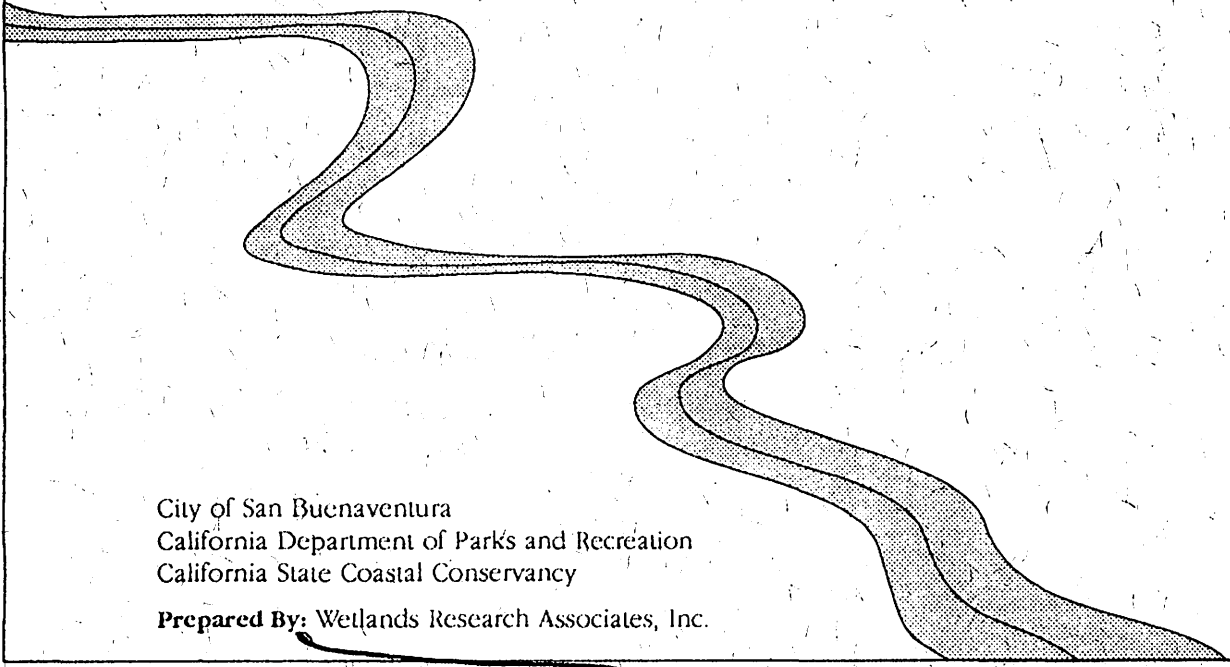


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# VENTURA RIVER ESTUARY ENHANCEMENT

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## Existing Conditions



City of San Buenaventura  
California Department of Parks and Recreation  
California State Coastal Conservancy

**Prepared By:** Wetlands Research Associates, Inc.

# **VENTURA RIVER ESTUARY ENHANCEMENT**

## **EXISTING CONDITIONS**

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Prepared for:

**City of San Buenaventura**  
501 Poli Street  
Ventura, CA 93002

**California Department of Parks and Recreation**  
24 East Main Street  
Ventura, CA 93001

**California State Coastal Conservancy**  
1330 Broadway, Suite 1100  
Oakland, CA 94612

Prepared by:

**Wetlands Research Associates, Inc.**  
2169 East Francisco Blvd., Suite G  
San Rafael, CA 94901

and

**Philip Williams and Associates, Ltd., San Francisco**  
**Hyden Associates, Sacramento**  
**Lawrence Hunt, Santa Barbara**  
**Paul Lehman, Santa Barbara**

October 1992

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## **1.0 INTRODUCTION**

The Ventura River Estuary Enhancement Project study area lies directly west of the City of San Buenaventura and approximately 60 miles west of Los Angeles. The study area covers approximately 110 acres and is comprised of two publicly owned parcels, the Emma Wood State Beach-Ventura River Group Camp (California Department of State Parks) and the Seaside Wilderness Park (City of San Buenaventura) and one privately owned parcel, the Hubbard property.

This report discusses the historical changes at the mouth of the Ventura River and describes the existing biotic, hydrological, and public access conditions and adjacent floodplain. Based on this information, the opportunities and constraints for enhancement of biotic resources balanced by public access for recreational and educational benefits are outlined.

## **2.0 SETTING AND HISTORIC CHANGES OF THE VENTURA RIVER ESTUARY AND WETLANDS**

### **2.1 Setting**

The Ventura River Estuary is a coastal lagoon formed in the delta of the Ventura River (Figure 1). The Main Lagoon of the estuary is located behind a barrier beach which periodically closes and the "Second Mouth" of the estuary is located at the mouth of a historic distributary channel to the west of the main channel. The delta is crossed by Highway 101, the Southern Pacific Railroad, and Main Street. A flood control levee constructed by the U.S. Army Corps of Engineers in 1948 to protect the City of San Buenaventura from flooding is situated along the eastern boundary of the estuary.

The Ventura River drains the southern California Transverse Ranges about 60 miles northwest of Los Angeles. The drainage area of the Ventura River is approximately 226 square miles and the river flows southward for approximately 15 miles from the confluence of the Matilija and North Fork Matilija Creeks to its mouth near the City of San Buenaventura. The main tributaries to the Ventura River include San Antonio Creek, Coyote Creek, Santa Ana Creek, and Canada Larga Creek.

The Ventura River forms a delta at the mouth of the lagoon where the river enters the Pacific Ocean. During flood flows, the Ventura River has a relatively high sediment load, and much of this load is deposited in the surf zone just offshore of the mouth. During the interval between floods, waves wash the sediment and carry away the finer portions and coarser material leaving a small bouldery delta (Norris and Webb 1990). Sand supplied from sea cliff erosion and streams west of Ventura is transported in eastward littoral currents and often covers the boulder delta. When wave action exceeds the outflow from the river, a berm builds and impounds the river in a closed embayment forming a brackish water lagoon. The lagoon may remain closed for several months, being breached either by strong ocean storms or by increased runoff from the Ventura River. It may then remain open for long periods of time, gradually becoming restricted as the beach rebuilds.

The wetland area within the Second Mouth of The Ventura River is the result of flood scouring of the distributary channel which intersects the ground water table. During the winter months, the Second Mouth lagoon temporarily expands due to collection of local run-off. During the remainder of the year, water levels are indirectly influenced by both tides and water levels in the main river mouth. The Second Mouth lagoon was reduced in size when it was filled for the construction of the Southern Pacific Railroad bridge, and subsequently when the western 150-foot span of the bridge was replaced by a causeway. This lagoon was enlarged during the flood flows of February 1992, but only beneath the remaining railroad bridge span.

Coastal dunes occur along the ocean shoreline. The dunes are subject to erosion from wave overwash and wind. On the landward side of the dunes, a "Dune Swale Wetland," or an area of low elevation extends from the Second Mouth eastward toward the main estuary. A similar low area behind the dunes was scoured to the west of the Second Mouth area during the February 1992 storm when flood flows were directed under the SPRR pedestrian underpass behind the dunes toward the Second Mouth.

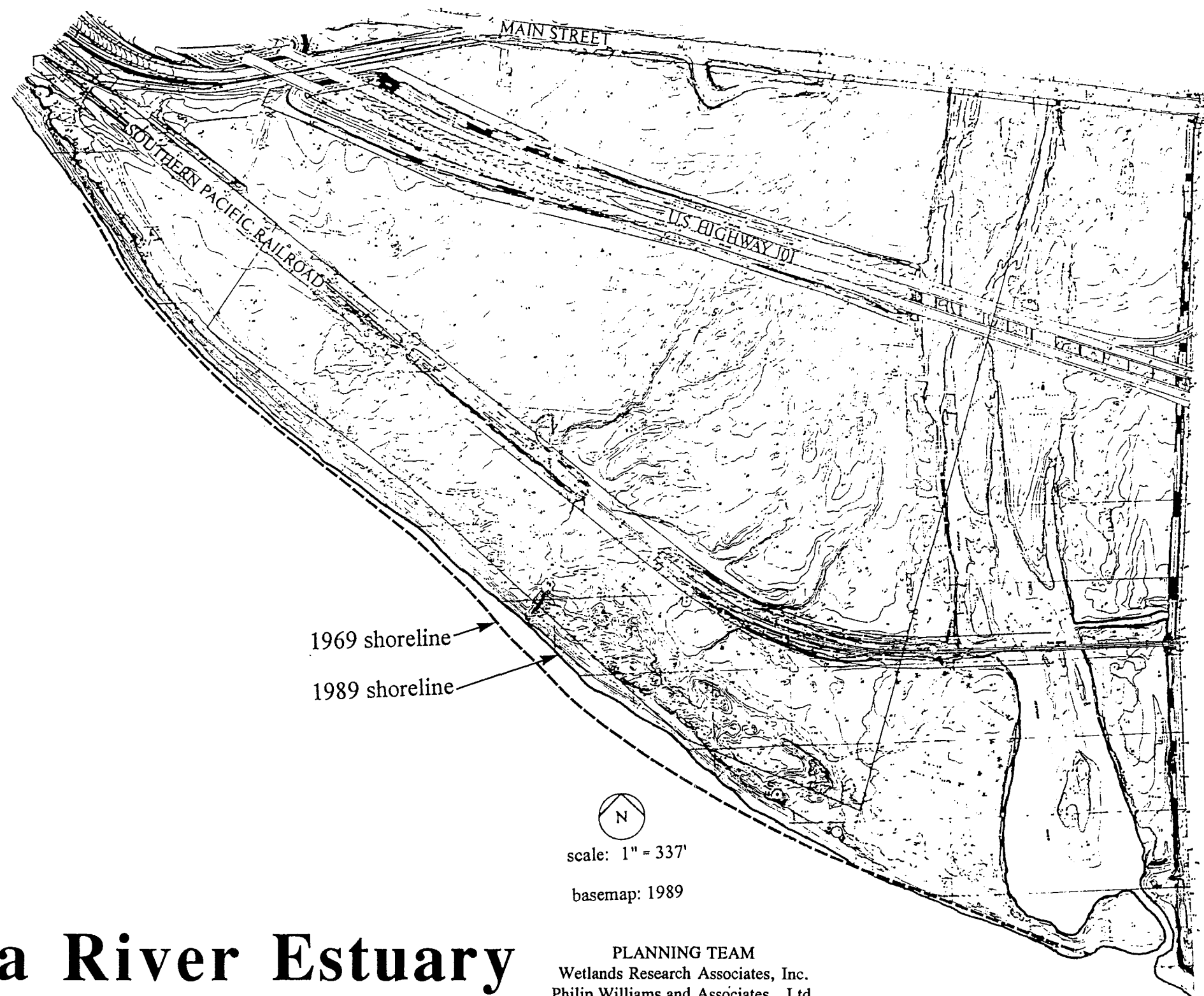
## 2.2 Historic Changes

### 2.2.1 Topographic maps

Topographic maps of the Ventura River Estuary were obtained for the years 1897, 1913, 1939, 1967, and 1969. Because of a lack of accurate control points, the locations of shorelines for these years could not be compared. A comparison could be made between the location of the 1969 shoreline and a 1989 photo used to prepare a base map. Some progradation at the mouth of the main estuary did occur in this interval, and some erosion occurred along the shoreline to the west of the river mouth (Figure 2).

The multiple channels of a deltaic system which carry flood flows are called distributary channels. In 1855, the main channel of the Ventura River was in its present location approximately with one prominent and several small open water areas along the deltaic front to the west of the main lagoon (Figure 3 after Keller and Capelli 1992). The Second Mouth of the Ventura River was formed at the location where the prominent distributary channel ended at the coastal dune.





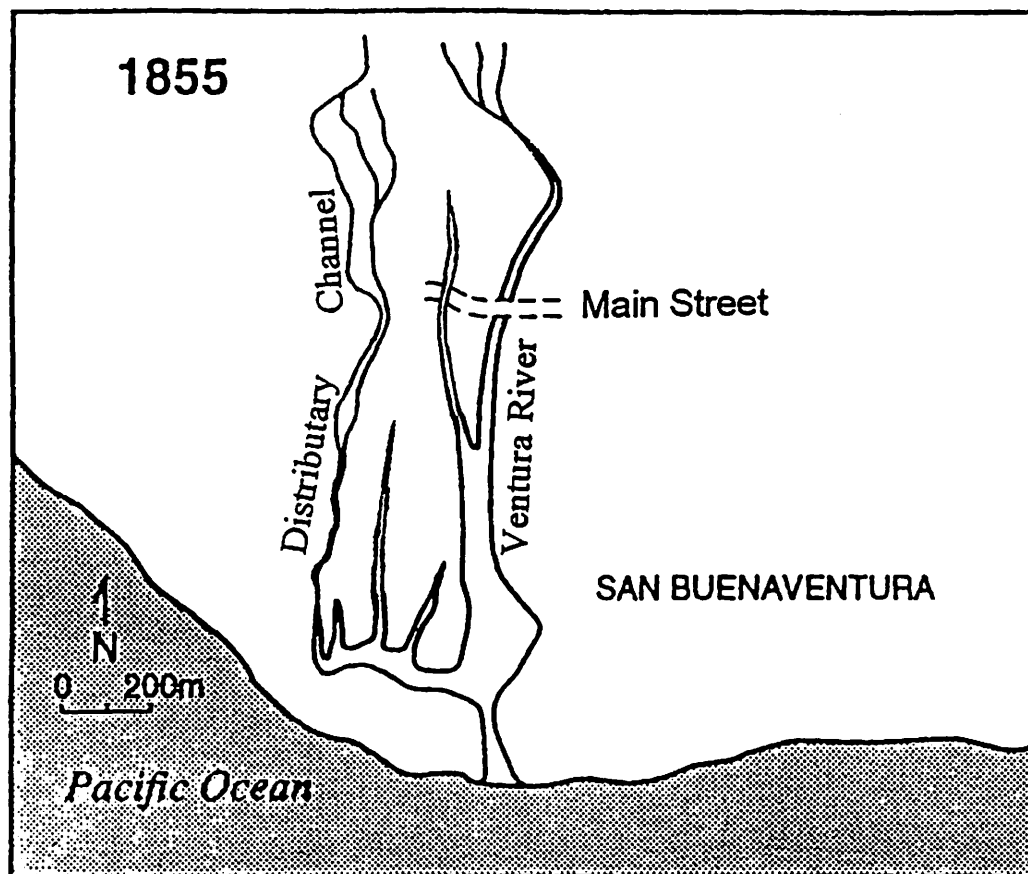
# Ventura River Estuary Enhancement Plan

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Figure 2. Comparison of the Ventura River Delta boundary - 1969 and 1989.



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Consultants in Hydrology

Figure 3. Map of the Ventura River Delta, 1855 (after Keller and Capelli 1992).



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### 2.2.2 Photography

Historical aerial photography is available for the Ventura River mouth from 1928 to present. Descriptions of the photographs are provided in Appendix A. During this period the river channel has become more narrow, distributary channels have been eliminated or blocked, and the extensive sand dunes and sandbars within the floodplain have been reduced. Development, including the construction of the levee south of Main Street, served to redirect the river, moving it farther westward than it was historically. The beaches and coastal dunes have fluctuated in width over the years. The Second Mouth estuary has also been reduced in size since the early photographs.

Photographs show that vegetation characteristics changed over time. Historically, the estuary and its floodplain supported riparian, scrub/shrub, and sand dune/sand bar habitat. The earliest photographs reviewed, taken in 1928 and 1939, showed a mixed distribution of riparian vegetation interspersed with broad sand bars. An exception was a dense block of Monterey Cypress and Monterey Pine planted to the west of the main mouth (Seaside Wilderness Park) in the early 1900's. By 1959, the river was channelized and much of the higher ground was being farmed. By the 1960's, the area of the study site west of the lagoon was densely covered with vegetation that appeared more dense than at any previous time.

Historically, the body of the Main Lagoon at the mouth of the Ventura River has generally included the area between the Southern Pacific Railroad bridge and the ocean (tidal activity does extend to just below the Main Street bridge). However, the width of the lagoon has increased, primarily by erosion of a high bank along the western side of the lagoon. Presumably, this erosion has been the result of the stabilization of the opposite bank by a flood control levee. In a comparison of historic and recent photographs when the lagoon is closed, the area of open water is larger in recent photographs.

The extent of open water within the area referred to as the Second Mouth has become reduced in size over time. Emergent marsh vegetation and/or open water was present in aerial photographs taken in the period between 1928 and 1946. Even in photographs taken during summer, open water was present in the Second Mouth. By 1959, the stabilization of the land surrounding the delta (as evidenced by agricultural lands and increased vegetative cover) corresponded to a decrease in the areal

extent and permanence of open water at the Second Mouth. Reductions of the open water area in the Second Mouth over time may have been caused by (1) variations in groundwater level; (2) sedimentation associated with natural events, such as flooding, and land use activities, such as bridge construction, installation of oil, gas, and communication lines, and pedestrian and recreational activities; or (3) lack of scour due to reduction of major flood events.

The other major change in the delta has been an increase in human intrusion into the Delta. Early photographs show both Main Street and the Southern Pacific Railroad; however, there are few trails or roads in the project area. By the 1950's and 60's, increased trails and roads are apparent and parks and campgrounds have been established within former riparian areas.

### 3.0 EXISTING BIOLOGICAL RESOURCES

The Ventura River Estuary and adjacent undeveloped areas support a diversity of biological resources, despite a noticeable reduction in area over the years. The resources within the study boundary include a variety of tidal, riparian, and upland habitats. The purpose of this part of the report is to describe the existing conditions of various habitats within the study area, analyze factors influencing vegetation growth and distribution, describe the spatial use of the area by wildlife, and discuss management opportunities.

#### 3.1 Vegetation

##### 3.1.1 Vegetative Communities

Vegetative communities of the Ventura River Estuary were studied in detail by Ferren, et al. (1990). Vegetation communities were categorized as: deep water, wetland, upland, and ruderal habitats (Figure 4). Deep water habitats included subtidal aquatic beds and channels. Wetland habitats included intertidal estuarine, riverine, and palustrine emergent and forested wetlands. Uplands included unmanaged areas, such as dunes and coastal sage scrub, at sufficiently high elevations that inundation was infrequent. Ruderal habitats included managed or former managed areas such as the Ventura River Group Camp and the Seaside Wilderness Park.

Vegetated wetland areas accounted for half (51 percent) of the study area; 42 percent of the area was

upland and ruderal areas; the remaining 7 percent was deep water estuarine habitat (Table 1).

**Table 1.** Estimates of habitat area in the Ventura River Estuary Enhancement Project Study Area (Ferren et al. 1990).

<u>Habitat</u>	<u>Percent of Total Area</u>
Estuarine	
Deep Water	7
Vegetated	12
Riverine	2
Palustrine	
Emergent	2
Scrub/Shrub	23
Forest	12
Upland	17
Ruderal	20
Other	<u>5</u>
TOTAL	100

For this study, the vegetation communities described by Ferren, et al. (1990) were grouped into habitat categories that more closely followed the habitat preferences of fish and wildlife. These habitats were then mapped in Figure 5 as: (1) vegetated ruderal habitat; (2) forested wetlands and transitional

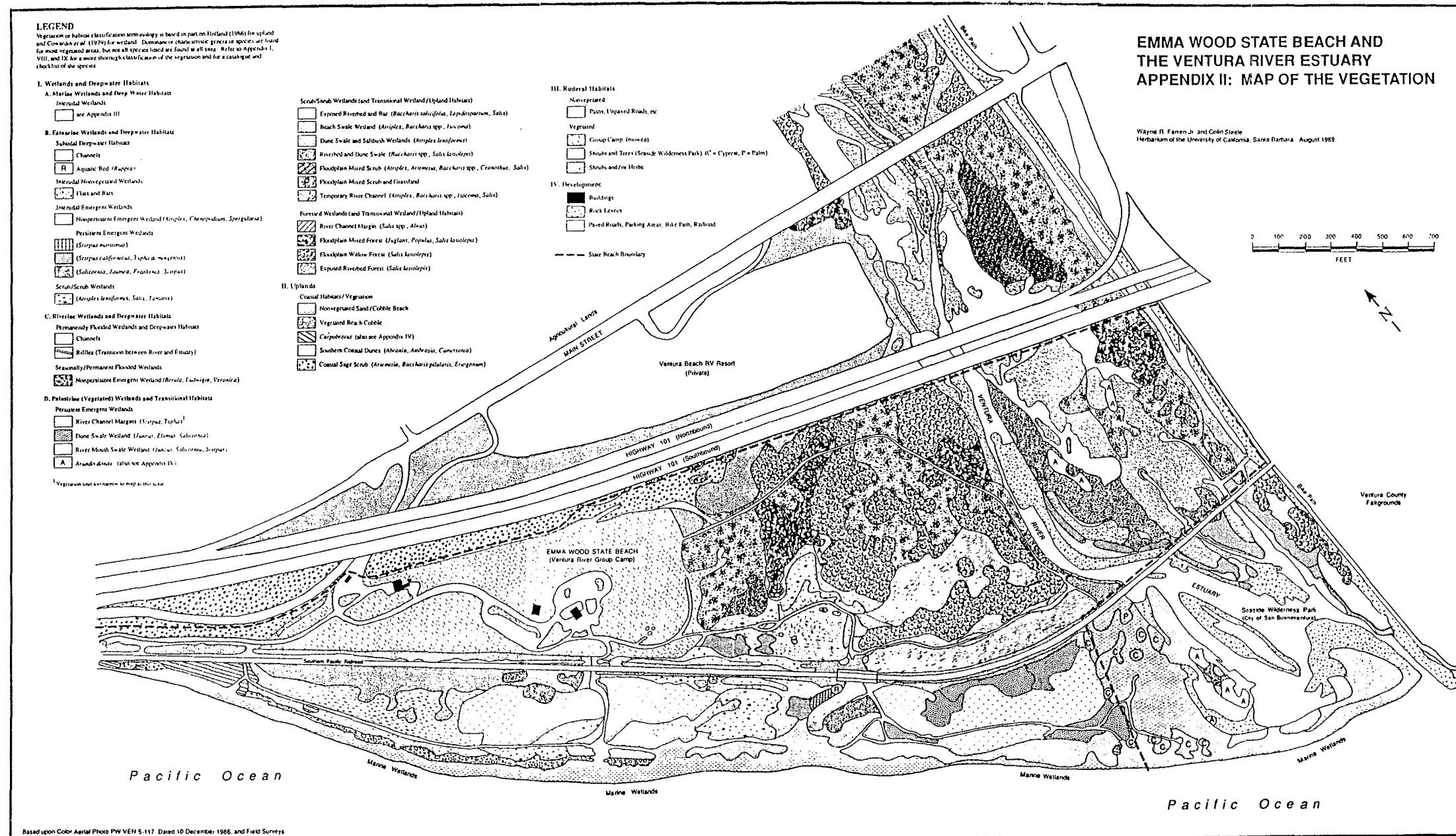









Figure 4. Map of the vegetation and habitats of the Ventura River Estuary (Ferren et. al. 1990).



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# LEGEND

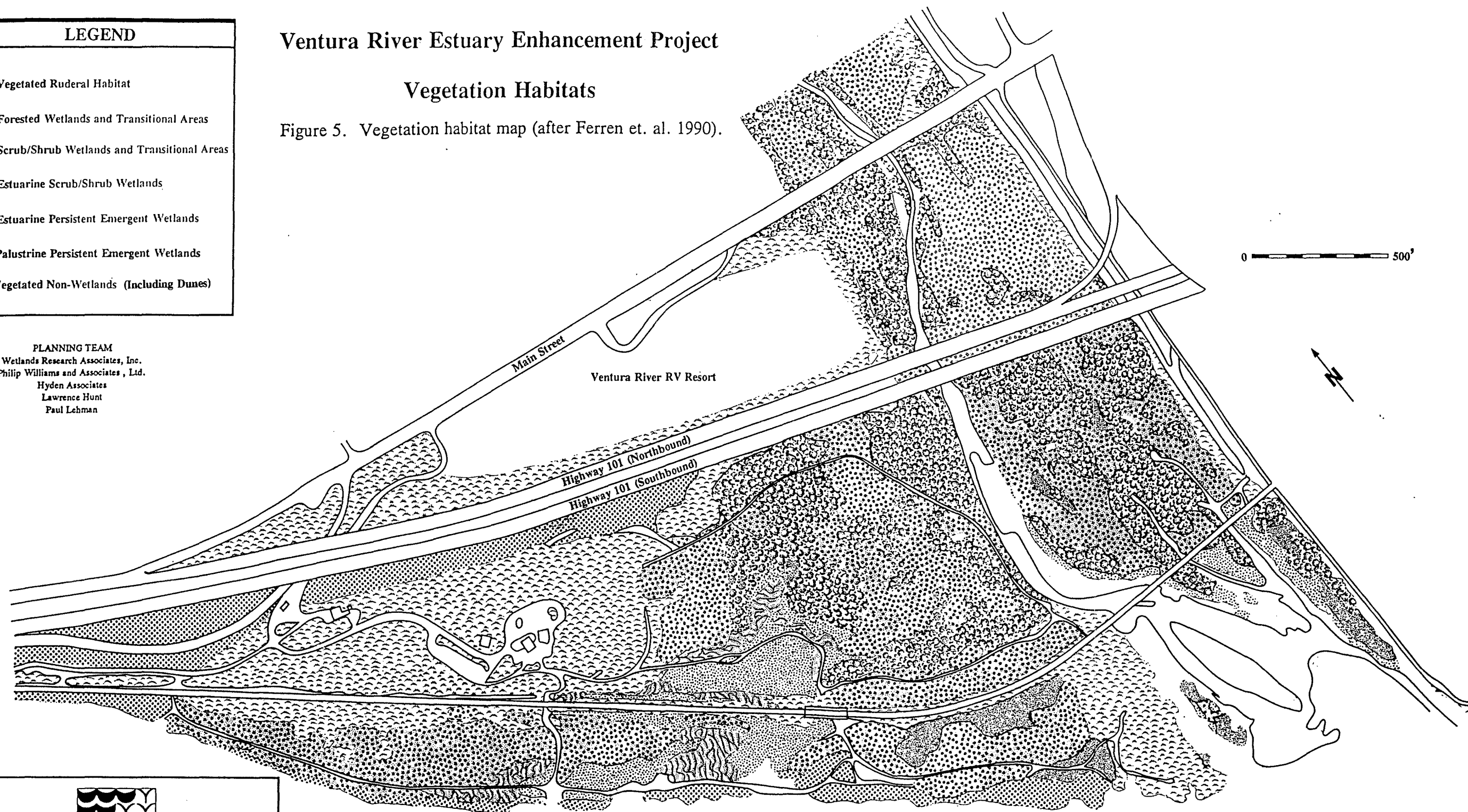
-  Vegetated Ruderal Habitat
-  Forested Wetlands and Transitional Areas
-  Scrub/Shrub Wetlands and Transitional Areas
-  Estuarine Scrub/Shrub Wetlands
-  Estuarine Persistent Emergent Wetlands
-  Palustrine Persistent Emergent Wetlands
-  Vegetated Non-Wetlands (Including Dunes)

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## Ventura River Estuary Enhancement Project

### Vegetation Habitats

Figure 5. Vegetation habitat map (after Ferren et. al. 1990).



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Pacific Ocean

areas; (3) scrub/shrub wetlands and transitional areas; (4) estuarine scrub/shrub wetlands; (5) estuarine persistent emergent wetlands; (6) palustrine persistent wetlands; and (7) vegetated non-wetlands. Forested and scrub/shrub wetlands collectively comprised riparian habitat and vegetated non-wetlands included coastal scrub/shrub and vegetated dune and beach areas. Detailed descriptions of the species composition for these various communities is provided in Ferren, et al. (1990). The biological resources associated with these habitats is further described in later sections of this report.

### 3.1.2 Special Status Species (Plants)

No Federally listed or candidate plant species or State listed or candidate rare or endangered plant species were found in the study area by Ferren, et al. (1990). None were found during this study, although concerted searches were not made at all appropriate times of year. Several plants of interest (as listed by societies such as the California Native Plant Society and the Santa Barbara Botanical Gardens) which have no Federal or State protection that were found on site by Ferren, et al. (1990) include spiny rush (*Juncus acutus* var. *sphaerocarpus*), southern California black walnut (*Juglans californica*), southern California locoweed (*Astragalus trichopodus*), Nuttall's chaparral mallow (*Malacothamnus fasciculatus*), and yerba mansa (*Anemopsis californica*). Plummer's baccharis (*Baccharis plummerae*) was historically reported in the area (M. Cappelli, pers. comm).

### 3.1.3 Exotic (Non-native) Vegetation

Exotic or California non-native vegetation in the study area was also treated by Ferren, et al. (1990). Invasive plants, such as giant reed (*Arundo donax*), kikuyu grass (*Pennisetum clandestinum*), hottentot fig (*Carpobrotus edulis*), and others are especially damaging to natural habitats because of their invasive growth and competitive exclusion of native plants. When large areas are colonized by exotic plants, habitat value for native wildlife is reduced or eliminated. Effects of this vegetation on wildlife are described in later sections of this report.

### 3.1.4 Factors Influencing Plant Distribution

Factors that affect plant growth and distribution in the Ventura River estuary and adjacent areas include flood frequency and intensity, frequency and duration of inundation, elevation, soil salinity, soil type, and human disturbance. In order to determine the suitability of the site for various species that



might be considered in an enhancement program, the role of these factors in affecting plant distribution was analyzed.

#### *Frequency of flooding and floodplain activities*

The frequency of flooding and duration of flood events and floodplain activities play an important role in plant density and distribution on river floodplains. Aerial photographs indicate there was an increased density of vegetative cover on the Ventura River floodplain within the study area in recent years (1960-1990). Some of the vegetation density increase was due to a reduction of disturbance on the floodplain. Farming practices on portions of the floodplain have ceased, including portions of the west bank within State Park property, which has allowed native and non-native vegetation to establish. Reduced flood control maintenance on the floodplain has also contributed to vegetative growth (Ferren, et al. 1990). Some of the increased growth was also due to establishment and growth of vegetation during almost ten years without flooding (between the 1982 and the 1992 floods). However, little vegetation was removed from the study area during the 1992 flood and most has re-grown rapidly. It may be that with less frequent flooding, plants can become better established than under more frequent flooding events. These plants may be less susceptible to removal or due to their density may protect one another from becoming dislodged. Also, some dominant exotics such as giant reed, simply bent over under the stress of the 1992 high flows and are now recovered fully.

#### *Frequency and duration of inundation*

The frequency and duration of inundation influences plant distribution due to the relative inundation tolerance of various plants through their growing season. Cattail (*Typha* spp.) and tule (*Scirpus* spp.), for example, will tolerate permanent inundation. Willow (*Salix* spp.) and other wetland scrub/shrub species will tolerate repeated inundation, but require well-drained soil and lowered water tables for at least part of the growing season.

During periods when the main river mouth is closed by the barrier beach, the water level behind the beach rises to 5 to 6 ft. NGVD<sup>1</sup> forming a lagoon. This level can be maintained for several

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<sup>1</sup> All elevations expressed in this report are relative to NGVD or National Geodetic Vertical Datum. It approximates mean sea level.

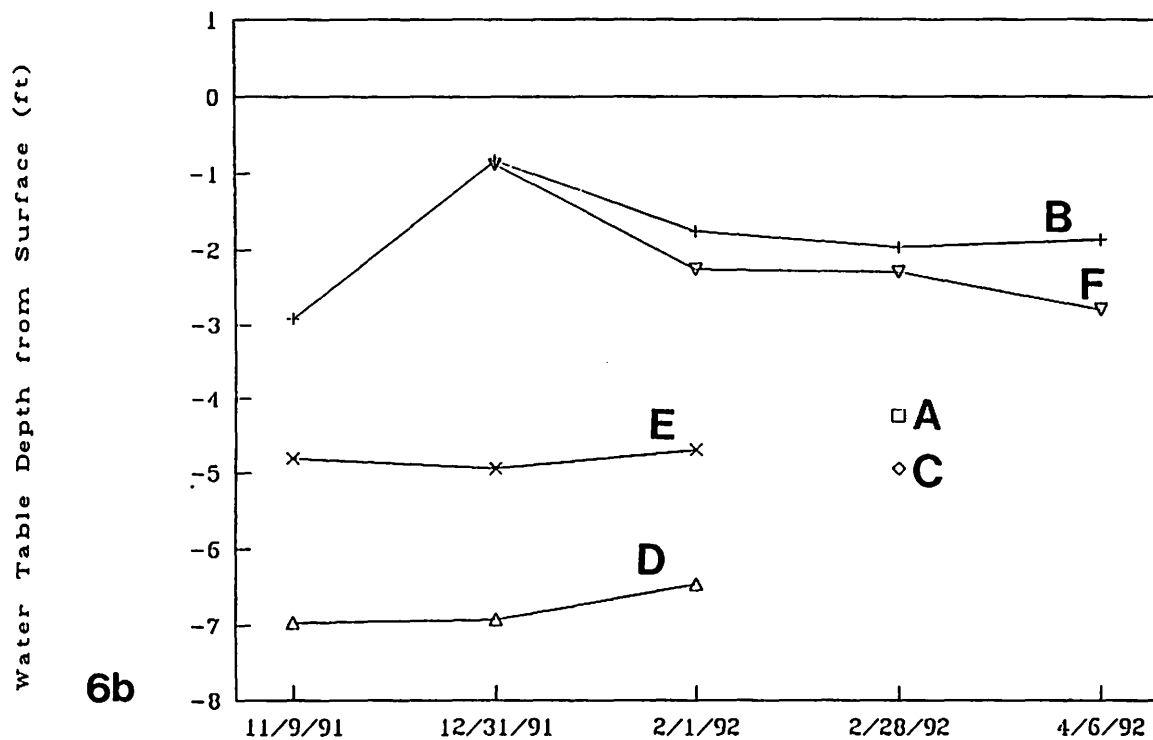
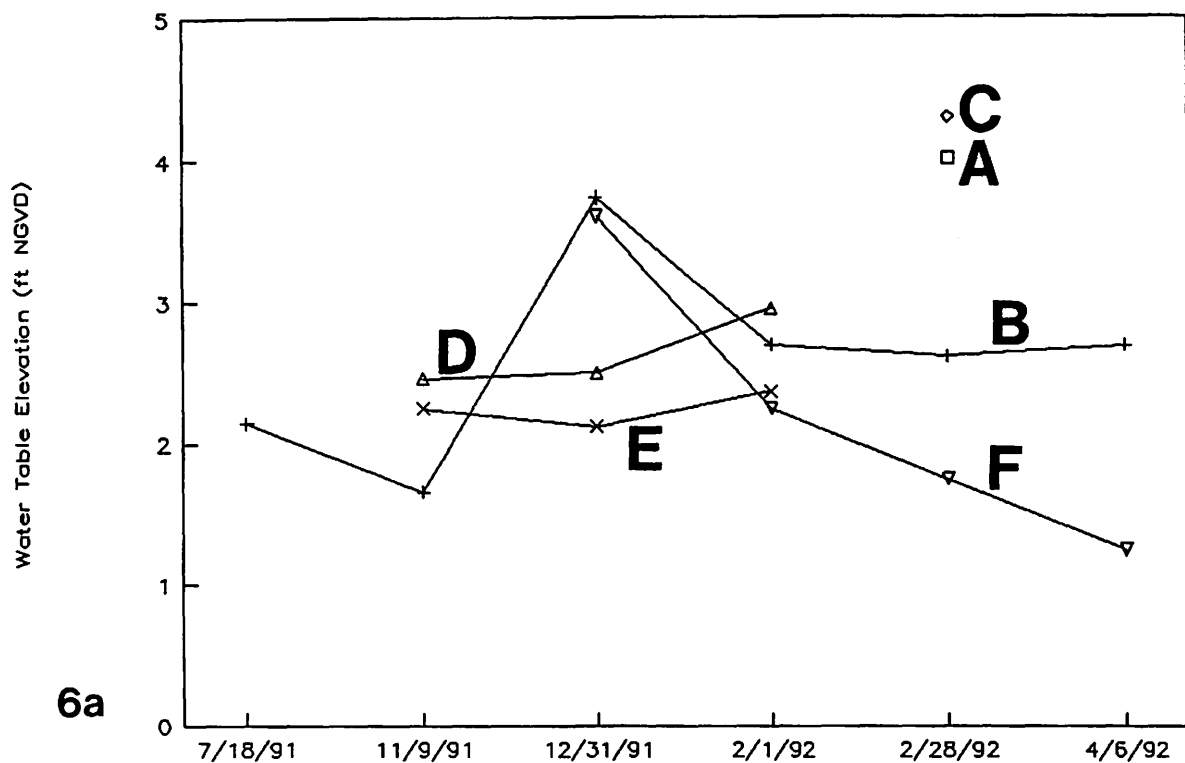
months until runoff causes the barrier beach to erode. The period and depth of inundation precludes plants from growing below approximately 3 ft. within the estuary. Between 3 - 6 feet, the inundation conditions are appropriate for cattail and tule communities to grow. Between 6 - 11 feet where inundation occurs less frequently and for shorter periods of time, a gradient of willow, *Baccharis* spp., and saltbush (*Atriplex* spp.) form scrub/shrub and forested areas on the river floodplain.

Once the barrier beach is breached, the main river mouth can remain open to tidal action for several weeks or months, exposing sand and gravel bars below 3 ft. Opportunistic plants, mainly annuals such as sand spurrey (*Spergularia marina*) and fat hen (*Atriplex patula*), grow and complete their lifecycles in these exposed areas. Areas above 3 ft. (cattail, tule, scrub shrub and forested wetland) drain and become desiccated near the surface. Cattails and tules enter dormancy as their above ground leaves die. Scrub shrub and forested wetland plants maintain growth through this dry period through deep, well established root systems.

The Second Mouth is part of a larger area of open water that existed prior to natural and human-caused filling. The lowest portion of the Second Mouth, a small depression only a few hundred square feet in size lying immediately south of the trestle, intercepts the water table (Figures 6a and 7) at approximately 2 ft. NGVD and is normally inundated much of the year. This deepest portion supports the aquatic plant, ditch grass (*Ruppia maritima*). Higher areas, mainly north of the trestle, pond water seasonally as the water table rises or as rain water accumulates. Cattails and tules dominate where seasonal ponding is as great as 1 - 2 ft. deep. Shallower areas that pond water 1 ft. or less are dominated by salt marsh plants such as pickleweed (*Salicornia virginica*) and salt grass (*Distichlis spicata*).

### *Elevation*

The effect of elevation on plant distribution in the Ventura River Estuary is generally related to inundation frequency and duration (described above) or depth to the ground water table. Ground water depths were measured in shallow wells located at various points west of the estuary (Figure 7). Groundwater table elevations vary depending on short-term and seasonal climatic fluctuations, and groundwater data collected in 1991 reflect drought conditions.



Well Stations: □ A + B ◇ C △ D × E ▽ F

Figure 6. Water table at Ventura River Estuary. Upper graph is water table elevation (6a). Lower graph is water table below the surface (6b).



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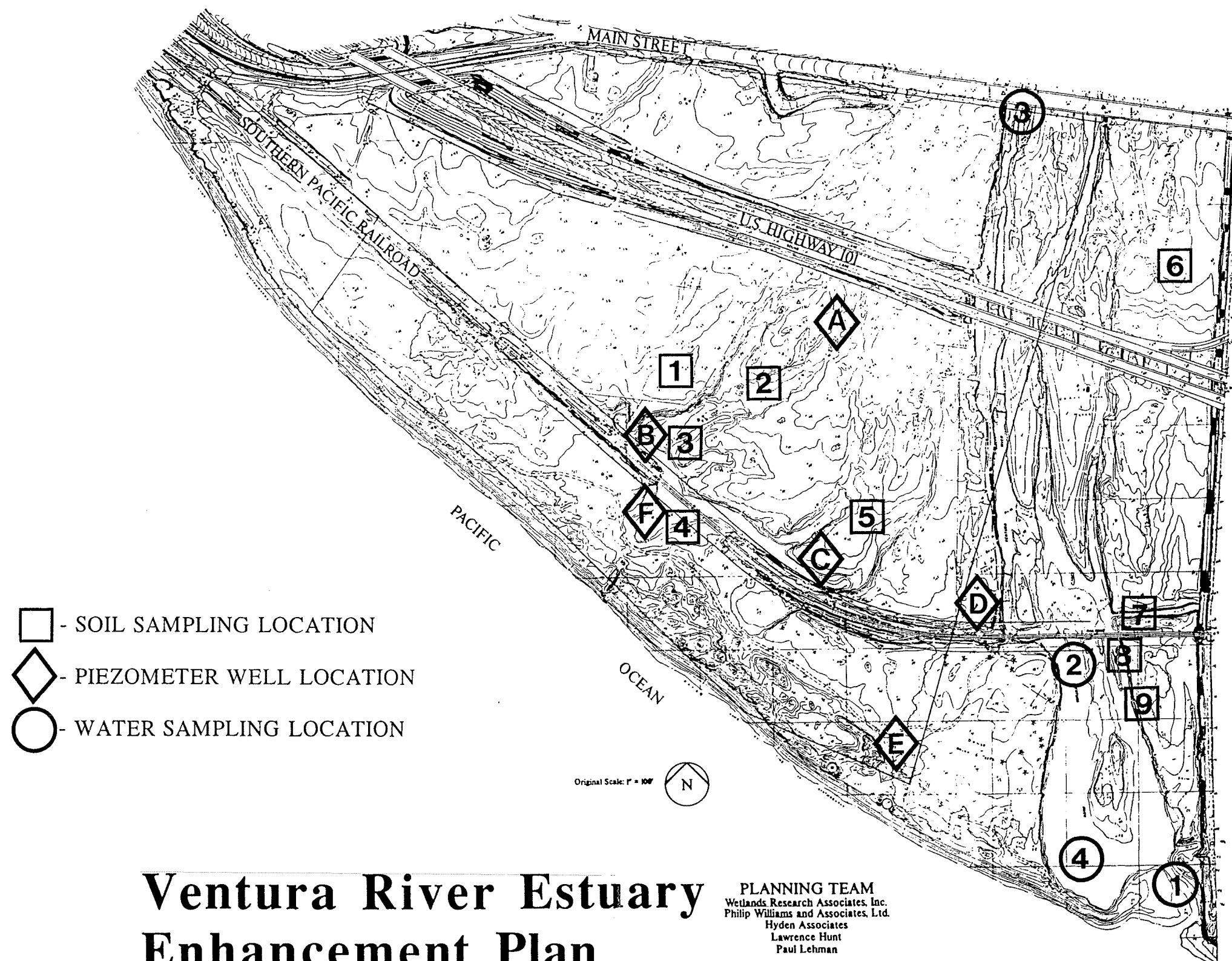


Figure 7. Soil, piezometer well, and water quality sampling locations at Ventura River Estuary.



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The ground water in the study area was below the depth at which wells were initially installed (4 - 8 ft) in summer 1991 but rose closer to the surface at least periodically during the following winter (Figure 6b). Ground water was closest to the surface near the Second Mouth (wells B and F) than in surrounding riparian and scrub/shrub areas (wells A, C, D, and E) because the Second Mouth area was at a lower elevation (Figure 1). This was probably the reason emergent wetland vegetation (bulrush, cattail) was present at the Second Mouth and riparian forest and scrub/shrub wetland vegetation were located elsewhere.

### *Soil Salinity*

Plant distribution is affected by soil salinity because plants have different salt tolerance levels. Marsh plants are commonly divided into three general categories of salt tolerance. Salt marsh plants, such as pickleweed and salt grass, tolerate soil salinity in concentrations from approximately 20 parts per thousand (ppt) to more than ocean water strength (33 - 34 ppt). Brackish marsh plants, such as tules and cattail, tolerate soil salinity in the range between approximately 5 ppt and 20 ppt. Freshwater marsh plants, such as willow, tolerate the least amount of soil salinity, generally 5 ppt or less.

Soil salinity and conductivity at the Ventura River Estuary were measured from soil samples and from interstitial water (free water in soil) in ground water wells (Figure 7). Soil samples were collected twice, once in late spring under open estuary conditions and once in fall under closed estuary conditions. Soil salinity/conductivity was measured using the saturation paste extract method (Richards 1954). Ground water samples from wells were collected on a monthly basis between December 1991 and April 1992.

Results (Table 2) show that soil salinity/conductivity varied slightly during the year. In spring, no soil salinity (0 ppt) was detected at the surface (between 0 and 6 in.) at all locations. This was expected because winter rains usually leach salt from the surface to deeper strata. Salinity at sampling station 9 in the estuary was higher (8 ppt) which may explain the dead or dormant bulrush observed at this location. By fall, surface soil salinity rose on the surface to 0.5 to 6 ppt at most sampling stations (1 through 6) presumably due to deposition of new salt (e.g., from sea spray) or from salt migrating to the surface as a result of evaporation. Results from soil samples taken approximately 24

inches below the surface (fall samples) and from wells indicated that soil below the surface generally was more saline (up to 12 ppt) than at the surface.

**Table 2.** Measurements of soil conductivity, salinity and pH at the Ventura River Estuary Study Area as observed on May 23 and December 12, 1991.

Station No.	Conductivity ( $\mu$ mhos/cm)			Salinity (ppt)			pH		
	<u>May</u> 6 in	<u>December</u> 6 in 24 in		<u>May</u> 6 in	<u>December</u> 6 in 24 in		<u>May</u> 6 in	<u>December</u> 6 in 24 in	
1	353	683		0	0.5		7.6	7.5	
2		1330	3690	0	1.0	2.0	8.2	8.4	8.2
3	986	1670	5370	0	2.0	4.0	7.9	7.8	7.9
4	4170			1	6.0		7.5		
5	344	391		0	0.5				
6	347	332		0	0.0		7.8	7.9	
7	359			0					
8	7450			2					
9	19100			8					
10		8320	14200		6.0	9.0		7.9	7.1

### *Soil Type*

The U.S. Soil Conservation Service (SCS 1970) has mapped and described five soil types within the study area: riverwash, sandy alluvial land, tidal flats, Camarillo sandy loam, and Camarillo loam, sandy substratum (Figure 8).

Riverwash occurs in the main river channel and is composed of coarse gravelly and stony materials. These areas are flooded most frequently following significant storms and are subject to either scouring or deposition. Willow, mule fat, and other brushy vegetation tend to colonize riverwash areas.

Sandy alluvial land is found in a narrow strip along the eastern edge of the river channel. It is deposited within a relatively high flood plain and is only infrequently flooded. The soil profile is stratified layers of sandy materials with areas of coarser materials, such as gravel and cobble. Willow and other brushy vegetation are dominant, but annual grasses and herbs are found on this soil type.

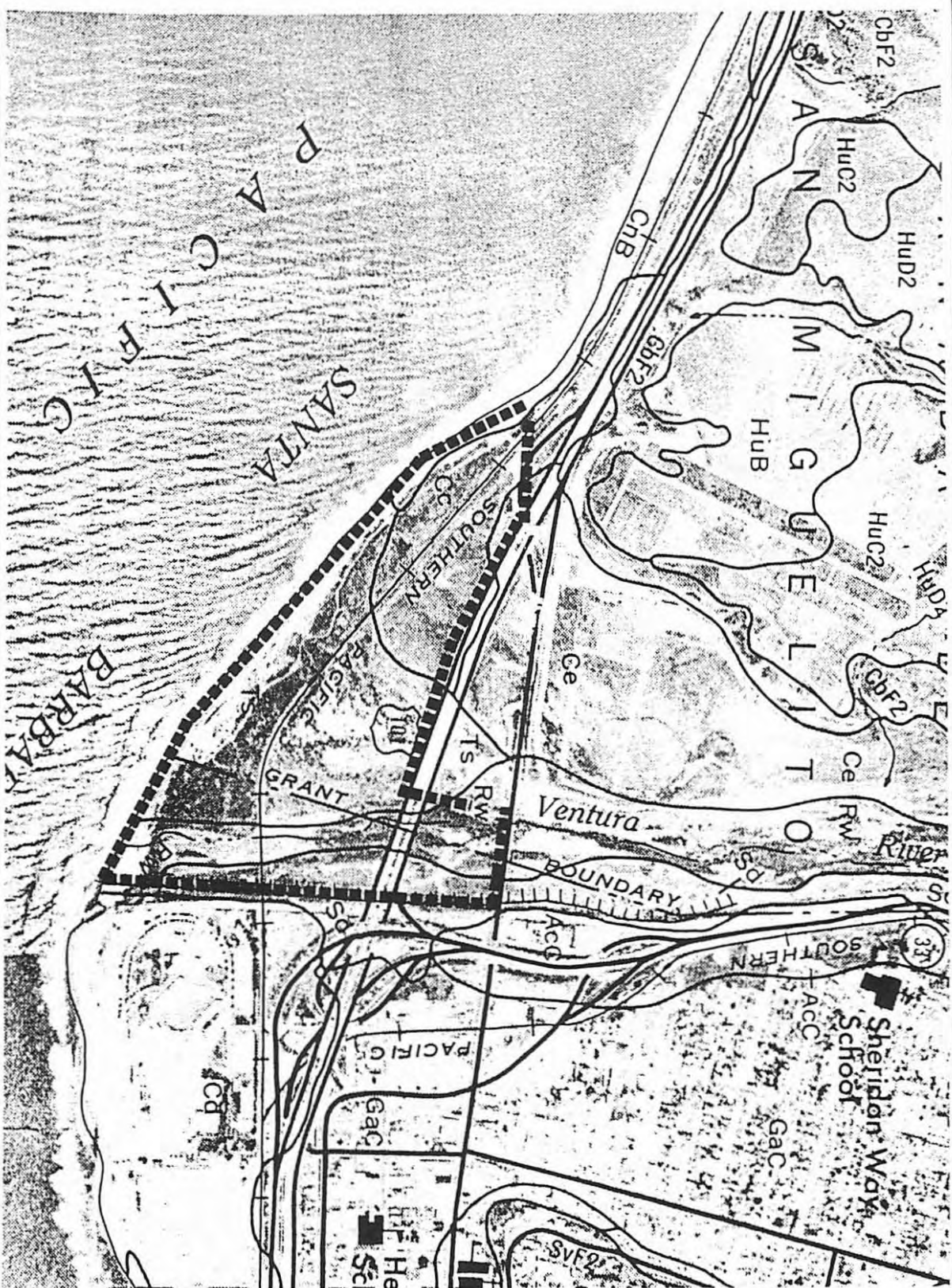


Figure 8. Soil types as mapped by the U.S. Soil Conservation Service. (Cc = Camarillo sandy loam, Ce = Camarillo loam, sandy substrate, Rv = Riverwash, Ts = Tidal flats).



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occur between the western bank of the river west to approximately the current boundary of the Ventura Beach RV Resort and the cleared areas of the Emma Wood State Beach-Ventura River Group Camp. Ocean beaches have also been included in this soil type. Current conditions, however, indicate that tidal areas occupy a more restricted area. Tidal areas, including those only potentially reached by extreme high tides (up to approximately 7 feet in elevation), are in the main river channel (to just below the Main Street bridge) under open estuary conditions and portions of the Seaside Wilderness Park. Portions of the area south of the railroad to the beach between the Seaside Wilderness Park and west of the Second Mouth, and an area north of the railroad trestle at the Second Mouth could be tidal whenever a channel is open to the ocean. Dominant plants in these areas are salt tolerant, such as pickleweed, salt grass, and *Atriplex* species.

Camarillo sandy loam occurs in the area occupied by the Ventura River Group Campground. This soil type is generally free of coarse material such as gravel and cobble, and is used as agricultural land.

Camarillo loam, sandy substratum occurs only in a small area south of Highway 101 in the group campground. As the name implies, this type is mainly loam with underlying sand. This soil type is generally used for agricultural purposes.

### *Human Disturbance*

Significant impacts to vegetation have occurred over the last century due to human activities. Although stabilization has resulted in greater vegetative cover within river bottom and immediately adjacent floodplain, agricultural and commercial development in the floodplain eliminated significant portions of riparian woodland and other habitats. The amount of vegetated river floodplain between Main Street and the ocean (including dune habitat) measured on an 1855 map (in Ferren, et al. 1990) was approximately 127 acres. Today the approximate area of vegetated floodplain has been reduced to 82 acres (65 percent of historic acreage). The main losses occurred along the river's eastern bank due to development. The reduction of dune habitat, in addition to human foot traffic, may be due, in part, to loss of sand supply that is intercepted by dams in the Ventura River and adjacent coastal watersheds.



Public access into the estuary area also has had impacts to vegetation. These impacts tend to be on a smaller scale than agricultural or commercial development, but occur daily. Pedestrian traffic on a maze of trails and other disturbances prevent plant regrowth. In some habitats, such as in dunes, vegetation recovery can be especially slow.

### 3.2 Wildlife

The botanical study by Ferren, et al. (1990) recognized that the interaction of four wetland systems (marine, estuarine, riverine and palustrine) and associated uplands, provided important habitats for a wide variety of animals, some of which have been identified by state and federal agencies as sensitive species. Much of the previous work on the faunal resources of the Ventura River has dealt with fishes, primarily the Steelhead Trout (*Oncorhynchus mykiss*). Other aquatic and terrestrial vertebrates were recorded only opportunistically.

The faunal resources of the Ventura River Drainage Basin were surveyed by Lawrence E. Hunt and Paul Lehman as part of this study. Their objectives were to: (1) compile a thorough inventory of the known and potential occurrence of native and introduced vertebrates (fish, amphibians, reptiles, birds and mammals) on the study area; and (2) document habitat use by vertebrates and identify the most sensitive vertebrate habitats on the study area.

Despite extensive alteration of the discharge patterns of the Ventura River and modification of adjacent riparian and upland habitats by flood control activities and water diversion projects, this watercourse is one of the few remaining in southern California where marine and estuarine habitats are still contiguous with riverine habitats (Ferren, et al. 1990). High habitat diversity has led to a diversity of faunal resources, including a variety of state and federally listed rare or endangered and regionally declining vertebrate species.

#### 3.2.1 Methods

The vertebrate resources of the study area were investigated through a combination of field work, surveys of museum and literature records, and conversations with local biologists. Field surveys were conducted between June 1991 and July 1992. Lawrence Hunt conducted the field, literature and

museum record surveys for fish, amphibians, reptiles and mammals. Paul Lehman conducted field and literature surveys for birds. Mark Capelli provided much of the information on the existing and historic distribution and occurrence of fishes in the study area.

### *Fishes*

As a group, more is known about the fishes of the Ventura River than any other vertebrate assemblage. This record however, has notable gaps which should be addressed in future research. The anadromous and resident fish resources of the Ventura River are the subject of a number of recent studies including: Swift (1975); Moore (1980); Swift, et al. (1989); City of San Buenaventura (1990 and 1991) and Swift, et al. (1991). This literature precluded the necessity for intensive field surveys to inventory fishes. Efforts focused on accumulating as much information as possible from literature and professional sources.

### *Amphibians and Reptiles*

Amphibians and reptiles were inventoried by intensively searching appropriate microhabitats throughout the study area during winter and spring 1991/1992. The surveys attempted to identify the value of habitats on-site as well as distribution of suitable microhabitats within them. Literature sources and museum records as well as consultation with local experts, were also used to compile an inventory and discuss potential and historic species occurrences.

### *Birds*

Bird diversity and density was sampled by visual and auditory means during the breeding, winter, and migratory seasons between June 1991 and July 1992. Data from several preceding years were also used. Literature and museum records as well as consultation with local birders supplemented the field surveys.

### *Mammals*

Mammals were inventoried by surveying the entire study area on several occasions between June 1991 and June 1992 and recording direct observations and signs (tracks, scat or burrows). Rodent diversity and habitat utilization was intensively sampled by live-trapping on two occasions: early November 1991 and early May 1992. During each trap session, four traplines of approximately 25 live

traps, were set for three consecutive nights. Traplines were placed in coastal dune/dune swale, estuarine, palustrine, and riparian woodland/scrub habitats on the study area (Figure 9).

A field survey for bats was conducted on 3 July 1992 by Drs. Patricia Brown and Robert Berry, Catherine Brown, Dr. Shimiko Matsumora (Japan) and Lawrence E. Hunt. Additional participants included Marla Daily of the Santa Cruz Island Foundation and James Rorabaugh, a biologist with the U.S. Fish and Wildlife Service. Visual searches of the entire study area were made between 1550 and 1825 hours which focused on locating bat sign (urine stains and droppings) beneath temporary and seasonal roost sites throughout the study area. Sites that contained bats or their sign were revisited between 2000 and 2350 hours on the same day. Mist nets were strategically placed at dusk to capture bats leaving these sites to forage and two "Mini-2" Bat Detectors were used to detect bat calls at night. Binocular and monocular night-vision scopes were also used to observe and identify foraging and roosting bats.

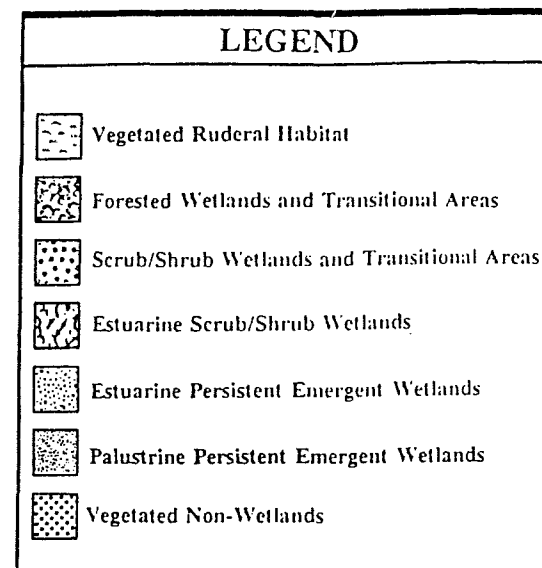
### 3.2.2 Species Diversity

Approximately 172 genera and 268 species of vertebrates native to California currently utilize the study area (Table 3). Birds were by far the most diverse group inhabiting the study area on a permanent or temporary basis. Amphibians and reptiles, for reasons discussed below, were a depauperate component of the vertebrate fauna of the study area.

Non-native vertebrates within fifteen genera containing 16 species of vertebrates were found in the study area.

**Table 3.** Number of genera and species of native and introduced vertebrates found on the project site. A full species list is provided in Appendix B.

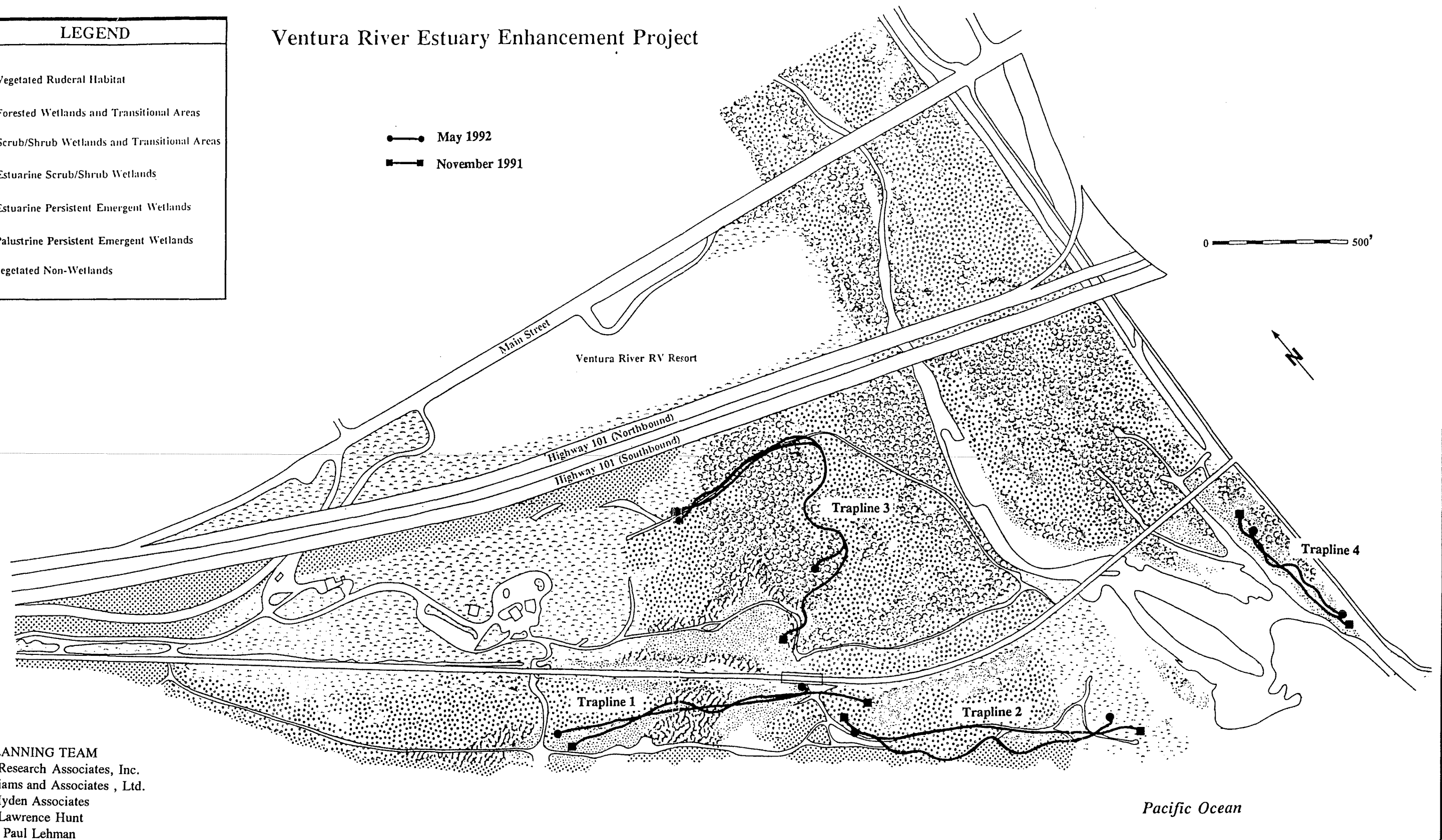
	<u># GENERA</u>	<u># SPECIES</u>
<b>FISHES</b>		
Native	10	11
Introduced	5	6
<b>AMPHIBIANS</b>		
Native	1	1
Introduced	1	1
<b>REPTILES</b>		
Native	5	5
Introduced	0	0
<b>BIRDS</b>		
Native	139	233
Introduced	4	4
<b>MAMMALS</b>		
Native	17	18
Introduced	<u>5</u>	<u>5</u>
<b>TOTAL</b>	<b>187</b>	<b>284</b>



# Ventura River Estuary Enhancement Project

● May 1992  
■ November 1991

0 500'



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Paul Lehman

Figure 9. Location of small mammal traplines.



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Non-native freshwater fish (6 species) comprised the majority of the introduced vertebrates found in the study area.

Twenty species of vertebrates known to occur within the study area were state and/or federally-listed sensitive species, including 3 species of fish, 2 species of reptiles, 14 species of birds and one species of mammal (Table 4). Together they comprised approximately 7 percent of the total vertebrate resources in the study area. Wildlife species are discussed in more detail in Appendix B.

**Table 4. List of animals of special interest for the Ventura River estuary.**

**California Department of Fish and Game  
Species of Special Concern**

Steelhead Trout  
*Oncorhynchus mykiss*  
Arroyo Chub  
*Gila orcutti*  
Silvery Legless Lizard  
*Anniella pulchra pulchra*  
Osprey  
*Pandion haliaetus*  
Black-shouldered Kite  
*Elanus caeruleus*  
Coopers Hawk  
*Accipiter cooperii*  
Black Swift  
*Cypseloides niger*  
Yellow Warbler  
*Dendroica petechia brewsteri*  
Yellow-breasted Chat  
*Icteria virens*  
Pallid Bat  
*Antrozous pallidus*

**State Endangered**

California Brown Pelican  
*Pelecanus occidentalis californicus*  
(also Federally threatened)  
Belding's Savannah Sparrow  
*Passerculus sandwichensis beldingi*  
(also Federal candidate species)

**Federal Candidate**

Tidewater Goby (Category 2)  
*Eucyclogobius newberryi*  
(also CDFG species of special concern)  
Southwestern Pond Turtle (category 2)  
*Clemmys marmorata pallida*  
(also CDFG species of special concern)  
White Faced Ibis (category 2)  
*Plegadis chihi*  
(also CDFG species of special concern)  
Western Snowy Plover (Category 2)  
*Charadrius alexandrinus nivosus*  
(also CDFG species of special concern)  
Tricolored Blackbird  
*Agelaius tricolor*  
(also CDFG species of special concern)

**Federal Endangered**

Peregrine Falcon  
*Falco peregrinus anatum*  
(also state endangered)  
California Least Tern  
*Sierna antillarum browni*  
(also state endangered)  
Least Bell's Vireo  
*Vireo belli pusillus*  
(also State endangered)

### 3.2.3 Habitat Use

Habitat classification for this report was based on a scheme developed by Ferren, et al. (1990). Vertebrate habitat use generally extends across botanical categories, so the vegetation types delineated

in the botanical resources report were combined into five general habitat types for the purposes of this report: estuarine wetlands; palustrine habitats; riparian woodland/scrub habitats; coastal dunes and ruderal habitats (Figure 5). General use of vertebrates by habitat type is summarized in Table 5.

**Table 5.** Potential occurrence of various animal groups in five general habitat groups.

	<u>Fish</u>	<u>Amphibians</u>	<u>Reptiles</u>	<u>Birds</u>	<u>Mammals</u>
Forested and Scrub/Shrub Areas		X	X	X	X
Estuarine Wetlands	X	X		X	X
Palustrine Wetlands		X	X	X	X
Ruderal			X	X	X
Coastal Dunes			X	X	X

### *Fishes*








The study area can be subdivided into two important contiguous brackish and freshwater habitats for fishes: the estuary and the primary river channel (Figure 10). The estuary provides important primary and nursery habitat for several species such as Topsmelt (*Atherinops affinis*), Prickly Sculpin (*Cottus asper*) and California Killifish (*Fundulus parvipinnis*) as well as sensitive species such as the Steelhead Trout and Tidewater Goby. Anadromous and catadromous fishes use the river channel to access fresh and saltwater habitats at appropriate times during their life-history cycles.


The sandbar at the mouth of the estuary is periodically breached by heavy outflows and high tides associated with storm events. Once opened, anadromous species attempting to spawn in the lower estuary can enter from the ocean (e.g., Topsmelt) as well as species that breed in freshwater upstream (e.g., Pacific Lamprey, Steelhead, California Killifish). Continuous freshwater inflows to the estuary are critical to maintaining the low salinity levels in the upper portions of the estuary favored by the Tidewater Goby. Preservation of these features and maintenance of good water quality are crucial to the continued survival of these resident anadromous and catadromous species in the Ventura River.

Figure 10

Occurrence of Sensitive Fishes  
in the Study Area

**LEGEND**

-  Vegetated Ruderal Habitat
-  Forested Wetlands and Transitional Areas
-  Scrub/Shrub Wetlands and Transitional Areas
-  Estuarine Scrub/Shrub Wetlands
-  Estuarine Persistent Emergent Wetlands
-  Palustrine Persistent Emergent Wetlands
-  Vegetated Non-Wetlands

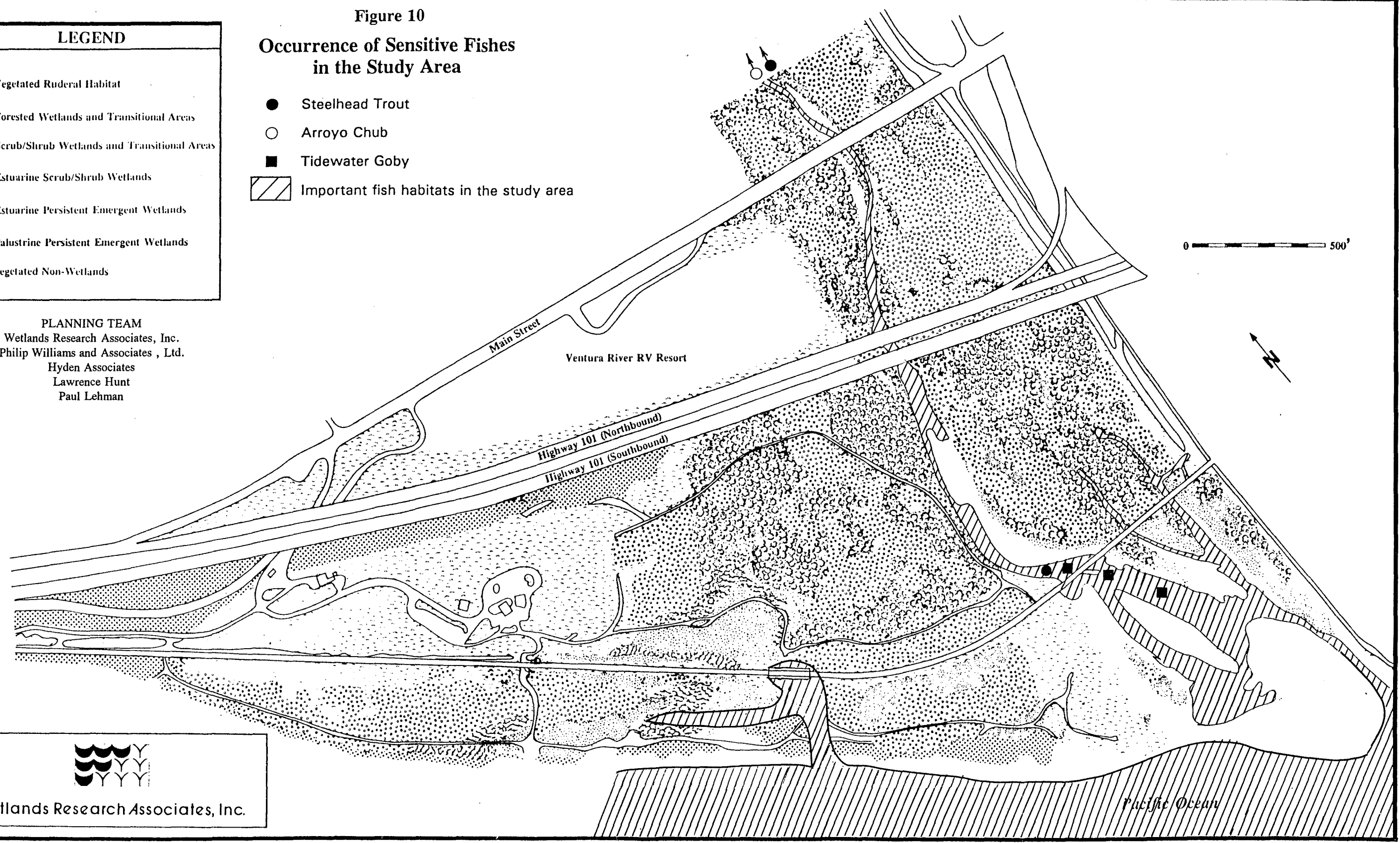
- Steelhead Trout
- Arroyo Chub
- Tidewater Goby
-  Important fish habitats in the study area

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0 500'



The Ventura River provides suitable habitat for three species of fish classified as sensitive at the state and/or federal level: Tidewater Goby, Arroyo Chub and Steelhead Trout. Each is discussed in Appendix C.

### *Amphibians*

In general, the study area provides marginal habitat for amphibian species because of the lack of fresh water and widespread occurrence of saline soils and halophytic vegetation. In the marginally freshwater wetland at the Second Mouth, brackish ground water can rise to between 1.5 and 3.5 feet below ground surface (Meisenbach 1975, in Ferren, et al. 1990).

Potentially important amphibian habitats are shown in Figure 11. The single amphibian species found on-site to date, the Pacific Chorus Frog (*Pseudacris regilla*), is capable of tolerating a broad range of habitat and disturbance conditions. The Bullfrog (*Rana catesbeiana*), an introduced species, may also occur on the study area. A desiccated carcass of this species was found in *Scirpus* beds on the east bank of the river approximately 300 feet south of the Southern Pacific railroad bridge and may have been transported to that location by a predator. Bullfrogs, if they occur on-site, are likely to be restricted to the primary channel of the Ventura River and adjacent riparian woodlands at the northern end of the study area. This species is common farther upstream in the Ventura River. A third species, the Western Toad (*Bufo boreas*) may also occur on-site in riparian wetlands and transitional areas, scrub wetlands and estuarine/palustrine wetlands. This species is common further upstream.








Fresh water habitats increase in size and persistence upstream from the study area, with a concomitant increase in amphibian diversity. Adult Western Toads, Pacific Chorus Frogs and larval and adult Bullfrogs were found in primary and secondary channels of the Ventura River and adjacent wetland habitats approximately 1-2 miles north of the Main Street bridge in 1990 (Hunt 1991). Large numbers of recently metamorphosed Western Toads and Pacific Chorus Frogs were again observed in the same vicinity in mid-late summer, 1991 and early to mid-summer, 1992 (Hunt, pers. obs.).

### *Reptiles*





Reptile diversity in the study area is relatively low due to the local marine climatic influence (frequent, persistent fog), lack of habitat heterogeneity and the frequent, sometimes intense natural and



# LEGEND

-  Vegetated Ruderal Habitat
-  Forested Wetlands and Transitional Areas
-  Scrub/Shrub Wetlands and Transitional Areas
-  Estuarine Scrub/Shrub Wetlands
-  Estuarine Persistent Emergent Wetlands
-  Palustrine Persistent Emergent Wetlands
-  Vegetated Non-Wetlands

**Figure 11**  
**Occurrence of Sensitive Reptiles and Amphibians in the Study Area**

-  Southwestern Pond Turtle
-  Silvery Legless Lizard
-  Important amphibian habitats in the study area
-  Important reptile habitats in the study area

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0 500'



Pacific Ocean

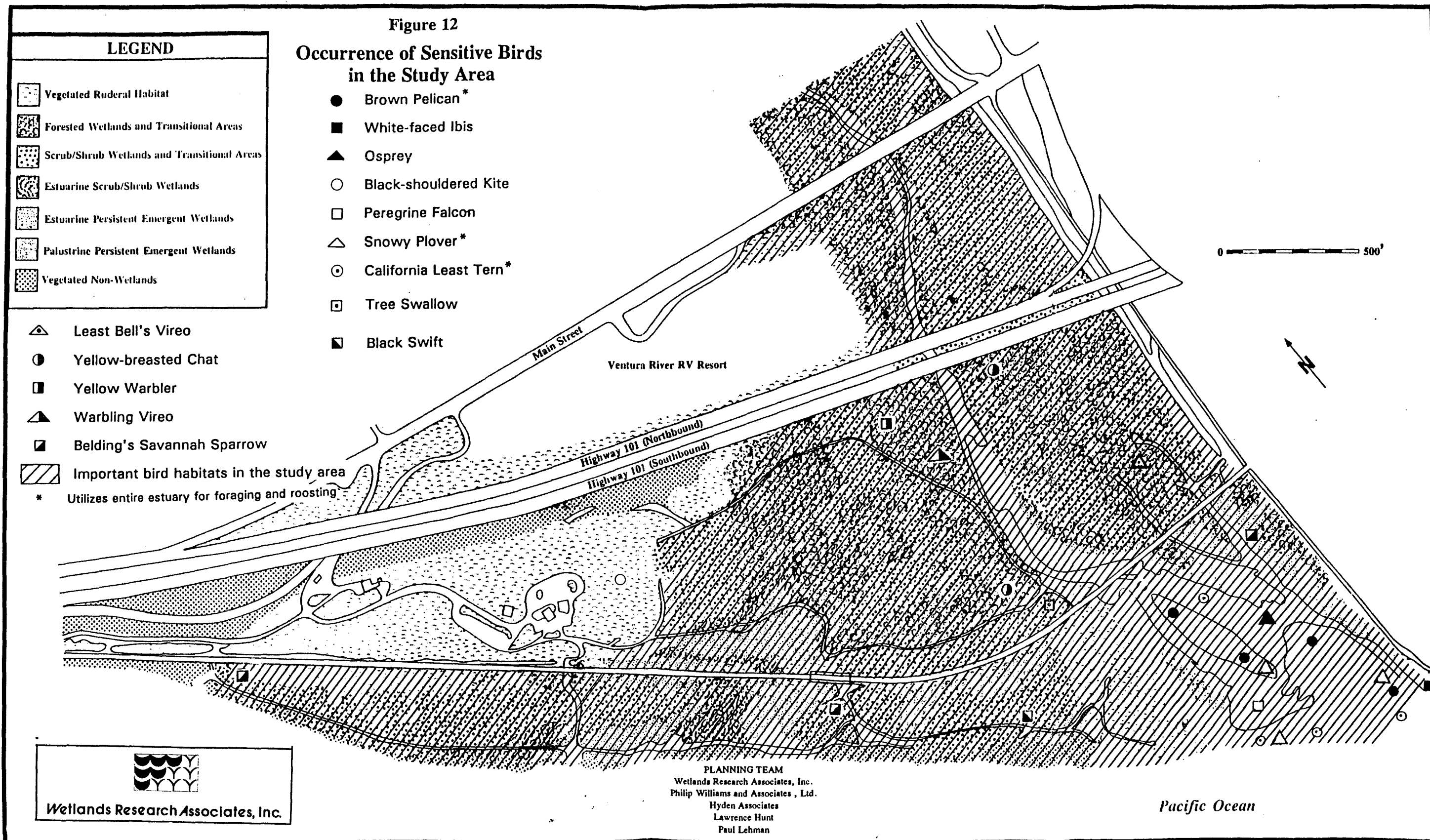
human-induced disturbances. Field surveys consistently sighted the same species including common, widespread taxa, such as the Western Fence Lizard (*Scallopers occidentalis*), Side-blotched Lizard (*Uta stansburiana*), Gopher Snake (*Pituophis melanoleucus*) and Common Kingsnake (*Lampropeltis getulus*). The coastal dunes and the riparian corridor along the Ventura River are important habitats for reptiles in the study area (Figure 11). The potential occurrence of other reptilian taxa in the study area are discussed in Appendix B.

Two sensitive species of reptiles, the Silvery Legless Lizard (*Anniella pulchra pulchra*) and Southwestern Pond Turtle (*Clemmys marmorata pallida*) have been observed or collected within the study area. Appendix C discusses the distribution of these species on-site.

### *Birds*

The two most important habitat types for birds in the study area are the Ventura River Estuary wetlands and riparian woodland areas (Figure 12).

The estuary is used by large number of waterbirds, whose densities varied seasonally and daily with fluctuating water levels. The largest numbers of birds were typically found when water levels in the estuary were relatively low, exposing mudflats and adjacent aquatic habitats. Moderate numbers of waterfowl were found on-site from mid-fall through early spring. Gulls and Terns used the area year-round for resting and bathing [as do a small number of Brown Pelicans (*Pelecanus occidentalis*)], and large numbers of shorebirds were present when water levels were low, exposing mudflats utilized for feeding. Regionally declining and/or endangered species that frequented the estuary include the Osprey (*Pandion haliaetus*) and Peregrine Falcon (*Falco peregrinus*), both rare visitors; Snowy Plover (*Charadrius alexandrinus*), of which small numbers were found on the sandy shores and mudflats, primarily in late summer; and California Least Tern (*Sterna antillarum*), which utilized the estuary for feeding, resting and bathing, often occurring for extended periods in late summer accompanied by fledged young. Small numbers of Black Brant (10-30 individuals) seasonally visited the estuary and associated cobble intertidal areas on their northward migration, feeding on the algae (*Enteromorpha* and *Ulva* spp.) which colonized the cobble substrate characteristic of portions of the estuary and intertidal area.



Riparian habitats bordering the upstream portions of the estuary and the Ventura River and other, more isolated patches surrounded by upland habitats within the study area provide important forage and cover for landbirds at all seasons. Dense willow and cottonwood woodland, especially adjoining water, were frequented by many migrant species in spring and fall, somewhat smaller numbers of wintering passerines, and several regionally rare and declining breeders in spring and summer. Regionally declining species of concern included Tree Swallow (*Tachycineta bicolor*), Yellow Warbler (*Dendroica petechia*) and Yellow-breasted Chat (*Icteria virens*). The endangered Least Bell's Vireo was found on territory in dense willow riparian woodland in the study area as recently as 1981, but has not been observed since that time.

Upland and ruderal habitats were used heavily by relatively widespread and common species of birds and were occasionally visited by rare and endangered species. Grassland areas may be attractive to several species of raptors, including the declining Black-shouldered Kite (*Elanus coeruleus*), but very few birds of prey were noted in the study area during the 1991 and 1992 surveys. Appendices B and C contain detailed information on the occurrence and potential occurrence of sensitive bird species in the study area.

Particular trees found in ruderal habitats, such as the river red gum (*Eucalyptus camaldulensis*) and tree tobacco (*Nicotiana glauca*), are attractive to landbirds in migration and winter. These include Hummingbirds, Yellow-rumped Warblers (*Dendroica coronata*), House Finches (*Carpodacus mexicanus*) and Goldfinches (*Carduelis* spp.). The grove of large Monterey cypress (*Cupressus macrocarpa*) adjoining the estuary was formerly more attractive to migrants, but is currently declining because many of the trees have died. Lawn areas in the Ventura River Group Camp were frequented by large flocks of Red-winged Blackbirds (*Agelaius phoeniceus*), Brewer's Blackbirds (*Euphagus cyanocephalus*), and European Starlings (*Sturnus vulgaris*).

The study area supports at least 237 species of resident and migratory birds, however, the area can be rated as good, but not excellent bird habitat. Species diversity and densities of migrants within a given season are lower than expected given the area and distribution of appropriate habitat. For example, raptors, even resident species, were conspicuously absent from the study area. This is surprising given the high densities of rodents on-site. The lower Ventura River delta would seem to

be an attractive landscape feature for migratory birds because of its prominent geographic position within the southern California coastal migratory corridor and diversity of aquatic and upland habitats.

The fact that some obligate riparian migrants continue to breed occasionally in riparian woodlands along the Ventura River (including the study area), indicates the region continues to hold great potential as an area of high species density and diversity. Preservation and restoration of particular habitats within the study area and upstream riparian corridor, in addition to maintaining freshwater flows and water quality in the Ventura River, may allow the area to increase its potential as bird habitat.








### *Mammals*

The study area was inhabited by an unexpected variety of small and large mammals, despite the presence of transportation corridors through the northern portions of the site, urban development to the east, and frequent human presence on-site. The mammal assemblage was composed of geographically widespread, generalist taxa.

Riparian woodlands, scrub habitats and estuarine and palustrine habitats were important resources for small mammals on the study area (Figure 13). High densities of rodents and other prey species in the study area may be attributed to the noticeable absence of avian and reptilian predators on the study area. On-site disturbance levels and the proximity of the study area to urban development initially appeared to favor the presence of introduced rodents, such as the House Mouse (*Mus musculus*) and Black Rat (*Rattus rattus*). Sampling revealed that these two species are present on-site, but in relatively low densities (Table 6). Black Rats appeared to be restricted to habitats east of the Ventura River (see below).

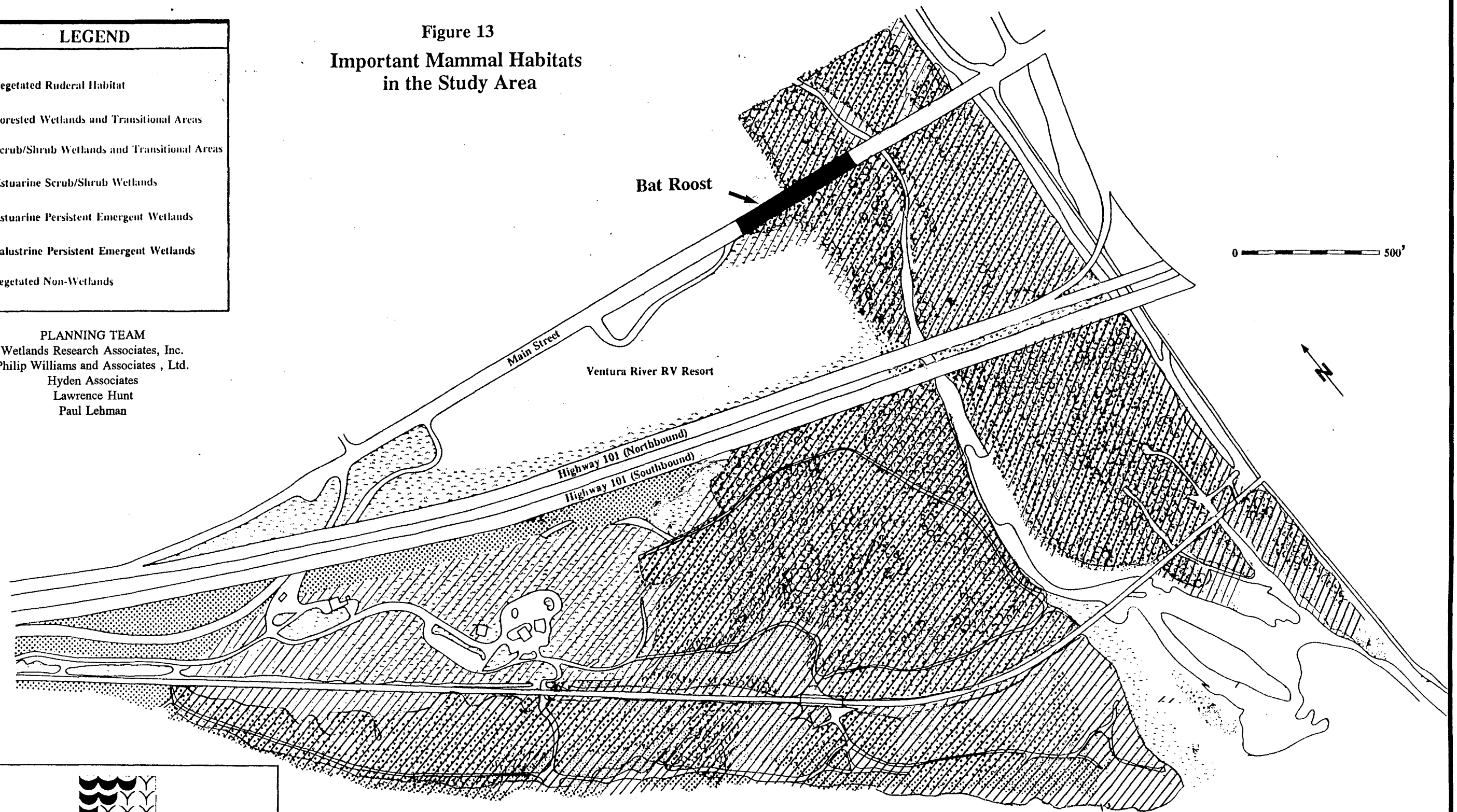
Rodent diversity and density was higher within the study area compared to similar upstream habitats (Hunt 1991). Palustrine, dune swale/coastal dune and riparian woodland/scrub habitats appeared to be utilized equally by these rodent species (Table 6, Figure 13). Estuarine habitats along the east bank of the Ventura River supported fewer rodents, but contained harbor species uncommon or absent from the rest of the study area, such as the California Vole (*Microtus californicus*).

# LEGEND

-  Vegetated Ruderal Habitat
-  Forested Wetlands and Transitional Areas
-  Scrub/Shrub Wetlands and Transitional Areas
-  Estuarine Scrub/Shrub Wetlands
-  Estuarine Persistent Emergent Wetlands
-  Palustrine Persistent Emergent Wetlands
-  Vegetated Non-Wetlands

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Figure 13  
 Important Mammal Habitats  
 in the Study Area



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Pacific Ocean

**Table 6.** Summary of small mammal trap events in habitats on the project site. The November 1991 and May 1992 trapping sessions are combined in this table.

SPECIES	HABITAT				TOTAL (%)
	Palustrine Trapline 1	Dune/ Dune Swale Trapline 2	Riparian Woodland/ Scrub Trapline 3	Estuarine Trapline 4	
Western Harvest Mouse	24	20	19	0	63 (35%)
Deer Mouse	3	17	7	0	27 (15%)
California Mouse	13	2	15	3	33 (19%)
California Vole	2	0	0	7	9 (5%)
Dusky-footed Woodrat	5	3	8	0	16 (9%)
House Mouse	8	7	1	7	23 (13%)
Black Rat	0	0	0	7	7 (4%)
TOTAL (%)	55 (31%)	49 (28%)	50 (28%)	24 (13%)	(100 %)

Distinctive patterns of habitat use were displayed by several species. The Western Harvest Mouse (*Reithrodontomys megalotis*) and Dusky-footed Woodrat (*Neotoma fuscipes*) were found in a variety of open and closed canopy habitats. The latter species was more abundant in shrub and woodland habitats with a well-developed shrub understory. In coastal dune habitat, woodrats were typically caught in traps placed near dense clumps of saltbush (*Atriplex* spp.) that bordered the leeward side of the dunes. The Deer Mouse (*Peromyscus maniculatus*) appeared to utilize coastal dune and riparian woodland/scrub habitat but was uncommon in palustrine habitats on-site (Table 6). Regionally, this species is typically most abundant in coastal sage scrub and coastal dune scrub (Collins, pers. comm.). Patterns displayed by the California Mouse (*Peromyscus californicus*) and Deer Mouse suggested complementary habitat use. The California Vole (*Microtus californicus*) was only found in two habitats in the study area: palustrine and estuarine. On a smaller scale, this species was trapped only in areas where coastal saltgrass (*Distichlis spicata*) was a significant microhabitat component. Appendix D contains additional microhabitat data for each trapline.



An interesting result of this study was high densities of California Mice found in coastal saltmarsh vegetation (*Atriplex/Salicornia/Frankenia* association). This species is typically found in heavily wooded habitats such as riparian woodlands, oak woodlands and dense chaparral on north-facing slopes, where they tend to co-occur with the Dusky-footed Woodrat (Paul Collins, pers. comm. 1992). The California Mouse was conspicuously absent from 900 trap-nights of trapping in similar saltmarsh habitats around Devereux Slough and west of the UC-Santa Barbara campus in Santa Barbara County (Hunt 1987). This species was also considered rare to absent from such habitats in the Santa Barbara region by several biologists consulted in Smith (1982). California Mice may be present at the mouth of the Ventura River due to the contiguity afforded by the riparian corridor to coastal and inland woodland and scrub habitats. They commonly occur with the Dusky-footed Woodrat in woodlands within the Ventura River floodplain upstream from the study area (Hunt 1991).

The non-native House Mouse was found throughout palustrine, dune and estuarine habitats, but was rare in woodland habitats. The Black Rat was found in small numbers only in estuarine habitats along the east bank of the Ventura River. This species appeared to be closely associated with stands of the introduced giant reed (*Arundo donax*) at this site (see Appendix B). Both species have been present at the mouth of the Ventura River for decades; the Black Rat at least as early as 1914 (Los Angeles County Museum No. 160). The apparent absence of rats from the rest of the study area may be attributed to either the dispersal barrier formed by the primary channel of the Ventura River or prior occupation of woodland and scrub habitats west of the river by the similar-sized Dusky-footed Woodrat.

Signs (tracks, scat) of medium to large native mammals were common throughout the site, but owing to the limited size of the study area, probably only represented a few individuals. Burrows of large mammals, indicative of habitation of the site, were conspicuously absent. Four species of introduced mammals are present in the area, but only three of these [House Mouse, Black Rat and Feral Cat (*Felis catus*)] appeared to reside on-site. Dogs (*Canis familiaris*) were generally accompanied by humans.

A major finding of this study was the discovery of a large bat roost, used by several species, beneath the Main Street bridge. This is the largest roost known to date on the coastal slope of Santa Barbara and Ventura Counties, although the regional distribution of bats in this area is poorly known.



Most of the collection records for bats in the vicinity of the Ventura River are old (1905-1950). The scarcity of more recent records is due to a lack of recent field work and regional declines in many bat populations.

The lower Ventura River probably represents the single most important foraging habitat for bats in the area. The array of freshwater, marine and upland habitats within and adjacent to the study area may support a high diversity of bats. Bats require both roosting and foraging habitat, which might be contiguous or spatially separated and a lack of suitable roost sites within the study area may be a factor limiting bat occupation of the site. The study area lacks specialized landscape features such as crevices in vertical rock walls; however, these habitat components are found farther upstream in the upper Ventura River drainage. Consequently, the entire riparian corridor throughout the drainage basin, including the study area, may be used as foraging space for a variety of bat species. It is thought that migratory bat species such as *Tadarida*, *Lasiurus* and *Lasionycteris* can move between the Channel Islands and the mainland, but other vespertilionids are resident to either the islands or mainland (Brown, pers. comm.).

The Main Street Bridge roost was shared by an equal number ( > 1000 individuals overall) of Big Brown Bats (*Eptesicus fuscus*) and Yuma Myotis (*Myotis yumanensis*) as well as smaller numbers of Mexican Freetail Bats (*Tadarida brasiliensis*) (< 100 individuals). Over 250 of the first two species were counted leaving the roost in a 30-minute interval at dusk, but because the bats occurred in at least 6 sections of the bridge and exited from both sides of the bridge, an accurate count was impossible. No bat use of the Southern Pacific Railroad or Highway 101 overcrossing was observed during the survey.

Appendices B and C contain further information on the known and potential occurrence of bats on the study area.

#### 3.2.4 1992 Flood Effects on Wildlife

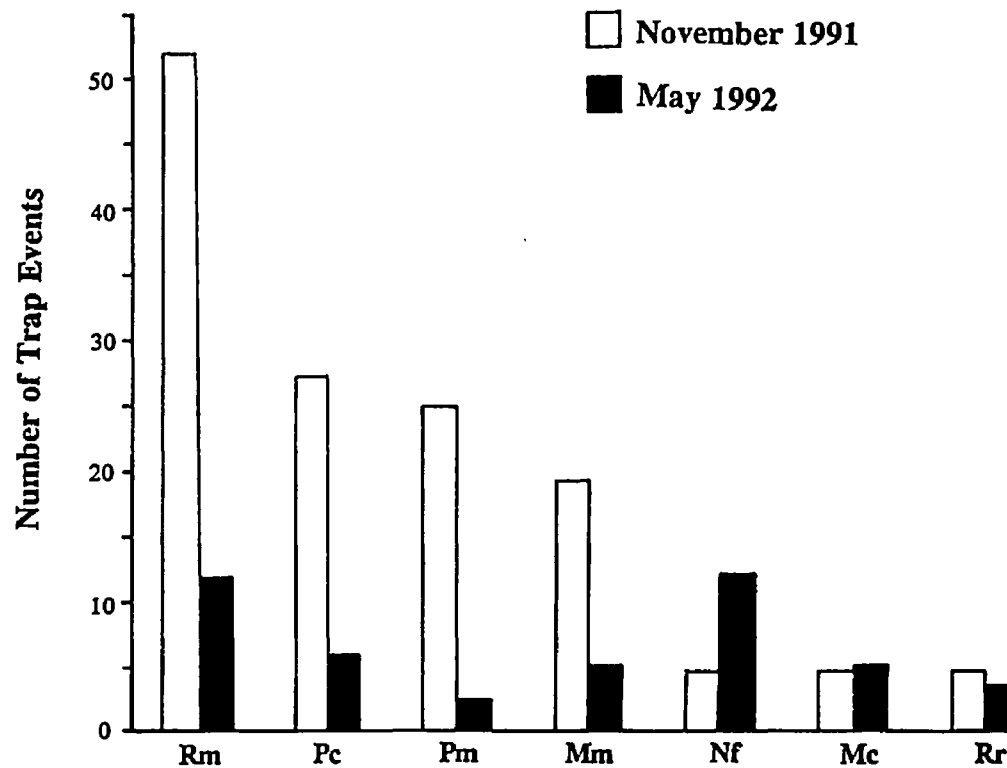
On the morning of 12 February 1992, following two to three days of heavy rainfall, the Ventura River overflowed its primary channel at a point approximately 0.5 miles upstream from the Main Street bridge and re-occupied an old distributary channel to the west (the Second Mouth). Water flowed

southward across agricultural land adjacent to the river and through the recreational vehicle park on the Hubbard Property, then over a low-lying section of Highway 101 and into Emma Wood State Beach-Ventura River Group Camp. Further southward movement of water was temporarily obstructed by the Southern Pacific Railroad berm. Water was deflected to the east and west, flowing out the Second Mouth and through a pedestrian walkway beneath the tracks west of the Second Mouth (Keller and Capelli 1992). The force of the water through the pedestrian walkway and the beneath the SPRR bridge was sufficient to carve a channel at least eight feet deep in the vicinity of the Second Mouth of the Ventura River. Figure 10 illustrates an approximation of the estuarine habitat created by flood scouring. This area was periodically subjected to tidal influence (until the sand bar formed) and the channel separated the dunes from the cobble beach to the west. Most of the palustrine and dune swale habitat as well as major portions of riparian woodland and scrub habitats were inundated by up to 3 feet of water. The study area, however, was not subjected to the large-scale removal of vegetation experienced along portions of the Ventura River upstream from the Main Street bridge. Estuarine habitats adjacent to the main channel of the Ventura River were more severely scoured and some patches of *Scirpus* and *Arundo* were removed in the estuary by the action of the water.

Figure 14 compares rodent population densities before and after flooding. Trapping in November 1991 revealed a diverse rodent community with high population densities, especially in palustrine, dune swale and riparian woodland/scrub habitats. The same species were present the following May 1992, but in substantially lower densities. Trap success declined an average of 32 percent (range: 15-47 percent decrease) between November 1991 and May 1992 (Appendix D). Species assemblages changed. Deer Mice and California Mice were present in the palustrine habitat trapline in November but absent the following May, and the California Vole was present there in May but absent the previous November.

### 3.3 Water Quality

Water quality in the Ventura River Estuary is influenced by agricultural and storm drain runoff, oil field waste including the discharge of brines into the river, discharges from the Ojai Valley Sanitary District Treatment Plant, and salinity variations due to changes in the configuration of the mouth of the estuary.



Temporal variation in small mammal trap success over all habitats in the project area between November 1991 and May 1992. [Rm = *Reithrodontomys megalotis*; Pc = *Peromyscus californicus*; Pm = *Peromyscus maniculatus*; Mm = *Mus musculus*; Nf = *Neotoma fuscipes*; Mc = *Microtus californicus*; Rr = *Rattus rattus*].

Figure 14. Temporal variation in small mammal trap success.



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Storm drain runoff includes street drainage and drainage from the Ventura County Fairgrounds. Discharge from the fairgrounds horse barn and surrounding riding areas directly enter the estuary at present, potentially contributing to high nutrient levels. The Fairgrounds is currently considering a plan to discharge runoff directly to the ocean. This plan would benefit water quality in the estuary but has been met with opposition from local surfers.

James M. Montgomery, Consulting Engineers, Inc. (JMM 1991) recently completed a study to address the problem of low dissolved oxygen (DO) levels downstream of the Ojai Valley Treatment plant (less than 7 mg/l during the summer and early fall) and excessive plant growth. The study showed that the treatment plant contributed high amounts of nutrients (nitrogen and phosphorous) to the river at the point of discharge. The study also concluded that wastewater effluent could constitute a major portion (e.g., during drought) of baseflow in the river at the point of discharge, and that DO levels were low during the period prior to rainfall. During wetter periods, treated wastewater discharges impact the river to a lesser degree. It should be noted that the JMM study was conducted during a drought year, which may have affected the proportion of base flow contributed to the river at the point of discharge.

In order to increase the present DO levels, JMM (1991) recommended: 1) reducing the effluent biological oxygen demand (BOD) concentration below the amount allowable by the facility's permit; 2) maintaining high DO levels (near saturation) in the effluent; reducing nutrient loading. Water Quality Objectives for the reach of the Ventura River downstream of the Treatment Plant as designated by the RWQCB are listed in Table 7.

**Table 7. Water quality objectives for Ventura River\*.**

<u>PARAMETER CONCENTRATION</u>	<u>MAXIMUM</u>
Total Dissolved Solids, mg/l	1,500
Sulfate, mg/l	600
Chloride, mg/l	600
Boron, mg/l	1.5
Nitrogen Nitrate + Nitrate, mg/l	10
Sodium Adsorption Ratio	5
<u>PARAMETER CONCENTRATION</u>	<u>MINIMUM</u>
Oxygen (D.O.), mg/l	7

\* (JMM 1991)

Wetlands Research Associates (WRA) sampled the water of the Ventura River lagoon on three occasions in 1991. The results of these sample dates are summarized in Table 8. The results substantiate the JMM (1991) findings that the Ventura River estuary is a nutrient enriched system. Phosphate levels were high under all conditions; nitrogen levels were excessive only when the lagoon was closed. Dissolved oxygen was at full saturation levels when the lagoon mouth was open. Under closed conditions (December 1991), oxygen levels were at supersaturation in surface and bottom samples, except at one station, and chlorophyll levels were an order of magnitude higher under closed conditions than under open conditions. The combination of lower temperatures in December (therefore less BOD) and high chlorophyll levels probably caused the high oxygen levels in the water column.

**Table 8. Water quality analysis of Ventura River Estuary conducted by Wetlands Research Associates.**

Station	Date	Temp.	D.O.	Salinity	Nitrate (NO <sub>3</sub> )	Phosphate (PO <sub>4</sub> )	Chlorophyll
1 (top)	5/91	16 °C	10	10 ‰	0.28 mg/l	3.5 mg/l	109.9 µg/m <sup>3</sup>
1 (btm)	5/91	-	8	26	0.46	1.8	195.1
2 (top)	5/91	18	10	0	3.00	5.5	181.4
2 (btm)	5/91	-	-	0	-	-	-
3	5/91	18	10	0	2.70	5.5	52.1
1 (top)	7/91	20	11	7	5.75	1.5	124.1
1 (btm)	7/91	19	8	20	2.10	1.3	171.8
2 (top)	7/91	20	11	2	4.00	1.6	152.7
2 (btm)	7/91	-	-	-	-	-	-
3	7/91	22	9	1	8.75	1.6	73.6
1 (top)	12/91*	14	16	3	13.00	9.0	801.9
1 (btm)	12/91*	13	13	4	38.25	5.5	1050.1
2 (top)	12/91*	16	19	2	16.00	2.3	1122.6
2 (btm)	12/91*	15	4	6	8.00	4.8	822.7
3	12/91*	13	11	4	24.00	13.5	55.2
4 (top)	12/91*	14	16	3	15.00	5.0	1168.4
4 (btm)	12/91*	15	13	3	33.00	8.0	801.9

\* Indicates mouth of estuary was closed during sample date

Under open conditions, the lagoon water quality is generally acceptable to aquatic life, although phosphate levels were high. However, under closed conditions, the lagoon becomes highly eutrophic.

It is possible that anoxic events do occur in the lagoon when salinity stratification occurs due to overwash of ocean water into the lagoon. However, the shallowness of the lagoon may result in wind-induced mixing which reduces the frequency of stratification events.

No sampling was conducted for organic or inorganic pollutants. Given the point and non-point sources of potential pollutants entering the lagoon, such sampling should be conducted.

## 4.0 EXISTING HYDROLOGY

### 4.1 Estuary Entrance Opening Characteristics

The hydroperiod, salinity characteristics and peak water surface elevations within the estuary are dependent on whether the entrance of the estuary is closed to tidal action by a sand bar or barrier beach, or whether it is open to allow full or muted tidal action. Opening and closing of the Ventura River Estuary is influenced by river and tidal flows and wave action.

The berm which impounds water at the mouth of the Ventura River opens and closes depending on the interactions between the river flow and wave action. During periods when the relative contribution of sand to the berm from wave action exceeds the scouring action of the river to maintain an open inlet, the sand berm will build up and the mouth will close. This typically occurs in late spring after the cessation of winter high flows. In contrast, during periods of relatively high river flows, primarily during the winter and early spring, the inlet is maintained in an open condition. Periodic opening of the lagoon may occur during the late spring, summer, and fall, as river flow impounded behind the berm either overtops the berm causing rapid downcutting and breaching, or as flow seeps through the closed berm and weakens it by seepage erosion. The pattern of opening and closing of the berm is altered in any given year depending on local precipitation, runoff, and wave climate.

The general conditions of whether a lagoon or small estuary inlet will be open to tidal action have been studied by Johnson (1973) and refined by Goodwin and Williams (1986). Johnson identified the principal processes governing the entrance condition as the longshore and onshore littoral transport that acts to close the estuary entrance and the scouring action of tidal flows that removes material deposited in the channel entrance. Precise qualification of the longshore sediment transport rate is difficult to assess without detailed field measurements, but is proportional to the annual deepwater wave power as a first approximation (Johnson 1973). The scouring action of the tidal currents is proportional to the total volume of water passing in or out of the estuary in a given tidal cycle. This volume is called the tidal prism. The potential tidal prism is the total volume of water stored in the estuary between the high water and low water elevations, measured in the ocean. The actual tidal prism will

be less than the potential tidal prism due to the damping of the tidal amplitude in the estuary. The potential diurnal tidal prism is the volume of water stored in the estuary between mean higher high water (MHHW) and mean lower low water (MLLW). The potential mean tidal prism is the volume of water stored in the estuary between mean high water (MHW) and mean low water (MLW).

The change in area and volume with stage in the lagoon portion of the Ventura River Estuary are shown in Figures 15 and 16. These relationships were calculated using the bathymetry surveyed in July 1991 (Figure 17). The estuary morphology at that time was consistent with the 1989 aerial photograph provided by the City of San Buenaventura but differs slightly from the topographic base map prepared by Hawkes and Associates in 1988. The topographic base map was modified to reflect the conditions encountered in July 1991. Observation of the estuary in June 1992 showed morphologic changes to the estuary which occurred during the February 1992 flood; however, the bathymetric changes resulting from the February flood were not surveyed as it would not have significantly modified the conclusions reached in this report.

The potential diurnal tidal prism is defined as the volume of water in the lagoon between MHHW (2.53 feet NGVD) and MLLW (-2.90 feet NGVD) while the potential mean tidal prism is defined as the water volume in the lagoon between MHW (1.82 feet NGVD) and MLW (-1.91 feet NGVD) (Figure 16).

Johnson (1973) and Williams (1986) have tabulated the potential tidal prism and deepwater wave power of California lagoons and estuaries for which data was available (Table 9). Based on the available data, they defined a criteria for the inlet channel remaining open under normal hydrologic and wave conditions. Figure 18 shows that if the lagoon under consideration plots to the right side of the dotted line, the lagoon will be predominantly open.

If the lagoon lies just to the left of the line, the lagoon will be closed periodically; further to the left the lagoon will be opened on a less frequent basis. Figure 18 indicates that the Ventura River Estuary falls within the category of periodically closed. As a first approximation, the tidal prism would have to be increased to 810 acre-feet ( $10^6 \text{ m}^3$ ) to maintain the estuary open to tidal circulation for most of the time. This would correspond to excavating the entire study area to below MLLW. Such



# VENTURA RIVER ESTUARY ELEVATION VS AREA



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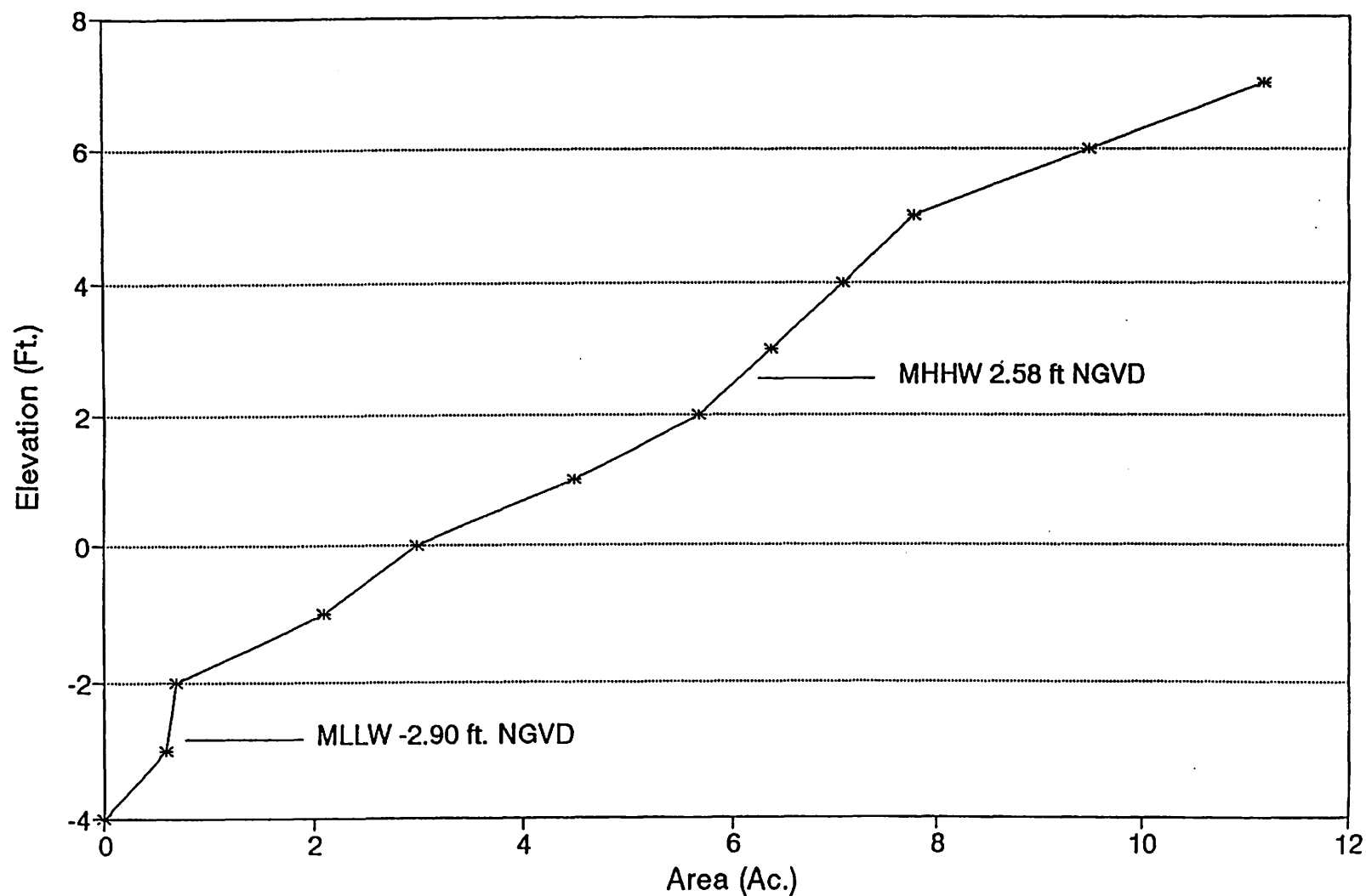


Figure 15. Elevation versus area curve for the Ventura River Estuary.



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# VENTURA RIVER ESTUARY ELEVATION VS. STORAGE VOLUME

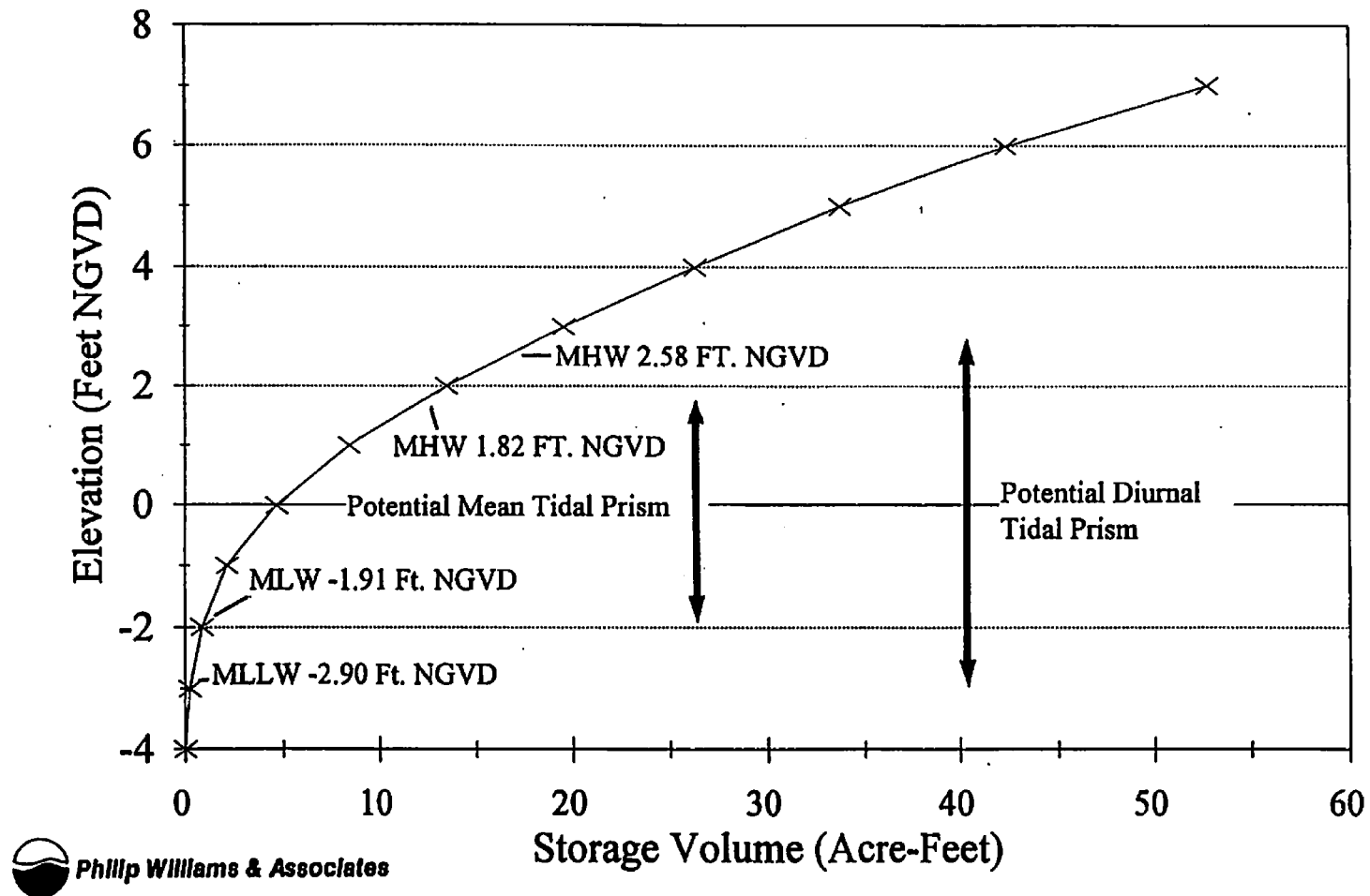
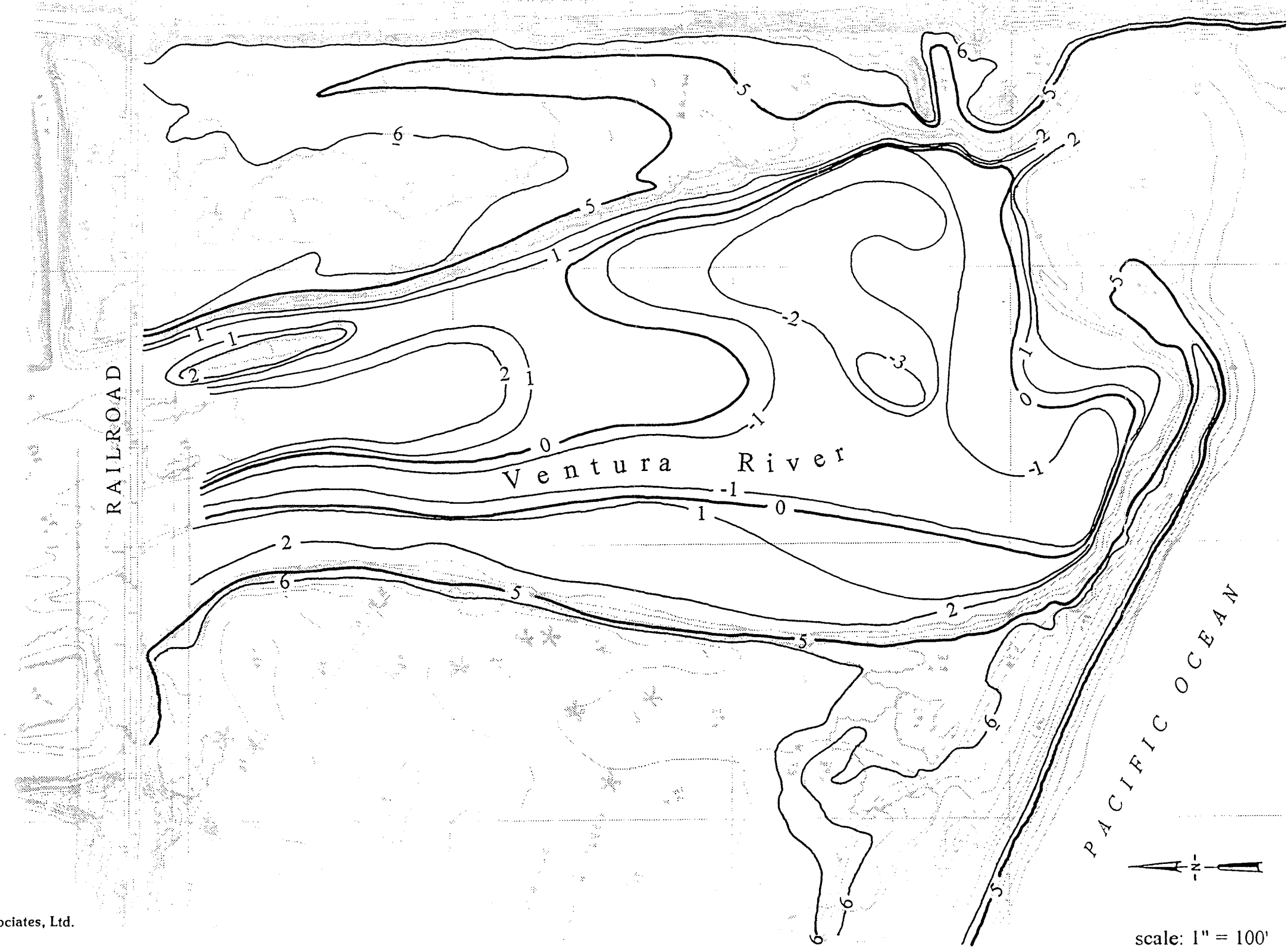


Figure 16. Elevation versus volume curve for the Ventura River Estuary.



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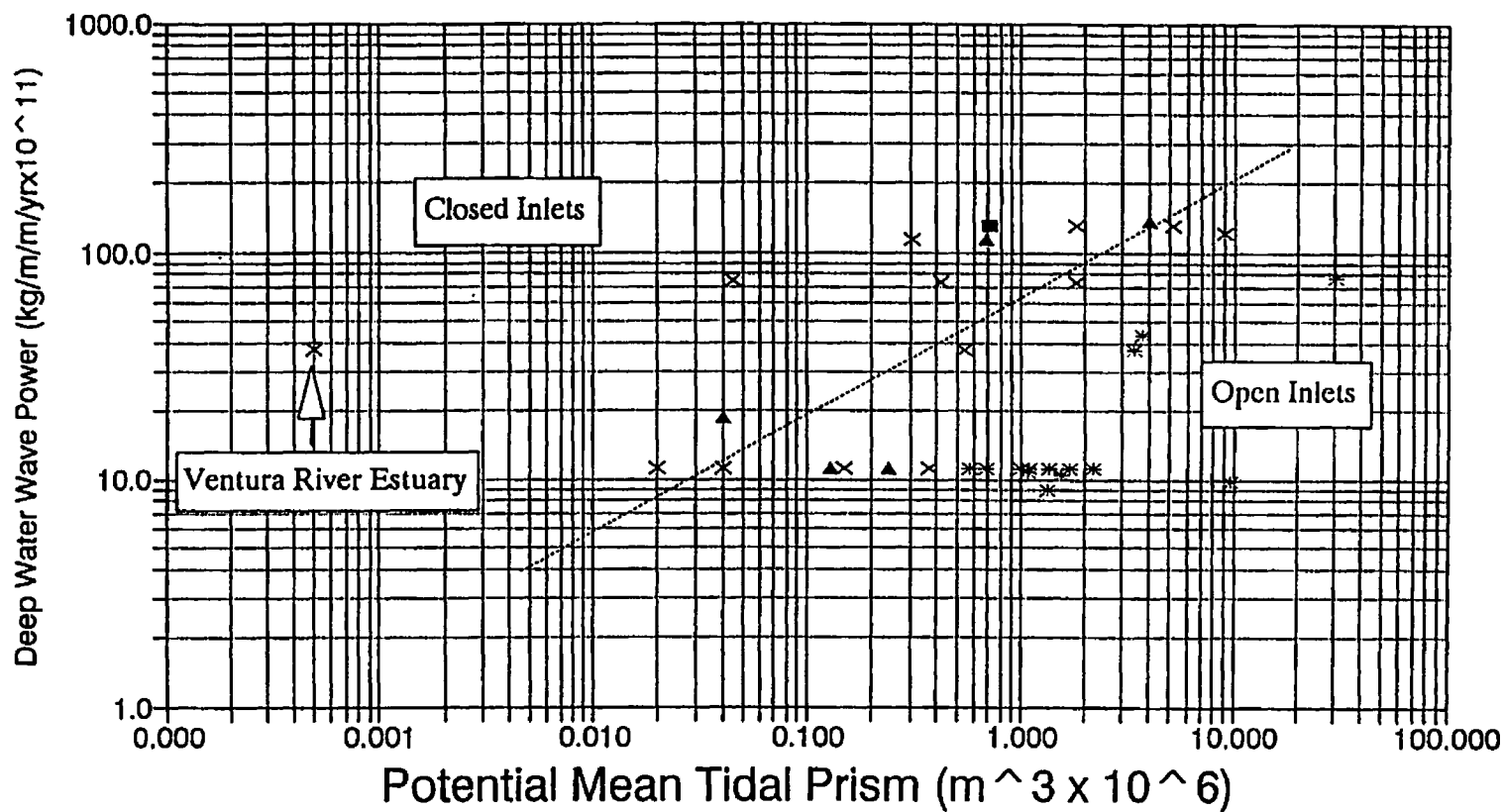
Figure 17. Bathymetry of the Ventura River Estuary, 1991 (Topography after Hawkes & Associates 1989).

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**Table 9.** Summary of tidal inlet characteristics for selected California Coast Estuaries and lagoons.

Site	Location	Potential tidal prism ( $10^4 \text{ m}^3$ )		Annual deep-water wave power ( $10^{11} \text{ kg-m/m/yr}$ )	Closure conditons
		Diurnal	Mean		
1	Smith River Estuary	99	68	113.02	Infrequent
2	Lake Earl	1218	906	122.72	Frequent
3	Freshwater Lagoon	99	71	129.8	Always
4	Stone Lagoon	243	181	129.8	Frequent
5	Big Lagoon	680	510	129.8	Frequent
6	Eel River Delta	566	396	138.38	Infrequent
7	Estero Americano	62	42	74.65	Frequent
8	Estero San Antonio	31	184	74.65	Frequent
9	Tomales Bay	4474	3030	77.96	Never
10	Abbotts Lagoon	48	31	114.51	Frequent
11	Drakes Estero	1387	963	9.7	Never
12	Bolinas Lagoon	566	368	43.64	Never
13	Pescadero	9.6	4.5	74.68	Frequent
14	Mugu, 1976	76	54	37.38	Frequent
15	Mugu, 1857	481	340	37.35	Never
16	Carpinteria	14	4	18.7	Infrequent
17	Agua Hedionda	226	156	10.44	Never
18A	Batiquitos, 1985	.57	37	11.2	Frequent
18B	Batiquitos, 1850	255	170	11.2	Never
19	San Dieguito 1976	0.6	4	11.2	Frequent
20	San Dieguito, 1889	105	68	11.2	Never
21	Los Pensaquitos, 1976	6	2	11.2	Frequent
22A	Tijuana, 1986	36	13	11.2	Infrequent
22B	Tijuana, 1977	42	24	11.2	Infrequent
22C	Tijuana, 1928	97	57	11.2	Never
22D	Tijuana, 1852	191	136	11.2	Never
23	Bolsas Bay, 1874	-	108	10.82	Never
24	Anaheim Bay	-	133	10.82	Never
25	Ventura River Estuary	0.06	0.05	37.35	Frequent

# Ventura River Tidal Lagoon Study Empirical Closure Conditions in CA



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Figure 18. Empirical closure conditions for estuaries and lagoons in California.



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extensive excavation would damage existing sensitive habitat. Therefore a fully tidal option with an entrance that does not close due to the effects of the tidal prism alone is not a viable alternative.

Johnson's analysis is a general guideline and the Ventura River Estuary has several unusual features which differentiate it from many of the lagoons shown in Figure 18, including:

- The Ventura River Estuary has a perennial source of freshwater, supplemented by treated wastewater.
- The littoral sediment load is much coarser than many other estuaries or lagoons in California, and the large cobbles are not transported easily by all currents from the estuary.
- Historical data shows that the Ventura River Estuary has always been subject to periodic closure, and has not been subject to the rapid aggradation and loss of tidal prism that has affected many small scale estuarine systems in California.
- Relatively rapid tectonic uplift in the Ventura River watershed and intense winter storms result in a geologically active delta.

The estuary is typically closed during the late summer and fall; however, on occasion the lagoon is open during summer and fall when there is significant baseflow in the Ventura River. When the estuary is closed for extended periods, river inflow fills the estuary until the water surface elevation is high enough to breach the barrier beach. Figure 19 shows a profile of the barrier beach separating the lagoon from the ocean. When the water surface elevation in the lagoon approaches an elevation of 7.5 ft. NGVD (the elevation of the bar crest) an inlet will form connecting the lagoon to the ocean. The barrier beach typically breaches during high magnitude flood flows in the Ventura River.

## 4.2 Freshwater Inflows

### 4.2.1 Hydrology of the Ventura River and Estuary

Southern California experiences a Mediterranean climate with over 90 percent of the rainfall falling between November and April. Mean annual precipitation near the mouth of the Ventura River is about 14.5 inches while the upper parts of the basin receive about 40 inches annually. The Ventura River Basin is shown on Figure 20.

VENTURA RIVER  
MOUTH CROSS-SECTION JUNE 4, 1992

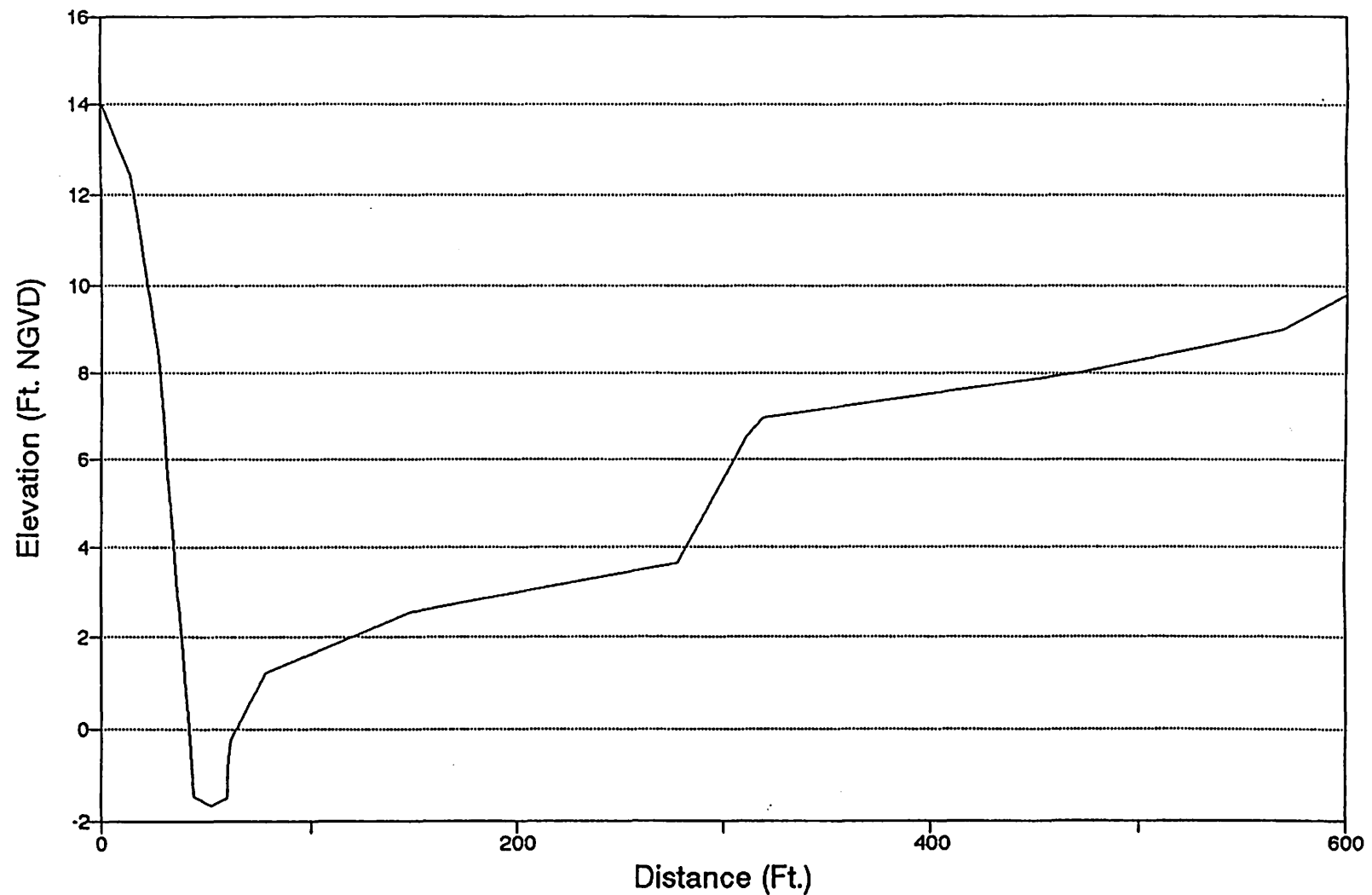


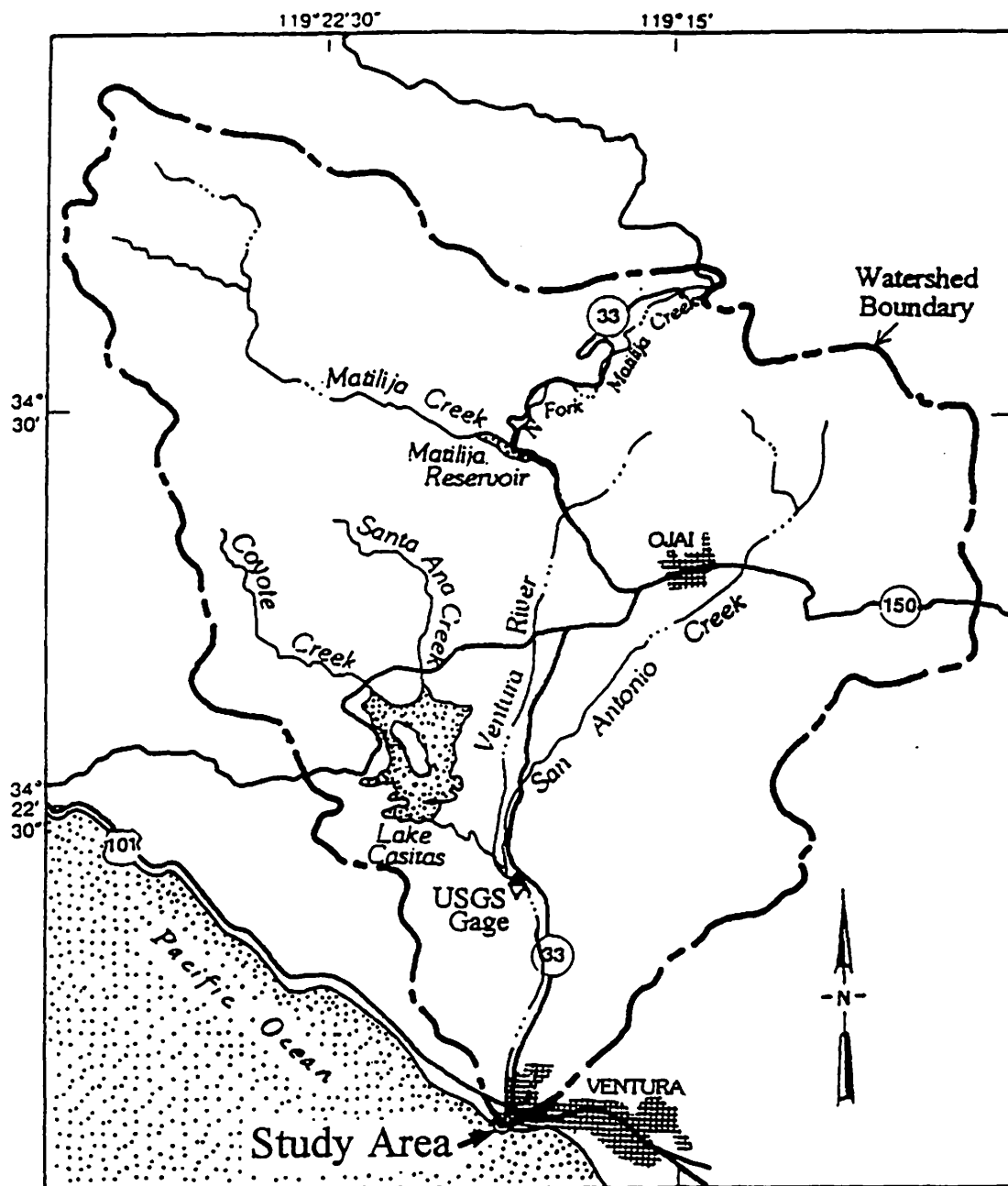
Figure 19. Elevation cross-section of the Ventura River mouth.



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0 8 MILES  
0 8 KILOMETERS



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Figure 20. Map of the Ventura River basin showing the watershed boundary.



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The Ventura River has two upstream reservoirs and a water diversion structure. Lake Casitas Reservoir, built in 1959, is operated by the Casitas Municipal Water District. Lake Casitas has a storage capacity of 254,000 acre-feet and is used primarily for water supply. Matilija Reservoir was built in 1948 and currently has a storage capacity of less than 1,000 acre-feet (original capacity of 7,000 acre-feet is reduced by reservoir sedimentation). The dam was originally built by Ventura County for flood control and water supply purposes. However, because of accumulation of sediment, the reservoir capacity is reduced to the extent that it is ineffective in controlling floods and has limited value for water supply. The Robles Casitas Diversion was constructed in 1959. This structure diverts a maximum of 500 cfs from the Ventura River to Lake Casitas, and bypasses the first 20 cfs to maintain low flow in the Ventura River. This minimum flow release ensures a permanent flow of water into the estuary.

Other sources of dry season flow to the estuary include surface and subsurface contributions from San Antonio Creek, springs, and discharge from the wastewater treatment plant.

The present flow regime is influenced by the reservoir impoundments, diversions, and wastewater discharge. USGS gaging records show that the lower portion of the river nearly always carries flows at present. A large proportion of this dry season flow is derived from the wastewater treatment plant, approximately 2.1 million gallons per day (JMM 1991). The Ventura River has reaches of perennial flow and intermittent flow along its length from contributions of groundwater and wastewater discharge (Ferren, et al. 1990).

The main branch of the Ventura River is technically classified as an interrupted stream (i.e. a water course which is characterized by alternating reaches of perennial and intermittent reaches). The Ventura River historically has maintained perennial flow from the confluence of the North Fork and Matilija Creek downstream to the Robles Casitas Diversion. The reach from the Diversion downstream to the confluence of San Antonio Creek has naturally and historically been devoid of surface flows except during the winter and early spring months. The reach from the confluence of San Antonio Creek to the ocean has naturally and historically maintained a surface flow throughout the year.

The flood frequency analysis for the Ventura River, calculated using the log-Pearson type III distribution for the Ventura River at Ventura (USGS Gage 11118500), is shown for the period of record from 1933 to the present in Table 10.

**Table 10.** Flood recurrence intervals for the Ventura River at Ventura, CA.

<u>RECURRENCE INTERVAL</u> (years)	<u>DISCHARGE</u> (CFS)
5	17,816
10	30,622
50	62,364
100	75,184

#### 4.2.2 History of Flooding in the Ventura River

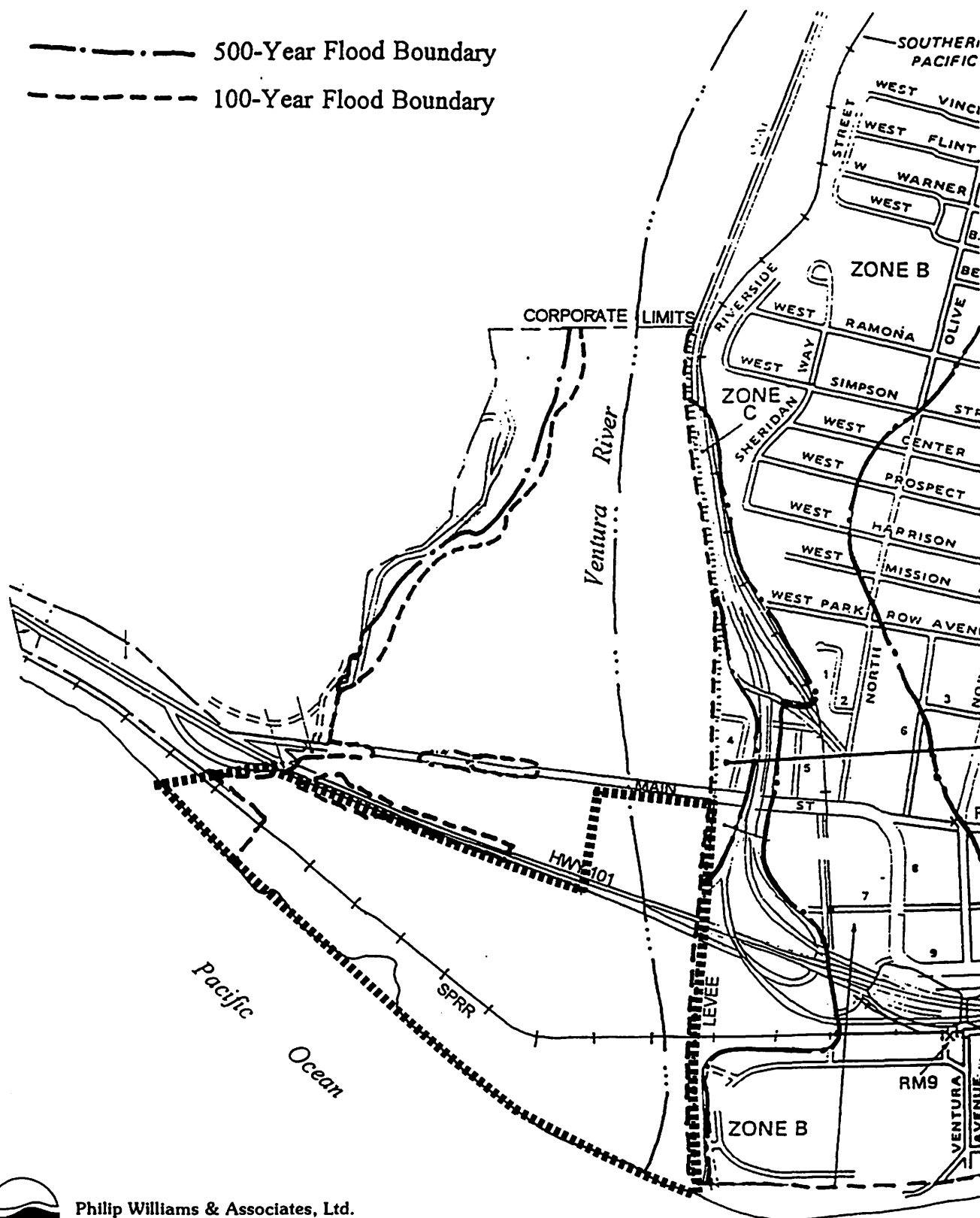
Historic records kept since the founding of the San Buenaventura Mission in 1782 show numerous damage-causing floods. Floods occurred in 1832, 1862, 1867, 1884, 1911, 1914, 1938, 1943, and 1952. A levee was constructed by the U.S. Army Corps of Engineers in 1948 in order to protect the City of San Buenaventura from flooding. The levee extends 2.6 miles upstream from the mouth and is constructed so that flood waters will be diverted toward the floodplain on the west side of the Ventura River, away from the developed area to the east. The current FEMA Flood Insurance Rate Map (1986) shows the entire study area inundated by the 100 year flood (Figure 21). A map showing lesser magnitude flood areas is provided in Appendix E.

Stream gaging records kept by the USGS since 1960 show significant floods (with discharges greater than 20,000 cfs) have occurred in the Ventura River in 1969, 1978, 1980, 1982, and 1986. Table 11 shows the magnitudes of these floods. Flood flows in the Ventura River are considered to be "flashy" because the peak flow is attained within a few hours of the heaviest rainfall, persists only for a short period of time, and then subsides quickly. During the 1969 flood, the capacity of the Ventura River was reduced when the main channel filled with sediment. Floodwater spread

**Table 11.** Historic flood occurrence and recent peak discharges of recent floods in the Ventura River.

<u>YEAR</u>	<u>DISCHARGE</u>	<u>RECURRENCE INTERVAL (yrs)</u>
1832	?	-
1862	?	-
1867	?	-
1884	?	-
1911	?	-
1914	?	-
1938	39,200	14
1943	35,000	13
1969	58,000	40
1978	63,600	55
1980	37,900	14
1983	27,000	8
1992	46,700	22

- · — · — 500-Year Flood Boundary
- - - - - 100-Year Flood Boundary



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Figure 21. FEMA map (1986) showing the 100-year and 500-year flood boundaries.



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out over a residential community and destroyed the approaches to the Santa Ana Boulevard Bridge. A storage tank at the Shell Chemical plant was also destroyed when the river eroded the bank beneath it. In addition, the lower pond of the Oak View Sanitation District's sewage treatment plant was washed out during this flood.

The February 12, 1992, flood had a peak magnitude of 46,700 cfs and a recurrence interval of about 22 years. The extent of riparian vegetation which was scoured out during the 1978 flood was not scoured out during the February 1992 flood. The river overflowed its main channel upstream of Main Street and reoccupied a historic distributary channel in the delta. Flood water flowed under a secondary bridge over a small distributary channel and over the "Fair Weather Crossing," a low spot on Highway 101 and on toward the Second Mouth of the Ventura River. Approximate flow directions are indicated in Figure 22. The railroad crossing created a backwater area in Ventura River Group Camp area where a majority of the area between Highway 101 and the railroad was inundated. As water flowed out the Second Mouth, a tidal estuary was scoured. The flooding characteristics observed during the February 1992 storm indicate the dynamic nature of the estuary, as well as the role of flooding in maintaining the tidal estuary at the Second Mouth.

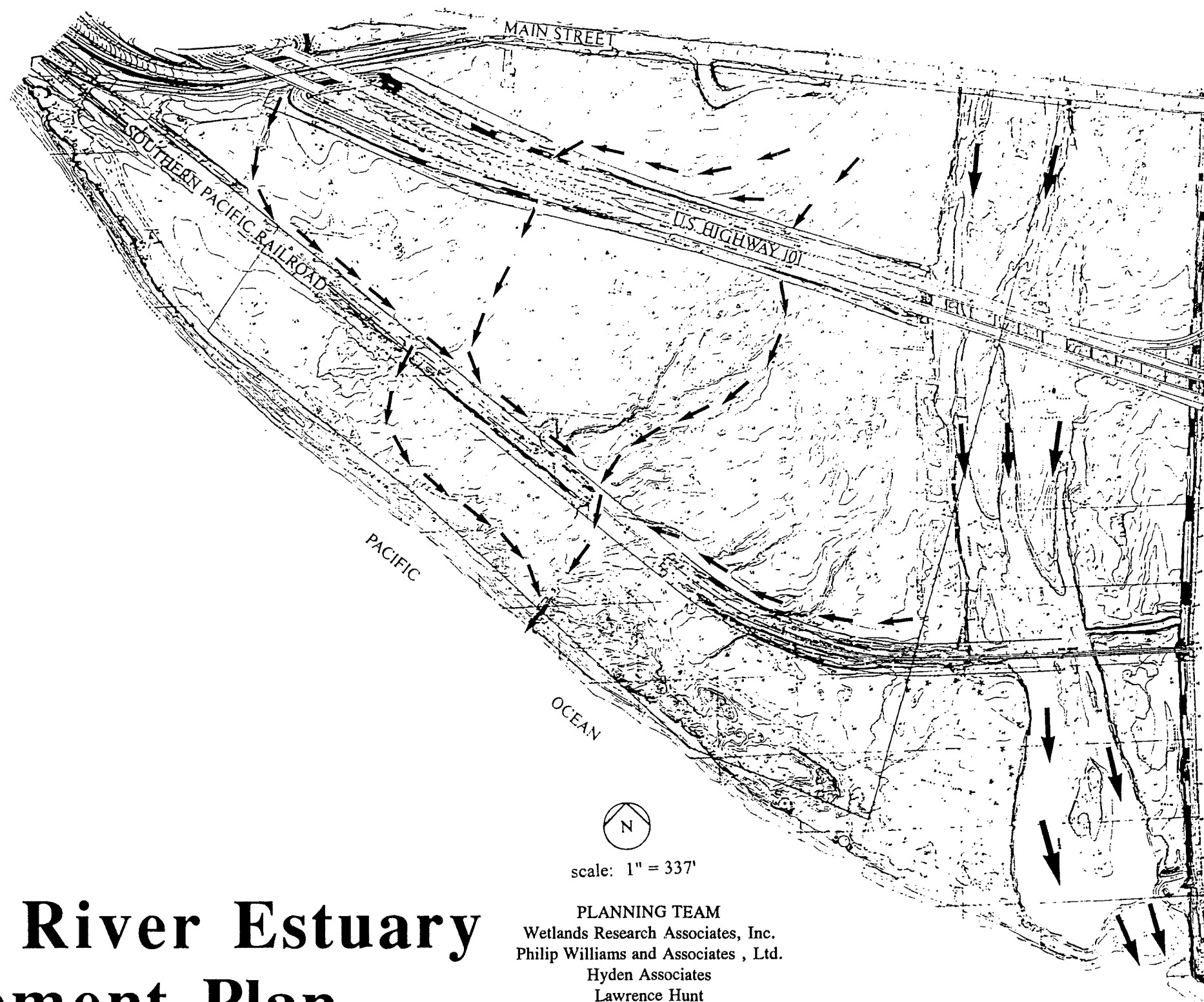
#### 4.3 Tidal Hydrology

Tidal datums for the Ventura River Estuary may be approximated using tidal datums for Rincon Island as shown in Table 12.

The results of a tidal monitoring conducted in June 1992 are shown on Figure 23. Tidal elevations were measured over a 24 hour period using an automatic tide recorder. During this tidal monitoring, the elevation of the entrance channel was higher than the lowest tide

**Table 12. Tidal datums at Rincon Island.**

<u>Tidal Datum</u>	<u>MLLW (ft)</u>	<u>NGVD (ft)</u>
Highest Observed Tide January 27, 1983	8.30	5.40
Mean Higher High Water (MHHW)	5.48	2.53
Mean High Water (MHW)	4.72	1.82
Mean Low Water (MLW)	0.99	-1.91
Mean Lower Low Water (MLLW)	0.00	-2.90
Lowest Observed Tide January 16, 1965	-2.15	-4.30



# Ventura River Estuary Enhancement Plan

Figure 22. Approximate path of floodwater of February 12, 1992 flood. (after Keller and Capelli 1992).



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**VENTURA RIVER ESTUARY**  
**TIDAL MONITORING 6/03 TO 6/04 1992**



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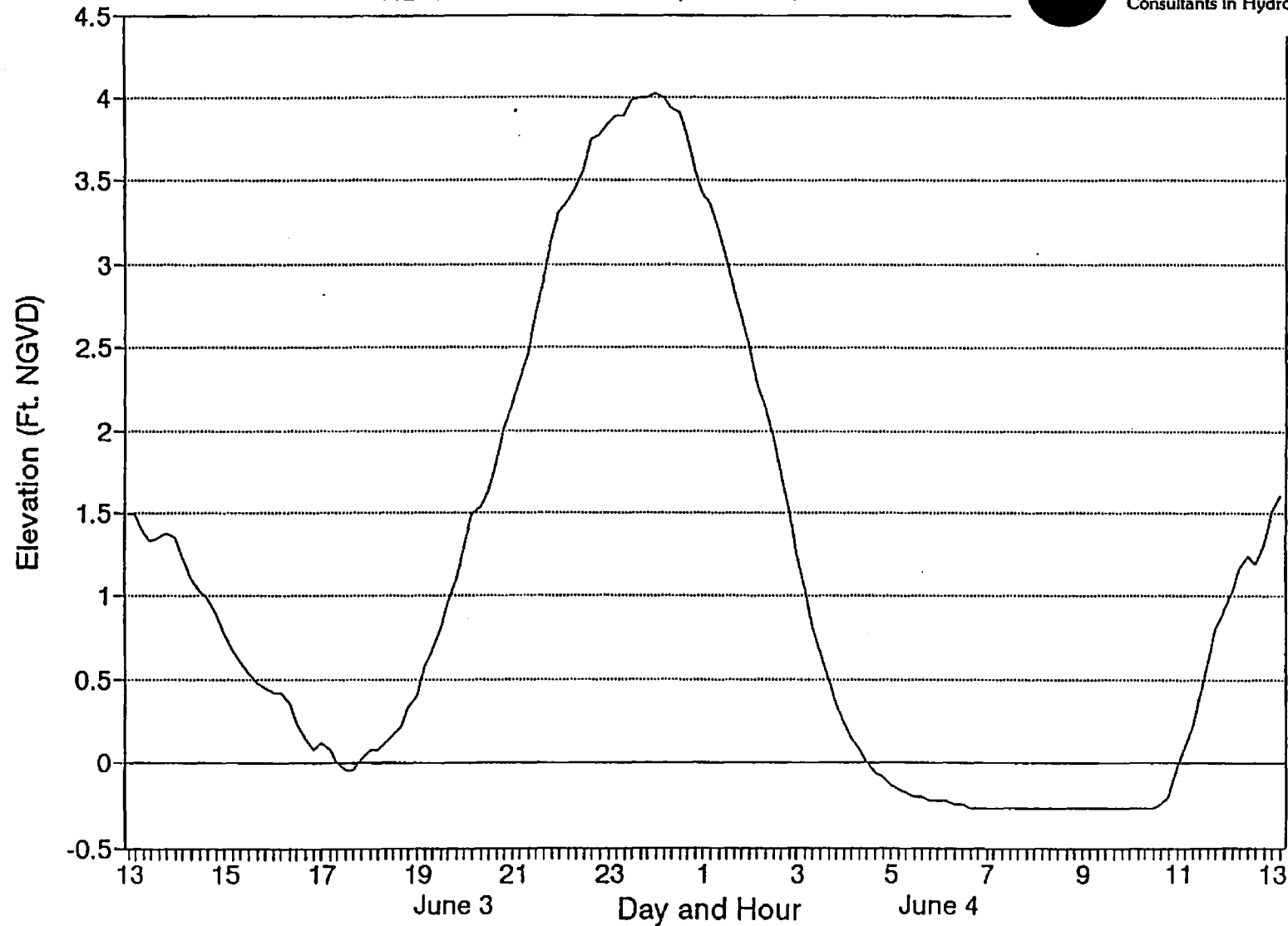


Figure 23. Tidal monitoring curve for the Ventura River Estuary.



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level measured. This contributes to a lower tidal prism in the lagoon, one of the factors influencing how long the estuary mouth will remain open.

#### 4.4 Erosion and Sediment Transport Processes

Fire-related and episodic climatic events create the potential for periodic sedimentation of the Ventura River Estuary with flushing of sediment limited to periods when the estuary mouth is open. Ferren, et al. (1990) recognized that natural disturbances associated in an environment with episodic storm flows and sediment transport events and increasing rates of sea level rise are important to consider in the long-term management of the estuary.

The chaparral ecosystem of southern California is a unique environment in which the relationships between vegetation and fire influence the processes of erosion and sedimentation operating in the region. Fires are common during the late summer to early fall when hot, dry easterly Santa Ana winds are prevalent. Fire increases the rate of sediment production from hillslopes and increases the sediment yield from rivers. The most recent fire in the Ventura River basin was the Wheeler Fire in 1985. The dominant geomorphic process during the following winter wet season included fluvial transport and deposition of fine gravel derived from hillslope erosion (Florsheim, et al. 1991).

Sediment typically enters relatively dry channels from the hillsides during the long dry season, and then is transported downstream during winter storm flows. During drought periods, or following wildfire, large volumes of sediment may accumulate in the stream channels and be mobilized by the first few storm flows during subsequent rainy periods. Evidence for catastrophic landslide and debris flows is present in the upper portion of the Ventura River Basin, and these are probably related to extremely high magnitude storm and seismic events.

Infrequent moderate and high magnitude storm flows in the Ventura River and its tributaries are responsible for transport and deposition of large volumes of sediment. When floodwaters reach the gentler slopes of the Ventura River Valley, velocity is reduced which causes large quantities of sediment to be deposited. Additional debris and sediment are carried by the main channel, which

causes rapid and destructive shifts in the current as some channel sections are filled and others are cut out (COE 1971).

Visual observation of the sediment size distribution of the Ventura River Delta ranges from fine grain material such as silt and sand to large cobbles. The larger material on the surface is found on the central island in the Main Lagoon and along the shore where wave action has removed the finer material. Fine grain material settles in the Main Lagoon. Coarse cobbles are present in the alluvial sediment of the Second Mouth area as indicated during auguring for placement of the groundwater piezometers.

#### 4.5 Salinity Distributions

The salinity characteristics within the Ventura River Estuary depend upon the magnitude and duration of freshwater inflows, the opening condition of the lagoon entrance, evaporation, and the seepage rate through the barrier beach when the estuary is closed to tidal influence.

A preliminary assessment of the salinity distributions in the Ventura River Estuary (Ferren, et al. 1990) has shown periodic fluctuations from greater than 20 parts per thousand (ppt) when the lagoon is open, to less than 0.5 ppt following lagoon closure.

The typical hydrologic sequence within the estuary begins with the barrier beach being breached in a significant winter flood flow. The entrance of the estuary will remain open until a wave storm closes the entrance by depositing sand and cobbles at the entrance. If the ebb tidal current is insufficient to move the deposited material, the estuary will become closed and salt water can no longer enter the estuary on tidal flows. Salt water will be added to the lagoon by waves overtopping the barrier beach. These waves will also push sand and cobbles up the beach thereby raising the height of the beach.

Salinities were measured on 5/23/92, 7/18/91, and 12/12/91 as part of the monitoring program (Table 8). The lack of closure between June 1991-92 differs from the normal cycle of opening and closing described by Ferren, et al. (1990). It was therefore not possible to measure the amount of time



the estuary takes to become fresh following closure by the barrier beach. If the closure conditions had been different, these measurements could be used to determine the rate of seepage through the barrier beach and determine the hydrologic conditions necessary for the natural breaching of the estuary and restoration of tidal action. This analysis would also indicate the period of closure of the estuary entrance between breaching. It is recommended that simple salinity and water surface elevation measurements be taken when the estuary is fully closed to complete the description of the hydrologic conditions for the Ventura River Estuary. No records of the periods of the estuary closures and/or salinity measurements have been located during this study. The salinity distributions recorded during this study demonstrated the following:

- The maximum limit of salinity intrusion by tidal action is approximately to Main Street.
- The estuary is stratified between the SPRR bridge and the ocean when open to tidal action. The difference between surface and bottom salinities is typically 15 ppt when the lagoon is open (Table 8). When the lagoon is partially closed, the lagoon is less stratified with the difference between surface and bottom sediments about 3 ppt.
- The excursion of isohalines with the estuary is highly dependent on the lagoon opening condition.

#### 4.6 Groundwater at the Second Mouth

The study area is located within the Lower Ventura River Basin which is part of the groundwater basin of the Oxnard Plain. Groundwater is unconfined and is found in unconsolidated to semi-consolidated alluvial deposits. Groundwater levels range from 0 to 40 feet below the surface and are shallowest near the Ventura River.

Groundwater elevations in the floodplain west of the mouth of the Ventura River are important in determining the feasibility of enhancement and restoration of habitat in the area near the Second Mouth. An array of piezometers was placed in the locations indicated on Figure 7. Installation of piezometers in the northeast portion of the Second Mouth area was not possible due to the cobble and boulders beneath the surface. Monitoring of the groundwater elevations through the summer and winter

months illustrate the depth below the surface of the shallow groundwater (Figures 6a and 6b). Salinities measured in the piezometers indicate that groundwater in the Second Mouth area is brackish ranging up to 12 ppt (Table 13).

**Table 13.** Conductivity and salinity measured in shallow ground water wells. Conductivity in micro-ohms/cm and salinity in ppt. A dash (-) indicates the well was dry.

Date	Well					
	A	B	C	D	E	F
11/9/91						
Conductivity	-	6210	-	5630	12300	-
Salinity	-	4	-	4	9	-
12/31/91						
Conductivity	-	7370	-	5590	13900	15900
Salinity	-	6	-	5	10	12
2/1/92						
Conductivity	-	8900	-	6000	9820	14500
Salinity	-	6	-	4	6	1
2/28/92						
Conductivity	-	-	-	-	-	-
Salinity	2	1	5	6		
4/6/92						
Conductivity	-	-	-	-	-	-
Salinity		1				6

A previous study (Meisenbach 1975 in Ferren, et al.) indicates the depth to groundwater is only 1.5 to 3.5 feet in the Second Mouth. Results of 1992 monitoring suggest that the groundwater is farther from the ground surface than previously thought in the northeast and southeast portions of the floodplain where auger holes 4-8 feet deep did not intersect the water table. The 1992 results may have been affected by drought conditions which depressed ground water levels in the study area.

## 5.0 PUBLIC ACCESS

There are two basic types of public access: 1) visual access and 2) physical access. Given these, there are several existing options for recreational use and issues involving public access within and adjacent to the study area.

### 5.1 Visual Access

Visually, two aspects of the study area are important. The first is the series of views and vistas from Highway 101. The highway crossing at the Ventura River is designated as a scenic approach in the City's general plan. It is an important component of visual access and adds to the visual image of the City which travelers formulate.

Although the portion of Highway 101 adjacent to the study area is not designated as an official scenic highway, it does meet the criteria described by Caltrans' Scenic Resources Program. Views from this section of highway into the study area are for the most part pleasing. Planning efforts in this area should preserve and enhance this resource.

The State Park (Emma Wood State Beach-Ventura River Group Camp) is one of the major constructed facilities within the viewshed from Highway 101. Given its function, location, and architectural character, its visual impact does not have a major negative effect on the scenic resource. However certain design and landscape treatments could be instituted that would soften the visual impact of this facility. The use of additional native landscape plantings to break up large paving area and screen storage and work areas would be one such treatment. This treatment would also enhance the view into the park from the Main Street entrance.

Although the Ventura Beach RV Resort (a recreational vehicle park) to the north of Highway 101 is out of the study area, the visual aesthetic of this area would be greatly enhanced with the addition of landscape screening along the highway frontage to reduce the impact of facility on the visual field of Highway users.

The second visual aspect of the study area are the views and vistas available from the Omer Rains Memorial Bikeway. The bikeway runs through the study area providing several views of the Ventura River Estuary and the Pacific Ocean. Many more recreation users can enjoy visual access into the study area from the bikeway than the physical carrying capacity of the study area would allow.

## 5.2 Physical Access

The Ventura River Estuary is a natural area that offers visitors and residents many educational and recreational benefits. Current recreational uses of the estuary and surrounding area include camping, hiking, biking, bird watching, photography, fishing, and beach access.

Current primary physical access to the study area is available through State Park, Seaside Wilderness Park, the Omer Rains Memorial Bikeway, and the 330-space parking Ventura County Fairgrounds parking lot.

The location of the estuary area also creates the potential for unacceptable and sometimes unsafe public access and use. Uncontrolled access from east and west of the river allows unauthorized trail formation throughout the entire site that disturbs sensitive habitat. Access across the Southern Pacific Railroad bridge (to and from the bike trail) also allows uncontrolled access to State Park and Seaside Wilderness Park. In addition, this access point creates some safety concerns.

Public access issues of concern include use of the Southern Pacific Railroad Bridge by pedestrians, capacity limits of the bikeway, uncontrolled access into the estuary, floodplain inhabitants living in the study area, and alleged illegal activities taking place in the study area.

The State Park is one of the major existing recreation facilities in the study area. The park consists of two major use areas. One is the Ventura River Group Camp adjacent to the west bank of the river and runs west to the park entrance off of Main Street. The second major use area consists of the vehicle parking and camping area west of the Main Street entrance designed primarily for use by individual campers. Activities for the park include fishing, picnicking, camping, surfing, nature

study, and other recreation uses associated with coastal access. The facilities at the park include a day use area, campgrounds, rostrums, parking, and beach access.

Seaside Wilderness Park is another public access resource in the study area. Access is currently limited to the portion of the park located on the eastern bank of the Ventura River adjacent to the bikeway. This bank is used for many recreation activities including sightseeing, dog-walking (and fetching), bidding, botanizing, shell-fish harvesting, fishing, and photography. Additionally, the general location of Seaside Wilderness Park (especially the portion on the western river bank is considered culturally significant by the Candelaria American Indian Council (General Plan EIR, Appendix F).

A 330-car parking lot at the Ventura County Fairgrounds is located directly adjacent to the study area east of the river mouth. This lot was completed in 1989 and is considered by many to be a significant element in the dramatic increase of recreation users in the area.

The Omer Rains Memorial Bikeway runs from the west end of the Ventura River Group Camp at Emma Wood State Park, along Main Street and the eastern bank of the river levee, and along the beach promenade in front of the fairgrounds and the 330-space parking lot. A connection to the Ventura River trail is proposed in the area north of Main Street. This connection would have the positive impact of reinforcing the link between the estuary and the community. It also has the potential negative impact of increasing the level of traffic on the existing bikeway and related human impact on the environmentally sensitive habitats of the study area.

Some existing public access points have a negative impact on the habitat and public access values of the estuary. The Southern Pacific Railroad Bridge adjacent to the bikeway provides a major unofficial route across the river for pedestrians and occasional bicyclists. Although this connection is potentially dangerous and probably illegal ("No Trespassing" signs were not observed) it is a well traveled path across the river. This access point creates foot traffic control problems for the State Park as well as the Seaside Wilderness Park. It also contributes to the use of the area as a homeless encampment, and for alleged illegal activity. This access point is considered unsafe because it takes several minutes to walk the span with an narrow catwalk on either side of the tracks as the only way

to avoiding a train. Although this catwalk would allow escape from injury in most cases, use of the bridge by pedestrians and bicyclists opens the opportunity for people crossing the bridge to panic or trip with the approach of a train.

The Highway 101 over-crossing, the Main Street Bridge, and the heavy riparian cover which provides shelter also attracts a number of "homeless" to the area. This unsanctioned, semi-permanent camping occurs predominantly in the areas north of the Highway 101 overcrossing. Continuous human habitation negatively impacts the habitat and access values of the site through destruction of vegetation, creation of a network of uncontrolled paths, lack of sanitation facilities, trash, and the introduction of domesticated animals which have become feral and in some cases prey on or compete with the native fauna.

## 6.0 SITE OPPORTUNITIES AND CONSTRAINTS

Existing conditions provide the setting for consideration of possible enhancement and restoration measures to improve natural resources within the Ventura River estuary. In some cases, species of special interest provide a focus for specific habitat restoration measures. However, the primary opportunity presented by this planning process is to consider the study area as a whole--first as a natural community with important linkages between habitats and second as a resource for the educational and passive recreational uses. It is clear from the biological studies undertaken that the Ventura River mouth supports a dynamic and diverse wildlife community--an island within an urbanized environment. This area has been subject to ever-decreasing boundaries as transportation corridors, development, and active recreational activities have occurred around and within it. At the same time, these existing conditions present constraints on possible restorative measures and must be considered within the overall plan.

The purpose of this section of the report is to describe restoration opportunities and to consider how they can be implemented within the natural and human constraints imposed on the system.

### 6.1 Biotic Communities

#### 6.1.1 Opportunities

##### *Coastal dune habitat*

Coastal dune habitat occurs between wave swept ocean beaches and back dune swale. Dune communities are very dynamic, subject to wave and wind forces. Where dune vegetation can gain a tenuous hold on the sand, it can provide habitat for small mammals and reptiles. For example, dunes are habitat for the silvery legless lizard, a California Department of Fish and Game "species of special concern". The quality of this habitat is dependent upon a mixture of open sand areas with protected, vegetated areas. Dune vegetation is subject to trampling by excessive public access, making re-establishment of a mosaic of vegetation and open sand a slow process.

Protection of dune vegetation through public access control is the most common means by which to manage these habitats. Clearly marked paths or boardwalks can direct people to the beach

without harming vegetation. Many of the species inhabiting the beach are not adversely affected by human intrusion as long as it is restricted to certain areas. In addition, removal of exotic vegetation and replanting with California native plants can greatly enhance the quality of this habitat for native fauna.

*Enhance dune swale wetland habitat*

The dune swale wetlands provide habitat for numerous small mammals that rely on a relatively continuous cover of vegetation for protection from predators. Restoration of "holes" in the vegetation matrix created by trails and other impacts through controlled public access and planting with California native plants can greatly improve this habitat.

*Create/Restore/Enhance habitat at Second Mouth*

Historically, small permanent and seasonal open water coastal lagoons lined the coastline between Ventura and Pt. Mugu. They were formed by the discharge of rivers over broad floodplains and by relatively shallow groundwater. It is probable that they ranged from freshwater to saline habitats and supported a variety of fish and wildlife. The lagoons were formed as a result of dynamic forces of river erosion and dune migration. Today, many of these lagoons have been filled for coastal development and agriculture or are degraded due to natural filling by sand and vegetation.

There are few opportunities remaining in the region to restore this type of habitat: north of Mugu Lagoon, the Santa Clara river mouth, and the Ventura River Estuary. The Second Mouth represents an opportunity for protection and restoration of this unique habitat. Impacts to this historic river outlet have both altered and reduced wetland habitat largely due to the constricting nature of the railroad trestle that was replaced with an earthen railroad bed. The current temporary flood repairs to the bridge have further degraded the potential habitat here. An opportunity to restore open water lagoon/estuary habitat and associated wetland vegetation when a permanent bridge is constructed may exist. This would benefit an array of animals including amphibians, birds, and mammals. Similar restoration opportunities exist when future maintenance work on the oil pipeline and communication lines is conducted.



### *Enhance riparian habitat*

As evidenced by the bird data collected for this study, the river delta mouth is an outstanding habitat for resident and migratory birds. A number of unique reptiles and mammals also use this area. Based on historical photographs, the density of riparian vegetation appears to have increased due to stabilization of the channel; however, the extent of riparian habitat throughout the river mouth has decreased due to conversion to agricultural and urban uses. Therefore, maintenance of this habitat type is critical.

Riparian habitat could be enhanced and expanded on the western floodplain. Protection and enhancement of the estuary and riparian woodlands in the study area and adjacent properties is critically important to the continued, albeit infrequent, establishment of territories and breeding of obligate riparian and shorebird species that are regionally declining. Removal of exotic vegetation and replacement with California native plants would improve the quality of habitat for wildlife. Areas of historic riparian vegetation that were removed by agriculture and other development could be replaced. Restricted and directed human use would also increase habitat value because many of the species using riparian areas are sensitive to disturbance.

### *Estuary*

Water entering the lower Ventura River from point and non-point sources has a high nutrient content. When the mouth is closed, the estuary becomes eutrophic and dissolved oxygen levels are likely to be reduced, especially at night and in the lower, more saline portions of the water column. Other pollutants (not measured in this study) may also be entering the estuary.

Improvements to the quality of water entering the lower estuary would improve habitat for fish and other aquatic organisms. These improvements would require appropriate management practices in the watershed; identifying all non-point discharges, monitoring, and controlling them; and monitoring and control of effluent from the Ojai Valley Sanitary District facility.

Water quantities released from upstream sources at appropriate intervals would assure beneficial conditions for wildlife. Releases could also be used with water quality monitoring to improve water quality.

### 6.1.2 Constraints

#### *Coastal dune habitat*

Coastal dune vegetation occupies a harsh environment (e.g., desiccation, wind). This combined with human impacts including trampling and sand agitation from foot traffic will make establishment of dune vegetation difficult. Although dune vegetation is adapted to harsh environmental conditions and is self-sustaining once established, revegetation will require special planning and persistence. Public use of the area may initially be difficult to control since trail use and access to this habitat have been unrestricted in the past. Such control will at least require signage to direct the public into appropriate areas and public education concerning sensitive areas. Some initial enforcement action may also be required.

#### *Second Mouth*

Habitat restoration in the area of the Second Mouth will be constrained by communication lines and an oil pipeline buried adjacent to the north side of the railroad as well as the railroad itself. Restoration efforts that might include excavation or other enhancement elements will require cooperation and coordination from the companies involved. Additional constraints include impacts to existing habitat by restoration elements and potential damage to enhancement elements by floods and intense human use of the area (the area is the junction of several trails).

#### *Riparian Habitat*

Establishment of riparian vegetation whether in replacing removed exotic vegetation, in revegetating trails and other open areas, or in habitat expansion areas will be constrained by the depth of the water. Establishment of vegetation may require excavation to lower the elevation of the substrate to nearer the water table and/or an extended maintenance program involving irrigation and weed control. Control of public access into the area to halt continued vegetation and habitat damage and prevent damage to revegetation efforts will be difficult given the past, long-term use of the site. The recent completion of a 330-space parking area immediately adjacent to the eastern side of the estuary has resulted in substantial increases in the level of human activity (including the incidence of pet dogs) in the study area. Special patrols may be necessary in addition to signage regulating access.

### ***Water Quality***

The constraints on improving water quality are the cost of increased water treatment from point and non-point sources and the predicament of balancing controlled water releases with flood control and municipal water requirements.

## **6.2 Hydrology**

### **6.2.1 Hydrologic Opportunities**

Hydrologic opportunities to enhance the Ventura River Estuary include management of the inlet to stabilize the salinity distribution and restoration in the vicinity of the Second Mouth such as:

- The salinity distribution in the lagoon could be stabilized to avoid dramatic changes between seasons. This could be achieved by management of the lagoon entrance, such as controlled breaching;
- Detrimental effects to marine organisms in the lagoon could be minimized if nutrients in the main source of summer freshwater inflow (treatment plant) is controlled.
- An opportunity exists to create a self maintaining system in the vicinity of the Second Mouth so that flood flows do not fill the Second Mouth area with sediment, and vegetation that is planted could be replaced at a low cost. This would allow large magnitude floods to discharge through the Second Mouth and scour sediment from the tidal channel without depositing sediment in a backwater upstream of the bridge. This can be achieved by enhancing the channel incised during the February 1992 flood and replacing the SPRR Bridge at the Second Mouth with a bridge large enough to allow for increased discharge of flood flows.

### **6.2.2 Hydrologic Constraints**

Constraints to enhancement and improvement of habitat at the Ventura River Estuary are associated with flooding, erosion and sedimentation, drought, human activities and structures, and water quality. The major constraints are:

- Flooding from the Ventura River may modify the morphology of the inlet and the area near the Second Mouth. Flooding, such as occurred during the February 1992 flood, inundated the river floodplain and the delta to the west of the main channel. This is a natural process and a necessary component of the self-maintaining system;

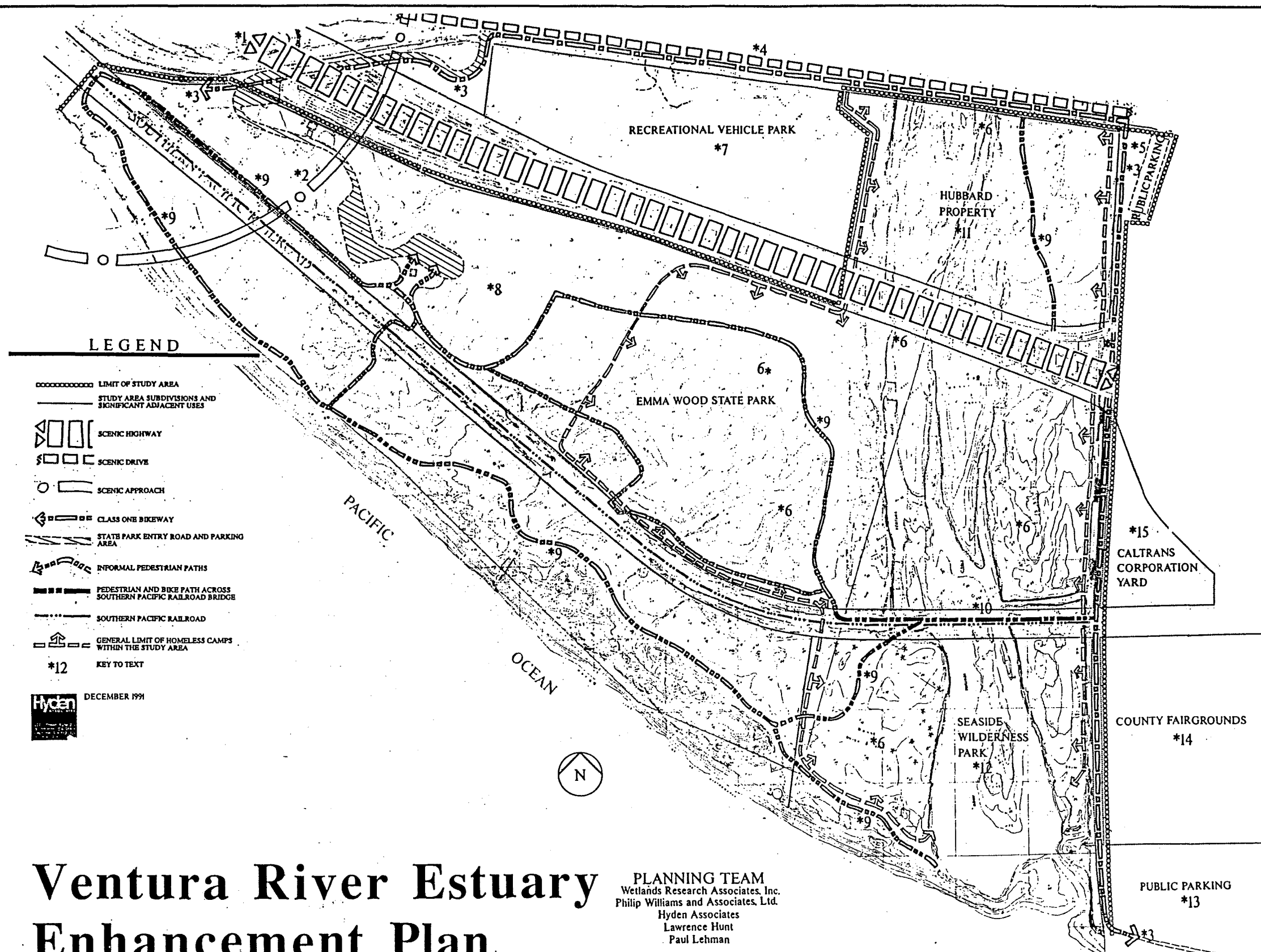
- High magnitude flood flows could cause channel incision, bank erosion, or sedimentation in the main estuary and shifting of channels in the delta;
- Upstream basin processes contribute abundant sediment in debris flows and in fluvial flood flows to downstream portions of the Ventura River. High volume sediment transport events could fill portions of the estuary causing secondary flooding, shifting of channels on the delta, and higher ground surface elevation relative to the groundwater. Flood flows overtopping the floodplain and delta area to the west of the Ventura River could deposit large amounts of sediment upstream of road alignments;
- Drought could lower groundwater tables in the vicinity of the Second Mouth and constrain vegetation to drought tolerant species. Lower magnitude dry season streamflow in the Ventura River may cause the inlet to remain closed for longer periods of time;
- Water quality in the estuary is influenced by treated wastewater, stormwater runoff, and local drainage from the fairgrounds. The quantity of freshwater inflow governs the salinity distribution, the depth of water, and the frequency and duration of inundation at specific locations in the estuary;
- The flood control levee on the east side of the estuary constrains enhancement to the west side of the Ventura River. Main Street, Highway 101, and the Southern Pacific Railroad (SPRR) constrain enhancement by dividing the enhancement area into separate sections. Construction activities associated with the SPRR Bridge at the Second Mouth since the February 1992 flood may complicate enhancement efforts at the Second Mouth.
- If the tidal prism was to be increased to approximately 810 acre-feet ( $10^6 \text{ m}^3$ ) to maintain the estuary open to tidal circulation the entire study area would need to be excavated to below MLLW. Massive excavation is not recommended because it would damage existing sensitive habitat and other enhancement alternatives that consider the unusual hydrologic conditions at the estuary. A fully tidal option with an entrance that does not close due to the effects of the tidal prism alone is, therefore, not a viable alternative.

## 6.3 Public Access

### 6.3.1 Opportunities

#### *Omer Rains Memorial Bikeway*

The Omer Rains Memorial Bikeway (A Class 1 Bikeway) runs along the eastern and northern perimeter of the study area (Number 3, Figure 24). This bikeway is heavily used. It provides an outstanding recreation opportunity for the community and visitors alike. An extension of the bikeway



# Ventura River Estuary Enhancement Plan

Figure 24. Map showing public access opportunities and constraints.



Wetlands Research Associates, Inc.

is proposed for the area north of Main Street in the near future. The bikeway also provides several opportunities for viewing areas of the estuary, as well as the possibility of developing docent-lead trail heads off of the bikeway.

#### *Main Street Scenic Drive*

Main Street (4) has been designated as a Scenic Drive in the City's general plan. Future public access development adjacent to Main Street should be designed to enhance this image.

#### *Public Parking at Main Street*

The public parking area at Main Street (5) provides a major staging area for trail users. It could possibly provide additional parking and staging areas for interpretive trails. A secondary interpretive kiosk could be placed on the unused portion of the site.

#### *Emma Wood State Park-Ventura River Group Camp*

The State Park is one of the major existing recreation facilities in the study area. The park consists of two major use areas. One is the Ventura River Group Camp (8) adjacent to the river, it runs west to the park entrance off of Main Street. The second major use area consists of the vehicle parking and camping area west of the Main Street entrance designed primarily for use by individual campers.

Recreational uses of the park include fishing, picnicking, camping, surfing, nature study, and other purposes associated with beach access.

The California Department of Parks and Recreation Emma Wood State Beach General Plan (1975) emphasizes the shoreline accessibility as the main recreation element of the park. It also identifies the preservation of the Ventura River and the small habitat types that exist adjacent to the river as of primary importance from a natural resources standpoint. The general plan also calls for the Ventura River area to be managed as a Natural Preserve.

The current nature interpretive facilities are limited to two existing kiosks within the State Park. However, there is ample opportunity to provide park visitors with an additional nature interpretive

facility in the open grassland area of the Ventura River Group Camp, where the main parking lots and camping facilities are located. This is the only location within the study area that has the available space and proximity to parking and the river mouth ideal for the placement of a nature interpretive center.

### *Seaside Wilderness Park*

Seaside Wilderness Park (12) offers many visual opportunities for bikeway, beach and State Park users. However given the ecological sensitivity of the area, use should be restricted primarily to visual access with some controlled access through docent lead tours. Visual access to the area could be enhanced with the addition of a permanent viewing area with amenities and interpretive signage on the west side of the bikeway in the general proximity of the fairgrounds parking lot. An existing kiosk is currently located in this area.

### *Public Parking at Fairgrounds*

The existing 330-space public parking lot (13) at the fairgrounds was completed in 1989 as part of Phase I of the Ventura County Fairgrounds Master Plan. Prior to the opening of this facility access to the river mouth and adjacent shoreline was used primarily by bicyclists, joggers, and surfers. After completion of the parking and roadway, access to the area became available to additional users with a wide range of mobility levels and dramatically increased the impact of human activity in the area.

Currently the 31st Agricultural District, which operates the lot, has restricted the use of the portion of the lot closest to the Ventura River Estuary to special fair-events in an effort to reduce the amount of pedestrian and vehicular traffic in the area.

This area has an opportunity for an interpretive center because of its proximity and elevational relationship to the river mouth. The proximity of the existing bikeway offers another opportunity to link existing recreational uses to an interpretive program, thus increasing facility users awareness and knowledge of the natural environment and sensitivity of the adjacent area.

### *County Fairgrounds*

The County Fairgrounds (14) generate a large number of visitors to the general site area. This creates an opportunity to reach a wide range of people with an interpretive program. However, the sheer numbers of people visiting this area can quite easily overwhelm the existing recreation facilities and a future interpretive facility.

### *Caltrans Corporation Yard*

The Caltrans Corporation Yard (15) has a negative visual impact on the study area, but limited to the views along the Class 1 bikeway. There is an opportunity to enhance the overall visual character of this segment of the bikeway by using native landscape screening between the bikeway and the corporation yard. As with all landscape treatment in public recreation facilities, the landscaping will have to be developed in a fashion that will not provide concealed areas adjacent to the bikeway.

## 6.3.2 Constraints

### *Highway 101 (Scenic Highway)*

Although this portion of Highway 101 (1) is not designated as an official scenic highway, it does meet the criteria set forth by the State of California Department of Transportation (Caltrans). Therefore, any facilities within the scenic corridor and the study area should be developed to ensure consistency with Caltrans Scenic Resources Program Criteria.

### *Ventura River Scenic Approach*

The crossing at Ventura River (2) is designated as a scenic approach in the City's general plan. This area is extremely important to the visual image of the city that travelers formulate. Therefore, great care should be taken in the development of facilities in this area.

### *Omer Rains Memorial Bikeway*

The portions of the bikeway (3) adjacent to the study area on the east side are heavily used. The bikeway is designed to Caltrans standards but due to heavy use is sometimes overcrowded and slightly dangerous. In a way it is a victim of its own success. Due to physical limitations, widening the trail appears cost prohibitive.



As stated before, there are plans to connect this bikeway to the proposed Ventura River Trail which in turn will connect with the Ojai Valley Trail. These proposed connections will probably increase the number of users on the Omer Rains Bikeway which in turn may adversely affect the environmentally sensitive habitats in the study area due to the increased bicycle and pedestrian traffic.

#### *General Area of Floodplain Inhabitants Population*

The Highway 101 over-crossing, the Main Street Bridge, and the dense riparian habitat along them (6) provide protection from the elements and greatly reduce the visibility from the streets and bikeway above. This not only creates shelter for wildlife but it also provides security and protection for a portion of the City's floodplain inhabitants.

However, this location poses a serious threat to those occupying the area on a permanent basis due to the seasonal flooding which at times is severe. In the floods of February 1992, a homeless individual was drowned and several had to be rescued from gravel bars in the river by helicopter.

The river bed has been a location for encampments for a long period of time. Although the cross-section of inhabitants has probably changed significantly over history, the use of the river bed as habitat has not, as the river bed provides a substantial amount of seclusion and safety. Because of this, there will always be a certain number of floodplain inhabitants camping in the river bed. However the current population most assuredly has a substantial increase in women and children than that of previous decades, and the male population has probably greatly increased. This is due to social and economic problems which are outside the scope of this study.

Currently the City does not have an accurate accounting of the floodplain inhabitants in the study area. Some private organizations may have a better sense of the population dynamics, and these potential sources are being explored. However, exact numbers will probably not be available.

There have been requests from some floodplain inhabitant advocates to the City for sanitation facilities in the river bed area. However, the City is not exploring the possibility of providing such facilities. If such facilities are considered in the future they should be sited away from the existing

parking area adjacent to Main Street and other existing heavily used recreation facilities in order to avoid a conflict of uses and users.

### *Recreational Vehicle Park*

The existing recreational vehicle park (7) is a privately operated facility. It abuts the study area on the eastern side of the park. The park operators discourage their guests from accessing the river bed through the use of "No Trespassing" signs.

Although this facility is out of the study area the general visual character of the area could be significantly enhanced with additional screening of the facility from Highway 101. This is particularly true for the southbound Highway 101 approach to the study area.

### *Emma Wood State Park-Ventura River Group Camp*

Constraints of locating an interpretive center inside the park (8) include: lack of a strong pedestrian/bicycle access, lack of views of the river mouth (unless a multi-story building were developed), and the potential management conflicts that locating an interpretive facility in the middle of a State Park would create.

### *Informal Pedestrian Paths*

Informal pedestrian paths (9) are found intermittently throughout the study area. These paths serve as maintenance, patrol, and recreational use routes. For the most part, the paths on the south side of the Southern Pacific right-of-way and in the open area of the state park are safe and secure. The paths east of the Ventura River Group Campground and in the river bed wind through dense riparian habitat. Because of the seclusion inherent in this kind of vegetation and the blind curves of the paths, it is these areas that are experiencing the bulk of the enforcement problems.

The physical design solutions to this type of problem are very limited and quite often are ineffective. Possible solutions, however, include barriers such as fencing and revegetation with uninviting plants like poison oak and blackberry. Additional measures would include education through the use of signs and increased surveillance and enforcement.

### *Pedestrian Path Across Southern Pacific Railroad Bridge*

The Southern Pacific Railroad Bridge (10) provides a major link between the existing bikeway and Emma Wood State Park for pedestrians and an occasional bicycle. Although this connection is somewhat dangerous and probably illegal (although no "No Trespassing" signs were seen on site visits), it is nevertheless a major thruway.

It is probably impractical to keep people off the bridge, so the best way of reducing its use is to provide a more convenient route. This approach would be costly and may greatly increase the management and enforcement problems in the area.

### *Seaside Wilderness Park*

The public access to Seaside Wilderness Park (12) is currently limited to the eastern bank of the Ventura River adjacent to the existing Class 1 bikeway. Unauthorized access to the portion of the park on the western bank is primarily by the Southern Pacific Railroad Bridge. The major recreation use of the western portion of the park is passive, such as bird watching.

### *Public Parking at Fairgrounds*

As stated before this facility is credited with the dramatic increase in public access use of the river mouth area. A combination of physical barriers, educational facilities (interpretive signs and possible interpretive center) and management practices must be employed to reduce the impact on the ecological resources while at the same time providing access and recreation opportunities in the area.

It will be a design challenge to overcome the strong architectural influence of the fairgrounds (13), which could be a major constraint to the development of an interpretive center atmosphere. Additionally, there is the question of whether or not the available fairgrounds parking area can be reduced enough to provide sufficient room for developing a worthwhile interpretive facility.

The type and quantity of potential visitors can have a major positive or negative influence on a potential interpretive center, depending on how the facility is designed and promoted.

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# APPENDICES



# APPENDIX A

## APPENDIX A

Features that may be involved in the enhancement project and changes that occurred in these features were examined. The earliest aerial reviewed was taken in September of 1928. At this time of year, the river was in a period of low flow south of Main Street, and the main mouth estuary held water in the lower estuary, though the outlet was extremely narrow and surrounded by sandbars. The Seaside Wilderness Park, planted with Monterey Cypress and Monterey Pine, comprises approximately 15 acres and is densely planted. The area of vegetation south of the railroad and west of the trestle is approximately 300 ft wide, and slightly narrower east of the trestle (200 ft). The barrier beach south of the railroad at the main mouth measures 400 ft from shore to the first visible vegetated area.

Several changes are apparent by 1939, as evidenced by aerials taken in January of that year. The existing Main Street Bridge was in place (constructed in 1932). The sandy point south of the main mouth had moved eastward approximately 1300 ft, and the beach is about 300 ft wide at this point. There are numerous sandy islands in the river channel. The vegetated areas south of the railroad have increased in size, by as much as 10%. The cypress grove, however has shrunk dramatically, now covering less than half the area as it did in 1928. The river is flowing in this photo, extending all the way to the river's main mouth. There is also a small estuary visible at the second mouth, flowing around the central support of the railroad bridge, but having no outlet to the ocean.

The beach appears narrower in the aerial shot in 1946, losing as much as 120 ft at the main mouth, and 30 ft at the second mouth. The sandy point is again apparent at the main mouth, measuring approximately 320 ft from shore to first visible vegetation. The vegetated areas south of the railroad remain constant. The cypress grove continues to shrink in area, and thins considerably; percent cover is much lower than in previous aerials. The river is more channelized and less braided than was evident in the 1939 aerial, possibly due to scouring from above average rainfall during 1942-3 (Ferren, 1990). It is flowing out of the main mouth and is connected to the second mouth estuary. The sandy areas in the river floodplain have more vegetative cover. Agricultural operations infringing on the western edge of the estuary have replaced the natural vegetation. Vegetative cover throughout the delta is increasing.

A 1959 aerial photo shows that the beach at the main mouth has decreased by about 200 ft since 1946. The vegetated areas south of the railroad are also smaller, now only approximately 200 ft wide (compared to 300 ft in 1928), and the beach area is also reduced. The river is strongly channelized, and the river's floodplain has shifted westward, probably due to the completion of the north-south levee that lies east of the river.

The second mouth coastal estuary is more evident in a 1965 photo, possibly due to a higher quality resolution. Highway 101 has been completed in its present location, and serves to break up habitats in the river delta. The beach is again wider at the second mouth than it appeared in the 1959 photograph, measuring 600 ft. The vegetated areas south of the railroad have spread shore-ward, almost doubling in size since 1959. The sandbars in the main mouth estuary are expanding also, and

vegetative cover between Main Street and the railroad is much sparser than in previous photos, which may be due to agricultural operations and scouring from heavy flooding (Ferren, 1990).

The last photo reviewed was shot in 1989. Vegetative cover increased dramatically south of Highway 101 between 1965 and 1989, when avocado trees and eucalyptus windbreaks were planted (Ferren, 1990). The river floodplain is also highly vegetated, as virtually no estuary sandbars are visible as in earlier aeriels. The recent drought that has eliminated scouring from river flows may have lead to re-establishment of dense riparian vegetation in the estuary (Ferren, 1990). The second mouth estuary has decreased in size, as a result of extension of the railroad berm, installation of an oil/gas pipeline north of the railroad, and construction of a State Park access road under the railroad trestle. A mobile home park was built in 1987 on an area north of Highway 101 and south of Main Street. The cypress grove is very sparse, with only a few individuals left standing.

## **APPENDIX B**

## **APPENDIX B**

This appendix lists vertebrate species that were observed on the project site during the field surveys between June 1991 and June 1992 in addition to literature and museum collection records for the area and discussions with local biologists. The bird list is derived from sight and auditory records gathered from the period 1979-1991. The relative status of fish populations in the lower Ventura River is based on that described in City of San Buenaventura (1990; 1991). Habitat occurrence of the amphibians, reptiles, birds and mammals in this list uses the following habitat types:

- 1 = Estuarine wetlands (and deep water for some birds)**
- 2 = Vegetated (scrub/shrub and forested) wetlands and transitional wetlands**
- 3 = Uplands**
- 4 = Ruderal Habitats**

Due to the secretive habits of amphibians, reptiles and mammals, it was not possible to assign a relative abundance classification to these groups of vertebrates. Relative abundance of birds follows this scheme:

- C = Common, averages more than 5 individuals/day in project area**
- U = Uncommon, averages 1-5 individuals/day in project area**
- R = Rare, averages 1-5 individuals/season in project area**
- X = Casual, less than 5 records in project area**

The seasonal status of birds was rated as follows:

- R = Permanent resident in project area**
- S = Summer resident (\*) breeds in project area**
- M = Spring and/or Fall migrant to project area**
- W = Winter visitor to project area**

**VERTEBRATE SPECIES KNOWN TO OCCUR  
WITHIN THE STUDY AREA  
(VENTURA RIVER GROUP CAMP, SEASIDE WILDERNESS PARK  
AND THE HUBBARD PROPERTY)**

The species in this list were observed during the 1991 and 1992 field surveys or are known from literature and museum records or from conversations with local biologists as occurring on or adjacent to the study site. Vertebrate species found in the vicinity and potentially occurring on-site are discussed in Section 5.0 of the report.

**FISHES**

**NATIVE FRESHWATER SPECIES**

<u>Scientific Name</u>	<u>Common Name</u>	<u>Status <sup>a</sup></u>
Family Petromyzontidae (Lampreys) <i>Lampetra tridentata</i> <sup>1</sup>	Pacific Lamprey	Common
Family Salmonidae (Trout and Salmon) <i>Oncorhynchus mykiss</i> <sup>1</sup>	Steelhead Trout	Common
Family Cyprinidae (Minnows and Carp) <i>Gila orcutti</i>	Arroyo Chub	Abundant
Family Fundulidae (Killifish) <i>Fundulus parvipinnis</i>	California Killifish	?
Family Gasterosteidae (Sticklebacks) <i>Gasterosteus aculeatus</i> <i>microcephalus</i>	Partially-armored Stickleback	Abundant
Family Cottidae (Sculpins) <i>Cottus asper</i> <sup>2</sup>	Prickly Sculpin	?

<sup>1</sup> = anadromous species

<sup>2</sup> = catadromous species

<sup>a</sup> = as per City of San Buenaventura (1990; 1991)

## FISH, continued.

## NATIVE ESTUARINE SPECIES

<u>Scientific Name</u>	<u>Common Name</u>	<u>Status <sup>a</sup></u>
Family Atherinidae (Silversides) <i>Atherinops affinis</i>	Topsmelt	Common
Family Gobiidae (Gobies) <i>Eucyclogobius newberryi</i>	Tidewater Goby	Common
Family Cottidae (Sculpins) <i>Leptocottus armatus</i>	Staghorn Sculpin	Rare
Family Embiotocidae (Surfperches) Genera and species unknown		Rare
Family Mugilidae (Mullet) <i>Mugil cephalus</i>	Striped Mullet	Rare

## INTRODUCED SPECIES

Family Cyprinidae (Minnows and Carp) <i>Cyprinus carpio</i>	Common Carp	Common
Family Ictaluridae (Catfish) <i>Ictalurus punctatus</i> <i>Ictalurus natalis</i>	Channel Catfish Yellow Bullhead	Rare Common
Family Poeciliidae (Livebearers) <i>Gambusia affinis</i>	Mosquitofish	Abundant
Family Centrarchidae (Sunfishes) <i>Lepomis cyanellus</i> <i>Micropterus salmoides</i>	Green Sunfish Largemouth Bass	Rare Common

## AMPHIBIANS

### NATIVE SPECIES

<u>Scientific Name</u>	<u>Common Name</u>	<u>Habitat</u>
Order Anura		
Family Hylidae (Treefrogs)		
<i>Pseudacris regilla</i>	Pacific Treefrog	1,2,3,4

### INTRODUCED AMPHIBIAN SPECIES

Order Anura		
Family Ranidae (True Frogs)		
<i>Rana catesbeiana</i>	Bullfrog	2

## REPTILES

### NATIVE SPECIES

Order Squamata		
Suborder Sauria (Lizards)		
Family Emydidae (Box and Water Turtles)		
<i>Clemmys marmorata pallida</i>	Southwestern Pond Turtle	1,2,3
Family Iguanidae (Iguanids)		
<i>Sceloporus occidentalis</i>	Western Fence Lizard	1,2,3,4
<i>Uta stansburiana</i>	Side-blotched Lizard	1,2,3,4
Family Anguidae (Alligator Lizards and Allies)		
<i>Anniella pulchra pulchra</i>	Silvery Legless Lizard	3,4
Suborder Serpentes (Snakes)		
Family Colubridae (Colubrids)		
<i>Pituophis melanoleucus</i>	Gopher Snake	1,2,3,4



## BIRDS

## NATIVE SPECIES

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>	<u>Season</u>	<u>Habitat</u>
Order Gaviiformes				
Family Gaviidae (Loons)				
<i>Gavia stellata</i>	Red-throated Loon	R		M,W1
<i>Gavia pacifica</i>	Pacific Loon	R		M,W1
<i>Gavia immer</i>	Common Loon	R		M,W1
Order Podicipediformes				
Family Podicipedidae (Grebes)				
<i>Podilymbus podiceps</i>	Pied-billed Grebe	U		M,W1
<i>Podiceps auritus</i>	Horned Grebe	R		M,W1
<i>Podiceps grisegena</i>	Red-necked Grebe	X		W1
<i>Podiceps nigricollis</i>	Eared Grebe	U		M,W1
<i>Aechmophorus</i> <i>occidentalis</i>	Western Grebe	U		M,W1
<i>Aechmophorus</i> <i>clarkii</i>	Clark's Grebe	R		M,W1
Order Pelecaniformes				
Family Pelecanidae (Pelicans)				
<i>Pelecanus occidentalis</i>	Brown Pelican	U		M,W1
Family Phalacrocoracidae (Cormorants)				
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	U		M,W1
<i>Phalacrocorax pelagicus</i>	Pelagic Cormorant	R		M,W1
Order Ciconiiformes				
Family Ardeidae (Hérons)				
<i>Botaurus lentiginosus</i>	American Bittern	X		M,W1
<i>Ardea herodias</i>	Great Blue Heron	U		M,W1
<i>Casmerodius albus</i>	Great Egret	R		M,W1
<i>Egretta thula</i>	Snowy Egret	U		M,W1
<i>Egretta caerulea</i>	Little Blue Heron	X		M1
<i>Bubulcus ibis</i>	Cattle Egret	X		M,W1
<i>Butorides striatus</i>	Green-backed Heron	U		R1
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	U		M,W1
Family Threskiornithidae (Ibises and Spoonbills)				
<i>Plegadis chihi</i>	White-faced Ibis	X		M1
Order Anseriformes				
Family Anatidae (Swans, Geese and Ducks)				
<i>Chen caerulescens</i>	Snow Goose	X		M1

## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance Season</u>	<u>Habitat</u>
Order Anseriformes (cont.)			
Family Anatidae (cont.)			
<i>Chen rossii</i>	Ross' Goose	X	M1
<i>Branta bernicla</i>	Brant	R	M1
<i>Branta canadensis</i>	Canada Goose	R	M,W1
<i>Aix sponsa</i>	Wood Duck	R	M,W1
<i>Anas crecca</i>	Green-winged Teal	U	M,W1
<i>Anas platyrhynchos</i>	Mallard	C R(*)	1
<i>Anas acuta</i>	Northern Pintail	U	M,W1
<i>Anas discors</i>	Blue-winged Teal	R	M1
<i>Anas cyanoptera</i>	Cinnamon Teal	U	M1
<i>Anas clypeata</i>	Northern Shoveler	R	M,W1
<i>Anas strepera</i>	Gadwall	R	M,W1
<i>Anas americana</i>	American Widgeon	U	M,W1
<i>Aythya valisineria</i>	Canvasback	X	M,W1
<i>Aythya americana</i>	Redhead	X	M,W1
<i>Aythya collaris</i>	Ring-necked Duck	R	M,W1
<i>Aythya marila</i>	Greater Scaup	R	M,W1
<i>Aythya affinis</i>	Lesser Scaup	U	M,W1
<i>Clangula hyemalis</i>	Oldsquaw	X	M,W1
<i>Melanitta perspicillata</i>	Surf Scoter	R	M,W1
<i>Melanitta fusca</i>	White-winged Scoter	X	M,W1
<i>Bucephala clangula</i>	Common Goldeneye	R	M,W1
<i>Bucephala albeola</i>	Bufflehead	U	M,W1
<i>Lophodytes cucullatus</i>	Hooded Merganser	X	M1
<i>Mergus merganser</i>	Common Merganser	X	M1
<i>Mergus serrator</i>	Red-breasted Merganser	U	M,W1
<i>Oxyura jamaicensis</i>	Ruddy Duck	U	M,W1
Order Falconiformes			
Family Cathartidae (Vultures)			
<i>Cathartes aura</i>	Turkey Vulture	R	M1,2,3,4
Family Accipitridae (Kites, Hawks and Eagles)			
<i>Pandion haliaetus</i>	Osprey	X	M1
<i>Elanus caeruleus</i>	Black-shouldered Kite	R	M,W3
<i>Circus cyaneus</i>	Northern Harrier	R	M,W1,3
<i>Accipiter striatus</i>	Sharp-shinned Hawk	U	M,W2,3
<i>Accipiter cooperi</i>	Cooper's Hawk	U	M,W2,3
<i>Buteo lineatus</i>	Red-shouldered Hawk	R	M,W2,3
<i>Buteo jamaicensis</i>	Red-tailed Hawk	U	M,W1,2,3,4

## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance Season</u>	<u>Habitat</u>
Order Falconiformes (cont.)			
Family Accipitridae (cont.)			
<i>Buteo lagopus</i>	Rough-legged Hawk	X	W3
<i>Falco sparverius</i>	American Kestrel	U	M,W1,2,3,4
<i>Falco columbarius</i>	Merlin	R	M1,3
<i>Falco peregrinus</i>	Peregrine Falcon	X	M,W1
<i>Falco mexicanus</i>	Prairie Falcon	X	M1,3
Order Galliformes			
Family Phasianidae (Grouse, Quail and Ptarmigan)			
<i>Callipepla californica</i>	California Quail	U	R(*)3,4
Order Gruiformes			
Family Rallidae (Rail, Gallinules and Coots)			
<i>Rallus limicola</i>	Virginia Rail	U	M,W1,2
<i>Porzana carolina</i>	Sora	U	M,W1,2
<i>Gallinula chloropus</i>	Common Moorhen	X	M,W1,2
<i>Fulica americana</i>	American Coot	C	M,W1,2
Order Charadriiformes			
Family Charadriidae (Plovers)			
<i>Pluvialis squatarola</i>	Black-bellied Plover	U	M,W1
<i>Pluvialis dominica</i>	Lesser Golden-Plover	X	M1
<i>Charadrius alexandrinus</i>	Snowy Plover	U	M,W1
<i>Charadrius semipalmatus</i>	Semipalmated Plover	U	M,W1
<i>Charadrius vociferus</i>	Killdeer	C	R(*)1,2,4
Family Haematopodidae (Oystercatchers)			
<i>Haematopus bachmani</i>	American BlackOystercatcher	X	M1
Family Recurvirostridae (Stilts and Avocets)			
<i>Himantopus mexicanus</i>	Black-necked Stilt	R	M1
<i>Recurvirostra americana</i>	American Avocet	R	M1
Family Scolopacidae (Sandpipers)			
<i>Tringa melanoleuca</i>	Greater Yellowlegs	U	M,W1,2
<i>Tringa flavipes</i>	Lesser Yellowlegs	R	M1,2
<i>Tringa solitaria</i>	Solitary Sandpiper	X	M1,2
<i>Catoptrophorus semipalmatus</i>	Willet	C	M,W1
<i>Heteroscelus incanus</i>	Wandering Tattler	R	M,W1
<i>Actitis macularia</i>	Spotted Sandpiper	U,R	M,W,S(*)1

## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>	<u>Season</u>	<u>Habitat</u>
Order Charadriiformes (cont.)				
Family Scolopacidae (cont.)				
<i>Numenius phaeopus</i>	Whimbrel	U		M,W1
<i>Numenius americanus</i>	Long-billed Curlew	R		M,W1
<i>Limosa fedoa</i>	Marbled Godwit	C		M,W1
<i>Arenaria interpres</i>	Ruddy Turnstone	U		M,W1
<i>Arenaria melanocephala</i>	Black Turnstone	U		M,W1
<i>Aphriza virgata</i>	Surfbird	R		M1
<i>Calidris canutus</i>	Red Knot	X		M1
<i>Calidris alba</i>	Sanderling	C		M,W1
<i>Calidris pusilla</i>	Semipalmated Sandpiper	X		M1
<i>Calidris mauri</i>	Western Sandpiper	C		M,W1
<i>Calidris minutilla</i>	Least Sandpiper	C		M,W1,2
<i>Calidris bairdii</i>	Baird's Sandpiper	X		M1
<i>Calidris melanotos</i>	Pectoral Sandpiper	X		M1,2
<i>Calidris alpina</i>	Dunlin	U		M,W1
<i>Limnodromus griseus</i>	Short-billed Dowitcher	U		M1
<i>Limnodromus</i>				
<i>scolopaceus</i>	Long-billed Dowitcher	U		M,W1,2
<i>Gallinago gallinago</i>	Common Snipe	U		M,W1,2
<i>Phalaropus tricolor</i>	Wilson's Phalarope	R		M,W1
<i>Phalaropus lobatus</i>	Red-necked Phalarope	R		M1
<i>Phalaropus fulicaria</i>	Red Phalarope	X		M,W1
Family Laridae (Gulls and Terns)				
<i>Larus philadelphia</i>	Bonaparte's Gull	U		M,W1
<i>Larus heermanni</i>	Heermann's Gull	C		M,W1
<i>Larus canus</i>	Mew Gull	C		M,W1
<i>Larus delawarensis</i>	Ring-billed Gull	C		M,W1
<i>Larus californicus</i>	California Gull	C		M,W1
<i>Larus argentatus</i>	Herring Gull	R		M,W1
<i>Larus thayeri</i>	Thayer's Gull	R		M,W1
<i>Larus occidentalis</i>	Western Gull	C		R1
<i>Larus glaucescens</i>	Glaucous-winged Gull	U		M,W1
<i>Larus hyperboreus</i>	Glaucous Gull	X		W1
<i>Rissa tridactyla</i>	Black-legged Kittiwake	X		M,W1
<i>Sterna caspia</i>	Caspian Tern	U		M,W1
<i>Sterna maxima</i>	Royal Tern	U		M,W1
<i>Sterna elegans</i>	Elegant Tern	C		M1
<i>Sterna hirundo</i>	Common Tern	R		M1
<i>Sterna forsteri</i>	Forster's Tern	U		M,W1

## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>	<u>Season</u>	<u>Habitat</u>
Order Charadriiformes (cont.)				
Family Laridae (cont.)				
<i>Sterna antillarum</i>	Least Tern	U		S,M1
<i>Chlidonias niger</i>	Black Tern		X	M1
Order Columbiformes				
Family Columbidae (Pigeons and Doves)				
<i>Columba fasciata</i>	Band-tailed Pigeon		R	M,W2
<i>Zenaidura macroura</i>	Mourning Dove		C	R(*)2,3,4
Order Strigiformes				
Family Tytonidae (Owls)				
<i>Tyto alba</i>	Barn Owl		?	R1,3,4
Family Strigidae (Owls)				
<i>Bubo virginianus</i>	Great Horned Owl		?	R(*)3,4
<i>Athene cunicularia</i>	Burrowing Owl		X	M,W3,4
<i>Asio flammeus</i>	Short-eared Owl		X	M,W1,3
Order Caprimulgiformes				
Family Caprimulgidae (Nightjars)				
<i>Chordeiles acutipennis</i>	Lesser Nighthawk		X	M3
Order Apodiformes				
Family Apodidae (Swifts)				
<i>Chaetura vauxi</i>	Vaux's Swift		U	M1,3
<i>Aeronautes saxatalis</i>	White-throated Swift		U	M3
Family Trochilidae (Hummingbirds)				
<i>Archilochus alexandri</i>	Black-chinned Hummingbird		U	M2,4
<i>Calypte anna</i>	Anna's Hummingbird		C	R(*)2,3,4
<i>Calypte costae</i>	Costa's Hummingbird		R	M2, ,3,4
<i>Selasphorus rufus</i>	Rufous Hummingbird		R	M2,3,4
<i>Selasphorus sasin</i>	Allen's Hummingbird		U	S(*)2,3,4
Order Coraciiformes				
Family Alcedinidae (Kingfishers)				
<i>Ceryle alcyon</i>	Belted Kingfisher		U	M,W1,2

## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>	<u>Season</u>	<u>Habitat</u>
Order Piciformes				
Family Picidae	(Woodpeckers)			
<i>Sphyrapicus varius</i>	Red-breasted Sapsucker	R		M, W2,4
<i>Picoides nuttallii</i>	Nuttall's Woodpecker	R		R2,4
<i>Picoides pubescens</i>	Downy Woodpecker	U		R(*)2,4
<i>Colaptes auratus</i>	Northern Flicker	U		M, W2,3,4
Order Passeriformes				
Family Tyrannidae	(Tyrant Flycatchers)			
<i>Contopus borealis</i>	Olive-sided Flycatcher	R		M2
<i>Contopus sordidulus</i>	Western Wood-Pewee	U		M2,4
<i>Empidonax traillii</i>	Willow Flycatcher	R		M2
<i>Empidonax hammondi</i>	Hammond's Flycatcher	R		M2
<i>Empidonax difficilis</i>	Pacific-slope Flycatcher	U		M2,4
<i>Sayornis nigricans</i>	Black Phoebe	U		R(*)2,4
<i>Sayornis saya</i>	Say's Phoebe	U		M, W3,4
<i>Myiarchus cinerascens</i>	Ash-throated Flycatcher	U		M2,3,4
<i>Tyrannus melancholicus</i>	Tropical Kingbird	X		M2,4
<i>Tyrannus coviferans</i>	Cassin's Kingbird	R		M3,4
<i>Tyrannus verticalis</i>	Western Kingbird	U		M3,4
Family Alaudidae	(Larks)			
<i>Eremophila alpestris</i>	Horned Lark	R		M3,4
Family Hirundinidae	(Swallows)			
<i>Tachycineta bicolor</i>	Tree Swallow	U,R		M,S1,2,3,4
<i>Tachycineta thalassina</i>	Violet-green Swallow	U		M1,2,3,4
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	C		S(*)1,2
<i>Riparia riparia</i>	Bank Swallow	X		M1,2
<i>Hirundo pyrrhonota</i>	Cliff Swallow	C		S(*)1,2,3,4
<i>Hirundo rustica</i>	Barn Swallow	U		M1,2
<i>Progne subis</i>	Purple Martin	X		M1,2
Family Corvidae	(Crows and Jays)			
<i>Aphelocoma coerulescens</i>	Scrub Jay	U		R(*)2,3,4
<i>Corvus brachyrhynchos</i>	American Crow	C		R(*)2,3,4
<i>Corvus corax</i>	Common Raven	U		R(*)2,3,4
Family Paridae	(Titmice and Chickadees)			
<i>Parus inornatus</i>	Plain Titmouse	?		? 2,3,4
Family Aegithalidae	(Bushtit)			
<i>Psaltiriparus minimus</i>	Bushtit	C		R(*)2,3,4

## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>	<u>Season</u>	<u>Habitat</u>
Order Passeriformes (cont.)				
Family Sittidae	(Nuthatches)			
<i>Sitta canadensis</i>	Red-breasted Nuthatch	R	M, W2, 4	
Family Certhiidae	(Creepers)			
<i>Certhia americana</i>	Brown Creeper	R		M, W2, 4
Family Troglodytidae	(Wrens)			
<i>Salpinctes obsoletus</i>	Rock Wren	X		M3, 4
<i>Thryomanes bewickii</i>	Bewick's Wren	C		R(*)2, 3, 4
<i>Troglodytes aedon</i>	House Wren	U		M2, 4
<i>Troglodytes troglodytes</i>	Winter Wren	X		M, W2
<i>Cistothorus palustris</i>	Marsh Wren	U		M, W2
Family Muscicapidae	(Thrushes)			
<i>Regulus satrapa</i>	Golden-crowned Kinglet	R		M, W2, 4
<i>Regulus calendula</i>	Ruby-crowned Kinglet	C		M, W2, 4
<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher	U		M, W2, 3, 4
<i>Catharus ustulatus</i>	Swainson's Thrush	R		M2
<i>Catharus guttatus</i>	Hermit Thrush	U		M, W2, 4
<i>Turdus migratorius</i>	American Robin	R		M, W2, 4
<i>Ixoreus naevius</i>	Varied Thrush	X		M, W2
<i>Chamaea fasciata</i>	Wrentit	C		R(*)2, 3, 4
Family Mimidae	(Mimic Thrushes)			
<i>Mimus polyglottos</i>	Northern Mockingbird	C		R(*)2, 3, 4
<i>Toxostoma redivivum</i>	California Thrasher	C		R(*)2, 3, 4
Family Motacillidae	(Pipits and Wagtails)			
<i>Anthus spinoletta</i>	American Pipit	C		M, W1, 2, 3, 4
Family Bombycillidae	(Waxwings)			
<i>Bombycilla cedrorum</i>	Cedar Waxwing	U		M, W2, 4
Family Laniidae	(Shrikes)			
<i>Lanius ludovicianus</i>	Loggerhead Shrike	U		M, W2, 3, 4
Family Vireonidae	(Vireos)			
<i>Vireo belli</i>	Bell's Vireo	X		S2
<i>Vireo solitarius</i>	Solitary Vireo	R		M2, 4
<i>Vireo huttoni</i>	Hutton's Vireo	U		R(*)2
<i>Vireo gilvus</i>	Warbling Vireo	U		M2
Family Emberizidae	(Warblers, Sparrows, Blackbirds and Orioles)			
<i>Vermivora celata</i>	Orange-crowned Warbler	U		M, W2, 3, 4
<i>Vermivora ruficapilla</i>	Nashville Warbler	R		M2, 3, 4
<i>Dendroica petechia</i>	Yellow Warbler	U		S(*)2
<i>Dendroica coronata</i>	Yellow-rumped Warbler	C		M, W2, 3, 4
<i>Dendroica nigrescens</i>	Black-throated Gray Warbler	R		M2, 4

## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance Season</u>	<u>Habitat</u>
Order Passeriformes (cont.)			
Family Emberizidae (cont.)			
<i>Dendroica townsendi</i>	Townsend's Warbler	U	M2,4
<i>Dendroica occidentalis</i>	Hermit Warbler	R	M2,4
<i>Dendroica striata</i>	Blackpoll Warbler	X	M2,4
<i>Dendroica castanea</i>	Bay-breasted Warbler	X	M2,4
<i>Mniotilta varia</i>	Black-and-white Warbler	X	M2,4
<i>Setophaga ruticilla</i>	American Redstart	X	M2
<i>Seiurus noveboracensis</i>	Northern Waterthrush	X	M, W2
<i>Opornis tolmiei</i>	MacGillivray's Warbler	R	M2
<i>Geothlypis trichas</i>	Common Yellowthroat	C	M, W2
<i>Wilsonia pusilla</i>	Wilson's Warbler	U	M2
<i>Icteria virens</i>	Yellow-breasted Chat	U	S(*)2
<i>Piranga rubra</i>	Summer Tanager	X	M2,4
<i>Piranga ludoviciana</i>	Western Tanager	U	M2,4
<i>Pheucticus</i>			
<i>melanocephalus</i>	Black-headed Grosbeak	C	S(*)2
<i>Passerina amoena</i>	Lazuli Bunting	R	M2,3,4
<i>Pipilo</i>			
<i>erythrophthalmus</i>	Rufous-sided Towhee	C	R(*)2,3,4
<i>Pipilo crissalus</i>	California Towhee	C	R(*)2,3,4
<i>Spizella passerina</i>	Chipping Sparrow	R	M3,4
<i>Chondestes grammacus</i>	Lark Sparrow	R	M3,4
<i>Passerculus</i>			
<i>sandwichensis</i>	Savannah Sparrow	U	M, W2,3,4
<i>Passerella iliaca</i>	Fox Sparrow	R	M, W2
<i>Melospiza melodia</i>	Song Sparrow	C	R(*)2,3,4
<i>Melospiza lincolnii</i>	Lincoln's Sparrow	U	M, W2,4
<i>Melospiza georgiana</i>	Swamp Sparrow	X	W2
<i>Zonotrichia albicollis</i>	White-throated Sparrow	X	W2,4
<i>Zonotrichia atricapilla</i>	Golden-crowned Sparrow	C	M, W2,3,4
<i>Zonotrichia leucophrys</i>	White-crowned Sparrow	C	M, W2,3,4
<i>Junco hyemalis</i>	Dark-eyed Junco	U	M, W4
<i>Dolichonyx oryzivorus</i>	Bobolink	X	M2,3
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	U	R(*)2,3,4
<i>Agelaius tricolor</i>	Tricolored Blackbird	R	M, W2,3,4
<i>Sturnella neglecta</i>	Western Meadowlark	C	M, W3,4
<i>Xanthocephalus</i>			
<i>xanthocephalus</i>	Yellow-headed Blackbird	R	M2,4



## BIRDS, continued.

## NATIVE SPECIES, continued.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance Season</u>	<u>Habitat</u>
Order Passeriformes (cont.)			
Family Emberizidae (cont.)			
<i>Euphagus</i>			
<i>cyanocephalus</i>	Brewer's Blackbird	C	R(*)2,3,4
<i>Molothrus ater</i>	Brown-headed Cowbird	C	R(*)2,3,4
<i>Icterus cucullatus</i>	Hooded Oriole	R	M2,4
<i>Icterus galbula</i>	Northern Oriole	U	M2,4
Family Fringillidae (Finches)			
<i>Carpodacus purpureus</i>	Purple Finch	U	M, W2,4
<i>Carpodacus mexicanus</i>	House Finch	C	R(*)2,3,4
<i>Carduelis pinus</i>	Pine Siskin	R	M, W2,4
<i>Carduelis psaltria</i>	Lesser Goldfinch	U	R(*)2,3,4
<i>Carduelis tristis</i>	American Goldfinch	U	R(*)2,3,4

## INTRODUCED BIRD SPECIES

Order Columbiformes			
Family Columbidae (Pigeons and Doves)			
<i>Columba livia</i>	Rock Dove	C	R(*)3,4
<i>Streptopelia chinensis</i>	Spotted Dove	R	R2,3,4
Order Passeriformes			
Family Sturnidae (Starlings)			
<i>Sturnus vulgaris</i>	European Starling	C	R(*)2,3,4
Family Passeridae (Weavers)			
<i>Passer domesticus</i>	House Sparrow	U	R(*)4

## MAMMALS

## NATIVE MAMMAL SPECIES

<u>Scientific Name</u>	<u>Common Name</u>	<u>Habitat</u>
Order Didelphimorphia		
Didelphidae		
<i>Didelphis virginianus</i>	Virginia Opossum	1,2,3,4
Order Insectivora		
Soricidae		
<i>Scapanus latimanus</i>	Broad-footed Mole	1,2,3,4
Order Lagomorpha		
Leporidae		
<i>Sylvilagus bachmani</i>	Brush Rabbit	1,2,3,4
Order Rodentia		
Sciuridae		
<i>Spermophilus beecheyi</i>	California Ground Squirrel	2,3,4
Geomyidae		
<i>Thomomys bottae</i>	Botta's Pocket Gopher	1,2,3,4
Cricetidae		
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	1,2,3,4
<i>Peromyscus californicus</i>	California Mouse	1,2,3,4
<i>Peromyscus maniculatus</i>	Deer Mouse	1,2,3,4
<i>Neotoma fuscipes</i>	Dusky-footed Woodrat	1,2,3,4
<i>Microtus californicus</i>	California Vole	1,2,3
Order Carnivora		
Canidae		
<i>Canis latrans</i>	Coyote	1,2,3,4
<i>Urocyon cinereoargenteus</i>	Common Gray Fox	1,2,3,4
Procyonidae		
<i>Procyon lotor</i>	Common Raccoon	1,2,3,4
Mustelidae		
<i>Mephitis mephitis</i>	Striped Skunk	1,2,3,4
Felidae		
<i>Felis rufus</i>	Bobcat	1,2,3,4

**MAMMALS, continued.****INTRODUCED MAMMAL SPECIES**

<u>Scientific Name</u>	<u>Common Name</u>	<u>Habitat</u>
Order Rodentia		
Muridae		
<i>Mus musculus</i>	House Mouse	1,2,3,4
<i>Rattus rattus</i>	Black Rat	2,4
Order Carnivora		
Canidae		
<i>Canis familiaris</i>	Feral Dog	1,2,3,4
Felidae		
<i>Felis catus</i>	Feral Cat	1,2,3,4

# APPENDIX C

## APPENDIX C

### OCCURRENCE OF SENSITIVE VERTEBRATE SPECIES ON THE PROJECT SITE

Nineteen taxa listed as sensitive by the CDFG (1991) and/or USFWS (1991) utilize the project site on a temporary or permanent basis:

#### FISHES

##### **Steelhead Trout (*Oncorhynchus mykiss*)**

**STATE/FEDERAL STATUS: CSS/NONE**

Steelhead trout are an anadromous form of rainbow trout, spending a portion of their life cycle in the ocean and spawning in freshwater. This is a winter-run form. During the winter period when freshwater outflows in the river are sufficiently high to maintain an open channel at the river mouth and permit upstream passage, mature adults ascend the river to spawn. Steelhead are most common in the Ventura River from December to May, although adults have been seen between the Main Street bridge and Foster Park in late June (Schultz, 1990) and August (Hunt, 1991). After spawning, most of the adults return to the ocean. Hatchling steelhead emerge from the spawning gravels in late spring after an incubation period of 3-4 weeks. Juvenile steelhead typically spend 1 year in the river, although some may remain for up to 3 years. They migrate back to the ocean during periods of high flow in winter and spring, where they remain for 1-2 years. They return to their home stream to spawn and may spawn one to two times during their adult lifespan (Moore, 1980; Reiser and Bjornn, 1979).

Steelhead, once abundantly distributed from Baja California to Alaska, are now rarely found south of Ventura County. They utilized nearly all accessible California coastal streams. Water diversion, channelization and other water development practices have virtually eliminated steelhead runs from coastal streams south of San Luis Obispo County. The Ventura River is believed to be one of the southern most streams in California currently supporting a steelhead run in most years (Moore, 1980).

The major tributaries of the Ventura River formerly were accessible to migrating steelhead and served as the principal spawning and rearing habitat in the river system (e.g., Matilija, San Antonio and Coyote Creeks). Historical estimates of steelhead densities annually entering Matilija Creek varied between 2,000 and 6,000 individuals (Moore, 1980; Capelli, 1991). Prior to the construction of Matilija Dam in 1948, Matilija Creek was the primary spawning tributary. Reports by Moore (1980) and City of San Buenaventura (1984-1990) characterize the stretch of river between the confluence of San Antonio Creek and Foster Park as the most important steelhead spawning and rearing habitat in the Ventura River. The Ventura River below San Antonio Creek formerly (and may still) supported a heterogeneous adult salmonid population consisting of migratory steelhead and resident rainbow trout (Tippets, 1979; Moore, 1980).

There are a number of barriers to successful upstream migration of steelhead, including: a) the annual formation of a sandbar across the mouth of the Ventura River, effectively isolating the estuary from the ocean. This sandbar is formed by the natural longshore current of sediment transport and maintained for most of the year by low flows which fail to breach the bar; b) water diversion activities, resulting in lack of mid-range outflows necessary for fish movement and; c) the nature of the lower Ventura River floodplain. The second and third factors work in combination to the detriment of this species. Several reaches of the lower Ventura River have no well-defined channel. At these locations (0.5-1.5 miles north of the estuary), the active channel is very shallow and meandering, creating freshwater marsh habitat. Higher sustained river flows would probably allow the river to maintain a deeper, primary channel throughout its length. Moore (1980) states that natural fluctuations in water levels are a significant determinant of survival and growth rates of juvenile steelhead.

Swift, et al., (1991) considers coastal lagoons to be important nursery grounds for this species. Studies conducted on the brackish estuary at the mouth of San Luis Obispo Creek also indicates that these water sources are important rearing habitat for juvenile steelhead. Freshwater inflows, especially during the dry season when sandbars isolate these lagoons from the ocean, are critically important in maintaining suitable water quality for this species. Inflow not only determines the depth of the lagoon and the areas flooded, but the pattern of salinity and temperature stratification. Decreased inflow promotes the formation and maintenance of a bottom layer of saltwater. In shallow lagoons, the layering tends to produce a solar collector effect, allowing temperatures in the bottom layers to reduce steelhead growth rates and prey densities. Freshwater inflow prevents thermal and solute stratification of the water column and is crucial to successful juvenile steelhead rearing (Smith, 1989).

#### **Arroyo Chub (*Gila orcutti*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This fish was native to the Los Angeles, San Gabriel, San Luis Rey, Santa Ana and Santa Margarita Rivers and Malibu and San Juan Creeks. It has been successfully introduced far outside its native range, often with trout plants, into the Santa Clara, Ventura, Santa Ynez, Santa Maria, Cuyama and Mohave River drainages and Malibu, Arroyo Grande and Chorro Creeks (Swift, et. al., (1991). They are now absent from much of their native range and are abundant only in the West Fork of the San Gabriel River (Moyle, et. al., 1989). It appears to prefer low gradient streams, concentrating in pools and backwaters.

Populations have been observed within one mile upstream of the Main Street bridge (Hunt, pers. obs., 1991). It is listed as abundant in the Ventura River in City of San Buenaventura reports (1984-1990). This species is currently considered reduced enough to deserve close monitoring to maintain or improve the status of populations (Swift, et. al., 1991).

#### **Tidewater Goby (*Eucyclogobius newberryi*)**

**STATE/FEDERAL STATUS: CSC/CATEGORY 2**

A California endemic, this fish is discontinuously distributed in euryhaline lagoons and lower stream reaches from Aqua Hedionda Lagoon, San Diego County north to the mouth of the Smith River, Del Norte County (Moyle, et. al., 1989). It is unique among Pacific Coast gobies in its ability

to complete its entire life cycle in fresh or brackish water. Salinities are typically less than 10 o/oo, but up to 40 o/oo. Low vagility, restricted habitat and short life span make populations vulnerable to elimination by human activities (Swift, et al., 1989). Coastal and upstream habitat modification and water diversion projects have seriously diminished habitat availability and quality in most lagoons still capable of supporting populations of this species. Viable populations existed at only 43 localities in 1990. Since 1900 this species has disappeared from 74% of the coastal lagoons south of Morro Bay. Less than 20 populations remain between Point Conception and the Mexican border (Swift, et al., 1989; Moyle, et. al., 1989). Non-native fish may be significant predators on this species. Swift, et. al., (1975) report that Green Sunfish (*Lepomis cyanellus*), Bluegill Sunfish (*L. macrochirus*), Largemouth Bass (*Micropterus salmoides*) and catfish (*Ictalurus* spp.) are known to prey upon the Tidewater Goby. All of these introduced predators have been reported from the lower Ventura River and must be assumed to represent a threat to the continued viability of this species in freshwater reaches of the river.

This is primarily an annual species. Observations from Orange County indicate that breeding occurs from late April to early May, with year-round breeding occurring if water temperature and inflows are sufficiently high. This species prefers the shallower, slow-moving or still, not stagnant upper portions of lagoons and estuaries with a fairly high oxygen content. These water sources must be supported by constant freshwater inflow, have little or no channelization, possess minimal or no tidal influence for a large part of the year, have fresh, unconsolidated sand and mud (transported from upstream) for reproductive burrows (Swift, et al., 1989). The Ventura River estuary supports one of the largest populations of this species in southern California because of its unique combination of physical and habitat features. Freshwater inflows are critical to the survival of this species for the same reasons discussed in the Steelhead Trout species account.

## AMPHIBIANS

No sensitive species of amphibians are known to occur on the study site.

## REPTILES

### Southwestern Pond Turtle (*Clemmys marmorata pallida*)

STATE/FEDERAL STATUS: CSC/CATEGORY 2

Formerly abundant in most freshwater and brackish watercourses from central California to Baja California, habitat alteration, collecting and the introduction of non-native predators (fish and bullfrogs) has severely fragmented the range of this turtle and reduced or eliminated recruitment in most extant populations (Holland, 1991). The Ventura and Santa Clara Rivers are among the southernmost coastal drainages harboring viable populations of turtles.

Although turtles were not been sighted within the project area, small numbers of individuals can be found between the Main Street bridge and Foster Park. Approximately 20-40 individuals occur within the Southern Pacific Milling Company lease site upstream from the Main Street bridge (Hunt, 1990). Although this species prefers freshwater habitats, Holland (1991) lists several reports describing the occurrence of turtles in brackish and even sea water. The Santa Barbara Museum of Natural History contains a specimen (No. 422), found "heavily oiled" on the beach east of the Ventura River on 5 March 1978. Permanent utilization of the project area by this species is unlikely due to the brackish nature of the estuary however, this area may represent temporary habitat for this species. Portions of the river upstream from the estuary to the Main Street bridge are expected to be used more frequently due to their freshwater nature. They have been sighted previously in this area (Ferren, et al., 1990).

**Silvery Legless Lizard (*Anniella pulchra pulchra*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This fossorial lizard occurs in a variety of habitats but is quite specific in its microhabitat requirements. It is usually found beneath the leaf litter of shrubs or trees. Because of its highly specialized morphology, it requires loose soils with a relatively high sand content in which to burrow. It is generally absent from soils possessing a significant clay or silt component and from soils that experience any degree of saturation, have a high water table or are subject to frequent disturbance (such as flooding). Ferren, et al., (1990) identified six soil types across the project site. These are: riverwash, tidal flats, coastal beaches, Camarillo loams and sandy loams and sandy alluvial land. Only the coastal beach soil type within the project site is capable of supporting legless lizards. It is discontinuously distributed along the coast wherever dune habitat persists (e.g., Pitas Point, Ventura River, Oxnard dunes). Habitat for this species was formerly much more extensive in the area. Beach erosion west of the Ventura River in the project site has eliminated considerable dune strand habitat. East of the Ventura River, residential, commercial and recreational development of the beaches and dunes has eliminated this species from the area. The remaining dune habitat represents the best chance for survival of this species if they are still found there. Four individuals of this species were collected 250 meters west of the mouth of the Ventura River in 1979 (UC-Santa Barbara Vertebrate Museum Nos. 8446-8449). Searches in April and May, 1992 failed to locate this species in this habitat however, it may be present in low numbers at this site. Unrestricted human access to the dunes is likely to extirpate this species from these dunes. In addition to Trampling of vegetation leads to destabilization of the sand substrate which increases aeolian transport of the sand and decreases dune elevation. This makes the dunes subject to washover during exceptionally high tides or storm events. Analogous situations have occurred in the dunes west of the Devereux estuary in Santa Barbara County and in dunes south of the Rio Santo Domingo in Baja California Norte, resulting in the apparent elimination of *Anniella* from these coastal localities.



## BIRDS

### **California Brown Pelican (*Pelecanus occidentalis californicus*)**

**STATE/FEDERAL STATUS: SE/FT**

Numbers of this species in the Southern California Bight have shown major declines that were the impetus for endangered classification. The Northern Anchovy (*Engraulis mordax*) comprises over 90% of the diet of the Brown Pelican, but has suffered serious population reductions due to overfishing (State of California, 1991). Small numbers can be seen occasionally roosting at the lagoon mouth, primarily during the summer. These birds feed offshore. Peak counts at the lagoon between 1978 and 1980 were 20 individuals (Richard Webster, pers. comm.). Only 1 and 3 individuals were seen at the lagoon during the 1991 censuses, on 11 and 17 August respectively and only one individual was seen during the 25 February 1992 survey. Human and non-human disturbance of post-breeding roosts along the central and southern California coast is a threat. Locally, such disturbance often results in these birds being forced to move elsewhere, such as to the nearby Ventura Harbor and Santa Clara River estuary, where large numbers congregate.

### **White-faced Ibis (*Plegadis chihi*)**

**STATE/FEDERAL STATUS: CSC/ CATEGORY 2**

This regionally declining species is now a rare migrant and winter visitor, with the only regular wintering site along the southern California coast being the gun clubs at Point Mugu. The only known sighting in the past ten years at the Ventura River mouth is of one bird on 23 September 1989 (Mark Capelli, pers. comm.).

### **Osprey (*Pandion haliaetus*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This fish-eating raptor is a rare migrant and winter visitor and very rare summer visitor to coastal southern California. Several individuals per year are seen in coastal Ventura County, and a very small number winters regularly at large inland lakes such as Lake Casitas and Lake Piru. Recent sightings in the Ventura River study area include 3 May 1978 (R. Webster, pers. comm.) and one adult fishing in the lagoon 13 May 1989 (Mark Capelli, pers. comm.).

### **Black-shouldered Kite (*Elanus caeruleus*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This regionally declining species is much rarer now than it was during its peak-population years in the mid-1970's. Through the early 1980's it was seen regularly on or adjoining the study area, particularly in upland areas. The loss of open space to the northwest of the study area by the construction of the Ventura River RV Resort may have played a factor in the decline of the kite at this site. It should be noted however, that kites have declined in most areas even where the habitat appears

to have been unaltered. No Black-shouldered Kites were seen in the study area during the 1991 surveys.

**Cooper's Hawk (*Accipiter cooperii*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This hawk is a regionally declining breeding species that nests in riparian and oak woodland. It is a rare breeder in Ventura County, but is still uncommon as a migrant and winter visitor. No Cooper's Hawks were found on-site during the nesting season in 1991, and there is no evidence that this species nested here at all during the past decade. Nesting likely takes place farther upstream beginning in the Canada Largo area.

**Peregrine Falcon (*Falco peregrinus*)**

**STATE/FEDERAL STATUS: SE/FE**

The number of sightings of this endangered raptor has increased during the past ten years partially as a result of a program in which individuals have been 'hacked' into the wild, often at former nest sites. One or two individuals have been seen on a fairly regular basis at the nearby Santa Clara River estuary for the past several years, and what is assumed to be one of these same individuals has been seen at the Ventura River estuary on at least one or two occasions (dates uncertain). At least one of these birds was believed to be commuting between Anacapa Island and the mainland coast. The waterfowl and shorebirds present at the Ventura River estuary are likely attractive to foraging Peregrine Falcons.

**Western Snowy Plover (*Charadrius alexandrinus nivosus*)**

**STATE/FEDERAL STATUS: CSC/CATEGORY 2**

This species has declined greatly as a breeder along California beaches since the 1930's and 1940's, undoubtedly the result of human disturbance. In fall and winter, numbers are augmented by migrants from the north. A small number continues to nest in the vicinity of the Santa Clara River estuary at McGrath State Beach. No Snowy Plovers are known to breed in the Ventura River study area, however, what are assumed to be post-breeding birds from McGrath are seen at the Ventura River estuary at least in the late summer. Two individuals were sighted at the river mouth between 15 August and 4 November 1978 (R. Webster, pers. comm.). Up to 5 individuals were there during August 1991. These birds frequented the upper sections of the sandy beach near the lagoon mouth and the drier mud-flats in the lagoon itself. The most serious threat to Snowy Plovers is human disturbance, particularly during the breeding season. This type of disturbance usually takes the form of people and motor vehicles moving through nesting and roosting areas in the sand and pets, particularly dogs. The loss of much sand from the beaches in the study area during the winter months results in poor habitat for this species at that season.

**California Least Tern (*Sterna antillarum browni*)**  
**STATE/FEDERAL STATUS: SE/FE**

The only colonies remaining between Los Angeles and Point Conception are found in Ventura County (McGrath State Beach and possibly at Point Mugu and Ormond Beach). Population declines in the state are largely the result of the same human factors listed above for the Snowy Plover. Three adults were sighted in the lagoon area on 15 August 1978 (R. Webster, pers. comm.). During the late summer in both 1990 and 1991, moderate numbers of post-breeding adult and juvenile Least Terns were found daily at the Ventura River mouth. In 1990, 15-20 individuals were present on 22 August (Mark Capelli, pers. comm.). Approximately 20 individuals present that month suffered several forms of human harassment, including bike riding, stone throwing and kite flying (Los Angeles Times: 29 August 1990, p. B3). Throughout most of August, 1991, as many as 16 individuals were present. These birds utilize the lagoon waters for fishing and drinking and the mudflats (when exposed) and adjacent beach for roosting. The nearshore ocean waters are also utilized for foraging. Many of the adults were still feeding their fledged young at this site in late December 1991. It is not whether these family groups are all Ventura County breeders or whether some of them are from colonies farther south in Orange or Los Angeles Counties or from farther north in northern Santa Barbara County. The winter range of this species is unknown, being somewhere in Latin American coastal habitats (State of California, 1991).

**Tree Swallow (*Tachycineta bicolor*)**  
**STATE/FEDERAL STATUS: NONE**

This regionally declining breeder is now known to nest in Ventura County only at the Ventura Sewage Treatment Facility adjoining the Santa Clara River estuary (several pairs only). Probable reasons for the decline are the loss of much riparian and wetland habitat used for nesting and foraging. This species still occurs fairly commonly as a migrant, and a small number regularly winters at the gun clubs at Point Mugu. In the Ventura River study area, 2 individuals were seen on 19 May 1991 (late for migrants) at appropriate breeding habitat—dead snags with holes in large willows—near the west side of the main railroad bridge. These birds were not seen on subsequent surveys.

**Least Bell's Vireo (*Vireo belli pusillus*)**  
**STATE/FEDERAL STATUS: SE/FE**

This species is a summer resident of riparian (primarily willow-cottonwood) woodland. It formerly bred from interior northern California (Red Bluff, Tehama County) south through the Sacramento and San Joaquin Valleys and Sierra Nevada foothills and in the coast ranges from Santa Clara County south to approximately San Fernando in Baja California Norte, Mexico and in scattered desert oases. The known breeding range is now restricted to two intermittent localities in the Salinas River Valley of Monterey and San Benito Counties, one local population along the Amargosa River in Inyo County and numerous small populations from southern California (Santa Barbara, Ventura, Riverside and San Diego Counties) into northwestern Baja California Norte (State of California, 1991). Major declines in the populations of this species statewide during the past fifty years have been the result of riparian habitat loss and increase brood-parasitism by the Brown-headed Cowbird (*Molothrus ater*). In Ventura County, very small populations persist along the Santa Clara River east of Saticoy,

east of Santa Paula, east of Fillmore, and east of Piru. The only nesting-season records from along the coast of the county are of one pair that nested in La Jolla Canyon in Point Mugu State Park in 1978 (Webster, Lehman and Bevier, 1980) and of a singing male on territory within the boundaries of the study area along the Ventura River from 1 to 15 May 1981. This bird frequented dense willow riparian approximately 100-200 feet inland from the main railroad bridge. No mate was ever seen.

It is doubtful that the Ventura River study area will support this species on a regular basis. Whereas the thick willow riparian vegetation along the main water channel is appropriate nesting habitat, the coastal location is not in keeping with this species' principal inland distribution. The overall scarcity of the species argues against it being found here regularly, even as a migrant, and no other individuals of this species have ever been recorded here. Attempts to locate Bell's Vireos farther up the Ventura River up to Ojai in 1986, failed to locate any individuals.

**Warbling Vireo (*Vireo gilvus*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This is a regionally declining riparian breeder. Whereas small numbers occur in the study area during migration, none have been found in recent years on-site during the summer.

**Yellow Warbler (*Dendroica petechia brewsteri*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This is a regionally declining riparian breeder. Like the previous species, it is found in the study area during migration, but a small number also remains to breed in willow-cottonwood forest. In 1991, at least two singing birds were found during June.

**Yellow-breasted Chat (*Icteria virens*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This regionally declining breeding species is now very uncommon and local in Ventura County. Probable breeding individuals were sighted in the study area on 27 April, 1 May and 13 July 1979 (R. Webster, pers. comm.). Up to four were found in the Ventura River study area during May and June 1991, all in dense willow forest on the west bank of the Ventura River between the Southern Pacific Railroad and Main Street overcrossings.

**Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*)**

**STATE/FEDERAL STATUS: SE/CATEGORY 2**

This subspecies is a resident of southern California coastal salt marshes from Goleta Slough, Santa Barbara County south to northwestern Baja California Norte, Mexico. None were found on-site during the 1991 censuses. Migrant races from the north were seen during the 6 November 1991 survey, but these birds are relatively common. However, one probable *beldingi* was reported from the second mouth of the Ventura River on 9 August 1976 and five were reported there the preceding

summer (Steven Forsell, letter to Mark Capelli, 10 August 1976). These birds were found in dense pickleweed (*Salicornia*), saltgrass (*Distichlis*) and salt bush (*Atriplex*) vegetation. Whereas this is appropriate habitat for this subspecies, its areal extent at the second mouth and in areas bordering the main lagoon is rather small. Any sparrow population there would have been small and probably unstable. It is likely that this taxon is currently a rare or very rare visitor to the site. Individuals or a pair might occasionally be expected to establish a territory in this area. Populations throughout the range appeared to be stable or increasing according to censuses conducted in the late 1980's. Approximately 2,275 pairs were located range-wide in 1986 (State of California, 1991).

**Tricolored Blackbird (*Agelaius tricolor*)**

**STATE/FEDERAL STATUS: CSC/CATEGORY 2**

Regional declines in numbers of this species have been attributed to the long-term loss of wetland habitat and consecutive years of below-normal rainfall from 1986-1991 in California. Its status in the study area is uncertain. None were seen on-site in 1991. In the past it may have occurred, primarily in fall and winter, in blackbird flocks foraging in the area or roosting at night in stands of *Scirpus* near the Southern Pacific railroad bridge over the Ventura River.

## **MAMMALS**

No sensitive mammal species are known to occur on the project site. See next section on the potential and historical vertebrate occurrence for more information.

**POTENTIALLY OCCURRING AND EXTIRPATED VERTEBRATES  
ON OR ADJACENT TO THE PROJECT SITE**

**FISHES**

**Brown Trout (*Salmo trutta*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This species is native to Europe and the British Isles. It was introduced into the eastern United States in 1883 and is a habitat generalist capable of displacing native Rainbow Trout and other native species from slower stream section where they two co-occur (Moyle, 1976; McGinnis, 1984). It was first introduced in northern California in 1894 and is now present in trout waters throughout the state.

This species was stocked in the Ventura River up to, and including, 1936. In 1946, very few, if any, were present (Shapovalov, 1946) and it has not been observed in the Ventura River since this time.

**Chinook or King Salmon (*Oncorhynchus tshawytscha*)**

**STATE/FEDERAL STATUS: SE/FT**

This winter run species is the most abundant salmon species in California, although it is the least numerous of all Pacific Coast salmon. One reason for its abundance at the southern end of its range (i.e., northern and central California) may be its very short habitation of spawning streams, usually only 3-4 weeks compared to the year residency of Coho Salmon (*O. kisutch*). The freshwater life of the parr is primarily devoted to migrating downstream to the sea and may represent an adaptation to the marked wet and dry season experienced by most watercourses in California (McGinnis, 1984). King Salmon spawn in permanent coastal streams and rivers that have cool, summer flows. The southernmost consistent run today occurs in the Sacramento-San Joaquin River system. Water diversion project and habitat alteration have seriously reduced most populations. Its relatively broad physiological tolerance is probably the reason for its persistence in many disturbed areas (Moyle, 1976). This species was recorded by Jordan, et al., (1881) from the Ventura River however, no specimens have been preserved and no later records have been reported from the Ventura River.

**Bluegill Sunfish (*Lepomis macrochirus*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This species was introduced to California in 1908 from the eastern United States and is now the most abundant centrarchid in the state (Moyle, 1976; McGinnis, 1984). It was first listed as occurring in the Ventura River by Martin and Snider (1973). Subsequent surveys by the City of San

Buenaventura between 1984 and 1990 did not locate this fish (City of San Buenaventura, 1990; 1991). A congener, the Green Sunfish (*L. cyanellus*), is listed as a rare inhabitant of the lower Ventura River.

**Arrow Goby (*Clevelandia ios*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This native species is a tidal mudflat dweller that only occasionally enters low-salinity environments. Martin and Snider (1973) list this species as occurring in the lower Ventura River; specimens have been collected from the Santa Clara River Estuary (Swift, et al., 1991). It has not been reported in subsequent surveys of the Ventura River (City of San Buenaventura, 1990; 1991). If it occurs in the Ventura River, it would be found at the lower (seaward) end of the estuary and adjacent mudflats at the river mouth (Swift, 1991).

**Santa Ana Sucker (*Catostomus santaanae*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This is a native species of southern California. Its original range was in rivers of the Los Angeles Basin (Big Tujunga Creek, Santa Ana, San Gabriel and Los Angeles Rivers). It has been introduced to the Soledad Canyon area of the upper Santa Clara River and appears to be maintaining stable populations at that site. Downstream in the Sespe Creek area hybridization with the introduced Owens Sucker (*C. fumeiventris*) occurs, but is contained to that region (Swift, et. al., 1991; Moyle, 1976). Capelli (1973) reports that this species was observed in the lower reaches of the Ventura River by California Department of Fish and Game personnel, but Swift, et. al., (1991) do not record this species from the Ventura River.

**Jacksmelt (*Atherinopsis californiensis*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This is primarily a saltwater fish and often occurs with Topsmelt (*Atherinops affinis*) in shallow bays, sloughs and estuaries and the lower reaches of coastal streams throughout the Pacific Coast (Moyle, 1976). Capelli (1973) reports that California Department of Fish and Game personnel observed this species in the lower reaches of the Ventura River. It may occur in the estuary at the mouth of the river during the spring to spawn in waters of lowered salinity (Swift, et al., 1991).

## **AMPHIBIANS**

**Black-bellied Slender Salamander (*Batrachoseps nigriventris*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This common salamander has been collected adjacent to the Ventura River and its tributaries several miles upstream from the study area: west bank Ventura River, opposite Casitas Springs (UCSB

(SSS) 18772-74); Ojai (LACM Nos. 32978-84); Meiners Oaks (LACM Nos. 32985-33017); Wheeler Hot Springs (LACM Nos. 10306-07); 1 mi S Casitas Springs (LACM Nos. 10461-65). Each of these localities contains habitat for this species (i.e., oak woodland or mesic scrub habitat). It probably occurs closer to the study area along the Ventura River than these records indicate. Its occurrence on-site is unlikely however, because of the high salt content in most of the soils on-site and because its preferred habitat (riparian and adjacent woodlands) is so limited on the study area. Additionally, this species is a poor colonizer of disturbed environments. The lower Ventura River floodplain is periodically disturbed by flooding during storm events and lacks suitable adjacent habitat such as oak woodland on old stream terraces that would function as refugia for this species.

**Western Toad (*Bufo boreas*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This common, widespread native toad occurs in a variety of coastal and montane habitats throughout California. It may occur in riparian habitats along the Ventura River at the northern edge of the study area and in freshwater wetlands associated with the second river mouth. This species was reported by Martin and Snider (1973) from the lower reaches of the Ventura River during a field survey extending from the mouth of the river to approximately 1 mile north of the Main Street bridge. Large numbers of recently metamorphosed individuals of this species were observed in June and July 1991 in wetland habitats along the Ventura River approximately 1 mi N of the Main Street bridge (Hunt, pers. obs.).

**California Red-legged Frog (*Rana aurora draytoni*)**

**STATE/FEDERAL STATUS: CSC/CATEGORY 2**

This species was formerly found in freshwater habitats throughout the Coast Range and Sierra Nevada foothills of California. Habitat destruction, conversion of streams and other lentic habitats to ponded water and the introduction of non-native predators (e.g., Largemouth Bass (*Micropterus salmoides*) and Bullfrog (*Rana catesbeiana*) to these aquatic environments, has reduced this species to small, fragmented populations. This species was probably formerly present in freshwater habitats in the study area, but no longer occurs here. Museum records document its presence in the Ventura River drainage: 0.5 mi S Matilija Dam (LACM No. 13499). It may still be present in the undisturbed portions of the upper main stem and tributaries of the Ventura River wherever bass and bullfrogs have not been introduced or cannot persist.

**Bullfrog (*Rana catesbeiana*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This introduced ranid is well-established in slow-moving and permanently ponded freshwater upstream from the study area between Main Street bridge and Foster Park: Hunt, 1991; west bank Ventura River, opposite Casitas Springs (UCSB No. 18086); Foster Park (SBNHM Nos. 72-74). It may range downstream as far as freshwater occurs, but would avoid brackish and sea water. A desiccated adult of this species was found in *Scirpus* beds along the east bank of the Ventura River



approximately 350 feet north of the mouth. It is likely that this individual was transported to this spot by a predator or humans.

## REPTILES

### **California Horned Lizard (*Phrynosoma coronatum frontale*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This native coastal subspecies is found in a variety of arid and mesic habitats. Coastal sand dunes and riparian corridors through scrub habitats provide suitable habitat for this species. It has been collected in arid habitats around Ojai (LACM No. 101483) and west of Lake Casitas, Ventura County, as well as coastal dunes west of Devereux Slough, Santa Barbara County (UCSB). These dunes are more extensive than those found on the study area and are contiguous with upland grassland and scrub habitat. Its occurrence in the study area in scrub habitats is unlikely.

### **Western Skink (*Eumeces skiltonianus*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This common, widespread lizard is found in a variety of relatively mesic habitats, such as oak woodland on north-facing slopes. It has been collected from riparian corridors along the Ventura River several miles upstream from the study area: west bank Ventura River, opposite Casitas Springs (UCSB (SSS) No. 18778); 2 mi WNW Ojai (LACM Nos. 14987-90); and the junction of Fairview Road and Hwy 33 in Meiners Oaks (LACM Nos. 27594-97). It may be found in riparian woodland and adjacent scrub habitats on the study area away from the estuary and its associated saline soils.

### **Southern Alligator Lizard (*Elgaria multicarinatus*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This lizard is generally found in mesic habitats in the region. It has been collected in the Ventura River drainage at 4.7 mi SE Ventura bridge on Hwy 150 to Ojai (LACM No. 15470); Rancho Dos Rios at the confluence of San Antonio Creek and Lion Creek (LACM Nos. 114372-74; 121969); 2 air mi S of Ojai (LACM No. 123181) and at Pitas Point (UCSB). It may be found in riparian woodland and adjacent scrub habitats in the study area.

### **Night Snake (*Hypsiglena torquata*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This small, secretive snake is generally locally found in rocky or sandy habitats ranging from arid to mesic. It has been collected from the Ventura River drainage at: Rancho Dos Rios at the confluence of San Antonio and Lion Creeks (LACM No. 75229); Santa Clara River, S of Santa Paula (LACM No. 21547); west of Lake Casitas (UCSB). Its occurrence along the coast was documented

by Don Schroeder in 1975, who reported an individual found, "...in tidal wrack at the back of the beach at the mouth of San Augustine Creek, Hollister Ranch, Santa Barbara County" (Collins, pers. comm.).

**California Whipsnake (*Masticophis lateralis*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This wide-ranging snake is found in a variety of habitats. It is locally most common in more arid, warmer, inland sites, but has been collected in coastal habitats in Santa Barbara, Santa Barbara County and between Rincon Creek and Pitas Point, Ventura County (USCB specimens). It has been collected in the Ventura River drainage west of Lake Casitas and along the North Fork Matilija Creek (Sam Sweet, pers. comm.). If it occurs on-site, it may be found in scrub habitats.

**Common Kingsnake (*Lampropeltis getulus*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This common, widespread species is a habitat generalist. It has been found in the Ventura River floodplain approximately 1.5 miles upstream from the study area (Hunt, 1991, 1992) and has been collected along the west bank of the Ventura River opposite Casitas Springs (UCSB No. 8239) and Oakview, corner Santa Ana Blvd and Santa Ana Road (SBNHM No. 1291). Large snake tracks were commonly seen in palustrine and dune habitats during the 1991 and 1992 field surveys on the study area and may have been made by this species and/or the Gopher Snake (*Pituophis melanoleucus*). The latter species was observed within the study area in *Arundo/Scirpus/Distichlis* habitat on the east bank of the Ventura River in May 1992.

**Two-striped Garter Snake (*Thamnophis hammondi*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This aquatic snake typically occurs in mesic environments, such as permanent freshwater (streams and ponds) with bordering riparian woodland, throughout central and southern California. It can also range well into xeric habitats adjacent to watercourses (Hunt, pers. obs.). Habitat alteration and flood control activities and the prolonged drought of 1986-1991 have reduced populations throughout its range. Additionally, the introduction of non-native predators such as the Largemouth Bass (*Micropterus salmoides*) and the Bullfrog (*Rana catesbeiana*), may have reduced or eliminated populations from many areas. Although not observed in the study area, this species has been collected along the west bank of the Ventura River opposite Casitas Springs (USCB 15708), several miles upstream from the study area. An immature individual was also found in marsh habitat in the active channel of the Ventura River approximately 1.5 miles upstream from the Main Street Bridge in late June 1992 (Hunt, pers. obs.). Suitable habitat for this species occurs along the Ventura River and adjacent riparian corridor in the study area. The area around the second river mouth is habitat for this species.

**Southern Pacific Rattlesnake (*Crotalus viridis helleri*)****STATE/FEDERAL STATUS: NONE/NONE**

This widespread snake is found in a variety of habitats from coastal to montane, but it most common in arid, warm, inland environments. Specimens from coastal localities are known: jct L Ave and 17th St, Point Mugu Naval Air Station (SBNHM No. 1346); Point Mugu NAS (SBNHM No. 143) and Devereux Slough (UCSB). The high rodent densities found throughout the study area would furnish abundant food for this species.

**BIRDS**

With the exception of the following species, almost all of the birds that might be expected to occur on the study area have been observed there. Several species found on-site as residents or migrants are rare and/or regionally declining.

**California Quail (*Callipepla californica*)****STATE/FEDERAL STATUS: NONE/NONE**

This native species occurs in sage scrub, chaparral, riparian woodlands, oak woodlands and savannah and some ruderal habitats. A small resident populations formerly occurred in the ruderal habitat along the Southern Pacific Railroad right-of-way in the vicinity of the second mouth of the Ventura River until the late 1960's when this area was cleared to install an underground oil line. Increased human disturbance resulting from construction of the Emma Wood State Beach-Ventura River Group Camp and the increase in feral cats also probably contributed to the elimination of this population (Capelli, pers. comm.).

**MAMMALS****Southern California Saltmarsh Shrew (*Sorex ornatus salicornicus*)****STATE/FEDERAL STATUS: CSC/CATEGORY 2**

Habitat destruction is the primary cause for this native shrew's decline and the impetus for state and federal listing. Populations of this species found in coastal saltmarshes in southern California were recognized as subspecifically distinct (Von Bloeker, 1932). Based on the collection localities at that time, the original description gives the northern limit of its distribution as the Point Mugu saltmarsh (LACM Nos. 3435 and 8118). This species (subspecies not known to authors) has subsequently been collected at Sandyland Slough (i.e., Carpinteria Saltmarsh) (UCSB No. 1717) and several individuals (subspecies unknown to authors) were caught in can traps during reptile and amphibian surveys in wetland and coastal shrub habitats on More Mesa (Smith, et al., 1982). This species may occur in estuarine and palustrine habitats adjacent to the Ventura River mouth in the study area.

**Trowbridge Shrew (*Sorex trowbridgei*)****STATE/FEDERAL STATUS: NONE/NONE**

This shrew is most commonly found in mesic, upland woodland habitats associated with the coastal ranges of California, Oregon and Washington. One of the southernmost records is skeletal material found in a White-tailed Kite (*Elanus leucurus*) pellet in Hope Ranch, Santa Barbara, Santa Barbara County (Stendall, 1967). It is not likely that this species occurs on the study area. If it does occur in riparian habitats on the study area, this population would be one of the southernmost in its range.

**Grey Shrew (*Notiosorex crawfordi*)****STATE/FEDERAL STATUS: NONE/NONE**

This shrew typically occurs in arid sagebrush and coastal sage scrub habitat. Little is known of the habits of this uncommon species and its habitat affinities may be broader than is currently known. Von Bloeker (1944) describes two individuals found in riparian habitat in August 1941, near the mouth of Rincon Creek, at the junction of the Highway 101 overcrossing, Santa Barbara County (LACM). Two nights of trapping by him on both banks of this stretch of Rincon Creek failed to locate any more specimens. However, he did find another individual the following morning, dead in the shallow water of the creek, having apparently died from a fall from the highway bridge. At the time this represented the northernmost collection locality for this species. He reports the nearest locality to be Timber Canyon, Ventura County (Von Bloeker, 1944). Additional collection localities from Ventura County are from the Santa Clara River drainage: 5 mi NE Santa Paula (LACM); Aliso Canyon, 6 mi NW Santa Paula (LACM); Fillmore (LACM No. 56166); Happy Talk Ranch, Santa Paula (SBNHM No. 1044) and Point Mugu (LACM No. 68692). It is not known what type of habitat from which the latter specimen was collected. Each of these localities possess upland scrub habitat that is not found on or in the immediate vicinity of the study area. Although it is unlikely, this species may be found in riparian or scrub habitat on the study area.

**Western Gray Squirrel (*Sciurus griseus*)****STATE/FEDERAL STATUS: NONE/NONE**

This tree squirrel inhabits woodland habitats throughout the Coast Ranges and Sierra Nevada foothills in California. Locally, old (1906) and recent (1988) museum records include: Matilija (MVZ No 3936); near Ojai (SBMNH Nos. 954-55; LACM No. 85699); Ventura (LACM Nos. 30002-03); Weldon Canyon (LACM No. 30004). Its congener, the Fox Squirrel (*S. niger*), is introduced from the eastern United States and has established localized populations around Ventura and the Santa Clara River Valley (Wolf, 1971). Local museum records for *S. niger* include: Foothill Road, Ventura (SBNHM No. 2220) and DOR Hwy 150, Ojai (SBNHM No. 936). It is likely that *niger* is displacing *griseus* where the two species co-occur. The Gray Squirrel is more likely to occur in riparian and adjacent oak woodlands along the upper Ventura River floodplain. Riparian habitat on the study area lacks sufficient food tree densities (oak and cottonwood) to support this species at this location.

**Pacific Kangaroo Rat (*Dipodomys agilis*)**  
**STATE/FEDERAL STATUS: NONE/NONE**

This native rodent is typically found in coastal sage scrub and other arid, upland habitats. It occurs in coastal dunes on Vandenberg Air Force Base in western Santa Barbara County where these dunes are contiguous with inland scrub habitat (Paul Collins, pers. comm.). It has been collected in the Santa Clara River drainage: Santa Clara River wash, 4 mi E Fillmore (LACM No. 52621); 0.75 mi W Somis (MVZ Nos. 97817-18) and 2 mi N Simi Valley, end on Edinger Road (SBNHM Nos. 2202-03). An old (1906) record is from the Ventura River drainage: Matilija (MVZ Nos. 3960-3978). The occurrence of this species on the study area is unlikely because: 1) the study area contains a limited amount of degraded coastal dune habitat that is isolated from upland habitats by adjacent estuarine and palustrine habitat, and 2) coastal sage scrub habitat does not occur adjacent to the Ventura River floodplain along near the study area. Populations might occur several miles farther upstream the Ventura River drainage where the floodplain is bordered by scrub habitat.

**Brush Mouse (*Peromyscus boylii*)**  
**STATE/FEDERAL STATUS: NONE/NONE**

This common mouse is generally found in chaparral, coastal sage scrub and oak woodland habitats. Local collection records in these habitats include: Matilija (MVZ Nos. 4008-20) and Ventura River floodplain, 5 mi N Ojai (LACM Nos. 46207; 46213-14) and 2 mi W Ventura (MVZ No. 84922). It is not known whether the latter record represents a coastal or upland locality. The California Mouse (*Peromyscus californicus*) was also collected at this locality on the same date (LACM Nos. 85149-50). The Brush Mouse has been collected closer to the coast in dense coastal sage scrub at Point Mugu (Paul Collins, pers. comm.) and in saltmarsh vegetation at the same location (LACM Nos. 38453-55). During small mammal trapping for this study, a *Peromyscus*, tentatively identified as *P. boylii*, was collected in willow/cottonwood woodland/scrub west of the Ventura River and south of Highway 101 on 2 November 1992. If this species occurs on-site, it is present in much lower densities than *P. californicus* and *P. maniculatus*. Trapping by Hunt (1991) along the Ventura River approximately 1-2 miles upstream from the study area in similar habitat, failed to locate *P. boylii*.

**Muskrat (*Ondatra zibethica*)**  
**STATE/FEDERAL STATUS: NONE/NONE**

This introduced aquatic rodent was formerly common on the study area prior to 1985. Individuals and houses were located adjacent to the Ventura River and in wetlands around the second river mouth south of the Southern Pacific Railroad tracks (Capelli, pers. comm.). Martin and Snider (1973) note the occurrence of this species in the lower Ventura River between the river mouth and approximately 1 mile north of the Main Street bridge in 1972. It has not been recorded from the Ventura River drainage since the mid-1980's. This species has also been introduced to the Santa Clara River. Old collection records are from: Fillmore (LACM No. 8415) and 3 mi E Fillmore at fish hatchery (LACM Nos. 28122-24). These records are from 1947 and 1960, respectively. The present status of this species on the Santa Clara River is unknown.

**Eastern Red Fox (*Vulpes vulpes fulva*)****STATE/FEDERAL STATUS: NONE/NONE**

This subspecies has been introduced to California from the eastern United States. It is widely established in several localities in the Central Valley of California. Locally, it is becoming increasingly common in coastal habitats in and around Devereux and Goleta Sloughs in Santa Barbara County (Hunt, 1987), where it may be displacing the native Grey Fox (*Urocyon cinereoargenteus*) where the two species co-occur. This species was reported by Capelli (1973) as occurring in the lower reaches of the Ventura River. Additionally, an individual was collected at Port Hueneme, Ventura County (SBNHM No. 2004) in 1979.

**Ringtail (*Bassariscus astutus*)****STATE/FEDERAL STATUS: NONE/NONE**

This secretive, nocturnal procyonid typically inhabits woodland and adjacent scrub habitats on rocky slopes near a permanent source of freshwater. Locally, it is probably found throughout the Santa Ynez Mountains. Prior to human disturbance, it may have occupied the study area or adjacent habitats. Its present occurrence on the study area is unlikely however, it does occur in the Ventura River drainage several miles upstream: Matilija (MVZ Nos. 3957-58); Hwy 33 at mile post 32.5, near Potrero John (SBNHM No. 2255).

**American Badger (*Taxidea taxus*)****STATE/FEDERAL STATUS: CSC/NONE**

This large, carnivorous mustelid is widely distributed throughout California in arid grassland and scrub habitats. Burrows belonging to this species were observed by Hunt (1991) within the riparian corridor approximately 2 miles upstream from the study area. Two individuals of this species were collected in 1985 at the Casitas Municipal Water District plant at Oakview with, "...6 gophers in stomach..." (SBNHM Nos. 2286-87). Suitable prey items (rodents) are common throughout the study area and it may occasionally utilize the site for foraging.

**Eastern Spotted Skunk (*Spilogale putorius*)****STATE/FEDERAL STATUS: NONE/NONE**

This mustelid typically occurs in woodland or scrub habitats with a sandy substrate. It has been collected from the Ventura River drainage at sites several miles upstream from the study area: Matilija (MVZ Nos. 3953-56). It is not likely to be a resident of the study area however, but it may use the area foraging.

**Long-tailed Weasel (*Mustela frenata*)****STATE/FEDERAL STATUS: NONE/NONE**

This species occurs throughout the Pacific states except the Mojave Desert. Locally, it is found in coastal grassland and scrub habitats. It is infrequently observed in coastal bluff and ruderal habitats on the UC-Santa Barbara campus (Hunt, pers. obs.; Capelli, pers. comm.) and on More Mesa and other locations throughout the Goleta Valley, Santa Barbara County (Smith, et. al., 1982). Old (1906) museum records exist for Ventura (MVZ Nos. 3944-50). Owing to the abundant rodent populations found on the study area, including Botta's Pocket Gopher (*Thomomys bottae*), it is likely that this species is found in the area.

**Mule Deer (*Odocoileus hemionus*)****STATE/FEDERAL STATUS: NONE/NONE**

Small groups and individuals of this species were commonly seen feeding on aquatic emergent and riparian vegetation along the Ventura River approximately 1-2 miles upstream from the study area in 1991 (Hunt, 1991). Sufficient bedding habitat does not exist on the study area to allow permanent or semi-permanent habitation for this species. Human habitation of the riparian corridor may prevent utilization of the study area as a foraging area by inhibiting movement of these animals between the upstream localities and the study area.

**Audubon Cottontail (*Sylvilagus audubonii*)****STATE/FEDERAL STATUS: NONE/NONE**

This rabbit is typically found in arid, upland habitats, which are lacking on the study area. It is relatively common in coastal sage scrub and locally, old (1906) museum records indicate its presence in Ventura (MVZ Nos. 3881-3886). It may still occur in scrub habitats adjacent to the lower Ventura River floodplain.

**BAT DISTRIBUTIONS IN THE STUDY AREA**

The distribution and habits of most species of bats in California are poorly known. The fact that a diverse array of freshwater, marine and upland habitats occur within and around the study area as well as the presence of suitable man-made roosting sites for certain species, may contribute to high bat species diversity in the area. Specialized roost sites, such as vertical rock walls, are found within a few miles of the study area. The study area lacks suitable roost sites for many species but is close enough to roost sites to serve as important foraging habitat for a number of species. Most of the collection records described below are old, dating from 1905-1950. The lack of more recent collection records is probably due to difficulties in observing and collecting these animals as well as regional population declines (Pat Brown, pers. comm.).

The Ventura River and the adjacent riparian corridor probably is the most important foraging habitat for bats on the study area. Lack of suitable roost sites may be an important factor limiting permanent or semi-permanent habitation of the study area for several species of bats. Both of the iron

truss Southern Pacific Railroad bridges lack suitable bat roost sites (lack of narrow vertical crevices that are closed at one end). The Highway 101 overcrossings contained suitable roost sites in the expansion joints between concrete sections, but did not contain bats. At least 1000 bats of 3 species were found roosting in dense colonies in expansion joints beneath the western half of the Main Street bridge. No bats were seen beneath this bridge east of the Ventura River and many of the expansion joints beneath this bridge were caulked, rendering them inaccessible to bats.

**The following three bat species were observed at the north end of the study area on 3 July 1992:**

**Yuma Myotis (*Myotis yumanensis*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This bat is also widespread in coastal and montane woodland habitats throughout the non-desert portions of the Pacific states. Locally, one museum record exists from the coastal slopes of the Santa Ynez Range in Santa Barbara County (Smith, et. al., 1982) and from Lake Sherwood, Ventura County (LACM No. 8082). Its roosting habits are similar to those of the preceding species. At least 500 individuals of this species were observed sharing a roost with Big Brown Bats and Mexican Freetail Bats beneath the west end of the Main Street bridge at the north end of the study area on 3 July 1992. At dusk, they left these roosts to forage along the riparian corridor. See the Big Brown Bat and Mexican Freetail Bat accounts for further information.

**Big Brown Bat (*Eptesicus fuscus*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This bat is typically found in upland and montane habitats throughout the Pacific States. Locally, it has been collected from the Ventura and Santa Clara River drainages: Ventura (LACM No. 70218) and Fillmore (LACM No. 31656). This species roosts on buildings and in crevices. On 3 July 1992, a roost containing at least 500 individuals of this species was found sharing a roost with an equal number of Yuma Myotis in expansion joints beneath the west end of the Main Street bridge at the north end of the study area. Over 250 individuals of these two species were counted in a 30-minute interval leaving these roosts at dusk. At dusk, these bats left their roost to forage along the Ventura River riparian corridor upstream and downstream of the Main Street bridge.

**Mexican Freetail Bat (*Tadarida brasiliensis*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This is a widespread bat of scrub and woodland habitats throughout coastal and montane regions of California, including the desert. It is one of the most common bat species in Santa Barbara and Ventura Counties. It is regularly heard and observed along the coast and in the foothills of the Santa Ynez Mountains of Santa Barbara County (Smith, et. al., 1982). Locally, collection records are from: Weldon Canyon (LACM No. 30275); Ventura (LACM No. 30277; MVZ Nos. 18786; 9441-45; 4021-22) and Fillmore (LACM Nos. 8927-28). This species frequently roosts beneath bridges (P. Brown, pers. comm.). The Southern Pacific Railroad bridge and Highway 101 bridges do not provide



suitable roosting habitat. On 3 July 1992, probably less than 100 individuals of this species were found in shared roosts with at least 1000 Big Brown Bats and Yuma Myotis beneath the west end of the Main Street bridge at the north end of the study area. Between 2000 and 2300 hours, the Freetail Bats left their roosts to forage along the Ventura River riparian corridor.

**The following bats are likely to occur with the study area:**

**California Myotis (*Myotis californicus*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This is a very widespread bat occupying most coastal and montane habitats. Local records are from coastal habitat on UCSB West Campus (Smith et. al., 1982) and from the upper Ventura River drainage several miles upstream the study area: Matilija (MVZ No. 4032) and Weldon Canyon (LACM No. 30260). Suitable roosting sites (buildings and crevices) occur adjacent to the study area and it is likely that this species utilizes the study area for foraging from roosts located in the city of Ventura and farther up the drainage. It is more solitary than the Yuma Myotis, which it resembles in size and call. It may be present beneath the Main Street bridge in low numbers (P. Brown, pers. comm.).

**Pallid Bat (*Antrozous pallidus*)**

**STATE/FEDERAL STATUS: CSC/NONE**

This bat is relatively common in coastal and lower montane habitats throughout the Pacific States. Locally, old collection records are from: Ventura (MVZ Nos. 4030-31 and 9446) and (LACM No. 30244) and Fillmore (LACM No. 8929). Observation of relatively large bat droppings and large insect parts beneath roosts containing Yuma Myotis, Big Brown Bat and Mexican Freetail Bat under the Main Street bridge on 3 July 1992, may indicate that Pallid Bats also utilize the bridge as temporary night roosts. The expansion joints beneath the bridge appear to be too small to function as daytime roosts for this species (P. Brown, pers. comm.).

**Western Mastiff Bat (*Eumops perotis californicus*)**

**STATE/FEDERAL STATUS: CSC/CATEGORY 2**

This uncommon bat is found in scrub and open woodlands from the San Francisco Bay region south through Baja California and mainland Mexico. Locally, old collection records are from a site in the Ventura River drainage, several miles upstream from the study area: Weldon Canyon (LACM No. 30253). It has also recently (1992) been sighted in upper Piru Creek in the Santa Clara River drainage (Sam Sweet, pers. comm.). Preferred roosting habitat includes caves and large clefts in vertical rock walls, however, it may also use structures such as the Main Street bridge on a short-term basis if crevices are large enough. This species forages considerable distances from roosts and the absence of suitable roost in the study area does not necessarily preclude their using the study area as feeding habitat.

**Townsend's Western Big-eared Bat (*Plecotus townsendii townsendii*)**  
**STATE/FEDERAL STATUS: CSC/CATEGORY 2**

This bat is found in scrub and woodland habitats throughout the Pacific States. This species has not been collected locally.

**Eastern Small-footed Myotis (*Myotis leibii*)**  
**STATE/FEDERAL STATUS: NONE/NONE**

This bat occurs in scrub and open woodland habitats throughout the Coast Ranges and Sierra Foothills of California and Great Basin Desert. A single museum record for the area is from oak woodland habitat in the foothills of the Santa Ynez Mountains in Santa Barbara, Santa Barbara County (SBMNH No. 981).

**Long-eared Myotis (*Myotis evotis*)**  
**STATE/FEDERAL STATUS: NONE/NONE**

This bat is found in a variety of coastal and montane habitats throughout the Pacific States. Locally, an old collection record exists from Matilija (LACM Nos. 30267-68). More recent records are 3.5 km E Ojai on Hwy 150 (LACM Nos. 85675-78 and 86792). This species may utilize the study area while foraging.

**Western Pipistrelle (*Pipistrellus hesperus*)**  
**STATE/FEDERAL STATUS: NONE/NONE**

This bat is distributed throughout lower elevation scrub and open woodland habitats, including the Mojave Desert, throughout southern California. It has been observed foraging over Atascadero Creek adjacent to More Mesa, Santa Barbara County (Smith, et. al., 1982) and has been collected from Ventura (LACM No. 30274); Cold Springs (Sespe River drainage) (LACM No. 30273) and Piru Creek (Santa Clara River drainage) (LACM Nos. 9056-57). This species roosts on buildings and in crevices. It is likely that this species utilizes the study area while foraging.

The following bat species may utilize the study area during seasonal migrations between late February to April and between September to October:

**Hoary Bat (*Lasiurus cinereus*)**  
**STATE/FEDERAL STATUS: NONE/NONE**

This is a very widespread bat in the United States, but is most common in the southwest (Brown, 1980). Montane populations of this bat appear to be migratory, moving to the coast from San Francisco south in the fall and inland and north in the spring (Ingles, 1965). Several museum records exist for coastal localities between Winchester Canyon and Montecito, Santa Barbara County (Smith, et. al., 1982). Old local collection records are: Weldon Canyon (LACM Nos. 30258-59) and Nordhoff

(MVZ No. 5147) in the Ventura River drainage and Fillmore (MVZ Nos. 114490-91) in the Santa Clara River drainage. This species is solitary and roosts in the foliage of trees (Ingles, 1965) and as well as in dense ground cover (Brown, 1980). It may use the study area for foraging.

**Eastern Red Bat (*Lasiurus borealis*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This migratory species is also widespread in the United States and appears to be more abundant in the north and east, with only occasional records from southern California (Brown, 1980). It is solitary and roosts in trees. It has been collected from Santa Cruz Island during the fall migration (Brown, 1980). On the mainland it has been collected from Ventura (LACM No. 30272).

**Silver-haired Bat (*Lasionycteris noctivagans*)**

**STATE/FEDERAL STATUS: NONE/NONE**

This species is most common in northern forests, where it is solitary and roosts in trees. Small numbers have been collected from Santa Cruz Island during spring migration and from isolated localities throughout southern California (Brown, 1980).

## **APPENDIX D**

## SMALL MAMMAL TRAPPING AND BIRD SURVEY DATA

SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
NOVEMBER 1991-TRAPLINE 1

**Location:** CA: Ventura Co., Ventura River estuary, approximately 0.5 mi west-northwest of Ventura River mouth, between SPRR tracks and ocean, approximately 250-300 feet from ocean.

**Habitat:** Estuarine Wetland.

**Trapping dates:** 31 October-3 November 1991.

**Trapline configuration:** Roughly linear, northwest-southeast orientation; traps 25-30 feet apart.

**Trapping duration:** 25 live-traps set for three nights = 75 trap-nights.

**Weather:** clear, low winds, 55-75 °F.

**Vegetation and edaphic conditions at trap locations:**

- Trap 1: *Atriplex*, *Distichlis*, *Salicornia*; silt
- 2: *Atriplex*, *Salicornia*; silt
- 3: *Salicornia*; silt
- 4: *Salicornia*, *Atriplex*; silt
- 5: *Salicornia*; silt
- 6: *Atriplex*, *Distichlis*; silt
- 7: *Atriplex*, *Distichlis*; silt, sand
- 8: *Atriplex*; silt, sand
- 9: *Atriplex*, *Distichlis*; silt
- 10: *Distichlis*; sand
- 11: *Atriplex*, *Distichlis*; silt
- 12: *Atriplex*, *Salicornia*; silt, sand
- 13: *Scirpus*, *Typha*; silt
- 14: *Atriplex*, *Distichlis*, *Salicornia*; silt
- 15: *Baccharis salicifolia*, forbs; silt, sand
- 16: *Baccharis*, *Brassica*; silt
- 17: *Baccharis*, *Foeniculum*; silt
- 18: *Atriplex*; silt
- 19: *Atriplex*, *Frankenia*; silt
- 20: *Baccharis*, *Atriplex*; silt
- 21: *Atriplex*, *Typha*; silt
- 22: *Atriplex*; silt
- 23: *Atriplex*; silt
- 24: *Atriplex*; silt
- 25: *Atriplex*; silt

**SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
NOVEMBER 1991-TRAPLINE 2**

**Location:** CA: Ventura Co., 200-1600 feet west-northwest of Ventura River mouth, south of SPRR tracks, approximately 100-200 feet north of ocean.

**Habitat:** Palustrine Wetland/Dune Swale-Southern Coastal Dune ecotone, grading into Ruderal habitat at east end of trapline.

**Trapping dates:** 31 October-3 November 1991.

**Trapline configuration:** roughly linear, northwest to southeast orientation; traps 25-30 feet apart.

**Trapping duration:** 25 traps for 3 nights = 75 trap-nights.

**Weather:** clear, low winds, 55-75 °F.

**Vegetation and edaphic conditions at trap locations:**

- Trap 1: *Atriplex*, *Distichlis*; silt
- 2: *Atriplex*; bare sand
- 3: *Atriplex*; bare sand
- 4: *Atriplex*; bare sand
- 5: *Atriplex*; bare sand
- 6: *Atriplex*, *Distichlis*; silt
- 7: *Atriplex*, *Distichlis*; silt
- 8: *Happlopappus*, *Distichlis*; sand
- 9: *Atriplex*; bare sand
- 10: *Atriplex*, *Distichlis*; sand
- 11: *Atriplex*, *Distichlis*; sand
- 12: *Atriplex*, *Distichlis*; sand
- 13: *Atriplex*; sand
- 14: *Atriplex*; sand
- 15: *Atriplex*; sand
- 16: *Atriplex*; sand
- 17: *Atriplex*; sand
- 18: *Atriplex*; clay
- 19: *Atriplex*; sand
- 20: *Atriplex*; sand
- 21: *Myoporum*; sand
- 22: *Myoporum*; sand
- 23: *Myoporum*; sand
- 24: *Myoporum*; sand
- 25: *Myoporum*; sand

**SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
NOVEMBER 1991-TRAPLINE 3**

**Location:** CA: Ventura Co., 400-1000 feet west of Ventura River, between SPRR tracks and Highway 101, approximately 600-1100 feet north of ocean.

**Habitat:** Floodplain Mixed Scrub, Floodplain Willow Forest and Floodplain Mixed Forest.

**Trapping dates:** 31 October-3 November 1991.

**Trapline configuration:** roughly semi-circular, traps 25-30 feet apart.

**Trapping duration:** 26 live-traps set for 3 nights = 78 trap-nights.

**Weather:** clear, low winds, 55-75 °F.

**Vegetation and edaphic conditions at trap locations:**

- |      |  |
|------|--|
| Trap | 1: <i>Salix, Distichlis, Salicornia</i> ; silt |
|      | 2: <i>Atriplex, Frankenia</i> ; silt           |
|      | 3: <i>Salix, Frankenia</i> ; silt              |
|      | 4: <i>Baccharis pilularis</i> ; silt           |
|      | 5: <i>Baccharis</i> ; silt                     |
|      | 6: <i>Baccharis salicifolia</i> , forbs; silt  |
|      | 7: <i>Baccharis pilularis</i> ; silt           |
|      | 8: <i>Salix, Baccharis</i> ; silt              |
|      | 9: <i>Salix</i> ; silt                         |
|      | 10: <i>Salix</i> ; silt                        |
|      | 11: <i>Baccharis, Foeniculum</i> ; silt        |
|      | 12: <i>Artemisia</i> ; silt                    |
|      | 13: <i>Artemisia</i> ; silt                    |
|      | 14: <i>Baccharis</i> ; silt                    |
|      | 15: <i>Baccharis</i> ; silt                    |
|      | 16: <i>Happlopappus</i> , forbs; silt          |
|      | 17: <i>Baccharis salicifolia</i> , forbs; silt |
|      | 18: <i>Atriplex</i> , forbs; silt              |
|      | 19: <i>Artemisia</i> ; silt                    |
|      | 20: <i>Artemisia</i> ; silt                    |
|      | 21: <i>Salix, Artemisia</i> ; silt             |
|      | 22: <i>Salix, Artemisia</i> ; silt             |
|      | 23: <i>Foeniculum</i> ; silt                   |
|      | 24: <i>Salix</i> , forbs; silt                 |
|      | 25: <i>Salix, Rubus</i> ; silt                 |
|      | 26: <i>Salix</i> ; silt                        |

**SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
NOVEMBER 1991-TRAPLINE 4**

**Location:** CA: Ventura Co., 10-50 feet east of Ventura River, south of SPRR tracks, approximately 600-1100 feet north of ocean.

**Habitat:** Estuarine/Palustrine Wetland.

**Trapping dates:** 31 October-3 November 1991.

**Trapline configuration:** roughly linear, north-south orientation; traps were 25-30 feet apart, cover permitting.

**Trapping duration:** 15 traps set for 3 nights = 45 trap-nights.

**Weather:** clear, low winds, 55-75 °F.

**Vegetation and edaphic conditions at trap locations:**

- |      |  |
|------|--|
| Trap | 1: <i>Arundo</i> ; silt, cobbles                         |
|      | 2: <i>Scirpus</i> , <i>Typha</i> ; silt, cobbles         |
|      | 3: <i>Scirpus</i> ; silt, cobbles                        |
|      | 4: <i>Scirpus</i> ; silt, cobbles                        |
|      | 5: <i>Scirpus</i> ; silt, cobbles                        |
|      | 6: <i>Arundo</i> , <i>Scirpus</i> ; silt, cobbles        |
|      | 7: <i>Scirpus</i> ; silt, cobbles                        |
|      | 8: <i>Scirpus</i> ; silt, cobbles                        |
|      | 9: <i>Scirpus</i> , <i>Distichlis</i> ; silt             |
|      | 10: <i>Distichlis</i> , <i>Salicornia</i> , forbs; silt  |
|      | 11: <i>Scirpus</i> , <i>Salix</i> ; silt                 |
|      | 12: <i>Scirpus</i> ; silt                                |
|      | 13: <i>Scirpus</i> , <i>Salix</i> ; silt, cobbles        |
|      | 14: <i>Scirpus</i> , <i>Baccharis salicifolia</i> ; silt |
|      | 15: <i>Scirpus</i> , <i>Baccharis</i> ; silt, cobbles    |



**SMALL MAMMAL LIVE-TRAPPING  
NOVEMBER 1991 TRAPPING RESULTS  
TRAPLINE 1**

	<u>1 November</u>	<u>2 November</u>	<u>3 November</u>
Trap 1.	Rm; m	Rm (2); m	Rm (2); m
2	o	o	Rm; m
3	o	o	Rm; f
4	o	Rm (2); m	Rm (2); m,f
5	o	Rm; m	s
6	o	o	o
7	o	o	Pm; m
8	o	o	o
9	o	Rm (2); m,f	o
10	o	o	o
11	Rm; f	Rm; f	o
12	Mm; m	s	s
13	s	s	Mm; m
14	Rm; f	Mm; m	Mm; m
15	Rm; m	Rm; f	s
16	Pm; m	Pm; m	Pc; m
17	Rm; m	Nf; f	Pc; f
18	s	s	s
19	o	Nf; f	Nf; f
20	Pc; j	Pc; j	Pc; j
21	Rm; j	Pc; f	Pc; f
22	Pc; m	s	Rm; m
23	Pc; j	Pc; j	o
24	Pc; m	Pc; j	o
25	s	s	Pc; m

**DAILY TRAP SUCCESS:**

48%

68%

64%

**AVERAGE TRAP SUCCESS: 44 individuals/75 trap-nights = 59% (5 spp.)**

**Explanation:** Rm (*Reithrodontomys megalotis*); Pm (*Peromyscus maniculatus*); Pc (*Peromyscus californicus*); Mm (*Mus musculus*); Nf (*Neotoma fuscipes*); m = male; f = female; j = juvenile; o = trap open; s = trap sprung.

**SMALL MAMMAL LIVE-TRAPPING  
NOVEMBER 1991 TRAPPING RESULTS  
TRAPLINE 2**

	<u>1 November</u>	<u>2 November</u>	<u>3 November</u>
Trap 1	o	o	o
2	o	Rm; m	o
3	o	Rm; m	Pm; j
4	Pm; m	Rm; f	Pm; j
5	Pm; f	Pc; f	Rm; m
6	o	o	o
7	Rm; m	o	Rm (2); m, f
8	Pm; f	Pm; f	Pm; f
9	o	o	Pm; m
10	o	Rm; m	o
11	o	o	o
12	Pm; f	Pm; f	Pm; f
13	Rm; f	o	o
14	Rm; m	o	o
15	s	s	s
16	Rm; m	o	Rm; m
17	Pm; j	Pm; j	Rm; j
18	Rm; f	o	o
19	Rm; m	Mm (2); m	o
20	Rm; m	Rm; m	o
21	o	Pm; j	o
22	Pm; j	o	o
23	Mm (3); f, 2j	Mm; m	o
24	o	o	o
25	o	o	Mm; m

**DAILY TRAP SUCCESS:**

64%

48%

48%

**AVERAGE TRAP SUCCESS: 40 individuals/75 trap-nights = 53% (4 spp.)**

**Explanation:** Rm (*Reithrodontomys megalotis*); Pm (*Peromyscus maniculatus*); Pc (*Peromyscus californicus*); Mm (*Mus musculus*); m = male; f = female; j = juvenile; o = trap open; s = trap sprung.

**SMALL MAMMAL LIVE-TRAPPING  
NOVEMBER 1991 TRAPPING RESULTS  
TRAPLINE 3**

	<u>1 November</u>	<u>2 November</u>	<u>3 November</u>
Trap 1	s	Rm (2); m,f	o
2	s	Rm; f	o
3	o	Pc; m	o
4	o	o	Pb; m
5	o	Pm; f	o
6	Pm; m	o	o
7	Pm; m	Pm; m	Pc; m
8	s	Pb; m	Pc; j
9	o	o	Pc; m
10	s	s	o
11	s	o	s
12	s	s	Rm (2); f
13	s	Pc; m	o
14	Pc; m	o	Pc; f
15	o	Pc; m	o
16	o	Rm; m	o
17	Pc; m	Rm; f	Pc; m
18	s	s	Nf; m
19	o	s	s
20	s	Rm; m	o
21	Rm; f	Pm; m	Rm; f
22	s	Rm; f	s
23	Pm; m	Pm; j	s
24	Rm; j	o	s
25	s	o	o
26	s	o	o

**DAILY TRAP SUCCESS:**

27%

58%

38%

**AVERAGE TRAP SUCCESS: 32 individuals/78 trap-nights = 41% (5 spp.)**

**Explanation:** Rm (*Reithrodontomys megalotis*); Pm (*Peromyscus maniculatus*); Pc (*Peromyscus californicus*); Pb (*Peromyscus boylii* [tentative identification]); Nf (*Neotoma fuscipes*); m = male; f = female; j = juvenile; o = trap open; s = trap sprung.

**SMALL MAMMAL LIVE-TRAPPING  
NOVEMBER 1991 TRAPPING RESULTS  
TRAPLINE 4**

	<u>1 November</u>	<u>2 November</u>	<u>3 November</u>
Trap 1	o	o	o
2	s	s	Mc; f
3	o	o	s
4	o	s	Pc; j
5	o	s	Mm; m
6	Pc; j	Mm; f	Mm; f
7	o	o	o
8	Rr; m	Mm; m	o
9	Pc; m	s	o
10	o	o	Mm; m
11	o	Mm; m	Mc; f
12	o	Mm; m	s
13	o	Rr; m	s
14	Rr; m	Mc; m	Rr; m
15	o	o	Mc; f

**DAILY TRAP SUCCESS:**

27%

40%

53%

**AVERAGE TRAP SUCCESS: 18 individuals/45 trap-nights = 40% (4 spp.)**

**Explanation:** Pc (*Peromyscus californicus*); Mm (*Mus musculus*); Rr (*Rattus rattus*); Mc (*Microtus californicus*); m = male; f = female; j = juvenile; o = trap open; s = trap sprung.

**SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
MAY 1992-TRAPLINE 1**

**Location:** CA: Ventura Co., Ventura River estuary, approximately 0.6 mi west-northwest of Ventura River mouth, between SPRR tracks and ocean, approximately 250-300 feet from ocean.

**Habitat:** Estuarine Wetland.

**Trapping dates:** 4-7 May 1992.

**Trapline configuration:** Roughly linear, west-east orientation; traps were 25-30 feet apart.

**Trapping duration:** 25 live-traps set for three nights = 75 trap-nights.

**Weather:** persistent low clouds and fog, slight drizzle on Day 3, low winds, 60-75°F.

**Vegetation and edaphic conditions at trap locations:**

- Trap 1: *Atriplex*, silt
- 2: *Atriplex*, *Salicornia*; silt
- 3: *Salicornia*; *Frankenia*; silt
- 4: *Salicornia*, *Frankenia*; silt
- 5: *Atriplex*; silt
- 6: *Atriplex*, silt
- 7: *Atriplex*, silt
- 8: *Atriplex*; silt
- 9: *Atriplex*, *Salicornia*; silt
- 10: *Atriplex*, *Salicornia*; silt
- 11: *Atriplex*, *Salicornia*; silt
- 12: *Atriplex*, *Distichlis*; silt
- 13: *Atriplex*, *Distichlis*, *Salicornia*; silt
- 14: *Atriplex*, *Distichlis*; silt
- 15: *Atriplex*, *Distichlis*; silt
- 16: *Atriplex*, *Distichlis*; silt
- 17: *Atriplex*, *Distichlis*; silt
- 18: *Atriplex*, *Distichlis*; silt
- 19: *Atriplex*, *Jaumea*, *Frankenia*; silt
- 20: *Atriplex*, *Jaumea*, *Distichlis*; silt
- 21: *Atriplex*, *Distichlis*, *Salicornia*; silt
- 22: *Atriplex*, *Distichlis*, silt
- 23: *Atriplex*; cobbles, silt
- 24: *Scirpus*; cobbles, silt
- 25: *Arundo*, *Distichlis*; cobbles, silt

**SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
MAY 1992-TRAPLINE 2**

**Location:** CA: Ventura Co., 200-1600 feet west-northwest of Ventura River mouth, south of SPRR tracks, approximately 100-200 feet north of ocean.

**Habitat:** Dune Swale-Southern Coastal Dune habitat, grading into Ruderal Habitat at east end of trapline.

**Trapping dates:** 4-7 May 1992.

**Trapline configuration:** roughly linear, northwest to southeast orientation; traps 25-30 feet apart.

**Trapping duration:** 25 traps for 3 nights = 75 trap-nights.

**Weather:** persistent low clouds and fog, slight drizzle on Day 3, low winds, 60-75°F.

**Vegetation and edaphic conditions at trap locations:**

- Trap 1: *Atriplex*; sand, silt
- 2: *Atriplex*, *Abronia*; sand
- 3: *Atriplex*; silt
- 4: *Atriplex*, *Abronia*; sand
- 5: *Cakile*; sand
- 6: *Cakile*, *Bromus*, *Carpobrotus*; sand
- 7: *Cakile*; sand
- 8: *Cakile*, *Abronia*, *Carpobrotus*; sand
- 9: *Phacelia*, *Bromus*; sand
- 10: *Happlopappus*, *Bromus*; sand
- 11: *Cakile*, *Abronia*; sand
- 12: *Cakile*, *Distichlis*, *Raphanus*; sand
- 13: *Cakile*; sand
- 14: *Cakile*, *Raphanus*; sand
- 15: *Raphanus*; sand
- 16: *Phacelia*, *Camissonia*; sand
- 17: *Atriplex*; sand
- 18: *Phacelia*, *Camissonia*; sand
- 19: *Cakile*, *Raphanus*; sand
- 20: *Cakile*, *Calystegia*, *Camissonia*; sand
- 21: *Cakile*, *Raphanus*; sand
- 22: *Sambucus*; sand
- 23: *Happlopappus*, *Carpobrotus*; sand
- 24: *Cakile*, *Raphanus*, *Carpobrotus*; sand
- 25: *Myoporum*, *Raphanus*; sand

**SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
MAY 1992-TRAPLINE 3**

**Location:** CA: Ventura Co., 400-1000 feet west of Ventura River, between SPRR tracks and Highway 101, approximately 600-1100 feet north of ocean.

**Habitat:** Floodplain Mixed Scrub, Floodplain Willow Forest and Floodplain Mixed Forest.

**Trapping dates:** 4-7 May 1992.

**Trapline configuration:** roughly semi-circular, traps 25-30 feet apart.

**Trapping duration:** 26 live-traps set for 3 nights = 78 trap-nights.

**Weather:** persistent low clouds and fog, slight drizzle on Day 3, low winds, 60-75°F.

**Vegetation and edaphic conditions at trap locations:**

- Trap 1: *Salix, Rubus*; silt
- 2: *Salix, Rubus*; silt
- 3: *Salix, Populus, Bromus*; silt
- 4: *Salix*; cobbles, silt
- 5: *Bromus, Salvia*; silt
- 6: *Foeniculum*; cobbles, silt
- 7: *Salix, Conium*; silt
- 8: *Artemisia, Salix*; silt
- 9: *Artemisia, Salix*; silt
- 10: *Atriplex, Bromus*; silt
- 11: *Brassica, Melilotus*; silt
- 12: *Brassica, Melilotus*; silt
- 13: *Brassica, Melilotus*; silt
- 14: *Salix, Brassica*; silt
- 15: *Salix*; silt
- 16: *Salix*, forbs; silt
- 17: *Salix, forbs*; silt
- 18: *Baccharis pilularis*, forbs; silt
- 19: *Baccharis, Phacelia*; silt
- 20: *Lepidospartum*; silt
- 21: *Happlopappus*, forbs; silt
- 22: *Artemisia, Baccharis*; silt
- 23: *Artemisia, Baccharis*; silt
- 24: *Salix, Baccharis salicifolia*,; silt
- 25: *Artemisia*; silt
- 26: *Artemisia*; silt

**SMALL MAMMAL LIVE-TRAPPING  
TRAPLINE HABITAT INFORMATION  
MAY 1992-TRAPLINE 4**

**Location:** CA: Ventura Co., 10-50 feet east of Ventura River, south of SPRR tracks, approximately 600-1100 feet north of ocean.

**Habitat:** Estuarine/Palustrine Wetland.

**Trapping dates:** 4-7 May 1992.

**Trapline configuration:** roughly linear, north-south orientation; traps 25-30 feet apart, cover permitting.

**Trapping duration:** 14 traps set for 3 nights = 42 trap-nights.

**Weather:** persistent low clouds and fog, slight drizzle on Day 3, low winds, 60-75°F.

**Vegetation and edaphic conditions at trap locations:**

- Trap 1: *Arundo*, *Distichlis*; silt, cobbles
- 2: *Scirpus*, *Distichlis*; silt, cobbles
- 3: *Scirpus*, *Distichlis*; silt, cobbles
- 4: *Scirpus*, *Distichlis*; silt, cobbles
- 5: *Scirpus*, *Arundo*; silt, cobbles
- 6: *Distichlis*, *Scirpus*; silt, cobbles
- 7: *Arundo*, *Scirpus*; silt, cobbles
- 8: *Arundo*, *Scirpus*; silt, cobbles
- 9: *Arundo*, *Scirpus*; silt
- 10: *Arundo*, *Scirpus*; silt, cobbles
- 11: *Arundo*, *Scirpus*; silt, cobbles
- 12: *Salix*, *Scirpus*; silt, cobbles
- 13: *Salix*, *Scirpus*; silt, cobbles
- 14: *Salix*, *Scirpus*; silt, cobbles



**SMALL MAMMAL LIVE-TRAPPING  
MAY 1992 TRAPPING RESULTS  
TRAPLINE 1**

	<u>5 May</u>	<u>6 May</u>	<u>7 May</u>
Trap 1	s	s	s
2	s	s	s
3	Rm; m	o	o
4	s	o	o
5	o	o	Mm; m
6	o	o	o
7	Nf; f	s	o
8	o	o	o
9	o	o	Nf, f
10	Mm; m	Mm, m	o
11	s	Mm, m	o
12	s	o	o
13	o	o	o
14	s	Mc; m	o
15	o	s	s
16	s	o	s
17	o	s	s
18	o	o	s
19	s	o	s
20	o	s	s
21	o	o	o
22	o	s	s
23	o	s	o
24	o	s	o
25	o	Mc; m	o

**DAILY TRAP SUCCESS:**

12%

16%

8%

**AVERAGE TRAP SUCCESS: 9 individuals/75 trap-nights = 12% (4 spp.)**

**Explanation:** Rm (*Reithrodontomys megalotis*); Mm (*Mus musculus*); Nf (*Neotoma fuscipes*);  
Mc (*Microtus californicus*); m = male; f = female; j = juvenile; o = trap open; s = trap sprung.

**SMALL MAMMAL LIVE-TRAPPING  
MAY 1992 TRAPPING RESULTS  
TRAPLINE 2**

	<u>5 May</u>	<u>6 May</u>	<u>7 May</u>
Trap 1	Nf; f(l)	s	s
2	Nf; m	o	Nf; m(*)
3	Pc; m	s	o
4	o	o	o
5	o	Rm; m	o
6	o	o	o
7	o	o	o
8	o	o	o
9	o	o	Pm; m
10	Pm; m	o	o
11	o	o	o
12	o	o	o
13	o	o	o
14	o	Rm; f	o
15	o	o	o
16	s	o	o
17	o	o	o
18	o	o	o
19	o	o	o
20	o	o	Rm; m(*)
21	o	o	o
22	o	o	o
23	o	o	s
24	o	o	o
25	o	o	o

**DAILY TRAP SUCCESS:**

16%

8%

12%

**AVERAGE TRAP SUCCESS: 9 individuals/75 trap-nights = 12% (4 spp.)**

**Explanation:** Rm (*Reithrodontomys megalotis*); Pm (*Peromyscus maniculatus*); Pc (*Peromyscus californicus*); Nf (*Neotoma fuscipes*); m = male; f = female; l = lactating; o = trap open; s = trap sprung; (\*) = collected as voucher (UC-Santa Barbara Vertebrate Museum).

**SMALL MAMMAL LIVE-TRAPPING  
MAY 1992 TRAPPING RESULTS  
TRAPLINE 3**

	<u>5 May</u>	<u>6 May</u>	<u>7 May</u>
Trap 1	o	o	h
2	o	o	h
3	o	o	h
4	o	Pc; f	h
5	o	Pc; f(l)	h
6	o	s	h
7	o	o	h
8	Pc; f(l)	o	h
9	o	o	h
10	Pc; m	o	h
11	o	s	s
12	Mm; m	Rm; m	s
13	o	o	s
14	s	o	o
15	Nf; m	o	o
16	o	o	o
17	Rm; (2) j	Nf; m	o
18	o	o	o
19	o	Rm; m	o
20	s	Rm; (3) m,m,f	o
21	o	s	Nf; m
22	Pc; m	Nf; (2) m,f	o
23	o	o	s
24	o	o	o
25	o	o	Nf; m
26	Nf; m	o	o

**DAILY TRAP SUCCESS:**

31%

38%

8%

**AVERAGE TRAP SUCCESS: 20 individuals/78 trap-nights = 26% (4 spp.)**

**Explanation:** Rm (*Reithrodontomys megalotis*); Pc (*Peromyscus californicus*); Mm (*Mus musculus*); Nf (*Neotoma fuscipes*); m = male; f = female; j = juvenile; l = lactating female; o = trap open; s = trap sprung; h = traps disturbed by humans.

**SMALL MAMMAL LIVE-TRAPPING  
MAY 1992 TRAPPING RESULTS  
TRAPLINE 4**

	<u>5 May</u>	<u>6 May</u>	<u>7 May</u>
Trap 1	o	o	Mc; m
2	o	o	o
3	Mc; m	Mc; m	o
4	o	o	o
5	o	o	o
6	o	o	o
7	Rr; m	o	s
8	Rr; m	s	s
9	o	o	o
10	Rr, j	o	o
11	s	o	o
12	o	o	o
13	s	o	o
14	s	o	o

**DAILY TRAP SUCCESS:**

29%

7%

7%

**AVERAGE TRAP SUCCESS: 6 individuals/42 trap-nights = 14% (2 spp.)**

**Explanation:** Rr (*Rattus rattus*); Mc (*Microtus californicus*); m = male; f = female; j = juvenile;  
o = trap open; s = trap sprung.

<u>Species</u>	<u>19 May</u>	<u>10 June</u>	<u>24 August</u>
Pied-billed Grebe			1
Double-crested Cormorant			5
Great Blue Heron	2	1	1
Snowy Egret			3
Green-backed Heron	1	1	1
Black-crowned Night-Heron			5
Brant	4		
Mallard	2	2	1
California Quail		1	
Black-bellied Plover		4	18
<i>Snowy Plover</i>			2
Semipalmated Plover			9
Killdeer	1	1	10
Black-necked Stilt		1	
Greater Yellowlegs			9
Willet			51
Spotted Sandpiper			6
Whimbrel			8
Marbled Godwit			11
Black Turnstone		1	1
Surfbird			4
Sanderling			125
Western Sandpiper			95
Least Sandpiper			8
Short-billed Dowitcher			2
Heermann's Gull		1	2
Ring-billed Gull			12
California Gull	25	2	7
Western Gull	150	85	167
Glaucous-winged Gull		1	
Glaucous-winged x Western Gull			1
Caspian Tern			2
Elegant Tern			2
Forster's Tern			2
<i>Least Tern</i>			16
Rock Dove	8	5	5
Spotted Dove			1
Mourning Dove	6	6	4
Black-chinned Hummingbird			1
Anna's Hummingbird	6	4	6
Allen's Hummingbird	7	3	
Belted Kingfisher			1
Downy Woodpecker	2	1	1
Black Phoebe	4	2	8
Ash-throated Flycatcher	1		
Western Kingbird			1
<i>Tree Swallow</i>	2		
N. Rough-winged Swallow	12	20	
Cliff Swallow	175	200	7
Scrub Jay	3	1	
American Crow	6	9	8
Common Raven	1		
Bushtit	8	10	32
Bewick's Wren	28	21	8
House Wren			1
Swainson's Thrush	1		
Wrentit	12	11	13
Northern Mockingbird	4	2	3
California Thrasher	7	3	3
Cedar Waxwing	8		
European Starling	9	8	5
Hutton's Vireo	2	2	
Warbling Vireo	2		
Orange-crowned Warbler			2
Yellow Warbler	6	2	3
Common Yellowthroat	5		3
<i>Yellow-breasted Chat</i>	1	4	
Western Tanager	3		
Black-headed Grosbeak	7	9	4
Rufous-sided Towhee	10	14	
California Towhee	13	18	
Song Sparrow	33	25	11
Red-winged Blackbird		4	12
Brewer's Blackbird	4		55
Brown-headed Cowbird	10	7	7
House Finch	30	18	60
Lesser Goldfinch	2	3	2
American Goldfinch	3	9	6
House Sparrow	5		18

Due to low water-levels at the Ventura River mouth most of the summer and early fall, good numbers of water birds were found there in 1991. Additional surveys were carried out--primarily at low tide--over and above the complete study-area censuses so as to better document the changing numbers and diversity of these water birds during this period. Much of the work was carried out by Ventura field-ornithologist Don Desjardin; additional field work was carried out by Shawneen Finnegan, Paul Lehman, Randy Moore, and Brad Sillasen--other Santa Barbara and Ventura county observers.

Ventura River Mouth Water-Bird Surveys, 1991  
(water birds only, from railroad bridge to beach)

<u>Species</u>	<u>9-11 August</u>	<u>17 August</u>	<u>28 August</u>	<u>1 September</u>
Pied-billed Grebe		1	1	1
Brown Pelican	1	3		
Double-crested Cormorant	2	3	1	
Great Blue Heron	1			1
Snowy Egret	3	3	2	2
Little Blue Heron	1			
Green-backed Heron	1	4	3	1
Black-crowned Night-Heron			1	
American Coot	3	4		
Black-bellied Plover	60	75	95	70
Snowy Plover		2	5	
Semipalmated Plover	8	10	12	30
Killdeer	3	5	4	2
Black-necked Stilt	2			
Greater Yellowlegs	4	6	6	4
Willet	30	25	120	75
Wandering Tattler	4	7	2	
Spotted Sandpiper	2	4	5	3
Whimbrel	25	18	6	6
Marbled Godwit	6	5		
Ruddy Turnstone	6	5		6
Black Turnstone	11	9	15	14
Surfbird	4	6		1
Sanderling			1	
Western Sandpiper	10	15	15	6
Least Sandpiper	8	10	12	4
Short-billed Dowitcher		3		1
Red Phalarope	1	1		
Heermann's Gull	18	25	13	9
Ring-billed Gull	5	6	8	18
California Gull	2	3	1	3
Western Gull	25	10	20	70
Caspian Tern	2	3	4	6
Elegant Tern	3	6	4	
Forster's Tern	12	8	2	5
Least Tern	8	5		
Belted Kingfisher		1	2	1

## Ventura River Mouth Bird Surveys 1991

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Species	19 May	10 Jun	24 Aug	6 Nov
Pied-billed Grebe			1	6
Eared Grebe				8
Double-crested Cormorant			5	4
Great Blue Heron	2	1	1	
Snowy Egret			3	
Green-backed Heron	1	1	1	
Black-crowned Night-Heron			5	
Brant	4			
Mallard	2	2	1	4
*Common Merganser				2
Turkey Vulture				1
American Kestrel				1
American Coot				24
California Quail		1		
Black-bellied Plover		4	18	69
*Snowy Plover			2	
Semipalated Plover			9	9
Killdeer	1	1	10	28
Black-necked Stilt		1		
Greater Yellowlegs			9	3
Willet			51	45
Spotted Sandpiper			6	6
Whimbrel			8	1
Marbled Godwit			11	9
Ruddy Turnstone				1
Black Turnstone		1	1	3
Surfbird			4	
Sanderling			125	175
Western Sandpiper			95	
Least Sandpiper			8	3
Long-billed Dowitcher				1
Short-billed Dowitcher			2	
Bonaparte's Gull				1
Heerman's Gull		1	2	14
Mew Gull				6
Ring-billed Gull			12	12
California Gull	25	2	7	53
Western Gull	150	85	167	30
Glaucous-winged Gull		1		
Glaucous-winged x Western Gull			1	
Royal Tern				10
Caspian Tern			2	
Elegant Tern			2	11
Foster's Tern			2	6

## Ventura River Mouth Bird Surveys 1991

Page 2 of 3

Species	19 May	10 Jun	24 Aug	6 Nov
*Least Tern			16	
Rock Dove	8	5	5	
Spotted Dove			1	
Mourning Dove	6	6	4	1
Black-chinned Hummingbird			1	
Anna's Hummingbird	6	4	6	3
Allen's Hummingbird	7	3		
Belted Kingfisher			1	1
Downy Woodpecker	2	1	1	2
Northern Flicker	1			
Black Phoebe	64	2	8	6
Say's Phoebe				1
Western Kingbird			1	
*Tree Swallow	2			
N. Rough-winged Swallow	12	620		
Cliff Swallow	175	200	7	
Scrub Jay	3	1		
American Crow	6	9	8	2
Common Raven	1			2
Bushtit	8	10	32	60
Bewick's Wren	28	21	8	3
House Wren			1	2
Marsh Wren				2
Ruby-crowned Kinglet				4
Swainson's Thrush	1			
Wrentit	12	11	3	8
Northern Mockingbird	4	2	3	8
California Thrasher	7	3	3	2
American Pipit				4
Cedar Waxwing	8			
European Starling	9	8	5	60
Hutton's Vireo	2	2		1
Warbling Vireo	2			
Orange-crowned Warbler			2	6
Yellow Warbler	6	2	3	1
Yellow-rumped Warbler				11
Townsend's Warbler				2
Common Yellowthroat	5		3	5
*Yellow-breasted Chat	1	4		
Western Tanager	3			
Black-headed Grosbeak	7	9	4	
Rufous-sided Towhee	10	14		1
California Towhee	13	18		2
Savannah Sparrow				6
Song Sparrow	33	25	11	18



## Ventura River Mouth Bird Surveys 1991

Page 3 of 3

Species	19 May	10 Jun	24 Aug	6 Nov
Lincoln's Sparrow				2
Golden-crowned Sparrow				2
White-crowned Sparrow				15
Red-winged Blackbird		4	12	20
Western Meadowlark				1
Brewer's Blackbird	4		55	75
Brown-headed Cowbird	10	7	45	
House Finch	30	18	50	
Lesser Goldfinch	2	3	5	
American Goldfinch	3	9	9	
House Sparrow	5		9	
Sum	691	1122	893	885

Ventura River Mouth Waterbird Surveys, 1991  
(waterbirds only, from railroad bridge to beach)

<u>Species</u>	<u>2 December</u>
Pied-billed Grebe	7
Red-necked Grebe	1
Eared Grebe	8
Western Grebe	3
Double-crested Cormorant	5
Great Blue Heron	2
Great Egret	1
Snowy Egret	3
Black-crowned Night-Heron	2
Green-winged Teal	12
Mallard	11
Northern Pintail	4
American Wigeon	2
Lesser Scaup	6
Bufflehead	4
Red-breasted Merganser	10
Buddy Duck	7
American Coot	15
Black-bellied Plover	3
Semipalmated Plover	5
Greater Yellowlegs	1
Willet	1
Spotted Sandpiper	2
Marbled Godwit	1
Buddy Turnstone	1
Black Turnstone	1
Sanderling	18
Least Sandpiper	5
Heermann's Gull	3
Ring-billed Gull	10
California Gull	8
Western Gull	15
Forster's Tern	1
Belted Kingfisher	1
Black Phoebe	1
Say's Phoebe	1

(water levels in lagoon now high)

<u>Species</u>	<u>25 February*</u>	<u>28 February</u>
Pied-billed Grebe		1
Brown Pelican	1	
Double-crested Cormorant		12
Great Egret		1
Snowy Egret		1
Green-backed Heron	1	
Black-crowned Night-Heron		1
Red-breasted Merganser		4
Red-tailed Hawk		1
American Kestrel	1	
Black-bellied Plover		175
Killdeer	1	
Black Turnstone		2
Sanderling		13
Heermann's Gull	8	8
Mew Gull	18	18
Ring-billed Gull	11	7
California Gull	200	85
Herring Gull	1	2
Thayer's Gull	1	1
Western Gull	80	105
Glaucous-winged Gull		2
Mourning Dove		1
Anna's Hummingbird		6
Allen's Hummingbird		1
Downy Woodpecker		1
Northern Flicker		2
Black Phoebe	1	5
Say's Phoebe		1
No. Rough-winged Swallow		3
Scrub Jay		2
American Crow		3
Bushtit		15
Bewick's Wren		7
Marsh Wren		1
Ruby-crowned Kinglet		2
Blue-gray Gnatcatcher		1
Hermit Thrush		1
Wrentit		6
Northern Mockingbird		1
California Thrasher		4
European Starling		5
Hutton's Vireo		2
Orange-crowned Warbler	1	6
Yellow Warbler	1	
Yellow-rumped Warbler	3	50
Townsend's Warbler		1
Common Yellowthroat	2	3
Rufous-sided Towhee	2	3
California Towhee		2
Savannah Sparrow		14
Song Sparrow	4	12
Golden-crowned Sparrow		3
White-crowned Sparrow	3	19
Red-winged Blackbird		5
Brewer's Blackbird	6	3
House Finch	10	25
American Goldfinch	4	17
House Sparrow		2

\*Lagoon area only--low water--mostly cobbles

<u>Species</u>	<u>8 March*</u>
Double-crested Cormorant	3
American Kestrel	1
Black-bellied Plover	97
Willet	2
Spotted Sandpiper	1
Ruddy Turnstone	4
Black Turnstone	1
Sanderling	15
Heermann's Gull	10
Mew Gull	8
Ring-billed Gull	6
California Gull	50
Western Gull	140
Glaucous-winged Gull	5
Forster's Tern	9
Tree Swallow	1
No. Rough-winged Swallow	3
American Crow	2
European Starling	2
Orange-crowned Warbler	1
Common Yellowthroat	1
Song Sparrow	2
House Finch	5
American Goldfinch	2

\*Lagoon area only--low water--mostly cobbles

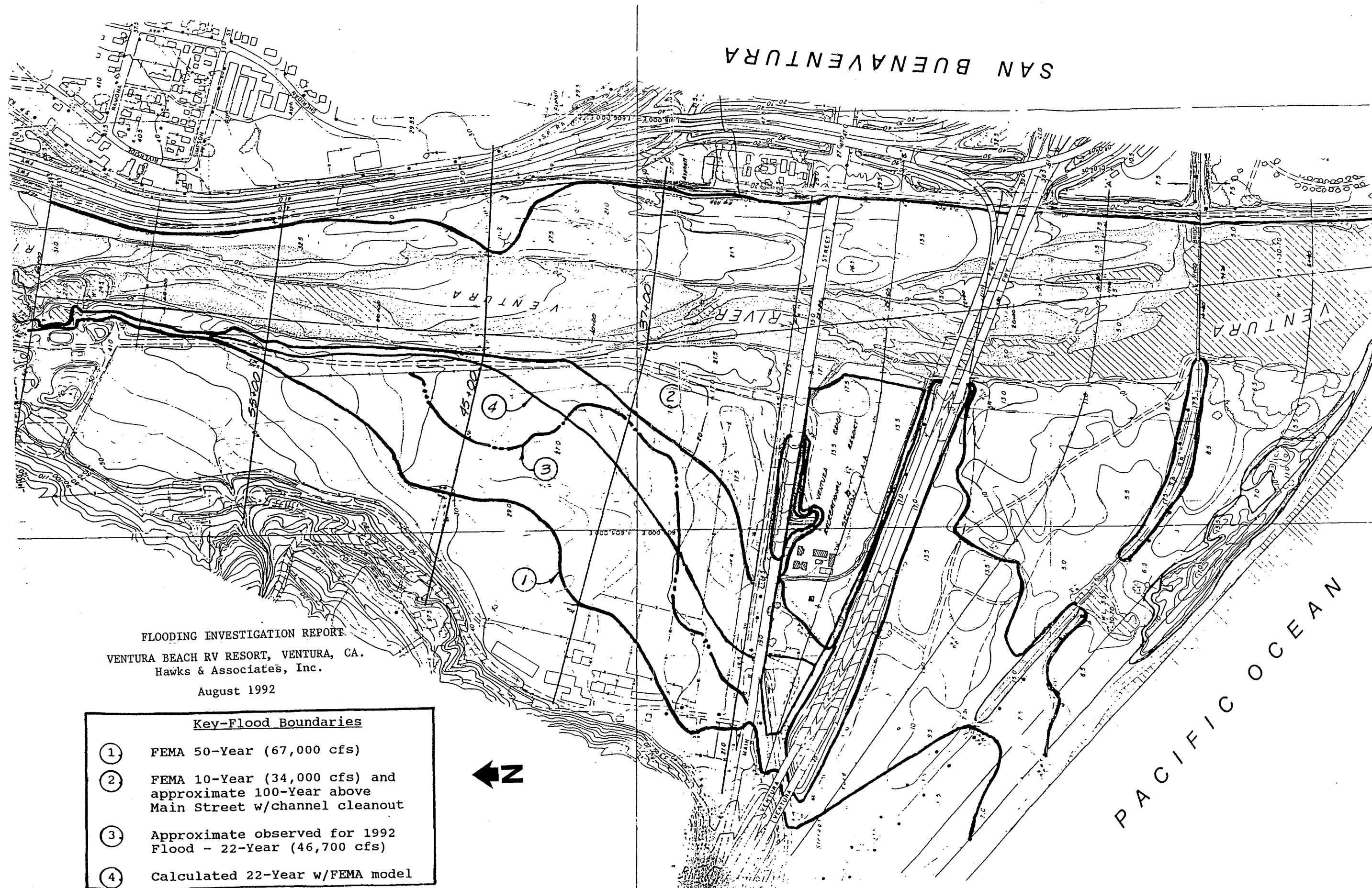
Ventura River Mouth Waterbird Surveys, 1992  
(waterbirds only, from railroad bridge to beach)

<u>Species</u>	<u>25 May</u>
Double-crested Cormorant	1
Brant	9
American Coot	3
Wandering Tattler	2
Whimbrel	1
Ruddy Turnstone	7
Black Turnstone	2
Sanderling	2
Heermann's Gull	20
Ring-billed Gull	3
Western Gull	15
Caspian Tern	3
Least Tern	6

## Ventura River Mouth Bird Surveys, 1992

<u>Species</u>	<u>21 June</u>
Brown Pelican	2
Double-crested Cormorant	1
Great Blue Heron	3
Snowy Egret	1
Green-backed Heron	2
Black-crowned Night-Heron	1
Brant	2
Killdeer	4
Willet	6
Spotted Sandpiper	1
Whimbrel	1
Heermann's Gull	25
California Gull	1
Western Gull	140
Elegant Tern	10
Forrester's Tern	1
Least Tern	12
Rock Dove	3
Mourning Dove	6
Anna's Hummingbird	3
Allen's Hummingbird	2
Downy Woodpecker	2
Northern Flicker	1
Black Phoebe	3
Tree Swallow	8 (inc. 3 juva.)
No. Rough-winged Swallow	35
Cliff Swallow	100
Scrub Jay	1
American Crow	21
Bushtit	15
Bewick's Wren	8
American Robin	1
Wrentit	4
Northern Mockingbird	1
California Thrasher	2
European Starling	25
Hutton's Vireo	2
Yellow Warbler	1
Common Yellowthroat	2
Yellow-breasted Chat	2
Black-headed Grosbeak	2
Rufous-sided Towhee	8
California Towhee	5
Song Sparrow	33
Red-winged Blackbird	19
Brewer's Blackbird	4
Brown-headed Cowbird	5
House Finch	20
Lesser Goldfinch	3
American Goldfinch	10
House Sparrow	3

# APPENDIX E



FLOODING INVESTIGATION REPORT  
VENTURA BEACH RV RESORT, VENTURA, CA.  
Hawks & Associates, Inc.  
August 1992

Key-Flood Boundaries

- ① FEMA 50-Year (67,000 cfs)
- ② FEMA 10-Year (34,000 cfs) and approximate 100-Year above Main Street w/channel cleanout
- ③ Approximate observed for 1992 Flood - 22-Year (46,700 cfs)
- ④ Calculated 22-Year w/FEMA model