REPORT ON THE

MARINA DEL REY HERONRY

2005

Prepared for

Mark D. Kelly
Senior Vice President
LYON CAPITAL VENTURES
Newport Beach CA 92660

By

Jeffrey B. Froke, Ph.D.
CALIFORNIA WILDLIFE ECOLOGY
Pebble Beach CA 93953

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INTRODUCTION

This report examines a population of three resident species of herons that nest colonially in Marina del Rey, Los Angeles County, California. The report focuses on reproductive site and habitat relationships of the herons within the context of the entire marina and its urban environs. Additional geographic information that is useful to understand the herons' nesting ecology, such as their patterns of foraging and roosting also is considered.

Specific impetus for this study comes from a need to know how development of the Villa Venetia property, including removal of all of its mature cypress trees, has the potential to alter the future (post-development) nesting prospects of a small colony of Great Blue Herons, i.e., unless special emphasis is given to understanding habitat attachments and resource requirements of this species.

This report includes an evaluation of its findings. It concludes with a series of recommendations for managing Great Blue Herons and for continuing study. An aim of management will be to compensate for losses that are associated with removal of colony resources as are linked to proposed development of the Villa Venetia property.

Success of this study will be measured by useful gains to knowledge about Great Blue Herons, Black-crowned Night-Herons and Snowy Egrets nesting in coastal Los Angeles County. Ensuing management will be successful if, as its result, the reproductive population and productivity of Great Blue Herons can be maintained within the Marina del Rey heronry.

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BACKGROUND

Study Objective

The aim of this study is to discover several fundamental features of a multi-species heronry that thrives within the Marina del Rey environment. Study findings will be used to understand and eventually predict key physical and ecological parameters of areas selected by herons for nesting. Results and analyses will demonstrate a range of habitat conditions acceptable to reproductive herons in this particular urban waterfront setting. So informed, wildlife planners will be in a better position to prescribe management for herons with reasonable confidence and success. A driving objective of this study is to ascertain whether tree relocation will have an adverse effect on the heronry; then, as may be necessary, to compensate for the removal of nest trees associated with the redevelopment of the Villa Venetia property.

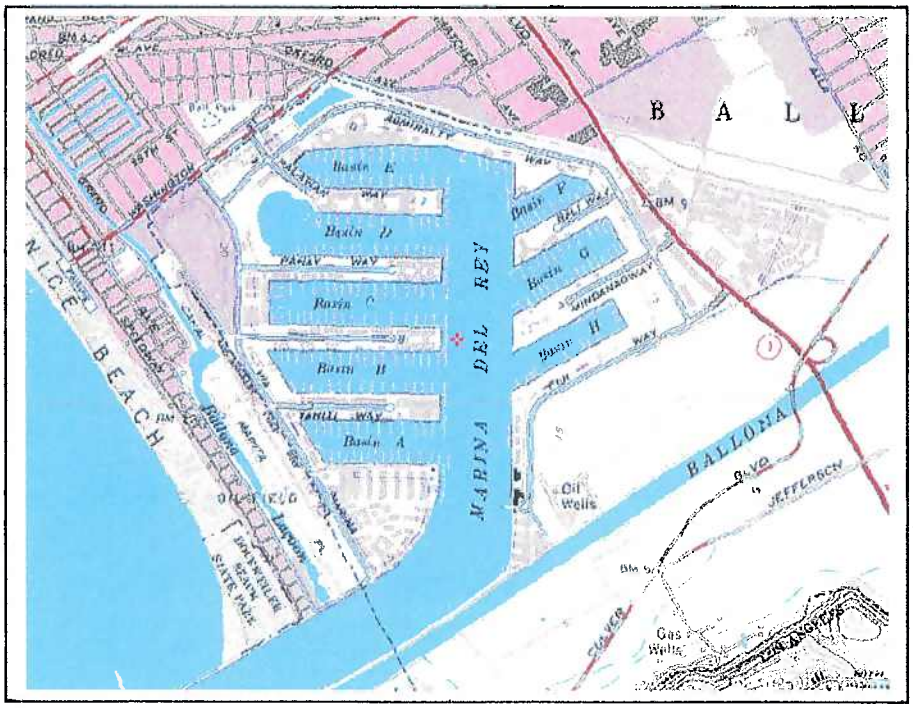
GREAT BLUE HERON, Ardea herodias

- All photographs in this report were taken by JB Froke -

BACKGROUND

Study Area

The heronry study area (Figure 1), which is larger than the heronry *per se*, measures approximately 1,500 acres (2.34 mi²). The study area encompasses all of Marina del Rey harbor, the coastward residential areas that are adjacent to the harbor, the canals and lagoons, and most of Ballona Wetlands. The rationale for these boundaries was to incorporate the entire harbor, all local heron nesting areas that were identified when the study was initiated, plus Villa Venetia and its contiguous 360° surroundings. Ballona was included because it provides alternative foraging space and resources for the herons that otherwise are focused inside the harbor and canal environment -- at least during the summer months.



Marina del Rey harbor is located in Santa Monica Bay, along the Pacific Coast of California. It is south of Venice and north of Playa del Rey, 15 miles southwest of downtown Los Angeles. Constructed in 1960, Marina del Rey Harbor is the largest artificial small-craft harbor in the United States, with a capacity to accommodate more than 6,000 private pleasure boats. The marina is protected at its entrance by two jetties and a detached breakwater, and is adjacent to the downcoast Ballona Creek Flood Control Channel.

BACKGROUND

Villa Venetia & Project Description [1]

Project Location

Villa Venetia and the proposed project are located in Marina del Rey at 13900 Fiji Way, identified as Parcel 64 in the Marina del Rey Local Coastal Program (LCP), an unincorporated area of the County of Los Angeles. Parcel 64 fronts the main channel of the Marina at the terminus of Fiji Way. The project site is located within the *Venice* USGS 7.5-minute quadrangle.

Existing Setting

Parcel 64 contains 6.4 acres and is irregular in shape. The site is bounded on the north by a US Coast Guard station and the Los Angeles County (LACo) Sheriff's station. LACo Department of Beaches & Harbors administrative offices and Fisherman's Village shopping center and marine commercial uses are located in close proximity to the project site just north of the government facilities. Ballona Creek abuts Parcel 64 to the south and the Ballona Wetlands Ecological Reserve is located east of the site. The main channel of the Marina abuts Parcel 64 to the west. The University of California (UCLA) Marina Aquatic Center (MAC) is contiguous to Villa Venetia at its southwest corner.

The project site is currently developed as *Villa Venetia,* four three-story apartment buildings containing a total of 224 units. Ninety (90) units were constructed in 1964 and the additional 134 units were completed in 1969. In addition to the apartment buildings, the site contains a clubhouse, lighted tennis court and subterranean parking. The total square footage of the apartments is 248,920 sq ft.

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1 Project information is adapted from materials provided by project developer, September 2005.

The existing Villa Venetia facility is reported as obsolete and costly to maintain. The existing boardwalk, sections of which are heavily coated with heron guano, is currently closed to the public and no boat slips are provided for temporary tie-ups. Villa Venetia, which was developed prior to the California Coastal Act and also prior to certification of the LCP, was not required to provide public access, view corridors and open space areas for public use and enjoyment of coastal resources. Consequently, the proposed renovation will bring the property to conformance with the Coastal Act and LCP and provide these additional access benefits to the general public.

Proposed Project

The proposed project would remove all on-site structures, improvements and vegetation, to be replaced with a multiple-family housing development containing 479 dwelling units (263 rental dwelling units and 216 for-sale condominium dwelling units). Accessory facilities would include a new marina containing 21-25 boat slips. Accompanying boating facilities such as on-dock utilities, bilge pump-out station, and land-side restrooms and locker facilities and recreation facilities are also proposed. Resident and visitor serving retail uses could be proposed if this addition does not precipitate a Local Coastal Plan amendment. As proposed, the project would result in a net increase of 255 dwelling units.

Access/Parking

Vehicular access to the site will be provided from Fiji Way. Access to the parking garage would be provided from driveways in multiple locations. Parking would be located in subterranean garages. The proposed project would provide 876 residential parking spaces on-site.

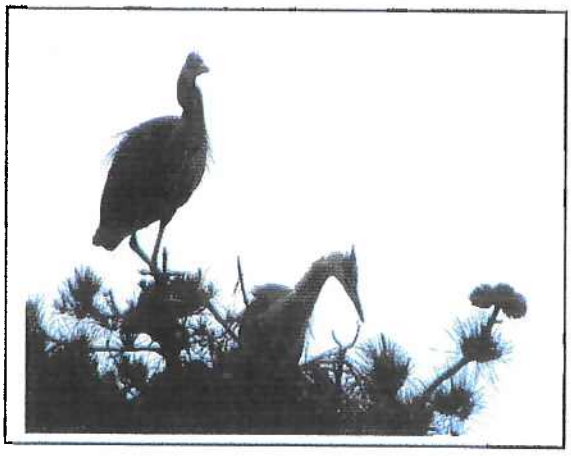
Project Developer's Vision

Respectful of the site's prominence on the water, the project is an assemblage of residential buildings and amenities composed to maximize the experience both inside and outside. Buildings of varying heights will surround a central landscaped plaza. Theses various elevations will be notched and graduated to soften the impact of the buildings when viewed from afar, creating a more porous effect and thus allowing wind and light to penetrate the area.

Proposed Building Materials & Lighting

In order to provide linkage to the neighborhood and create public spaces that will maximize access to adjacent coastal resources, the waterfront boardwalk will be designed to provide visitor-serving retail uses and allow public access to the site via broad, open steps leading from the boardwalk onto the plaza level. In addition, the area would provide public restroom facilities. Public accessways and view corridors will be greatly enhanced or redesigned from what currently exists on the site.

Landscape plant palettes will contain only species that are non-invasive and will have no negative effects on adjacent indigenous plants and habitats, e.g., those protected in Ballona Wetlands. The project proposes a greater amount of landscape coverage than in the existing development. Project landscaping first will be reviewed by the project biologist then carefully coordinated with California Department of Fish & Game, owner of Ballona Ecological Reserve.



Nesting pair of Great Blue Herons (note seasonal breeding plumes on both male and female adult birds)...

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SPECIES PROFILE

Great Blue Heron, *Ardea herodias*

Great Blue Herons are seasonally monogamous, meaning that every reproductive bird will seek a new mate for each successive breeding season -- or following the failure of a season's first nesting attempt (Simpson 1984). The male selects the breeding territory or nest site, which may contain an old nest. There is no fidelity to old or previously used nests among individual herons, i.e., the original nest-builders; but old nests may be reused incidentally for many years by succeeding generations of nesters. That being said, fidelity with respect to the *choice of tree species* for nest-building can be quite strong within colonies of Great Blue Herons (Kelsal & Simpson 1979). Pairs may nest singly, but do so more often in colonies, large and small.

Nest Season

1) Although data on the subject are lean, it is known that adult Great Blue Herons in southern California return to colony sites as early as December (Brandman 1976) and January (Froke *unpubl.*), but apparently more often in February: At Channel Islands Harbor (Ventura County; Froke 2003-present), Great Blue Herons resume nest presence and activities during January and February; and at Dana Point Harbor (Orange County; Froke 2003 – present), Great Blue Herons have been observed seen gathering sticks for nest-building each year as early as mid-February. (Also, see Nest Structures, below).

2) From the same data as above, first eggs have appeared in early March; whereas earlier first eggs have been reported for central California herons (Marin County) by Pratt (1970). Second nest attempts in the species have followed either a

successfully fledged first brood or the failure of a first brood: Under certain circumstances, the species is capable of double-clutching[1].

3) During early-season phases of nesting, high winds and low air temperatures will provoke Great Blue Herons to vacate their colony and abandon their nests, particularly if eggs have not yet been laid (Palmer 1962), i.e., if their reproductive investment has been only nominal to date.

Disturbance at the nest, e.g., by Red-tailed Hawks (*Buteo jamaicensis*) and other large raptors, American Crows (*Corvus brachyrhynchos*) and Turkey Vultures (*Cathartes aura*) also can instigate nest abandonment by individual herons and dissolution of early season heronries (Mehner 1952). Indeed, the relentless actions of crows upon night-herons at the Channel Islands Harbor heronry appears to be a significant disturbance to the herons, perhaps enough to have caused the majority of the colony to abandon the site during 2004. But, while sensitive to aerial antagonists, the same Black-crowned Night-Herons as well as Great Blue Herons (and Snowy Egrets) at Marina del Rey are not disturbed by the presence of humans immediately adjacent to their active nest trees.

Nest Habitat

4) The Great Blue Heron is "widespread and remarkably adaptable" in its habitat selectivity throughout its geographic range (Butler 1992) that includes most of North America and Central America (Palmer 1962).

5) Colony location appears to be best explained by the distribution of foraging sites within the same landscape (Gibbs 1991): Flight-line and distance to reliable food resources are key factors that comprise the overall geographic value of heronries. Several well-documented colonies were located at 1.40 - 4.00 miles to principal feeding sites (Butler 1991; Dowd & Flake 1985; Parris 1979; Thompson 1978).

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1 **Double-clutching** in birds refers to the ability of certain species, as *indeterminate layers*, to lay a second clutch of eggs in one season, generally in response to loss of a clutch or early mortality of a brood.

6) The number of nests in several heronries -- located in Oregon, British Columbia, and Maine – has been positively related to the size of nearby foraging habitats (Bayer and McMahon 1981; Butler 1991; Gibbs *et al.* 1987; Gibbs 1991; Werschkul *et al.* 1977).

7) Site selection also can be driven by the presence and threat from predators, especially mammals, e.g., Raccoon (*Procyon lotor*), Coatimundi (*Nasua narica*), and Coyote (*Canis latrans*): Herons that nest on the ground (Taverner 1926; Gill & Mewaldt 1979), on low shrubs (Behle 1958; Vermeer 1969), cacti (Rosenberg *et al.* (1991), and sagebrush (Blus *et al.* 1980) do so on predator-free islands or cliffsides, only. All herons currently nesting in the Marina de Rey heronry and other coastal sites in Southern California do so in trees (Froke *unpubl.* 2003 – present).

Nest Structures

8) In addition to natural support structures, the most frequent of which are trees (typically 30 - 90 ft); Great Blue Herons also nest on manmade structures and utilize artificial nest platforms (e.g., Sandilands 1980).

9) Nests are built with sticks gathered from the ground, nearby trees, and unguarded nests, primarily by males and placed on the nest by females (Cottrille & Cottrille 1958; Palmer 1962; Mock 1976). The nest, which is built in three days to two weeks, usually is a platform of twigs with a saucer-like interior lined with pine needles, mosses, reeds, dry grasses, smaller twigs, or eucalyptus leaves.

10) At each of the three waterfront heronries in Southern California, Channel Islands – Ventura Harbors, Dana Point Harbor, and Marina del Rey – nesting Great Blue Herons extensively gather sticks from drift-lines along the ocean beach that is adjacent and closest to the embayment and their nest site (Froke 2003 – present). This habit portrays a definite advantage to nest-building in a coastal

environment (in late winter) whereas the urban marina of itself may not produce branches and sticks of sufficient size and quantity for a heron's large nest.

11) Nests range from flimsy platforms to bulky older structures, replaced annually or reused and fortified on a multiple-year basis (Andrle 1988).

Twig-lined interior of a Great Blue Heron nest, Marina del Rey, 2005

Nest Life

12) Incubation, which is by both members of the pair, begins after the first egg is laid; and in California the time to hatching may average 25 days (Pratt 1970). A full clutch may range from 2 to 6 eggs; the mean from California data is slightly more than three (3) eggs (Pratt & Winkler 1985); and five (5) is said to be the "commonest number" (Miller (1944) for Great Blue Herons in other regions.

13) Eggshells are thrown to the ground whereas feces, partially eaten prey, and dead chicks remain in nest (Brandman 1976; Froke, *unpublished field notes* 1973-2005).

14) Nestlings gain 86 percent of their adult weight by 45 days (Quinney 1982), and engage in their first flight at 50-80+ days (Pratt 1970; Quinney & Smith 1979; Vermeer 1969; Werschkul *et al.*, 1977). After fledging, the young will return to the nest for up to three weeks to be fed by their parents (Quinney & Smith 1979).

15) Mean nesting success ($\bar{x}$ = no. all young fledged / no. all successful nests) from 16 studies was 2.3 young per nest; overall success was 62 percent (overall = no. nestlings survived to fledge / no. all eggs hatched) (Butler 1992).

16) From the same broad-based dataset as above, first year mortality averaged 69 percent and second year mortality averaged 36.3 percent (Butler 1992). From 349 band recoveries in Illinois, but without providing evidence for causation, Owen (1959) calculated first-year mortality at 71 percent.

Pair of adult Great Blue Herons at their nest atop a Monterey Cypress

Historical Notes on California Colonies and Nests

Shown in a chart below are data on Great Blue Heron nests that were gleaned from the oölogical[2] archives maintained by the Western Foundation of Vertebrate Zoology (WFVZ)[3]. These data represent the profuse fieldwork of egg and nest collectors who were active during a time when the disturbance and destruction of live eggs and active nests - by hobbyists as well as scientists - was *more or less* legal in the United States. These data are emphasized here, versus gathering more contemporary records from, e.g., Fish and Game files, because of (1) their historical and rural context, (2) the [legally] unencumbered access that the observers had to the nests and colonies, and (3) the generally-acclaimed thoroughness that was attributed to the collectors with respect to never leaving a stone – or nest – unturned. Further, the egg and nest record collections of WFVZ are the largest and most extensive in the world, having been systematically and opportunistically amassed over the past five decades from many smaller private, governmental and institutional collections throughout California and the world by the organization's late founder.

The following oddments from the oölogists' fieldnotes are useful to describe the geographical circumstances and tree selection of nesting Great Blue Herons and colonies in California, notably when more of the state's developed landscape was rural versus urban.

The collections took place in March-April, presumably to maximize the likelihood of finding whole eggs (the object of the search) *versus* live chicks. Additional Great Blue Heron nest trees mentioned in WFVZ files include species of oaks (*Quercus*), cottonwoods (*Populus*), willows (*Salix;* 60 ft specimen), cypress (*Cupressus*), spruce (*Abies;* 100 ft specimen), and Pacific Madrone (*Arbutus menziesii*).

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2 Oölogy is the scientific study of bird nests and eggs.

3 Western Foundation of Vertebrate Zoology, 439 Calle San Pablo, Camarillo, CA 93012. WFVZ houses the largest collections of bird eggs and nests (and their supporting data) in the world; and WFVZ makes these collections available to professional and academic researchers.

Selected data taken from WFVZ files: Great Blue Heron nests in California. 1895-1940.

PLACE	DATE	NOTATION	TREE	COLLECTOR
Zuma Canyon, Los Angeles Co.	1895		*Platanus racemosa*	WL Chambers
Newark, Alameda Co.	Mar. 1912 (also 1910)	"Colony breeding in grove of Gum trees about a mile out of town, nest made of fine dry limbs and about 65 feet high."	*Eucalyptus* sp.	HA Snow
Salinas, Monterey Co.	1917	"...made of sticks placed about 20 feet high in a Blue Gum grove."	*Eucalyptus globulus*	H Shank
Del Mar, San Diego Co.	Apr. 1921	Small scrub oak on steep pinnacles at Del Mar sandstone cliffs.	*Quercus dumosa*	Anon.
Benecia, Solano Co.	Mar. 1928	"35 feet up in smooth-barked eucalyptus in small grove along highway."	*Eucalyptus* sp.	Anon.
Morro Bay, San Luis Obispo Co.	1931	Large colony in eucalyptus grove at Morro Bay	*Eucalyptus globulus*	H Shank
Pt. Mugu, Ventura Co.	Mar. 1935	"...small colony of eight pair ... quite bulky of dry eucalyptus twigs and lined with dry leaves. 70 feet above ground in one of a group of eucalyptus trees growing alongside a drain canal."	*Eucalyptus* sp., probably *globulus* re 70' height	MC Badger
Rancho Santa Fe, San Diego Co.	Mar. 1940 (also 1934)	"Fifty feet up in a eucalyptus tree, ten feet above the nest of a Red-bellied Hawk [Red-shouldered Hawk]. The nest of the Heron was made of sticks and lined with twigs and leaves,"	same as above re 50' height	EN Harrison* [ENH was founder of WFVZ].

Contemporary Colonies

Providing an interesting comparison to the Villa Venetia colony, there are two Great Blue Heron colonies in coastal Ventura County that comprise the Great Blue Heron portion of the Channel Islands Harbor heronry (Froke *unpubl.* 2003-present; 2004[4]). The larger colony occupies a roadside band of tall Blue Gum trees running alongside Spinnaker Way near Ventura Harbor. Twelve pairs nested in the eucalyptus trees during 2005; and birds perched to rest along the rims and catwalks of the adjacent TOSCO fuel tanks and foraged in the uplands adjacent to the facility parking lot and work areas.

4 FROKE, J. B. 2004. Synopsis of the Channel Islands Harbor heronry, 2003-2004: Black-crowned Night-Heron, Great Blue Heron & Snowy Egret @ Channel Islands Harbor, Port Hueneme & Ventura Harbor Ventura County, California.

The second Great Blue Heron colony making up the Channel Islands Harbor heronry presently includes four pairs nesting in three trees. Two of the nest trees, hosting three pairs, are located in a motel parking lot: one is a Monterey Pine that is adjacent to and brushing-up against the two-story motel building; and the second is a Mexican Fan Palm that overarches the building and swimming pool. The third nest tree is a Monterey Cypress located 300 yards distant from the first two, westward on the opposite side of the harbor's west channel, also adjacent to a parking lot and busy picnic area and boat marina.

The second of the preceding Ventura County colonies is best compared as an analog to the colony at Villa Venetia. Both presently consist of fewer than 10 nesting pairs that are closely associated with one another, but whose nest locations span several hundred yards overall. The principal feature of all nests in both colonies is their proximate association with busily occupied (human) outdoor spaces (lawns and walkways) and multi-story domiciles, with adjacent waterways and underneath parking lots and driveways. At both the harbor motel site and Villa Venetia, it is possible to look into a nearby (15-20 ft @ eye-level) nest from a regularly used outdoor stairwell, without disrupting the sitting birds.

Habituation and Tolerance

As much as other urban nesting herons in Southern California, Great Blue Herons exemplify how ecological adaptations of certain species can be transmuted or translated in the context of a human-dominated setting, i.e., a busy urban waterfront environment. The apparent "habituation" or "tolerance" of a wild heron to the presence and actions of people – in a manner that would not occur in a wild or so-called natural setting – represents little more than an individual or population's capacity to assess and learn what about them is safe and 'tolerable,' and within their otherwise inherited and instinctive boundaries. Herons may not 'prefer' to inhabit an urban *versus* natural place, or *vice versa;* but it is arguable that they are not capable to perceive the difference, all things considered *and provided.*

Response to Pedestrians, for Example

For example, roosting and nesting in tree tops provides essential vertical space and sanctuary for Great Blue Herons. In trees, as well as on tank rims, elevated catwalks, and motel roof tops, experienced herons perceive their risk or protection from ground-based disturbances *and* are in a better position to detect and respond to aerial and arboreal threats to their safety and that of their nests and young.

At Villa Venetia, the calmly received, but closely watched pedestrian underneath a group of nests would get a wildly different reception from herons if to pass by instead using a hang-glider or hydraulic cherry-picker, or simply by climbing the tree. Probably a similar reception would be given to the pedestrian if the heronry were situated in rural Northern California or the North Woods: It takes time and repetition for a bird population to recognize and become familiar with the patterns and limitations of its human neighbors.

View of Villa Venetia (Marina del Rey) from Playa del Rey, across Ballona Area A (2005)

SPECIES PROFILE

Black-crowned Night-Heron, *Nycticorax nycticorax*

A true cosmopolite, and thereby distinguished from the Great Blue Heron and the Snowy Egret, the Black-crowned Night-Heron breeds on every continent except Australia and Antarctica. The species is widespread and common in North America (Davis 1993); and it is fairly common and resides year-round in lowlands and foothills across most of California (Granholm *n.d.*).

Although the species is a notable migrant and wanderer throughout its world range (Palmer 1962), Southern California populations of Black-crowned Night-Herons generally are sedentary and settle for making seasonal shifts, regionally and locally. According to Arnold Small (1994), there are significant influxes of both adult and immature herons from the interior valleys to the coast during August through March. However, since at least 2003, my own impression from the Southern California coast is that local populations remain mostly stable and sedentary.

Black-crowned Night-Herons are colonial breeders and gregarious throughout the year, including interspecifically with other colonial heron species -- locally the Great Blue Heron and Snowy Egret. Unlike these herons, Black-crowned Night-Herons are most active at night during the non-breeding season. However, the birds actively forage by both day and night during the nesting season, probably to meet the higher caloric demands of producing and rearing young (Naoko & Sawara 2000).

<u>Nest Season</u>

1) In his waterbird guide, Cogswell (1977) stated that Black-crowned Night-Herons in California breed mainly from February to July. However, more recent field

studies have verified a substantially more protracted nesting season in the state (*below*).

2) Findings of a coastal Ventura County heronry demonstrate that Black-crowned Night-Herons, while still occupying their winter roosts, investigate potential nest locations in early February. By March, birds are no longer at their winter-roost and are nesting or initiating nesting. By late April, pairs fully engage in nesting and feeding young. In this observed scenario, Black-crowned Night-Herons, pairs of which are asynchronous in their nesting schedules, will raise and fledge young well into mid-August. A similar pattern has recently emerged in Dana Point Harbor (Froke *unpubl.* 2003 - present).

3) Unpublished data from the former USN Long Beach Naval Shipyard has revealed nests with viable eggs as late as 26 July and 9 August 1996 (*on file,* WFVZ).

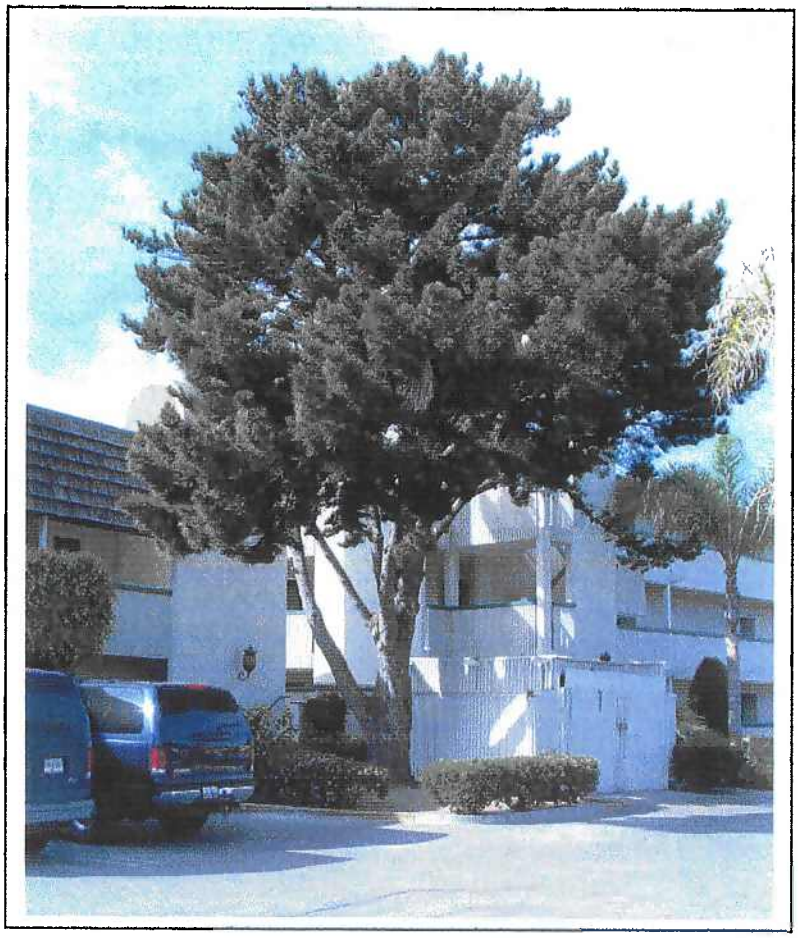
Nest Habitat

4) Black-crowned Night-Herons are flexible in their selection of colonial breeding sites; but whether on a remote island or amidst a busy urban waterscape, defense from predation is of paramount importance. The same is true for selection of post-breeding roost sites. Protection from cooling winter and early spring winds also is crucial (Froke *unpubl.*; Pelmutter 1992; Tian-hou & Guo-zhen 2000).

5) In southern and central California, Black-crowned Night-Herons nest in numerous types of trees and tall shrubs and dense emergent marsh vegetation. In urban and park settings, e.g., Dana Point and Channel Islands harbors, the birds prefer nest placement in treetops but just inside the first canopy layer, possibly for defense from crows and cool breezes. In Ventura County, nesting birds select the supportive branches and foliar cover of Monterey Pine (*Pinus radiata*), Monterey Cypress, New Zealand Christmas-Tree (*Metrosideros excelsus*),

London Plane Tree (*Platanus* x *acerifolia*), Blue Gum, and a magnolia. In Orange County, the birds select upper canopy sites in inter-branching groups of eucalyptus trees.

6) Most of the heron nest sites in coastal Ventura County, including in part, Channel Islands Harbor, are in trees associated with residential and hospitality building complexes, i.e., high-density condominiums, apartments, and a motel where human activity is a constant presence. In most cases, nest trees, which host Great Blue Herons and Snowy Egrets as well as Black-crowned Night-Herons, literally brush against the occupied buildings, placing the nest strata at eye-level with balconies and exterior stairwells, and nests just 10-20 ft from human observers.



Monterey Pine with four heron nests (2 Great Blue Heron & 2 Black-crowned Night-Heron), Ventura County, CA

Nest Structures

7) In well-established colonies, the male Black-crowned Night-Heron may either adopt a territory with an old nest, which the pair would later rework by adding new sticks, or he may begin a new nest from scratch. Either way, the male brings sticks to the female, who in turn weaves them to form or re-form the shallow saucer-like structure. With the male gathering and the female weaving, the pair can complete construction of the nest in two to six days.

8) The nest structure, typically constructed of coarse sticks and lined with finer materials, may be solidly built with several inches of material or it may be frail with a bottom thin enough for eggs and nestlings to be plainly visible from underneath.

Nest Life

9) Black-crowned Night-Herons typically produce clutches of three-five eggs: The mean clutch from 684 nests in a South San Francisco Bay colony (Bair Island, May 1971) was 2.90 eggs (Gill 1977).

10) Although the laying interval may be one egg every other day (2-day interval), incubation starts with the first egg. Incubation, which is by both parents, reportedly lasts 22-26 days (Yu & Hahm 1997; Hancock & Kushlan 1984; Custer *et al.* 1992).

11) Nestlings are fed regurgitated shrimp and fish on the first day from hatching.

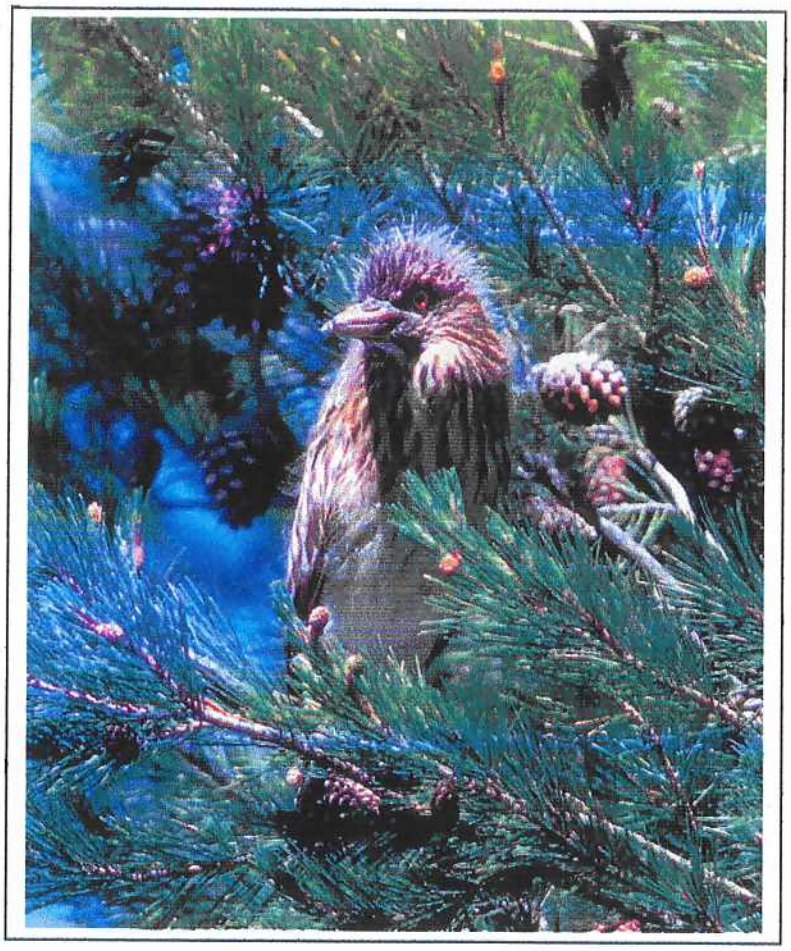
12) Parents dispose of eggshells over the side of the nest as soon as hatching is complete. Otherwise, parent birds do not attempt nest sanitation, and nests are plastered with white excrement by the time all young have fledged. However, young will back up to the nest rim to void when they are able to stand and move around (Maxwell & Putnam 1968; May 1929; Nickell 1966); hence, the outside of

the nest and surrounding foliage and ground below will be plastered white with accumulated guano.

Brooding adult Black-crowned Night-Heron

13) The species' nestling period lasts from 30 to 35 days, and the nestlings are able to maintain their own body warmth (they are homœothermic) at 28 days (Zhu *et al.* 2000).

14) Young may leave the nest after two weeks, hopping to outer branches to stretch and sun ("branching"); and by six-seven weeks they may fly and ultimately fledge from the nest. Fledglings fly to foraging sites with adults and beg for food (Palmer 1962). In Dana Point Marina, young Black-crowned Night-Herons learn within two months after fledging to forage for fish and crabs from the stern decks of pleasure craft and from docks (Froke *unpubl.* 2004, 2005).



Nestling Black-crowned Night-Heron 'branching' away from its nest

SPECIES PROFILE

Snowy Egret, *Egretta thula*

Even though the geographic range of the Snowy Egret covers much of North and South America, the birds are not long distance migrants. In particular, Snowy Egrets are local dispersers in California's coastal environment. There, the species is widespread along the shores of estuaries, rocky coastlines, fresh and saline emergent wetlands, ponds, slow-moving rivers, and wet fields.

Snowy Egrets, Doheny Breakwater, Orange County

Relying on what is now long-outdated information (specifically, Garrett & Dunn 1981), California Department of Fish and Game (Granholm *n.d.*) currently refers to the Snowy Egret as being common from September to April in coastal lowlands of southern California, but rare through summer, and occurring then mainly in San Diego County. The late Arnold Small (1994) characterized any Snowy Egrets along the coast from July and August to late April, and birds remaining along the coast during the summer as

probably immature birds. *However,* the species including its breeding adults is much more common than rare throughout the year including summer in coastal areas of Orange, Los Angeles and Ventura counties (Froke, *current studies*).

Nest Season

1) As suggested above, useful data on nesting Snowy Egrets in southern California is wanting, especially data on published places and dates to describe the species nesting range and season. Nonetheless, an established Snowy Egret colony in coastal Ventura County generally gains its momentum each year (2003-2005) by mid-March and is largely concluded by mid-August. Colonial Snowy Egrets in Dana Point Harbor, though more staggered in starting times among pairs, altogether nested from early April through August, 2005 (Froke *unpubl.* 2003 - present).

Nest Habitat

2) Regarding Snowy Egrets in southern California, California Department of Fish and Game (Granholm *n.d.*; again relying on Garrett and Dunn 1981) stated that "dense marshes are required for nesting;" also, that the species nests "usually in rather low trees" (*in* Cogswell 1977 and Palmer 1962).

3) More recently, Small (1994) stated that Snowy Egrets in California require low dead trees and bushes within or at the edges of freshwater lakes or marshes for nesting.

4) *Nevertheless,* Snowy Egrets in Orange County nest from 50 to 60 ft up in 70-ft eucalyptus trees; and in Ventura County, nests are placed 20 to 30 ft up in 30- to 40-ft Monterey Pines and London Planes, and in all cases in landscaped settings at 30-40 ft above sea-level.

5) Snowy Egrets apparently prefer to establish territories and collectively their colonies in trees occupied by conspecifics and other heron species – locally Black-crowned Night-Herons -- rather than establish territories in vacant sites (Davis 1986; *also* Meyerriecks 1957; Howell 1932; Meanley 1955; Montagna & Wimsatt 1942).

Nest Structures

6) Snowy Egrets build a typically elliptical, flat and loosely woven nest from slender twigs, one-two feet in length. The male collects the twigs from trees and bushes nearby, also from the ground and from unattended nests in the colony, and the female weaves them into position. Working thusly, a pair completes their nest in five-seven days.

Nest Life

7) Snowy Egrets are seasonally monogamous and re-pair annually. To advertise for a mate, the male first selects a stable nest site from which to display and he may initiate slight to moderate nest-building to interest the female (Palmer 1962). The male may attach to an old nest (Parsons 1985; Davis 1986; Burger 1978) or start with a new location. Nest construction begins with courtship and continues at least through incubation (Hancock & Kushlan 1984).

8) Clutches are usually three-five within a range of two-six; and the species is probably single-brooded. However, it will renest if the first brood has failed; and in that case the pair may select a new colony site for the renesting (Ogden 1994).

9) Incubation lasts 20-24 days, and the young leave the nest at 20-25 days thereafter. Both parents care for the nestlings, but no data are available regarding age at independence or first breeding. While incubating and brooding, nest relief between parents involves the ceremonial presentation of a stick, which in turn is worked into the nest.

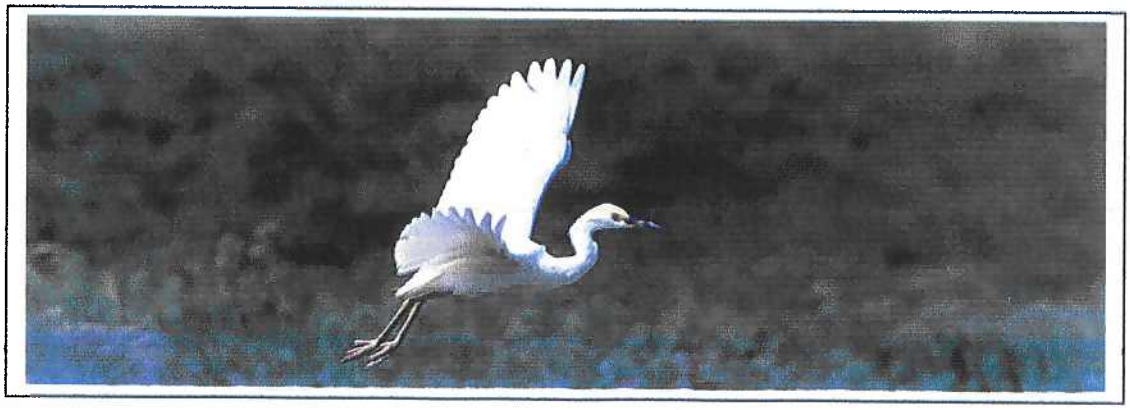
Breeding adult SNOWY EGRET: Note blood-swollen facial tissue that signifies breeding condition

FINDINGS

Number & Distribution of Nests

Two hundred and seventy-two (272) heron nests, *active* or *recently active*[1], were identified and mapped within the Marina del Rey heronry during the latter part of the 2005 nesting season (July - September). These nests were clustered inside four (4) geographic areas (Areas A - D; see Figures 2 -7). All nests were constructed in medium to tall trees (30 - 100 ft) including mostly Blue Gum and Ironbark (*Eucalyptus sideroxylon*), plus several Monterey Cypress (*Cupressus macrocarpa*), a Coral Tree (*Erythrina crista-galli*), a Mexican Fan Palm (*Washingtonia robusta*), and a magnolia (*Magnolia globosa*).

Herons had nested in seven (7) additional trees during 2004-2005, each growing adjacent to public park or apartment complex parking lots within the marina. However, the branches of these had been trimmed and the nests removed prior to their discovery and documentation as nest trees, i.e., it was evident that tree-trimming took place before nesting was completed.



Snowy Egret

1 *Terminology* -- ACTIVE refers to nests in use at the time of observation: adults and/or nestlings were present. RECENTLY ACTIVE refers to heron nests that proved evidence of recent use: Guano (whitewash) or food residue on nest or underlayment structure, visible eggshell(s) or remains of chicks attached to nest or adjacent foliage. Expert judgment is required to determine whether a recently active nest was last used during the present or preceding nesting season.

The distribution of active and recently active heron nests among the four geographical areas within the Marina del Rey heronry (2005) is summarized in the following table.

AREA	No. TREES	No. NESTS	HERON spp.[2]
A	3	13	BcNH
B	27	251	BcNH, SE
C [Villa Venetia & Vicinity]	4	6	GBH
D	1	2	BcNH
TOTAL	35	272	BcNH, SE, GBH

Table 1. GEOGRAPHIC DISTRIBUTION OF HERON NESTS WITHIN THE MARINA DEL REY HERONRY, 2005

Great Blue Heron nest, Area C (2005)

2 *Abbreviation* -- BcNH = Black-crowned Night-Heron; GBH = Great Blue Heron; SE = Snowy Egret.

FINDINGS

Nest Tree Selection

The two hundred and seventy-two (272) nests identified within the Marina del Rey heronry indicate availability of tree species - with specimens of sufficient size - and a preference for these by the individual herons. The distribution of heron nests constructed among these tree species during 2005 is summarized in the following table.

HERON SPECIES	No. NESTS	CORAL TREE	CYPRESS	GUM	MAGNOLIA	FAN PALM
Great Blue Heron	*6*		5			1
Black-crowned Night-Heron	*216*	1		214	1	
Snowy Egret	*50*			50		
TOTALS	*272*	1	5	264	1	1

Table 2. TREE SPECIES SELECTION (NUMBER OF NESTS PER TREE TYPE) BY NESTING HERONS AT MARINA DEL REY HERONRY, 2005

A thirty-five-foot gum tree with 25 active nests of Black-crowned Night Herons and Snowy Egrets, Marina del Rey, 2005

FINDINGS

Villa Venetia Nest Trees

Nine (9) mature Monterey Cypress trees currently grow on the Villa Venetia property, these measuring 30-60 ft in height. Figure 9 provides a tree locator and key to the assigned numbers (1-9) for each of the onsite cypress trees.

Heron Use

Three (3) of the Villa Venetia cypress trees recently have been used by Great Blue Herons for nesting. Two of these, (nos. 4 and 6) are located along the waterfront and were used for nesting by three (3) pairs during the 2005 breeding season and reportedly in previous years. The third of the three cypress trees (no. 1) was used by at least two pairs previous to this study, apparently during 2004.

Because none of the individual herons in Marina del Rey have been banded or otherwise marked, it is not possible to know whether any of the birds that nested in the waterfront cypress trees during 2005 were the same as had nested previously in (or fledged from) the third cypress tree (no. 1) in 2004, or any preceding year.

In addition to the three recently active nests in tree nos. 4 and 6, there also is a small nest or partial construction of a heron nest in tree no. 6. By its size and location, this structure appears to have belonged to a Black-crowned Night-Heron; but it is possible that it is a partially-built nest that was prematurely abandoned by a pair of Great Blue Herons.

Collateral Species

In addition to herons using the trees, at least two Double-crested Cormorants (*Phalacrocorax auritus*) used cypress tree no. 6 as a day perch and possibly as an overnight perch during the study period (July-October), and likely previous. This is worth mentioning because local naturalists have stated that the cormorants have nested in the tree(s) when in fact they only perch onsite (granted, the heavily accumulated guano in the branches may appear to be a nest from ground-level). No cormorant nests are present in any of the local trees; and no cormorant nests were identified within the marina environment during the study period.

Condition of Trees

Cypress no. 1 is a tall (55-60 ft), healthy and mostly full-foliaged tree that was "topped" during the course of seasonal trimming. The tree was topped three (3) years ago,

Monterey Cypress no. 1

previous to the present lease ownership of the Villa Venetia complex. Approximately two years ago, during the current lease ownership (Lyon Capital), accumulated deadwood was removed from the interior well of the tree, during October-December after the nesting herons had vacated the tree. Two former Great Blue Heron nests remain at the top of the tree, adjacent to the top-cut. The tree is situated between a parking lot and driveway and adjacent to a tennis court.

Cypress trees no. 4 and 6, which were occupied in 2005 by five nesting pairs, and cypress no. 5 which closely *interbranches* with its neighbors, are suffering the effects of overcrowding (limb breakage and shading) and guano deposition. Nonetheless, and probably due to their height and open exposure, they appear to have been *preferred* by the herons for nesting. Tree no. 5, which was not a nest tree in 2005 but is part of the nest tree complex, is in an advanced state of senescence. In total, 30-40 percent of the foliage and branches of the three trees is dead or dying in response to leaf-burial, scalding, and general phytotoxification[1] from accumulated heron and cormorant guano. Wind stress -- the trees face the prevailing northerly breezes and winds -- which normally is well tolerated in the species, probably is an exacerbating factor in the deterioration of these damaged cypresses.

Cypress trees nos. 2, 3, 7, 8, and 9 are all hardy trees that apparently have not been used for nesting by herons (no stick relicts are evident). Tree no. 3, however, has been used as a day-perch by Great Blue Herons. For example, during the latter part of the 2005 nesting season, nesting adults from cypress no. 4 and an offsite nest tree (palm tree nest @ Shanghai Red's; *see below*) were observed at rest inside the deeper foliage of tree no. 3; and both nest sites were in plain view of the regular perch position.

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1 Several guano-related factors can achieve phytotoxic levels in rookeries and heronries: E.g., increased pH will generate excess hydrogen ions which in turn decrease the absorption of anions (e.g., nitrate, chloride, phosphate), slowing vegetation growth and inhibiting regeneration (Salisbury & Ross 1969); and increased soluble salts adversely affect water potential at the roots of trees (Wiese 1978); also see Gillham (1956) and Weseloh & Brown (1971). For specific effects of cormorants on heronry vegetation, see Cuthbert *et al.* 2002.

Monterey Cypress trees nos. 4, 5 and 6 at Villa Venetia

Monterey Cypress no. 6

Monterey Cypress no. 8

Offsite, Fourth Heron Nest

In addition to the three active nests at Villa Venetia, a fourth Great Blue Heron pair nested within the Marina del Rey heronry during 2005. Their nest was located in a Mexican Fan Palm on the grounds of Shanghai Red's Restaurant (palm no. 1), approximately 440 ft from its nearest neighbor at Villa Venetia (cypress no. 4). A triangular polygon that attaches all identified Great Blue Heron nests in the area, which is equivalent to all nests of the species within the marina heronry, measures 1,430 sq ft.

All Great Blue Heron nest trees proven to occur within the Marina del Rey heronry, 2004-2005

Nestling Development & End of Nest Season

All four nesting pairs of Great Blue Herons were well underway by the time this study started during the first week of July, 2005. As could be told from ground-based observations, all nestlings visible in the four nests appeared to be in similar stages of natal development, give or take one-week: During the first week of July, the nestlings appeared to be between four and five weeks old. All nestlings fledged during the period of 16-22 August. When it was certain they were empty, the three nests in cypress

trees 4 and 6 were examined first-hand on 23 August 2005. The nest in palm tree no. 1 was not approached or examined as closely.

Accessing a vacant heron nest in Monterey Cypress no. 6, 23 August 2005

Recently fledged Great Blue Heron nest, cypress no. 6, 23 August 2005

FINDINGS

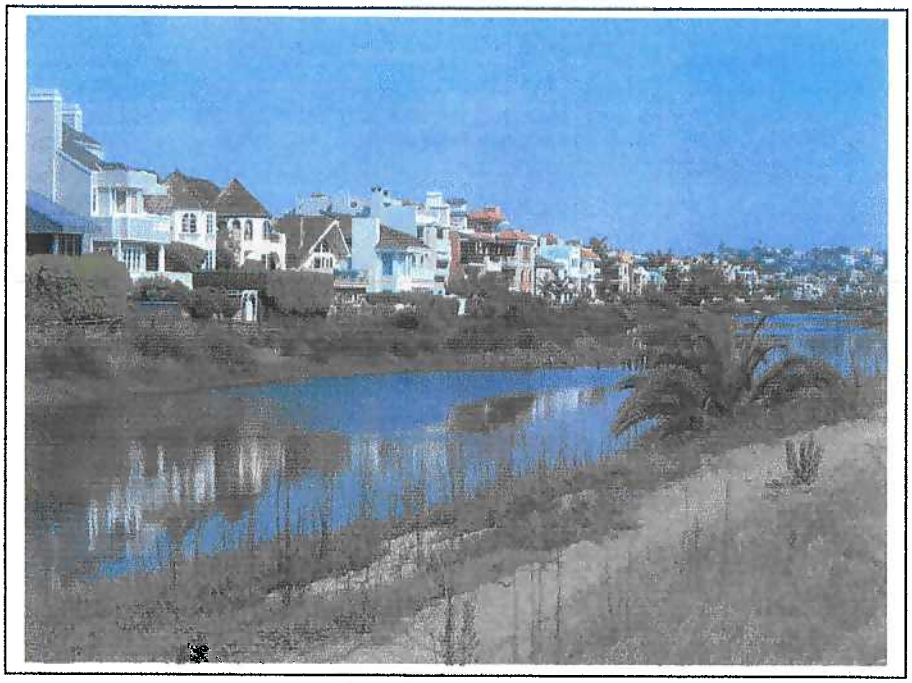
Heron Foraging

Incidental observations of heron foraging within the heronry environment during July through October revealed the following general patterns and information (see Figure 8):

1) Great Blue Herons more frequently foraged in the uplands and seasonally dry fields of Ballona Wetlands (Areas A & B) than either Black-crowned Night-Herons or Snowy Egrets.

2) Black-crowned Night-Herons foraged during daytime as well as nighttime; and as a corollary, diurnal group roosts of the species were not encountered during the nesting period.

3) Snowy Egrets more commonly foraged in groups than the other heron species.

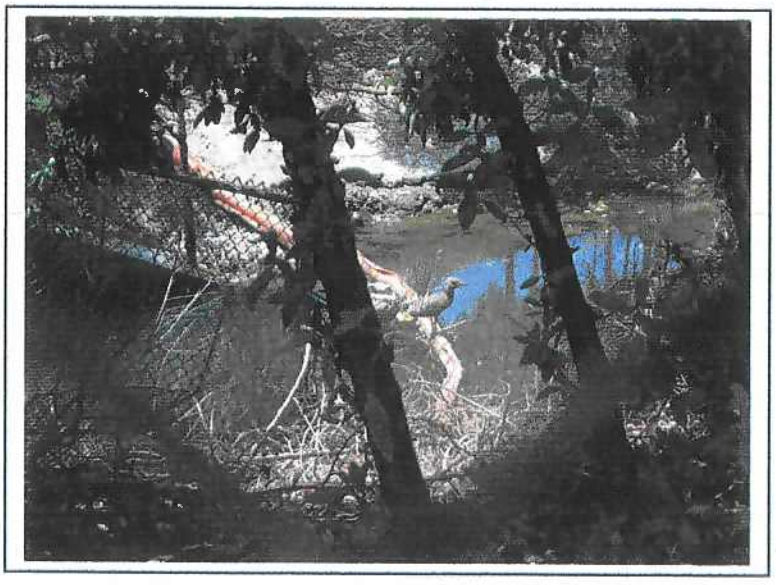


Ballona Lagoon, Marina del Rey, 2005

4) Great Egrets (*Ardea alba*) were encountered on very few occasions, and only as single birds, usually foraging in proximity of Great Blue Herons in the Ballona fields. Nonetheless, it is expected that the species will forage throughout the Marina study area, albeit in smaller numbers and outside of the breeding season.

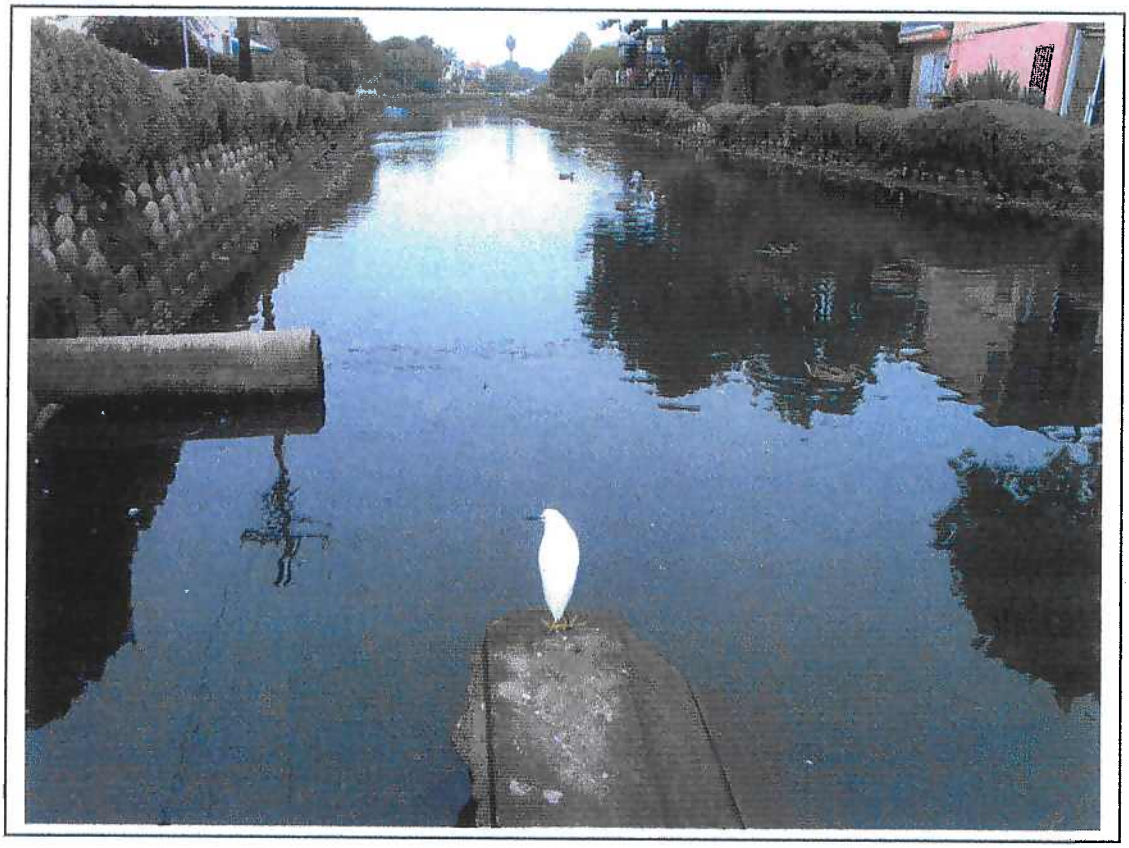
5) Great Blue Herons, Black-crowned Night-Herons, and Snowy Egrets all foraged throughout the lamp-lit marina waterfront, from late evening through early morning, using docks, ramps, and boat sterns (dive and bait platforms) as perches from which to stalk and attack prey.

6) During the daytime, the Oxford Flood Control Basin ("Oxford Slough") was visited relatively infrequently by foraging herons. However, this study did not investigate the solitary Green Heron, *Butorides virescens*, a species that is resident inside the protected basin. Small numbers of individual juvenile Black-crowned Night-Heron occasionally hunted from a well-shaded outlet structure; and small numbers of Snowy Egrets returned from time to time to hunt on the edge of the main inlet. Great Blue Herons were not observed inside the basin during July through October, 2005.



Immature Black-crowned Night-Heron, Oxford Flood Control Basin, Marina del Rey, 2005

7) The majority of incidental observations of foraging herons, and of observations made while specifically searching for foraging herons were from within the marina dock environment and the Ballona Lagoon / Grand Canal areas.



Snowy Egret, Grand Canal, Venice, 2005

REVIEW & EVALUATION

Findings from this study confirm the presence of a thriving multi-species heronry in Marina del Rey. Although the presence of the heronry is general knowledge to public agencies, local naturalists, and even casual observers, the present data from the 2005 nest season are the first to describe fundamental attributes such as breeding numbers, nesting locations, and habitat selection.

Nest History

A documented history of the Marina del Rey heronry, including Ballona is not available. Besides missing geographic and chronologic data, there is no reliable information on evolving population numbers for any of the three nesting species. To emphasize the problem, a recent news story (LA Times, 8 June 2004) reported that the Villa Venetia colony was then comprised of 38 nesting pairs: The claim is unsubstantiated and grossly exaggerated, and of itself highly unlikely. Such a colony would have left relic nests and guano behind that would be clearly evident in 2005; and as reported here, no such nests or residue are present. Further, had so many nesting birds been present in the heronry just one year ago, it would be reasonable to expect that a larger number than was actually observed in 2005 would be present in the marina environment.

Nest Site Selection

Whereas Black-crowned Night-Herons and Snowy Egrets nested predominantly in eucalyptus trees, the local Great Blue Herons selected a group of cypress trees (plus a single palm in the immediate vicinity) for nesting. This pattern is familiar to the multi-species heronry that presently exists in and near Channel Islands Harbor: There, the majority of night-herons and all egrets most recently nested in a grove of Monterey

Pines while the Great Blue Herons, in two separate colonies, nested in eucalyptus, pines and cypresses. One of the two colonies of Great Blue Herons is considerably the larger (17-20 pairs, 2005) and inhabits a linear roadside grove of tall Blue Gum trees adjacent to the Ventura Marina and a petroleum storage facility.

In both the Los Angeles and Ventura county heronries, the Great Blue Herons have opted for the taller and more sturdy trees available in the respective heronry environments, forsaking the interspecific communality that otherwise attracts the species in any number of other heronries where the nest structures are otherwise sturdy and sufficient. Put another way, where suitable tall trees are limited, Great Blue Herons are obliged to nest in those; whereas Black-crowned Night-Herons and Snowy Egrets can more readily accommodate themselves to nest in a wider range of trees and tree species, allowing more opportunities for mixed-species colonies to establish.

During 2003 and 2004, and evidently before, two pairs of Great Blue Herons at Channel Islands Harbor had nested side-by-side in the amassed treetops of two adjacent Monterey Cypress trees. After one of the nest trees was toppled during a winter storm in 2004, only one pair nested in the surviving tree the following season (2005). Simultaneously, an additional pair nested in a nearby Monterey Pine (*Pinus radiata*) that previously had been occupied by two pairs of Great Blue Herons, at least during 2003 and 2004. As has also been observed and reported for other heron species, this event suggests that Great Blue Herons are resilient to the loss of nest trees in colonial groves and stands; and further suggests why nest tree fidelity (in typically open and wind-swept environments) does not appear as an evolved trait in the species.

In addition to height and stability of selected nest trees, Great Blue Herons in Marina del Rey (and Ventura County) exhibit another known habit of the species: to nest high and in plain view of the surrounding airspace and the neighboring colony, and within a short distance to water. Conversely, Black-crowned Night-Herons and Snowy Egrets, while also nesting in vicinity of the water and foraging resources, appear to prefer more

foliar cover above and surrounding their nests, and locally may nest as low as 20 ft above ground-level.

Tree Condition & Maintenance

The adverse effect of heron nesting, i.e., guano deposition and accumulation, is taking a toll on cypress trees (nos. 4, 5, 6) recently in use by nesting Great Blue Herons. Significant portions of the affected trees are dying-back as a result of heron use; and the general welfare of the trees is questionable. Three adjacent cypress trees (nos. 7, 8, 9) that are approximately the same age and nearly as tall size as those that are deteriorating, and that have identical environmental exposure but are not used by herons, are in very good condition. These trees probably are not used by herons because they are not contiguous and do not inter-branch and therefore are not as attractive to nesting herons.

A minimum of six (6) large eucalyptus trees that formerly had been used as nest trees by one or more species of herons, most recently in 2004 or 2005, were located after being vacated by the birds. In the case of at least four (4) of these trees, it was evident that tree trimming and nest removal had taken place during the 2005 nest season, i.e., before July and the start of the study period. Recency could be determined by the freshness and mass of the ground-deposited guano and pieces of uneaten prey below the tree branches. These trees were located in apartment complexes and parking lots throughout the marina; but none were located in the vicinity of Villa Venetia.

Nest Production

Three nestlings occupied each of the three Great Blue Heron nests as of the last observation made prior to final fledging of each nest; and the observations were made between 1-7 days before the respective vacancies. Therefore, from available evidence it is assumed that nine (9) young herons successfully fledged from the three cypress nests at Villa Venetia in mid-late August, 2005. The last recorded observations of young

Black-crowned Night-Herons and Snowy Egrets in or near their nests were made on 12 September 2005.

Foraging

Heron foraging is widespread but unevenly distributed in the context of the entire marina-wetlands environment, inclusive of the urban canals and lagoons. Specifically, during July through October the summer-dry wetlands and associated uplands are relatively unimportant to herons that focus instead on the shallows and muddy edges of watered sites such as the canals, and on fishing and crabbing inside the marina proper. In view of identified heronries in Los Angeles, Orange and Ventura counties, it is increasingly evident that foraging conditions provided within the developed marinas, i.e., perennial prey bases (fish and crabs), artificial hunting platforms, clearwater shorelines, and nighttime lighting represent important resources for the three species of predatory herons.

Conclusion Regarding Villa Venetia

Development of the Villa Venetia property, including removal of the existing nine cypress trees, will preclude future onsite nesting by Great Blue Herons, *the only heron species nesting onsite.* The local population very likely will adjust and recover from the loss of the cypress trees, but with uncertainty as to where, when and to what extent such recovery (*successful reproduction and natural recruitment*) will take place. Better certainty and assurance of success will depend on the subsequent availability of necessary resources (*suitable setting and structures*) for pair formation and secure nesting. On the other hand, it is sensible to expect that development of the property will not have deleterious effects on populations of Black-crowned Night-Herons and Snowy Egrets that *are all offsite but within the same heronry.*

RECOMMENDATIONS

A / Heron Management

There is enough known about Great Blue Herons - the species and the local population - to initiate a management program to compensate for the removal of reproductive habitat as will be caused by development of the Villa Venetia property. Following is an outline of a specially recommended management program designed to conserve Great Blue Herons within the marina heronry. As is recommended below, a second season of nesting study (January - September 2006) will provide useful data to inform a final version of this management program.

Management Concept

The concept is to establish a new colony tree grove at an offsite location within Marina del Rey or immediately next door inside Ballona Ecological Reserve. The replacement grove would be comprised of Monterey Cypress trees collected and transplanted from Villa Venetia. In addition to trees, and to further encourage adoption by nesting herons, formerly used nests would be relocated to the recreated colony structure.

The planning and design of the program would refer to proven traditional methods plus innovative techniques used elsewhere successfully to enhance colonial heron and wading bird populations with artificial nest structures.

Program Location

Two alternative sites have been identified for this program: From ecological and management standpoints, both are appropriate for introducing and sustaining a heron colony (see Figure 10). The first site is located inside Parcel 9U, adjacent to the marina

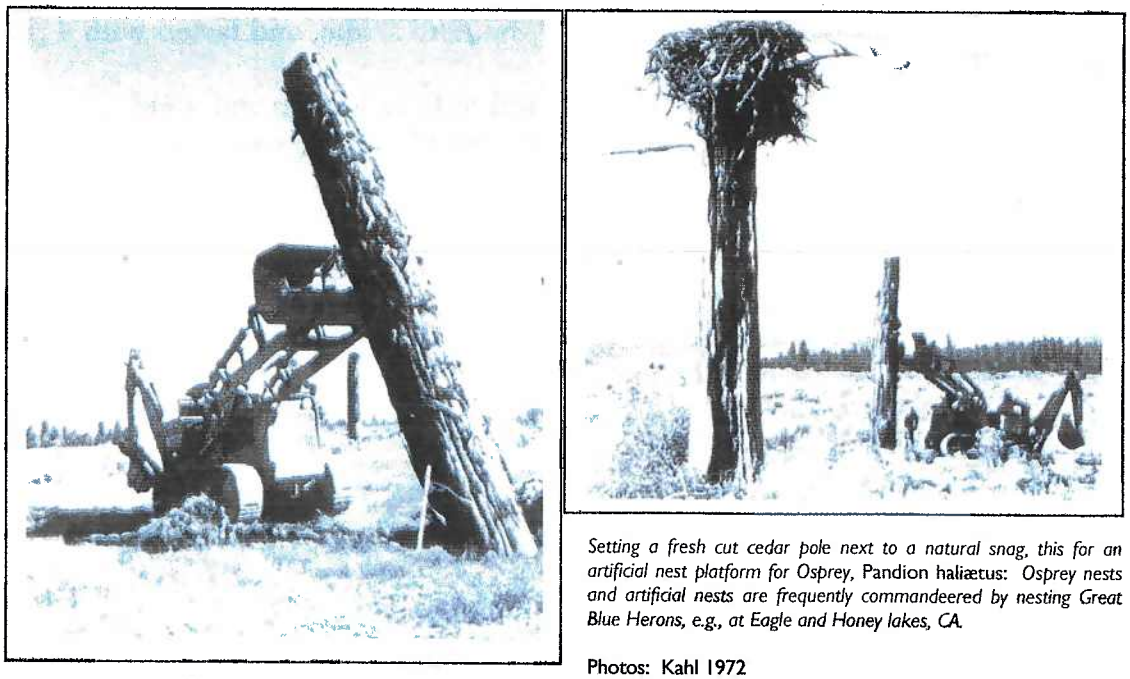
near Marina Way and Via Tahiti (*Marina Site*). The second site is inside Ballona Area A, proximal to Villa Venetia (*Ballona Site*). Cover conditions of both sites are predominantly ruderal, based on soils derived from compacted dredging spoils and fill.

Major Program Elements

1) Three live cypresses would be transferred from Villa Venetia to the selected management area. For this purpose, the three most suitable candidate trees, based on their height, density and vigor, are nos. 2, 7, and 8 (see Figure 9).

2) Set amidst the relocated live cypresses, an additional cypress would be *cut* and moved to the management area, more or less intact, to be maintained as a *snag*, or standing dead tree. Best candidates for this purpose are tree nos. 1 and 6. Both candidates presently contain at least one previously used heron nest; and the nest or nests would be transported and preserved intact with the tree.

3) The best method for *planting* the snag, e.g., setting it in poured concrete or inside a concrete collar with drain gravel plus cabling, will be determined in consultation with both a soils specialist and civil engineer.



Setting a fresh cut cedar pole next to a natural snag, this for an artificial nest platform for Osprey, Pandion haliætus: *Osprey nests and artificial nests are frequently commandeered by nesting Great Blue Herons, e.g., at Eagle and Honey lakes, CA.*

Photos: Kahl 1972

3) Simple lumber braces would be installed onto the natural framework of the live trees and snag for the purpose of lending support to both the snag and the nests.

4) At the time of planting the trees and snag, four (4) remote camera receivers would be installed at the tree tops, two (2) of which would be pre-wired for ground pick-ups, and two (2) would be set up for wireless transmission and remote (web-based) monitoring.

5) Optimal design of the new colony site would incorporate a small wetland feature that entails at least a seasonal pond (probably saltwater) in close proximity to the nest trees.

6) The program would include appropriate interpretive signage and supportive materials, initially developed by the project ecologist/ornithologist and distributed through local agency and NGO naturalists, and hospitality and tourism representatives.

Great Blue Heron nestlings at Bakers Lake Heronry, Cooks County Nature Preserve, Chicago IL (2000)

Program Assurances

1) The design and implementation of the heron nesting structure will be directed by the project ecologist/ornithologist who will work in close collaboration with appropriate specialists, i.e., a qualified arborist, civil engineer, and telecom-webcam expert as well as the construction or landscape contractor.

2) The program will focus on four overlapping stages of heron observation and periodic monitoring. These will be during the (a) Villa Venetia tree removal; (b) Villa Venetia site disturbance inasmuch as it takes place during nesting months (Jan-Oct); (c) new site construction and installation of the relocated trees and snag; and (d) post-installation, first full-year that the new colony trees and snag are in-place.

3) A final post-construction monitoring element will entail four additional years of twice-monthly inspections (32 hours per month) of heron nesting and nest season foraging activity for all species throughout the heronry, but with appropriate emphasis on Great Blue Herons.

B / Further Study

Additional Nesting Season

The present study was initiated midstream during the 2005 nesting season. Evidently, most pairs were either finished nesting or were just wrapping-up and their young were fledging when the study was initiated. The exception was the colony of Great Blue Herons, the entirety of which was still in the nestling stage and had several weeks to complete when observations were started. Also, a minority of Black-crowned Night-Herons and Snowy Egrets was at a comparable stage of development as the Great Blue Herons. It is strongly recommended that a full nesting season, starting at the beginning with pair formation and colony development be studied during 2006.

Simultaneous Studies

Three questions should be addressed in order to better understand the working relationships of the Marina del Rey Heronry landscape and waterscape with respect to nesting herons, and ultimately to the conservation of nesting Great Blue Herons. These matters would be studied simultaneously with the primary 2006 nesting study, previously recommended.

First, what are the main geographic patterns of foraging for each of the three heron species throughout their respective nesting seasons?

Second, at a survey level, what prey resources are available to the herons within the identified geographic foraging ranges? In particular, what are principal small mammals available to Great Blue Herons inside Area A of Ballona Wetlands during the species' nesting season?

Third, what are the main foraging conditions, such as water quality and prey availability within the Oxford Flood Control Basin; and as a corollary, what is the general level of use of the basin by foraging herons during the nesting season?

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FIG 1

FIG 1 - AERIAL IMAGE OF HERONRY STUDY AREA
Study Area encompasses, e.g., Admiralty Park, Ballona Creek, Ballona Lagoon, Ballona Wetlands, Del Rey Lagoon, Grand Canal, Marina del Rey, Oxford Slough, and Villa Venetia. Study area = +/- 1,500 acres; image dated 29 Mar 04.

MARINA DEL REY HERONRY

Marina del Rey | Los Angeles County CA | 2005

JB Froke PhD | California Wildlife Ecology | *jbfroke@msn.com*
3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595

FIG 2 - 2005 ATLAS OF NESTING HERONS

Four geographically grouped nesting areas, which in total encompass all active or recently active heron nests recorded within the heronry study area during 2005. See Figures 3-6 and 7 for closer views of each nest area (A,B,C,D).

MARINA DEL REY HERONRY

Marina del Rey | Los Angeles County CA | 2005

JB Froke PhD | California Wildlife Ecology | *jbfroke@msn.com*
3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595

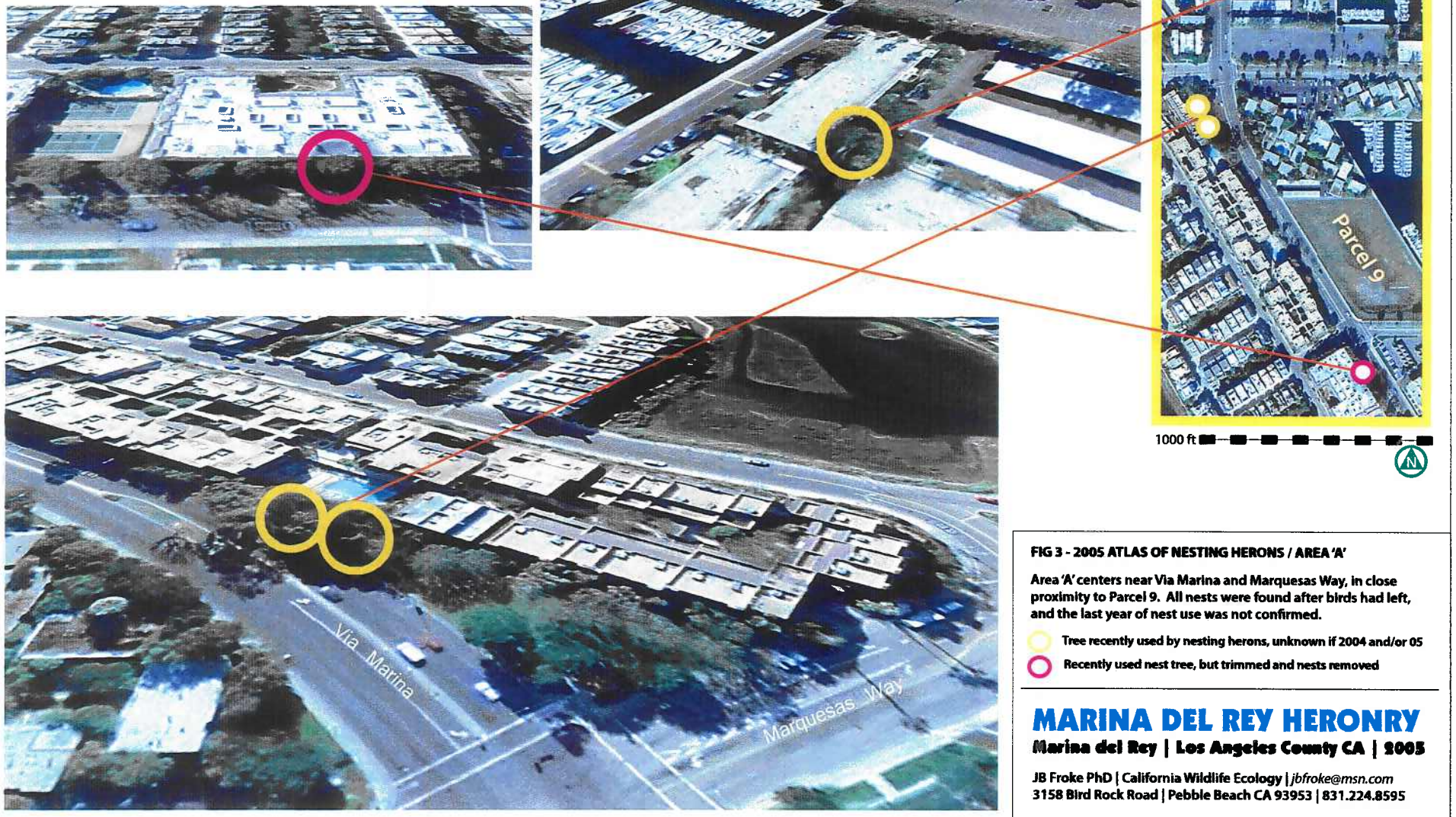

FIG 3 - 2005 ATLAS OF NESTING HERONS / AREA 'A'

Area 'A' centers near Via Marina and Marquesas Way, in close proximity to Parcel 9. All nests were found after birds had left, and the last year of nest use was not confirmed.

Tree recently used by nesting herons, unknown if 2004 and/or 05

Recently used nest tree, but trimmed and nests removed

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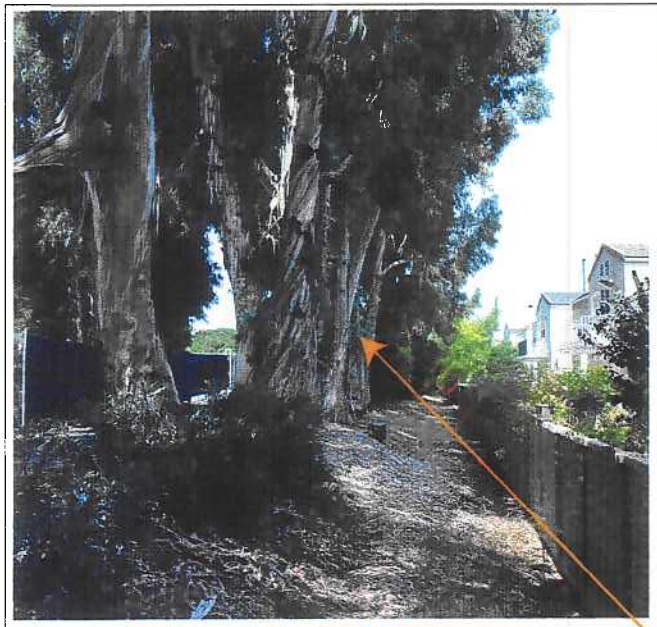
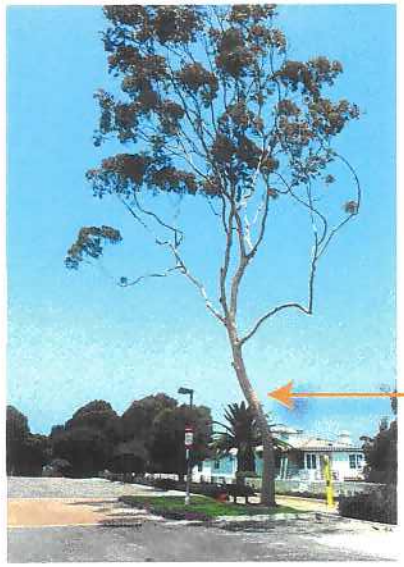
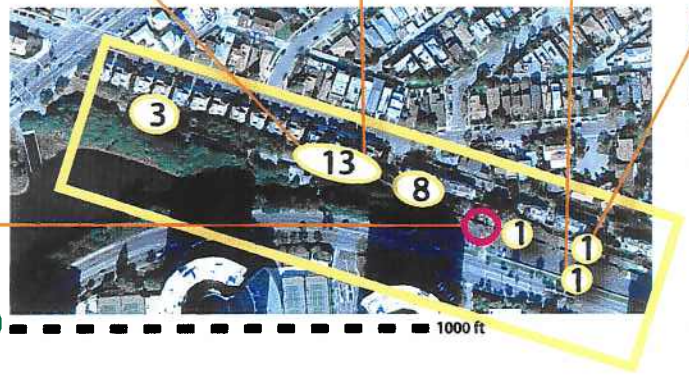
FIG 3

FIG 4







1000 ft

FIG 4 - 2005 ATLAS OF NESTING HERONS / AREA 'B'

Area 'B' extends along the public bicycle pathway from Washington Boulevard, adjacent to Oxford Slough to the western portion of Admiralty Park near Admiralty Way. Also, see Figure 7 for detail.

27 trees occupied by nesting herons during 2004-2005

Recently used nest tree, but trimmed and nests removed

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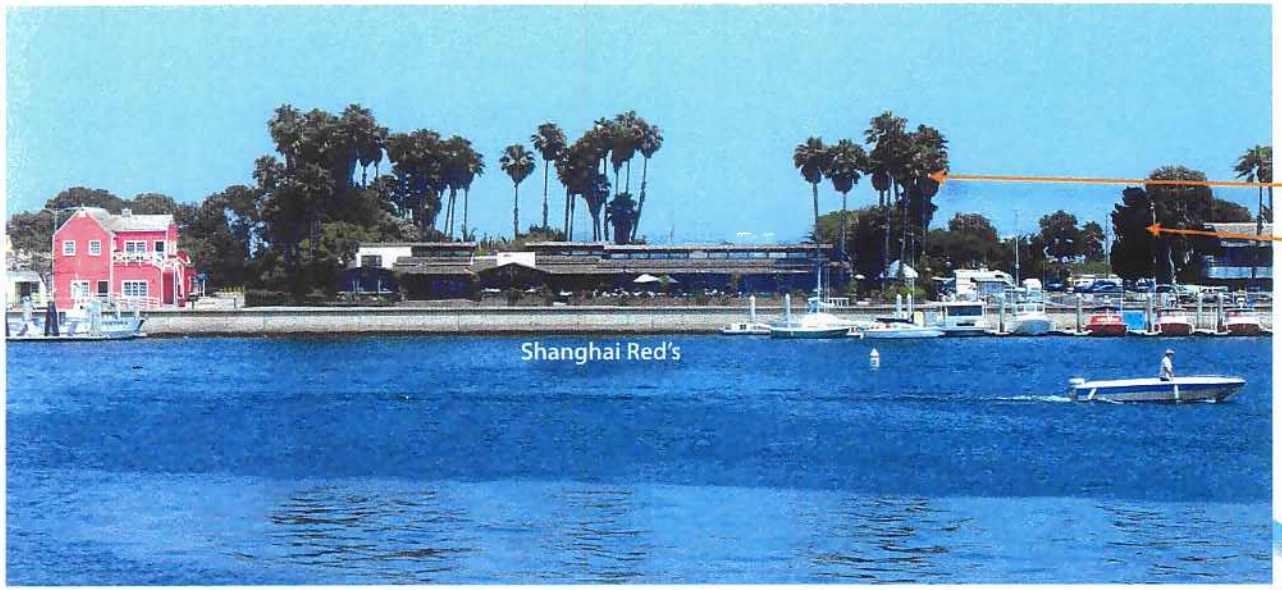
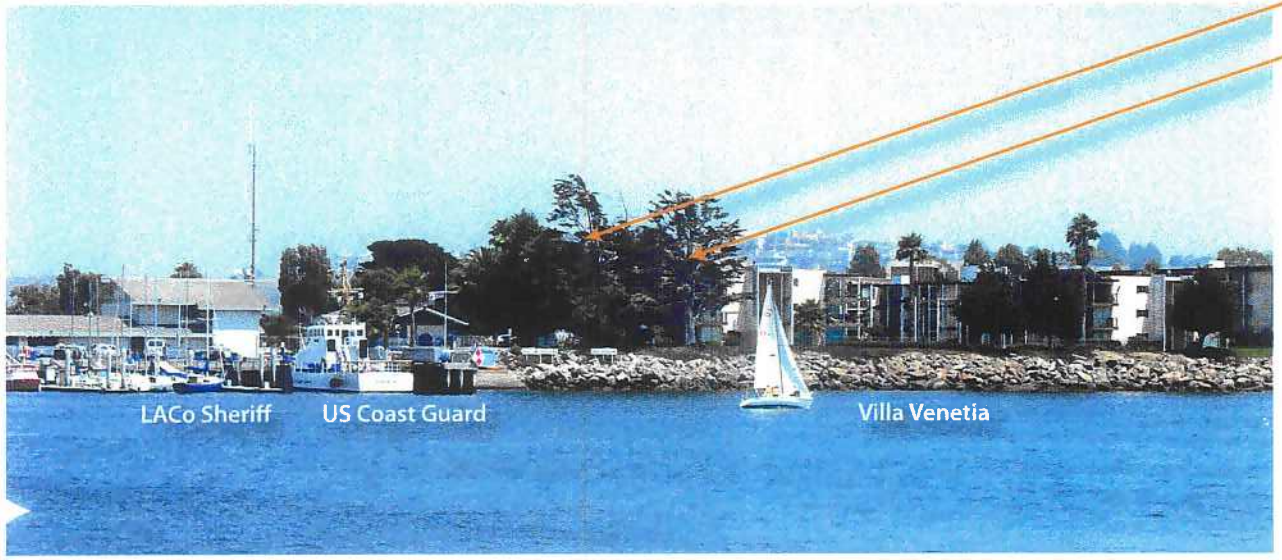
3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595





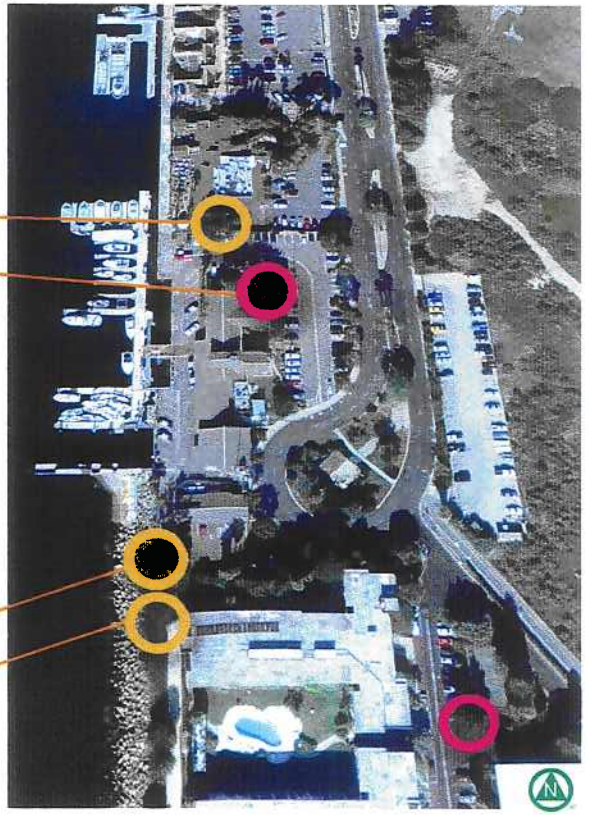


FIG 5 - 2005 ATLAS OF NESTING HERONS / AREA 'C'

Area 'C' is located at the southern terminus of Fiji Way, incorporating Fisherman's Village, US Coast Guard station, LACo Sheriff's and Beaches and Harbors offices, and Villa Venetia.

Trees occupied by nesting herons during 2005

Recently used nest tree, but subsequently trimmed

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3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595

FIG 6 - 2005 ATLAS OF NESTING HERONS / AREA 'D'

Area 'D' is situated at the end of Bora Bora Way near the Fuel Docks and overlaps part of the Harbor Village apartment complex. All highlighted trees in Area 'D' have been used by nesting herons recently, but since have been trimmed and all nests removed. Nesting birds probably were Black-crowned Night-Herons.

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3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595

FIG 7

LEGEND

A Grove of three eucalyptus trees, overhanging the bicycle trail, that supported approximately 50 heron nests, all or most Black-crowned Night-Heron. All were 2004 and/or 2005 nests.

B Grove of 13 eucalyptus trees, overhanging patios and trail, that supported approximately 110 heron nests, all or most Black-crowned Night-Heron. All or most were 2005 nests, though any number may also be carry-overs from 2004.

C Grove of eight eucalyptus trees, overhanging trail, that supported approximately 30 herons nests, both Black-crowned Night-Heron and Snowy Egret. All were 2005 nests, though any number may have been carry-overs from 2004.

D One eucalyptus tree, overhanging trail and parking lot, supported approximately 25 heron nests in 2005.

E One eucalyptus tree, overhanging trail and parking lot, supported approximately 35 heron nests in 2005.

F Single magnolia tree, overhanging parking lot, that supported a single Black-crowned Night-Heron nest in 2005.

FIG 7 - ATLAS OF NESTING HERONS / CLOSE-UP OF AREA B

Nesting Black-crowned Night-Herons and Snowy Egrets that comprised the major colony within the marina heronry during 2005 occupied a series of planted gum trees adjacent to an Oxford Avenue residential neighborhood, Oxford Slough and Admiralty Park. Approximately 250 active (2005) or recent (2004-05) heron nests were found in 27 trees.

MARINA DEL REY HERONRY

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JB Froke PhD / California Wildlife Ecology / *jbfroke@msn.com*
3158 Bird Rock Road / Pebble Beach CA 93953 / 831.224.8595

FIG. 8

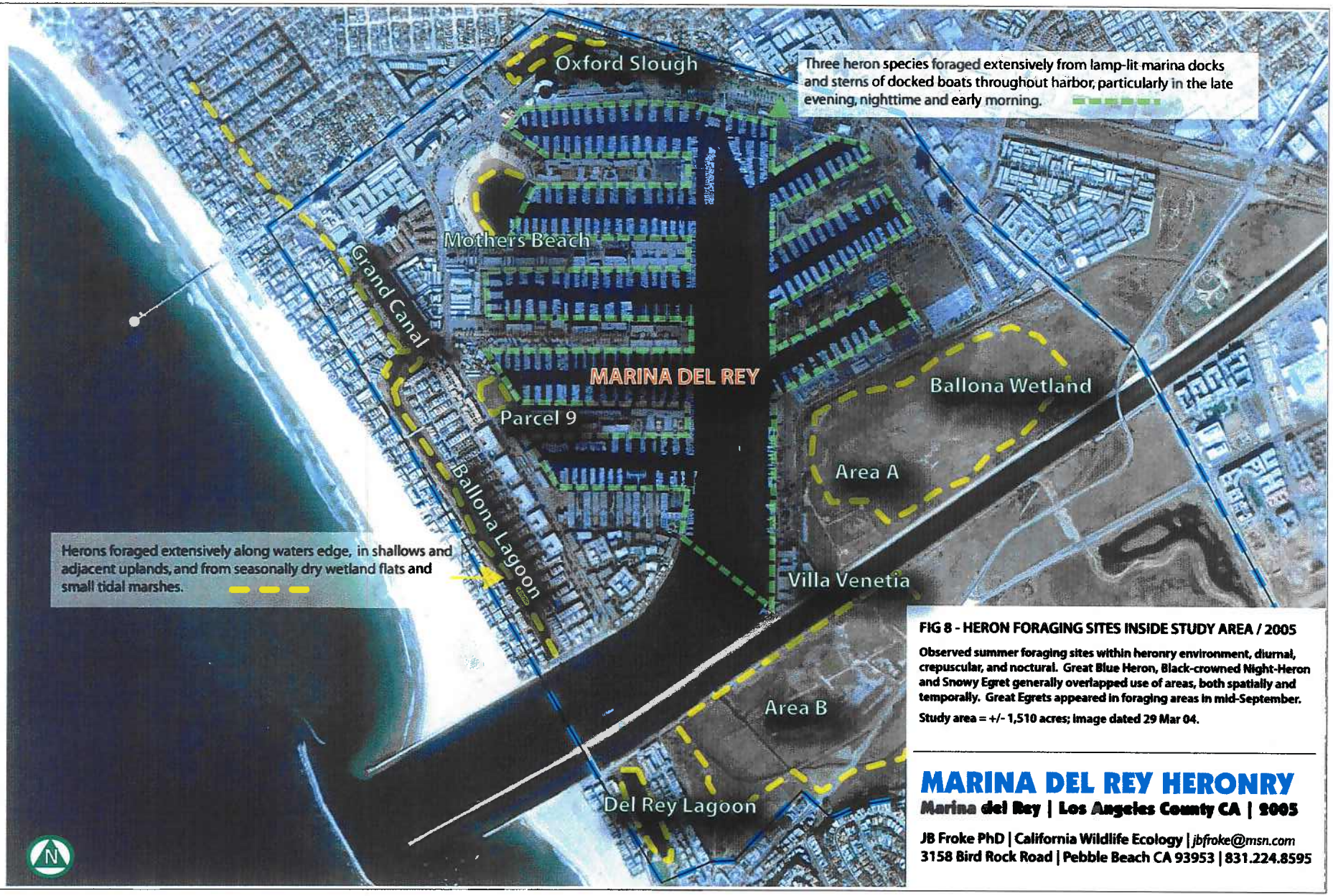

FIG 8 - HERON FORAGING SITES INSIDE STUDY AREA / 2005

Observed summer foraging sites within heronry environment, diurnal, crepuscular, and noctural. Great Blue Heron, Black-crowned Night-Heron and Snowy Egret generally overlapped use of areas, both spatially and temporally. Great Egrets appeared in foraging areas in mid-September.

Study area = +/- 1,510 acres; image dated 29 Mar 04.

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JB Froke PhD | California Wildlife Ecology | *jbfroke@msn.com*
3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595

FIG 9

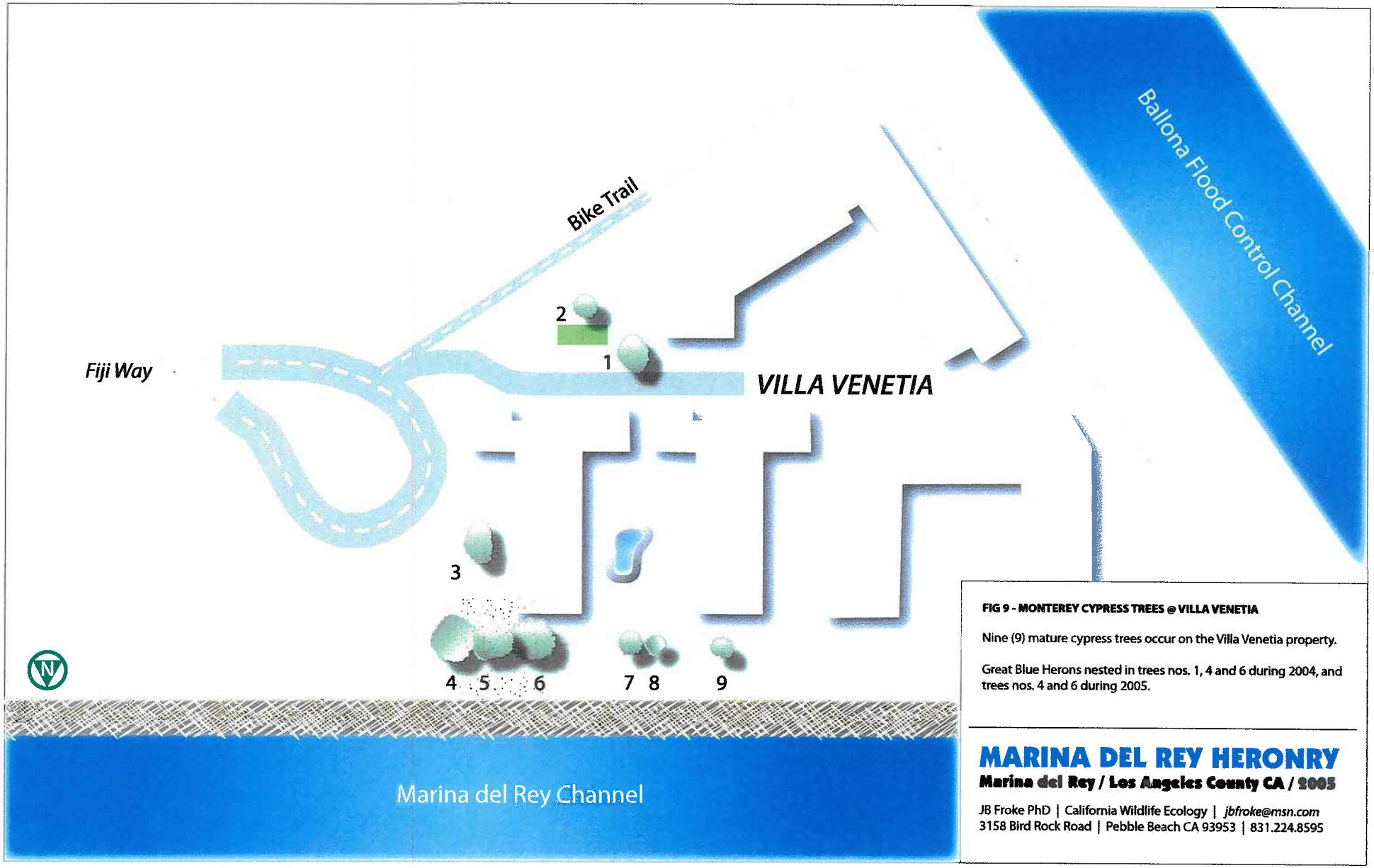

FIG 9 - MONTEREY CYPRESS TREES @ VILLA VENETIA

Nine (9) mature cypress trees occur on the Villa Venetia property.

Great Blue Herons nested in trees nos. 1, 4 and 6 during 2004, and trees nos. 4 and 6 during 2005.

MARINA DEL REY HERONRY

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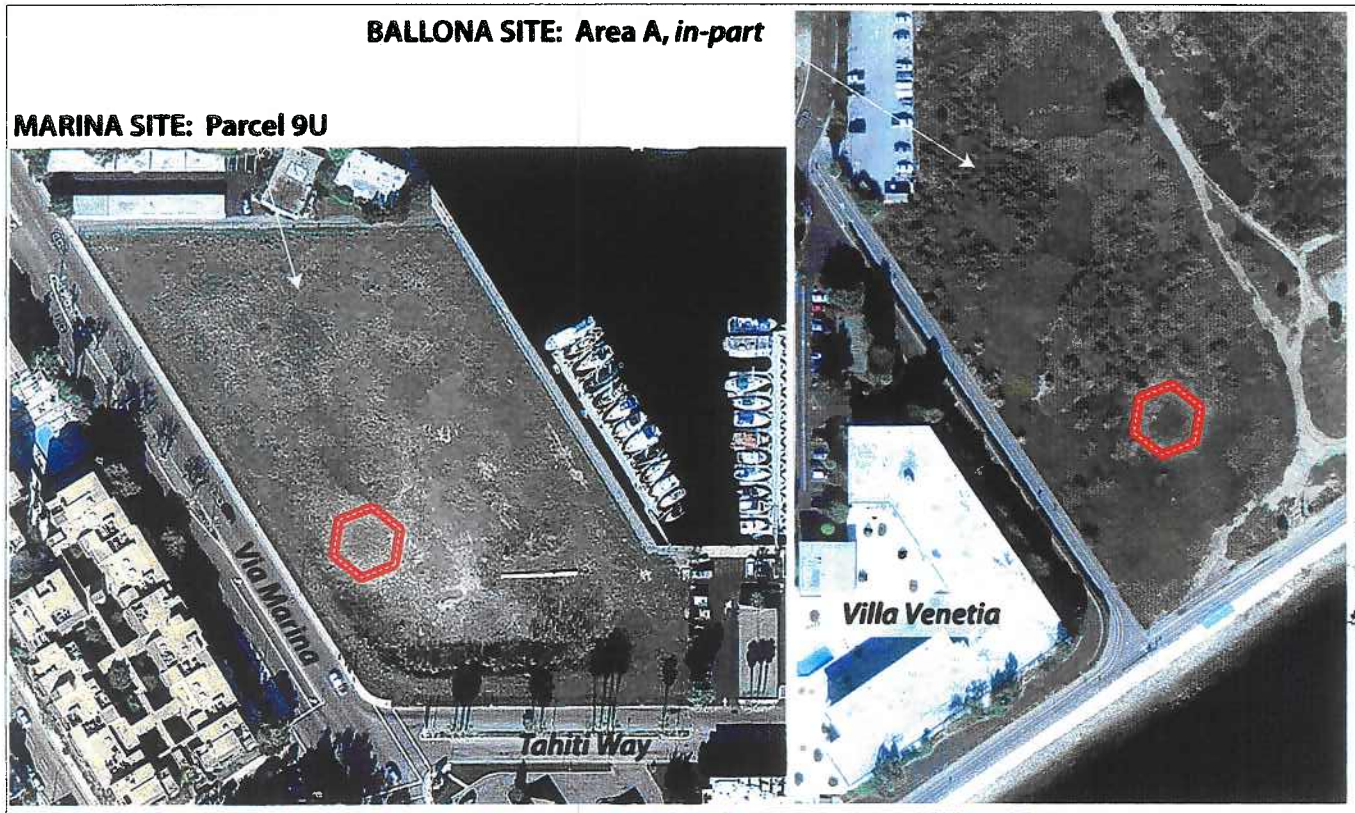
JB Froke PhD | California Wildlife Ecology | *jbfroke@msn.com*
3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595

BALLONA SITE: Area A, *in-part*

MARINA SITE: Parcel 9U



snag from cutting cypress no. 1 or 6

FIG 10 - ALTERNATIVE HERON MANAGEMENT SITES

Two alternative sites for recommended mitigation - management of nesting Great Blue Herons per removal of nest trees at Villa Venetia property. Management includes translocation of living and cut Monterey Cypress trees from Villa Venetia site and assemblage of nest structures in combination with appropriate landscape materials and site modifications.

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JB Froke PhD | California Wildlife Ecology | *jbfroke@msn.com*
3158 Bird Rock Road | Pebble Beach CA 93953 | 831.224.8595