.45	0.00	2.45
45,000 AF relinquished costs	0.18	0.21	0.39
Less, Capital Cost Credits	-1.18	0.00	-1.18
Less, Delta Water Charges paid prior to 2007	-33.78	-24.71	-58.50
Rate applicable in 2007	12.16	13.86	26.02

a) Includes revenue received from non-contractors.
b) Includes (1) Delta Facility planning costs, (2) Delta Studies costs, and (3) Suisun Marsh Facilities Costs.
Note: The OMP&R unit rates do not includes amounts for Conservation RAS.

TABLE B-21. Total Delta Water Charge for Each Contractor

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	14,000	50,050	177,100	241,150	0	0	0
1968	0	0	0	19,156	29,701	193,245	242,102	0	0	0
1969	0	0	0	30,324	44,096	215,483	289,903	0	0	0
1970	0	0	0	80,908	107,730	585,200	773,838	0	0	0
1971	0	0	0	57,320	123,080	637,120	817,520	0	0	0
1972	0	0	0	99,668	143,877	707,328	950,873	0	0	0
1973	0	0	0	120,880	167,099	782,167	1,070,146	0	0	0
1974	0	0	0	137,684	182,339	818,664	1,138,687	0	0	0
1975	0	0	0	146,204	187,324	804,123	1,137,651	0	0	0
1976	0	0	0	168,489	208,652	862,036	1,239,177	0	0	0
1977	0	0	0	172,931	208,645	827,062	1,208,638	0	0	0
1978	0	0	0	206,378	243,231	926,594	1,376,203	0	0	0
1979	0	0	0	237,771	273,208	1,005,955	1,516,934	0	0	0
1980	0	18,325	18,325	272,717	307,426	1,090,867	1,671,010	12,396	3,479	15,875
1981	0	25,440	25,440	415,564	469,768	1,589,984	2,475,316	18,068	10,414	28,482
1982	0	34,917	34,917	457,988	519,053	1,679,289	2,656,330	38,166	99,788	137,954
1983	0	12,035	12,035	316,703	359,775	1,114,795	1,791,273	38,004	68,902	106,906
1984	0	22,453	22,453	334,587	380,914	1,132,448	1,847,949	57,909	105,498	163,407
1985	0	22,001	22,001	381,970	435,728	1,244,939	2,062,637	106,103	192,937	299,040
1986	35,358	21,767	57,125	423,378	485,372	1,330,615	2,239,365	151,206	275,347	426,553
1987	0	22,984	22,984	430,024	493,786	1,304,900	2,228,710	185,355	336,664	522,019
1988	88,878	150,466	239,344	464,114	533,731	1,361,400	2,359,245	239,792	436,607	676,399
1989	102,688	305,328	408,016	513,853	591,760	1,491,833	2,597,446	331,518	602,402	933,920
1990	112,723	355,132	467,855	534,787	616,676	1,537,512	2,688,975	417,802	760,166	1,177,968
1991	129,296	395,515	524,811	603,028	681,067	1,667,194	2,951,289	443,403	806,745	1,250,148
1992	158,879	489,808	648,687	729,545	808,579	1,945,453	3,483,577	506,628	921,780	1,428,408
1993	172,457	530,778	703,235	771,894	840,958	1,990,673	3,603,525	507,825	923,957	1,431,782
1994	177,824	546,610	724,434	778,647	817,579	1,946,615	3,542,841	486,654	885,437	1,372,091
1995	203,738	713,497	917,235	874,946	874,946	2,083,205	3,833,097	520,801	947,567	1,468,368
1996	213,506	774,152	987,658	901,129	860,168	2,048,020	3,809,317	512,005	931,562	1,443,567
1997	250,558	866,141	1,116,699	1,041,633	951,056	2,264,420	4,257,109	566,105	1,029,994	1,596,099
1998	266,952	882,469	1,149,421	1,048,658	957,470	2,279,691	4,285,819	141,683	888,760	1,030,443
1999	290,688	923,459	1,214,147	1,084,480	990,178	2,357,566	4,432,224	589,391	1,072,362	1,661,753
2000	390,936	948,784	1,339,720	1,628,402	1,005,778	2,394,709	5,028,889	598,677	1,089,257	1,687,934
2001	496,412	1,097,880	1,594,292	1,868,283	1,005,998	2,395,234	5,269,515	598,809	1,089,496	1,688,305
2002	512,928	1,125,429	1,638,357	1,896,134	1,020,996	2,430,942	5,348,072	607,736	1,105,738	1,713,474
2003	511,059	1,112,692	1,623,751	1,856,232	999,510	2,379,785	5,235,527	594,946	1,082,469	1,677,415
2004	569,615	1,441,431	2,011,046	2,043,834	1,094,911	2,606,931	5,745,676	651,732	1,185,788	1,837,520
2005	573,730	1,219,893	1,793,623	2,081,144	1,084,212	2,581,456	5,746,812	645,364	1,174,201	1,819,565
2006	606,342	1,272,002	1,878,344	2,167,747	1,129,330	2,688,880	5,985,957	672,220	1,223,064	1,895,284
2007	595,224	1,232,237	1,827,461	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2008	603,681	1,233,538	1,837,219	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2009	612,137	1,234,839	1,846,976	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2010	620,594	1,236,140	1,856,734	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2011	629,051	1,237,441	1,866,492	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2012	637,508	1,238,742	1,876,250	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2013	644,663	1,240,043	1,884,706	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2014	654,421	1,241,344	1,895,765	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2015	671,985	1,242,645	1,914,630	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2016	688,248	1,242,645	1,930,893	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2017	704,511	1,242,645	1,947,156	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2018	720,774	1,242,645	1,963,419	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2019	737,037	1,242,645	1,979,682	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2020	752,649	1,242,645	1,995,294	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2021	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2022	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2023	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2024	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2025	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2026	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2027	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2028	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2029	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2030	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2031	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2032	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2033	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2034	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
2035	755,251	1,242,645	1,997,896	2,097,764	1,092,870	2,602,072	5,792,706	650,518	1,183,578	1,834,096
TOTAL	26,465,815	51,321,257	77,787,072	88,248,290	53,978,987	134,941,521	277,168,798	29,105,320	53,574,143	82,679,463

TABLE B-21. Total Delta Water Charge for Each Contractor

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Kern County Water Agency		County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
				Municipal and Industrial	Agri-cultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	40,695	10,469	0	0	165,522	3,177	8,073	98,608	326,544
1969	61,267	3,281	0	0	337,686	4,200	8,805	102,478	517,717
1970	104,405	19,950	0	0	964,915	8,645	17,290	228,095	1,343,300
1971	129,596	21,720	0	0	1,377,772	9,412	20,272	264,260	1,823,032
1972	160,756	24,113	0	0	2,175,835	11,253	43,131	905,057	3,320,145
1973	195,541	26,664	0	386,638	2,373,167	13,333	27,553	373,307	3,396,203
1974	224,202	27,909	0	446,545	2,781,595	13,954	29,770	445,138	3,969,113
1975	329,688	27,413	0	481,560	3,041,048	14,620	33,702	827,591	4,755,622
1976	414,245	29,388	0	549,549	3,931,785	15,673	35,966	877,151	5,853,757
1977	312,532	28,195	0	569,545	4,071,218	15,977	40,289	626,210	5,663,966
1978	342,208	31,588	0	674,939	4,950,959	20,006	41,065	666,516	6,727,281
1979	395,523	34,294	0	772,757	5,901,986	22,863	45,725	771,613	7,944,761
1980	555,341	37,679	0	881,371	6,984,026	27,272	70,658	933,481	9,489,828
1981	740,789	54,204	0	1,351,487	11,140,730	41,556	77,692	1,373,168	14,779,626
1982	782,396	57,248	0	1,518,993	12,703,436	47,707	85,873	1,530,443	16,726,096
1983	543,462	38,004	0	1,057,789	9,141,315	35,471	58,273	78,506	10,952,820
1984	580,379	13,572	0	1,333,200	9,741,623	39,893	61,770	756,132	12,526,569
1985	667,740	42,441	0	1,540,611	11,403,920	48,100	69,320	644,383	14,416,515
1986	745,447	45,362	0	1,714,679	12,925,113	55,946	77,115	1,469,725	17,033,387
1987	762,180	44,485	0	1,766,065	13,410,817	59,314	77,108	1,503,601	17,623,570
1988	827,669	46,411	0	1,916,790	14,707,763	61,882	83,540	1,633,680	19,277,735
1989	921,621	49,728	0	2,125,033	16,312,361	66,304	92,825	1,821,693	21,389,565
1990	964,288	50,136	0	1,998,766	17,276,959	66,848	95,259	1,980,383	22,432,639
1991	1,023,374	53,208	0	2,121,239	18,335,590	70,944	101,096	2,101,729	23,807,180
1992	1,169,299	60,795	0	2,727,688	20,646,125	81,061	115,511	2,401,419	27,201,898
1993	1,172,060	60,939	0	2,734,129	20,694,874	81,252	115,784	2,407,089	27,266,127
1994	1,123,198	58,398	0	2,156,809	20,295,455	77,865	110,957	2,306,739	26,129,421
1995	1,202,009	62,497	0	2,803,995	21,223,694	83,328	118,743	2,468,598	27,962,864
1996	534,818	69,191	0	2,756,635	19,492,814	81,921	102,219	2,426,904	25,464,502
1997	1,208,521	67,162	0	3,047,908	22,148,973	90,576	129,072	2,683,338	29,375,550
1998	1,216,671	77,807	0	2,726,511	22,070,376	91,188	129,942	2,820,148	29,132,643
1999	1,258,233	69,974	0	2,819,648	22,824,299	94,303	134,381	2,793,715	29,994,553
2000	1,278,056	70,943	0	3,223,279	21,220,235	95,788	136,498	2,837,730	28,862,529
2001	1,278,336	71,058	0	2,864,700	21,110,372	95,809	136,528	2,838,352	28,395,155
2002	1,393,975	72,121	0	3,272,056	21,060,431	97,237	138,564	2,711,156	28,745,540
2003	1,364,640	70,550	0	3,203,191	20,617,243	95,192	135,648	2,654,103	28,140,567
2004	1,494,892	77,810	0	3,845,137	22,248,916	104,277	148,595	2,897,005	30,816,632
2005	1,480,284	77,153	0	3,653,945	22,127,832	232,331	147,143	2,739,621	30,458,309
2006	1,541,885	80,379	0	3,619,232	23,235,419	242,000	153,266	2,587,429	31,459,610
2007	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2008	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2009	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2010	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2011	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2012	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2013	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2014	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2015	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2016	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2017	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2018	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2019	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2020	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2021	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2022	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2023	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2024	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2025	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2026	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2027	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2028	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2029	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2030	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2031	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2032	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2033	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2034	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
2035	1,492,106	77,741	0	3,502,388	22,485,282	242,123	148,318	2,495,959	30,443,917
TOTAL	73,813,295	4,118,728	0	170,231,671	1,159,247,377	9,440,045	7,556,243	133,969,105	1,558,376,464

TABLE B-21. Total Delta Water Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	13,060	0	0	0	0	0	0	0	0
1969	0	17,804	0	0	0	0	0	0	0	0
1970	0	37,905	0	0	0	0	0	0	0	0
1971	0	48,508	0	0	0	0	0	0	0	0
1972	160,756	74,751	41,797	4,662	64,303	1,367	67,518	13,021	369,739	85,202
1973	222,207	107,163	51,552	7,279	79,994	2,577	95,104	26,131	54,908	14,338
1974	279,090	143,266	59,539	10,791	93,030	3,721	121,869	39,631	465,150	114,427
1975	319,822	166,307	63,964	13,250	100,515	4,752	140,722	50,989	479,733	119,705
1976	431,018	207,673	74,449	17,045	117,550	6,269	174,366	67,591	538,772	137,142
1977	469,922	226,502	79,144	19,079	122,180	6,861	189,848	77,255	540,410	139,097
1978	600,180	274,819	97,313	24,428	147,413	9,687	236,913	98,345	631,768	165,313
1979	720,173	320,077	115,033	29,836	171,470	11,889	284,640	117,285	714,457	189,760
1980	857,818	376,845	134,920	35,949	210,736	14,256	337,177	138,590	811,952	215,694
1981	1,355,100	592,631	218,713	57,637	343,292	22,946	534,813	211,396	1,237,658	330,644
1982	1,551,434	664,082	254,298	66,408	400,739	26,335	313,057	235,100	1,341,923	364,482
1983	1,110,994	472,521	184,283	47,759	291,367	19,002	434,517	163,925	943,775	252,096
1984	450,405	509,602	202,914	52,247	321,718	20,719	472,282	174,500	1,003,760	266,383
1985	565,881	591,346	240,344	61,540	381,970	24,474	551,734	200,605	1,152,983	308,405
1986	635,066	659,259	275,347	70,160	438,498	27,822	625,994	223,785	1,285,253	350,799
1987	652,450	676,176	288,131	73,104	467,095	29,064	648,002	228,654	1,319,729	364,779
1988	711,641	742,582	319,496	80,756	525,996	32,024	711,641	248,146	1,438,752	402,232
1989	2,083,593	830,453	362,565	91,333	605,021	36,301	803,932	276,155	1,607,864	454,180
1990	2,207,667	869,029	386,049	96,930	636,731	38,438	848,974	289,119	1,696,277	481,308
1991	2,454,678	961,298	409,704	102,869	675,746	40,793	900,994	306,835	1,819,725	510,800
1992	2,804,695	1,098,371	468,125	117,538	772,102	46,610	1,029,469	350,587	2,079,203	583,636
1993	2,811,318	1,100,964	469,230	117,815	773,925	46,720	1,031,900	351,415	2,084,113	585,014
1994	2,694,116	1,055,065	449,668	112,905	741,661	44,772	988,880	336,766	1,997,227	560,625
1995	2,883,156	1,129,097	481,220	120,826	793,702	47,914	1,058,269	360,394	2,137,369	599,963
1996	2,834,460	1,110,027	473,093	118,785	780,296	47,104	1,040,394	354,307	2,101,269	589,830
1997	3,133,957	1,227,316	523,081	131,336	862,744	52,082	1,150,325	391,745	2,323,295	652,153
1998	3,155,093	1,235,593	526,609	132,222	868,562	52,433	1,728,006	394,387	2,338,963	656,551
1999	3,262,870	1,277,800	544,598	136,739	898,233	54,224	1,787,034	407,859	2,418,863	678,979
2000	3,314,278	2,279,763	553,178	138,893	912,384	55,078	1,815,190	510,073	2,456,972	689,676
2001	3,315,004	2,280,263	553,299	138,924	912,584	55,090	1,815,587	510,185	2,457,510	689,827
2002	3,437,351	2,314,256	561,548	140,995	926,188	55,912	1,842,654	517,791	2,494,146	700,112
2003	3,365,016	2,265,555	549,731	138,028	906,698	54,735	1,803,877	506,894	2,441,659	685,379
2004	3,686,201	2,481,798	602,201	151,202	993,241	59,960	1,976,053	555,277	2,674,711	750,797
2005	3,650,179	2,457,547	596,316	149,725	983,535	59,374	2,018,049	549,850	2,648,574	743,459
2006	3,802,076	2,559,814	3,256,234	155,955	1,344,441	61,844	2,038,172	572,731	2,758,791	774,398
2007	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2008	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2009	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2010	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2011	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2012	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2013	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2014	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2015	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2016	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2017	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2018	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2019	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2020	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2021	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2022	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2023	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2024	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2025	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2026	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2027	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2028	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2029	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2030	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2031	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2032	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2033	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2034	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
2035	3,679,329	2,477,172	3,151,109	150,920	1,301,036	59,848	1,972,370	554,241	2,669,726	749,397
TOTAL	172,690,206	107,294,876	105,849,847	7,341,630	57,395,704	2,908,741	88,816,686	25,930,308	132,289,307	36,939,698

TABLE B-21. Total Delta Water Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	241,150
1968	0	0	0	13,060	0	1,050	875	1,925	0	583,631
1969	0	0	0	17,804	0	1,225	929	2,154	0	827,578
1970	0	0	0	37,905	0	3,848	1,995	5,843	0	2,160,886
1971	0	0	0	48,508	0	4,546	3,186	7,732	0	2,696,792
1972	0	2,043,211	0	2,926,327	0	4,929	3,778	8,707	0	7,206,052
1973	0	2,317,893	0	2,979,146	0	7,059	4,444	11,503	0	7,456,998
1974	0	4,231,933	0	5,562,447	0	8,336	4,931	13,267	0	10,683,514
1975	0	5,073,286	0	6,533,045	0	9,416	5,117	14,533	0	12,440,851
1976	0	6,422,167	0	8,194,042	0	7,004	5,780	12,784	0	15,299,760
1977	0	7,104,278	0	8,974,576	0	16,917	5,827	22,744	0	15,869,924
1978	0	9,016,389	0	11,302,568	0	12,635	6,844	19,479	0	19,425,531
1979	0	10,935,192	0	13,609,812	0	16,575	7,773	24,348	0	23,095,855
1980	84,294	13,102,796	12,396	16,333,423	0	19,834	8,801	28,635	0	27,557,096
1981	140,930	20,910,099	36,136	25,991,995	0	21,682	13,370	35,052	0	43,335,911
1982	167,929	23,998,560	57,248	29,441,595	0	16,117	14,694	30,811	0	49,027,703
1983	124,148	17,203,307	50,672	21,298,366	0	15,202	10,134	25,336	0	34,186,736
1984	138,982	18,766,458	64,344	22,444,314	20,590	15,442	10,681	46,713	0	37,051,405
1985	166,935	22,050,974	84,882	26,382,073	24,050	16,976	12,166	53,192	0	43,235,458
1986	195,056	25,089,658	120,965	29,997,662	31,753	18,145	13,457	63,355	0	49,817,447
1987	207,598	26,095,043	148,284	31,198,109	37,071	17,794	13,642	68,507	0	51,663,899
1988	233,604	28,781,238	201,116	34,429,224	46,722	18,565	14,852	80,139	0	57,062,086
1989	268,530	32,505,376	265,215	40,190,518	61,184	19,891	16,576	97,651	0	65,617,116
1990	289,119	33,616,369	334,242	41,790,252	63,506	20,055	17,381	100,942	0	68,658,631
1991	306,835	35,676,185	354,722	44,521,184	170,267	21,283	19,155	210,705	0	73,265,317
1992	350,587	40,763,329	405,303	50,869,555	194,545	24,318	22,697	241,560	0	83,873,685
1993	351,415	40,859,579	406,260	50,989,668	195,005	24,376	23,563	242,944	0	84,237,281
1994	336,766	39,156,173	389,323	48,863,947	186,875	23,360	23,360	233,595	0	80,866,329
1995	360,394	41,903,674	416,641	52,292,619	199,987	24,999	26,040	251,026	0	86,725,209
1996	0	41,195,923	409,604	51,055,092	196,610	24,576	26,624	247,810	0	83,007,946
1997	0	45,548,810	447,746	56,444,590	214,918	27,173	30,223	272,314	0	93,062,361
1998	0	45,855,992	450,529	57,394,940	107,459	27,356	31,537	166,352	0	93,159,618
1999	47,152	47,422,430	466,491	59,403,272	226,327	28,291	33,820	288,438	0	96,994,387
2000	71,841	48,169,576	478,942	61,445,844	229,892	69,207	35,708	334,807	0	98,699,723
2001	95,809	48,180,135	479,047	61,483,264	229,942	83,833	37,187	350,962	0	98,781,493
2002	97,237	48,898,394	486,188	62,472,772	233,371	85,083	39,185	357,639	0	100,275,854
2003	118,989	47,869,376	475,957	61,181,894	228,460	83,293	39,743	351,496	0	98,210,650
2004	156,416	52,438,420	521,386	67,047,663	250,266	92,048	0	342,314	0	107,800,851
2005	167,795	51,925,988	516,291	66,466,682	247,820	31,300	0	279,120	0	106,564,111
2006	188,222	51,397,939	537,775	69,448,392	258,133	32,607	50,485	341,225	0	111,008,812
2007	195,155	49,738,600	520,414	67,219,317	249,799	723,749	18,703	992,251	0	108,109,748
2008	450,158	49,738,600	520,414	67,474,320	249,799	723,749	52,472	1,026,020	0	108,408,278
2009	450,158	49,738,600	520,414	67,474,320	249,799	723,749	54,290	1,027,838	0	108,419,853
2010	450,158	49,738,600	520,414	67,474,320	249,799	723,749	56,108	1,029,656	0	108,431,429
2011	450,158	49,738,600	520,414	67,474,320	249,799	723,749	58,186	1,031,734	0	108,443,265
2012	450,158	49,738,600	520,414	67,474,320	249,799	723,749	60,264	1,033,812	0	108,455,101
2013	450,158	49,738,600	520,414	67,474,320	249,799	723,749	62,602	1,036,150	0	108,465,895
2014	450,158	49,738,600	520,414	67,474,320	249,799	723,749	64,940	1,038,488	0	108,479,292
2015	450,158	49,738,600	520,414	67,474,320	249,799	723,749	67,538	1,041,086	0	108,500,755
2016	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,519,615
2017	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,535,878
2018	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,552,141
2019	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,568,404
2020	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,584,016
2021	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2022	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2023	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2024	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2025	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2026	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2027	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2028	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2029	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2030	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2031	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2032	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2033	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2034	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
2035	450,158	49,738,600	520,414	67,474,320	249,799	723,749	70,135	1,043,683	0	108,586,618
TOTAL	17,466,162	2,478,945,550	23,709,711	3,257,578,426	10,898,924	21,985,067	2,534,363	35,418,354	0	5,289,008,577

TABLE B-22. Water System Revenue Bond Surcharge for Each Contractor

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County	Santa Barbara County	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	29,131	40,505	69,636	25,436	30,176	100,035	155,647	13,126	24,392	37,518
1989	48,804	69,621	118,425	43,343	51,681	170,303	265,327	26,828	49,634	76,462
1990	41,166	60,482	101,648	38,407	51,185	149,440	239,032	27,956	51,795	79,751
1991	63,389	92,401	155,790	62,470	81,991	235,712	380,173	44,887	83,709	128,596
1992	84,320	126,227	210,547	89,247	115,208	325,629	530,084	61,137	113,925	175,062
1993	90,152	137,473	227,625	98,432	125,174	347,457	571,063	67,725	126,662	194,387
1994	91,785	141,222	233,007	102,021	126,216	352,415	580,652	81,420	159,156	240,576
1995	108,311	181,787	290,098	126,000	149,378	416,955	692,333	131,674	270,727	402,401
1996	132,304	232,343	364,647	158,514	180,787	505,043	844,344	242,654	534,448	777,102
1997	135,556	237,492	373,048	171,263	187,162	522,127	880,552	141,810	846,616	988,426
1998	130,346	228,366	358,712	164,682	179,971	502,065	846,718	136,361	814,087	950,448
1999	182,507	316,416	498,923	227,072	248,031	691,830	1,166,933	188,835	1,124,110	1,312,945
2000	238,571	364,418	602,989	260,766	284,875	794,730	1,340,371	218,359	1,364,019	1,582,378
2001	234,773	358,616	593,389	561,965	280,341	782,078	1,624,384	214,883	1,342,304	1,557,187
2002	257,520	391,851	649,371	610,230	288,977	806,174	1,705,381	221,503	1,383,661	1,605,164
2003	268,151	408,027	676,178	635,422	300,907	839,455	1,775,784	230,647	1,440,782	1,671,429
2004	268,425	408,444	676,869	636,070	301,214	840,312	1,777,596	230,883	1,442,252	1,673,135
2005	253,413	385,602	639,015	610,756	284,369	793,318	1,688,443	217,970	1,361,594	1,579,564
2006	466,224	709,422	1,175,646	1,123,655	523,176	1,459,528	3,106,359	401,017	2,505,032	2,906,049
2007	466,420	709,718	1,176,138	1,124,125	523,395	1,460,139	3,107,659	401,185	2,506,080	2,907,265
2008	438,849	667,766	1,106,615	1,057,676	492,456	1,373,828	2,923,960	377,470	2,357,941	2,735,411
2009	445,514	677,908	1,123,422	1,073,741	499,936	1,394,695	2,968,372	383,204	2,393,756	2,776,960
2010	426,290	648,656	1,074,946	1,027,408	478,363	1,334,513	2,840,284	366,668	2,290,464	2,657,132
2011	460,176	700,218	1,160,394	1,109,078	516,389	1,440,595	3,066,062	395,815	2,472,535	2,868,350
2012	460,666	700,964	1,161,630	1,110,259	516,939	1,442,129	3,069,327	396,237	2,475,168	2,871,405
2013	485,554	738,834	1,224,388	1,170,242	544,867	1,520,041	3,235,150	417,644	2,608,891	3,026,535
2014	503,510	766,157	1,269,667	1,213,518	565,016	1,576,253	3,354,787	433,088	2,705,369	3,138,457
2015	529,520	805,734	1,335,254	1,276,205	594,203	1,657,677	3,528,085	455,460	2,845,120	3,300,580
2016	534,898	813,918	1,348,816	1,289,167	600,238	1,674,514	3,563,919	460,086	2,874,018	3,334,104
2017	527,034	801,952	1,328,986	1,270,214	591,414	1,649,896	3,511,524	453,322	2,831,765	3,285,087
2018	464,783	707,229	1,172,012	1,120,182	521,559	1,455,017	3,096,758	399,778	2,497,289	2,897,067
2019	501,213	762,661	1,263,874	1,207,981	562,438	1,569,061	3,339,480	431,112	2,693,025	3,124,137
2020	461,530	702,279	1,163,809	1,112,341	517,908	1,444,833	3,075,082	396,980	2,479,809	2,876,789
2021	466,529	709,884	1,176,413	1,124,388	523,517	1,460,481	3,108,386	401,279	2,506,666	2,907,945
2022	450,746	685,869	1,136,615	1,086,350	505,806	1,411,073	3,003,229	387,704	2,421,865	2,809,569
2023	450,394	685,333	1,135,727	1,085,501	505,411	1,409,971	3,000,883	387,401	2,419,974	2,807,375
2024	432,595	658,251	1,090,846	1,042,605	485,439	1,354,252	2,882,296	372,092	2,324,342	2,696,434
2025	389,979	593,405	983,384	939,895	437,617	1,220,841	2,598,353	335,436	2,095,365	2,430,801
2026	350,547	533,404	883,951	844,860	393,368	1,097,398	2,335,626	301,519	1,883,497	2,185,016
2027	389,346	592,440	981,786	938,368	436,906	1,218,857	2,594,131	334,891	2,091,960	2,426,851
2028	288,127	438,423	726,550	694,419	323,323	901,990	1,919,732	247,829	1,548,111	1,795,940
2029	317,838	483,632	801,470	766,026	356,663	995,000	2,117,689	273,384	1,707,748	1,981,132
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	13,366,906	20,475,350	33,842,256	30,430,300	15,283,990	42,697,660	88,411,950	11,709,259	70,069,663	81,778,922

TABLE B-22. Water System Revenue Bond Surcharge for Each Contractor

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
				Kern County Water Agency					
	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Municipal and Industrial	Agri-cultural	County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0
1988	33,986	1,657	0	67,288	726,501	2,228	2,851	66,748	901,259
1989	59,273	2,785	0	116,689	1,251,452	3,733	4,927	116,736	1,555,595
1990	53,349	2,419	0	287,811	947,351	3,248	4,367	109,118	1,407,663
1991	82,252	3,731	0	359,380	1,564,983	5,035	6,771	168,217	2,190,369
1992	112,566	5,127	0	452,691	2,153,423	6,927	9,285	230,217	2,970,236
1993	119,670	5,459	0	272,449	2,491,672	7,381	9,894	244,813	3,151,338
1994	118,265	5,379	0	244,671	2,485,820	7,300	9,766	241,933	3,113,134
1995	139,227	6,339	0	317,885	2,894,182	8,598	11,490	284,798	3,662,519
1996	169,333	7,703	0	354,341	2,722,241	10,460	13,978	346,366	3,624,422
1997	165,364	7,980	0	366,285	2,673,847	10,826	14,465	357,986	3,596,753
1998	159,011	7,672	0	352,211	2,571,110	10,410	13,909	344,232	3,458,555
1999	218,784	10,373	0	485,897	3,371,115	14,376	19,166	476,017	4,595,728
2000	251,339	11,735	0	557,296	3,620,348	16,500	21,990	546,406	5,025,614
2001	247,338	11,547	0	548,424	3,461,158	16,238	21,640	537,707	4,844,052
2002	273,542	11,904	0	565,321	3,496,023	16,737	22,306	521,659	4,907,492
2003	284,834	12,395	0	588,659	3,640,346	17,428	23,227	543,193	5,110,082
2004	285,125	12,408	0	589,259	3,644,059	17,446	23,251	543,748	5,115,296
2005	269,179	11,714	0	556,305	3,431,851	39,485	21,951	488,483	4,818,968
2006	495,230	21,551	0	1,023,478	6,313,845	72,643	40,384	814,866	8,781,997
2007	495,438	21,560	0	1,023,907	6,316,488	75,257	40,401	812,623	8,785,674
2008	466,151	20,285	0	963,382	5,943,110	70,809	38,013	764,588	8,266,338
2009	473,232	20,594	0	978,014	6,033,379	71,884	38,590	776,201	8,391,894
2010	452,811	19,705	0	935,812	5,773,035	68,782	36,925	742,707	8,029,777
2011	488,806	21,271	0	1,010,201	6,231,938	74,250	39,860	801,746	8,668,072
2012	489,326	21,294	0	1,011,277	6,238,574	74,329	39,903	802,600	8,677,303
2013	515,763	22,444	0	1,065,912	6,575,620	78,345	42,058	845,961	9,146,103
2014	534,836	23,274	0	1,105,330	6,818,788	81,242	43,614	877,245	9,484,329
2015	562,464	24,477	0	1,162,428	7,171,028	85,438	45,867	922,561	9,974,263
2016	568,177	24,725	0	1,174,234	7,243,862	86,306	46,333	931,931	10,075,568
2017	559,824	24,362	0	1,156,971	7,137,366	85,037	45,651	918,230	9,927,441
2018	493,700	21,484	0	1,020,315	6,294,331	74,993	40,259	809,773	8,754,855
2019	532,395	23,168	0	1,100,286	6,787,676	80,871	43,415	873,242	9,441,053
2020	490,244	21,334	0	1,013,173	6,250,274	74,468	39,977	804,105	8,693,575
2021	495,553	21,565	0	1,024,146	6,317,964	75,275	40,410	812,813	8,787,726
2022	478,789	20,835	0	989,499	6,104,228	72,728	39,043	785,316	8,490,438
2023	478,415	20,819	0	988,726	6,099,461	72,671	39,013	784,702	8,483,807
2024	459,509	19,996	0	949,654	5,858,424	69,800	37,471	753,693	8,148,547
2025	414,242	18,026	0	856,101	5,281,295	62,923	33,780	679,444	7,345,811
2026	372,356	16,204	0	769,538	4,747,289	56,561	30,364	610,744	6,603,056
2027	413,568	17,997	0	854,710	5,272,713	62,821	33,725	678,340	7,333,874
2028	306,053	13,318	0	632,510	3,901,961	46,489	24,957	501,992	5,427,280
2029	337,612	14,692	0	697,733	4,304,320	51,283	27,531	553,756	5,986,927
2030	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0
TOTAL	14,416,931	633,307	0	30,590,199	192,164,451	1,939,561	1,182,778	24,827,556	265,754,783

TABLE B-22. Water System Revenue Bond Surcharge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	64,266	57,111	27,032	7,656	44,492	2,154	55,996	16,240	151,182	39,907
1989	205,668	98,720	46,993	13,263	78,104	3,763	97,138	27,981	259,860	69,104
1990	185,010	87,808	42,449	11,905	69,970	3,385	87,327	24,956	231,650	61,851
1991	296,854	140,371	65,947	18,548	108,704	5,236	135,623	38,641	363,310	96,172
1992	402,015	234,421	89,358	25,192	147,297	7,053	183,813	52,160	491,537	130,372
1993	424,871	247,076	93,981	26,566	154,919	7,437	193,361	55,045	517,379	137,298
1994	424,023	247,222	94,502	26,865	155,776	7,431	194,191	54,968	525,394	139,422
1995	500,083	290,999	111,729	31,823	184,169	8,769	229,530	64,852	623,848	165,594
1996	606,387	353,131	135,428	38,635	223,236	10,640	278,178	78,696	760,333	201,821
1997	626,151	362,776	139,565	39,802	230,058	10,972	286,779	81,146	808,482	207,472
1998	602,091	348,838	134,202	38,273	221,218	10,550	275,761	78,028	777,418	199,501
1999	826,108	479,470	184,524	52,650	304,166	14,475	642,815	107,060	1,041,566	277,200
2000	940,325	1,150,965	210,453	60,212	346,906	16,486	736,157	121,898	1,191,538	316,860
2001	925,355	1,132,642	207,102	59,254	341,384	16,224	724,438	135,581	1,172,568	311,816
2002	974,814	1,167,539	213,483	61,079	351,902	16,724	746,758	139,071	1,208,696	321,423
2003	1,015,056	1,215,738	222,296	63,601	366,429	17,415	777,586	144,812	1,258,593	334,692
2004	1,016,092	1,216,978	222,523	63,666	366,803	17,432	778,379	144,960	1,259,877	335,033
2005	959,268	1,148,920	210,078	60,105	346,290	16,457	734,849	136,853	1,189,420	316,297
2006	1,764,840	2,113,756	2,063,426	110,581	852,281	30,278	1,351,959	251,779	2,188,268	581,916
2007	1,765,578	2,114,641	2,064,289	110,627	852,637	30,290	1,352,525	251,885	2,189,184	582,159
2008	1,661,212	1,989,641	1,942,266	104,087	802,237	28,500	1,272,575	236,995	2,059,777	547,747
2009	1,686,444	2,019,862	1,971,767	105,668	814,422	28,933	1,291,904	240,595	2,091,063	556,067
2010	1,613,673	1,932,703	1,886,684	101,109	779,279	27,684	1,236,157	230,213	2,000,833	532,072
2011	1,741,945	2,086,335	2,036,658	109,146	841,224	29,885	1,334,420	248,513	2,159,880	574,367
2012	1,743,800	2,088,557	2,038,826	109,262	842,120	29,917	1,335,841	248,778	2,162,180	574,978
2013	1,838,010	2,201,394	2,148,976	115,165	887,616	31,533	1,408,011	262,218	2,278,994	606,042
2014	1,905,981	2,282,802	2,228,446	119,424	920,441	32,699	1,460,080	271,915	2,363,272	628,454
2015	2,004,438	2,400,725	2,343,561	125,593	967,988	34,388	1,535,504	285,961	2,485,352	660,918
2016	2,024,797	2,425,108	2,367,364	126,869	977,820	34,737	1,551,100	288,866	2,510,595	667,631
2017	1,995,029	2,389,456	2,332,560	125,004	963,444	34,227	1,528,296	284,619	2,473,686	657,816
2018	1,759,385	2,107,223	2,057,048	110,239	849,646	30,184	1,347,780	251,001	2,181,504	580,117
2019	1,897,284	2,272,386	2,218,278	118,879	916,241	32,550	1,453,418	270,674	2,352,489	625,586
2020	1,747,070	2,092,474	2,042,650	109,467	843,699	29,973	1,338,346	249,244	2,166,235	576,057
2021	1,765,991	2,115,135	2,064,772	110,653	852,837	30,297	1,352,841	251,943	2,189,695	582,295
2022	1,706,248	2,043,581	1,994,921	106,909	823,985	29,272	1,307,074	243,420	2,115,618	562,596
2023	1,704,915	2,041,985	1,993,363	106,826	823,342	29,250	1,306,053	243,230	2,113,966	562,157
2024	1,637,541	1,961,290	1,914,590	102,604	790,805	28,094	1,254,441	233,618	2,030,427	539,942
2025	1,476,222	1,768,078	1,725,978	92,496	712,901	25,326	1,130,863	210,604	1,830,404	486,751
2026	1,326,957	1,589,303	1,551,460	83,144	640,818	22,765	1,016,518	189,309	1,645,327	437,534
2027	1,473,823	1,765,205	1,723,173	92,346	711,742	25,285	1,129,025	210,262	1,827,430	485,960
2028	1,090,672	1,306,303	1,275,199	68,339	526,710	18,712	835,511	155,600	1,352,351	359,624
2029	1,203,139	1,441,005	1,406,693	75,386	581,023	20,641	921,667	171,645	1,491,802	396,708
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	51,529,431	58,529,673	49,844,593	3,238,918	23,617,081	888,023	38,210,588	7,285,835	64,092,983	17,027,329

TABLE B-22. Water System Revenue Bond Surcharge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	24,019	2,642,354	18,118	3,150,527	1,336	552	853	2,741	0	4,317,328
1989	42,040	4,587,641	34,565	5,564,840	0	918	1,454	2,372	0	7,583,021
1990	38,023	4,037,980	34,994	4,917,308	2,535	800	1,283	4,618	0	6,750,020
1991	59,122	6,259,893	54,115	7,642,536	9,945	1,243	2,027	13,215	0	10,510,679
1992	80,131	8,435,312	72,892	10,351,553	13,671	1,710	2,806	18,187	0	14,255,669
1993	84,371	8,885,273	76,858	10,904,435	14,608	1,827	3,026	19,461	0	15,068,309
1994	85,698	8,926,755	76,794	10,959,041	14,409	1,801	3,070	19,280	0	15,145,690
1995	101,792	10,539,433	90,436	12,943,057	16,957	2,119	3,704	22,780	0	18,013,188
1996	124,074	12,810,361	109,783	15,730,703	20,640	2,580	4,621	27,841	0	21,369,059
1997	28,259	13,168,230	112,960	16,102,652	21,382	2,674	4,872	28,928	0	21,970,359
1998	27,174	12,662,268	108,619	15,483,941	20,562	2,571	4,685	27,818	0	21,126,192
1999	53,545	17,454,651	149,123	21,587,353	28,348	3,543	6,765	38,656	0	29,200,538
2000	70,117	19,805,800	168,259	25,135,976	32,271	9,794	7,996	50,061	0	33,737,389
2001	69,001	19,490,499	165,580	24,751,444	31,757	9,638	7,869	49,264	0	33,419,720
2002	71,126	20,091,004	170,682	25,534,301	32,736	9,935	8,112	50,783	0	34,452,492
2003	74,063	20,920,403	177,728	26,588,412	34,087	10,345	8,446	52,878	0	35,874,763
2004	74,138	20,941,743	177,910	26,615,534	34,121	10,356	8,456	52,933	0	35,911,363
2005	69,992	19,770,593	167,960	25,127,082	32,213	9,776	7,983	49,972	0	33,903,044
2006	128,769	34,565,228	309,009	46,312,090	59,265	17,986	14,686	91,937	0	62,374,078
2007	128,823	34,579,696	309,139	46,331,473	59,290	17,994	14,692	91,976	0	62,400,185
2008	121,208	32,535,632	290,865	43,592,742	55,785	16,930	13,824	86,539	0	58,711,605
2009	123,049	33,029,814	295,283	44,254,871	56,633	17,187	14,034	87,854	0	59,603,373
2010	117,740	31,604,556	282,541	42,345,244	54,189	16,446	13,428	84,063	0	57,031,446
2011	127,099	34,116,825	305,001	45,711,298	58,497	17,753	14,495	90,745	0	61,564,921
2012	127,234	34,153,155	305,325	45,759,973	58,559	17,772	14,511	90,842	0	61,630,480
2013	134,108	35,998,315	321,821	48,232,203	61,723	18,732	15,295	95,750	0	64,960,129
2014	139,068	37,329,538	333,722	50,015,842	64,005	19,425	15,860	99,290	0	67,362,372
2015	146,251	39,257,886	350,961	52,599,526	67,311	20,428	16,680	104,419	0	70,842,127
2016	147,737	39,656,614	354,526	53,133,764	67,995	20,636	16,849	105,480	0	71,561,651
2017	145,565	39,073,603	349,314	52,352,619	66,995	20,332	16,601	103,928	0	70,509,585
2018	128,371	34,458,396	308,054	46,168,948	59,082	17,931	14,641	91,654	0	62,181,294
2019	138,433	37,159,223	332,199	49,787,640	63,713	19,336	15,788	98,837	0	67,055,021
2020	127,473	34,217,205	305,898	45,845,791	58,669	17,805	14,538	91,012	0	61,746,058
2021	128,853	34,587,775	309,211	46,342,298	59,304	17,998	14,696	91,998	0	62,414,766
2022	124,494	33,417,678	298,750	44,774,546	57,298	17,389	14,198	88,885	0	60,303,282
2023	124,397	33,391,581	298,517	44,739,582	57,253	17,375	14,187	88,815	0	60,256,189
2024	119,481	32,072,021	286,720	42,971,574	54,991	16,689	13,627	85,307	0	57,875,004
2025	107,711	28,912,517	258,475	38,738,326	49,573	15,045	12,284	76,902	0	52,173,577
2026	96,820	25,989,098	232,340	34,821,393	44,561	13,524	11,042	69,127	0	46,898,169
2027	107,536	28,865,534	258,055	38,675,376	49,493	15,020	12,264	76,777	0	52,088,795
2028	79,580	21,361,337	190,968	28,620,906	36,626	11,115	9,076	56,817	0	38,547,225
2029	87,786	23,564,050	210,660	31,572,205	40,403	12,262	10,012	62,677	0	42,522,100
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	4,134,271	1,025,327,470	9,064,730	1,352,790,925	1,722,791	495,292	425,336	2,643,419	0	1,825,222,255

TABLE B-23. Total Transportation and Delta Water Charge for Each Contractor

(in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa County FC&WCD	Solano County WA	Total	Alameda County FC&WCD, Zone 7	Alameda County Water District	Santa Clara Valley Water District	Total	San Luis Obispo County FC&WCD	Santa Barbara County FC&WCD	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	11,750	43,787	21,132	76,669	0	0	0
1963	0	0	0	199,673	190,236	447,594	837,503	0	0	0
1964	0	0	0	263,210	277,398	621,174	1,161,782	6,694	21,659	28,353
1965	0	0	0	373,722	404,239	1,157,791	1,935,752	13,751	36,017	49,768
1966	18,057	0	18,057	419,362	421,628	1,412,600	2,253,590	26,516	61,329	87,845
1967	41,560	0	41,560	552,988	548,387	1,862,808	2,964,183	56,450	118,225	174,675
1968	128,588	0	128,588	682,759	633,066	2,178,036	3,493,861	115,927	229,740	345,667
1969	254,662	0	254,662	817,355	583,307	2,298,276	3,698,938	185,117	358,783	543,900
1970	277,493	0	277,493	903,666	640,164	2,787,493	4,331,323	200,110	387,595	587,705
1971	227,419	0	227,419	845,130	675,059	2,806,542	4,326,731	202,372	392,830	595,202
1972	224,922	0	224,922	929,119	822,262	3,027,272	4,778,653	209,015	406,506	615,521
1973	221,035	31,353	252,388	915,555	716,357	3,120,308	4,752,220	206,516	402,639	609,155
1974	240,442	32,924	273,366	956,141	746,798	3,324,543	5,027,482	208,503	407,005	615,508
1975	237,400	36,276	273,676	1,014,516	792,919	3,213,566	5,021,001	225,853	439,786	665,639
1976	271,231	40,819	312,050	1,127,567	943,328	3,362,062	5,432,957	228,933	447,212	676,145
1977	293,565	45,078	338,643	1,096,181	922,067	3,302,979	5,321,227	238,656	468,632	707,288
1978	273,807	49,159	322,966	1,184,963	935,682	3,712,097	5,832,742	245,286	484,166	729,452
1979	289,415	53,320	342,735	1,281,524	1,009,429	3,819,046	6,109,999	243,064	483,342	726,406
1980	310,779	86,049	396,827	1,434,484	1,173,659	4,118,582	6,726,725	282,208	540,456	822,664
1981	347,710	112,817	460,527	1,542,998	1,348,984	4,507,072	7,399,054	307,018	596,566	903,584
1982	438,260	141,798	580,058	1,623,310	1,369,396	4,940,901	7,933,607	328,168	682,443	1,010,611
1983	354,703	163,242	517,946	1,493,581	1,259,998	4,909,747	7,663,326	357,171	701,981	1,059,152
1984	467,232	246,623	713,856	1,803,603	1,478,252	6,869,751	10,151,606	409,482	800,953	1,210,435
1985	735,929	386,187	1,122,116	2,301,425	2,224,952	7,795,981	12,322,358	500,648	969,826	1,470,474
1986	1,119,826	714,023	1,833,849	2,170,037	2,013,959	8,193,339	12,377,335	536,703	1,037,924	1,574,627
1987	1,773,371	1,581,733	3,355,104	2,666,542	2,505,517	7,979,748	13,151,807	570,595	1,148,862	1,719,457
1988	2,349,015	2,524,068	4,873,083	2,727,700	2,774,284	7,829,776	13,331,760	673,019	1,439,487	2,112,506
1989	2,548,170	3,700,620	6,248,790	2,711,651	2,515,323	7,578,335	12,805,309	772,517	1,814,603	2,587,120
1990	2,899,410	3,848,146	6,747,556	3,146,946	2,929,625	8,354,874	14,431,445	933,311	2,046,195	2,979,506
1991	2,940,701	4,169,425	7,110,126	2,418,874	2,384,093	6,430,306	11,233,273	979,649	2,366,642	3,346,291
1992	2,797,105	4,144,190	6,941,295	2,893,339	2,926,955	7,656,397	13,476,691	1,118,743	2,526,627	3,645,370
1993	2,854,875	4,171,687	7,026,562	3,750,112	2,977,192	8,849,446	15,576,750	1,185,596	2,725,769	3,911,365
1994	2,987,315	4,224,488	7,211,803	3,787,188	3,586,085	9,612,974	16,986,247	1,335,886	3,517,571	4,853,457
1995	2,960,697	4,404,411	7,365,108	4,035,839	3,313,187	8,393,270	15,742,296	1,647,663	6,194,234	7,841,897
1996	3,044,394	4,897,402	7,941,796	3,643,676	3,178,232	9,227,992	16,049,900	2,591,704	15,229,004	17,820,708
1997	3,027,378	4,733,999	7,761,378	3,870,184	3,145,383	9,337,452	16,353,019	3,002,323	23,731,433	26,733,756
1998	2,935,964	4,589,687	7,525,651	3,479,657	3,204,049	9,084,654	15,768,360	3,255,725	28,306,094	31,561,819
1999	3,153,293	5,067,870	8,221,163	4,165,792	3,670,900	11,379,341	19,216,033	3,804,992	29,596,993	33,401,985
2000	3,461,761	5,620,694	9,082,455	5,803,535	3,595,950	10,225,069	19,624,554	3,778,512	30,647,422	34,425,934
2001	4,077,160	6,366,877	10,444,037	7,651,552	4,082,226	12,197,421	23,931,199	4,325,809	32,645,829	36,971,638
2002	4,321,849	6,558,581	10,880,431	7,516,120	4,075,428	13,130,226	24,721,774	4,052,063	32,381,776	36,433,839
2003	4,439,385	6,903,912	11,343,297	7,318,008	3,793,122	11,898,495	23,009,625	4,127,842	32,669,250	36,797,092
2004	4,978,166	7,445,546	12,423,712	8,339,005	4,188,611	11,596,368	24,123,984	4,202,089	33,271,428	37,473,517
2005	4,342,639	6,733,122	11,075,761	8,547,630	4,429,619	12,563,864	25,541,113	4,326,481	33,535,756	37,862,237
2006	5,404,676	8,054,544	13,459,220	9,985,053	5,411,710	14,030,529	29,427,292	6,540,850	35,367,522	41,908,372
2007	5,848,062	8,393,468	14,241,530	11,174,098	5,799,103	14,843,893	31,817,094	4,829,200	39,158,912	43,988,112
2008	6,421,045	8,727,866	15,148,911	12,565,807	6,251,266	16,109,489	34,926,562	7,310,198	38,062,792	45,372,990
2009	5,812,790	6,934,437	12,747,227	12,596,124	6,355,237	16,054,638	35,005,999	7,595,729	37,371,329	44,967,058
2010	5,844,232	6,939,072	12,783,304	12,887,374	6,506,005	16,373,494	35,766,873	7,765,319	37,632,168	45,397,487
2011	5,843,122	7,010,531	12,853,653	12,138,444	6,079,057	16,924,630	35,142,131	7,488,932	37,288,946	44,777,878
2012	5,887,622	7,038,216	12,925,838	12,200,607	6,108,434	17,008,116	35,317,157	7,588,203	37,498,706	45,086,909
2013	5,907,386	7,063,465	12,970,851	12,133,857	6,058,138	16,772,208	34,964,203	7,612,043	37,637,891	45,249,934
2014	5,911,525	7,062,771	12,974,296	11,770,110	5,843,094	16,232,478	33,845,682	7,466,056	37,431,849	44,897,905
2015	5,981,481	7,105,866	13,087,347	11,848,887	5,830,991	16,058,055	33,737,933	7,514,310	37,618,232	45,132,542
2016	6,012,570	7,118,993	13,131,563	11,991,694	5,894,010	16,110,494	33,996,198	7,579,280	37,752,984	45,332,264
2017	6,006,628	7,095,729	13,102,357	11,717,336	5,761,904	15,744,152	33,223,392	7,449,559	37,485,343	44,934,902
2018	5,913,080	7,018,613	12,931,693	11,490,492	5,671,612	15,482,437	32,644,541	7,410,366	37,175,191	44,585,557
2019	5,966,085	7,094,121	13,060,206	11,696,734	5,790,910	15,778,434	33,266,078	7,550,971	37,565,909	45,116,880
2020	5,910,229	6,987,342	12,897,571	11,277,689	5,588,650	15,244,973	32,111,312	7,295,188	36,949,385	44,244,573
2021	5,922,501	6,997,650	12,920,151	11,274,666	5,586,785	15,245,045	32,106,496	7,298,728	36,974,344	44,273,072
2022	5,872,909	6,945,831	12,818,740	11,066,065	5,483,946	14,972,246	31,522,257	7,158,285	36,657,074	43,815,359
2023	5,872,820	6,912,267	12,785,087	11,141,832	5,523,718	15,065,579	31,731,129	7,188,285	36,708,000	43,896,285
2024	5,886,147	6,913,931	12,800,078	11,293,388	5,600,364	15,258,851	32,152,603	7,311,225	36,863,815	44,175,040
2025	5,824,495	6,838,267	12,662,762	10,971,590	5,439,695	14,850,625	31,261,910	7,184,872	36,472,290	43,657,162
2026	5,785,473	6,777,366	12,562,839	11,123,044	5,522,942	15,033,756	31,679,742	7,243,665	36,424,732	43,668,397
2027	5,808,405	6,823,063	12,631,468	11,057,118	5,485,134	14,952,781	31,495,033	7,192,453	36,480,294	43,672,747
2028	5,707,576	6,666,424	12,374,000	10,804,578	5,367,961	14,620,004	30,792,543	7,124,852	35,963,791	43,088,643
2029	5,721,333	6,697,599	12,418,932	10,822,110	5,372,666	14,645,866	30,840,642	7,093,626	36,018,603	43,112,229
2030	5,398,769	6,203,443	11,602,212	10,112,204	5,044,250	13,722,097	28,878,551	6,853,752	34,366,134	41,219,886
2031	5,372,110	6,175,000	11,547,110	9,967,944	4,970,215	13,538,115	28,476,274	6,776,258	34,215,943	40,992,201
2032	5,375,357	6,165,718	11,541,075	10,102,077	5,037,758	13,709,070	28,848,905	6,862,299	34,371,981	41,234,280
2033	5,396,449	6,165,370	11,561,819	10,320,059	5,145,651	13,992,958	29,458,668	7,051,766	34,722,759	41,774,525
2034	5,284,035	6,054,952	11,338,987	10,122,661	5,046,860	13,736,528	28,906,049	6,899,006	34,442,568	41,341,574
2035	5,113,096	5,887,668	11,000,764	10,107,780	5,043,883	13,706,989	28,858,652	6,859,510	34,365,642	41,225,152
TOTAL	241,678,691	301,695,710	543,374,401	452,179,392	254,073,043	722,955,230	1,429,207,665	267,113,466	1,423,315,719	1,690,429,185

TABLE B-23. Total Transportation and Delta Water Charge for Each Contractor

(in dollars)

SAN JOAQUIN VALLEY AREA									
				Kern County Water Agency					
Calendar Year	Dudley Ridge Water District	Empire West Side Irrigation District	Future Contractor San Joaquin Valley	Municipal and Industrial	Agri-cultural	County of Kings	Oak Flat Water District	Tulare Lake Basin Water Storage District	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	2,724	0	0	0	0	0	2,724
1965	0	0	6,027	73,543	0	0	0	0	79,570
1966	0	0	12,035	137,285	0	0	0	0	149,320
1967	0	0	26,249	267,525	0	0	0	0	293,774
1968	224,863	19,355	54,573	445,315	1,707,907	16,944	19,621	307,144	2,795,722
1969	241,040	10,858	87,557	524,952	2,725,665	16,821	19,353	458,146	4,084,393
1970	306,153	34,294	94,656	573,846	3,874,807	21,431	30,373	520,792	5,456,353
1971	327,556	37,022	95,676	605,729	5,194,583	27,171	34,653	712,014	7,034,405
1972	381,217	40,283	98,769	631,452	7,160,048	26,469	63,760	1,983,416	10,385,415
1973	398,531	38,905	97,531	1,025,724	7,288,944	28,813	39,235	781,297	9,698,980
1974	506,825	40,119	98,440	1,144,626	7,998,836	29,540	42,529	1,041,211	10,902,126
1975	679,255	40,568	106,683	1,197,000	9,378,180	31,236	48,144	1,554,104	13,035,170
1976	718,929	43,089	108,064	1,323,673	10,621,999	32,663	52,075	1,440,444	14,340,936
1977	579,202	39,006	112,534	1,367,237	10,935,227	34,430	54,184	1,136,448	14,258,267
1978	697,714	36,029	115,500	1,565,715	13,267,022	38,924	58,998	1,170,331	16,950,233
1979	780,939	47,842	114,232	1,668,782	15,342,234	43,061	70,589	1,724,129	19,791,809
1980	961,857	49,577	125,929	1,770,094	16,980,862	48,017	94,886	1,670,360	21,701,583
1981	1,210,796	83,943	134,147	2,430,626	22,581,643	66,491	100,598	2,281,316	28,889,561
1982	1,246,912	70,137	135,036	2,523,486	24,975,869	70,658	108,243	2,275,922	31,406,263
1983	1,181,152	52,487	149,180	2,084,871	24,620,691	75,438	87,400	506,508	28,757,728
1984	1,490,607	28,469	164,483	3,396,201	33,347,123	94,317	121,380	1,539,693	40,182,273
1985	1,766,381	129,899	184,883	3,891,023	39,315,432	117,579	139,459	2,814,739	48,359,395
1986	2,008,191	79,276	180,423	4,079,656	43,415,702	136,711	153,113	3,651,450	53,704,522
1987	1,883,365	95,194	179,850	4,570,657	42,685,043	137,328	151,352	3,744,261	53,447,050
1988	1,968,313	109,572	193,712	4,734,317	44,620,432	138,274	146,509	3,898,655	55,809,784
1989	2,122,936	101,699	187,891	4,677,170	46,811,366	137,082	166,333	4,379,959	58,584,436
1990	1,882,977	86,903	221,368	4,827,701	45,586,813	121,149	148,635	3,957,759	56,833,305
1991	1,687,849	80,192	220,258	4,535,666	37,462,468	103,904	134,645	3,498,769	47,723,752
1992	2,233,468	105,011	241,431	5,549,954	48,659,564	143,779	175,628	4,537,599	61,646,434
1993	2,455,623	120,014	264,933	5,805,843	54,560,731	161,518	195,193	5,291,453	68,855,308
1994	2,260,461	107,520	306,333	5,210,092	52,031,343	145,621	178,005	4,664,186	64,903,561
1995	2,856,907	115,436	304,270	6,621,268	60,491,427	180,796	210,338	5,522,987	76,303,430
1996	2,079,003	125,126	389,175	6,670,890	58,901,328	178,468	189,950	7,088,752	75,622,692
1997	2,790,580	100,531	276,653	6,521,729	57,769,465	138,112	212,150	4,710,883	72,520,103
1998	2,645,355	119,852	381,853	5,812,611	54,360,965	143,432	203,908	4,965,302	68,633,278
1999	2,697,215	134,246	366,504	6,357,194	57,227,682	181,837	215,880	7,274,247	74,454,804
2000	2,622,853	120,600	303,259	6,363,533	51,446,943	174,146	213,127	6,167,186	67,411,647
2001	3,293,579	145,284	327,968	6,046,016	58,539,194	191,938	258,689	6,424,177	75,226,846
2002	3,008,432	127,392	321,476	6,794,396	53,188,388	186,918	238,166	5,733,510	69,598,679
2003	3,059,898	131,038	340,003	7,048,962	55,840,685	201,424	237,144	6,035,052	72,894,206
2004	3,249,402	167,420	343,909	8,136,038	56,614,700	353,510	252,973	5,811,423	74,929,374
2005	3,849,114	178,696	356,697	7,506,113	67,920,825	696,486	251,713	6,720,787	87,480,431
2006	3,823,965	201,167	356,343	8,421,090	70,090,468	600,124	287,668	6,318,619	90,099,445
2007	4,050,598	192,452	367,989	9,225,405	72,271,152	640,680	308,813	6,632,802	93,689,891
2008	4,279,612	204,545	380,595	9,664,260	76,877,516	677,717	324,583	7,012,417	99,421,245
2009	3,966,617	188,208	363,376	9,370,322	71,327,477	631,330	303,305	6,497,063	92,647,698
2010	4,113,302	196,063	363,827	9,731,139	73,787,788	655,565	316,626	6,743,120	95,907,430
2011	3,874,631	183,247	365,305	9,113,254	69,182,673	616,220	298,951	6,342,401	89,976,682
2012	3,878,311	183,436	365,870	9,133,635	69,489,733	617,139	297,527	6,348,522	90,314,173
2013	3,980,103	188,526	366,014	9,359,503	70,873,022	633,367	307,855	6,517,878	92,226,268
2014	3,835,934	180,813	363,349	9,009,459	68,531,082	609,676	294,142	6,276,040	89,100,495
2015	3,929,203	185,449	360,236	9,146,859	69,875,767	624,534	302,896	6,431,115	90,856,059
2016	4,054,051	191,933	353,913	9,382,332	71,882,198	644,775	314,051	6,639,857	93,463,110
2017	3,933,656	185,707	339,826	8,963,914	69,933,042	625,254	303,510	6,438,699	90,723,608
2018	3,877,898	183,368	317,309	8,744,378	69,448,565	607,572	297,472	6,347,512	89,824,074
2019	4,038,889	191,453	308,520	9,057,622	71,916,941	632,667	311,690	6,615,651	93,073,433
2020	3,881,703	183,599	306,942	8,657,479	69,393,322	607,048	298,914	6,354,035	89,683,042
2021	3,876,591	183,285	305,966	8,622,945	69,321,728	606,006	298,182	6,345,293	89,559,996
2022	3,793,937	179,107	305,264	8,418,285	67,979,484	592,530	291,359	6,207,565	87,767,531
2023	3,848,068	181,946	304,618	8,542,787	68,824,512	601,297	296,515	6,298,213	88,897,956
2024	3,910,496	185,377	304,185	8,697,370	69,945,110	611,749	301,933	6,403,222	90,359,442
2025	3,727,033	176,175	303,889	8,275,519	67,251,336	582,359	284,804	6,097,739	86,698,854
2026	3,851,835	183,077	303,147	8,578,894	69,245,440	603,044	297,786	6,307,981	89,371,204
2027	3,803,892	180,198	303,325	8,451,028	68,403,305	594,695	292,546	6,226,249	88,255,238
2028	3,710,486	176,264	300,043	8,258,773	67,222,271	580,588	282,457	6,073,694	86,604,576
2029	3,702,485	175,567	300,076	8,227,173	67,001,010	578,833	284,203	6,059,217	86,328,564
2030	3,394,819	162,444	299,551	7,596,089	63,145,088	532,379	259,660	5,555,621	80,945,651
2031	3,321,520	158,601	298,766	7,405,209	62,025,846	519,996	252,533	5,432,778	79,415,249
2032	3,384,170	161,888	297,700	7,554,685	62,984,474	530,283	258,570	5,537,840	80,709,610
2033	3,459,953	165,849	297,895	7,743,463	64,476,534	542,687	263,285	5,664,511	82,614,177
2034	3,386,605	162,011	297,310	7,552,598	63,104,669	530,447	258,170	5,541,789	80,833,599
2035	3,449,337	165,297	296,054	7,707,229	64,291,698	540,296	262,475	5,646,842	82,359,228
TOTAL	178,495,150	8,629,945	17,630,077	405,131,210	3,365,555,387	22,643,293	13,871,410	314,910,696	4,326,867,168

TABLE B-23. Total Transportation and Delta Water Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley - East Kern Water Agency	Castaic Lake Water Agency	Coachella Valley Water District	Crestline - Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	33,309	0	0	0	0	0	0	0	51,711	0
1964	62,847	27,438	16,286	4,369	37,145	1,142	28,427	8,202	82,782	34,973
1965	118,565	52,989	28,459	7,191	40,756	2,081	50,300	15,217	135,023	35,333
1966	215,713	101,232	51,184	12,474	73,129	3,752	90,369	27,670	232,426	61,445
1967	417,348	210,746	98,904	23,464	141,365	7,282	175,119	54,006	433,210	115,536
1968	744,206	491,125	176,688	41,496	251,125	12,866	311,081	95,438	781,930	208,864
1969	1,072,647	742,016	264,900	61,208	370,850	18,688	458,937	138,023	1,205,472	321,659
1970	1,395,848	941,966	371,728	89,673	519,163	25,223	632,989	184,783	1,777,650	467,431
1971	1,727,773	1,136,343	503,422	128,321	712,537	31,827	857,146	231,214	2,538,403	659,218
1972	2,207,788	1,381,338	682,096	185,824	989,700	43,760	1,179,256	287,548	3,774,702	950,069
1973	2,360,340	1,429,754	829,097	190,947	1,216,863	46,049	1,270,009	313,372	4,042,999	960,784
1974	2,481,092	1,525,225	853,731	204,027	1,256,738	48,922	1,328,852	331,627	4,480,180	1,104,244
1975	2,698,796	1,616,198	900,445	219,242	1,332,005	53,231	1,414,851	355,193	4,655,321	1,207,793
1976	3,163,245	1,652,864	958,179	232,081	1,424,703	57,721	1,491,141	381,199	4,854,833	1,278,480
1977	3,145,012	1,740,705	859,286	245,063	1,267,009	54,200	1,578,494	406,543	5,110,695	1,336,049
1978	3,593,002	1,873,735	1,058,836	255,418	1,567,751	56,795	1,625,709	419,949	5,108,379	1,373,766
1979	4,266,594	1,953,504	1,144,724	267,741	1,689,966	60,273	1,801,011	449,679	5,153,276	1,341,866
1980	4,950,893	2,091,841	1,254,546	295,300	1,890,349	67,594	1,972,994	498,972	5,664,035	1,484,871
1981	5,778,625	2,561,138	1,413,847	328,765	2,140,325	100,740	2,291,039	603,182	6,478,238	1,688,045
1982	5,537,462	2,724,147	1,499,972	346,669	2,284,051	82,284	2,265,745	641,909	6,769,199	1,929,385
1983	6,287,841	2,794,693	2,021,337	380,786	3,118,525	88,372	2,461,270	658,528	6,981,081	1,808,463
1984	7,663,206	3,873,394	3,123,607	497,530	4,874,874	96,480	2,726,640	727,732	8,069,552	2,597,938
1985	9,494,182	4,339,431	3,957,883	601,872	6,209,843	103,693	2,916,561	959,565	8,909,659	2,686,498
1986	9,462,355	4,974,829	4,418,531	647,576	6,954,134	130,208	3,100,055	1,223,753	9,159,122	3,398,233
1987	9,496,466	4,832,282	4,286,505	678,027	6,830,144	240,859	3,154,460	1,254,957	10,560,620	3,398,610
1988	9,094,804	5,019,001	4,343,583	704,352	6,996,687	158,832	3,328,582	1,044,110	11,111,463	3,270,823
1989	10,985,206	5,028,306	4,050,973	691,132	6,579,291	210,621	3,409,349	1,746,666	10,828,253	3,453,364
1990	12,376,664	5,496,308	4,745,014	729,168	7,663,400	331,158	3,640,183	1,953,805	11,739,188	4,220,944
1991	9,236,278	4,610,066	3,298,997	688,804	5,277,044	221,152	4,499,612	1,639,984	11,121,092	3,642,282
1992	11,792,383	5,798,748	3,452,415	612,831	5,529,109	174,984	5,477,700	1,532,224	11,160,289	3,693,763
1993	12,205,489	5,445,406	3,656,000	617,132	5,863,795	211,890	5,368,538	1,753,869	12,123,330	4,041,978
1994	14,274,279	6,012,641	3,681,660	694,501	5,904,571	277,997	6,319,305	2,090,615	12,750,420	4,776,885
1995	14,140,578	6,387,506	4,503,309	661,742	7,259,099	212,229	5,511,821	1,952,389	12,220,505	4,480,562
1996	14,566,985	6,618,643	7,455,778	710,580	12,127,573	208,342	5,609,442	2,300,101	12,746,956	4,598,694
1997	15,136,535	6,512,295	7,071,320	750,347	8,455,419	207,872	6,031,417	2,342,092	14,414,986	4,897,092
1998	13,676,086	6,145,896	6,170,181	717,194	6,979,423	209,228	7,636,031	1,950,284	14,321,071	4,179,809
1999	15,392,624	6,644,958	5,183,512	823,182	7,122,720	213,796	8,243,073	2,350,813	15,737,693	5,114,792
2000	14,788,674	10,253,713	3,643,052	793,120	5,562,498	186,800	8,190,152	2,079,775	15,511,808	4,255,067
2001	24,849,221	15,869,263	4,683,972	995,954	7,551,916	199,053	8,875,616	3,991,805	21,437,432	4,395,648
2002	16,254,111	13,071,866	3,921,265	957,440	6,293,917	182,320	8,047,536	3,366,534	22,231,817	5,760,963
2003	17,593,494	13,984,378	4,109,892	930,633	6,603,939	187,292	9,902,296	2,911,116	20,095,911	5,931,746
2004	18,675,421	15,379,485	4,686,581	1,033,166	6,571,517	201,435	9,935,287	3,176,601	24,330,801	5,413,295
2005	20,181,040	15,026,082	18,471,934	800,300	11,908,258	198,531	10,093,257	3,414,665	22,051,488	5,845,449
2006	23,683,654	16,736,993	28,903,046	1,331,841	10,743,103	330,617	15,760,795	4,626,546	31,241,765	6,734,838
2007	22,684,050	20,302,270	40,748,663	1,592,339	13,228,376	649,617	13,037,235	5,934,438	35,150,616	6,922,951
2008	40,706,827	26,197,663	46,851,741	2,406,562	18,059,568	728,045	27,018,365	6,648,928	42,731,463	10,828,989
2009	39,857,068	23,953,541	42,833,446	2,137,839	16,315,278	661,627	26,570,043	6,030,707	39,018,234	9,794,010
2010	41,266,688	24,708,659	44,351,086	2,200,593	16,909,011	684,615	27,468,787	6,244,731	40,119,523	10,111,893
2011	35,252,265	24,192,013	39,372,718	1,890,329	14,893,069	583,929	23,100,350	5,309,873	36,140,894	8,983,662
2012	36,439,256	25,676,576	40,595,584	1,946,510	15,378,042	603,253	23,916,299	5,488,662	37,063,005	9,248,524
2013	36,164,461	25,503,637	40,393,094	1,923,100	15,267,272	599,432	23,737,433	5,451,596	36,663,328	9,153,168
2014	35,198,493	24,742,175	39,282,310	1,895,914	14,867,399	583,148	23,137,874	5,301,182	36,195,100	8,990,019
2015	35,391,629	24,941,331	39,480,268	1,885,620	14,913,047	586,348	23,281,501	5,330,296	35,988,612	8,961,904
2016	36,536,373	25,707,422	40,513,686	1,964,430	15,383,339	604,881	24,045,767	5,503,588	37,320,362	9,301,059
2017	35,091,834	24,727,995	39,216,474	1,877,395	14,783,812	581,117	23,133,137	5,288,187	35,798,011	8,899,246
2018	35,810,832	25,002,882	39,693,390	1,913,781	15,033,042	592,390	23,677,290	5,400,668	36,308,041	9,045,251
2019	36,690,767	25,446,654	40,527,582	1,956,959	15,356,813	606,336	24,125,026	5,532,246	37,043,660	9,238,549
2020	34,706,628	23,999,980	38,012,667	1,836,505	14,393,056	572,661	22,907,060	5,229,091	34,745,523	8,632,019
2021	34,529,400	23,794,903	37,566,870	1,793,409	14,196,262	568,614	22,735,305	5,198,146	33,937,329	8,444,684
2022	33,551,740	22,962,154	36,126,906	1,746,863	13,703,772	552,397	22,058,737	5,050,729	33,015,021	8,186,550
2023	33,827,207	23,192,456	35,432,310	1,770,113	13,672,759	556,693	22,229,719	5,091,719	33,319,171	8,256,120
2024	34,554,713	23,633,019	36,101,277	1,783,905	13,930,792	568,460	22,625,360	5,201,847	33,559,933	8,351,399
2025	33,848,230	23,029,194	35,186,181	1,750,778	13,623,732	556,794	22,196,062	5,096,665	32,972,214	8,187,195
2026	34,191,248	23,262,373	35,684,053	1,774,527	13,750,869	562,197	22,355,095	5,149,482	33,269,374	8,254,303
2027	34,003,401	23,007,614	35,025,801	1,748,891	13,602,556	559,265	22,250,981	5,120,065	32,862,794	8,165,050
2028	33,522,688	22,746,496	34,691,667	1,711,243	13,388,033	551,078	21,897,566	5,050,751	32,116,712	7,976,582
2029	33,407,152	22,473,529	34,600,251	1,730,634	13,379,814	549,279	21,835,173	5,032,566	32,496,643	8,044,426
2030	32,189,905	21,052,356	33,195,040	1,656,063	12,795,421	528,394	20,906,906	4,859,043	31,010,975	7,647,629
2031	31,852,386	20,644,419	33,039,845	1,606,372	12,646,752	522,868	20,742,331	4,808,724	30,155,170	7,458,827
2032	32,043,916	20,931,401	32,798,969	1,642,599	12,689,363	525,956	20,787,569	4,837,913	30,816,320	7,597,020
2033	34,018,924	22,167,302	34,996,495	1,725,980	13,515,073	558,046	22,136,767	5,136,884	32,202,256	8,011,172
2034	32,263,965	20,976,777	33,190,223	1,634,246	12,788,194	529,492	20,981,766	4,874,716	30,677,627	7,587,863
2035	34,343,197	21,895,517	35,219,082	1,762,566	13,587,031	563,203	22,206,861	5,189,891	32,789,939	8,124,541
TOTAL	1,381,223,921	895,982,792	1,251,534,359	74,454,548	604,237,874	22,448,326	828,164,809	210,885,584	1,419,674,606	367,562,152

TABLE B-23. Total Transportation and Delta Water Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Ventura County Flood Control District	Total	City of Yuba City	County of Butte	Plumas County FC&WCD	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	79,888
1963	0	690,539	0	775,559	0	0	0	0	12,626	1,625,689
1964	21,728	1,260,042	9,375	1,594,755	0	0	0	0	13,938	2,801,552
1965	21,859	2,179,810	17,761	2,705,344	0	0	405	405	28,937	4,799,776
1966	37,952	3,898,819	33,415	4,839,578	0	0	564	564	31,321	7,380,275
1967	71,260	7,691,085	68,133	9,507,458	0	0	562	562	47,718	13,029,930
1968	128,877	15,313,065	142,760	18,699,521	0	1,050	1,439	2,489	46,945	25,512,793
1969	198,704	23,145,744	215,144	28,213,991	0	1,225	4,119	5,344	52,963	36,854,190
1970	289,546	30,607,434	273,523	37,576,957	0	3,848	17,111	20,959	69,744	48,320,533
1971	409,205	39,946,463	342,325	49,224,198	0	4,546	19,182	23,728	55,532	61,487,214
1972	537,044	54,976,817	422,192	67,618,135	0	4,929	21,145	26,074	80,412	83,729,132
1973	587,814	59,575,172	435,541	73,258,742	0	7,059	21,772	28,831	54,219	88,654,535
1974	611,275	65,991,774	455,447	80,673,134	0	8,336	22,403	30,739	76,783	97,599,138
1975	644,464	71,813,105	478,284	87,388,928	0	9,416	23,517	32,933	84,547	106,501,893
1976	668,152	74,889,946	475,466	91,528,011	0	7,004	23,251	30,255	106,717	112,427,071
1977	696,350	73,320,946	506,941	90,267,293	0	16,917	24,054	40,971	98,618	111,032,307
1978	708,874	81,933,455	523,053	100,098,721	0	12,635	24,219	36,854	100,786	124,071,754
1979	712,699	83,583,809	526,278	102,951,420	0	16,575	28,346	44,921	119,352	130,086,642
1980	862,107	93,010,922	583,496	114,627,919	0	19,834	26,556	46,390	178,812	144,500,919
1981	946,788	112,152,065	672,397	137,155,193	0	21,682	34,558	56,240	185,347	175,049,505
1982	1,021,156	117,123,623	727,476	142,953,077	0	16,117	43,111	59,228	173,894	184,116,739
1983	1,076,102	118,970,809	854,111	147,501,918	0	15,202	29,405	44,607	220,926	185,765,602
1984	1,211,437	156,252,901	933,156	192,648,447	20,590	15,442	31,790	67,822	225,959	245,200,397
1985	1,287,602	195,472,350	993,495	237,932,635	24,050	16,976	32,399	73,425	340,322	301,620,724
1986	1,344,580	218,310,192	1,058,119	264,181,687	31,753	18,145	33,591	83,489	279,227	334,034,736
1987	1,379,421	204,837,839	1,056,160	252,006,349	37,071	17,794	33,378	88,243	345,116	324,113,126
1988	1,465,634	221,645,350	1,123,943	269,307,163	48,058	19,117	33,600	100,775	365,207	345,900,277
1989	1,505,285	230,306,400	1,232,220	280,027,066	61,184	20,809	37,183	119,176	422,329	360,794,226
1990	1,624,564	277,172,576	1,855,829	333,548,801	66,041	20,855	36,807	123,703	474,284	415,138,600
1991	1,720,675	221,864,576	1,549,792	269,370,354	180,212	22,526	42,194	244,932	214,683	339,243,411
1992	1,779,693	245,342,779	1,503,314	297,850,231	208,216	26,028	43,511	277,755	443,676	384,281,453
1993	1,943,122	219,214,982	1,551,085	273,996,616	209,613	26,203	47,582	283,398	599,571	370,249,570
1994	1,920,319	257,372,371	1,475,136	317,550,701	201,284	25,161	46,074	272,519	609,932	412,388,220
1995	1,982,578	225,839,379	1,568,231	286,719,927	216,944	27,118	50,016	294,078	534,971	394,801,706
1996	1,651,010	235,386,048	1,622,470	305,602,621	217,250	27,156	56,618	301,024	571,857	423,910,599
1997	1,759,495	245,428,898	1,777,095	314,784,863	236,300	29,847	59,910	326,057	428,638	438,907,814
1998	1,952,225	227,227,506	1,797,418	292,962,350	128,021	29,927	54,386	212,334	465,140	417,128,933
1999	2,268,132	254,361,636	1,866,557	325,323,488	254,675	31,834	58,367	344,876	559,344	461,521,694
2000	2,567,020	253,103,196	1,968,766	322,903,641	262,163	79,001	61,576	402,740	0	453,850,970
2001	3,551,602	442,340,647	2,260,949	541,003,078	261,699	93,471	62,742	417,912	0	687,994,709
2002	4,963,185	330,993,173	2,296,388	418,340,514	266,107	95,018	68,291	429,416	0	560,404,651
2003	5,766,410	357,998,864	2,313,407	448,329,377	262,547	93,638	68,949	425,134	0	592,798,730
2004	6,268,152	407,770,558	2,591,574	506,033,872	284,387	102,404	29,277	416,068	0	655,400,528
2005	6,389,956	386,882,222	2,124,149	503,387,332	280,033	41,076	28,801	349,910	0	665,696,784
2006	7,207,189	486,434,684	2,677,770	636,412,841	317,398	50,593	85,638	453,629	0	811,760,799
2007	8,301,227	562,288,429	5,692,615	736,532,826	309,089	741,743	53,962	1,104,794	0	921,374,246
2008	10,653,658	528,676,076	6,307,591	767,815,476	305,584	740,679	86,913	1,133,176	0	963,818,360
2009	10,026,918	483,762,681	5,715,751	706,677,143	306,432	740,936	88,991	1,136,359	0	893,181,484
2010	10,226,075	497,956,487	5,922,991	728,171,139	303,988	740,195	90,203	1,134,386	0	919,160,619
2011	9,533,531	529,490,297	5,050,647	733,793,577	308,296	741,502	93,348	1,143,146	0	917,687,067
2012	9,691,684	546,679,467	5,223,550	757,950,412	308,358	741,521	95,442	1,145,321	0	942,739,810
2013	9,620,229	542,369,311	5,181,356	752,027,417	311,522	742,481	98,564	1,152,567	0	938,591,240
2014	9,517,463	527,462,439	5,015,482	732,188,998	313,804	743,174	101,467	1,158,445	0	914,165,821
2015	9,484,196	529,487,881	5,047,094	734,779,727	317,110	744,177	104,480	1,165,767	0	918,759,375
2016	9,689,362	546,757,332	5,205,860	758,533,461	317,794	744,385	107,086	1,169,265	0	945,625,861
2017	9,448,095	524,558,480	4,994,015	728,397,798	316,794	744,081	106,841	1,167,716	0	911,549,773
2018	9,564,635	531,416,967	5,065,775	738,524,944	308,881	741,680	104,878	1,155,439	0	919,666,248
2019	9,663,522	541,110,308	5,147,275	752,445,697	313,512	743,085	103,400	1,159,997	0	938,122,291
2020	9,312,150	507,712,173	4,845,599	706,905,112	308,468	741,554	90,224	1,140,246	0	886,981,856
2021	9,190,708	500,466,131	4,793,201	697,214,962	309,103	741,747	89,556	1,140,406	0	877,215,083
2022	9,043,387	482,232,742	4,620,027	672,851,025	307,097	741,138	87,673	1,135,908	0	849,910,820
2023	9,086,879	485,549,294	4,667,328	676,651,768	307,052	741,124	87,661	1,135,837	0	855,098,062
2024	9,149,110	494,280,930	4,764,691	688,505,436	304,790	740,438	87,100	1,132,328	0	869,124,927
2025	9,070,689	481,672,371	4,645,751	671,835,856	299,372	738,794	85,755	1,123,921	0	847,240,465
2026	9,131,708	487,942,563	4,708,150	680,035,942	294,360	737,273	84,511	1,116,144	0	858,434,268
2027	9,056,171	479,634,866	4,637,702	669,675,157	299,292	738,769	85,731	1,123,792	0	846,853,435
2028	8,989,020	477,656,658	4,623,231	664,921,725	286,425	734,864	82,541	1,103,830	0	838,885,317
2029	9,020,239	471,565,313	4,548,345	658,683,364	290,202	736,011	83,476	1,109,689	0	832,493,420
2030	8,932,547	448,625,537	4,341,570	627,741,386	249,799	723,749	73,462	1,047,010	0	791,434,696
2031	8,812,531	438,325,752	4,248,097	614,864,074	249,799	723,749	73,461	1,047,009	0	776,341,917
2032	8,901,394	447,061,688	4,320,565	624,954,673	249,799	723,749	73,459	1,047,007	0	788,335,550
2033	9,146,851	471,328,368	4,570,738	659,514,856	249,799	723,749	73,459	1,047,007	0	825,971,052
2034	8,891,674	446,249,268	4,321,519	624,967,330	249,799	723,749	73,458	1,047,006	0	788,434,545
2035	9,220,784	471,769,178	4,532,384	661,204,174	249,799	723,749	73,456	1,047,004	0	825,694,974
TOTAL	344,137,675	21,917,723,556	189,719,041	29,507,749,245	12,621,715	22,480,359	4,008,954	39,111,028	8,723,612	37,545,462,304

TABLE B-24. Equivalent Unit Charge for Water Supply for Each Contractor [a]

(in dollars per acre-foot)

Project Service Area and Water Supply Contractor	Transportation Charge: Capital Cost Component	Transportation Charge: Minimum OMP&R Component	Transportation Charge: Off-Aqueduct Component	Transportation Charge: Variable OMP&R Component	Transportation Charge: Total	Delta Water Charge	Water System Revenue Bond Surcharge	Total Equivalent Unit Charge
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
FEATHER RIVER AREA								
City of Yuba City	0.00	0.00	0.00	0.00	0.00	55.51	8.13	63.63
County of Butte	0.00	0.00	0.00	0.00	0.00	33.84	0.94	34.78
Plumas County Flood Control and Water Conservation District	26.70	3.41	0.00	0.00	30.11	32.63	5.01	67.75
Feather River Area	2.86	0.37	0.00	0.00	3.22	39.51	3.30	46.03
NORTH BAY AREA								
Napa County Flood Control and Water Conservation District	135.62	42.90	4.36	17.44	200.32	20.20	11.27	231.79
Solano County Water Agency	83.62	34.22	4.35	11.76	133.96	26.63	10.49	171.07
North Bay Area	103.21	37.49	4.36	13.90	158.96	24.21	10.78	193.95
SOUTH BAY AREA								
Alameda County Flood Control and Water Conservation District, Zone 7	36.18	33.99	8.08	25.72	103.98	25.89	7.36	137.22
Alameda County Water District	24.74	25.90	7.02	16.78	74.44	21.70	4.44	100.58
Santa Clara Valley Water District	22.15	19.42	6.37	13.28	61.21	15.63	3.22	80.06
South Bay Area	25.19	23.21	6.80	16.18	71.37	18.55	4.19	94.12
SAN JOAQUIN VALLEY AREA								
County of Kings	5.10	5.21	3.40	9.86	23.58	20.54	3.51	47.63
Dudley Ridge Water District	5.13	4.78	3.16	6.03	19.10	16.23	2.26	37.59
Empire West Side Irrigation District	1.99	4.00	2.43	5.46	13.89	17.54	1.72	33.14
Kern County Water Agency	9.26	9.24	4.87	8.22	31.59	19.05	2.39	53.03
Oak Flat Water District	2.00	2.26	1.96	3.73	9.95	15.98	1.71	27.64
Tulare Lake Basin Water Storage District	5.19	4.67	3.10	5.70	18.66	16.59	2.16	37.41
San Joaquin Valley Area	8.54	8.46	4.57	5.76	27.32	16.71	2.19	46.22
CENTRAL COASTAL AREA								
San Luis Obispo County Flood Control and Water Conservation District	167.69	80.38	14.76	118.09	380.93	58.68	20.98	460.59
Santa Barbara County Flood Control and Water Conservation District	733.75	113.82	17.96	107.18	972.71	48.37	53.01	1,074.09
Central Coastal Area	559.43	103.52	16.97	110.54	790.46	51.55	43.14	885.15
SOUTHERN CALIFORNIA AREA								
Antelope Valley-East Kern Water Agency	45.13	40.28	29.32	85.09	199.82	32.99	7.89	240.71
Castaic Lake Water Agency	49.33	41.05	23.25	60.67	174.30	27.98	12.45	214.73
Coachella Valley Water District	51.57	49.30	37.49	97.10	235.46	22.35	10.21	268.02
Crestline-Lake Arrowhead Water Agency	109.60	87.56	32.61	110.75	340.52	42.55	14.44	397.51
Desert Water Agency	43.39	39.41	48.20	57.65	188.65	20.22	6.64	215.51
Littlerock Creek Irrigation District	60.68	53.51	28.96	95.98	239.14	43.28	10.21	292.63
Mojave Water Agency	96.15	97.86	27.10	161.62	382.73	58.15	20.26	461.13
Palmdale Water District	51.29	47.37	36.24	109.30	244.20	41.84	9.20	295.24
San Bernardino Valley Municipal Water District	175.21	118.24	27.22	101.16	421.83	52.34	18.67	492.84
San Gabriel Valley Municipal Water District	98.25	80.15	41.51	71.20	291.10	36.76	12.61	340.47
San Gorgonio Pass Water Agency	588.92	199.27	22.72	154.21	965.12	59.63	13.74	1,038.49
The Metropolitan Water District of Southern California	77.53	56.34	35.33	60.90	230.10	32.33	10.16	272.59
Ventura County Flood Control District	136.13	99.90	23.25	128.46	387.74	58.64	19.78	466.17
Southern California Area	71.58	52.89	32.01	61.52	218.00	31.40	9.77	259.18
ALL AREAS	47.24	33.65	19.06	37.05	137.00	25.66	6.70	169.37

a) Hypothetical charges, which, if assessed on all Table A water delivered to date, all surplus water delivered prior to May 1, 1973, and all Table A water estimated to be delivered during the remainder of the project repayment period (Table B-5B), would provide a sum at the end of the period financially equivalent to all Transportation Charge and Delta Water Charge payments required under a water supply contract, considering interest at the Project Interest Rate, 4.608 percent per annum.

TABLE B-25. Equivalent Unit Transportation Costs of Water Delivered From or Through Each Aqueduct Reach [a]

(in dollars per acre-foot)

Aqueduct Reach	Unit Costs of Reach [b]						Cumulative Unit Costs from the Delta					
	Capital Costs	Water System Revenue Bond Surcharge [c]	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total	Capital Costs	Water System Revenue Bond Surcharge [c]	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
North Bay Aqueduct												
1	39.97	13.26	11.65	1.31	3.81	70.00	39.97	13.26	11.65	1.31	3.81	70.00
2	42.54	14.11	5.09	0.00	0.00	61.74	82.51	27.37	16.74	1.31	3.81	131.74
3A	7.58	2.51	10.13	2.45	6.17	28.84	90.09	29.88	26.87	3.76	9.98	160.58
3B	48.77	16.18	22.90	3.15	13.69	104.69	131.28	43.55	39.64	4.46	17.50	236.43
South Bay Aqueduct												
1	6.99	2.32	13.66	5.39	14.28	42.64	8.94	2.97	16.35	7.15	20.95	56.36
2	0.66	0.22	1.54	0.00	0.00	2.42	9.60	3.19	17.89	7.15	20.95	58.78
4	2.20	0.73	2.63	0.00	0.00	5.56	11.80	3.92	20.52	7.15	20.95	64.34
5	4.61	1.53	2.06	0.00	0.00	8.20	16.41	5.45	22.58	7.15	20.95	72.54
6	0.27	0.09	0.22	0.00	0.00	0.58	16.68	5.54	22.80	7.15	20.95	73.12
7	2.04	0.68	0.40	0.00	0.00	3.12	18.72	6.22	23.20	7.15	20.95	76.24
8	2.77	0.92	0.66	0.00	0.00	4.35	21.49	7.14	23.86	7.15	20.95	80.59
9	5.73	1.90	2.48	0.00	0.00	10.11	27.22	9.04	26.34	7.15	20.95	90.70
California Aqueduct												
1	1.95	0.65	2.69	1.76	6.67	13.72	1.95	0.65	2.69	1.76	6.67	13.72
2A	1.24	0.41	0.53	0.00	0.00	2.18	3.19	1.06	3.22	1.76	6.67	15.90
2B	0.64	0.21	0.27	0.00	0.00	1.12	3.83	1.27	3.49	1.76	6.67	17.02
3	0.55	0.18	0.20	0.00	0.00	0.93	4.38	1.45	3.69	1.76	6.67	17.95
4	0.88	0.29	1.33	0.82	3.01	6.33	5.26	1.74	5.02	2.58	9.68	24.28
5	0.68	0.23	0.27	0.00	0.00	1.18	5.94	1.97	5.29	2.58	9.68	25.46
6	0.17	0.06	0.13	0.00	0.00	0.36	6.11	2.03	5.42	2.58	9.68	25.82
7	1.02	0.34	0.32	0.00	0.00	1.68	7.13	2.37	5.74	2.58	9.68	27.50
8C	0.02	0.01	0.06	0.00	0.00	0.09	7.15	2.38	5.80	2.58	9.68	27.59
8D	0.39	0.13	0.26	0.00	0.00	0.78	7.54	2.51	6.06	2.58	9.68	28.37
9	0.33	0.11	0.24	0.00	0.00	0.68	7.87	2.62	6.30	2.58	9.68	29.05
10A	0.35	0.12	0.31	0.00	0.00	0.78	8.22	2.74	6.61	2.58	9.68	29.83
11B	0.51	0.17	0.20	0.00	0.00	0.88	8.73	2.91	6.81	2.58	9.68	30.71
12D	0.48	0.16	0.18	0.00	0.00	0.82	9.21	3.07	6.99	2.58	9.68	31.53
12E	0.34	0.11	0.30	0.00	0.00	0.75	9.55	3.18	7.29	2.58	9.68	32.28
13B	0.73	0.24	0.35	0.00	0.00	1.32	10.28	3.42	7.64	2.58	9.68	33.60
14A	2.81	0.93	2.70	1.39	5.68	13.51	13.09	4.35	10.34	3.97	15.36	47.11
14B	0.44	0.15	0.33	0.00	0.00	0.92	13.53	4.50	10.67	3.97	15.36	48.03
14C	0.37	0.12	0.25	0.00	0.00	0.74	13.90	4.62	10.92	3.97	15.36	48.77
15A	2.09	0.69	2.81	1.68	6.17	13.44	15.99	5.31	13.73	5.65	21.53	62.21
16A	3.45	1.14	4.35	3.63	14.39	26.96	19.44	6.45	18.08	9.28	35.92	89.17
17E	11.65	3.86	12.23	12.70	53.14	93.58	31.09	10.31	30.31	21.98	89.06	182.75
17F	3.02	1.00	0.15	0.00	0.00	4.17	34.11	11.31	30.46	21.98	89.06	186.92
18A	2.71	0.90	1.47	0.00	-5.58	(0.50)	36.82	12.21	31.93	21.98	83.48	186.42
19	2.00	0.66	0.89	0.00	0.00	3.55	38.82	12.87	32.82	21.98	83.48	189.97
19C	2.18	0.72	0.00	0.00	0.00	2.90	41.00	13.59	32.82	21.98	83.48	192.87
20A	1.59	0.53	1.47	0.00	0.00	3.59	42.59	14.12	34.29	21.98	83.48	196.46
20B	1.93	0.64	0.97	0.00	0.00	3.54	44.52	14.76	35.26	21.98	83.48	200.00
21	0.98	0.33	0.67	0.00	0.00	1.98	45.50	15.09	35.93	21.98	83.48	201.98
22A	1.02	0.34	0.35	0.00	0.00	1.71	46.52	15.43	36.28	21.98	83.48	203.69
22B	9.98	3.31	9.47	4.10	17.52	44.38	56.50	18.74	45.75	26.08	101.00	248.07
23	2.74	0.91	0.65	0.00	-7.12	(2.82)	59.24	19.65	46.40	26.08	93.88	245.25
24	5.32	1.76	1.84	0.00	0.00	8.92	64.56	21.41	48.24	26.08	93.88	254.17
25	3.88	1.29	0.10	0.00	0.00	5.27	68.44	22.70	48.34	26.08	93.88	259.44
26A	4.24	1.41	6.13	0.00	-48.59	(36.81)	72.68	24.11	54.47	26.08	45.29	222.63
28G	7.90	2.62	2.32	0.00	0.00	12.84	80.58	26.73	56.79	26.08	45.29	235.47
28H	7.60	2.52	2.43	0.00	0.00	12.55	88.18	29.25	59.22	26.08	45.29	248.02
28J	85.27	28.28	33.82	0.00	0.00	147.37	173.45	57.53	93.04	26.08	45.29	395.39
West Branch												
29A	3.95	1.31	7.02	1.56	6.24	20.08	38.06	12.62	37.48	23.54	95.30	207.00
29F	2.89	0.96	0.84	0.00	0.00	4.69	40.95	13.58	38.32	23.54	95.30	211.69
29G	9.58	3.18	3.99	0.00	-22.46	(5.71)	50.53	16.76	42.31	23.54	72.84	205.98
29H	5.97	1.98	3.79	0.00	0.00	11.74	56.50	18.74	46.10	23.54	72.84	217.72
29J	10.01	3.32	1.09	0.00	-42.01	(27.59)	66.51	22.06	47.19	23.54	30.83	190.13
30	16.06	5.33	3.40	0.00	0.00	24.79	82.57	27.39	50.59	23.54	30.83	214.92
Coastal Branch												
31A	7.26	2.41	16.04	1.73	5.37	32.81	14.80	4.92	22.10	4.31	15.05	61.18
33A	271.38	90.02	30.24	14.69	70.17	476.50	286.18	94.94	52.34	19.00	85.22	537.68
34	193.89	64.31	0.84	0.00	0.00	259.04	480.07	159.25	53.18	19.00	85.22	796.72
35	0.00	0.00	0.00	0.00	0.00	0.00	480.07	159.25	53.18	19.00	85.22	796.72

a) Representative of transportation unit costs only; does not include a unit cost of conservation. The Delta Water Rate should be added to these values to approximate unit costs at canalside. Includes surplus water prior to May 1, 1973.

b) Hypothetical charges which, if assessed on all Table A water delivered to date, all surplus water delivered prior to May 1, 1973, and all Table A water estimated to be delivered during the remainder of the Project repayment period (Table B-5B), would provide a sum at the end of the period financially equivalent to all Transportation Charges required under the water supply contract considering interest rate at the Project Interest Rate of 4.608 percent per annum.

c) The Water System Revenue Bond Surcharge equivalent unit rate is calculated by multiplying Column [1] by the ratio of the 2004 WSRB surcharge to the sum of the Transportation Capital and the Capital component of the Delta Water Charge.

TABLE B-26. Capital Costs of Each Aqueduct Reach to be Reimbursed Through the Capital Cost Component of the East Branch Enlargement Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT MOJAVE DIVISION							
	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23B
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	117,000	0	0	0	0	0	0	0
1980	200,000	0	0	0	0	0	0	74,000
1981	135,000	0	0	0	0	0	0	385,000
1982	1,503,000	0	0	0	0	0	0	1,586,000
1983	2,260,000	0	0	0	0	0	0	2,965,000
1984	735,000	0	0	0	0	0	796,000	1,380,000
1985	93,000	435,000	75,000	544,000	859,000	703,000	970,000	146,000
1986	784,000	4,477,000	3,144,000	2,234,000	1,569,000	1,203,000	1,808,000	34,000
1987	11,000	951,000	1,076,000	666,000	399,000	47,000	16,421,000	43,000
1988	1,000	125,000	1,681,000	1,730,000	2,024,000	40,000	13,326,000	70,000
1989	0	206,000	2,089,000	2,174,000	2,510,000	61,000	11,242,000	229,000
1990	1,000	577,000	903,000	735,000	928,000	194,000	20,131,000	887,000
1991	1,000	280,000	413,000	333,000	422,000	93,000	20,702,000	1,215,000
1992	0	40,000	41,000	39,000	35,000	13,000	9,599,000	3,719,000
1993	0	19,000	16,000	19,000	12,000	6,000	2,319,000	19,654,000
1994	0	2,000	3,000	2,000	4,000	3,000	803,000	3,173,000
1995	0	0	0	0	0	0	223,000	1,465,000
1996	0	0	0	0	0	0	6,014,000	478,000
1997	0	0	0	0	0	0	404,000	1,327,000
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
TOTAL	5,841,000	7,112,000	9,441,000	8,476,000	8,762,000	2,363,000	104,758,000	38,830,000

TABLE B-26. Capital Costs of Each Aqueduct Reach to be Reimbursed Through the Capital Cost Component of the East Branch Enlargement Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Total	Reach 25	Reach 26A	Reach 26B	Total	
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	117,000	0	0	0	0	117,000
1980	0	0	274,000	0	0	0	0	274,000
1981	0	0	520,000	0	0	0	0	520,000
1982	0	0	3,089,000	0	0	0	0	3,089,000
1983	0	0	5,225,000	0	0	0	0	5,225,000
1984	0	0	2,911,000	0	0	0	0	2,911,000
1985	0	0	3,825,000	0	528,000	89,000	617,000	4,442,000
1986	25,000	0	15,278,000	0	1,926,000	154,000	2,080,000	17,358,000
1987	178,000	0	19,792,000	0	3,699,000	437,000	4,136,000	23,928,000
1988	632,000	0	19,629,000	0	5,667,000	3,329,000	8,996,000	28,625,000
1989	1,130,000	0	19,641,000	0	40,879,000	1,650,000	42,529,000	62,170,000
1990	2,066,000	0	26,422,000	0	29,853,000	1,650,000	31,503,000	57,925,000
1991	4,980,000	0	28,439,000	0	26,027,000	999,000	27,026,000	55,465,000
1992	11,920,000	0	25,406,000	0	15,317,000	299,000	15,616,000	41,022,000
1993	16,303,000	0	38,348,000	0	4,878,000	0	4,878,000	43,226,000
1994	7,081,000	0	11,071,000	0	3,151,000	0	3,151,000	14,222,000
1995	5,350,000	0	7,038,000	0	2,137,000	0	2,137,000	9,175,000
1996	1,706,000	0	8,198,000	0	9,181,000	0	9,181,000	17,379,000
1997	1,905,000	0	3,636,000	0	175,000	0	175,000	3,811,000
1998	28,000	0	28,000	0	0	0	0	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
TOTAL	53,304,000	0	238,887,000	0	143,418,000	8,607,000	152,025,000	390,912,000

TABLE B-27. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT							
	MOJAVE DIVISION							
	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23B
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	1,048,625	0
1995	0	0	0	0	0	0	953,814	0
1996	0	0	0	0	0	0	1,171,411	0
1997	0	0	0	0	0	0	1,110,038	0
1998	0	0	0	0	0	0	1,213,002	0
1999	1,229	517	646	409	383	169	668,466	0
2000	4,452	1,875	2,340	1,484	1,386	614	1,315,920	0
2001	347	146	183	116	108	48	1,045,627	0
2002	1,639	690	861	546	510	226	1,539,859	0
2003	0	0	0	0	0	0	1,814,089	0
2004	2,132	27,868	18,579	18,731	10,355	8,528	1,485,104	0
2005	1,205	15,752	10,502	10,588	5,853	4,820	1,045,785	0
2006	0	0	0	0	0	0	1,839,222	0
2007	0	0	0	0	0	0	1,963,545	0
2008	0	0	0	0	0	0	1,862,750	0
2009	0	0	0	0	0	0	1,862,750	0
2010	0	0	0	0	0	0	1,862,750	0
2011	0	0	0	0	0	0	1,862,750	0
2012	0	0	0	0	0	0	1,862,750	0
2013	0	0	0	0	0	0	1,862,750	0
2014	0	0	0	0	0	0	1,862,750	0
2015	0	0	0	0	0	0	1,862,750	0
2016	0	0	0	0	0	0	1,862,750	0
2017	0	0	0	0	0	0	1,862,750	0
2018	0	0	0	0	0	0	1,862,750	0
2019	0	0	0	0	0	0	1,862,750	0
2020	0	0	0	0	0	0	1,862,750	0
2021	0	0	0	0	0	0	1,862,750	0
2022	0	0	0	0	0	0	1,862,750	0
2023	0	0	0	0	0	0	1,862,750	0
2024	0	0	0	0	0	0	1,862,750	0
2025	0	0	0	0	0	0	1,862,750	0
2026	0	0	0	0	0	0	1,862,750	0
2027	0	0	0	0	0	0	1,862,750	0
2028	0	0	0	0	0	0	1,862,750	0
2029	0	0	0	0	0	0	1,862,750	0
2030	0	0	0	0	0	0	1,862,750	0
2031	0	0	0	0	0	0	1,862,750	0
2032	0	0	0	0	0	0	1,862,750	0
2033	0	0	0	0	0	0	1,862,750	0
2034	0	0	0	0	0	0	1,862,750	0
2035	0	0	0	0	0	0	1,862,750	0
TOTAL	11,004	46,848	33,111	31,874	18,595	14,405	70,371,507	0

TABLE B-27. Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed Through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge

(in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Subtotal	Reach 25	Reach 26A [a]	Reach 26B	Subtotal	
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	1,048,625	0	1,713,260	0	1,713,260	2,761,885
1995	0	0	953,814	0	1,452,549	0	1,452,549	2,406,363
1996	0	0	1,171,411	0	1,350,581	0	1,350,581	2,521,992
1997	679,826	0	1,789,864	0	1,528,509	0	1,528,509	3,318,373
1998	825,038	0	2,038,040	0	1,619,068	0	1,619,068	3,657,108
1999	382,178	0	1,053,997	0	956,229	0	956,229	2,010,226
2000	735,803	0	2,063,874	0	1,409,109	0	1,409,109	3,472,983
2001	812,634	0	1,859,209	0	811,400	0	811,400	2,670,609
2002	727,751	0	2,272,082	0	1,143,205	0	1,143,205	3,415,287
2003	899,739	0	2,713,828	0	1,248,051	0	1,248,051	3,961,879
2004	913,701	0	2,484,998	0	1,815,458	0	1,815,458	4,300,456
2005	1,036,550	0	2,131,055	0	1,862,342	0	1,862,342	3,993,397
2006	1,091,151	0	2,930,373	0	1,899,216	0	1,899,216	4,829,589
2007	1,117,178	0	3,080,723	0	1,943,971	0	1,943,971	5,024,694
2008	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2009	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2010	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2011	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2012	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2013	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2014	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2015	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2016	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2017	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2018	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2019	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2020	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2021	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2022	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2023	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2024	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2025	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2026	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2027	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2028	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2029	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2030	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2031	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2032	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2033	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2034	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
2035	1,109,728	0	2,972,478	0	1,995,971	0	1,995,971	4,968,449
TOTAL	40,293,933	0	110,821,277	0	76,640,136	0	76,640,136	187,461,413

a) Units 3 and 4 at Devil Canyon Powerplant were operational in 1993. These minimum OMP&R costs for Reach 26A will be revised to reflect operational date of those units.

TABLE B-28. Capital Costs of East Branch Enlargement Transportation Facilities Allocated to Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	Antelope Valley-East Kern Water Agency	Coachella Valley Water District	Desert Water Agency	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	The Metropolitan Water District of Southern California	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	11,731	1,010	10,566	466	0	93,227	117,000
1980	0	28,241	4,708	27,495	797	0	212,759	274,000
1981	0	56,134	16,676	61,271	538	0	385,381	520,000
1982	0	326,180	76,872	337,913	5,988	0	2,342,047	3,089,000
1983	0	554,658	138,964	582,070	9,004	0	3,940,304	5,225,000
1984	0	306,514	68,842	314,468	2,928	0	2,218,248	2,911,000
1985	49,675	447,266	65,773	347,262	4,514	21,614	3,505,896	4,442,000
1986	185,353	1,757,633	236,324	1,363,586	41,900	78,842	13,694,362	17,358,000
1987	49,735	2,455,279	378,535	1,774,447	10,615	151,421	19,107,968	23,928,000
1988	124,534	2,689,959	500,466	1,712,431	13,783	231,982	23,351,845	28,625,000
1989	155,446	7,118,094	2,423,000	1,671,088	17,419	1,673,409	49,111,544	62,170,000
1990	62,786	6,459,229	1,943,918	2,234,452	8,680	1,222,053	45,993,882	57,925,000
1991	28,686	6,265,822	1,875,066	2,168,712	4,024	1,065,433	44,057,257	55,465,000
1992	2,911	4,826,764	1,610,921	1,359,335	471	627,012	32,594,586	41,022,000
1993	1,205	5,094,237	1,828,410	2,722,156	212	199,684	33,380,096	43,226,000
1994	273	1,726,376	631,816	478,543	27	128,988	11,255,977	14,222,000
1995	0	1,130,963	423,243	206,978	0	87,480	7,326,336	9,175,000
1996	0	2,025,987	645,296	606,205	0	375,830	13,725,682	17,379,000
1997	0	451,011	154,366	205,796	0	7,164	2,992,663	3,811,000
1998	0	3,551	1,293	0	0	0	23,156	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
TOTAL	660,604	43,735,629	13,025,499	18,184,774	121,366	5,870,912	309,313,216	390,912,000

TABLE B-29. Capital Cost Component of East Branch Enlargement Facilities Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	Antelope Valley - East Kern Water Agency	Coachella Valley Water District	Desert Water Agency	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District [a]	The Metropolitan Water District of Southern California	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	18,266	1,209,293	360,156	502,810	3,356	0	8,552,529	10,646,410
1989	19,175	1,269,524	378,094	527,854	3,523	0	8,978,504	11,176,674
1990	19,186	1,270,244	378,308	528,153	3,525	0	8,983,597	11,183,013
1991	19,187	1,270,261	378,314	528,160	3,525	0	8,983,717	11,183,164
1992	38,420	2,543,616	757,549	1,057,606	7,059	0	17,989,315	22,393,565
1993	40,122	2,662,533	793,256	1,105,728	7,371	0	18,827,641	23,436,651
1994	39,705	2,628,706	782,890	1,092,986	7,295	0	18,591,099	23,142,681
1995	39,632	2,623,828	781,438	1,090,958	7,281	0	18,556,603	23,099,740
1996	39,856	2,639,103	786,038	1,097,172	7,323	0	18,664,309	23,233,801
1997	41,743	2,763,629	823,074	1,149,085	7,669	0	19,545,322	24,330,522
1998	42,642	2,823,126	840,793	1,173,823	7,834	0	19,966,107	24,854,325
1999	44,738	2,961,887	882,120	1,231,519	8,219	0	20,947,475	26,075,958
2000	49,031	3,246,109	966,768	1,349,695	9,008	0	22,957,586	28,578,197
2001	49,048	3,247,263	967,111	1,350,175	9,011	0	22,965,748	28,588,356
2002	47,729	3,159,931	941,102	1,313,862	8,769	0	22,348,105	27,819,498
2003	40,383	2,662,845	792,431	1,109,474	7,418	0	18,837,475	23,450,026
2004	43,914	2,907,364	865,881	1,208,849	8,068	0	20,561,864	25,595,940
2005	32,275	2,136,768	636,380	888,444	5,929	0	15,111,947	18,811,743
2006	53,494	3,625,410	1,090,816	1,472,551	9,828	0	25,568,477	31,820,576
2007	67,152	4,549,811	1,368,792	1,848,518	12,337	0	32,088,918	39,935,528
2008	63,426	4,294,213	1,291,490	1,745,954	11,653	0	30,288,880	37,695,616
2009	64,886	4,402,364	1,325,221	1,786,139	11,921	0	31,043,916	38,634,447
2010	64,638	4,369,374	1,313,198	1,779,328	11,876	0	30,824,799	38,363,213
2011	66,186	4,495,818	1,354,017	1,821,963	12,159	0	31,698,616	39,448,759
2012	66,292	4,502,964	1,356,182	1,824,822	12,179	0	31,748,937	39,511,376
2013	65,590	4,447,846	1,338,611	1,805,535	12,049	0	31,366,580	39,036,211
2014	66,192	4,466,570	1,341,392	1,822,113	12,161	0	31,517,083	39,225,511
2015	67,935	4,584,990	1,377,059	1,870,091	12,481	0	32,351,999	40,264,555
2016	68,121	4,597,374	1,380,759	1,875,207	12,516	0	32,439,514	40,373,491
2017	69,782	4,710,625	1,414,919	1,920,940	12,822	0	33,237,674	41,366,762
2018	68,169	4,599,566	1,381,283	1,876,526	12,525	0	32,455,860	40,393,929
2019	70,046	4,732,262	1,421,907	1,928,227	12,868	0	33,387,185	41,552,495
2020	67,201	4,531,071	1,360,289	1,849,913	12,347	0	31,975,270	39,796,091
2021	68,717	4,635,694	1,392,023	1,891,612	12,624	0	32,711,490	40,712,160
2022	68,003	4,595,810	1,381,133	1,871,915	12,494	0	32,423,016	40,352,371
2023	56,498	3,833,714	1,154,094	1,555,264	10,380	0	27,033,673	33,643,623
2024	58,473	3,965,053	1,193,302	1,609,579	10,743	0	27,961,930	34,799,080
2025	66,907	4,524,191	1,359,911	1,841,799	12,293	0	31,915,814	39,720,915
2026	24,538	1,703,639	517,840	675,475	4,508	0	11,981,129	14,907,129
2027	25,000	1,731,166	525,631	688,200	4,593	0	12,178,439	15,153,029
2028	16,319	1,120,310	338,928	449,230	2,998	0	7,889,128	9,816,913
2029	17,026	1,166,423	352,574	468,679	3,128	0	8,215,818	10,223,648
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	2,055,643	138,212,288	41,443,074	56,585,933	377,666	0	975,673,088	1,214,347,692

a) Under Article 49(d)(4)(A) of its contract, San Bernardino Valley Municipal Water District elected to pay a portion of its allocated costs of East Branch Enlargement in advance rather than to participate in payment of Water System Revenue Bonds. This election made via a letter of agreement signed June 1, 1987. As of June 1999, $6,347,938 has been received from the San Bernardino Valley Municipal Water District.

TABLE B-30. Minimum OMP&R Component of East Branch Enlargement Facilities Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	Antelope Valley-East Kern Water Agency	Coachella Valley Water District	Desert Water Agency	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	The Metropolitan Water District of Southern California	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	320,415	101,486	95,075	0	70,133	2,174,776	2,761,885
1995	0	278,176	86,604	86,479	0	59,461	1,895,643	2,406,363
1996	0	287,293	82,991	106,208	0	55,287	1,990,213	2,521,992
1997	0	389,636	123,446	100,643	0	62,571	2,642,077	3,318,373
1998	0	429,772	135,927	109,979	0	66,278	2,915,152	3,657,108
1999	37	236,006	75,040	60,907	11	39,144	1,599,081	2,010,226
2000	132	403,693	121,479	120,396	40	57,683	2,769,559	3,472,982
2001	10	310,158	90,353	94,888	3	33,215	2,141,981	2,670,608
2002	49	391,107	108,642	140,014	15	46,798	2,728,663	3,415,288
2003	0	453,227	124,576	164,477	0	51,090	3,168,508	3,961,878
2004	1,278	501,557	153,704	142,324	265	74,317	3,427,009	4,300,454
2005	722	475,085	157,779	99,156	150	76,236	3,184,268	3,993,396
2006	0	561,690	168,751	166,756	0	77,746	3,854,647	4,829,590
2007	0	583,118	173,444	178,028	0	79,578	4,010,527	5,024,695
2008	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2009	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2010	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2011	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2012	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2013	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2014	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2015	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2016	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2017	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2018	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2019	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2020	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2021	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2022	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2023	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2024	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2025	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2026	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2027	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2028	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2029	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2030	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2031	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2032	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2033	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2034	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2035	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
TOTAL	2228	21,820,249	6,605,090	6,394,222	484	3,137,305	149,501,804	187,461,382

TABLE B-31. Total East Branch Enlargement Facilities Transportation Charge for Each Contractor

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	Antelope Valley-East Kern Water Agency	Coachella Valley Water District	Desert Water Agency	Mojave Water Agency	Palmdale Water District	San Bernardino Valley Municipal Water District	The Metropolitan Water District of Southern California	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	18,266	1,209,293	360,156	502,810	3,356	0	8,552,529	10,646,410
1989	19,176	1,269,524	378,094	527,854	3,523	0	8,978,504	11,176,675
1990	19,186	1,270,244	378,308	528,153	3,525	0	8,983,597	11,183,013
1991	19,187	1,270,261	378,314	528,160	3,525	0	8,983,717	11,183,164
1992	38,420	2,543,616	757,549	1,057,606	7,059	0	17,989,315	22,393,565
1993	40,122	2,662,533	793,256	1,105,728	7,371	0	18,827,641	23,436,651
1994	39,705	2,949,121	884,376	1,188,061	7,295	70,133	20,765,875	25,904,566
1995	39,632	2,902,004	868,042	1,177,437	7,281	59,461	20,452,246	25,506,103
1996	39,856	2,926,396	869,029	1,203,380	7,323	55,287	20,654,522	25,755,793
1997	41,743	3,153,265	946,520	1,249,728	7,669	62,571	22,187,399	27,648,895
1998	42,642	3,252,898	976,720	1,283,802	7,834	66,278	22,881,259	28,511,433
1999	44,775	3,197,893	957,160	1,292,426	8,230	39,144	22,546,556	28,086,184
2000	49,163	3,649,802	1,088,247	1,470,090	9,048	57,683	25,727,147	32,051,180
2001	49,058	3,557,421	1,057,465	1,445,063	9,014	33,215	25,107,729	31,258,965
2002	47,778	3,551,037	1,049,744	1,453,876	8,784	46,798	25,076,769	31,234,786
2003	40,383	3,116,071	917,007	1,273,952	7,418	51,090	22,005,983	27,411,904
2004	45,192	3,408,921	1,019,585	1,351,173	8,333	74,317	23,988,874	29,896,395
2005	32,997	2,611,853	794,159	987,600	6,078	76,236	18,296,215	22,805,138
2006	53,494	4,187,099	1,259,566	1,639,307	9,828	77,746	29,423,124	36,650,164
2007	67,152	5,132,928	1,542,235	2,026,546	12,337	79,578	36,099,445	44,960,221
2008	63,426	4,872,761	1,466,521	1,914,844	11,653	81,706	34,253,155	42,664,066
2009	64,886	4,980,911	1,500,251	1,955,027	11,921	81,706	35,008,191	43,602,893
2010	64,638	4,947,921	1,488,229	1,948,217	11,876	81,706	34,789,076	43,331,663
2011	66,186	5,074,365	1,529,048	1,990,851	12,159	81,706	35,662,891	44,417,206
2012	66,292	5,081,511	1,531,212	1,993,711	12,179	81,706	35,713,212	44,479,823
2013	65,590	5,026,393	1,513,642	1,974,423	12,049	81,706	35,330,855	44,004,658
2014	66,192	5,045,117	1,516,422	1,991,002	12,161	81,706	35,481,359	44,193,959
2015	67,934	5,163,538	1,552,090	2,038,981	12,481	81,706	36,316,275	45,233,005
2016	68,121	5,175,922	1,555,790	2,044,097	12,516	81,706	36,403,789	45,341,941
2017	69,782	5,289,172	1,589,949	2,089,830	12,821	81,706	37,201,950	46,335,210
2018	68,169	5,178,114	1,556,313	2,045,414	12,524	81,706	36,420,136	45,362,376
2019	70,046	5,310,809	1,596,937	2,097,115	12,869	81,706	37,351,460	46,520,942
2020	67,201	5,109,618	1,535,320	2,018,803	12,347	81,706	35,939,545	44,764,540
2021	68,717	5,214,241	1,567,052	2,060,501	12,625	81,706	36,675,766	45,680,608
2022	68,003	5,174,357	1,556,164	2,040,804	12,494	81,706	36,387,291	45,320,819
2023	56,498	4,412,262	1,329,124	1,724,153	10,380	81,706	30,997,948	38,612,071
2024	58,473	4,543,598	1,368,333	1,778,468	10,743	81,706	31,926,205	39,767,526
2025	66,907	5,102,739	1,534,942	2,010,688	12,293	81,706	35,880,090	44,689,365
2026	24,538	2,282,187	692,870	844,365	4,508	81,706	15,945,406	19,875,580
2027	25,000	2,309,713	700,661	857,090	4,593	81,706	16,142,714	20,121,477
2028	16,319	1,698,858	513,959	618,120	2,998	81,706	11,853,404	14,785,364
2029	17,026	1,744,970	527,604	637,568	3,128	81,706	12,180,094	15,192,096
2030	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2031	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2032	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2033	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2034	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
2035	0	578,547	175,031	168,889	0	81,706	3,964,275	4,968,448
TOTAL	2,057,871	160,032,539	48,048,151	62,980,158	378,149	3,137,305	1,125,174,908	1,401,809,081

Conversion Factors

Quantity	To convert from customary unit	To metric unit	Multiply customary unit by	To convert to customary unit, multiply metric unit by
Length	inches (in)	millimeters (mm)●	25.4	0.03937
	inches (in)	centimeters (cm)	2.54	0.3937
	feet (ft)	meters (m)	0.3048	3.2808
	miles (mi)	kilometers (km)	1.6093	0.62139
Area	square inches (in^2)	square millimeters (mm^2)	645.16	0.00155
	square feet (ft^2)	square meters (m^2)	0.092903	10.764
	acres (ac)	hectares (ha)	0.40469	2.4710
	square miles (mi^2)	square kilometers (km^2)	2.590	0.3861
Volume	gallons (gal)	liters (L)	3.7854	0.26417
	million gallons (10^6 gal)	megaliters (ML)	3.7854	0.26417
	cubic feet (ft^3)	cubic meters (m^3)	0.028317	35.315
	cubic yards (yd^3)	cubic meters (m^3)	0.76455	1.308
	acre-feet (ac-ft)	thousand cubic meters (m^3 x 10^3)	1.2335	0.8107
	acre-feet (ac-ft)	hectare-meters (ha - m)■	0.1234	8.107
	thousand acre-feet (taf)	million cubic meters (m^3 x 10^6)	1.2335	0.8107
	thousand acre-feet (taf)	hectare-meters (ha - m)■	123.35	0.008107
	million acre-feet (maf)	billion cubic meters (m^3 x 10^9)◆	1.2335	0.8107
	million acre-feet (maf)	cubic kilometers (km^3)	1.2335	0.8107
Flow	cubic feet per second (ft^3/s)	cubic meters per second (m^3/s)	0.028317	35.315
	gallons per minute (gal/min)	liters per minute (L/min)	3.7854	0.26417
	gallons per day (gal/day)	liters per day (L/day)	3.7854	0.26417
	million gallons per day (mgd)	megaliters per day (ML/day)	3.7854	0.26417
	acre-feet per day (ac-ft/day)	thousand cubic meters per day (m^3 x 10^3/day)	1.2335	0.8107
Mass	pounds (lb)	kilograms (kg)	0.45359	2.2046
	tons (short, 2,000 lb)	megagrams (Mg)	0.90718	1.1023
Velocity	feet per second (ft/s)	meters per second (m/s)	0.3048	3.2808
Power	horsepower (hp)	kilowatts (kW)	0.746	1.3405
Pressure	pounds per square inch (psi)	kilopascals (kPa)	6.8948	0.14505
	head of water in feet	kilopascals (kPa)	2.989	0.33456
Specific capacity	gallons per minute per foot of drawdown	liters per minute per meter of drawdown	12.419	0.08052
Concentration	parts per million (ppm)	milligrams per liter (mg/L)	1.0	1.0
Electrical conductivity	micromhos per centimeter	millisiemens per centimeter (µS/cm)	1.0	1.0
Temperature	degrees Fahrenheit (˚F)	degrees Celsius (˚C)	(˚F - 32)/1.8	(1.8 x ˚C) + 32

● When using "dual units," inches are normally converted to millimeters (rather than centimeters).

■ Not used often in metric countries, but is offered as a conceptual equivalent of customary western U.S. practice (a standard depth of water over a given area of land).

◆ ASTM Manual E380 discourages the use of billion cubic meters since that magnitude is represented by giga (a thousand million) in other countries. It is shown here for potential use for quantifying large reservoir volumes (similar to million acre-feet).

Other Common Conversion Factors

1 cubic foot=7.48 gallons=62.4 pounds of water

1 cubic foot per second (cfs)=450 gallons per minute (gpm)

1 cfs=646,320 gallons a day=1.98 ac-ft a day

1 acre-foot=325,900 gallons=43,560 cubic feet

1 million gallons=3.07 acre-feet

1 million gallons a day (mgd)=1,120 ac-ft a year