STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

CALIFORNIA LEAST TERN POPULATION AND NESTING SURVEY, 1974[1]

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ABSTRACT

A survey of the nesting sites of California least terns was conducted in July, 1974. Purposes were to identify nesting sites in California and to estimate the breeding population. The breeding population was estimated at 582 pairs. Breeding activity was recorded at 20 sites, three of which were newly identified. Nesting was known at 16 sites. Conditions in 1974 at known nesting sites were discussed and recommendations were made for least tern protection and management.

1/ Supported by Federal Aid in Wildlife Restoration, W-54-R-7, "Nongame Wildlife Investigations," Job Final Report, Job I-1 (September 1974).

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RECOMMENDATIONS

On the basis of this survey, the following recommendations are made for least tern protection and management. These are intended to be supplemental to the recommendations made in the 1973 least tern census report (Bender, 1974).

1. Initial steps to establish a Recovery Team for the California least tern be continued and this team coordinate professional and volunteer efforts for least tern protection before and during each nesting season.

2. All persons who have shown a past interest in least tern protection be made aware of the existence and membership of the Recovery Team.

3. Temporary fencing be made available during the nesting season to be erected quickly to protect colonies subject to imminent human disturbance.

4. A management plan be developed by the Department for least tern nesting sites on Bair Island and at Bolsa Chica Ecological Reserve.

5. Efforts be continued to encourage least tern use of the manmade nesting site in Anaheim Bay.

6. A least tern census and nesting survey be conducted yearly between June 1 and July 30.

INTRODUCTION

The California least tern has been classified as an endangered species by the U. S. Department of the Interior and the State of California. The population of these birds has declined significantly since the turn of the century.

California Department of Fish and Game has conducted several studies on these birds since 1970. Nesting sites were surveyed in 1970 (Craig, 1971), concentrating on land ownership, development plans, and recommendations for management. Basic information on breeding biology was gathered by Massey (1971). In 1973 the first statewide census was made of the breeding population (Bender, 1973).

In early 1974 initial steps were taken to set up the California Least Tern Recovery Team. This interagency committee was organized to coordinate the efforts of agencies and individuals concerned with least tern conservation. The team has recommended that the Department continue yearly population censuses of least terns to document population trends and determine management needs.

OBJECTIVES

The purposes of the 1974 survey were to estimate the breeding population of least terns in California, to identify new nesting sites used in 1974, and to obtain some indication of nesting success.

METHODS

Most of the least tern nesting sites known in previous years were visited three times in July. On each visit, counts were made of the numbers of breeding and post-breeding adults and young present at each site. Information also was collected from Department of Fish and Game and U. S. Fish and Wildlife Service personnel and from other knowledgeable individuals in various parts of the birds' range. Using information from all these sources estimates were made of the breeding population at each site in 1974 and of their relative degree of nesting success. Limitations imposed by starting the survey late in the nesting season dictated that different methods be used from those of the 1973 census.

RESULTS

The 1974 nesting population of least terns in California is estimated at 582 pairs (Table 1). Breeding pairs were recorded at 20 sites. Nesting was known at 16 sites. Three of these, Ormond Beach, San Diego Stadium and Coronado Cays, were not known to support nesting least terns in previous surveys.

During the nesting season, no terns were recorded at Oakland Airport, San Elijo Lagoon, and Del Mar. Least terns nested at these sites in recent years. In late July, adults with young appeared at San Elijo Lagoon, but these birds had undoubtedly nested elsewhere.

Population estimates are a composite of the author's observations and the estimates of many other individuals. These estimates are not directly comparable to the figures gathered in the more comprehensive 1973 census.

TABLE 1

CALIFORNIA LEAST TERN NESTING SITES
AND POPULATION ESTIMATES, 1974

Site	Estimated No. Pairs	Estimated Degree of Nesting Success
San Mateo County		
Bair Island	8[1]	probably poor
Alameda County		
Bay Farm Island	19	probably poor
Ventura County		
Ormond Beach	4	probably poor
Point Mugu	2	3
Los Angeles County		
Terminal Island	10[2]	none
Playa Del Rey	22	good
San Gabriel River	60	fair
Orange County		
Huntington State Beach	5	probably fair
San Diego County		
Santa Margarita River	less than 150	excellent
Buena Vista Lagoon	1	3
Agua Hedionda Lagoon	5	probably fair
Batiquitos Lagoon	50	probably good
Los Penasquitos Lagoon	15	probably good
Mission Bay (all sites)	85	prob. fair-good
San Diego Airport	60	probably good
San Diego Stadium	2	probably good
Sweetwater River	36	poor
Coronado Cays	6	probably fair
South San Diego Bay	60	probably good
Tijuana River	1	3
Estimated Breeding Population	582 pairs	

1/ This colony probably was a renesting attempt by birds from the disturbed Bay Farm Island colony. These birds are not included in the total estimate.

2/ This flock was disrupted before egg-laying and may have joined another colony. These birds are not included in the total estimate.

3/ No nests were found.

During the July survey, some pairs had already fledged young and left their nesting site before the author's first visit. Others were still tending very young chicks on the last visit in the third week of July. Therefore, an accurate census of breeding adults was not possible, and only a very rough estimate of fledging success could be made.

Detailed discussion and location maps of the newly identified sites are contained in Appendix B. Discussions of each of the other sites used in 1974 are contained in Appendix A.

DISCUSSION

Early in the nesting season concern had been expressed by many knowledgeable people that the 1974 nesting population was substantially lower than in 1973. Counts by Marine Corps personnel at the Santa Margarita River mouth showed that the colony had dropped from 250-300 pairs in 1971-1973 (Conservation Report for 1972; Bender, 1973) to less than 150 pairs in 1974. Preliminary estimates at some other sites implied losses of similar magnitude. There were no known factors in the breeding range in 1974 which could account for the loss of one-third or more of the adult population of least terns. Speculative suggestions, some of them published in area newspapers, included killing of the birds for food on their winter range and hurricanes along the migration route.

The 1974 estimate of the breeding population was 42 pairs less than the 1973 count of 624 pairs. Because the 1974 survey was confined to a one month period late in the nesting season, some pairs may have gone unreported. Thus, if a population decline had actually occurred, the decrease was not large. Although the 1974 and 1973 nesting population estimates cannot be directly compared, the data do not support the early fears of a drastic population decline.

Considerable variation was shown by the least tern population in the size of nesting colonies at specific sites from one year to another. The most notable examples are the sharp reductions in the San Francisco Bay area and at Santa Margarita River and the increases at Batiquitos Lagoon and South San Diego Bay. At the same time certain individual birds, such as those at Buena Vista Lagoon, seem to return to a locality even though successful nesting has not occurred there for some years. No explanation can presently be suggested for these behavior patterns.

During the winter of 1973-74, a manmade least tern nesting site was built at Anaheim Bay. The site is now part of the new Seal Beach National Wildlife Refuge. Site construction was a mitigation measure imposed by the City of Huntington Beach and the South Coast Regional Commission on the developer of the Huntington Harbour property, site of a least tern nesting colony for several years. Though properly constructed initially, the manmade site became rapidly overgrown with iceplant and other vegetation. Despite early spring efforts to clear it, this site was not used for nesting by least terns in 1974.

San Elijo Lagoon apparently continues to have an adequate food supply, but there is no suitable nesting site. Fresh water inflow to the lagoon was stopped in the fall of 1973, and water loss through evaporation has lowered the lagoon level seriously. Restoration of fresh water inflow is essential to preservation of the habitat for least terns and other water birds.

Though a significant amount of information about least terns has become available in recent years, especially from Massey's studies (1971 and in press), some major questions remain. One of these is the location of the least terns' winter range. Another is the age at first breeding, with its corollaries of degree of fidelity to the hatching site and location of the nonbreeding juvenile birds during the nesting season. Still another is the status of the nesting population, if any, in Baja California, Mexico.

ACKNOWLEDGEMENTS

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San Francisco Bay area	Robert Gill, Jr., Bruce Elliott, Elsie Roemer
Monterey-Ventura area	Sanford Wilbur
Los Angeles-Orange County area	Kenneth Stager, Larry Sansone, Elizabeth Copper, Shirley Wells, Charles Collins, Barbara Massey
San Diego County area	Deane Swickard, John and Dorothy Helmer, Jessie La Grange, Kent Hartwell, Richard Field, Michael Evans, Harold McKinnie, Ann Matthewson, Wendell Gayman, Paul Jorgensen, Eric Thowless, Terry Roeder, Anthony Mercieca

The study was supervised by Ronald M. Jurek.

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APPENDIX A

Least Tern Use of Known Nesting Sites in California in 1974, with Discussion of Significant Problems.

FIGURE

BAIR ISLAND

Approximately eight pairs of least terns were found nesting on Bair Island in late July, 1974, by Department of Fish and Game personnel. Considering this late date and the previous disturbance at the Bay Farm Island site, it is possible that these birds were renesting at Bair Island after failure at Bay Farm Island. Fledging success was probably very poor for this late attempt.

BAY FARM ISLAND

Initial least tern nesting in the San Francisco Bay area in 1974 took place on the north shore of Bay Farm Island, Alameda Co. The colony consisted of 12 nests on May 31, but only 3 on June 17. There was considerable disturbance by construction vehicles and people at the site. Fledging success was probably poor. The total adult population in the area was 19 pairs.

POINT MUGU

Two pairs of adults were resident through the summer at the marsh and estuary at Point Mugu, but no nesting was found.

TERMINAL ISLAND

Ten to twelve pairs were seen on Terminal Island in Los Angeles Harbor in May. The birds had progressed to courtship feeding. Scrape-making and egg-laying were imminent when landfill and grading operations disrupted the colony. The birds may have joined another flock, perhaps at Playa Del Rey or at San Gabriel River mouth. Methods of providing a permanent nesting site for least terns in this area need to be investigated.

PLAYA DEL REY

Twenty-two pairs nested on the salt flat in 1974. Nesting success was good. The manager of the nearby riding stable, which has a right of access to the area, cooperated with the Department to prevent human disturbance at the colony. Temporary fencing was erected around the colony by Dr. Kenneth Stager and other personnel of the Los Angeles County Natural History Museum, Department of Fish and Game representatives, and volunteers. These measures will need to be repeated in future years to insure the colony's continued protection.

SAN GABRIEL RIVER

This site held the largest colony north of the Santa Margarita River. Sixty breeding pairs nested in two clusters, one group on fresh fill graded two weeks before the first nest was found. A meeting of the landowner and representatives of various concerned agencies resulted in protection for the birds from construction activities through the nesting season. Fledging success was fair at best, possibly due to predation by feral cats. Motorcycles remain a threat because of the site location adjacent to Pacific Coast Highway, the lack of

fencing on the highway side, and a past history of unauthorized motorcycle use on the property.

HUNTINGTON STATE BEACH

This well protected site had five pairs of nesting least terns this year. Fledging success was probably fair. The State Beach continues to devegetate and loosen the sand in late winter or early spring each year. Continued use of this site by nesting terns depends on the maintenance of the quantity and quality of the food supply in the Santa Ana River and the two adjacent flood control channels.

SANTA MARGARITA RIVER

Though still the largest colony in the state, the population at this site dropped from 250 pairs in 1973 to less than 150 pairs in 1974. No reason was discerned for the loss. Fledging success was excellent here, perhaps the only site in the state where this was true. This remains the only colony which is adequately monitored and in which population, hatching success, and fledging success are known with any degree of accuracy. Another experiment in manmade nesting site construction was carried out at this site during the previous winter, and some of the birds readily nested on the sand-surfaced area which was prepared for them.

BUENA VISTA LAGOON

One pair was resident in the lagoon area through the summer, but no nesting was found.

AGUA HEDIONDA

A small colony of five pairs nested on the salt flats at the head of the lagoon. Motorcycles may have disrupted part or all of the initial nesting. Ownership of this site needs to be determined and the landowner informed of the birds' presence in an effort to insure adequate protection for the colony during the 1975 nesting season.

BATIQUITOS LAGOON

Most of the 50 to 60 pairs of least terns at Batiquitos apparently nested on dried flats and bars on the north half of the lagoon section between the railroad tracks and Interstate 5 freeway. Permission to approach the site from the north could not be arranged in time to count the nests, or even to confirm the presence of eggs or chicks in most of this area. It is probable that fledging success was good here. From 6 to 10 pairs nested, widely scattered, on the north side of San Marcos Creek and on extensive flats along the north side of the inland section of the lagoon. Fledging success in this inland area was unknown, but because human disturbance is significant here, it was possibly lower than for the seaward area.

LOS PENASQUITOS LAGOON

A colony of 15 to 18 pairs nested on the salt flats in the center of the marsh north of the railroad embankment. Some of the nests were apparently on Torrey Pines State Reserve land and part on San Diego Gas and Electric Company land. Disturbance was minimal and fledging success probably good.

This estuary is normally tidal, though its opening has been blocked for several years. Although this colony is well situated at present, when tidal flow is restored, the least tern nesting sites used in 1973 and 1974 will be inundated at spring tides (Mudie, Browning, and Speth, 1974). Alternate nesting sites currently available are marginal.

SAN DIEGO AIRPORT

The areas least terns used for nesting in preceeding years (near the east end of the main runway and between the runway and the taxi strip) were re-oiled before the 1974 nesting season and were unuseable by the birds. The colony moved to a 22 acre area of recent dirt fill south of the west end of the runway. This area was much more suitable to the birds' needs, and the colony here may have numbered as many as 60 pairs. Fledging success was probably good, despite minor predation, probably by a feral cat. Plans to begin moving this fill in the middle of the nesting season were modified to prevent disturbance of the birds. The fill will be relocated before the 1975 nesting season, and its availability for nesting then is unknown. High priority should be given to providing a useable nesting area for these birds in 1975, either on the relocated fill or in the adjacent area.

MISSION BAY

The number of least terns nesting in Mission Bay in 1974 was difficult to determine due to a lack of systematic counts. The birds were scattered over several nesting areas, most of which had been used in previous years (Figure A-1). The 1974 Mission Bay flock is estimated at 85 pairs. Fledging success cannot be accurately estimated; it probably varied from poor to good.

Sites used in 1974 were North Fiesta Island, South Fiesta Island, North Area and West Area near East Mission Bay Drive, Beacon Island, the Cloverleaf and the Mud Flats at the south end of the park, and an area of fallow land east of Quivera Basin. The newly used area near Quivera Basin is owned by the City of San Diego as part of the Mission Bay complex. This site is sandy dredge fill with shells, grown up quite heavily to a variety of low weeds. In the initial stages of City-contracted landscaping, part of this site was plowed after least tern nesting had begun, and some clutches were destroyed. Further work on this landscaping was postponed until the nesting season was finished. Landscaping plans for the Cloverleaf site have been modified by the City and may successfully accommodate the least terns. A low, nearly-invisible wire fence placed there by local Sierra Club volunteers was successful in keeping the chicks from wandering into the adjacent roadway.

Before the 1974 nesting season, the City of San Diego developed a fence-enclosed nesting area for least terns near Crown Point. This area had not been used previously by the birds as a nesting site. No nesting terns were attracted to this site this year.

Efforts at hand-clearing heavily vegetated sites this year were largely unsuccessful. Before the 1975 nesting season, vegetation on most of the Mission Bay nesting sites should be removed mechanically, with hand removal used at the Cloverleaf and Beacon Island sites.

Arrangements are needed among the agencies concerned with Mission Bay to mechanically clear the fenced, temporary sanctuary near East Mission Bay Drive before the 1975 nesting season. If the birds can be attracted back to this area, their fledging success may be much improved by the protection of the fence. Both long-term and temporary efforts at protection of this flock and its nesting sites need to be continued.

Agencies concerned with least tern preservation need to give the City of San Diego information and advice in this and other efforts to provide or protect least tern nesting habitat.

SWEETWATER RIVER

This colony increased to at least 36 pairs of nesting least terns in 1974. Fledging success was poor, as motorcycle and other off-road vehicle use of the area has sharply increased. This has caused some outright destruction of eggs and young and nearly continuous disturbance to the adults. It is imperative for the continued existence of this colony that off-road vehicles be barred from the fill area, at least during the nesting season.

SOUTH SAN DIEGO BAY

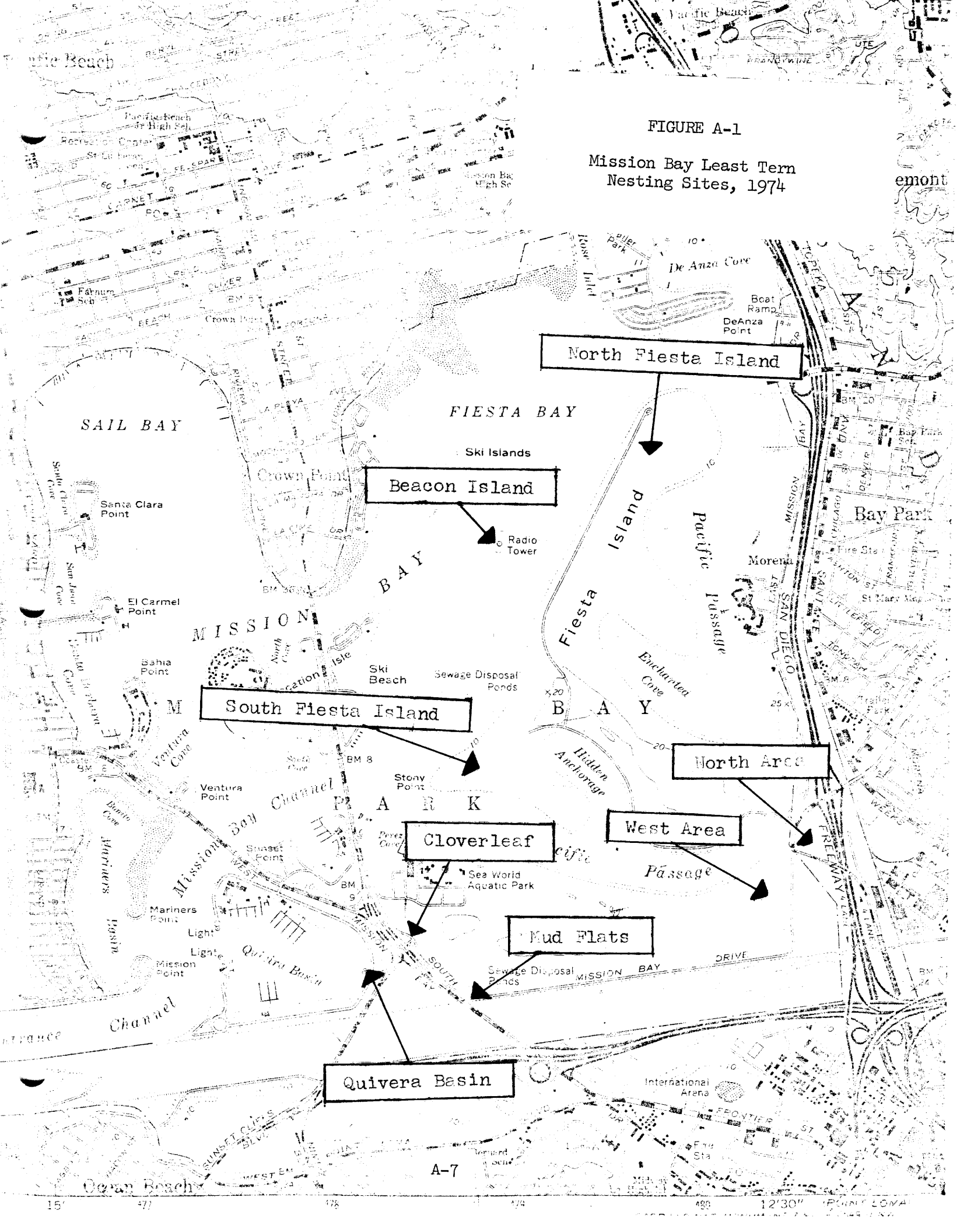
The least tern colony on the salt pond dikes numbered approximately 60 pairs in 1974. Fledging success was apparently good. Early in the nesting season, employees of the salt company scraped the tops of some of the dikes, destroying a number of least tern clutches as well as those of other nesting tern species. The least terns apparently renested successfully. Motorcycles remain an occasional but potentially very damaging problem, as do irresponsible shooters. There is a certain amount of predation on the site, most of it apparently avian. A revival of the cooperation of previous years between the salt company and the San Diego Audubon Society in maintaining the area as a wildlife refuge is needed. Advice and assistance should be provided to the salt company in scheduling dike maintenance and other necessary activities to avoid harming the nesting birds. Methods of preventing motorcycle access to the dikes are apparently relatively simple and need to be implemented.

TIJUANA RIVER

A flock of about 20 least terns was seen at the 1973 nesting site at the mouth of the Tijuana River in the spring of 1974, but they moved elsewhere before nesting. One pair remained in the area through the summer but was not known to nest. No reason was discerned for the birds' failure to nest here in 1974.

FIGURE A-1

Mission Bay Least Tern
Nesting Sites, 1974



APPENDIX B

Least Tern Nesting Sites Newly Identified in 1974.

ORMOND BEACH

LOCATION

Ormond Beach, near the Ormond Power Plant, Port Hueneme, Ventura County.

SITE DESCRIPTION

Nests were located on ocean beach on both sides of seaward line of sand dunes; dunes are sparsely vegetated with sea rocket (Cakile sp.) and other vegetation; the beach is about 1.6 km (1 mile) long, but the nests found were in a small area on the upper beach near a small lagoon (terminus of a drainage canal) which appears to contain many small fish.

OWNERSHIP

Although undeveloped, the area has been subdivided and apparently involves ten or more separate ownerships. The California Department of Parks and Recreation owns scattered parcels in the area, but it was undetermined whose property the nests actually were on.

HISTORICAL USE

Historically, least terns nested on Port Hueneme beaches, and a few terns are reported in the vicinity each summer. However, this is the first time in many years that least tern nesting has been confirmed in Ventura County.

Three nests were discovered by Bob Foulk and Steve Forsell, Ventura County Flood Control Division, on July 2, 1974. Each contained 2 eggs. On July 3, Foulk, Forsell, Sanford Wilbur (Fish and Wildlife Service) and John Borneman (National Audubon Society) revisited the site. At that time, one nest contained 2 chicks. Also, a fourth nest with 2 eggs was found in the same area. The largest number of adult terns seen in the area was 7, indicating that most of the nests were probably found.

ELEMENTS OF THREAT

Human disturbance -- Ormond Beach receives heavy public use, both by foot traffic and vehicles. There were numerous vehicle tracks through the nesting area in July 1974. On Independence Day, fireworks are set off from the nearby Port Hueneme pier, and public use of the area is extra heavy.

Development -- The area has been subdivided, but no development has occurred or appears pending. The uplands nearby are currently under study for a commercial development, and it appears such use could destroy the feeding pond and increase activity at the nest site.

Predators -- There was no evidence of predation. There are many dogs on the beach, and a number of gulls loaf around the pond. The terns were very diligent in chasing any gull that flew over the nesting area.

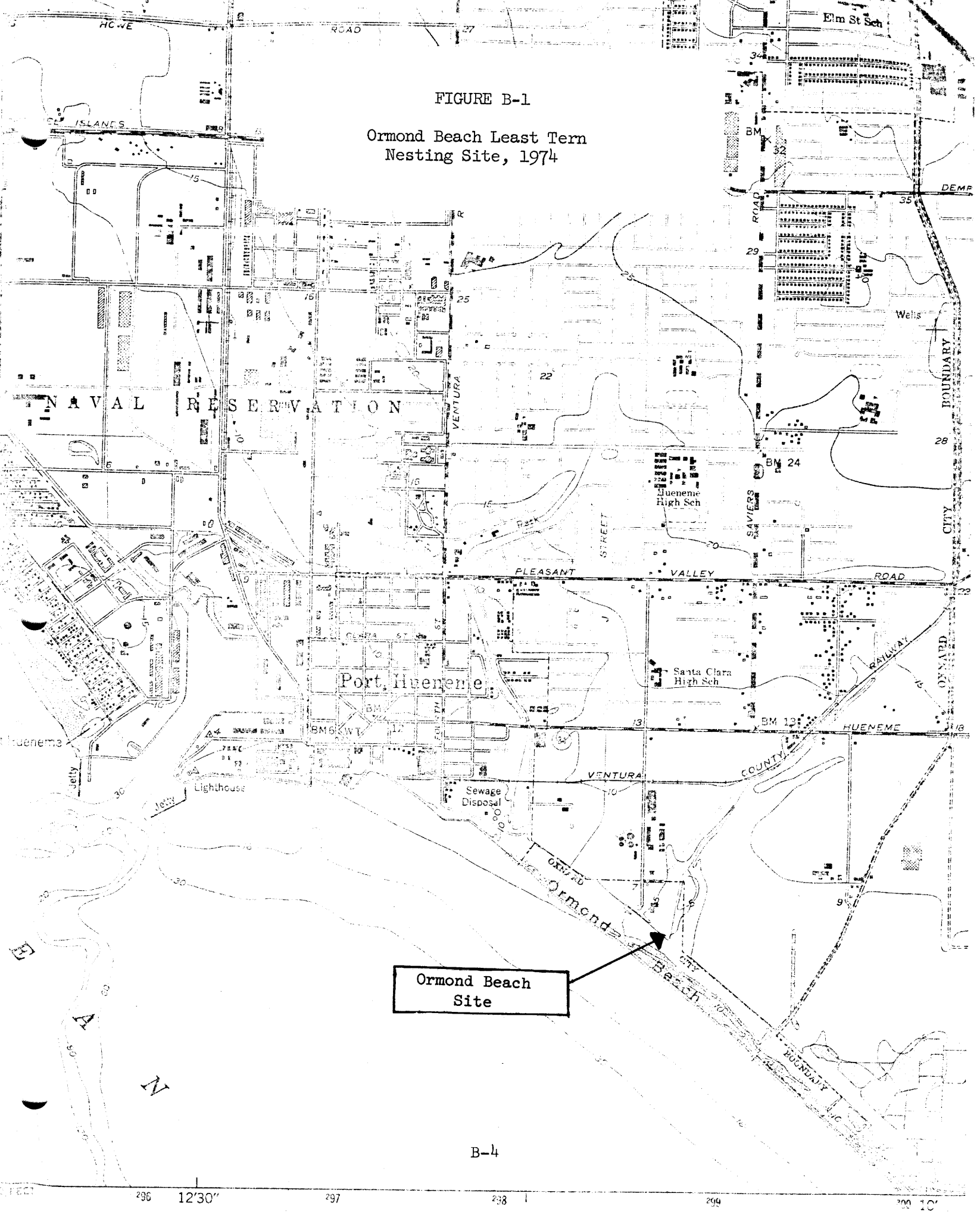
POSSIBLE ACTIONS TO PROTECT SITE

The value of the area probably depends on maintaining the small feeding pond as well as the beach nesting site. It is not a large area, but development plans for the area probably conflict with tern perpetuation there. Preservation avenues are so far unexplored.

(Information and discussion supplied by Sanford Wilbur, U. S. Fish and Wildlife Service.)

FIGURE B-1

Ormond Beach Least Tern
Nesting Site, 1974



SAN DIEGO STADIUM

LOCATION

The site is adjacent to the sports arena parking lot in Mission Valley, San Diego, San Diego County; seven miles east of the ocean and 5 miles northeast of nearest salt water at San Diego Bay.

SITE DESCRIPTION

The nesting site is located in the bed of the San Diego River west of the San Diego Stadium parking lot, the area is now used for gravel mining and concrete making. Several freshwater ponds, apparently left by the gravel mining, occupy part of the area and provide a source of small fish and supply habitat for other species of water-oriented birds. Much of the dry ground is covered with mounds of "tailings", gravel, waste concrete, and access roadways. Vegetation includes marsh plants (cattails, reeds, etc.) and species typical of disturbed areas.

OWNERSHIP

Ownership of the site has not been determined. The gravel mining company presumably holds a lease, if not outright ownership, on the area and controls access.

HISTORICAL USE

It is not known whether least terns used the San Diego River bed before the flow was altered by various flood control installations. There have been a few sightings of the species in the Mission Valley area in recent years, but nesting was not confirmed.

Four adult least terns were seen feeding three chicks by Eric Thowless on June 18, 1974, on a flat expanse of gravel, dirt, and poured-out concrete. No nests were located, and it is believed that only two pairs of birds used the site. This early nesting was probably successful, as no least terns were in the area when it was visited by the author and Michael Evans, San Diego County Environmental Review Board, on July 13, 1974.

ELEMENTS OF THREAT

Human Disturbance -- The site receives very little human or vehicular traffic. The location is distant from residential areas, access routes are not obvious, and the site appears seldom visited by people.

Development -- The site's location in the river bed would seem to preclude development for most uses.

Predators -- There was no evidence of predation or predators. The site is not normally frequented by gulls, but it might be visited by wandering dogs, feral cats, or hawks.

POSSIBLE ACTIONS TO PROTECT SITE

Ownership and future plans for the area need to be determined. Active efforts to protect the site appear unnecessary at this time.

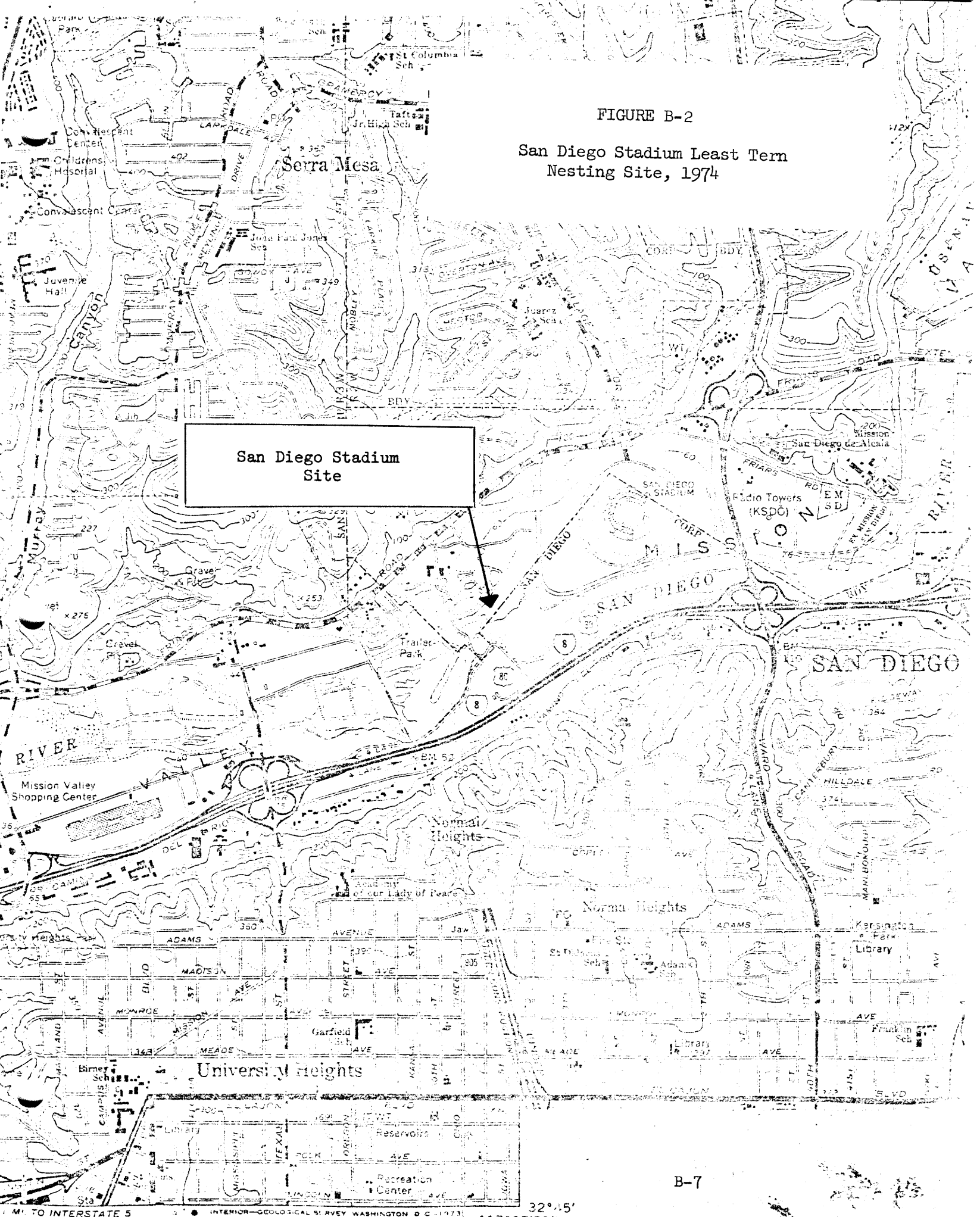


FIGURE B-2

San Diego Stadium Least Tern
Nesting Site, 1974

CORONADO CAYS

LOCATION

Southeast end of developed section of Coronado Cays, Silver Strand peninsula west of South San Diego Bay in San Diego County.

SITE DESCRIPTION

Bulkheaded dredge fill adjacent to the Bay, prepared for water-oriented residential development; surface is mixed sand and shells sparsely vegetated with iceplant.

OWNERSHIP

The site is part of the private development of Coronado Cays, and therefore is presumably in private ownership. There is a possibility that the small parcel used by the least terns may be owned by the San Diego Port Authority.

HISTORICAL USE

Least terns historically nested at various points along the Silver Strand peninsula. Increasing human use of the beaches and urbanized areas apparently deprived the birds of their nesting areas. There have been a few recent reports of least terns seen along the Silver Strand, but this is the first time in many years that nesting has been confirmed.

The presence of nesting least terns was reported by Paul Jorgensen of San Diego. The site was visited on July 13, 1974, by the author. Nine adult least terns, 2 flying young, and 2 chicks were seen, and 4 of the adults appeared to be nesting. Fifteen adults were seen on July 21, some of which were apparently still nesting. There is apparently a significant amount of human disturbance on the site, which may account for the relatively late nesting. Ample food is probably available in the adjacent South San Diego Bay.

ELEMENTS OF THREAT

Human Disturbance -- Disturbance of the site by vehicles, strollers, and dog walkers is significant but not heavy. Most of the people are probably residents in the adjacent development. Current dredging and site preparation activities on land south and east of the nesting site is probably not a source of disturbance to the birds.

Development -- The site has been initially prepared (by bulkheading and leveling) for development, and adjacent areas are presently being similarly altered.

Predators -- No evidence of predation was seen, but it is impossible to know what effect the dogs and cats from nearby residences may have produced. Gulls roost nearby and are common in the general area.

POSSIBLE ACTIONS TO PROTECT SITE

Concerned agencies need to determine the landowners' timetable for development and explore the possibility of leaving this section of Coronado Cays as a permanent least tern nesting site. If this proves to be impossible, other little used areas of the Silver Strand, most of which are apparently government property, need to be investigated for possible enhancement as least tern nesting habitat, now that the birds have returned to this area.

FIGURE 3

Coronado Cays Least Tern
Nesting Site, 1974