Vertebrate Resources at Emma Wood State Beach and the Ventura River Estuary, Ventura County, California: Inventory and Management

Report to
City of San Buenaventura,
California Coastal Conservancy
and
The State of California
Department of Parks and Recreation,

by

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6 November 1992

PREFACE

This report is intended to accompany the previous study by Ferren, et al. (1990), entitled "Botanical resources at Emma Wood State Beach and the Ventura River estuary, California: Inventory and Management". Support for work reported here came from joint funding from the City of San Buenaventura, California Coastal Conservancy and the State of California, Department of Parks and Recreation. The contract for the Ventura River Estuary Enhancement Project was awarded to Wetlands Research Associates of San Rafael, California, who subcontracted Lawrence E. Hunt and Paul E. Lehman to inventory and assess the vertebrate resources of the lower Ventura River and estuary.

This work forms the basis for a study of the faunal resources of the Ventura River Estuary and surrounding area. The study area includes: a) Emma Wood State Beach-Ventura River Group Camp, which is owned and operated by the California Department of Parks and Recreation; b) Seaside Wilderness Park, which is owned by the City of San Buenaventura, and; c) the Hubbard property, a privately owned parcel within the floodplain. The findings of this study were related to previous work conducted by the authors upstream and adjacent to the Ventura River floodplain. Management recommendations presented in this report are intended to enhance the wildlife and interpretive values of the lower Ventura River and increase public awareness of the wealth of biological resources found in this unique area.

Lawrence E. Hunt
6 November 1992

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1.0 INTRODUCTION

1.1 Background

The Ventura River Estuary and adjacent habitats occur in coastal central Ventura County, California (Fig. 1) immediately west of urbanized portions of the City of San Buenaventura and about 65 air miles west of Los Angeles (Fig. 2). In 1988, the Environmental Research Team of the University of California-Santa Barbara Herbarium was awarded a contract to examine the botanical resources at Emma Wood State Beach-Ventura River Group Camp. Their report (Ferren, et al, 1990), suggested the need for a companion study of the faunal resources of the area. In 1991, a contract was awarded to Wetlands Research Associates, San Rafael, California, by the City of San Buenaventura, the California State Coastal Conservancy and the California Department of Parks and Recreation to study aspects of the biological and hydrological resources, and recreational opportunities of the Ventura River Estuary, Emma Wood State Beach-Ventura River Group Camp and the Hubbard Property.

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.

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.

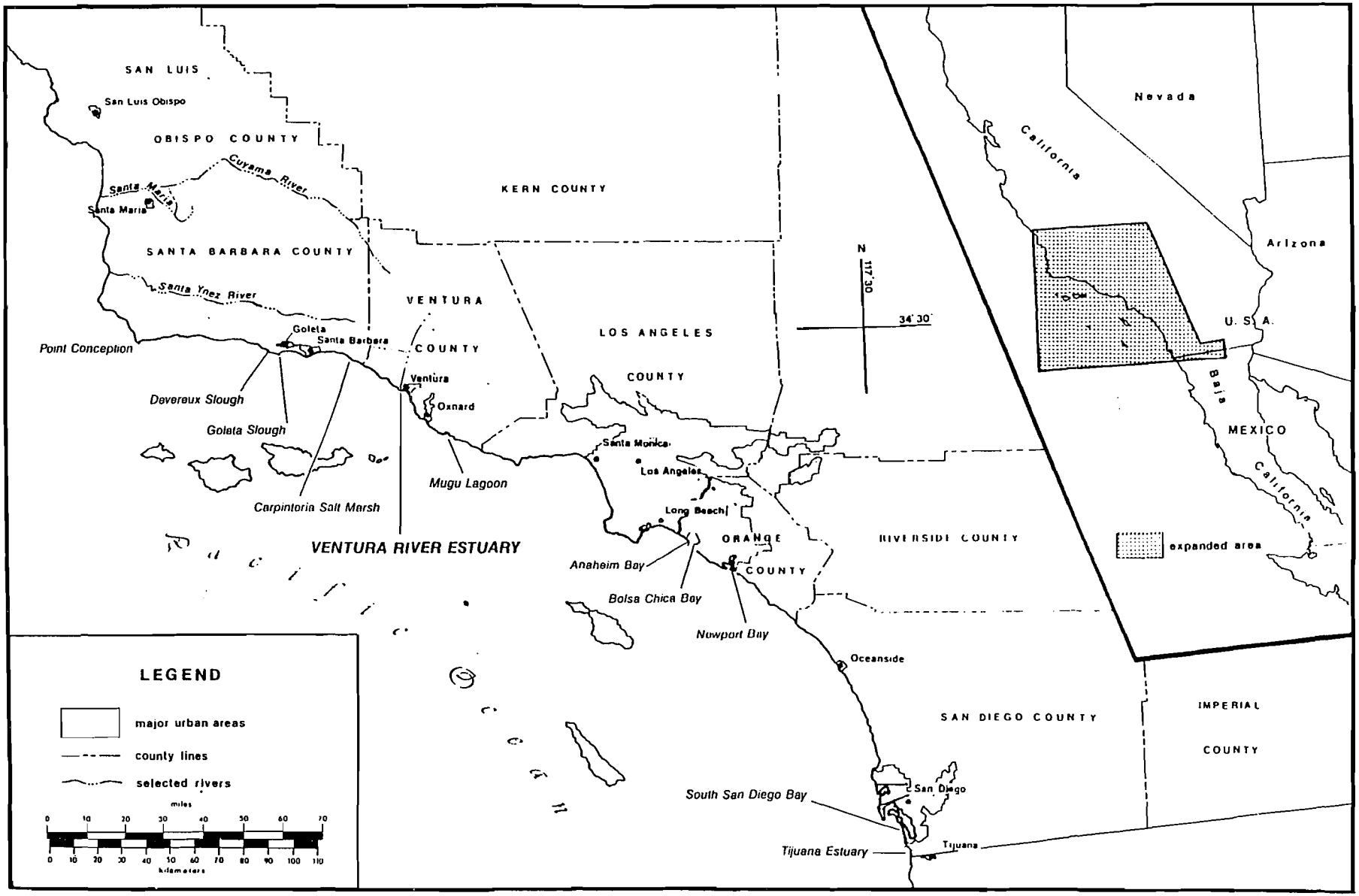

FIG. 1. LOCATION OF THE VENTURA RIVER ESTUARY (and the Study Area, including Emma Wood State Beach–Ventura River Group Camp, and Seaside Wilderness Park). **Adapted from Ferren, et. al. (1990).**

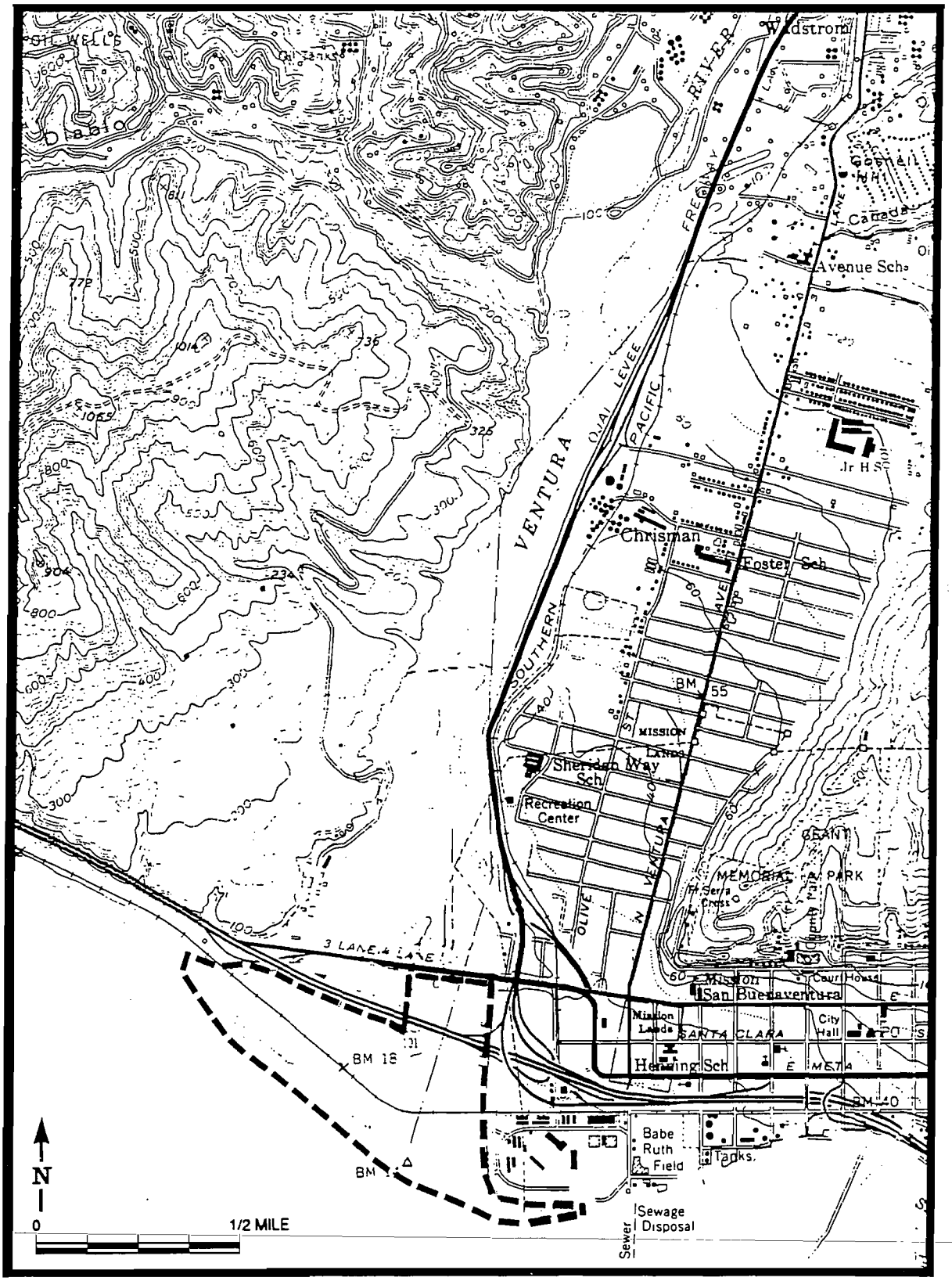

FIG. 2. TOPOGRAPHIC MAP OF THE LOWER VENTURA RIVER BASIN. (Modified from the Ventura 7.5 minute Quadrangle 1951, photo revised 1967). The general study area is outlined by a bold, dashed line. **Adapted from Ferren, et. al. (1990).**

Although the Ventura River Estuary and native habitats at Emma Wood State Beach and the Hubbard Property have been significantly impacted by human activities, it remains an area of high faunal diversity in close proximity to an urban area.

1.2 Study area

The study area (Fig. 3) covers approximately 110 acres and includes three sub-areas: Emma Wood State Beach-Ventura River Group Camp (77 acres); Seaside Wilderness Park (20 acres); and the Hubbard Property (13 acres). Ferren, et al, (1990) provides a description of each area.

1.3 Purpose

The information presented in this report is based on field surveys, literature reviews, searches of museum records and conversations with local biologists. The purpose of this study was 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;*

2) *Document habitat use by vertebrates and identify the most sensitive vertebrate habitats on the study area;*

3) *Suggest management recommendations for sensitive species and habitats occurring on the study area and evaluate management recommendations suggested by Ferren, et al, (1990) as they relate to vertebrate resources on-site;*

4) *Identify interpretive themes for public education regarding vertebrate resources on the study area, and;*

5) *Identify future research opportunities.*

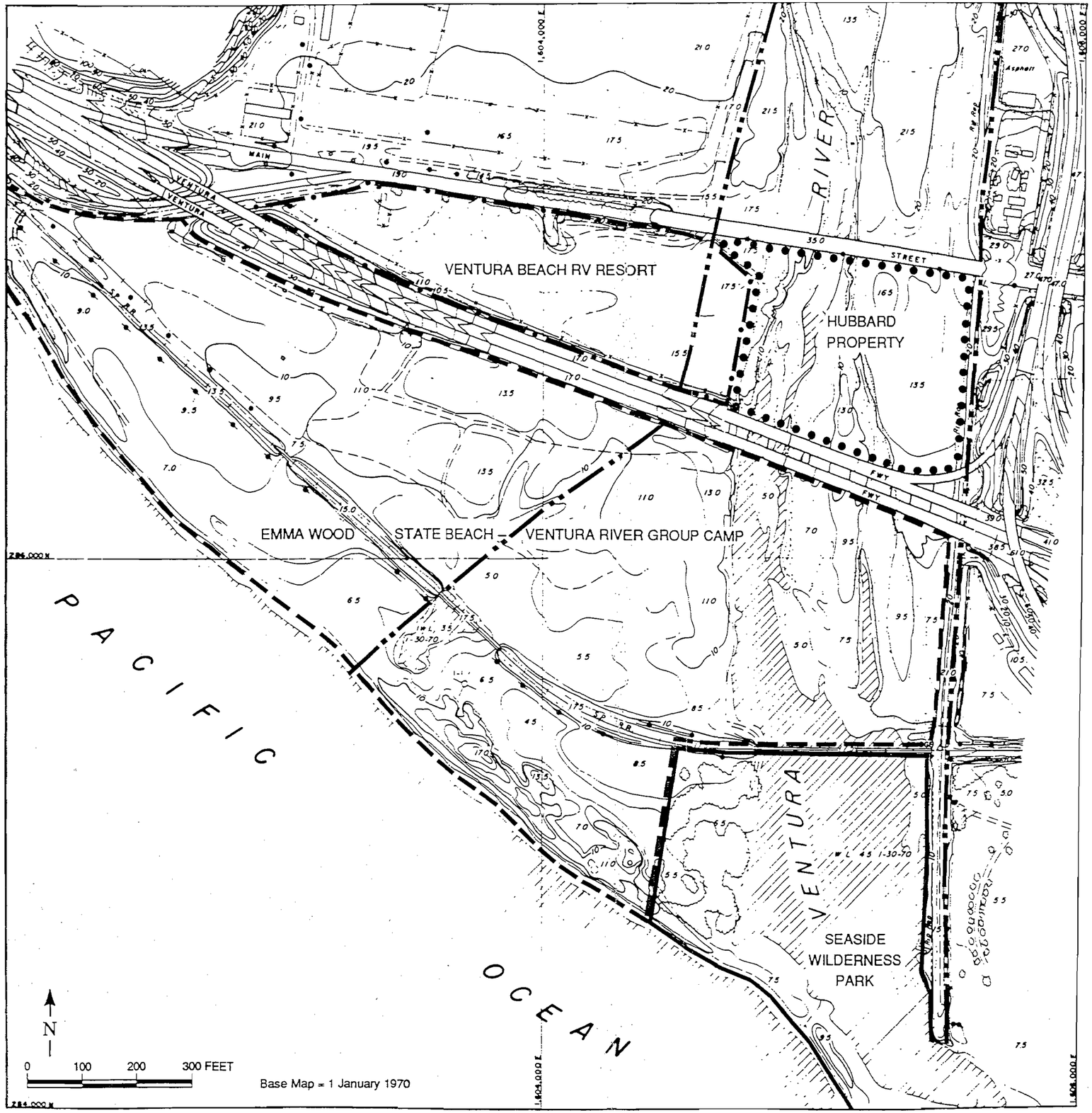

Fig. 3. Topographic, Ownership, and Regulatory Boundary Map

— — — **Emma Wood State Beach - Ventura River Group Camp**
(State of California, Department of Parks and Recreation)

——— **Seaside Wilderness Park**
(City of San Buenaventura-ownership)

• • • • • **Hubbard Property**
(Private)

———··— **Permanent Easement for Channel Clearing and Maintenance**
(Ventura County Flood Control District)

—·—·— **Ventura Beach RV Resort**
(Private)

The entire study area occurs within the City of San Buenaventura.

Adapted from Ferren, et. al. (1990).

Figure 3.

2.0 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.

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 (See Section 7.0: Research Opportunities). The anadromous and resident fish resources of the Ventura River are the subject of a number of recent studies, including: Swift, et al (1975); Moore (1980); Swift, et al (1989); City of San Buenaventura (1984-1990) 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 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 the 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.

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

Mammals were inventoried by surveying the entire study area on several occasions between June 1991 and June 1992 and recording direct observations and sign

(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, consisting 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 (Fig. 4). The live-trapping results are summarized in Fig. 10 and Table 2. Detailed microhabitat and trap success data is presented in Appendix 2.

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. The weather was generally overcast (low fog) in the afternoon, clearing in early evening. Winds were less than 5 knots, from the southwest. Air temperatures reached a daytime high of 75 ·F and a nighttime low of 55 ·F. 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, placed directly beneath roosts, were used to capture bats leaving these sites at dusk to forage. A single mist net was also placed across a 20-foot wide channel of the Ventura River near the northern end of the study area. Two "Mini-2" Bat Detectors were used to detect bat calls at night. Binocular and monocular night-vision scopes were used to observe and identify foraging and roosting bats.

3.0 HABITAT USE

The following discussion pertains to vertebrates known to occur on the study area as documented by direct observations during field surveys or through literature and/or museum records.

3.1 Species density

Approximately 172 genera and 268 species of vertebrates native to California currently utilize the study area (Table 1). Birds are by far the most diverse group inhabiting the study area on a permanent or temporary basis. Amphibians and reptiles, for reasons discussed below, are a depauperate component of the vertebrate fauna of the study area.

Fifteen genera containing 16 species of vertebrates not native to California are also found in the study area. Non-native freshwater fish (6 species) comprise the majority of the introduced vertebrates found in the study area.

Twenty species of vertebrates known to occur within the study area are 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. Together they comprise approximately 7% of the native vertebrate resources in the study area. These species are discussed in more detail in Section 4.0.

Table 1. Number of genera and species of native and introduced vertebrates found on the study area. A full species list is provided in Appendix 1.

		Number of genera	Number of species
FISHES	Native	10	11
	Introduced	5	6
AMPHIBIANS	Native	1	1
	Introduced	1	1
REPTILES	Native	5	5
	Introduced	0	0
BIRDS	Native	139	233
	Introduced	4	4
MAMMALS	Native	17	18
	Introduced	5	5
SUBTOTAL	**Native**	**172 genera**	**268 species**
	Introduced	**15 genera**	**16 species**
TOTAL		**187 GENERA**	**284 SPECIES**

3.2 Habitat use

Habitat classification for this report is 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 (Fig. 5).

3.2.1 Fishes

The Ventura River in the study area can be subdivided into two important contiguous habitats for fishes: the estuary and the primary river channel (Fig. 6). 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, the river can receive adults of anadromous species attempting to spawn in the estuary (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.

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 separately in Section 4.1.

3.2.2 Amphibians

In general, the study area provides marginal habitat for amphibian species because of the lack of freshwater and widespread occurrence of saline soils and associated halophytic vegetation. Well logs indicate that brackish ground water lies between 1.5 and 3.5 feet below ground surface at the second mouth of the Ventura River (Meisenbach, 1975, in Ferren, et al, 1990). Potentially important amphibian habitats are shown in Figure 7.

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. It was found at several locations throughout the study area.

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 occur on-site in riparian wetlands and transitional areas, scrub wetlands and estuarine/palustrine wetlands. This species is also common farther upstream.

Freshwater 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.).

3.2.3 Reptiles

Reptile diversity in the study area is relatively low due to the local marine influence (frequent, persistent fog), lack of habitat heterogeneity and the frequent, sometimes intense natural and human-induced disturbances. Field surveys consistently sighted the same species: common, widespread taxa, such as the Western Fence Lizard (*Sceloporus 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 (Fig. 7). The potential occurrence of other reptilian taxa in the study area are discussed in Section 5.0.

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. Section 4.0 discusses the distribution of these species on-site.

3.2.4 Birds

The two most important habitat types for birds in the study area are the Ventura River Estuary wetlands and the riparian woodlands (Fig. 8).

The estuary is used by large number of waterbirds, whose densities vary seasonally and daily with fluctuating water levels. The largest numbers of birds are typically found when water levels in the estuary are relatively low, exposing mudflats and adjacent aquatic habitats. Moderate numbers of waterfowl are found on-site from mid-fall through early spring, gulls and terns use the area year-round for resting and bathing (as do a small number of Brown Pelicans (*Pelecanus occidentalis*), and large numbers of shorebirds are present when water levels are low, exposing mudflats utilized for feeding. Regionally declining and/or endangered species that frequent this site include the Osprey (*Pandion haliaetus*) and Peregrine Falcon (*Falco peregrinus*) (rare visitors), Snowy Plover (*Charadrius alexandrinus*) (small numbers are found on the sandy shores and mudflats, primarily in late summer), and Least Tern (*Sterna antillarum*) (which utilize the estuary area 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 visit the estuary and associated cobble intertidal areas on their northward migration. Here they feed on the abundant algae (*Enteromorpha* and *Ulva* spp.) which colonizes 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 woodlands, especially adjoining water, are 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 include 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 are used heavily by relatively widespread and common species of birds and may occasionally be 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. Section 4.0 and 5.0 contains detailed information on the occurrence and potential occurrence of sensitive bird species in the study area.

Particular components of 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 are frequented by large flocks of Red-winged Blackbirds (*Agelaius phoeniceus*), Brewer's Blackbirds (*Euphagus cyanocephalus*) and European Starlings (*Sturnus vulgaris*).

The lower Ventura River and Estuary supports at least 237 species of resident and migratory birds however, the area can 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. Raptors, even resident species, are conspicuously absent from the study area. This finding is surprising given the high densities of rodents on-site. One might also expect the Ventura River fan delta 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 obligate riparian migrants continue to occasionally breed in woodlands along the Ventura River (including the

study area), indicates that 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.

3.2.5 Mammals

The study area is inhabited by a unexpected variety of small and large mammals, despite the presence of transportation corridors through the northern portions of the site (Fig. 2), urban development to the east and frequent human presence on-site. The mammal assemblage here is composed of geographically widespread, generalist taxa.

Riparian woodlands, scrub, estuarine and palustrine habitats are important resources for small mammals on the study area (Fig. 9). High densities of rodents and other prey species in the study area may be attributed to the noticeable absence of avian and reptilian predators in 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 2). Black Rats appeared to be restricted to habitats east of the Ventura River (see below).

Sign (tracks, scat) of medium to large native mammals are common throughout the site, but owing to the limited size of the study area, probably only represent 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*) appear to reside on-site. Dogs (*Canis familiaris*) are 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 (Brown, pers. comm). Most of the

collection records for bats in the vicinity of the Ventura River are old (1905-1950). The scarcity of more recent records may be due to a lack of recent field work coupled with 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. 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 Southern Pacific railroad bridges over the primary and secondary mouths of the Ventura River do not contain suitable roost sites for bats due to a lack of vertical crevices. Expansion joints between concrete sections of the underside of the southbound portion of the Highway 101 overcrossing offered suitable roost sites for bats but none were found there during the survey. The Main Street bridge, built in 1932, provides a roost for several species of bats. Most of the bats were observed in expansion joints beneath the western half of the bridge. Bat guano was observed beneath the eastern half of the bridge however, human encampments prevented a thorough survey of this portion of the bridge.

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 a least 6 sections of the bridge and exited from both sides of the bridge, an accurate count was impossible.

The Big Brown Bat is found is almost all habitats (including desert) throughout the Pacific States. Preferred roost sites include buildings and crevices. Locally, it has been collected from the Ventura and Santa Clara River drainages: Ventura (LACM No. 70218) and Fillmore (LACM No. 31656). Yuma Myotis are widespread in coastal and montane woodland habitats, including riparian situations in desert areas and also select buildings and crevices for roosting. Single museum records from the coastal slopes of the Santa Ynez Mountains in Santa Barbara County (Smith, et al, 1982) and from Lake Sherwood, Ventura County (LACM No. 8082) are the only specimens known prior to this study from this region. Mexican Freetail Bats are widespread in all lower elevation habitats throughout California, including the desert and are one of the most commonly observed bat species along the coastal and foothill regions of Santa Barbara and Ventura Counties. This species typically roosts beneath bridges. Local collection records include Weldon Canyon (LACM No. 30275); Ventura (LACM No. 30277; MVZ Nos. 18786; 9441-45; 4021-22) and Fillmore (LACM Nos. 8927-28) and Santa Cruz Island (Brown, pers. comm.).

Sections 4.0 and 5.0 contain further information on the known and potential occurrence of bats in the study area and Sections 6.0 and 7.0 discuss management and future research opportunities for this group of mammals.

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 appear to be utilized equally by these rodent species (Table 2; Fig 9). Estuarine habitats along the east bank of the Ventura River support fewer rodents, but harbor species uncommon or absent from the rest of the study area, such as the California Vole (*Microtus californicus*).

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 scrub and woodland habitats with a well-developed forb understory. In coastal dune habitat, woodrats were typically caught in traps placed near dense clumps of Saltbush (*Atriplex* ssp.) that bordered the leeward side of the dunes. The Deer Mouse (*Peromyscus maniculatus*) appears to utilize coastal dune and riparian woodland/scrub habitat but is uncommon in palustrine habitats on-site (Table

Table 2. Summary of small mammal trap events by habitat in the study area. The November 1991 and May 1992 trapping sessions are combined in this table.

	HABITAT TYPE				
	Palustrine	Dune/Dune Swale	Riparian Wdland/scrub	Estuarine	
SPECIES	Trapline 1	Trapline 2	Trapline 3	Trapline 4	TOTAL (%)
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%)	178

2). 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 suggest 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 2). Appendix 2 contains additional microhabitat data for each trapline.

An interesting result documented high densities of California mice 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 closely with the Dusky-footed Woodrat (Collins, pers. comm.). 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 and appeared to be closely associated with stands of Giant Reed (*Arundo donax*) at this site (Appendix 2). Both species have been present at the mouth of the Ventura River for decades; the Black Rat at least since 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 the prior occupation of woodland and scrub habitats west of the river by the similar-sized Dusky-footed Woodrat.

On the morning of 13 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. 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 Park. 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 of the Ventura River 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 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 6

illustrates an approximation of this newly-created estuarine habitat. This area is now periodically subjected to tidal influence and the channel separates 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 however, the study area was not subjected to 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 large patches *Scirpus* and *Arundo* were removed by the action of the water.

Figure 10 compares rodent population densities before and after this storm event. 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, but in substantially lower densities. Trap success declined an average of 32% (range: 15-47%) between November 1991 and May 1992 (Appendix 2). 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.

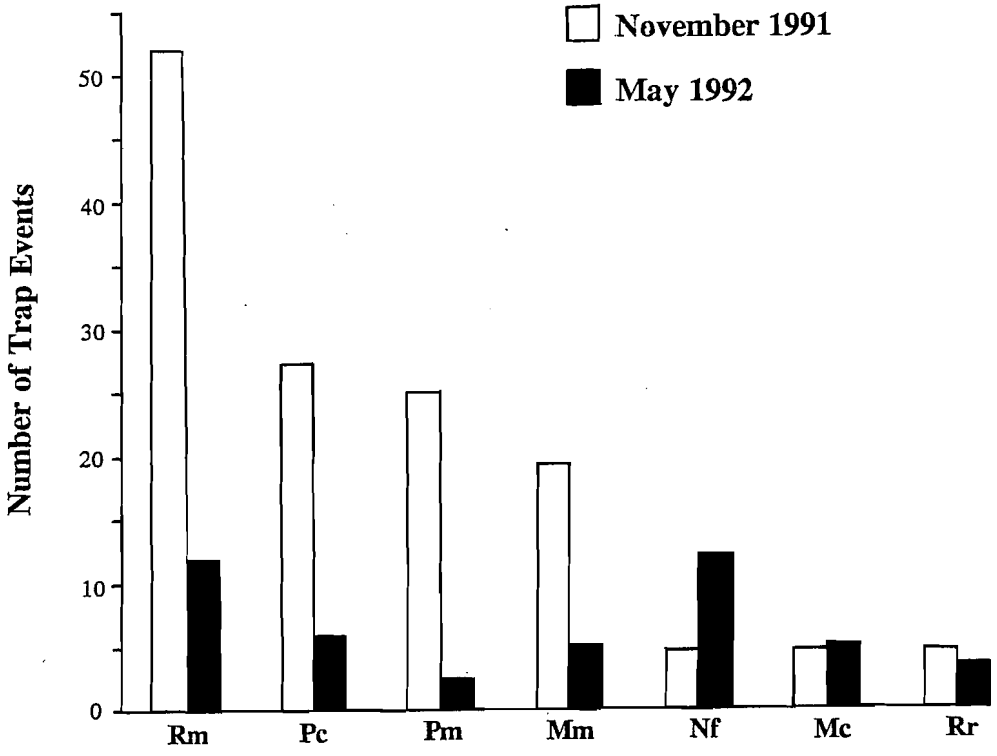

Figure 10. Temporal variation in small mammal trap success over all habitats in the project area between November 1991 and May 1992. [Rm = *Reithrodontomys megalotis*; Pc = *Peromyscus californicus*; Pm = *Peromyscus maniculatus*; Mm = *Mus musculus*; Nf = *Neotoma fuscipes*; Mc = *Microtus californicus*; Rr = *Rattus rattus*].

4.0 SENSITIVE SPECIES

4.1 Regulatory Classification of Sensitive Species

This section details the occurrence of protected vertebrates within or adjacent to the study site. State and federal regulatory status for a particular taxon is listed in California Department of Fish and Game (CDFG, 1991) and United States Fish and Wildlife Service (USFWS, 1991) bulletins. The term "sensitive species" means that a particular vertebrate species falls into one or more of the following categories:

a) Officially listed under the State and or Federal Endangered Species Acts;
b) State or Federal candidate species for possible listing, and;
c) California Department of Fish and Game "Species of Special Concern" (CDFG, 1991).

The following status acronyms are used:

SE - State of California Endangered
ST - State of California Threatened
CSC - California Species of Special Concern
FE - Listed as Endangered by the Federal Government
FT - Listed as Threatened by the Federal Government
FSS - Federal (Bureau of Land Management and Forest Service) Sensitive Species
CATEGORY 1 - Candidate for Federal listing (i.e., taxa for which the USFWS has sufficient biological information to support a proposal to list as Endangered or Threatened)
CATEGORY 2 - Candidate for Federal listing (i.e., taxa for which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking).

The study area is used on a temporary or permanent basis by at least twenty taxa listed as sensitive by the CDFG (1991) and/or USFWS (1991).

4.2 Fishes

Steelhead Trout (*Oncorhynchus mykiss*)
STATE/FEDERAL STATUS: CSC/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 species 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 trout are most common in the Ventura River from December to May (Moore, 1980), although sub-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. Historically, 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 southernmost streams in California currently supporting a steelhead run in most years (Moore, 1980; Leidy, 1991).

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 4,000 and 5,000 individuals (Clanton, et al, 1946; Evans, 1947). 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 currently accessible in the Ventura River. The Ventura River below San Antonio Creek currently supports a heterogeneous adult salmonid population consisting of migratory steelhead and resident rainbow trout (Tippets, 1979; Moore, 1980; City of San Buenaventura, 1990; 1991).

There are a number of barriers to successful upstream migration of steelhead, including: a) water diversion activities, which involve temporary and permanent physical barriers, and restriction in the level and direction of mid-range outflows necessary for fish movement; b) a variety of physical barriers such as road and bicycle crossings built without fish passage provisions, and; c) periodic flood control maintenance activities which eliminate natural geomorphological features such as holding pools. Several reaches of the lower Ventura River also have no well-defined channel as a result of mineral extraction activities. At these locations (0.5-1.5 miles north of the estuary), the active channel is very shallow and meandering, creating freshwater marsh habitat. The expected termination of this activity and 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 in the Ventura River.

Smith (1987) and Swift, et al. (1991) consider estuaries to be important rearing areas for juvenile steelhead, particularly in smaller stream systems with limited upstream rearing habitat. Freshwater inflows, especially during the dry season when sandbars isolate these estuaries from the ocean, are critically important in maintaining suitable water quality for this species. Inflow rates not only determine the depth of the estuary and the areas flooded, but patterns of salinity and temperature stratification. Decreased inflows promote the formation and maintenance of a bottom layer of saltwater which, in shallow estuaries, produces a solar collector effect, elevating water temperatures in the bottom layers enough to reduce steelhead growth rates and prey densities. Sufficient freshwater inflow prevents stratification of the water column and is crucial to successful juvenile steelhead rearing (Smith, 1987).

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.

Moderate numbers have been observed immediately 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 (1990, 1991). Extant populations deserve close monitoring and actions to maintain or improve the regional status of this species should be implemented (Swift, et al, 1991).

Tidewater Goby (*Eucyclogobius newberryi*)
STATE/FEDERAL STATUS: CSC/CATEGORY 2

A California endemic, this fish is discontinuously distributed in euryhaline estuaries and lower stream reaches from Aqua Hedionda Lagoon, San Diego County north to the mouth of the Smith River, Del Norte County (Swift, et al, 1975; Swift, 1989; 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 dispersal rates, restricted habitat and short life span make populations vulnerable to elimination by human activities (Swift, et al, 1989).

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, but not stagnant, upper portions of lagoons and

estuaries in water 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). Freshwater inflows are critical to the survival of this species for the same reasons discussed in the Steelhead Trout species account.

Coastal and upstream habitat modification and water diversion projects have seriously diminished habitat availability and quality in most estuaries 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 estuaries 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.

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. Individuals from the Ventura River Estuary have been transplanted to the Malibu Creek Estuary in Los Angeles County in an effort to replace the population which had been extirpated (Swift, 1991).

4.3 Amphibians

No sensitive species of amphibians are known to occur on the study area. Section 5.2 contains a discussion of the occurrence of the California Red-legged Frog (*Rana aurora draytonii*) in the lower Ventura River drainage.

4.4 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 and the introduction of non-native predators and competitors (fish, bullfrogs and crayfish) has severely fragmented the range of this turtle and reduced or eliminated recruitment in most extant populations (Holland, 1991; Jennings, et al, 1992). The Ventura and Santa Clara Rivers are among the southernmost coastal drainages harboring viable populations of turtles.

Although turtles were not sighted within the study area, small numbers of individuals can be found just outside the study area between the Main Street bridge and Foster Park. Approximately 20-40 adult individuals were observed by Hunt (1991) between a point 1 mile upstream from the Main Street bridge and the Shell Road bridge. Although this species prefers freshwater habitats, Holland (1991) lists several reports describing the occurrence of turtles in brackish and even sea water. A "heavily oiled" individual was found on the beach east of the Ventura River on 5 March 1978 (Santa Barbara Museum of Natural History, No. 422). Permanent utilization of a majority of the study 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 study area between the estuary and the Main Street bridge are expected to be used more frequently due to lowered salinities. Turtles have been sighted previously in this area (Ferren, et al, 1990).

Silvery Legless Lizard (*Anniella pulchra pulchra*)
STATE/FEDERAL STATUS: CSC/NONE

This highly specialized fossorial lizard occurs in a variety of habitats but is quite specific in its microhabitat requirements. It burrows beneath the leaf litter of shrubs or trees in loose, sandy soils and is generally absent from soils possessing a significant clay or silt component or from soils that experience any degree of saturation, overly a high water table or are subject to frequent disturbance (such as flooding). The only soil

type capable of supporting legless lizards within the study area is the remnant coastal sand dunes west of the Ventura River. 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 legless lizards at this site however, it may still be present here in low numbers. Formerly more continuous, legless lizard habitat is now highly fragmented between Pitas Point, the study area and the Oxnard Dunes. Beach erosion west of the Ventura River has eliminated considerable dune strand habitat. East of the Ventura River, recreational, commercial and residential development of the beaches and dunes has eliminated this species from this area. The remaining dune habitat on-site represents the best chance for survival of this species in the immediate vicinity.

Unrestricted human access to the dunes west of the Ventura River mouth is likely to extirpate this species from this locality, if indeed, they still occur there. Excessive human traffic in the dunes increases windborne transport of sand, leading to a loss of dune mass over time. The dunes are then 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 (Abbott, 1972) and in coastal dunes south of the Rio Santo Domingo in Baja California Norte, resulting in the apparent elimination of *Anniella* from these coastal localities (L. Hunt, pers. obs.). Invasion of the dunes by non-native exotics such as Hottentot Fig (*Carpobrotus edulis*) and introduced grasses also decreases the ability of this habitat to support these lizards. Section 6.0 presents management recommendations for the remaining dune habitat within the study area.

4.5 Birds

California Brown Pelican (*Pelecanus occidentalis californicus*)
STATE/FEDERAL STATUS: SE/FT

Pelican densities in the Southern California Bight have shown major declines associated with commercial overfishing of its primary food source, the Northern Anchovy (*Engraulis mordax*) (California Department of Fish and Game, 1991). Small numbers can be seen occasionally roosting at the estuary mouth, primarily during the summer. These birds feed in nearshore waters. Peak counts at the estuary between

1978 and 1980 were 20 individuals (Richard Webster, pers. comm.). One and 3 individuals were seen at the estuary during the 1991 censuses, on 11 and 17 August respectively and two individuals were seen during the 25 February and 21 June 1992 surveys. Twenty-five individuals were observed swimming in the estuary and roosting on the sand bar on 13 and 14 June 1992 (Capelli, pers. obs.). Human and non-human disturbance of post-breeding roosts along the central and southern California coast are a threat. Locally, such disturbance often results in 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 to the region, with the only regular wintering site along the California coast north of Orange County being the gun clubs at Point Mugu. One bird was sighted on the beach adjacent to the eastern mouth of the Ventura River on 23 September 1989 (Capelli, pers. obs.). This is the only known sighting in the previous ten years for the study area.

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 (Webster, pers. comm.), a single adult fishing in the estuary 13 May 1989 (Capelli, pers. obs.) and a single adult foraging along the Ventura River between a point approximately 0.50 miles upstream of the Main Street bridge and the estuary on 22 October 1992 (L. Hunt, pers. obs.).

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 (Capelli, pers. obs.). The loss of open space to the west and northwest of the study area with the construction of the Emma Wood State Beach-Ventura River Group Camp in 1983, played a role in the decline of the kites at this site. It should be noted however, that kites have declined in most areas even where the habitat appears unaltered and population densities may be temporally cyclic. Evermann (1885) listed kites as rare residents of the Santa Clara River Valley, having found only 4 or 5 pairs between 1879 and 1881. No Black-shouldered Kites were seen in the study area during the 1991 or 1992 surveys.

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 due to human disturbance. In fall and winter, numbers are augmented by migrants from the north. Small numbers continue to nest in

the vicinity of the Santa Clara River estuary at McGrath State Beach. Evermann (1885) found this species to be abundant along coastal Ventura County between the Ventura and Santa Clara Rivers between 1879 and 1881. Snowy Plovers are not known to breed in the Ventura River study area however, what are assumed to be post-breeding birds from McGrath State Beach are seen at the Ventura River Estuary at least in late summer and fall. Two individuals were sighted at the river mouth between 15 August and 4 November 1978 (Webster, pers. comm.). Several hundred individuals were observed on an exposed gravel bar in the lower estuary in Spring 1989 (Ferren, et al, 1990). Up to 5 individuals were there during August 1991. These birds frequented the upper sections of the sandy beach near the estuary mouth and the drier mud-flats in the estuary itself. The most serious threat to Snowy Plovers is human disturbance, particularly during the April-June breeding season. This type of disturbance usually involves people, motor vehicles and pets, particularly dogs moving through nesting and roosting areas on the beach and in the dunes west of the estuary. The exposure of cobble beds along the beaches and the estuary during the winter months yields poor habitat for plovers at that season.

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

The only nesting colonies remaining between Los Angeles and Point Conception are found in Ventura County (McGrath State Beach, Point Mugu and Ormond Beach). Statewide population declines are due to the same human factors as for the Snowy Plover. Three adults were sighted in the estuary area on 15 August 1978 (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 on the sand bars and beaches in the estuary and at the river mouth. In 1990, 15-20 individuals were present on 22 August (Capelli, pers. obs.). These individuals were subjected to 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 and the adults were still feeding their fledged young at this site in late August 1991. It is unknown whether these family groups bred in Ventura County or in colonies in Orange or Los Angeles Counties or northern Santa

Barbara County. This species winters in Latin America. Between 13 and 14 June 1992, about 12 to 14 individuals were observed feeding and drinking in the estuary and nearshore waters. They remained there until early July (Capelli, pers. obs.). No evidence of nesting was found despite the presence of suitable habitat on a large sandspit that had formed in the lagoon. The breeding colony at nearby McGrath State Beach appeared to have failed this summer and may be the source of these birds.

Black Swift (*Cypseloides niger*)
STATE/FEDERAL STATUS: CSC/NONE

One individual of this species was sighted at the mouth of the Ventura River on 19 April 1981 (Webster, pers. comm.). Suitable nesting habitat does not occur in the vicinity of the lower Ventura River, however it is probably a casual migrant to the area and the site may be used for foraging during migration.

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

Tree swallows have declined due to the loss of riparian and wetland habitat used for nesting and foraging. Evermann (1885) listed this species as a "...locally abundant resident.", adding that "Many breed in the willows near the mouth of the Santa Clara River." They are now known to nest in Ventura County only at the Ventura Sewage Treatment Facility adjoining the Santa Clara River estuary (several pairs), 1-2 mi E of Saticoy (5 pairs in 1992), 3 mi E Santa Paula (2-3 pairs in 1992) and at several locations farther inland along the Santa Clara River (Holmgren, pers. comm.). This species still occurs fairly commonly as a migrant and small numbers regularly winter at the gun clubs at Point Mugu. In the Ventura River study area, 2 individuals were seen on 19 May 1991 (late for migrants) in appropriate breeding habitat--dead snags with holes in large willows--near the west side of the main railroad bridge. In 1992 at least 8 individuals (including 3 fledged juveniles) were seen in the estuary and immediately upstream vicinity, thus providing strong evidence of local nesting.

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

This species is a summer resident of riparian woodland (primarily willow-cottonwood). 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 population along the Amargosa River in Inyo County and numerous small populations from southern California (Santa Barbara, Ventura, Riverside, San Bernardino and San Diego Counties) into northwestern Baja California Norte (State of California, 1991). Major statewide declines during the past fifty years result from the combination of riparian habitat loss and increased brood-parasitism by the Brown-headed Cowbird (*Molothrus ater*). In Ventura County, very small populations persist along the middle and upper portions of the Santa Clara River between Saticoy and the junction of the river and Interstate 5. 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 riparian willow habitat approximately 100-200 feet inland from the main railroad bridge. No mate was seen.

It is doubtful whether the Ventura River study area can support this species on a regular basis. Dense willow riparian vegetation along the main water channel offers suitable nesting habitat however, the coastal location is not consistent with the inland breeding habits typically displayed by this species. The overall rarity of this species factors against its regular occurrence in the project site, even as a migrant. Attempts to locate Bell's Vireos in the Ventura River floodplain between the river mouth and Ojai in 1986, and farther upstream in 1991, were unsuccessful (California Department of Fish and Game, 1991).

Warbling Vireo (*Vireo gilvus*)
STATE/FEDERAL STATUS: NONE/NONE

Evermann (1885) listed this species as an uncommon summer resident of the Santa Clara River Valley during his observations between 1879 and 1881. It is now a regionally declining riparian breeder. Small numbers occur in the study area during migration but none have been found on-site during the summer.

Yellow Warbler (*Dendroica petechia brewsteri*)
STATE/FEDERAL STATUS: CSC/NONE

This is a regionally declining riparian breeder and like the previous species, is found in the study area during migration however, a small number remain to breed in willow-cottonwood forest during the summer. In 1991, at least two singing birds were found during June in riparian woodland west of the Ventura River and south of Highway 101. One bird was present in the same vicinity in late June 1992.

Yellow-breasted Chat (*Icteria virens*)
STATE/FEDERAL STATUS: CSC/NONE

This regionally declining breeding species is now uncommon but local in Ventura County. Probable breeding individuals were sighted in the study area on 27 April, 1 May and 13 July 1979 (Webster, pers. comm.). Four individuals were found in dense willow forest on the west bank of the Ventura River between the Southern Pacific Railroad bridge and the Main Street bridge in May and June 1991 and two birds were observed in the same area on 21 June 1992.

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. Populations throughout the range appeared to be stable or increasing according to censuses conducted in the late 1980's and approximately 2,275 pairs were located range-wide in 1986 (California Department of Fish and Game, 1991). The more common inland migratory race frequents coastal habitats between late spring and late fall (Holmgren, pers. comm.). Individuals of this race were seen on-site during the 6 November 1991 survey. 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 (Forsell, 1976). None were found on-site during the 1991 censuses. In July 1992, a small flock of *beldingi*, consisting of three pairs of adults and a few juveniles, were observed south of the railroad tracks approximately 0.8 miles west of the Ventura River Estuary (Greaves, pers. comm.). These individuals were found in dense *Salicornia/Distichlis/Atriplex* vegetation. Lush, green stands of *Salicornia* are required for breeding birds. The areal extent of this habitat around the second mouth and in areas bordering the main estuary is rather small. Consequently, sparrow populations found there would be expected to be small and unstable. Individuals or a pair of birds may occasionally establish a territory in this area.

4.6 Mammals

Pallid Bat (*Antrozous pallidus*)
STATE/FEDERAL STATUS: CSC/NONE

This is a widespread bat of coastal, desert and lower elevation montane habitats throughout the Pacific States. Old collection records include: Ventura (MVZ Nos. 4030-31; 9446; LACM No. 30244) and Fillmore (LACM No. 8929). It also occurs on Santa Cruz Island (Brown, pers. comm.). Large fecal pellets and insect remains found beneath expansion joints under the west side of the Main Street bridge on 3 July 1992 suggest that this site is used as a temporary nighttime roost by this species. The expansion joints are large enough in places to also provide daytime roosts (Brown, pers. comm.).

5.0 POTENTIALLY OCCURRING OR EXTIRPATED SPECIES

The vertebrates discussed in this section fall into two categories: 1) their occurrence on-site could not be documented through field, museum record and literature surveys however, they have been verified as occurring in similar habitats adjacent to the Ventura River floodplain or in coastal saltmarsh habitats between Goleta, Santa Barbara County and Port Hueneme, Ventura County. Many of these species are common and have been included because they occur in mesic woodland habitats upstream from the project area. The riparian corridor adjacent to the Ventura River may allow them to disperse towards the coast; 2) they have previously been documented as occurring in or near the study area, but are now thought to be extirpated from the vicinity.

The following museum acronyms are used in this section: LACM (Los Angeles County Museum); UCSB (UC-Santa Barbara Vertebrate Museum): SBMNH (Santa Barbara Museum of Natural History); MVZ (UC-Berkeley Museum of Vertebrate Zoology); CAS (California Academy of Sciences).

5.1 FISHES

Brown Trout (*Salmo trutta*)
STATE/FEDERAL STATUS: NONE/NONE

This European native was introduced into the eastern United States in 1883. It was first introduced in northern California in 1894 and is now present in trout waters throughout the state. It is capable of displacing native Rainbow Trout and other native species from slower stream sections wherever they co-occur (Moyle, 1976; McGinnis, 1984). This species was stocked in the Ventura River up to, and including, 1936, but in 1946, very few, if any, were still present (Shapovalov, 1946). 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. Its very brief habitation of spawning streams, usually only 3-4 weeks compared to the year residency of Coho Salmon (*O. kisutch*), may be an adaptation to the marked wet and dry season experienced by most watercourses in California. The freshwater life of the parr is primarily devoted to migrating downstream to the sea (McGinnis, 1984). King Salmon spawn in permanent coastal streams and rivers that have cool, summer flows. The southernmost consistent run now occurs in the Sacramento-San Joaquin River system. Water diversion projects 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). King Salmon were recorded by Jordan and Gilbert (1881) from the Ventura River however, no specimens were preserved and no later records have been reported from this watercourse.

Bluegill Sunfish (*Lepomis machrochirus*)
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 species (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) listed this species as occurring in the lower Ventura River and 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 here, it would be found at the 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 native southern California species was originally found 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. Introduced populations in Sespe Creek have hybridized with the introduced Owens Sucker (*C. fumeiventris*) but introgression appears to be limited to that watercourse (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) does 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).

5.2 AMPHIBIANS

Black-bellied Slender Salamander (*Batrachoseps nigriventris*)
STATE/FEDERAL STATUS: NONE/NONE

This common salamander has been collected in oak woodland and mesic scrub habitats adjacent to the Ventura River and its tributaries several miles upstream from the study area, including the west bank of the 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). It probably occurs closer to the study area in woodlands along the Ventura River however, its occurrence on-site is unlikely because: a) elevated soil salinities; b) lack of stable woodland habitat such as oak woodland on old stream terraces, and; c) this species is a poor colonizer of disturbed environments which are common throughout the study area.

Western Toad (*Bufo boreas*)
STATE/FEDERAL STATUS: NONE/NONE

This widespread species 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 temporary 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 their field surveys which extended 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 and July 1992 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 draytonii*)
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 such as Largemouth Bass (*Micropterus salmoides*) and Bullfrog (*Rana catesbeiana*) to these aquatic environments, has eliminated this species from 75% of its range. Populations that remain are small and fragmented. Only 3 populations remain in central and southern California that contain greater than 350 adults (Jennings, et al, 1992). Red-legged frogs were probably present in freshwater habitats in the study area, but no longer occur there. Records from the 1940's document its presence in the main stem of the Ventura River (6.4 miles NE of Ventura and the Ventura River at Coyote Creek in Foster Park) and its tributaries (San Antonio Creek, 4 miles downstream from Ojai). These specimens are mostly tadpoles (Jennings, pers. comm.). There are more recent (1970's) records from tributaries in the upper Ventura River drainage: 0.5 mi S Matilija Dam (LACM No. 13499); Matilija Creek at the Hot Springs (UCSB). Several mid-1970's records exist for San Antonio Creek. Red-legged frogs are probably still extant in this drainage and in the headwaters of most tributaries of the Ventura River wherever bass and bullfrogs have not been introduced or cannot persist. It has probably been extirpated from the main stem of the river (Jennings, pers. comm.).

Bullfrog (*Rana catesbeiana*)
STATE/FEDERAL STATUS: NONE/NONE

This introduced ranid is 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 salinities permit, but avoids brackish and sea water. In November 1991, 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 the spot by a predator.

5.3 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 such as coastal sand dunes, open scrub and riparian habitats with friable soils. It has been collected in arid upland habitats around Ojai (LACM No. 101483) and west of Lake Casitas (UCSB) and has also been found in coastal dunes west of Devereux Slough, Santa Barbara County (UCSB). These dunes are more extensive than those found in the study area and are contiguous with upland grassland and scrub habitats. Its occurrence in scrub or coastal dune habitats in the study area is unlikely.

Western Skink (*Eumeces skiltonianus*)
STATE/FEDERAL STATUS: NONE/NONE

This common lizard is found in a variety of relatively mesic habitats, such as oak woodland on north-facing slopes. It has been collected from the riparian corridor 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 in the study area away from the estuary and saline soils.

Southern Alligator Lizard (*Elgaria multicarinatus*)
STATE/FEDERAL STATUS: NONE/NONE

This lizard is typically found in mesic woodland and scrub habitats throughout the region. It has been collected in the Ventura River drainage at 4.7 mi SE of the Ventura River bridge over 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 is expected to occur in riparian woodland and adjacent scrub habitats in the study area.

Ringneck Snake (*Diadophis punctatus*)
STATE/FEDERAL STATUS: NONE/NONE

This small, secretive snake occurs in a variety of coastal and upland habitats. It has been found within the Ventura River floodplain on a stream terrace 15 feet above the river at a point approximately 2 miles north of the Main Street bridge in May 1991 (UCSB; Hunt, pers. obs.). It may occur within the study area however, the site lacks suitable cover objects and is subject to periodic disturbance from storm events.

Night Snake (*Hypsiglena torquata*)
STATE/FEDERAL STATUS: NONE/NONE

This small, secretive snake is generally found in rocky or sandy habitats. 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) and 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 Canyon on the Hollister Ranch in Santa Barbara County" (Collins, pers. comm.). Its potential occurrence in the study area is controlled by the same factors that affect the Ringneck Snake.

Striped Racer (*Masticophis lateralis*)
STATE/FEDERAL STATUS: NONE/NONE

This wide-ranging snake is a habitat generalist but locally, is typically encountered in arid, warm, inland sites. It has been collected in coastal habitats in Santa Barbara and Ventura Counties (e.g., Santa Barbara and between Rincon Creek and Pitas Point) (UCSB) and within the Ventura River drainage west of Lake Casitas and along the North Fork Matilija Creek (Sam Sweet, pers. comm.). If it occurs in the study area, it may be found in scrub habitats.

Common Kingsnake (*Lampropeltis getulus*)
STATE/FEDERAL STATUS: NONE/NONE

This snake is a habitat generalist and 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 in Oakview at the corner of Santa Ana Blvd and Santa Ana Road (SBNHM No. 1291). Large snake tracks commonly seen in palustrine and dune habitats during the 1991 and 1992 field surveys on the study area may have been made by this species and/or the Gopher Snake (*Pituophis melanoleucus*). The latter species was found within the study area in *Arundo/Scirpus/Distichlis* habitat on the east bank of the Ventura River south of the Southern Pacific railroad tracks in May 1992 (Hunt, pers. obs.).

Two-striped Garter Snake (*Thamnophis hammondii*)
STATE/FEDERAL STATUS: CSC/NONE

This aquatic snake occurs in semi-permanent and permanent freshwater streams and ponds with bordering riparian woodland in central and southern California. It also frequents stock ponds and other man-made water sources. It can range well into xeric habitats such as chaparral adjacent to watercourses (Hunt, pers. obs.). Habitat alteration, 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 (UCSB 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 provides marginal habitat for this species.

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

This widespread snake is found in a variety of coastal and montane habitats, but is most common in arid, warm, inland environments. Coastal collection localities include: jct L Ave and 17th St, Point Mugu Naval Air Station (SBNHM No. 1346); Point Mugu NAS (SBNHM No. 143) and Devereux Slough (UCSB). High rodent densities found throughout the study area furnish abundant food for this species and it is likely to occur on-site.

5.4 BIRDS

Tundra Swan (*Cygnus columbianus*)
STATE/FEDERAL STATUS: NONE/NONE

Evermann (1885) listed this species as a "Frequent winter visitor in lagunas along the coast [of Ventura County].", during observations made between 1879 and 1881. It is now observed near the coast only as far south as the Monterey Bay region.

Trumpeter Swan (*Cygnus buccinator*)
STATE/FEDERAL STATUS: NONE/NONE

Evermann (1885) listed this species as a "Winter visitant with the [Tundra Swan], but more common.", during his observations between 1879 and 1881. It is now regularly found no further south than the Columbia River.

Bald Eagle (*Haliaetus leucocephalus*)
STATE/FEDERAL STATUS: ENDANGERED/ENDANGERED

Evermann (1885) listed this species as a resident of coastal Ventura County, including "...one or more resident pairs on the coast near Rincon Point." The Ventura River Estuary and adjacent riparian corridor probably provided excellent foraging and

roosting sites for eagles.

Bald eagles are regular winter visitors to parts of Santa Barbara and Ventura Counties, frequenting inland reservoirs such as Lake Cachuma in Santa Barbara County and Lake Casitas in Ventura County. The Lake Cachuma eagles appear to be spending greater amounts of time at these localities and could conceivably breed in the area in the future.

Cooper's Hawk (*Accipiter cooperi*)
STATE/FEDERAL STATUS: CSC/NONE

This hawk is a regionally declining breeder that nests in riparian and oak woodland. It is a rare breeding species in Ventura County and is uncommon as a migrant and winter visitor. This species was not sighted on the study area during the 1991 nesting season and there is no evidence to suggest that this species nested here during the previous decade. Two individuals were sighted in riparian woodland by Hunt (1991), 1-2 miles north of the Main Street bridge. Nesting likely occurs upstream beginning in the Cañada Larga area.

Long-eared Owl (*Asio otus*)
STATE/FEDERAL STATUS: CSC/NONE

If old accounts of its abundance in the Santa Clara River Valley are any indication of previous regional trends, this species probably formerly occurred along the lower Ventura River. Evermann (1885) considered this species, "...an abundant resident, found dozing during the day in the clumps of live oaks or among the willows along the streams [in the Santa Clara River Valley]. Old crow's nests are generally appropriated in which it lays its eggs."

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 population 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.).

Tricolored Blackbird (*Agelaius tricolor*)
STATE/FEDERAL STATUS: CSC/CATEGORY 2

Evermann (1885) listed this species as an abundant resident of the Santa Clara River Valley, seemingly more abundant than the Red-winged Blackbird (*A. phoeniceus*). Small flocks of less than 100 individuals are still seen in this valley (Hunt, pers. obs.). Regional declines in numbers of Tricolored blackbirds have been attributed to the cumulative loss of wetlands in conjunction with consecutive years of below-normal precipitation between 1986 and 1991. Previously, it may have been found on the study area during the fall and winter months foraging with Red-winged and Brewer's Blackbird (*Euphagus cyanocephalus*) flocks or roosting at night in *Scirpus* beds near the Southern Pacific Railroad Bridge over the Ventura River.

5.5 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. Southern California coastal saltmarsh populations were recognized as subspecifically distinct by Von Bloeker (1932). Based on collection

localities known to him at that time, Von Bloeker considered the northern distributional limit to be the Point Mugu saltmarsh (LACM Nos. 3435 and 8118). Ornate shrews (subspecies not known to us) have subsequently been collected at Sandyland Slough (i.e., Carpinteria Saltmarsh) (UCSB No. 1717) and several individuals (subspecies unknown to us) 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 probably occurs in estuarine and palustrine habitats adjacent to the Ventura River mouth in the study area.

Trowbridge's Shrew (*Sorex trowbridgii*)
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. Locally, it is typically found in heavily wooded areas of the Santa Ynez Mountains (e.g., mountains behind Montecito and Carpinteria, Santa Barbara County) (Collins, pers. comm.). It apparently reaches its southern distributional limit north of the study area however, it is included here because of an indeterminate record from coastal southern Santa Barbara County. Stendall (1967) found skeletal material tentatively identified as *S. trowbridgii* in a Black-shouldered Kite (*Elanus caeruleus*) pellet in Hope Ranch in Santa Barbara, Santa Barbara County. It is not likely that this species occurs on the study area. If it does occur in riparian habitats here, this population would be the southernmost in its range.

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

This uncommon shrew typically occurs in arid sagebrush and coastal sage scrub habitat. Little is known of its habits and its habitat affinities may be broader than 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 creek and the Highway 101 overcrossing in Santa Barbara County (LACM). Two nights of trapping by him on both banks of this stretch of Rincon Creek failed to produce

additional specimens however, he did find an another individual the following morning, dead in the shallow water of the creek, having apparently died from a fall from the highway bridge. Dense stands of coastal sage scrub are found on slopes adjacent to the riparian corridor at this site and it is possible that this species prefers scrub habitats adjacent to mesic habitats. This record represented the northwesternmost collection locality at the time. Von Bloeker reported the nearest locality to be Timber Canyon, Ventura County. Additional collection localities from Ventura County are all from the Santa Clara River and adjacent drainages: 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 others); Simi Valley, north side of Southern Pacific railroad right-of-way, 0.7 miles west of Oak Park (SBMNH) and Point Mugu (LACM No. 68692). Habitat information for the latter specimen is lacking, but recent collecting in July 1992 seems to indicate that this species has an affinity for dense coastal sage scrub (Collins, pers. comm.). Each of the above localities possess dense coastal sage scrub habitat that is not found on or in the immediate vicinity of the study area. Although unlikely, this species may be found in remnant scrub habitats on the study area.

California Myotis (*Myotis californicus*)
STATE/FEDERAL STATUS: NONE/NONE

This is a very widespread bat occupying most lower elevation habitats in the West. Local records include coastal habitats on the 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). It also occurs on Santa Cruz Island (Brown, pers. comm.). Suitable roosting sites (buildings and crevices in rock cliffs) 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 or farther up the drainage. It is more solitary than the Yuma Myotis, which it resembles in size and call and it may be present beneath the Main Street bridge in low numbers (P. Brown, pers. comm.).

Western Mastiff Bat (*Eumops perotis californicus*)
STATE/FEDERAL STATUS: CSC/CATEGORY 2

This large bat is an uncommon inhabitant of scrub and open woodlands from San Francisco Bay south through Baja California and mainland Mexico (Williams, 1986). Old collection records include the Ventura River drainage, several miles upstream from the study area: Weldon Canyon (LACM No. 30253). Old museum records are not indicative of their continued presence in an area because of regional population declines (Williams, 1986). It has also recently (spring, 1991) been sighted in upper Piru Creek in the Santa Clara River drainage (Sweet, pers. comm.) and heard foraging within the Camarillo city limits in August, 1992 (Brown, pers. comm.). This bat emits a distinctive 12-15 kHz echolocation call, audible to most people. 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 the crevices are large enough. Known populations appear to fly large distances from their roosts and over a wide variety of habitats when foraging (Brown, pers. comm.). The absence of suitable roost sites in the study area may not preclude their use of the study area when foraging from roosts located farther up the drainage basin.

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 but it apparently occurs along coastal Santa Barbara and Ventura Counties. A colony exceeding 100 individuals occurs on Santa Cruz Island and a long-term radio-tracking study of individuals from this colony is being conducted by Dr. Pat Brown. This species probably forages over the study area, but no roosting habitat is available on-site (barns or other buildings). Regional declines will probably result in upgrading the sensitivity classification of this species to Category 1 in 1993 (Brown, pers. comm.).

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). It may also occur along coastal Santa Barbara and Ventura Counties. It is solitary and difficult to distinguish from the California Myotis, either through size, flight or echolocation signals (Brown, pers. comm.).

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

This bat is found in a variety of habitats throughout the Pacific States. It is typically found in montane habitats, although it has been collected on Santa Cruz and Catalina Islands (Brown, 1980). These individuals may have possible been vagrants (Brown, pers. comm.). Mainland Ventura County records include: Matilija (LACM Nos. 30267-68) and 3.5 km E Ojai on Hwy 150 (LACM Nos. 85675-78 and 86792). This species may utilize the study area while foraging.

Fringed Myotis (*Myotis thysanodes*)
STATE/FEDERAL STATUS: NONE/NONE

This northern bat is found throughout Washington and Oregon, and extends southward into California through the Coast and Sierra Nevada Ranges (Ingles, 1965). It frequently co-occurs with *M. evotis* and may occasionally forage over the study area (Brown, pers. comm.).

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

This bat is found in lower elevation scrub and open woodland habitats, including the Mojave Desert, throughout southern California. It is usually not found along the coast but a few records exist for the Santa Monica Mountains in Ventura and Los Angeles Counties (Brown, pers. comm.) and it has been observed foraging over Atascadero Creek adjacent to More Mesa, Santa Barbara County (Smith, et al, 1982). It 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 and may utilize the study area while foraging.

Spotted Bat (*Euderma maculata*)
STATE/FEDERAL STATUS: CSC/CATEGORY 2

Spotted bats range throughout western North America from southern British Columbia to Mexico. They occur throughout California in suitable habitat (arid desert and open pine forests in rough, rocky terrain). They typically roost in rock crevices and forage large distances from these roosts (Williams, 1986). The type locality (described in 1897) for this species is at the mouth of Castaic Creek, 8 miles east of Piru, Santa Clara Valley, Ventura County (Brown, pers. comm.). Suitable habitat occurs throughout the upper Matilija and Sespe Creek drainages and individuals may use the study area when foraging from roosts in these areas (Brown, pers. comm.).

The following bat species may use the study area for foraging and for establishing temporary roosts 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). According to Smith, et. al. (1982), several museum records occur in coastal localities between Winchester Canyon and Montecito, Santa Barbara County. Old local collection records include: 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 bat is solitary and roosts in the foliage of trees (Ingles, 1965) and as well as in dense ground cover such as Ice Plant (*Mesembryanthemum* spp.) (Brown, 1980). As a vagrant to the area, it may use the study area for foraging and may establish temporary roosts on-site during migration.

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 has been collected from Santa Cruz Island during the fall migration (Brown, 1980; SBMNH) and from the mainland at Ventura (LACM No. 30272). This is a solitary, tree-roosting species which may utilize the study area in a manner similar to the Hoary Bat.

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). Its use of temporary roosts and foraging on the study area would be similar to the Hoary Bat and Eastern Red Bat.

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

This rabbit is typically found in arid, scrub habitats, which are lacking in the study area. It is relatively common in coastal sage scrub habitats. Old museum records include Ventura in 1906 (MVZ Nos. 3881-3886). It may still occur in scrub habitats adjacent to the lower Ventura River floodplain upstream from 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. Museum records spanning 80 years include: Matilija (MVZ No 3936); near Ojai (SBMNH Nos. 954-55; LACM No. 85699); Ventura (LACM Nos. 30002-03): Weldon Canyon (LACM No. 30004). A congener, the Fox Squirrel (*S. niger*), was introduced from the eastern United States in the last century and has subsequently established localized populations in and around the Ventura city limits and along the Santa Clara River Valley (Wolf, 1971; Hunt, pers. obs.). Local museum records for *S. niger* include: Foothill Road, Ventura (SBMNH No. 2220) and DOR Hwy 150, Ojai (SBMNH No. 936). The Fox Squirrel may be displacing the Gray Squirrel where they co-occur (Wolf, 1971). Within the Ventura River drainage the Gray Squirrel is more likely to occur in higher elevation riparian and adjacent oak woodlands. Riparian habitat in the study area lacks food and cover trees (oak and cottonwood) to support a population of this species at this location.

Agile 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 can be found in coastal dunes (e.g., Vandenberg Air Force Base in western Santa Barbara County) where the dunes are contiguous with inland scrub habitats (Paul Collins, pers. comm.). It has been collected in the Santa Clara River and adjacent drainages: Santa Clara River wash, 4 mi E Fillmore (LACM No. 52621); 0.75 mi W

Somis (MVZ Nos. 97817-18); 2 mi N Simi Valley at the end of Edinger Road (SBMNH Nos. 2202-03) and along the SPRR right-of-way, 0.6 mi. W of Gabbert Road on the western edge of Moorpark (SBMNH). A large series of specimens were collected in 1906 from Matilija in the Ventura River drainage (MVZ Nos. 3960-3978). The occurrence of this species in the study area is unlikely because of a lack of suitable coastal dune or upland scrub habitats on-site and because kangaroo rats probably do not frequent floodplain areas that are periodically inundated. Extant populations might occur several miles farther upstream in the Ventura River drainage in scrub habitats.

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). The habitat relationships for the latter specimen are unknown. This species may be syntopic with the California Mouse (*P. californicus*), based on specimens with the same collection locality and date (LACM Nos. 85149-50). The Brush Mouse has been collected near 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). Given its apparent habitat affinities, the Brush Mouse may occur in riparian woodland in low densities on the study area. An individual, tentatively identified as *P. boylii*, was collected in willow-cottonwood woodland with a scrub understory west of the Ventura River and south of Highway 101 on 2 November 1992. Previous trapping by Hunt (1991) approximately 1-2 miles upstream from the study area in the floodplain, failed to locate *P. boylii*.

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

A small population of this introduced aquatic rodent was regularly observed in the study area prior to 1985. 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) noted 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 was also introduced to the Santa Clara River in the 1940's and was collected in 1947 at Fillmore (LACM No. 8415) and in 1960 at a point 3 mi E of Fillmore at the State Fish Hatchery (LACM Nos. 28122-24). The present status of this population is unknown. Muskrats have also been collected from the Point Mugu lagoon (SBMNH).

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

This species has been introduced to California from the midwestern and eastern United States and is now widely established in several locations in the Central Valley of California. The Red Fox is expanding its range in coastal habitats around Devereux and Goleta Sloughs in Santa Barbara County (Hunt, 1987) and it may be displacing the native Gray Fox (*Urocyon cinereoargenteus*) where the two species co-occur (Jurek, 1992). This species was reported by Capelli (1973) as occurring in the lower reaches of the Ventura River however, the nearest documented record is from Port Hueneme, Ventura County (SBNHM No. 2004), collected in 1979. Foxes were not directly observed during this study but fox tracks, tentatively identified as those of the Gray Fox, were commonly observed throughout the study area.

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 water source. Locally, it is found throughout the Santa Ynez and San Rafael Mountains. Prior to human encroachment, it may have occupied the study area and adjacent habitats. It has been collected within the Ventura River drainage several miles upstream from the study area at Matilija (MVZ Nos. 3957-58) and Hwy 33 at mile post 32.5, near Potrero John (SBNHM No. 2255). It may occur farther downstream along the Ventura River than these records indicate. For example, a specimen killed on Gobernador Canyon Road, above

Carpinteria in Santa Barbara County, had its "...stomach full of avocados." (SBMNH specimen record). Similar oak woodland/avocado orchard habitat associations occur along the middle reaches of the Ventura River.

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

This large, carnivorous mustelid is widely distributed throughout California in arid grassland and scrub habitats containing friable soils and relatively open, uncultivated ground where it preys primarily on rodents. Most populations in southern California lowlands have been extirpated through direct killing and urban and agricultural expansion (Williams, 1986). Recently constructed burrows of this species were observed by Hunt (1991) in the Ventura River floodplain approximately 2 miles upstream from the study area. Two badgers were collected in 1985 at the Casitas Municipal Water District plant at Oakview with, "...6 gophers in stomach..." (SBNHM Nos. 2286-87). The fact that rodents are common throughout the study area may allow badgers to occasionally utilize the site for foraging however, semi-permanent occupation of the site is unlikely.

Western Spotted Skunk (*Spilogale gracile*)
STATE/FEDERAL STATUS: NONE/NONE

This mustelid typically occurs in woodland or scrub habitats with a sandy or rocky substrate. Old collection records are from the upper Ventura River drainage basin at Matilija (MVZ Nos. 3953-56). It is not likely to be a resident of the study area however, but it may occasionally use the area for foraging. Striped skunks (*Mephitis mephitis*) are common on-site.

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

This small, secretive mustelid is locally found in coastal grassland and scrub

habitats. It has been 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 grassland locations throughout the Goleta Valley, Santa Barbara County (Smith, et al, 1982). It is probably more abundant than these casual observations would indicate. Several specimens were collected from Ventura in 1906 (MVZ Nos. 3944-50). Weasels may be found on-site because of the abundance of prey and retreat sites.

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

Individuals and small groups of deer were commonly observed feeding and bedding in marsh and riparian habitats along the Ventura River approximately 1-2 miles upstream from the Main Street bridge in 1991 (Hunt, 1991). Suitable bedding habitat is limited in the study area however, the site contains potential forage for deer. Human encampments within the riparian corridor and the significant human presence in the study area may be a factor in the apparent absence of deer from this site.

6.0 MANAGEMENT RECOMMENDATIONS AND OPPORTUNITIES

6.1 Fishes

Management of the estuary and freshwater inflows for the support and restoration of native fish, requires the maintenance of adequate water quality and quantity in the lower reaches of the Ventura River. Conflicting uses include: alteration of stream habitats for flood control; diversions at the Casitas Municipal Water District's Robles Diversion and the City of San Buenaventura's Foster Park Diversion; discharge of treated municipal wastewater from the Ojai Valley Sanitary District plant; and sand and gravel washing operations in the Ventura River floodplain on the Southern Pacific Milling Company lease site, and; non-point discharges from a system of storm drains serving the west end of the City of San Buenaventura.

The Ventura River carries a large sediment load. Estimates average of over 1,000,000 tons per year for the period 1969-1981. Approximately 40% of this load consists of coarse material. This coarse material includes fine gravels which are deposited in the river as gravel beds. These beds are critical spawning habitat for several native resident and anadromous fish (Moore, 1980; City of San Buenaventura, 1984-1990; Reiser and Bjornn, 1979).

In general, sediment transport processes in the Ventura River are primarily influenced by relatively infrequent, short-duration, high-intensity storm events. These events dominate the movement of sediment from the Ventura Basin to the ocean, accounting for as much as 93% of the annual total sediment load (Hill and McConaughy, 1988). In 1948 and 1959, Matilija and Casitas Dams were constructed on Matilija and Coyote Creeks, altering the natural flux of sediment from basin to river and permanently eliminating the most important spawning sites for Steelhead Rainbow Trout in the Ventura River system (Moore, 1980).

Large and small water diversions may have a significant negative effect on native fishes of the Ventura River, including the estuary. Diversion of water especially during low-flow periods, increases the difficulty of upstream movement by fishes, results in warmer average water temperatures and favors the growth of filamentous algae and aquatic vegetation which leads to a general eutrophication of the stream.

Water diversions also decrease the amount of freshwater inflows to the estuary at the mouth of the Ventura River, decreasing habitat quality for low-salinity estuarine species such as the Tidewater Goby. Decreased inflows promote marked thermal stratification of the water column in the estuary, depressing the ability of the estuary to serve as nursery habitat for juvenile Steelhead Rainbow Trout, Prickly Sculpin, Topsmelt and the California Killifish.

Municipal water treatment facilities typically return water to the stream that is of lower quality than that prior to use. Elevated levels of nutrients in wastewater discharge into the Ventura River from the Ojai Valley Sanitary District wastewater treatment plant have been linked to enhanced growth of non-native aquatic vegetation and filamentous algae (Hendrickson, 1991).

The Southern Pacific Milling Company engaged in sand and gravel mining activities on approximately 153 acres of lower Ventura River floodplain for about 25 years beginning in the mid- to late 1960's. Mining and materials processing ceased in 1992 and the former plant site and adjacent areas will undergo habitat restoration. While in operation, sand and gravel washing activities significantly increased turbidity in stream sections downstream from the discharge point (Hunt, 1991). Three native freshwater fish species (Steelhead Rainbow Trout, Arroyo Chub and Partially-armored Stickleback) are visual predators. Increased turbidity of the water column decreases their ability to locate food (Hagen, 1967, in City of San Buenaventura, 1984-1990). Channelization of the primary stream channel as a result of mining operations and flood control activities, decreased aquatic habitat heterogeneity (e.g., loss of pool-riffle sequences) and converted gravel and cobble substrates within the river channel to sand and silt substrates. Habitat features utilized by fish, such as overhanging banks, are eliminated by channelization, destroying refugia that protect fish from unfavorable thermal regimes and predators (Schlosser, 1991).

The following recommendations should be undertaken by the appropriate responsible agencies to protect and where feasible, restore the natural fisheries resources:

1) Minimize the need for flood control maintenance by restricting development

on the 100-year Ventura River floodplain. Utilize wherever practicable, the best management practices in the performance of necessary flood control maintenance activities.

2) Ensure that all point waste discharges are adequately treated to protect the recognized beneficial uses of the Ventura River. Of particular importance is the need to control nutrient levels and bio-oxygen demand in the lower reaches of the river and estuary.

3) Identify the origins and types of non-point sources of pollution (stemming from both urbanized and non-urbanized areas of the Ventura River watershed), and institute a program of public education and regulation to control these non-point sources.

4) Develop a stream flow model utilizing a methodology such as the U.S. Fish and Wildlife Service's "Instream Flow Incremental Methodology (IFIM)" to determine what levels of surface flows at what times of the year are necessary to maintain native fishes at self-sustaining levels.

6.2 Amphibians

The continued survival of amphibians on the study area depends on maintenance or enhancement of existing freshwater habitats and is affected by the same issues discussed under fishes. Restoration of wetlands around the second mouth of the Ventura River may improve breeding habitat for native amphibian species currently present in the study area. Permanent or semi-permanent freshwater on-site may encourage colonization by bullfrogs, so any freshwater habitat enhancement proposal should contain provisions for the control of this species. Control measures include the removal of adult and larval Bullfrogs by hand capture and shooting.

6.3 Reptiles

The proximity to the ocean and the degree of habitat disturbance promote occupation of the study area by habitat generalists. Restoration and control of human

traffic in and adjacent to the coastal dunes west of the river mouth offers the best method of protecting the California Legless Lizard or for supporting its re-introduction. Stabilization of the dunes with native plants that form a dense leaf litter will increase wildlife values of this unique habitat feature.

6.4 Birds

Factors that may depress avian use of the study area include: presence of transportation corridors across the lower Ventura River; flood control activities, including confinement of the Ventura River to a narrow channel which increases the frequency and severity of habitat disturbance during storm events; intentional or accidental introductions of non-native plant and animal species; direct human disturbance to breeding, roosting or foraging birds; human habitation of lower Ventura River floodplain habitats, and; unrestricted human and feral animal access to all habitats within the study area. The recent completion of a 300-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. Protection of the estuary and riparian woodlands in the study area and adjacent properties is critically important to the continued establishment of territories and breeding by regionally declining obligate riparian and shorebird species.

Avian species diversity in the study area is considerable, but some species are rare or absent because of human developments adjacent to or within the study area. The numbers of most birds could be increased, and the occurrence of some species encouraged through implementation of the following recommendations:

1) Control human access to the shores of the estuary and adjacent beaches from May through September to protect potential breeding and known roosting habitats of the Snowy Plover and Least Tern. Severely limit human access to the remaining coastal sand dunes west of the river mouth. Restoration of this habitat with native plant species will stabilize the dunes and will encourage the continued habitation of these areas by Snowy Plovers and Least Terns.

2) Prohibit dogs from roaming loose without a leash. Feral cats should be trapped and removed from the area.

3) Re-design the existing large trail along the west bank of the Ventura River to function as the sole access to the riparian woodland and scrub habitat west of the river. Educational possibilities exist here. Secondary trails should be eliminated.

4) Control exotic plant species, especially Giant Reed (*Arundo donax*) and Castor Bean (*Ricinus communis*) in riparian habitats.

5) Plant a row of trees along the eastern edge of the existing bicycle trail at the base of the levee on the east side of the Ventura River to screen activities and night-lighting of the Fairgrounds from the estuary. Candidate tree species include Monterey Cypress (*Cupressus macrocarpa*). This tree is not locally native, but is native to California and possesses high wildlife value.

6) Discourage flood control and other activities within the limited riparian woodlands on the study area to protect the breeding and foraging habitat of many bird species.

7) The periodically exposed mudflats along the borders of the estuary are critical bird habitat. Freshwater inflows are essential for the estuary to serve as foraging and roosting habitat for shorebirds, including sensitive species such as the White-faced Ibis and Least Tern (especially during summer and fall for the latter species). Tidal influence, at least for part of the year, is an important element in the natural hydrologic regime of the estuary. Restricting freshwater inflows will maintain sandbar presence and prevent tidal inundation of the mudflats. Alternatively, elimination of the sandbar when it forms will subject the estuary to continuous tidal effects and promote a transport environment inhibitory to the deposition of silts and clays required for mudflat formation and maintenance.

6.5 Mammals

The transportation corridors that transect the middle and northern portions of the study area, effectively restricts open space between the river mouth and lower reaches of the floodplain to a narrow strip bordering the primary channel of the river (Fig. 4). Absence of burrows of medium and large mammals in the study area, indicating at least short-term occupation of the site, may be the result of diminished continuity between

the study area and upstream riparian and scrub habitats. Maintenance of this wildlife corridor is critical if widely-foraging mammals such as native procyonids, mustelids, canids and felids are to continue using the study area. Despite restriction of habitat continuity between the study area and upstream environments, small mammal densities on-site are relatively high. The riparian woodlands within the study area provide important foraging habitat for a number of bat species. Implementation of the following recommendations would benefit mammals in the study area:

1) Bat species diversity appears to be constrained by the limited availability of suitable roosting sites within the study area. To date, there appears to be a single roost in the study area: the Main Street bridge. The Highway 101 overcrossing could be improved as roosting habitat for bats by removing caulk from expansion joints. The Main Street bridge is critical habitat for bats in the study area. The expansion joints should be kept open and accessible. Future maintenance plans on this bridge should be sensitive to bat habitat requirements and any work on this structure should be monitored by a qualified biologist. Human habitation, specifically smoke from cooking fires and night-time illumination, may result in abandonment of otherwise suitable roost sites beneath this bridge. Human activities beneath this structure should be restricted.

2) Removal of invasive exotic plant species in the study area may have an impact on small mammal populations. Appendix IV in Ferren, et al, (1990) describes a control program. For example, elimination of introduced Kikuyu Grass (*Pennisetum clandestinum*) and replacement with native Coastal Saltgrass (*Distichlis spicata*) along the east bank of the Ventura River south of the Southern Pacific Railroad bridge may temporarily displace California Vole and Western Harvest Mouse populations, but will ultimately increase habitat values in this area. Removal of Giant Reed (*Arundo donax*) would eliminate a favored nest site for the introduced Black Rat and it is not known whether this population would subsequently move into adjacent native habitats and possibly displace the native Dusky-footed Woodrat, or simply decline in numbers within their present area of occupation.

3) Control of feral cats in the study area may be beneficial to ground-foraging birds and mammals.

4) Human habitation of the lower Ventura River floodplain should be

controlled. Semi-permanent and permanent encampments interfere with wildlife movements and use of the area. Improper sanitation and disposal of trash in these areas are important point sources of pollutants.

6.6 Conclusions

In general, wildlife values in the Ventura River Estuary and adjacent riparian and scrub habitats can be improved by:

1) Monitoring the upstream use of the Ventura River to assure quality and quantity control of freshwater inflows through the lower reaches and into the estuary;

2) Limit human access to specific trails and require domestic dogs to be leashed at all times;

3) Educate the public through interpretive themes that highlight important physical and habitat features in the study area;

4) Eliminate human habitation within the study area and adjacent upstream habitats;

5) Restore coastal dunes on-site and restrict human traffic to boardwalks across or adjacent to the dune strand;

6) Remove invasive non-native plant species and replace with native species.

7) Limit streambed alterations for flood control or other purposes.

7.0 RESEARCH OPPORTUNITIES

"The biological richness of the study area is directly related to the interfacing of four wetland systems (Marine, Estuarine, Riverine and Palustrine) and adjacent uplands." (Ferren, et al, 1990, p. 163). The botanical richness of the area in turn leads to high faunal diversity. Despite urbanization and transportation corridors that have isolated and reduced the size of the Ventura River delta, the faunal resources of the region still provides a number of important research and educational opportunities. This study focused on the vertebrate resources of the study area. A complete inventory of faunal resources of the study area is still incomplete. Future inventory work should focus on:

a) document short- and long-term changes in diversity and density of aquatic invertebrates in the lower Ventura River and estuary in relation to temporal and seasonal fluctuations in salinity and upstream inflows. Aquatic invertebrates are an important food source for most fish and a number of semi-aquatic and terrestrial reptiles, birds and mammals. They also provide an important means of assessing the biological health of aquatic systems (Hunt, 1992).

b) document species diversity of terrestrial insects, including a number of sensitive species that may inhabit coastal dune and riparian woodland habitats on the study area, such as the Monarch Butterfly (*Danaus plexippus*), Globose Dune Beetle (*Coelus globosus*), a Federal Category 2 taxon, and the Sandy Beach Tiger Beetle (*Cincindela hirticollis gravida*) which, according to Ferren, et. al. (1990), historically occurred in the coastal dunes of the region (Natural Diversity Data Base, 1988). Performance criteria for restoration of the coastal dunes in the study area could include monitoring the presence and densities of dune obligates, such as the Globose Dune Beetle. If this species is found to be absent from the site, it could be reintroduced from nearby populations. Its continued presence in dunes is an indicator of "healthy", stabilized dune habitat (R. Arnold, pers. comm.). Riparian woodlands adjacent to the Ventura River provide suitable winter roosting sites for Monarch butterflies (Hunt, 1991). Eucalyptus windrows north of the Main Street bridge and west of the river were important winter roosts for Monarchs, but were removed in March, 1991 due to frost damage. The remaining windrows bordering the agricultural fields at this location continued to attract large numbers of Monarchs in Fall 1992 (Hunt, pers. obs.).

c) The Main Street bridge is the largest known bat roost in the area. Additional surveys could provide a regional perspective on the importance of this roost site. More accurate counts of bats leaving this roost site at dusk should be conducted and mist-netting at difference seasons and at points farther upstream would provide additional information on species diversity in the area. Seasonal occupation of the Main Street bridge roost site should be monitored to determine if the species found to date remain in this area and are active year-round. The three species of bats found during the 3 July 1992 bat survey are migratory at many coastal localities, moving to the coast in the spring and inland in the fall and winter where they retreat to deeper crevices to hibernate (P. Brown, pers. comm.). Use of a bat detector at different times of the year would establish baseline information on species presence in the study area. It is likely that the river mouth, estuary and adjacent riparian and scrub habitats provide foraging habitat for additional bat species (P. Brown, pers. comm.). If *Plecotus townsendii* or *Eumops perotis* are captured in mist nets in the area, they should be radio-tagged and tracked back to their respective roosts.

d) Conduct more extensive trapping to determine the status and distribution of shrews within and adjacent to the study area.

e) Document the presence of Gray Fox (*Urocyon cinereoargenteus*) and/or Red Fox (*Vulves vulpes*) in the study area.

f) Document the number, timing and spawning patterns of adult steelhead entering the Ventura River and the rearing and instream movement of juvenile steelhead, including downstream smolt movement. This investigation should utilize accepted survey techniques, such as Fyke nets and electro-fishing and should include a comparative genetic analysis of fishes to identify significant genetic differences between southern, central and northern California populations.

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APPENDIX 1.

CHECKLIST OF NATIVE AND INTRODUCED VERTEBRATES KNOWN TO OCCUR IN THE STUDY AREA (VENTURA RIVER GROUP CAMP, SEASIDE WILDERNESS PARK AND THE HUBBARD PROPERTY)

APPENDIX 1.

This appendix contains species that were observed in the study area during the field surveys between June 1991 and July 1992 as well as species documented as occurring in the study area through literature, museum records and discussions with local biologists. The bird list is derived from sight and auditory records gathered between 1979 and 1992. The relative status of fish populations in the lower Ventura River is based on reports by the City of San Buenaventura (1990; 1991). Habitat relationships for vertebrates exclusive of fishes are as follows:

1 = Estuarine wetlands (and nearshore waters for some birds)

2 = Vegetated (scrub/shrub and forested) wetlands and transitional wetlands

3 = Uplands

4 = Ruderal Habitats

Relative abundances of birds were rated as follows:

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

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 or potentially occurring on-site are discussed in Section 5.0 of the report.

FISHES

NATIVE FRESHWATER SPECIES

SCIENTIFIC NAME	COMMON NAME	STATUS [a]
Family Petromyzontidae (Lampreys)		
Lampetra tridentata [1]	Pacific Lamprey	Common
Family Salmonidae (Trout and Salmon)		
Oncorhynchus mykiss [1]	Steelhead Trout	Common
Family Cyprinidae (Minnows and Carp)		
Gila orcutti	Arroyo Chub	Abundant
Family Fundulidae (Killifish)		
Fundulus parvipinnis	California Killifish	?
Family Gasterosteidae (Sticklebacks)		
Gasterosteus aculeatus microcephalus	Partially-armored Stickleback	Abundant
Family Cottidae (Sculpins)		
Cottus asper [2]	Prickly Sculpin	?

[1] = anadromous species
[2] = catadromous species
[a] = as per City of San Buenaventura (1990; 1991)

FISHES (continued)

NATIVE ESTUARINE SPECIES

SCIENTIFIC NAME	COMMON NAME	STATUS
Family Atherinidae (Silversides)		
Atherinops affinis	Topsmelt	Common
Family Gobiidae (Gobies)		
Eucyclogobius newberryi	Tidewater Goby	Common
Family Cottidae (Sculpins)		
Leptocottus armatus	Staghorn Sculpin	Rare
Family Embiotocidae (Surfperches)		
Genera and species unknown		Rare
Family Mugilidae (Mullet)		
Mugil cephalus	Striped Mullet	Rare

INTRODUCED FRESHWATER SPECIES

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

AMPHIBIANS

NATIVE SPECIES

SCIENTIFIC NAME	COMMON NAME	HABITAT
Order Anura		
Family Hylidae (Treefrogs)		
Pseudacris regilla	Pacific Chorus Frog	1,2,3,4

INTRODUCED SPECIES

SCIENTIFIC NAME	COMMON NAME	HABITAT
Order Anura		
Family Ranidae (True Frogs)		
Rana catesbeiana	Bullfrog	2

REPTILES

NATIVE SPECIES

SCIENTIFIC NAME	COMMON NAME	HABITAT
Order Squamata		
Suborder Sauria (Lizards)		
Family Emydidae (Box and Water Turtles)		
Clemmys marmorata pallida	Southwestern Pond Turtle	1,2,3
Family Iguanidae (Iguanids)		
Sceloporus occidentalis	Western Fence Lizard	1,2,3,4
Uta stansburiana	Side-blotched Lizard	1,2,3,4
Family Anguidae (Alligator Lizards and Allies)		
Anniella pulchra pulchra	Silvery Legless Lizard	3,4

REPTILES (continued)

SCIENTIFIC NAME	COMMON NAME	HABITAT
Suborder Serpentes (Snakes)		
Family Colubridae (Colubrids)		
Pituophis melanoleucus	Gopher Snake	1,2,3,4

BIRDS

NATIVE SPECIES

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Order Gaviiformes				
Family Gaviidae (Loons)				
Gavia stellata	Red-throated Loon	R	M,W	1
Gavia pacifica	Pacific Loon	R	M,W	1
Gavia immer	Common Loon	R	M,W	1
Order Podicipediformes				
Family Podicipedidae (Grebes)				
Podilymbus podiceps	Pied-billed Grebe	U	M,W	1
Podiceps auritus	Horned Grebe	R	M,W	1
Podiceps grisegena	Red-necked Grebe	X	W	1
Podiceps nigricollis	Eared Grebe	U	M,W	1
Aechmophorus occidentalis	Western Grebe	U	M,W	1
Aechmophorus clarkii	Clark's Grebe	R	M,W	1
Order Pelecaniformes				
Family Pelecanidae (Pelicans)				
Pelecanus occidentalis	Brown Pelican	U	M,W	1

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Family Phalacrocoracidae (Cormorants)				
Phalacrocorax auritus	Double-crested Cormorant	U	M,W	1
Phalacrocorax pelagicus	Pelagic Cormorant	R	M,W	1
Order Ciconiiformes				
Family Ardeidae (Herons)				
Botaurus lentiginosus	American Bittern	X	M,W	1
Ardea herodias	Great Blue Heron	U	M,W	1
Casmerodius albus	Great Egret	R	M,W	1
Egretta thula	Snowy Egret	U	M,W	1
Egretta caerulea	Little Blue Heron	X	M	1
Bubulcus ibis	Cattle Egret	X	M,W	1
Butorides striatus	Green-backed Heron	U	R	1
Nycticorax nycticorax	Black-crowned Night Heron	U	M,W	1
Family Threskiornithidae (Ibises and Spoonbills)				
Plegadis chihi	White-faced Ibis	X	M	1
Order Anseriformes				
Family Anatidae (Swans, Geese and Ducks)				
Chen caerulescens	Snow Goose	X	M	1
Chen rossii	Ross' Goose	X	M	1
Branta bernicla	Brant	R	M	1
Branta canadensis	Canada Goose	R	M,W	1
Aix sponsa	Wood Duck	R	M,W	1
Anas crecca	Green-winged Teal	U	M,W	1
Anas platyrhynchos	Mallard	C	R(*)	1
Anas acuta	Northern Pintail	U	M,W	1
Anas discors	Blue-winged Teal	R	M	1
Anas cyanoptera	Cinnamon Teal	U	M	1
Anas clypeata	Northern Shoveler	R	M,W	1
Anas strepera	Gadwall	R	M,W	1
Anas americana	American Widgeon	U	M,W	1
Aythya valisineria	Canvasback	X	M,W	1
Aythya americana	Redhead	X	M,W	1
Aythya collaris	Ring-necked Duck	R	M,W	1
Aythya marila	Greater Scaup	R	M,W	1
Aythya affinis	Lesser Scaup	U	M,W	1

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Clangula hyemalis	Oldsquaw	X	M,W	1
Melanitta perspicillata	Surf Scoter	R	M,W	1
Melanitta fusca	White-winged Scoter	X	M,W	1
Bucephala clangula	Common Goldeneye	R	M,W	1
Bucephala albeola	Bufflehead	U	M,W	1
Lophodytes cucullatus	Hooded Merganser	X	M	1
Mergus merganser	Common Merganser	X	M	1
Mergus serrator	Red-breasted Merganser	U	M,W	1
Oxyura jamaicensis	Ruddy Duck	U	M,W	1
Order Falconiformes				
Family Cathartidae (Vultures)				
Cathartes aura	Turkey Vulture	R	M	1,2,3,4
Family Accipitridae (Kites, Hawks and Eagles)				
Pandion haliaetus	Osprey	X	M	1
Elanus caeruleus	Black-shouldered Kite	R	M,W	3
Circus cyaneus	Northern Harrier	R	M,W	1,3
Accipiter striatus	Sharp-shinned Hawk	U	M,W	2,3
Accipiter cooperi	Cooper's Hawk	U	M,W	2,3
Buteo lineatus	Red-shouldered Hawk	R	M,W	2,3
Buteo jamaicensis	Red-tailed Hawk	U	M,W	1,2,3,4
Buteo lagopus	Rough-legged Hawk	X	W	3
Falco sparverius	American Kestrel	U	M,W	1,2,3,4
Falco columbarius	Merlin	R	M	1,3
Falco peregrinus	Peregrine Falcon	X	M,W	1
Falco mexicanus	Prairie Falcon	X	M	1,3
Order Galliformes				
Family Phasianidae (Grouse, Quail and Ptarmigan)				
Callipepla californica	California Quail	X	R(*)	3,4
Order Gruiformes				
Family Rallidae (Rail, Gallinules and Coots)				
Rallus limicola	Virginia Rail	U	M,W	1,2
Porzana carolina	Sora	U	M,W	1,2
Gallinula chloropus	Common Moorhen	X	M,W	1,2
Fulica americana	American Coot	C	M,W	1,2

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Order Charadriiformes				
Family Charadriidae (Plovers)				
Pluvialis squatarola	Black-bellied Plover	U	M,W	1
Pluvialis dominica	Lesser Golden-Plover	X	M	1
Charadrius alexandrinus	Snowy Plover	U	M,W	1
Charadrius semipalmatus	Semipalmated Plover	U	M,W	1
Charadrius vociferus	Killdeer	C	R(*)	1,2,4
Family Haematopodidae (Oystercatchers)				
Haematopus bachmani	American Black Oystercatcher	X	M	1
Family Recurvirostridae (Stilts and Avocets)				
Himantopus mexicanus	Black-necked Stilt	R	M	1
Recurvirostra americana	American Avocet	R	M	1
Family Scolopacidae (Sandpipers)				
Tringa melanoleuca	Greater Yellowlegs	U	M,W	1,2
Tringa flavipes	Lesser Yellowlegs	R	M	1,2
Tringa solitaria	Solitary Sandpiper	X	M	1,2
Catoptrophorus semipalmatus	Willet	C	M,W	1
Heteroscelus incanus	Wandering Tattler	R	M,W	1
Actitis macularia	Spotted Sandpiper	U,R	M,W,S(*)	1
Numenius phaeopus	Whimbrel	U	M,W	1
Numenius americanus	Long-billed Curlew	R	M,W	1
Limosa fedoa	Marbled Godwit	C	M,W	1
Arenaria interpres	Ruddy Turnstone	U	M,W	1
Arenaria melanocephala	Black Turnstone	U	M,W	1
Aphriza virgata	Surfbird	R	M	1
Calidris canutus	Red Knot	X	M	1
Calidris alba	Sanderling	C	M,W	1
Calidris pusilla	Semipalmated Sandpiper	X	M	1
Calidris mauri	Western Sandpiper	C	M,W	1
Calidris minutilla	Least Sandpiper	C	M,W	1,2
Calidris bairdii	Baird's Sandpiper	X	M	1
Calidris melanotos	Pectoral Sandpiper	X	M	1,2
Calidris alpina	Dunlin	U	M,W	1
Limnodromus griseus	Short-billed Dowitcher	U	M	1

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Limnodromus scolopaceus	Long-billed Dowitcher	U	M,W	1,2
Gallinago gallinago	Common Snipe	U	M,W	1,2
Phalaropus tricolor	Wilson's Phalarope	R	M,W	1
Family Scolopacidae (continued)				
Phalaropus lobatus	Red-necked Phalarope	R	M	1
Phalaropus fulicaria	Red Phalarope	X	M,W	1
Family Laridae (Gulls and Terns)				
Larus philadelphia	Bonaparte's Gull	U	M,W	1
Larus heermanni	Heermann's Gull	C	M,W	1
Larus canus	Mew Gull	C	M,W	1
Larus delawarensis	Ring-billed Gull	C	M,W	1
Larus californicus	California Gull	C	M,W	1
Larus argentatus	Herring Gull	R	M,W	1
Larus thayeri	Thayer's Gull	R	M,W	1
Larus occidentalis	Western Gull	C	R	1
Larus glaucescens	Glaucous-winged Gull	U	M,W	1
Larus hyperboreus	Glaucous Gull	X	W	1
Rissa tridactyla	Black-legged Kittiwake	X	M,W	1
Sterna caspia	Caspian Tern	U	M,W	1
Sterna maxima	Royal Tern	U	M,W	1
Sterna elegans	Elegant Tern	C	M	1
Sterna hirundo	Common Tern	R	M	1
Sterna forsteri	Forster's Tern	U	M,W	1
Sterna antillarum	Least Tern	U	S,M	1
Chlidonias niger	Black Tern	X	M	1
Order Columbiformes				
Family Columbidae (Pigeons and Doves)				
Columba fasciata	Band-tailed Pigeon	R	M,W	2
Zenaida macroura	Mourning Dove	C	R(*)	2,3,4
Order Strigiformes				
Family Tytonidae (Owls)				
Tyto alba	Barn Owl	?	R	1,3,4

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Family Strigidae (Owls)				
Bubo virginianus	Great Horned Owl	?	R(*)	3,4
Athene cunicularia	Burrowing Owl	X	M,W	3,4
Asio flammeus	Short-eared Owl	X	M,W	1,3
Order Caprimulgiformes				
Family Caprimulgidae (Nightjars)				
Chordeiles acutipennis	Lesser Nighthawk	X	M	3
Order Apodiformes				
Family Apodidae (Swifts)				
Cypseloides niger	Black Swift	X	M	1,2,3,4
Chaetura vauxi	Vaux's Swift	U	M	1,3
Aeronautes saxatalis	White-throated Swift	U	M	3
Family Trochilidae (Hummingbirds)				
Archilochus alexandri	Black-chinned Hummingbird	U	M	2,4
Calypte anna	Anna's Hummingbird	C	R(*)	2,3,4
Calypte costae	Costa's Hummingbird	R	M	2,3,4
Selasphorus rufus	Rufous Hummingbird	R	M	2,3,4
Selasphorus sasin	Allen's Hummingbird	U	S(*)	2,3,4
Order Coraciiformes				
Family Alcedinidae (Kingfishers)				
Ceryle alcyon	Belted Kingfisher	U	M,W	1,2
Order Piciformes				
Family Picidae (Woodpeckers)				
Sphyrapicus varius	Red-breasted Sapsucker	R	M,W	2,4
Picoides nuttallii	Nuttall's Woodpecker	R	R	2,4
Picoides pubescens	Downy Woodpecker	U	R(*)	2,4
Colaptes auratus	Northern Flicker	U	M,W	2,3,4

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Order Passeriformes				
Family Tyrannidae (Tyrant Flycatchers)				
Contopus borealis	Olive-sided Flycatcher	R	M	2
Contopus sordidulus	Western Wood-Pewee	U	M	2,4
Empidonax traillii	Willow Flycatcher	R	M	2
Empidonax hammondii	Hammond's Flycatcher	R	M	2
Empidonax difficilis	Pacific-slope Flycatcher	U	M	2,4
Sayornis nigricans	Black Phoebe	U	R(*)	2,4
Sayornis saya	Say's Phoebe	U	M,W	3,4
Myiarchus cinerascens	Ash-throated Flycatcher	U	M	2,3,4
Tyrannus melancholicus	Tropical Kingbird	X	M	2,4
Tyrannus coviferans	Cassin's Kingbird	R	M	3,4
Tyrannus verticalis	Western Kingbird	U	M	3,4
Family Alaudidae (Larks)				
Eremophila alpestris	Horned Lark	R	M	3,4
Family Hirundinidae (Swallows)				
Tachycineta bicolor	Tree Swallow	U,R	M,S	1,2,3,4
Tachycineta thalassina	Violet-green Swallow	U	M	1,2,3,4
Stelgidopteryx serripennis	Northern Rough-winged Swallow	C	S(*)	1,2
Riparia riparia	Bank Swallow	X	M	1,2
Hirundo pyrrhonota	Cliff Swallow	C	S(*)	1,2,3,4
Hirundo rustica	Barn Swallow	U	M	1,2
Progne subis	Purple Martin	X	M	1,2
Family Corvidae (Crows and Jays)				
Aphelocoma coerulescens	Scrub Jay	U	R(*)	2,3,4
Corvus brachyrhynchos	American Crow	C	R(*)	2,3,4
Corvus corax	Common Raven	U	R(*)	2,3,4

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Family Paridae (Titmice and Chickadees)				
Parus inornatus	Plain Titmouse	?	?	2,3,4
Family Aegithalidae (Bushtit)				
Psaltriparus minimus	Bushtit	C	R(*)	2,3,4
Family Sittidae (Nuthatches)				
Sitta canadensis	Red-breasted Nuthatch	R	M,W	2,4
Family Certhiidae (Creepers)				
Certhia americana	Brown Creeper	R	M,W	2,4
Family Troglodytidae (Wrens)				
Salpinctes obsoletus	Rock Wren	X	M	3,4
Thryomanes bewickii	Bewick's Wren	C	R(*)	2,3,4
Troglodytes aedon	House Wren	U	M	2,4
Troglodytes troglodytes	Winter Wren	X	M,W	2
Cistothorus palustris	Marsh Wren	U	M,W	2
Family Muscicapidae (Thrushes)				
Regulus satrapa	Golden-crowned Kinglet	R	M,W	2,4
Regulus calendula	Ruby-crowned Kinglet	C	M,W	2,4
Polioptila caerulea	Blue-gray Gnatcatcher	U	M,W	2,3,4
Catharus ustulatus	Swainson's Thrush	R	M	2
Catharus guttatus	Hermit Thrush	U	M,W	2,4
Turdus migratorius	American Robin	R	M,W	2,4
Ixoreus naevius	Varied Thrush	X	M,W	2
Chamaea fasciata	Wrentit	C	R(*)	2,3,4
Family Mimidae (Mimic Thrushes)				
Mimus polyglottos	Northern Mockingbird	C	R(*)	2,3,4
Toxostoma redivivum	California Thrasher	C	R(*)	2,3,4
Family Motacillidae (Pipits and Wagtails)				
Anthus spinoletta	American Pipit	C	M,W	1,2,3,4

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Family Bombycillidae (Waxwings)				
Bombycilla cedrorum	Cedar Waxwing	U	M,W	2,4
Family Laniidae (Shrikes)				
Lanius ludovicianus	Loggerhead Shrike	U	M,W	2,3,4
Family Vireonidae (Vireos)				
Vireo belli	Bell's Vireo	X	S	2
Vireo solitarius	Solitary Vireo	R	M	2,4
Vireo huttoni	Hutton's Vireo	U	R(*)	2
Vireo gilvus	Warbling Vireo	U	M	2
Family Emberizidae (Warblers, Sparrows, Blackbirds and Orioles)				
Vermivora celata	Orange-crowned Warbler	U	M,W	2,3,4
Vermivora ruficapilla	Nashville Warbler	R	M	2,3,4
Dendroica petechia	Yellow Warbler	U	S(*)	2
Dendroica coronata	Yellow-rumped Warbler	C	M,W	2,3,4
Dendroica nigrescens	Black-throated Gray Warbler	R	M	2,4
Dendroica townsendi	Townsend's Warbler	U	M	2,4
Dendroica occidentalis	Hermit Warbler	R	M	2,4
Dendroica striata	Blackpoll Warbler	X	M	2,4
Dendroica castanea	Bay-breasted Warbler	X	M	2,4
Mniotilta varia	Black-and-white Warbler	X	M	2,4
Setophaga ruticilla	American Redstart	X	M	2
Seiurus noveboracensis	Northern Waterthrush	X	M,W	2
Oporornis tolmiei	MacGillivray's Warbler	R	M	2
Geothlypis trichas	Common Yellowthroat	C	M,W	2
Wilsonia pusilla	Wilson's Warbler	U	M	2
Icteria virens	Yellow-breasted Chat	U	S(*)	2
Piranga rubra	Summer Tanager	X	M	2,4
Piranga ludoviciana	Western Tanager	U	M	2,4
Pheucticus melanocephalus	Black-headed Grosbeak	C	S(*)	2
Passerina amoena	Lazuli Bunting	R	M	2,3,4
Pipilo erythrophthalmus	Rufous-sided Towhee	C	R(*)	2,3,4
Pipilo crissalus	California Towhee	C	R(*)	2,3,4
Spizella passerina	Chipping Sparrow	R	M	3,4
Chondestes grammacus	Lark Sparrow	R	M	3,4

BIRDS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Family Emberizidae (continued)				
Passerculus sandwichensis	Savannah Sparrow	U	M,W	2,3,4
Passerella iliaca	Fox Sparrow	R	M,W	2
Melospiza melodia	Song Sparrow	C	R(*)	2,3,4
Melospiza lincolnii	Lincoln's Sparrow	U	M,W	2,4
Melospiza georgiana	Swamp Sparrow	X	W	2
Zonotrichia albicollis	White-throated Sparrow	X	W	2,4
Zonotrichia atricapilla	Golden-crowned Sparrow	C	M,W	2,3,4
Zonotrichia leucophrys	White-crowned Sparrow	C	M,W	2,3,4
Junco hyemalis	Dark-eyed Junco	U	M,W	4
Dolichonyx oryzivorus	Bobolink	X	M	2,3
Agelaius phoeniceus	Red-winged Blackbird	U	R(*)	2,3,4
Agelaius tricolor	Tricolored Blackbird	R	M,W	2,3,4
Sturnella neglecta	Western Meadowlark	C	M,W	3,4
Xanthocephalus xanthocephalus	Yellow-headed Blackbird	R	M	2,4
Euphagus cyanocephalus	Brewer's Blackbird	C	R(*)	2,3,4
Molothrus ater	Brown-headed Cowbird	C	R(*)	2,3,4
Icterus cucullatus	Hooded Oriole	R	M	2,4
Icterus galbula	Northern Oriole	U	M	2,4
Family Fringillidae (Finches)				
Carpodacus purpureus	Purple Finch	U	M,W	2,4
Carpodacus mexicanus	House Finch	C	R(*)	2,3,4
Carduelis pinus	Pine Siskin	R	M,W	2,4
Carduelis psaltria	Lesser Goldfinch	U	R(*)	2,3,4
Carduelis tristis	American Goldfinch	U	R(*)	2,3,4

INTRODUCED SPECIES

Order Columbiformes

Family Columbidae (Pigeons and Doves)

Columba livia	Rock Dove	C	R(*)	3,4
Streptopelia chinensis	Spotted Dove	R	R	2,3,4

BIRDS (continued)

INTRODUCED SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	ABUNDANCE	SEASON	HABITAT
Order Passeriformes				
Family Sturnidae (Starlings)				
Sturnus vulgaris	European Starling	C	R(*)	2,3,4
Family Passeridae (Weavers)				
Passer domesticus	House Sparrow	U	R(*)	4

MAMMALS

NATIVE SPECIES

SCIENTIFIC NAME	COMMON NAME	HABITAT
Order Insectivora		
Family Soricidae		
Scapanus latimanus	Broad-footed Mole	1,2,3,4
Order Chiroptera		
Family Vespertilionidae		
Antrozous pallidus	Pallid Bat	1,2,3,4
Eptesicus fuscus	Big Brown Bat	1,2,3,4
Myotis yumanensis	Yuma Myotis	1,2,3,4
Family Molossidae		
Tadarida brasiliensis	Mexican Freetail Bat	1,2,3,4
Order Lagomorpha		
Family Leporidae		
Sylvilagus bachmani	Brush Rabbit	1,2,3,4

MAMMALS (continued)

NATIVE SPECIES (continued)

SCIENTIFIC NAME	COMMON NAME	HABITAT
Order Rodentia		
Family Sciuridae		
Spermophilus beecheyi	California Ground Squirrel	2,3,4
Family Geomyidae		
Thomomys bottae	Botta's Pocket Gopher	1,2,3,4
Family Cricetidae		
Reithrodontomys megalotis	Western Harvest Mouse	1,2,3,4
Peromyscus californicus	California Mouse	1,2,3,4
Peromyscus maniculatus	Deer Mouse	1,2,3,4
Neotoma fuscipes	Dusky-footed Woodrat	1,2,3,4
Microtus californicus	California Vole	1,2,3
Order Carnivora		
Family Canidae		
Canis latrans	Coyote	1,2,3,4
Urocyon cinereoargenteus	Gray Fox	1,2,3,4
Family Procyonidae		
Procyon lotor	Raccoon	1,2,3,4
Family Mustelidae		
Mephitis mephitis	Striped Skunk	1,2,3,4
Family Felidae		
Felis rufus	Bobcat	1,2,3,4

MAMMALS (continued)

INTRODUCED SPECIES

SCIENTIFIC NAME	COMMON NAME	HABITAT
Order Didelphimorphia		
Family Didelphidae		
Didelphis virginianus	Virginia Opossum	1,2,3,4
Order Rodentia		
Family Muridae		
Mus musculus	House Mouse	1,2,3,4
Rattus rattus	Black Rat	2,4
Order Carnivora		
Family Canidae		
Canis familiaris	Feral Dog	1,2,3,4
Family Felidae		
Felis catus	Feral Cat	1,2,3,4

APPENDIX 2.

SMALL MAMMAL LIVE-TRAPPING MICROHABITAT INFORMATION AND TRAP RESULTS

NOVEMBER 1991 TRAPPING SESSION

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: *Salix*, *Distichlis*, *Salicornia*; silt
2: *Atriplex*, *Frankenia*; silt
3: *Salix*, *Frankenia*; silt
4: *Baccharis pilularis*; silt
5: *Baccharis*; silt
6: *Baccharis salicifolia*, forbs; silt
7: *Baccharis pilularis*; silt
8: *Salix*, *Baccharis*; silt
9: *Salix*; silt
10: *Salix*; silt
11: *Baccharis*, *Foeniculum*; silt
12: *Artemisia*; silt
13: *Artemisia*; silt
14: *Baccharis*; silt
15: *Baccharis*; silt
16: *Happlopappus*, forbs; silt
17: *Baccharis salicifolia*, forbs; silt
18: *Atriplex*, forbs; silt
19: *Artemisia*; silt
20: *Artemisia*; silt
21: *Salix*, *Artemisia*; silt
22: *Salix*, *Artemisia*; silt
23: *Foeniculum*; silt
24: *Salix*, forbs; silt
25: *Salix*, *Rubus*; silt
26: *Salix*; 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: *Arundo*; silt, cobbles
2: *Scirpus*, *Typha*; silt, cobbles
3: *Scirpus*; silt, cobbles
4: *Scirpus*; silt, cobbles
5: *Scirpus*; silt, cobbles
6: *Arundo*, *Scirpus*; silt, cobbles
7: *Scirpus*; silt, cobbles
8: *Scirpus*; silt, cobbles
9: *Scirpus*, *Distichlis*; silt
10: *Distichlis*, *Salicornia*, forbs; silt
11: *Scirpus*, *Salix*; silt
12: *Scirpus*; silt
13: *Scirpus*, *Salix*; silt, cobbles
14: *Scirpus*, *Baccharis salicifolia*; silt
15: *Scirpus*, *Baccharis*; silt, cobbles

SMALL MAMMAL LIVE-TRAPPING

NOVEMBER 1991 TRAPPING RESULTS

TRAPLINE 1

	1 November	2 November	3 November
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

	1 November	2 November	3 November
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

	1 November	2 November	3 November
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

	1 November	2 November	3 November
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.

MAY 1992 TRAPPING SESSION

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

	5 May	6 May	7 May
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

	5 May	6 May	7 May
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

	5 May	6 May	7 May
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

	5 May	6 May	7 May
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.

APPENDIX 3.

VENTURA RIVER STUDY AREA
BIRD SURVEYS
1991 - 1992

Species	19 May	10 June	24 August
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
Snowy Plover			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
Least Tern			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
Tree Swallow	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
Yellow-breasted Chat	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)

Species	9-11 August	17 August	28 August	1 September
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

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	
Semiplated 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
For ster's Tern			2	6

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

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)

Species	2 December
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
Ruddy Duck	7
American Coot	15
Black-bellied Plover	3
Semipalmated Plover	5
Greater Yellowlegs	1
Willet	1
Spotted Sandpiper	2
Marbled Godwit	1
Ruddy 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)

Ventura River Mouth Bird Surveys, 1992

Species	25 February*	28 February
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

Ventura River Mouth Bird Surveys, 1992

Species	8 March*
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)

Species	25 May
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

Species	21 June	
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	
Forester'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 juvs.)
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	

Ventura River Estuary Enhancement Project

Figure 4. Location of small mammal traplines.

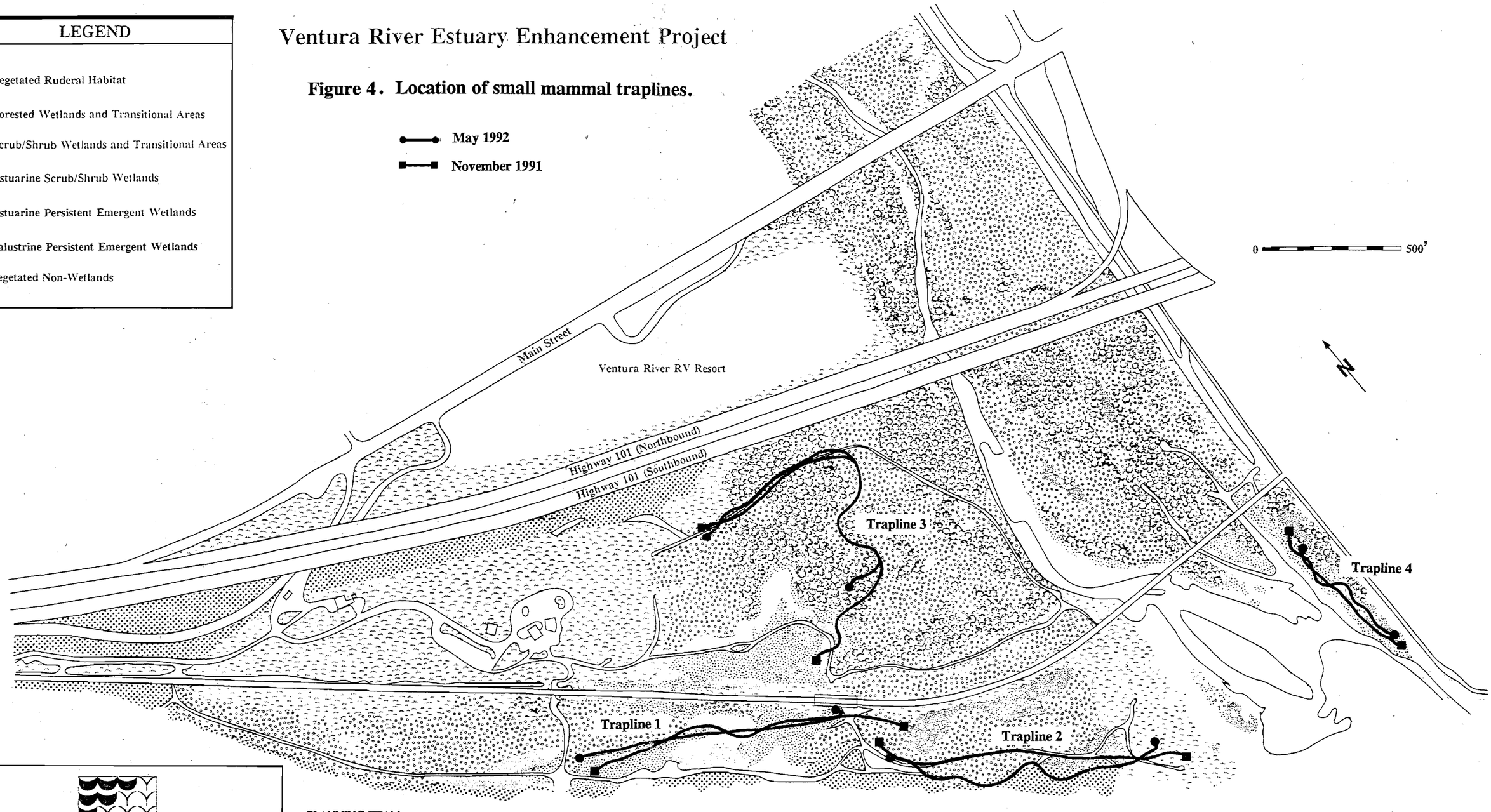

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Figure 4.

Ventura River Estuary Enhancement Project

Figure 5 . Map of the vegetation.

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

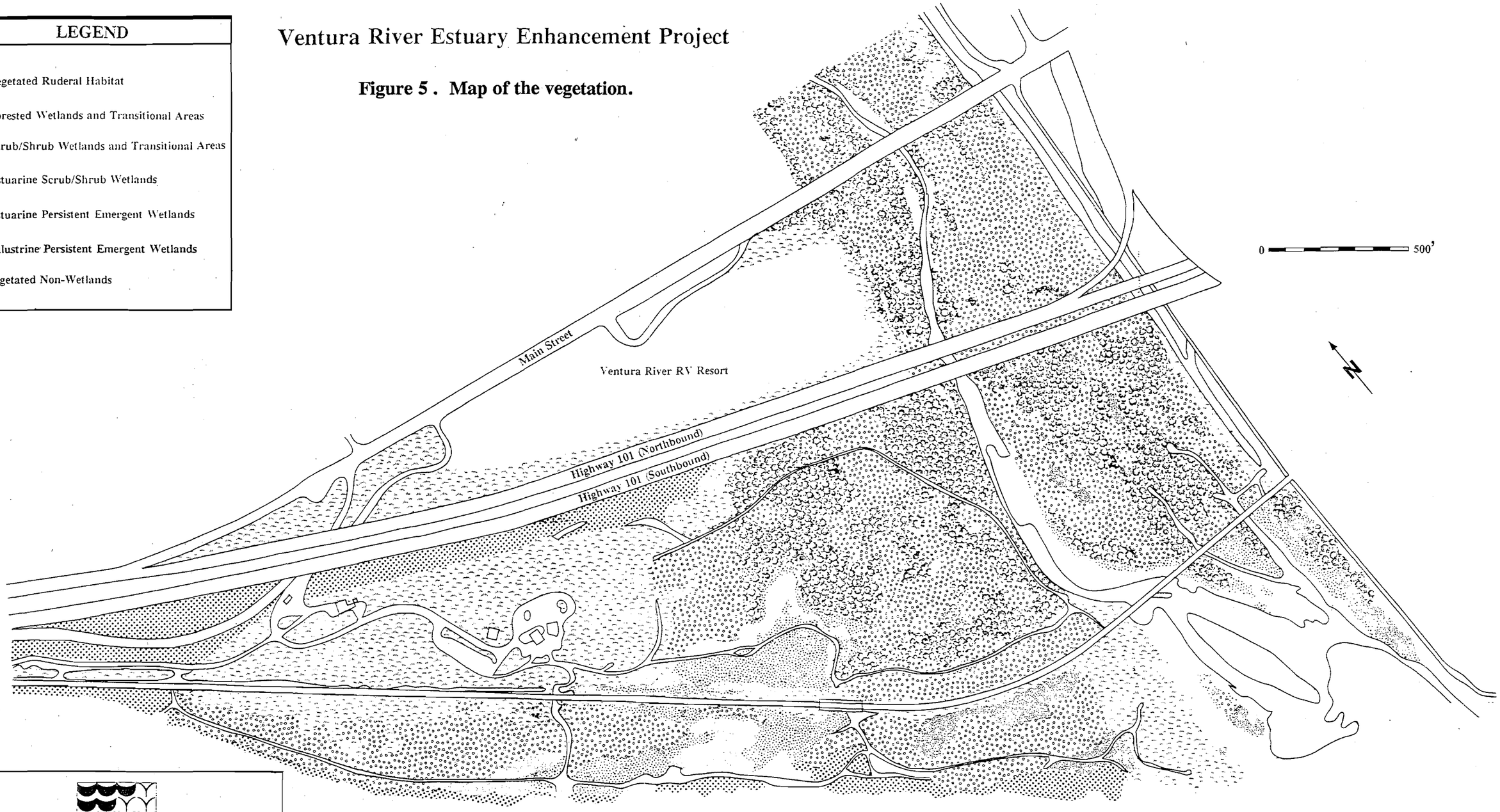

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Figure 5

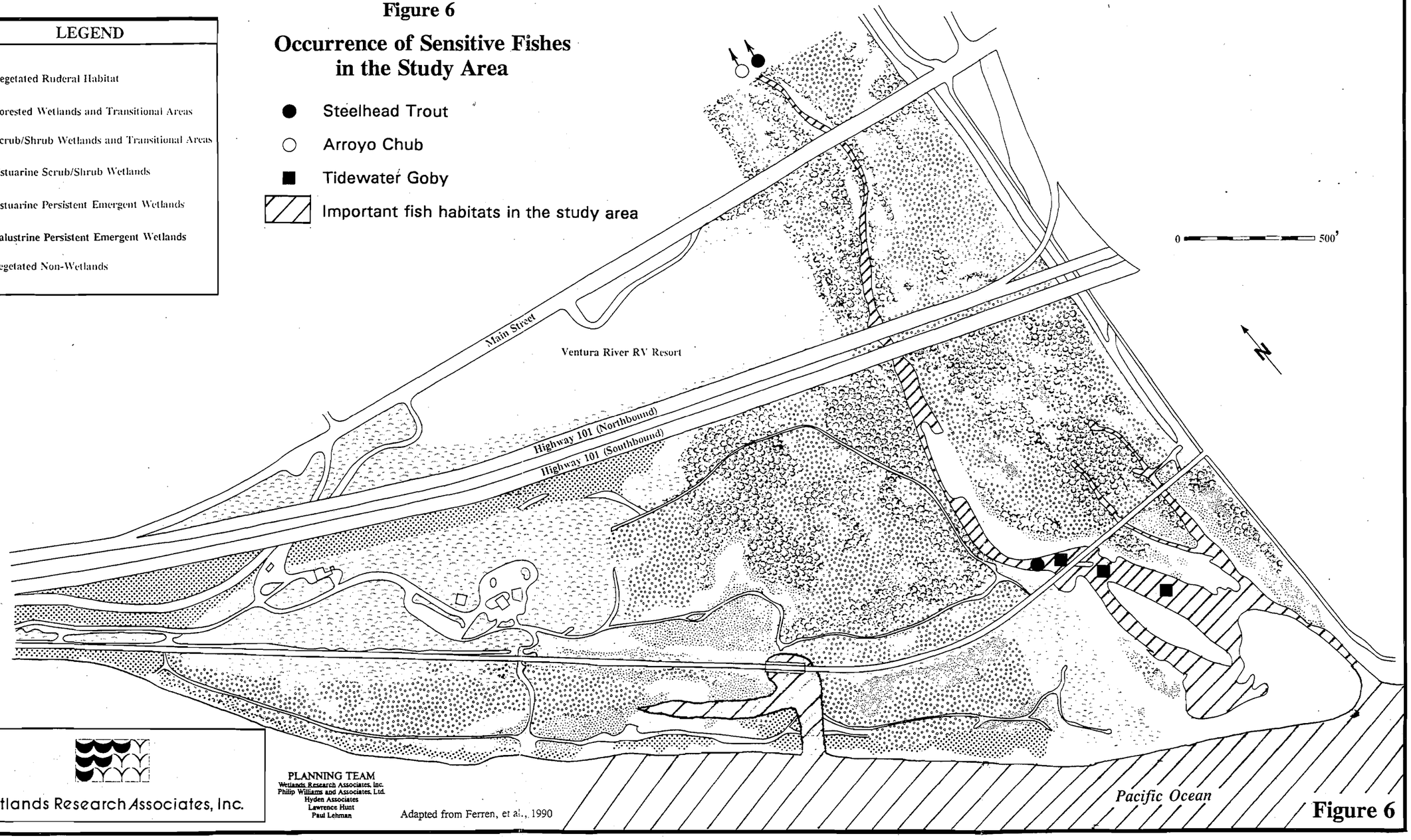
Figure 6

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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Adapted from Ferren, et al., 1990

Figure 6

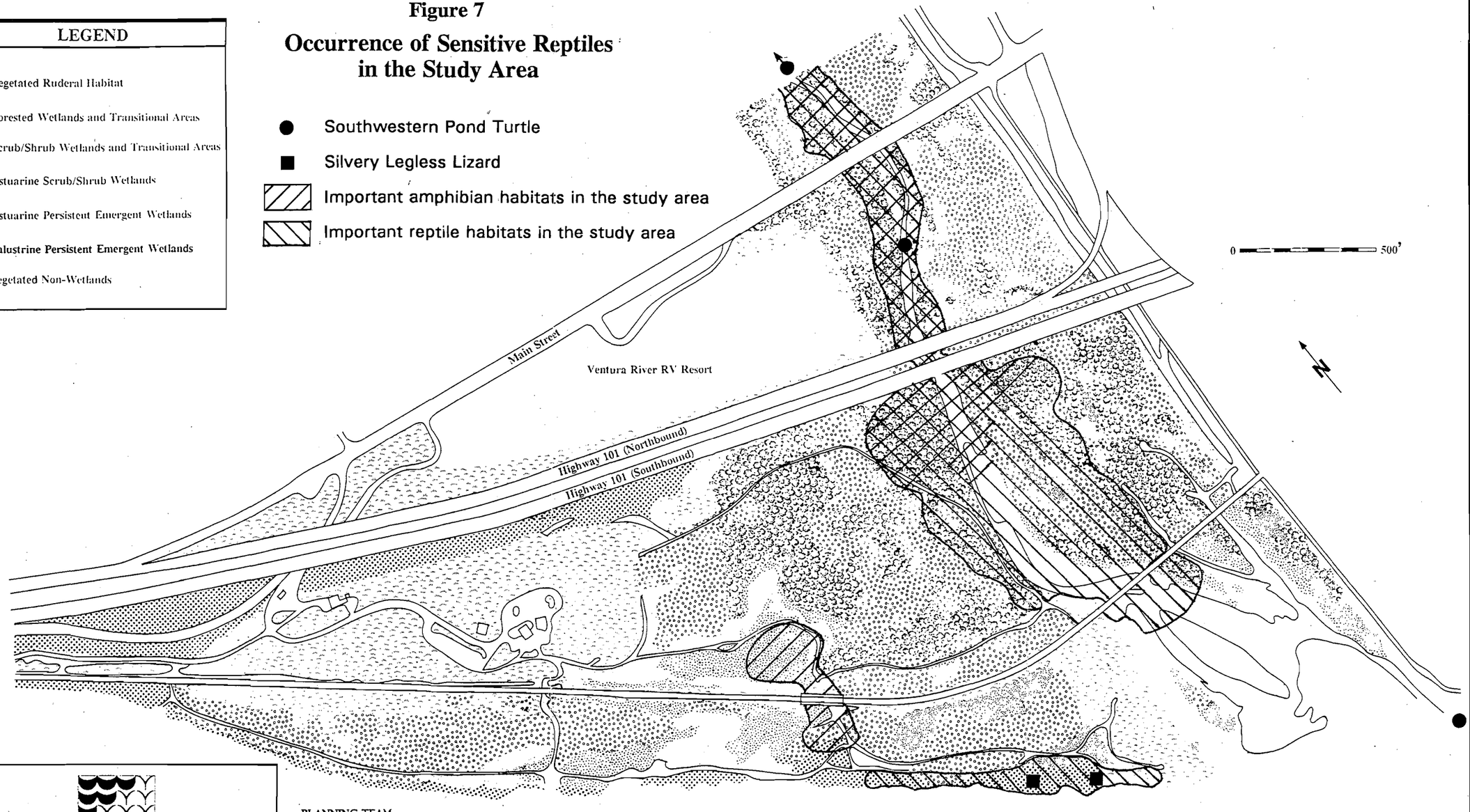
Figure 7

Occurrence of Sensitive Reptiles 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

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



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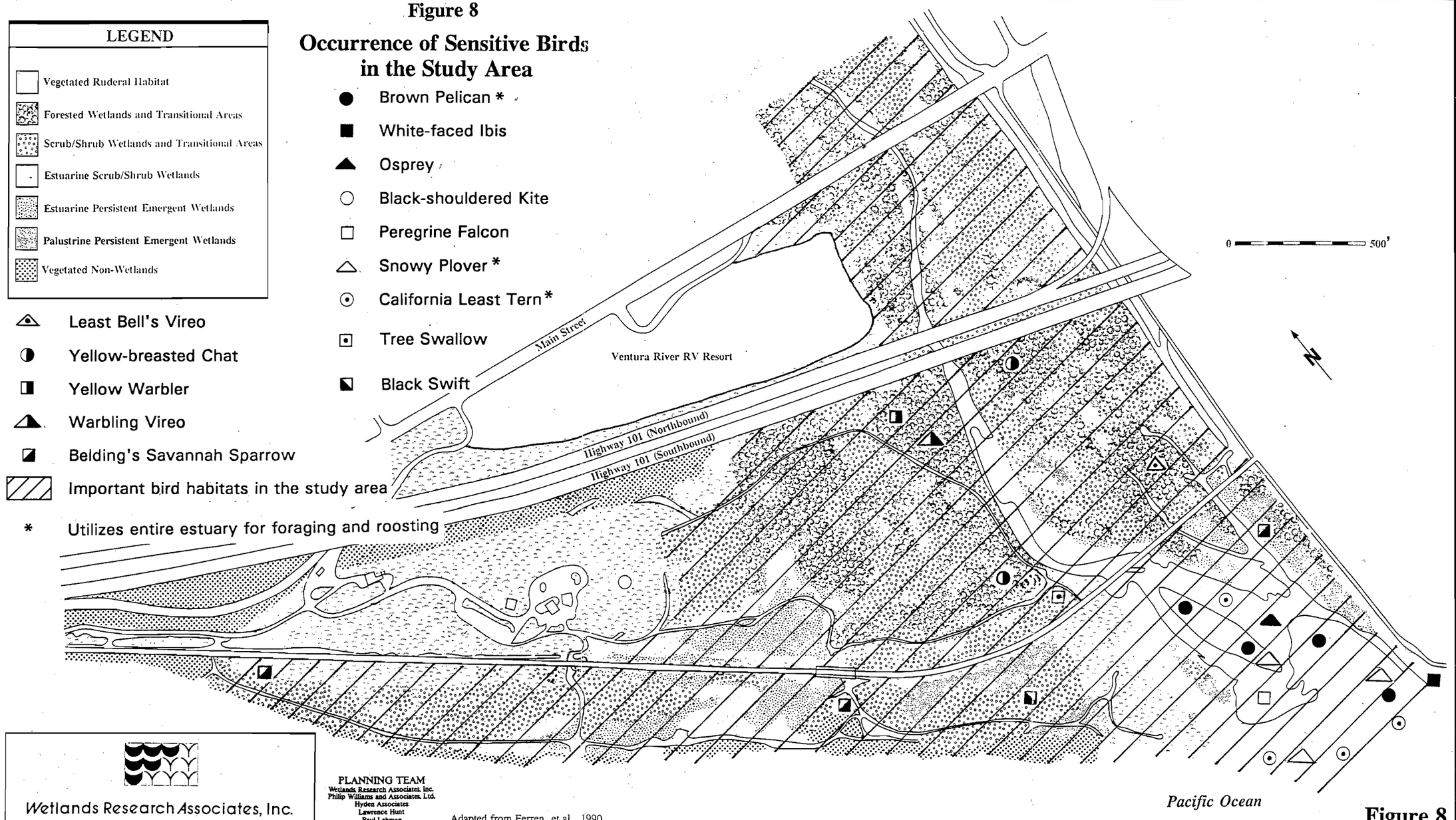
Adapted from Ferren, et al.; 1990

Figure 7

Figure 8

Occurrence of Sensitive Birds in the Study Area



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Adapted from Ferren, et al., 1990

Figure 8

Figure 9

Important Mammal Habitats in the Study Area

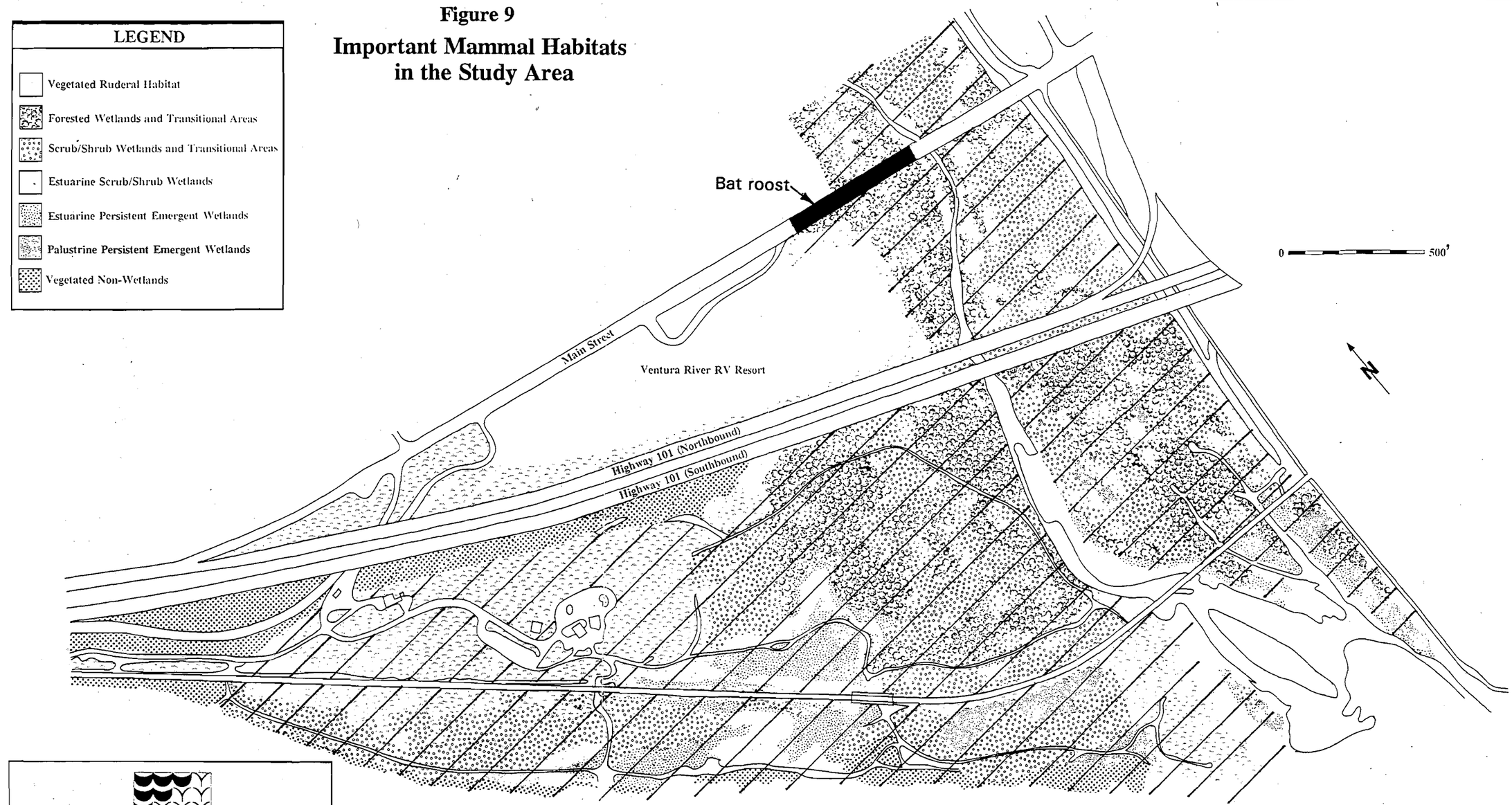

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Figure 9