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BIOLOGICAL RESOURCES OF THE SAN MATEO CREEK AREA
Camp Pendleton, California

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**Southern California
Wetlands Inventory Library**

1.0 INTRODUCTION

San Mateo Creek is located on the southern California coast at the boundary between Orange and San Diego Counties. The study area includes the riparian and marsh habitat surrounding San Mateo Creek, a small fresh water stream located just south of the city of San Clemente. The Camp Pendleton Marine Corps base is directly to the south and east.

San Mateo estuary is part of San Onofre State Beach which consists of one of four subunits operated by the Department of Parks and Recreation under a lease agreement with the U.S. Navy. San Mateo Creek is part of subunit two and designated as a wetland preserve.

San Mateo estuary is located at the mouth of the small canyon cut by San Mateo Creek on the edge of the Santa Ana mountains. The creek flows year-round within the study area. ~~Upstream flows, however, are~~ intermittent.

Interstate 5 and an older Pacific Coast Highway bridge cross the creek just seaward of the agricultural field. A railroad track and tressel also cross the saltmarsh and lagoon just landward of the beach.

The object of this study was to carry out a thorough biological baseline study of the entire San Mateo system. A resource inventory on this area has not been made yet several plans for the system have been developed by the Department of Parks and Recreation. In the state's plan (Briner, 1984), campgrounds and picnic areas would be developed in the valley along with parking and beach access routes. Much of the marsh would remain a wetland preserve but an interpretive facility, a golf course on the adjacent bluff and increased beach areas would greatly alter the area in terms of its present habitat resource value.

The following study was thus designed to determine the biological resources of the San Mateo area. Vegetative communities and wildlife were sampled quantitatively over a period of one year. From the information provided in this report, it will be possible to assess impacts of present and proposed plans for the San Mateo area.

2.0 BOTANICAL SURVEY OF THE LOWER SAN MATEO CREEK WETLANDS,
RIPARIAN HABITATS, AND ADJACENT SLOPES

2.1 Introduction

The San Mateo Creek is one of the few remaining drainage systems in coastal southern California that is in a relatively natural state. It extends for over 50 miles and has a watershed of over 132 square miles (Jorgensen, et al 1971) draining portions of the Santa Margarita Mountains, Sitton Peak, and the western slopes of the Elsinore Mountains in northern San Diego, southeastern Orange, and western Riverside counties. Cristianitos Creek joins San Mateo Creek about 3 miles inland from the coast and contributes 29 square miles to the total water shed (Jorgensen, et al 1971). The mouth of San Mateo Creek forms a blind estuary at the Pacific Ocean in the northwesternmost corner of San Diego County, just south of San Clemente. Only after heavy storms (generally occurring in winter) is the sand bar at the mouth of the creek breached. At the lower end of the drainage there is an area of extensive wetland vegetation.

The only portion of the creek that has had any alteration to the natural flow is the very lower end. The construction of the railroad embankment and trestle by the Santa Fe Railway in the early part of this century stabilized the mouth of the creek (Kutcher 1979). In the 1930's during the construction of old State Highway 1, a straight channel was cut and levees were made between the highway bridge crossing the creek and the railway trestle, thus stabilizing the channel from below State Highway 1 to the ocean (Kutcher 1979). Upstream from the freeway and outside of the study area there are several earthen reservoirs constructed by the farmers to increase percolation of runoff into the watertable. Also there is an old, much overgrown levee upstream from the freeway and on the

western edge of the agricultural fields that was apparently constructed to prevent the creek from changing course and destroying cultivated areas on the river terrace.

This study is concerned with the lower 1.3 mile stretch of the creek and adjacent slope (Fig. II-1). Maximum width of this area is along the coast where it is about 0.7 miles wide. Excluding the cultivated fields, the total area covers approximately 325 acres (130 hectares). It is the purpose of this botanical resource survey to document all plant species that occur within the study site; to provide a checklist with an indication of cover or abundance within each community; to determine rare and endangered plants, if any, that occur on the study site and to locate them; to evaluate the ecological merits of the communities; to delimit, describe and map the plant communities of the study site; and to make management suggestions.

Much to the benefit of this survey, there have been some previous studies of the woodland and wetland areas of this study site. Peta Mudie (1970) provided some quantitative data on the Jaumea wetland and Colia Kutcher (1979) of California State University, Fullerton, has sampled the riparian woodlands and has provided us with a recent checklist that has been compiled from her records as well as those of Walt Wright, Karlan Marsh, and Peta Mudie.

2.2

METHODS

The field work on the study site was conducted from October, 1985 to August, 1986. During these field surveys vouchers of plant species were made of almost all the species and quantitative vegetation sampling was performed. The earlier field surveys concentrated on collecting specimens of species observed and evaluating the partitioning of the

vegetation into communities. The later surveys were concerned with the sampling and mapping of the vegetation and with collecting vouchers of specimens not previously collected.

The method of quantitative vegetation sampling employed was the point-intercept method (Mueller-Dombois & Ellenberg 1974). This method estimates cover and is performed by walking through the vegetation and dropping a narrow rod at periodic intervals and recording whatever species are intercepted by the rod. Species intercepted at each sampling point are recorded as a hit. However, no single species is ever recorded more than once for one sampling point.

The point intercept method is a relatively simple, rapid, and objective technique for acquiring quantitative cover data. It permits close examination of almost all species present in the area being sampled and gives plenty of scope for objectivity (Ranson 1950). The point intercept method is performed by walking in a straight line and dropping the narrow rod at predetermined intervals without subjectively aiming. In vegetation that is open or of low stature there is usually little problem in maintaining a straight line by sighting on some distant reference point and dropping the rod objectively by holding it at arms length, either within the line of sight with the reference point or to one side, and dropping it without looking. In dense or tall vegetation walking a straight line is nearly impossible. Straight transects could only be approximated by a series of short, straight segments in tall vegetation. When vegetation became too dense, it was detoured but the transect was visually maintained and cover was estimated for sampling points that would have fallen within the detoured area. Although poison oak was very dense in some of the communities and common sense demanded one to by-pass it, it

common to two transects; MA is the sum of absolute cover values of all species in transect A; and MB is the sum of absolute cover values of all species in transect B. Percent bare ground was not included in the calculation of IS for cluster analysis, but was included for the ordination analysis.

Cluster analysis was performed using the similarity indices to group similar transects together. This is a reiterative procedure that initially clusters the next two most similar units (transects, transect and group of transects, or groups of transects) until all transects are in one group. This analysis aids in the classification of the communities and graphically represents the breakdown of the vegetation into communities by a dendrogram. The method of cluster analysis used was the Unweighted Paired-Group Method using Arithmetic Averages (UPGMA; Sneath and Sokal 1973).

Ordination analysis was done to demonstrate the grouping of the transects and to suggest the major environmental parameters that determine which groups of plants grow where. The method of ordination was detrended correspondence analysis (DECORANA) using the algorithm of Hill and Gauch (1980) and was performed by the BIOSTAT program.

Mapping was done with the aid of black and white aerial photographs taken in 1980 and obtained from the EROS Data Center, Geological Survey, U.S. Department of Interior. Ground surveys were used to verify photographic interpretations. These photographs also served as the base map.

2.3 RESULTS

Species Interview

The total number of species recorded for the study site is 316 (Appendix 1), of which 30% are naturalized introductions. All but 18

species have been collected or seen by me, and these 18 are indicated in Appendix 1 by a 'K' in the source column for Celia Kutcher's checklist. All those marked with a 'V' have vouchers at the herbarium at the University of California, Los Angeles, some duplicates have been distributed to the Natural History Museum, San Diego. Those marked with an 'S' are based on field sightings.

Appendix 1 also lists the plant communities that the species occur in along with their corresponding absolute cover-abundance value based on transect results and scaled to the following Braun-Blanquet cover-abundance scale:

- 5 - with absolute cover more than 75%
- 4 - " " " from 50 to 75%
- 3 - " " " " 25 to 50%
- 2 - " " " " 5 to 25%
- 1 - numerous, but absolute cover less than 5%
- + - few, with small cover
- r - solitary, with small cover

Nomenclature and common names used in Appendix 1 follow Beauchamp (1986).

The percentage of introduced species is quite high at 30%. For San Diego County this percentage is 23% (Beauchamp 1986) and for the Santa Monica Mountains it is 27% (Raven et al 1986).

2.4 Sensitive Species

A preliminary list of sensitive plants that might occur on the study site was prepared by extracting species from Smith and York (1984), which includes rare plant classifications by the California Department of Fish and Game and the U.S. Fish and Wildlife Service. The preliminary list included those species that occur within the same 15 minute quadrangle as the study site and adjacent 15 minute quadrangles. From this preliminary list species considered unlikely to occur on the study site because of their habitat, elevational range, or geographic distribution were

Table II-1. Sensitive Plants that Might Occur in the San Mateo Marsh area. Extracted from Smith and York (1984).

List 1B: Plants Rare and Endangered in California and Elsewhere

Chorizanthe parryi Wats. var. fernandina (Wats.) Jeps.
Family: Polygonaceae Common Name: San Fernando Valley Spineflower R-E-D Code: 3-2-3*
Notes: Once occurred in areas that are now heavily urbanized. State/Federal Status: /C1**

Chorizanthe staticoides Benth. var. compacta (Coodm.) Reveal
Family: Polygonaceae Common Name: Turkish Rugging R-E-D Code: 2-2-3
State/Federal Status: /C2

Dudleya multicaulis (Rose) Moran
Family: Crassulaceae Common Name: Many-Stemmed Dudleya R-E-D Code: 1-2-3
State/Federal Status: /C2

List 2: Plants Rare or Endangered in California, but more Common Elsewhere

Euphorbia misera Benth
Family: Euphorbiaceae Common Name: Cliff Spurge R-E-D Code: 2-2-1
Notes: Threatened by development. Large shrub, not easily missed. State/Federal Status:
Not reported near here (Beauchamp 1986).

Harpogonella palmeri (Gray) var. palmeri
Family: Boraginaceae Common Name: Palmer's Grappling Hook R-E-D Code: 1-2-1
Notes: Not listed by Veno (1979) from the study site. State/Federal Status:

Lotus nuttallianus Greene
Family: Fabaceae Common Name: Nuttall's Lotus R-E-D Code: 2-3-1
State/Federal Status: /C3c

Selaginella cinerascens A. A. Eat.
Family: Selaginellaceae Common Name: Mesa Clubmoss R-E-D Code: 1-2-1
State/Federal Status:

Table II-1. Sensitive Plants (continued).

List 3: Plants About Which We Need More Information

Aphanisma blitoides Nutt. ex Moq. in DC.
 Family: Chenopodiaceae Common Name: Aphanisma
 Notes: Beauchamp (1986) reports this from San Onofre Bluffs
 R-E-D Code: 1-2-2
 State/Federal Status: /C2

List 4: Plants of Limited Distribution (a Watch List)

<u>Calandrinia maritima</u> Nutt. Family: Portulacaceae	Common Name: Seaside Calandrinia or Sea Kisses R-E-D Code: 1-2-1 State/Federal Status:
<u>Corathrogyne filiginifolia</u> (H. & A.) Nutt. var. <u>incana</u> (Nutt.) Canby Family: Asteraceae	Common Name: San Diego Sand Aster R-E-D Code: 1-2-1 State/Federal Status:
<u>Dichondra occidentalis</u> House Family: Convolvulaceae	Common Name: Western Dichondra R-E-D Code: 1-2-1 State/Federal Status: /C3
<u>Dudleya blochmanniae</u> (Eastw.) Moran ssp. <u>blochmanniae</u> Family: Grassulaceae	Common Name: Blochman's Dudleya R-E-D Code: 1-1-2 State/Federal Status:
<u>Suaeda esteroa</u> Ferren & Whitmore Family: Chenopodiaceae	Common Name: Esteroa R-E-D Code: 1-1-1 State/Federal Status:

Notes: Not likely to occur here, only known from salt marshes.

* R-E-D code

R (Rarity)

1 - rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time.

2 - occurrence confined to several populations or to one extended population.

3 - occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported.

Table II-1. Sensitive Plants (continued).

E (Endangerment)

- 1 - not endangered
- 2 - endangered in a portion of its range
- 3 - endangered throughout its range

D (Distribution)

- 1 - more or less widespread outside of California
- 2 - rare outside California
- 3 - endemic to California

**Federal Categories

C1 - used for species that the U.S. Fish and Wildlife Service currently has substantial information on file to document its vulnerability or threatened status.

C2 - used for species that have insufficient information to document their vulnerability or threatened status.

C3 - used for species that were previously considered but are now excluded because they are known to be extinct (C3a), taxonomically invalid (C3b), or too widespread or not threatened at this time (C3c).

eliminated. The final list of sensitive plants is presented in Table II-1, which is arranged in the same format as Smith and York (1984).

There are four plants of List 1: Plants Rare and Endangered in California and Elsewhere, four species of List 2: Plants Rare or Endangered in California, but more Common Elsewhere, one species of List 3: Plants about which We Need more Information, and six of list 4: Plants of Limited Distribution (a watch list). Of these 15 sensitive species, only Lotus nuttallianus (Nuttal's Lotus) was found on the study site during this survey. It occurs at the southwestern boundary at the base of the bluff below the U.S. Coast Guard Station and above the railroad tracks. This is quite an exposed site and probably frequently disturbed because of erosion. Of the remaining plants in Lists 1 and 2 only Dudleya multicaulis (Many-Stemmed Dudleya) has ever been collected from the 7.5 minute San Clemente Quadrangle that the study site occurs in. Of lists 3 and 4 Aphanisma blitoides (Aphanisma), Calandrinia maritima (Seaside Calandrinia), and Dudleya blochmaniae (Blochman's Dudleya) are likely to occur on the study site, but were not found during this study despite efforts to locate them.

2.5 Vegetation Analysis

Location of transects is mapped in Fig. II-2. The data from the transects is presented in a Braun-Bianquet Table (Table II-2) where the species and transects are more or less ranked along a moisture gradient from dry at the top left of the table to wet at the bottom right.

The ordination of the transects is presented in Fig. II-3. The abscissa (the first ordination axis) is equated with moisture and has an eigenvalue of 0.866, which is proportional to the amount of variation that is explained by the moisture parameter in the first ordination. The

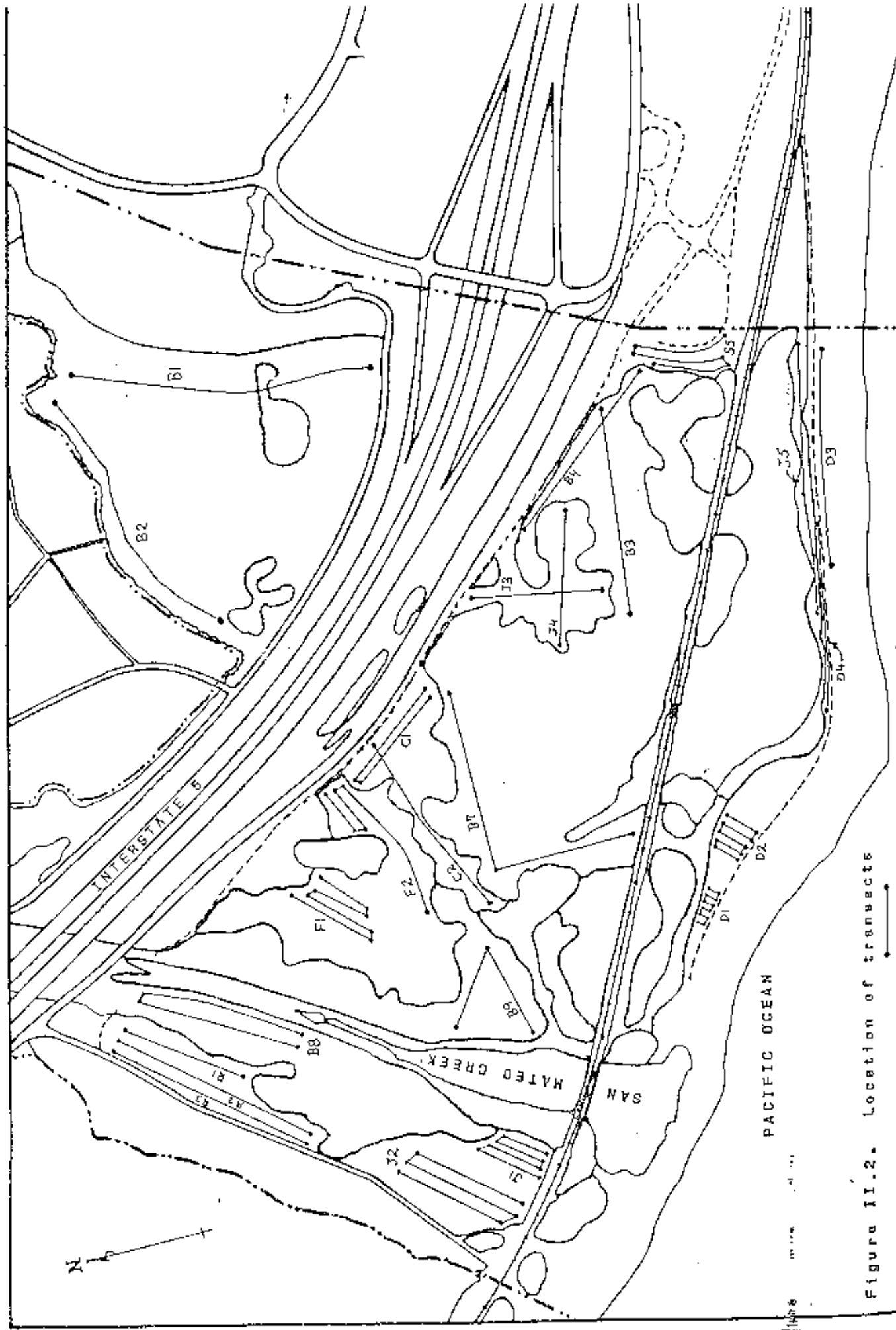


Figure II.2. Location of transects

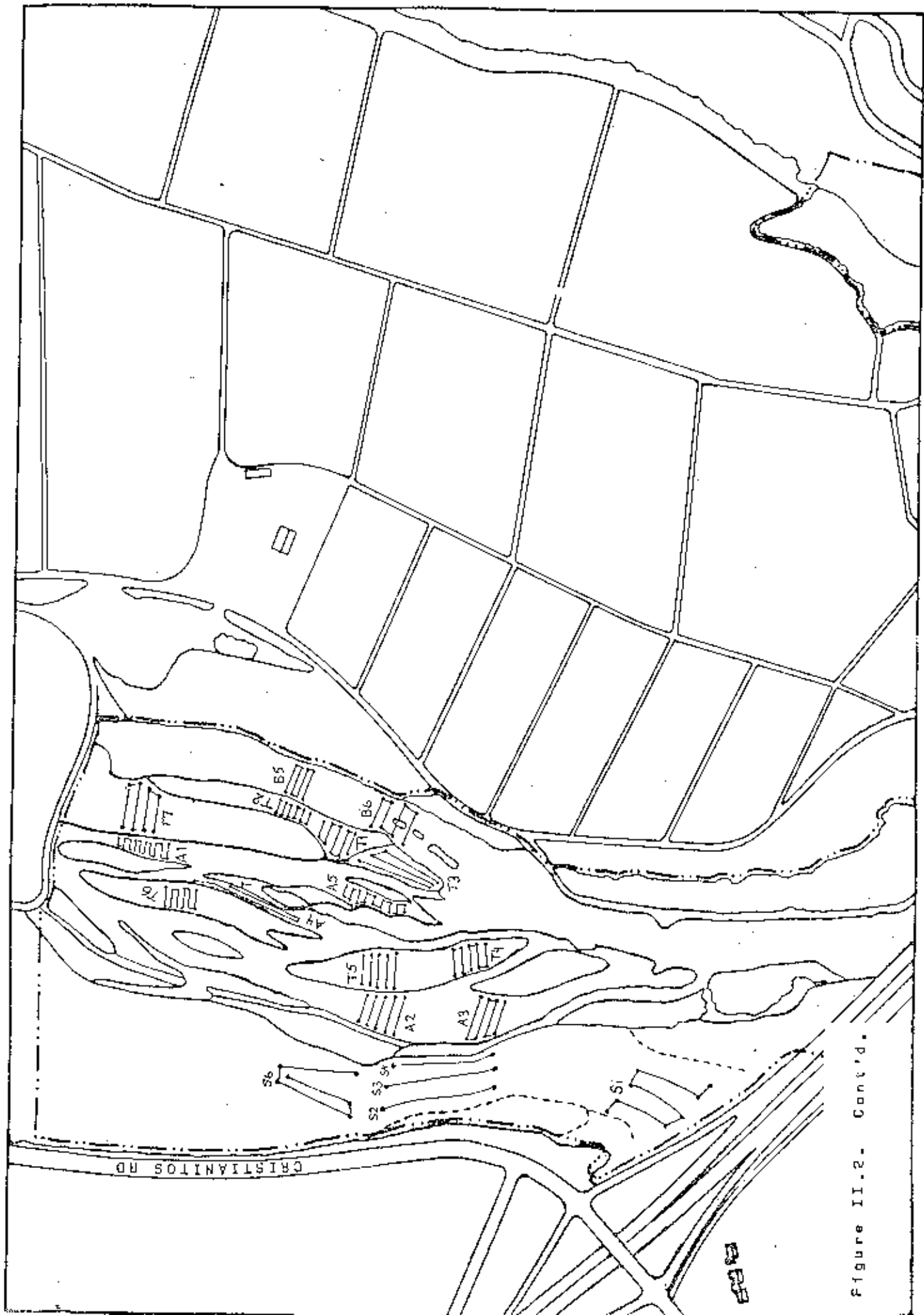


Figure II.2. Cont'd.

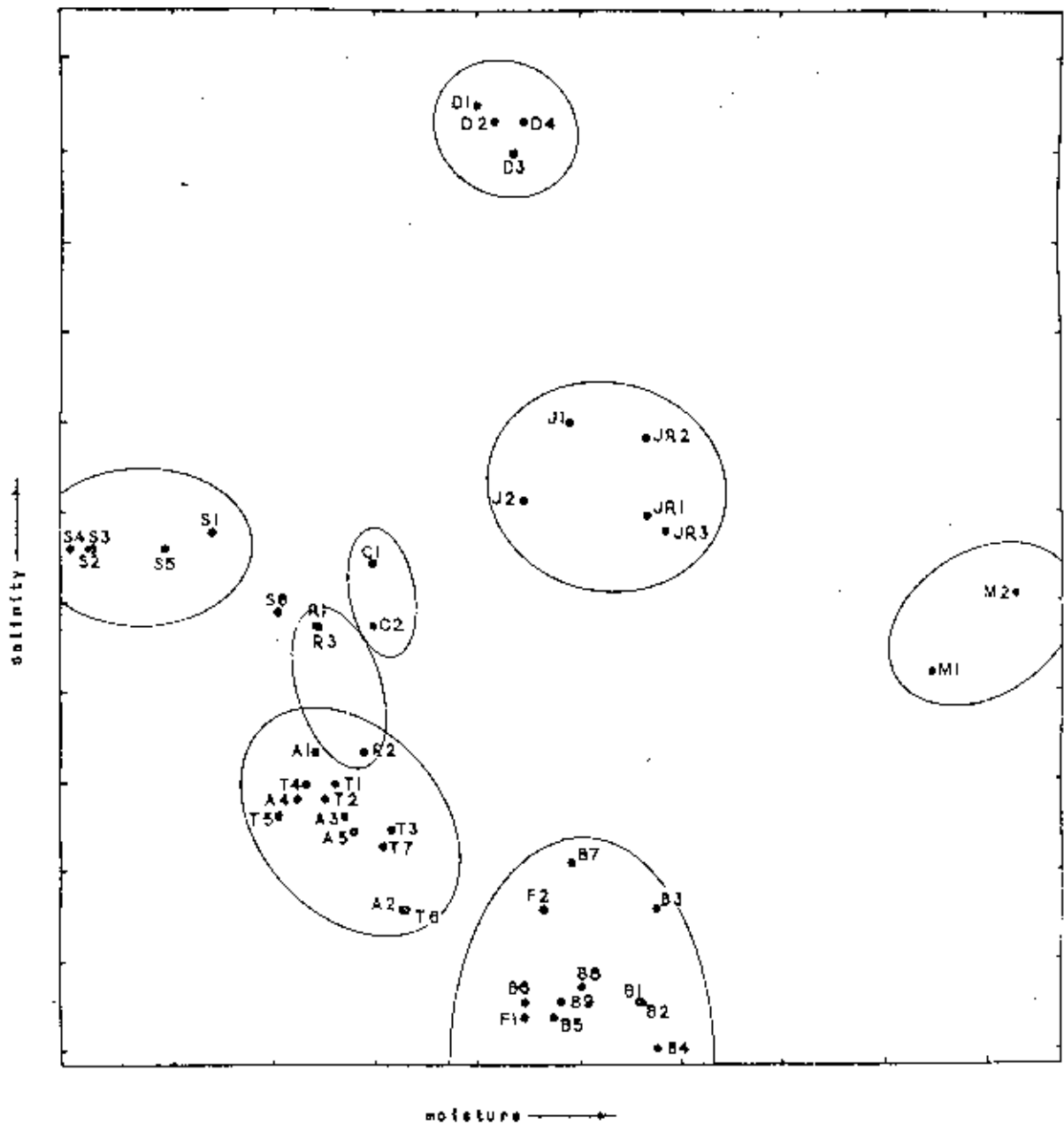


Figure II-3. Detrended correspondence analysis of transects. Abscissa is equated to moisture, and ordinate is \pm equated to salinity. B = willow woodland, F = sycamore-cottonwood woodland, J = fleshy jaumea meadow, JR = fleshy jaumea-mexican rush meadow, R = old field, T = alluvial terrace, A = alluvial channel, S = coastal sage scrub, C = coyote bush scrub, D = coastal strand, and M = freshwater marsh.

ordinate (the second ordination) is interpreted to be either salinity or physiological drought stress and has an eigenvalue of 0.672. In Fig. II-3, eight clusters of transects have been circled and these can be equated with plant communities. In addition to these there are aquatic, intermittent streambed, and ruderal communities that were not included in the data analysis.

The results of the cluster analysis are presented in Fig. II-4. Based on the dendrogram, six major clusters and twelve minor clusters are recognizable and can be equated to plant communities or phases of a community. The following is a brief interpretation of the dendrogram; a description of the communities follows the dendrogram analysis.

Proceedings from the top of the dendrogram (Fig. II-4) to the bottom of the six major clusters are labeled alphabetically, and the subclusters within each major cluster are numbered.

All transects from the riparian woodlands have clustered neatly in cluster A and within this cluster, A1 is equated with willow woodland and A2 with sycamore-cottonwood woodland. The low similarity that these two communities have with each other ($SI = 0.228$) justifies the separation of these two units as distinct communities.

Cluster B contains transects that are dominated by one or more of the following species: Jaumea acarnosa (fleshy jaumea), Anemopsis californica (yerba mansa), Distichlis spicata (salt grass), or Juncus mexicanus (Mexican rush). The similarity between subclusters B1 and B2 is low ($SI = 0.261$) and supports recognition of separate communities in a manner consistent with Mudie's (1970) treatment of these two communities. Thus, there is a fleshy jaumea meadow and a fleshy jaumea-mexican rush meadow.

Cluster C is a heterogeneous group of transects representing braided stream channels, alluvial terraces, and oil fields. Subcluster C1

Tracks

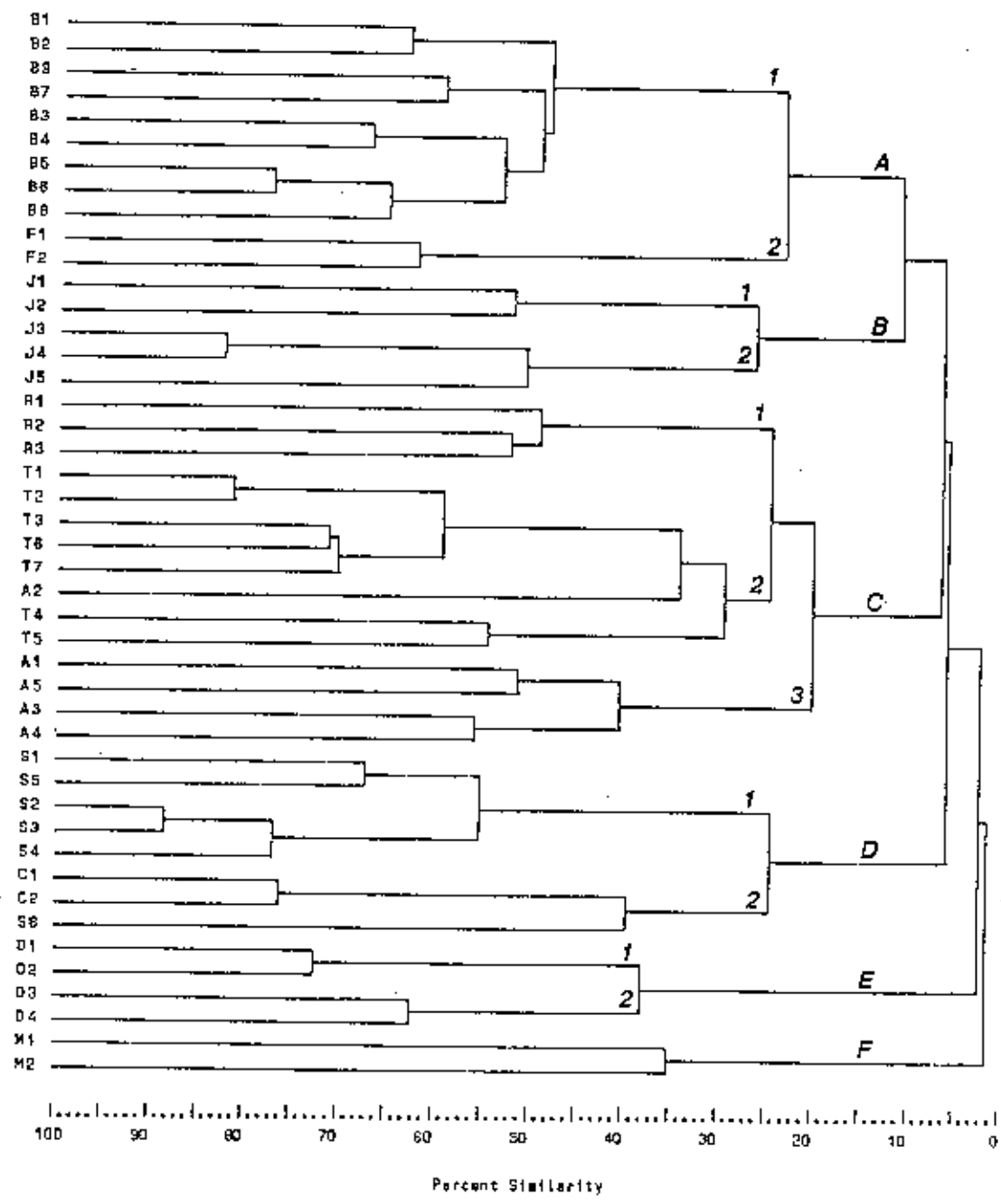


Figure II-4. Dendrogram of cluster analysis; see text for lettering and numbering.

represents three adjacent transects from what may be an old agricultural field. Subclusters C2 and C3 represent transects from alluvial streambed sites that are quite diverse. However, there is a slight pattern to their clustering. The transects of alluvial terraces along with one transect (A6) from a channel site have all been grouped in cluster C22, and the remaining transects from the channel sites form cluster C3. Thus three communities are recognized: old field (C1), alluvial terrace (C2), and alluvial channels (C3).

The transects grouped into cluster D are all dominated by shrubs. Cluster D1 is equated with coastal sage scrub, and D2 with coyote bush scrub.

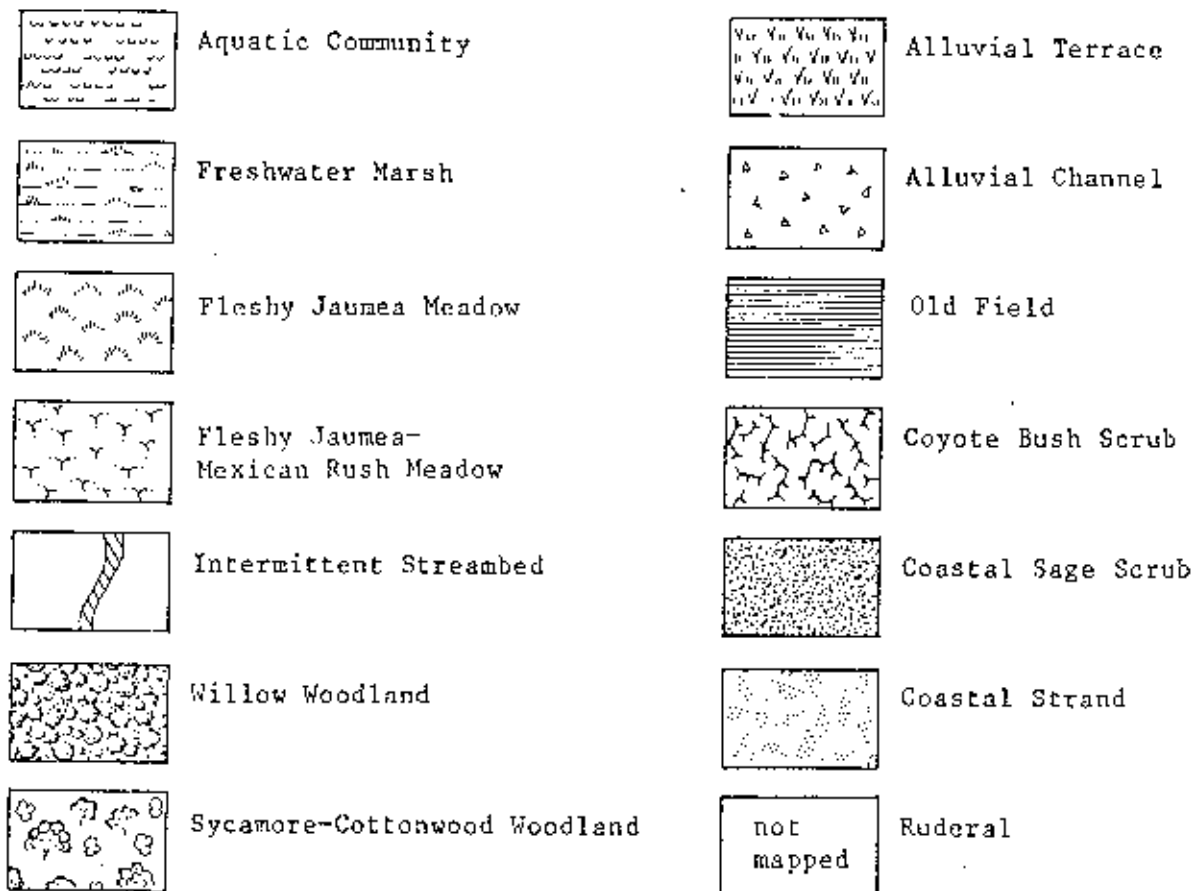
Coastal strand transects form cluster E. Within cluster E there is dichotomy into two subclusters that could be recognized as two different communities because of a low similarity ($SI = 0.375$) but are kept as one community here to keep with the traditional approach.

Cluster F represents the freshwater marsh transects. Cover data from this community was not as rigorously gathered as the other communities, and although only two phases (tule marsh and cat-tail marsh) of the community are represented in the dendrogram, there is also the Olney's bulrush phase of the community which was not quantitatively sampled.

The cluster analysis has delimited three more communities than are apparent in the two dimensional presentation of the ordination analysis of the transects in Fig. II-3.

In addition to these communities, the unsampled communities (aquatic, intermittent streambed, and ruderal) are added. Thus 14 plant communities are recognized, and these are mapped in Fig. II-5.

Figure II-5. Plant community map of lower San Mateo Creek and adjacent slopes.

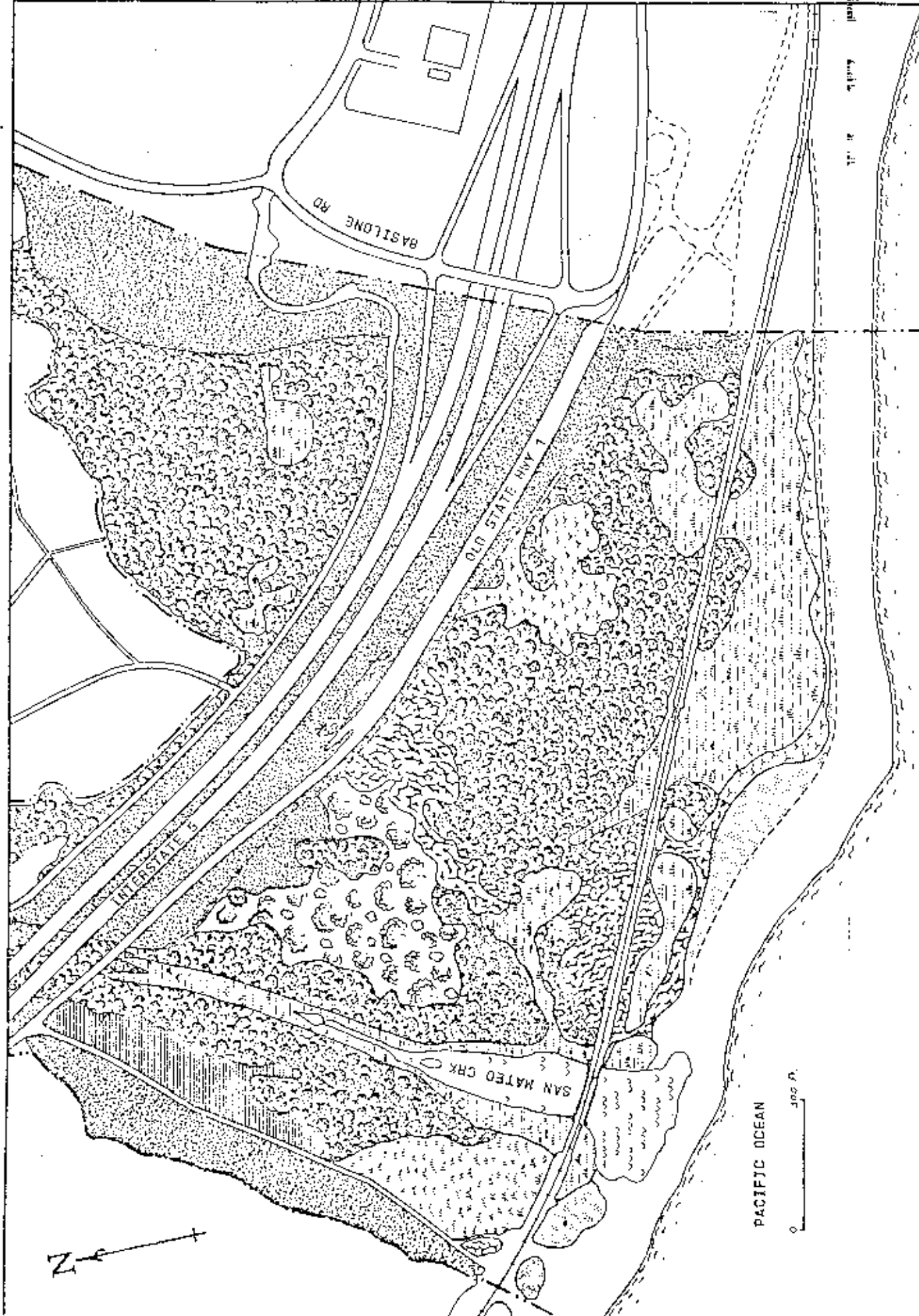


scale: 1 inch = 500 ft

—+—+—+—+— railroad

—.....— approximate boundary of study area

4450000



N

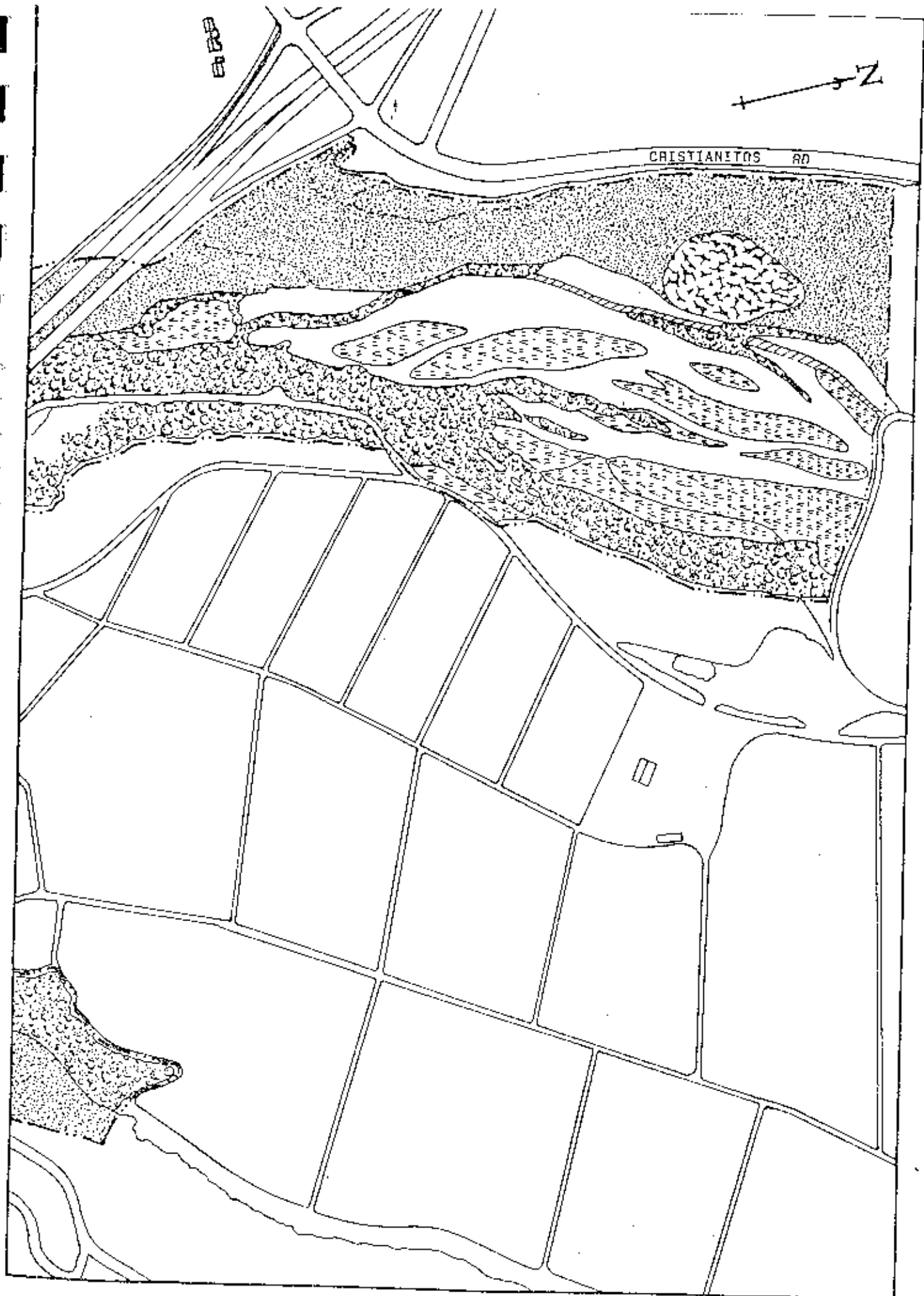
PACIFIC OCEAN
500 FT.

BASTLONG RD

OLD STATE HWY 7

INTERSTATE 5

SAN MATEO CRK



2.6 Description of Plant Communities

The following descriptions of the plant communities are based on transect data and field observations at the study site. Additional information and descriptions of most of these communities can be found in Lutting (1976) and Barbour and Major (1977).

Aquatic Community

The aquatic community is restricted to the lowermost portions of San Mateo Creek where there is perennial water, from slightly upstream of the freeway to the sandbar, that forms a barrier to the ocean at the mouth of the stream. It also occurs at a seepage area at the base of the sandstone cliff on the western edge of the floodplain north of the freeway. The water can be slow moving or standing, fresh or slightly brackish. Total area occupied by this community/habitat is about 6.2 acres or almost 2% of the study area. Species that make up this community are free floating or submersed plants. Characteristic species are Ruppia maritima (beakfruit sea-tassle), Nasturtium officinale (white water-cress), Zanichellia palustris (horned-pondweed), Samolus parviflora (water-pimpernel), Potamogeton pectinatus (fennel-leaf pondweed), Lemna minima (lesser duck weed), L. gibba (wind-bags), Azolla filiculoides (Pacific mosquito fern), Fluchea odorata (salt marsh fleabane) and freshwater algae species.

Freshwater Marsh

The freshwater marsh occupies the lowland areas and old stream channels of the San Mateo Creek. These areas are wet for most of the year and some areas are wet for the entire year. Total area occupied by this community is about 25 acres or almost 8% of the study area. There are only 14 species that are listed for this community and cat-tail, tules, or the

Olney's bulrush can form nearly pure stands. Other species present are Sparganium eurycarpum (broad-fruit bur-weed), Pluchea odorata, Persicaria ssp., Lemna minima, and Azolla filiculoides; the floating aquatics occurring in the more open areas, generally margins, of the marsh. There is about 100% cover in this community. Three phases (cat-tail, tule, and Olney's bulrush marsh) of this community can be recognized that may reflect slight differences in salinity and elevation or sequence of colonization. The tule marsh is dominated by nearly pure strands of Scirpus californicus (California bulrush). The cat-tail marsh is formed by solid stands of cat-tails both Typha latifolia (common cat-tail), with some of the other freshwater marsh species also being present. The Olney's bulrush marsh is the least extensive and occupies areas adjacent to the willow riparian woodlands at the southeastern end of the site. Marginal areas to the freshwater marsh have Solidago occidentalis (western goldenrod), Eclipta alba (flea-seed), Stachys rigida (hedge-nettle), Pluchea odorata, and Polygonum species.

From comparison of the present extent of the freshwater marsh community with its distribution in the aerial photographs taken in 1980, and the presence of old, dead willow snags, it appears that the freshwater marsh is expanding at the expense of the willow woodland in the eastern portion of the site along the railroad tracks. This may be a result of higher water levels. Although willows can withstand flooding they cannot always be inundated. Drift from herbicides used by the Santa Fe Railway to keep the embankments free of vegetation may also have killed many of the willows. This latter explanation appears to be supported by other dead willows at other places along the railroad embankments.

Fleshy Jaumea Meadow

The fleshy jaumea meadow is dominated by Jaumea carnosa with a scattering of shrubby species like Baccharis pilularis (coyote-bush), B. glutinosa (mule-fat), Atriplex lentiformis (quail saltbush), Tamarix ramosissima (tamarisk). Also present are the halophytes Salicornia virginica (woody glasswort), Distichlis spicata (salt grass), Carpobrotus aequilaterus (sea-fig), C. edulis (Hottentot-fig), and Malophora crocea (croceum ice-plant). The succulent perennials and the salt grass form continuous mats between the shrubby species. The greater number of halophytes and the greater number of shrubs distinguishes this community from the following one. This area is occasionally inundated by sea water when the sand barrier is breached.

Fleshy Jaumea-Mexican Rush Meadow

This community is dominated by Jaumea carnosa, Anemopsis californica, and Juncus mexicanus which form a low, continuous, matted vegetation. The community occurs in clearings in the willow woodland and as a transition between freshwater marsh and coastal strand. Because of the apparent stacks of decomposed branches and logs (now covered by poison oak), old oil drums, small excavations, and Washington robusta (fan palm), and Phoenix canariensis (with the fronds trimmed off at one time) in the portions of this community that are encircled by the willow woodland, this area may have been cleared for cultivation or grazing sometime ago. However, the common plants here are halophytic and may be indicative of soil salinities that are excluding the willows.

Intermittent Streambed

The intermittent streambed community occupies the lower parts of the creek bed that apparently have periodic surface flow through much of the

wet season from year to year and subsurface flow during much of the dry season. It does not occupy those sites that have water flow only during floods. It is characterized by non-persistent species like Juncus rugulosa (wrinkled rush), J. xiphioides (iris-leaf rush), J. macrophyllus (long-leaf rush), Elocharis montevidensis, Rumex crispus (curly dock), R. salicilolia (willow dock), Persicaria ssp (smartweeds), Typha domingensis (tule cat-tail), T. latifolia (common cat-tail), Gnaphalium palustre (lowland cudweed), Mimulus nasutus (snout monkey flower), M. pilosus (downy monkey flower), Diplachne uninervia (dense-flower sprangle-top), and Paspalum dilatatum (common knotgrass) and some woody species like Salix hindsiana var. leucodendroides (sandbar willow) and Tamarix ramosissima. During the drier months of the year the herbaceous species die out or go dormant. This community occupies the least area of any community considered and is estimated to cover slightly over one acre within the study site.

Willow Woodland

The willow woodland is the most extensive community in the study area occupying approximately 100 acres or almost 31% of the total area. It is dominated by Salix lasiolepis (arroyo willow), a shrub or small tree that attains heights of about 30 ft. Although there are other willow species present, they form a small percentage of the cover. Salix laevigata (red willow) is more common in the area north of the freeway occurring along the stream banks. Salix lasiandra (lance-leaf willow) is infrequent, but like S. laevigata it is more common north of the freeway along the channels, Salix hindsiana is only in very early successional willow communities and is more characteristic of the intermittent streambed community. It was never observed in the more mature stands of willow woodland. Sambucus

mexicana (desert elderberry) is fairly common. Trees that occur sporadically are Populus fremontii (western cottonwood), P. trichocarpa (black cottonwood), Alnus rhombifolia (white alder), Platanus racemosa (California sycamore), and Quercus agrifolia (coast live oak). The understory is quite diverse and apparently varies due to water table level or degree and duration of inundation. In some areas only one or two species may dominate the understory while in others there is heavy litter and very little understory present. Common understory species are : Conium maculatum (common poison hemlock), Apium graveolens (common celery), Toxicodendron diversibolum (poison oak), or Artemisia douglasiana (Douglas's mugwort). Less common understory species are : Carex spissa, Hydrocotyle verticillata, Elcocharis montevidensis, Juncus rugulosa, Baccharis douglasii, Solidago occidentalis, Ricinus communis, etc. In general there are several phases of the willow woodland that are considered to represent a successional maturity from thicket to mature woodlands.

Sycamore-Cottonwood Woodland

The sycamore-cottonwood community is considered to represent a successional more mature riparian woodland with willows being replaced by Populus fremontii and Platanus racemosa and an occasional Quercus agrifolia or Alnus rhombifolia. Presumably it would in turn be succeeded by an oak woodland. Total area occupied by this community is almost nine acres. Understory composition is similar to that of the willow woodland.

Alluvial Terrace

The alluvial terrace community is quite a diverse assemblage of plant associations that occupy the flat areas between or adjacent to the stream channels. These areas generally have sandier substrates and are one or

two feet higher in elevation than the adjacent channels. The terraces can be dominated by annuals and perennial herbs or by mule-fat and thus can have quite a different appearance, but the herbaceous and grassy layer of the mule-fat dominated terraces is of the similar species composition as the terraces dominated by annuals and perennial herbs. Common weedy, herbaceous species are : Bromus rubens (foxtail chess), B. mollis (common ripgut grass), Avena barbata (slender oat), Brassica nigra (black mustard), Croton californica (croton), Vulpia myuros (foxtail fescue), Lupinus bicolor (dove lupine), etc. Common woody species are: Baccharis glutinosa (mule fat), Nicotiana glauca (tree tobacco), Opuntia littoralis (coastal prickly-pear), and Arundo donax (giant reed).

Alluvial Channels

The alluvial channels are stonier and rockier than the higher terraces and have a very low plant cover with bare ground being over 70%. Rockier or moister channels, which approach the intermittent streambed community, are dominated by Baccharis glutinosa as in transect A2 and the drier, sandy-stony channels are dominated by Gnaphalium leucocephalum (white-head cudweed) and Lepidospartium squamatum (scale broom) with some Helianthemum scoparium (rush-rose). Annuals are sparse in both phases. The channel beds are fairly sterile, apparently not enough moisture exists to support an intermittent streambed vegetation or the water flow is too erratic.

Oil Field

The area occupied by this community is almost six acres and apparently was part of an old alluvial terrace. Channelization of the stream cut through this terrace and the levee has protected it from stream erosion and flooding. Because of the high number of introduced species, this area was evidently disturbed at one time. Perhaps the area was cultivated or grazed

or was used as a construction camp during the construction of the bridges across the creek. In any case the vegetation is heavily invaded by introduced European weeds (ca 40% of cover), but also has many coastal sage scrub species. The community may represent a stage of succession between disturbed sites or alluvial terraces and coastal sage scrub.

Coyote Bush Scrub

12
The coyote bush scrub occupies fairly low areas that are wetter than coastal sage scrub as well as dry slopes that appear to be very similar to slopes occupied by coastal sage scrub. In total there is about 12 acres that support coyote bush scrub. Species composition is very low with only 22 species being listed from this community. Baccharis pilularis is by far the most dominant shrub forming almost pure stands that average about 6 ft tall. This species is also a component of the following community. Other species present are Salix lasiifolia, Ribes speciosum (fuchsia-flower gooseberry), Toxicodendron diversilobum, Artemisia californica (coastal sagebush), etc. At the northwest end of the study area on dry slopes there is another area dominated by coyote bush. This area may have seepage or perhaps may represent an area where there was some slippage which has resulted in a moister habitat. It is in an area that one would expect coastal sage scrub but the dominance of coyote bush and the presence of Mexican elderberry make it more similar to coyote bush scrub. There is no evidence of a recent fire that may have resulted in the dominance of coyote bush. Coyote bush scrub extends for quite a distance up the canyon and is often considered an association of coastal sage scrub (Kirkpatrick and Hutchinson 1977, 1980).

13 Coastal Sage Scrub

The coastal sage scrub occurs on the driest sites in the study area occupying the steep slopes and on some of the drier flat areas. This community, which covers 58 acres, is the second most extensive plant community in the study area. It is composed of many aromatic shrubs that reach heights of 4 to 6 ft. Dominant species are Artemisia californica, Baccharis pilularis, Isoneris arborea (bladderpod), Encelia californica (California encelia), Isocoma veneta (coastal goldenbush), and Salvia mellifera (black sage). Some less dominant but characteristic species are: Mirabilis californica (coastal wishbone plant), Lycium californica (California desert thorn), Dudleya edulis (ladies-fingers), Marah macrocarpa (Cucamonga manroot), and Salvia spiana (white sage). There are also a scattering of some taller shrubs like Rhus integrifolia (lemonade-berry), Heteromeles arbutifolia (toyon) and Sambucus mexicana. This community is fairly dense and averages about 12% open ground.

Coastal Strand

The vegetation along the beach above the intertidal zone is composed of species that are able to withstand salt-spray, mobile substrate, and wind. These are severe environmental parameters that few plant species are able to endure. In addition to these natural parameters, plants of this habitat are subjected to heavy foot traffic from swimmers and surfers that use the beach for recreation and have thus reduced the size and vigor of the community. As a result of the severe impact on this habitat there are only about 20 species of plants that occur here and their coverage is generally very low. These species are: Carpobrotus acquilateralis (seafig), Distichlis spicata (salt-grass), Ambrosia bipinnatifida (beach burweed), Cakile maritima (sea-rocket), Abronia maritima (red sand-verbena), etc.

There is quite a degree of variation in cover in this community. Some areas that are dominated by either Carpobrotus or Distichlis have the highest cover (up to 55%). The more open areas tend to have less salt grass and sea-figs and greater relative cover of the other species. This difference may be a response to soil stability and structure as well as distance from and elevation above the intertidal zone. Some areas with heavier soils as along the dirt road where there is clay is where most of the Mosebrayanthemum crystalinum (crystal ice plant) and M. nodiflorum (little ice plant) occur.

6. Ruderal

The ruderal community is a diverse assemblage of plants that occupy disturbed sites, whether they are steep slopes or flats, sandy or clay soils, wet or dry. In this study site the ruderal areas are mostly road shoulders, railroad embankment, and areas that are disturbed frequently enough that native vegetation generally cannot compete or sites that have been disturbed recently enough that the native vegetation has not yet come back or established itself. The ruderal sites are the only sites where the introduced species outnumber the native species. Ruderal sites cover about six acres.

2.7 DISCUSSION

Of the communities recognized in this study, the coastal sage scrub, some of the coyote bush scrub, and ruderal are upland communities. The remaining communities are considered wetland or riparian communities. Recently a standard classification system has been proposed for wetland habitats in the United States by Cowardin et al (1979). Johnson et al (1984) have made minor modifications to Cowardin's classification so that

it is applicable to riparian areas of southwestern U.S. Following their scheme, the wetland plant communities that are here recognized are placed into their hierarchical classification system in Table II-3.

Very little information is available on the ecology of riparian communities and freshwater wetlands in southern California and most of what is known is extrapolated from similar communities outside our area. Studies by McBride and Strahan (1984) on Dry Creek, Sonoma County, California, are pertinent to understanding the succession of riparian communities along San Mateo Creek, but their findings are not completely comparable because they were studying a stream with greater and longer duration of flow than that of San Mateo Creek, and their site was farther north. To summarize their findings, McBride and Strahan found high correlations between sediment size and species establishment and between first year mortality and depth to ground water. Thus, sandbar willow seedlings were more common on fine textured soils (<2mm), and mule-fat and Fremont's cottonwood seedlings were more common on coarser grained sediments (>1cm). Sediment grain size is important in water holding capacity. The finer the grain, the greater the water holding capacity. Sandbar willow seedlings are very susceptible to short periods of water stress and therefore require finer sediments. Fremont's cottonwood seedlings have roots that are three times longer than willows (McBride and Strahan 1984) and thus are able to tap into soil moisture that lies at greater depths than the willows can reach. Similar observations were made on other species of cottonwood (Mosner & Minckler 1963; Nixon 1975). Willows, however are better adapted to withstanding inundation than cottonwoods (Mosner & Minckler 1963). Once seedlings and saplings are well established they can trap larger gravel during winter flooding which results in the accumulation of coarser substrates and higher elevations of

Table II-3. Comparison of where the plant communities of San Mateo Creek are placed in U.S. Fish and Wildlife system of classification (Cowardin et al 1979) as modified by Johnson et al 1984.

Riverine	
lower perennial	Aquatic Community
intermittent streambed	Intermittent Streambed
Palustrine (Riparian)	
Mesoriparin	
Scrub-Shrub Wetland	Coyote Bush Scrub
	Terrace Scrub ??
Forested Wetland	Willow Woodland
	Sycamore-Cottonwood Woodland
Emergent Wetland	Freshwater Marsh
	Jaumea Meadow
	Jaumea-Rush Meadow
Xeroriparin	
Scrub-Shrub Wetland	Alluvial Terrace ?
	Alluvial Channel ?

the seed beds. However, winter floods or peak discharge can scour out the channels and remove seedlings. The seedbed becomes unsuitable for the establishment of sandbar willow and mule-fat, but is suitable for cottonwood and red willow. Light reduction by the canopy eventually prevents further establishment of the red willow and cottonwood. Sediments continue to be deposited, which results in increased elevation of the seedbed, which in turn results in the accumulation of finer sediments. Thus, the soil moisture regime becomes more favorable, but the seedbed is less favorable for willows. At Dry Creek, white alders become established beneath the willow and cottonwood canopy and in higher and finer sediments. For San Mateo Creek white alder probably does the same. The Dry Creek study had no sycamores, and it is somewhat conjectural when sycamore comes in, but it probably behaves similar to the cottonwoods with which it is associated and of similar stature. If these riparian communities were permitted to progress to climax, the climax community would probably be a coastal live oak woodland.

Many of the alluvial terraces north of the freeway do not support willow riparian vegetation. Evidently because ground water is not close enough to the surface. North of the freeway no alluvial terrace vegetation has culminated into a climax community, but the old field area may be suggestive of what the climax community might become minus the introduced species. These areas would progress eventually to a coastal sage scrub community.

The study area has fine examples of riparian and wetland plant communities. Many riparian and wetland areas in southern California have been destroyed or heavily altered because of flood control programs or agricultural development. (See Warner and Hendrix, 1984, for literature on

the destruction and alteration of riparian communities.) San Diego County is more fortunate than most of southern California because many of its streams have not been channelized. It is important, therefore, to protect the remaining riparian and wetland habitats that still exist.

The area of the lower San Mateo Creek is floristically rich with over 219 native species and 74 families on 325 acres. One sensitive plant, Lotus nuttallianus, occurs at the base of the coastal bluffs at the U.S. Coast Guard Station. This area is susceptible to a lot of disturbance because of erosion of the bluffs, and Lotus nuttallianus may grow better where there is disturbance and openings. Therefore, it may not require any special management program other than keeping people from walking over it.

Management suggestions

The following suggestions are made in part to preserve the naturalness of the area and to answer questions that may be pertinent to management decisions.

Many weedy species should be controlled or eradicated. There are some weedy species that are so abundant that controlling them is out of the question, but there are some that are of low enough densities now that control procedures should be considered before their densities get too high and they become uncontrollable pests. These species are : Tamarix ramosissima, Cortaderia atacamensis, Arundo donax, Phoenix canariensis, Washington robusta, Ricinus communis.

Studies should be conducted to determine the effect of agricultural runoff on the vegetation and the effect of pesticide drift into the native vegetation, not only from the agricultural fields but also from weed control projects along the railroad embankment.

Fires have gone through the area in the past as evidenced by the

charred timbers of the railroad trestle. It may be desirable to develop a control burning program that would occur at naturally occurring intervals to rejuvenate the marsh community and clear out dead and decadent trees and shrubs.

The California Department of Parks and Recreation should work to prevent upstream development that could damage downstream qualities because of increased sediment load, and increased runoff. Policies should also be established that protect against future encroachment of farming into existing riparian and wetland communities.

There is some off-road vehicle use of the streambed and floodplain north of the freeway. This area should be posted and patrolled to prevent such activities.

Portions of beach should be protected from foot traffic so that the coastal strand community can recover.

3.0 AQUATIC HABITATS

3.1 Introduction

San Mateo Creek flows on the surface year-round in the lower part of the valley creating extensive riparian habitat along the stream as well as a small lagoon near the beach. The streambed becomes dry upstream from the Interstate 5 bridge except during winter rains. During the 1950's and presumably previously, year-round surface flows did not exist in the present stream bed (Kutcher, personal communication). An old roadbed ford crosses the stream just south of the Pacific Coast Highway bridge and presumably this route was used except in times of flood. A stream gauging station has been in place near the I-5 bridge for many years. Records back to 1953 show the highest mean discharge ranged from not recordable (0.0 cubic feet per second [cfs]) in dry years such as 1961 to as high as 39.7 cfs in wet years such as 1958 (Jorgensen, et al., 1971).

The presence of year-round stream flows south of the I-5 bridge in recent years is not well understood. Increased flows may be due to percolation and runoff from upstream agriculture or residences. Agriculture may remove water from the stream channel due to ground water pumping and it may return to the channel below the fields due to percolation. Agriculture, however, has been present in the lower San Mateo area for many years. It is more likely that the flows in the lower portions of San Mateo Creek are due to runoff and percolation associated with the increased number of residential units in the drainage basin.

The object of this section of the report is to describe the aquatic habitat and fauna of San Mateo Creek and the lagoon.

3.2 Water Quality

Physical and chemical parameters of the stream were measured in each season during late 1985 and 1986. Measurements of temperature, dissolved oxygen and salinity were taken at two stations in the lagoon as well as at two stations along the stream (see Fig. III-1).

No salinity was found in the lagoon or stream at any time (Table III-1). The creek forms a freshwater lagoon which is elevated above mean sea level. Water is impounded by the beach berm and percolates laterally through the beach sands and out into the ocean. On two occasions during the study, rain runoff caused sufficient flows to breach the berm and the lagoon drained. For several days sea water washed into the lagoon at high tide and the lagoon drained completely at low tide.

In less than a week the beach berm was again formed by high tides and the lagoon's mouth closed. Local residents state that the beach berm had been opened by grading equipment regularly during the time when President Nixon's Western Whitehouse (Casa Pacifica) was located on the nearby bluff.

The lagoon thus never becomes brackish for more than a few days and hence a true estuary does not exist here. The emergent vegetation all strongly support the salinity data. The San Mateo creek, marsh and lagoon habitats are all essentially part of a freshwater ecosystem.

Dissolved oxygen and temperature data (Table III-1) also are typical for a southern California coastal stream. Dissolved oxygen levels were all measured in early morning and would be expected to rise about 20 % during the day due to photosynthesis. Oxygen concentrations are all well above stressful levels and are considered to be within the normal range for a shallow, freshwater stream.

TABLE III-1 (Continued)

May 30, 1987

Dissolved Oxygen	5.9	5.0	6.3	5.6	6.0	5.8	6.0	5.6	6.1	5.7
Temperature	21.5	21.3	22.5	21.2	21.8	21.5	22.6	21.8	22.3	21.0
Salinity	0	0	0	0	0	0	0	0	0	0

August 3, 1987

Dissolved Oxygen	6.0	6.0	6.1	6.0	6.1	6.0	5.9	5.9	6.0	6.0
Temperature	23.8	22.5	24.5	24.3	24.0	24.0	24.3	24.0	23.9	23.8
Salinity	0	0	0	0	0	0	0	0	0	0

Laboratory Water Analyses

In order to obtain a total ionic analysis of the water in the creek, samples were collected at two stations in the system and taken to the Edward S. Babcock Laboratories in Riverside. The data from these analyses are presented in table III-2. The two samples are not significantly different in terms of cations, anions, hardness or nutrient content. The water quality can be considered quite good, with a relatively low level of total hardness and electrical conductivity. Nutrient levels (phosphate and nitrate) were also low indicating no contamination of the system with sewage effluent or agricultural fertilizers. Chloride ion levels are above what normally would be expected in freshwater but only slightly so. Onshore marine air flow and salt spray probably are responsible for the slightly elevated chloride levels in San Mateo Creek.

3.3 Aquatic Invertebrates

Aquatic invertebrates in San Mateo Creek were sampled for all four water quality stations using dip nets and a small mesh (5 mm) minnow seine. All organisms captured were placed in labeled bottles and preserved in 10% formalin.

The most dominant invertebrates in the stream and lagoon are crayfish (Table III-2). Two species are present; the native Pacific crayfish (Pacifastacus leninasculus) and the introduced swamp crayfish (Procambarus clarki). The other crustacean that was very abundant in the system was the amphipod (Hyalocella azteca).

In addition, a typical assemblage of insects characteristic of freshwater streams in southern California streams was present (Table III-2). The highest diversity of aquatic insects was present in the lagoon just east of the railroad trestle.

Table III-2
Laboratory Analyses of Water Samples from San Mateo Creek

Water Quality Analysis
Edward S. Babcock & Sons
- Riverside, CA 92502

Station 2 (west end of lagoon, adjacent to beach)

Date: 9 June 1986

Total Hardness	286 mg/L
Calcium (Ca)	81 mg/L
Magnesium (Mg)	20 mg/L
Sodium (Na)	92 mg/l.
Potassium (K)	2 mg/L
Cations Total	9.77 me/l.
Total Alkalinity	155 mg/L
Hydroxide (OH)	None mg/L
Carbonate (CO ₃)	None mg/L
Bicarbonate (HCO ₃)	189 mg/L
Sulfate (SO ₄)	149 mg/L
Chloride (Cl)	96 mg/l.
Nitrate (NO ₃)	46 mg/l.
Anions Total	9.64 me/L
Electrical Conductivity	1010 umho/cm
Total Dissolve Residue	635 mg/l.
pH	7.4 units
Phosphate	0.4 mg/l.
Boron (B)	0.1 mg/L

Station 4 (150 yds. upstream from I-5 bridge)

Total Hardness	359 mg/l.
Calcium (Ca)	90 mg/l.
Magnesium (Mg)	32 mg/l.
Sodium (Na)	118 mg/l.
Potassium (K)	2 mg/L
Cations Total	12.35 me/L
Total Alkalinity	190 mg/L
Hydroxide (OH)	None mg/L
Carbonate (CO ₃)	None mg/L
Bicarbonate (HCO ₃)	232 mg/l.
Sulfate (SO ₄)	198 mg/L
Chloride (Cl)	130 mg/L
Nitrate (NO ₃)	54 mg/l.
Anions Total	12.46 me/L
Electrical Conductivity	1170 umho/cm
Total Dissolve Residue	745 ug/l.
pH	7.5 units
Phosphate	0.1 mg/L
Boron (B)	0.1 mg/l.

Table III-3 Aquatic Invertebrates of San Mateo Creek

Station 1 (east of railroad tressle)

P. Arthropoda		
Cl. Crayfish		
	<u>Species</u>	<u>Number</u>
Pacific Crayfish	<u>Pacifistacus leninasculus</u>	3
Swamp crayfish	<u>Procambarus clarki</u>	5
Amphipod	<u>Hyalella azteca</u>	15
Cl. Insecta		
	mayfly nymph	Family Ephemerelellidae - 2
	dragonfly nymph	Suborder Anisoptera - 3
	danselfly nymph	Suborder Zygoptera - 13
	backswimmer	Family Corixidae - 5
	water boatman	Family Notonectidae - 8
	diving beetle	Family Dytiscidae - 7

Station 2 (west end of lagoon, adjacent to bench)

<u>Species</u>		
P. Arthropoda		
Class Crustacea		
amphipod	<u>Hyalella azteca</u>	- 17
cladoceran	<u>Daphnia magna</u>	- numerous
Class Insecta		
danselfly nympe	Suborder Anisoptera	- 5
water boatman	Family Notonectidae	- 5
diving beetle	Family Dytiscidae	- 4

Station 3 (Under I-5 bridge)

Pacific crayfish	<u>Pacificastacus lenusculus</u>	- 5
swamp crayfish	<u>Procambarus clarki</u>	- 7
amphipod	<u>Hyalella azteca</u>	- 37
diving beetle	Family Dytiscidae	- 3

Station 4 (150 yards north of I-5 bridge)

Pacific crayfish	<u>Pacificastacus lenusculus</u>	- 3
amphipod	<u>Procambarus clarki</u>	- 24

3.4 Fishes

Fish were sampled using a Smith-Root backpack electrofishing unit and a 30 foot minnow seine (5 mm mesh). Sampling for fish in the lagoon occurred at station 2. In the stream, sampling took place at stations 4 and 5. Fish sampling occurred on 11 September and 7 December, 1985 and on 30 May, 1986. Only three species of fish were found to be present: green sunfish (Lepomis cyanella), mosquitofish (Gambusia affinis) and staghorn sculpin (Leptocottus armatus) (Table III-4). The latter species was the only native fish captured and it is a marine form that prefers bay habitats and sometimes moves into lagoons. Only one sculpin was caught. It was 80 mm in length and was present at station 5.

Green sunfish made up most of the biomass of fishes present. The mean length of sunfish in the stream in September was 78.1 mm. The mean length of sunfish in December increased slightly to 83.2 mm. By the following May the mean length was 89.1 mm. This introduced fish is widely distributed in southern California. Mature males and females were most common in the stream north of the I-5 bridge. In the stream below the bridge and in the lagoon, juveniles were abundant.

The tidewater goby Eucyclogobius newberryi was not found in the present study. Dr. Cam Swift of the Los Angeles County Museum of Natural History (personal communication) captured tidewater gobies in the flowing portion of San Mateo Creek above the lagoon in 1981. This small and somewhat elusive species may still be present. A collecting expedition to determine the status of the tidewater goby in San Mateo Creek, headed by Dr. Swift and coordinated by the authors, is planned for early summer of 1987.

Table III-4 Fish of San Mateo Creek

Date: 11 September 1985

Station 2 (west end of lagoon, adjacent to beach)
gear: 30-ft seine, 3/8 inch mesh

	<u>Species</u>		
Mosquito fish	<u>Gambusia affinis</u>	16 fish	20-32 mm in length
green sunfish	<u>Lepomis cyanella</u>	98 fish	30-80 mm in length

Station 3 (at I-5 bridge)
gear: Smith-Root backpack electrofisher

	<u>Species</u>		
green sunfish	<u>Lepomis cyanella</u>	52 fish	35-75 mm in length

Station 4 (150 yds north of I-5 bridge)
gear: Smith-Root backpack electrofisher.

	<u>Species</u>		
Staghorn sculpin	<u>Leptocottus armatus</u>	1 fish	80 mm in length
mosquito fish	<u>Gambusia affinis</u>	23 fish	25-35mm in length

green sunfish	<u>Lepomis cyanella</u>	44 fish		
<u>sex</u>	<u>standard length (mm)</u>		<u>sex</u>	<u>st. length (mm)</u>
j	46		m	135
j	100		m	100
m	100		m	100
j	65		m	95
j	95		j	70
j	40		j	85
j	75		m	100
m	75		j	70
j	105		m	95
j	85		j	95
j	90		m	110
j	100		m	110
j	80		j	75
j	65		m	115
j	75		m	110
j	60		m	115
j	80		j	50
j	60		j	95
j	75		j	55
j	60		j	55
j	45		j	40
j	45		j	55

mean length = 78.1 mm

Table III-4 (cont'd)

Date: 7 December 1985

Station 2 (west end of lagoon, adjacent to beach)
gear: 30 ft seine, 3/8 inch mesh

<u>Species</u>			
mosquito fish	<u>Gambusia affinis</u>	14 fish	25-35 mm
green sunfish	<u>Lepomis cyanella</u>	1 fish	55 mm

Station 3 (at I-5 bridge)
gear: Smith-Root backpack electrofisher

<u>Species</u>			
mosquito fish	<u>Gambusia affinis</u>	35 fish	22-30 mm

Station 4 (150 yds. north of I-5 bridge)
gear: Smith-Root backpack electrofisher

<u>Species</u>			
green sunfish	<u>Lepomis cyanella</u>	36 fish	
<u>St. Length (mm)</u>	<u>St. length (mm)</u>	<u>St. length (mm)</u>	<u>St. length (mm)</u>
120	125	60	70
110	60	85	85
115	85	60	70
135	105	75	60
110	90	95	75
110	100	80	80
115	80	75	75
90	80	85	50
50	50	25	60

mean length = 83.2 mm

Date: 30 May 1986

Station 2 (west end of lagoon, adjacent to beach)
gear: 30 ft seine, 3/8 inch mesh

<u>Species</u>			
mosquito fish	<u>Gambusia affinis</u>	35 fish	20-32 mm
green sunfish	<u>Lepomis cyanella</u>	17 fish	50-75 mm

Table III-4 (cont'd)

Station 3 (under I-5 bridge)

gear: Smith-Root backpack electrofisher

mosquito fish	<u>Gambusia affinis</u>	numerous
green sunfish	<u>Lepomis cyanella</u>	5 fish

<u>Sex</u>	<u>St. length (mm)</u>	
m	100	
f	75	Note: 3 bullfrog tadpoles (<u>Rana catesbiana</u>) 1 <u>Hyla regilla</u> tadpole
f	85	
m	105	
f	75	

mean length = 88.0 mm

Station 4 (150 yards north of bridge)

mosquito fish	<u>Gambusia affinis</u>	numerous
---------------	-------------------------	----------

green sunfish	<u>Lepomis cyanella</u>		
<u>Sex</u>	<u>St. length (mm)</u>	<u>Sex</u>	<u>St. length (mm)</u>
f	75	m	110
f	75	m	110
f	78	f	70
f	80	m	85
f	71	f	65
m	105	m	115
m	103	m	105

mean length = 89.1 mm

4.0 AMPHIBIANS AND REPTILES

4.1 Methods and Results

Amphibians and reptiles were surveyed visually during all visits to the area. In addition, pit traps were set at several locations (Fig. IV-1) and checked periodically during the summer months. A list of species expected to occur in the study area (based on Stebbins, 1966) is presented in table IV-1, which also indicates which species were actually encountered.

4.2 Discussion

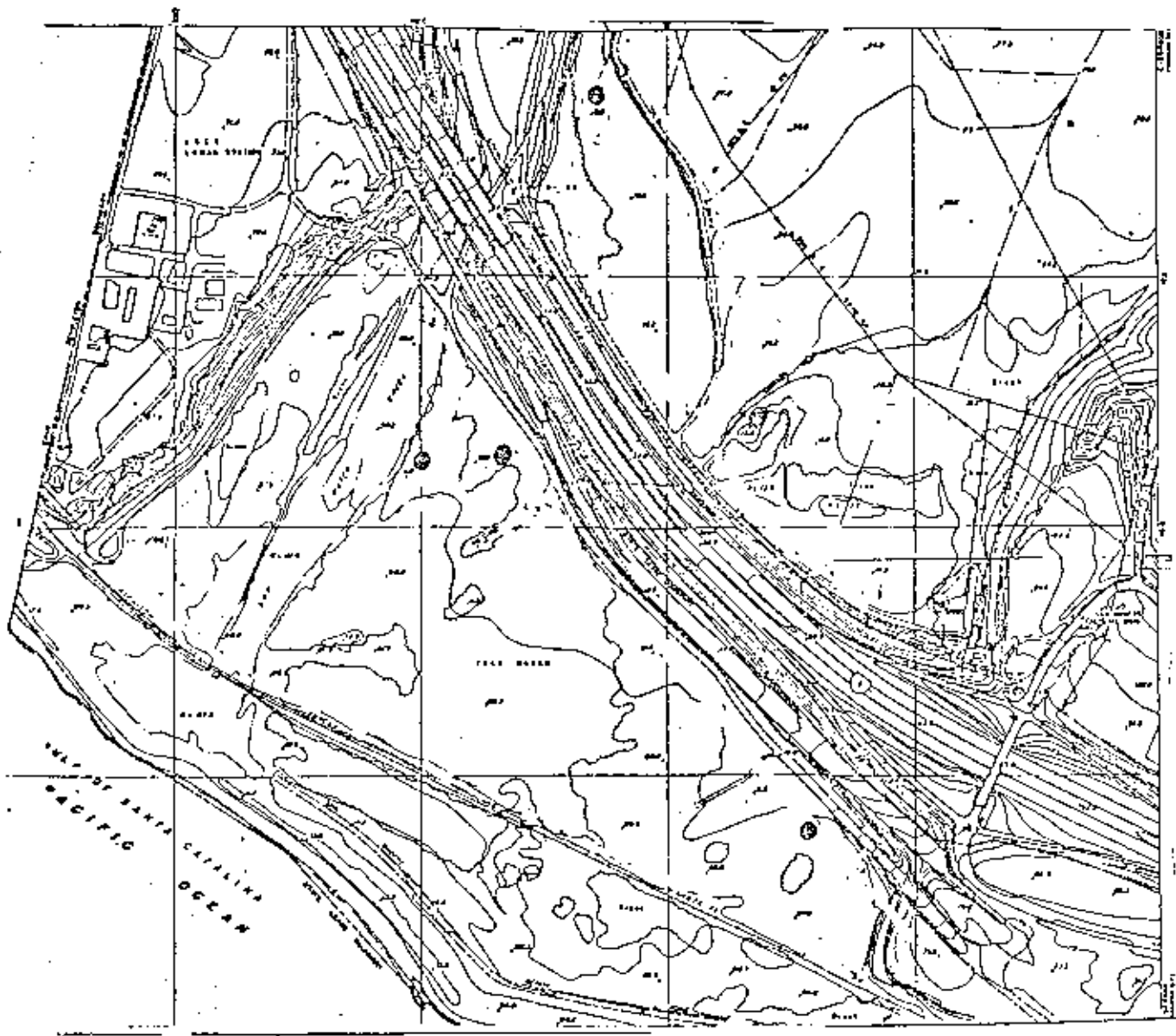
Amphibians

Bullfrogs (Rana catesbiana) are common in the upstream section of the lagoon at the mouth of San Mateo Creek and along all parts of the stream. Their presence makes the occurrence of the red legged frog (Rana aurora) unlikely; the former species preys upon other frog larvae and adults. Tree frogs (Hyla regilla) were encountered regularly in the wetter portions of the riparian habitat west of Interstate 5. Only one salamander (Batrachoseps pacificus) was found. Salamanders are known to burrow deep into the soil and may only appear on the surface for brief periods each year. A few small western toads (Bufo boreas) were found in May of 1986 in the riparian sections of the study.

Reptiles

At least a dozen western pond turtles (Clemmys marmorata) were regularly observed sunning on logs in the lagoon during the fall of 1985. Western fence lizards (Sceloporus occidentalis) were common in the study area, while the side blotched lizard (Uta stansburiana) are somewhat less common. The reptiles observed are species that are normally found in disturbed coastal sage scrub habitats; plus a few species, such as western

Figure IV-1. Amphibians and Reptiles of the San Mateo Creek Study Area



⊙ = Location of pit trap.

skink (Eumeces skiltonianus) and common garter snake (Thamnophis sirtalis), other coastal sage species that prefer sandier or drier areas, such as western whiptail (Cnemidophorus tigris) and coast horned lizard (Phrynosoma coronatum) were not encountered in the valley although they do occur on the mesas bordering the study area.

Very few snakes were encountered other than the garter snake. The only other species observed was the gopher snake (Pituophis melanoleucus). Most of the snake listed in table IV-1 as possible in the area are either rare or are likely to be found in undisturbed coastal sage habitat or in oak woodland areas. Their absence in the study area is not expected.

Table IV-4 Amphibians and Reptiles of the San Mateo Creek Study Area

Common Name	Scientific Name	Status
<u>Amphibia</u>		
California Newt	<u>Taricha torosa</u>	+
Pacific Slender Salamander	<u>Batrachoseps pacificus</u>	?
Western Spadefoot	<u>Scaphiopus hammondi</u>	poss
Western Toad	<u>Bufo boreas</u>	+
Pacific Treefrog	<u>Hyla regilla</u>	+
Red-legged Frog	<u>Rana aurora</u>	poss
Bullfrog	<u>Rana catesbeiana</u>	+
<u>Reptilia</u>		
Western Pond Turtle	<u>Clemmys marmorata</u>	+
Western Fence Lizard	<u>Sceloporus occidentalis</u>	+
Side-blotched Lizard	<u>Uta stansburiana</u>	+
Coast Horned Lizard	<u>Phrynosoma coronatum</u>	prob
Western Skink	<u>Eumeces skiltonianus</u>	+
Western Whiptail	<u>Cnemidophorus tigris</u>	poss
Southern Alligator Lizard	<u>Gerrhonotus multicarinatus</u>	+
California Legless Lizard	<u>Anniella pulchra</u>	prob
Ringneck Snake	<u>Diadophis punctatus</u>	prob
Striped Racer	<u>Masticophis lateralis</u>	poss
Coachwhip	<u>Masticophis flagellum</u>	poss
Racer	<u>Coluber constrictor</u>	poss
Gopher Snake	<u>Pituophis melanoleucus</u>	+
Common Garter Snake	<u>Thamnophis sirtalis</u>	+
Western Aquatic Garter Snake	<u>Thamnophis couchi</u>	prob.
Western Black-headed Snake	<u>Tantilla planiceps</u>	poss
Night Snake	<u>Hypsiglena torquata</u>	poss
Western Rattlesnake	<u>Crotalus viridis</u>	poss

+ = present; prob. = probably present; poss = possibly present.

5.0 Birds

5.1 Introduction

The San Mateo marsh is an important habitat for both migratory and resident birds. The area is frequently visited by various Audubon Society groups for bird observation. In fact, in terms of visitor use, bird watching is probably second only to beach users.

This section consists of the following parts; a review of previous work, a section on field methods, presentation of results, and a discussion section. This latter section contains a discussion of census variation, a review of individual habitats and comments on each bird. These latter comments are grouped according to whether the bird is a resident and breeding species or belongs in some other category (wintering, migrant, vagrant). Finally, there are sections on breeding bird populations in the various habitats of the study area and on changes in bird populations in the area, including a listing of birds observed in the area in past studies but not present today.

5.2 Previous Work

Although the coastal area of southern California is popular among bird watchers, there is little published information on the San Mateo Creek study area, in large part due to its inaccessibility as part of Camp Pendleton Marine Base. An early study of the area was done by Dixon (1906; see appendix) who spent a week during each year from 1904 to 1906 studying the birds along the canyons of the San Mateo and San Onofre Creeks to a distance of six miles from the coast. His records, while providing a valuable record of early bird life in the area, are rather spotty for smaller birds. His failure to find Bewick's wren and yellow-breasted chat,

for instance, is probably an indication of bird identification techniques of the day rather than the actual presence or absence of these birds. Dixon also failed to report any water birds.

The San Mateo Creek Study area is included in a recent monograph, The Birds of San Diego County (Unitt, 1984). Unitt's reports of bird records for the San Mateo Creek area are based on Dixon and on a brief visit to the area in 1978 by Sharon Goldwasser, who was conducting a survey of least Bell's vireo. Unitt recorded as "probable breeding, published," birds that Dixon listed as occurring in the area during his visits, which were all in March, April and May. These records apply to an area extending six miles upstream from the ocean and, therefore, may not be in the San Mateo study area. The study area has also been mentioned in several species studies, including Neff (1937) on tricolored redwing, and Salata (1981) on least Bell's vireo. In addition to these references, bird sightings for the San Mateo Creek drainage were solicited from members of the South Coast Audubon Society, which conducts annual field trips to the area.

5.3 Field Methods

The study area was visited almost weekly from August 18th, 1985 through June 24, 1986; 35 censuses were conducted during this period of 45 weeks. In order to standardize census results, each visit to the study area occurred during morning hours (0630 to 1100) under good weather conditions and followed the same route. Census routes were established in such a way as to insure adequate coverage of each habitat type on the study site and to provide good visibility of the study area. A map showing study area boundaries and the standard census routes is presented in figure V-1.

Portions of the study area other than the standard census route were

Table V-1. Bird Observations for the San Mateo Creek Study Area,
August 1985 through June, 1986.

Species	Observations		Max. No. Observed	Habitat	Status
	No.	Dates			
Red-throated Loon	3	12-17 to 1-19	1	Ocean	W
Arctic Loon	1	4-12	1	Ocean	W
Pied-billed Grebe	29		14	Lagoon	R*
Eared Grebe	1	2- 3	1	Lagoon	W
Western Grebe	6	12-10 to 2-22	12	Ocean	W
Brown Pelican	13		3	Ocean	V
Double-cr. Cormorant	12	10-12 to 3-26	5	Ocean	W
American Bittern	2	3-26; 4-28	1	Marsh	M
Great Blue Heron	5	9-12 to 1-19	2	Lagoon	W
Great Egret	4	9-12 to 12-31	1	Lagoon	W
Snowy Egret	8	11- 5 to 4-12	1	Lagoon	W
Cattle Egret	1	12-24	1	Lagoon	W
Green-backed Heron	10	3-31 to 10-12	2	Marsh-Beach	R*
Black-cr. Night Heron	17	8-17 to 4-28	5	Lagoon	W
Canada Goose	1	11-21	2	Field	W
Green-winged Teal	7	11-26 to 3- 5	15	Marsh	W
Mallard	30	8-17 to 6-24	44	Marsh-Lagoon	R*
Northern Pintail	1	8-21	2	Lagoon	W
Cinnamon Teal	13	9-21 to 4-19	11	Marsh-Lagoon	W, R?
Gadwall	18	9-14 to 5-29	16	Marsh-Lagoon	W, R?
American Wigeon	2	12-10 to 1-19	1	Lagoon	W
Canvasback	8	11-26 to 1-19	16	Lagoon	W
Redhead	6	12- 3 to 1-19	11	Lagoon	W
Ring-necked Duck	13	8-17 to 1-19	27	Lagoon	W
Lesser Scaup	11	11-26 to 2-19	48	Lagoon	W
Old Squaw	2	12-17 to 1-19	1	Lagoon	W
Surf Scoter	3	11-21 to 5-20	10	Ocean	W
Bufflehead	13	11- 5 to 2- 9	15	Lagoon	W
Red-br. Merganser	16	11-21 to 5- 4	13	Ocean	W
Ruddy Duck	14	11- 5 to 2- 9	30	Lagoon	W
Turkey Vulture	4	8-21 to 5-20	1	Aerial	V
Black-shouldered Kite	8	3- 5 to 6-18	2	Riparian	R*
Northern Harrier	1	10-12	1	Marsh	M
Sharp-shinned Hawk	3	11- 4 to 2- 3	1	Woodland	W
Cooper's Hawk	13	9-12 to 3-31	1	Woodland	WR?
Red-shouldered Hawk	20	8-17 to 6-18	2	Woodland	R*
Red-tailed Hawk	16	10-12 to 6- 6	3	Field-Woodland	R
American Kestrel	11	9-12 to 1-19	2	Field	W
California Quail	20	8-17 to 6-24	40	Coastal Sage	R*
Virginia Rail	7	8-17 to 5-29	4	Marsh	M
Common Moorhen	29	8-17 to 6-24	25	Marsh	R*
American Coot	24	8-17 to 5- 4	165	Lagoon	R*
Black-bellied Plover	12	10-12 to 3-26	10	Beach	W
Snowy Plover		12-10 to 4-19	20	Beach	W
Semipalmated Plover	1	4-28	2	Beach	M
Killdeer	21	8-21 to 6-24	6	Field-Beach	R
Black-necked Stilt	2	8-21 ; 4-28	4	Lagoon	M

Table V-1.(cont) Bird Observations for the San Mateo Creek Study Area,
August 1985 through June, 1986.

Species	Observations		Max. No. Observed	Habitat	Status
	No.	Dates			
Greater Yellow-legs	2	2-22 ; 3- 5	2	Lagoon	W
Willet	14	12- 3 to 4-28	16	Beach	W
Whimbrel	8	12- 3 to 2- 3	2	Beach	W
Marbled Godwit	1	12-10	1	Beach	W
Wandering Tattler	1	4-28	1	Beach	W
Ruddy Turnstone	2	3- 5 ; 4-12	2	Beach	W
Black Turnstone	6	2- 9 to 4-19	8	Beach	W
Surfbird	1	4-12	1	Beach	W
Sanderling	14	9-14 to 4-19	85	Beach	W
Western Sandpiper	4	9-21			
		4-12 to 4-28	85	Beach	M
Least Sandpiper	4	12- 3 to 4-19	83	Beach	W
Short-billed Dowitcher	1	3- 5	1	Beach	M
Bonaparte's Gull	6	11- 5 to 5- 4	25	Ocean-Lagoon	W
Heerman's Gull	14	8-17 to 6-24	31	Beach	V
Ring-billed Gull	26	10-12 to 5-20	100	Beach	W
California Gull	8	12-10 to 4-19	120	Beach	W
Herring Gull	5	12- 3 to 3-14	4	Beach	W
Western Gull	32	8-17 to 6-24	60	Beach	V
Glaucous-winged Gull	1	2-22	2	Beach	W
Common Tern	1	3-31	2	Beach	M
Forster's Tern	12	8-17 to 5-20	10	Beach	V
✓Elegant Tern	7	4-19 to 6-24	16	Ocean	SV
Caspian Tern	1	6-24	1	Ocean	V
Least Tern	1	4-28	1	Ocean	M
Feral Rock Dove	3	8-17 to 9-12	20	Field-Beach	V
Mourning Dove	28	8-17 to 6-24	36	Field-Woods	R*
Barn Owl	1	9-21	1	Woods	R?
Great Horned Owl	1	8-21	1	Woods	R?
✓Vaux's Swift	3	10-12			
		5- 4 to 5-15	6	Aerial	M
White-th. Swift	31	8-17 to 6-24	60	Aerial	R*
Anna's Hummingbird	35	8-17 to 6-24	52	Woodland, Sage	R*
Rufous Hummingbird	1	8-17	1	Woodland	M
Allen's Hummingbird	1	10-12	1	Woodland	M
Belted Kingfisher	3	8-21 to 3-26	2	Lagoon	V
Roadrunner	1	4-15	1	Field	V
Nuttall's Woodpecker	23	8-21 to 6-24	3	Woodland	R*
Downy Woodpecker	16	9-21 to 6-24	3	Woodland	R*
Common Flicker	19	8-21 to 6-24	3	Woodland	R
Cassin's Kingbird	1	3-31	1	Field	M
Ash-th. Flycatcher	3	5- 4 to 5-29	2	Field	S
Western Wood Pewee	3	9-12			
		5-15 to 5-29	1	Woodland	M
Hammond's Flycatcher	1	9-12	1	Woodland	M
✓Willow Flycatcher	1	9-14	1	Woodland	M
Western Flycatcher	4	9-12 to 10-12	3	Woodland	M
Black Phoebe	35	8-17 to 6-20	7	Riparian	R*

Table V-1.(cont) Bird Observations for the San Mateo Creek Study Area,
August 1985 through June, 1986.

Species	Observations		Max. No. Observed	Habitat	Status
	No.	Dates			
Say's Phoebe	12	9-14 to 3- 5	2	Field	W
Tree Swallow	18	1-19 to 6-24	27	Woodland	S*
N. Rough-w. Swallow	15	2-22 to 8-17	22	Field	S*
Cliff Swallow	13	3-26 to 8-17	190	Field	S*
Barn Swallow	10	8-17 to 10-12			
		3-14 to 5-15	20	Field-Beach	M
Horned Lark	3	5-29 to 6-24	8	Field	S*?
Scrub Jay	2	8-21 ; 6-18	1	Coastal Sage	V
Common Crow	34	8-17 to 6-24	225	Field-Woods	R*
Common Raven	19	8-17 to 6-18	66	Field	V
Bushtit	35	8-17 to 6-24	189	Woodland	R*
Bewick's Wren	32	8-21 to 6-24	20	Woodland	R*
House Wren	11	3-26 to 9-12	7	Woodland	S*
Marsh Wren	34	8-17 to 6-24	21	Marsh	R*
Ruby-crowned Kinglet	18	10-12 to 3-26	11	Woodland	W
Blue-Gray Gnatcatcher	10	9-12 to 1-19	6	Woodland	W
Black-t. Gnatcatcher	25	9-12 to 6-24	6	Coastal Sage	R*
Swainson's Thrush	1	6-24	1	Woodland	S*?
Hermit Thrush	1	3-14	1	Woodland	W
Wrentit	35	8-17 to 6-24	19	Coastal Sage	R*
N. Mockingbird	3	8-17;2-22;3-14	1	Coastal Sage	V
California Thrasher	22	8-17 to 6-24	4	Coastal Sage	R*
Water Pipit	11	11- 5 to 2- 9	50	Field	W
Cedar Waxwing	3	5- 4 to 5-20	20	Woodland	W
Loggerhead Shrike	9	8-17 to 1- 9	2	Fields, Sage	W
European Starling	13	8-21 to 6-24	6	Fields-Woodland	W,R
Bell's Bireo	2	9-12 ; 9-21	2	Woodland	M
Warbling Vireo	5	9-12 to 9-21			
		5- 4 to 5-15	3	Woodland	M
Orange-cr. Warbler	29	8-21 to 6-24	9	Woodland	R*
Yellow Warbler	10	3- 5 to 9-14	6	Woodland	S*
Yellow-rumped Warbler	23	10-12 to 4-28	34	Woodland	W
Black-th. Gray Warbler	2	9-14 ; 5- 4	1	Woodland	M
Black Poll Warbler	1	9-21	1	Woodland	M
MacGillivray's Warbler	4	9-12 to 10-12			
		4-19	1	Woodland	M
Common Yellowthroat	35	8-17 to 6-24	22	Marsh	R*
Wilson's Warbler	6	9-12 to 9-21			
		4-19 to 5-15	8	Woodland	M
Yellow-breasted Chat	10	4-19 to 8-21	16	Woodland	S*
Nashville Warbler	1	8-21	1	Woodland	M
Black-headed Grosbeak	12	4-12 to 8-21	7	Woodland	S*
Blue Grosbeak	3	8-17 to 9-11	3	Woodland	S*
Lazuli Bunting	1	9-21 ; 5-20	3	Field	M
Rufous-sided Towhee	28	8-21 to 6-24	14	Woodland	R*
Brown Towhee	35	8-17 to 6-24	8	Coastal Sage	R*
Rufous-crowned Sparrow	1	8-21	1	Coastal Sage	?
Chipping Sparrow	1	4-28	1	Woods	M

Table V-1.(cont) Bird Observations for the San Mateo Creek Study Area,
August 1985 through June, 1986.

Species	Observations		Max. No. Observed	Habitat	Status
	No.	Dates			
Brewer's Sparrow	1	9-21	3	Field	M
Savannah Sparrow	5	10-12 to 2-3	20	Field	W
Song Sparrow	35	8-17 to 6-24	79	Woodland-Marsh	R*
Lincoln's Sparrow	2	8-17 ; 1-19	15	Field	M
Golden-cr. Sparrow	9	10-12 to 4-19	14	Coastal Sage	W
White-cr. Sparrow	18	10-12 to 4-19	45	Coastal Sage	W
Red-winged Blackbird	30	8-17 to 6-24	356	Marsh-Field	R
Tricolored Redwing	2	3-26 ; 6-24	5	Marsh	V
Western Meadowlark	12	11-5 to 2-9	19	Field	W
Brown-headed Cowbird	13	3-14 to 6-24	26	Woods	S*
Northern Oriole	6	3-31 to 8-17	3	Woods	S*
House Finch	35	8-17 to 6-24	188	Field, Sage	R*
Lesser Goldfinch	21	8-17 to 6-24	16	Woodland	R*
American Goldfinch	21	9-14 to 6-24	31	Woodland	R*

Status: M = migrant, R = resident, S = summer, V = visitor, W = Winter

* denotes breeding

also visited on an irregular basis to insure complete coverage of the site. Birds were identified by sight and sound and, during the breeding season, a tape recorder was used to elicit territorial defense responses from breeding species. Special care was used to determine the presence or absence of rare and/or endangered species such as least Bell's vireo and snowy plover. Daniel Guthrie conducted all censuses except for those between December 17 and January 14. These were conducted by Richard Clements, a competent birder who accompanied Dr. Guthrie on earlier censuses. On each visit to the area all bird observations were recorded and, during the breeding season, locations of singing individuals were plotted on a map of the area during each visit to allow estimation of densities of breeding birds.

5.4 Census Results

A summary of observations for the entire study site is presented in table V-1. This table lists all bird species observed during the entire study period (150), gives the highest number of individuals of each species observed, the dates each species was present, the status of each species and its preferred habitat. Tables V-2 through V-6 present all census observations for the area between Interstate 5 and the Pacific Ocean and tables V-7 through V-11 present all census observations for the area inland from Interstate 5.

Table V-2. Birds of the San Mateo Creek Study Area, West of Interstate 5, August through October.

Species	Date of survey					
	8-17	8-21	9-12	9-14	9-21	10-12
Pied-billed Grebe	4(10)	4(10)	3	8	6	10
Brown Pelican	-	1	1	-	-	2
Double-crested Cormorant	-	-	-	-	-	3
Great Blue Heron	-	-	2	-	-	-
Great Egret	-	-	1	-	-	-
Green-backed Heron	-	-	-	-	1	-
Black-cr. Night Heron	1	-	-	-	-	3
Mallard	28	8(6)	10	12	1	-
Northern Pintail	-	2	-	-	-	-
Cinnamon Teal	-	-	-	-	4	-
Gadwall	-	-	-	2	1	1
Ring-necked Duck	1	-	-	-	1	1
Northern Harrier	-	-	-	-	-	1
Cooper's Hawk	-	-	-	1	-	-
Red-shouldered Hawk	-	-	-	-	1	2
Red-tailed Hawk	-	-	-	-	-	1
American Kestrel	-	-	1	-	-	3
California Quail	-	1	-	-	-	-
Virginia Rail	1	-	-	-	-	-
Common Moorhen	4	4(2)	18	25	18	15
American Coot	2(4)	2(3)	5	8	7	60
Black-bellied Plover	-	-	-	-	-	4
Killdeer	-	3	2	2	-	1
Black-necked Stilt	-	4	-	-	-	-
Marbled Godwit	-	-	-	2	-	-
Sanderling	-	-	-	10	-	-
Western Sandpiper	-	-	-	-	3	-
Heerman's Gull	31	1	6	-	-	2
Ring-billed Gull	-	-	-	-	-	10
Western Gull	16	5	5	-	-	2
Forster's Tern	4	1	-	-	-	-
Feral Rock Dove	-	1	-	-	-	-
Mourning Dove	11	26	26	3	4	-
Barn Owl	-	-	-	-	1	-
Great horned Owl	-	1	-	-	-	-
Vaux's Swift	-	-	-	-	-	1
White-throated Swift	-	-	10	-	20	2
Anna's Hummingbird	6	10	15	10	16	15
Rufous Hummingbird	1	-	-	-	-	-
Allen's Hummingbird	-	-	-	-	-	1
Belted Kingfisher	-	1	-	-	2	-
Nuttall's Woodpecker	-	1	1	-	2	1
Downy Woodpecker	-	-	-	-	1	1
Northern Flicker	-	1	-	-	-	1
Western Wood-Pewee	-	-	1	-	-	-
Hammond's Flycatcher	-	-	1	-	-	-
Western Flycatcher	-	-	2	1	1	1
Black Phoebe	2	4	3	1	3	3

Table V-11. Birds of the San Mateo Creek Study area, East of Interstate 5, May and June

Species	Date of Survey						
	5-4	5-15	5-20	5-29	6-6	6-18	6-24
Green-backed Heron	-	1	-	1	-	-	1
Gadwall	3	-	-	-	-	-	-
Turkey Vulture	-	-	-	1	-	-	-
Red-shouldered Hawk	-	-	-	-	-	1	-
Red-tailed Hawk	-	-	-	1	1	-	-
Killdeer	-	1	1	-	-	-	-
California Quail	2	10	-	6	4	1	3
Mourning Dove	4	10	4	5	2	3	6
White-throated Swift	-	20	-	25	30	30	20
Anna's Hummingbird	5	-	2	-	-	2	1
Roadrunner	-	1	-	-	-	-	-
Nuttall's Woodpecker	-	-	-	-	-	1	-
Downy Woodpecker	-	-	1	1	-	-	-
Ash-throated Flycatcher	2	-	-	1	2	-	-
Black Phoebe	-	-	-	1	-	2	2
N. Rough-winged Swallow	15	6	8	7	8	10	4
Cliff Swallow	-	50	2	5	8	4	6
Tree Swallow	10	8	6	4	9	10	7
Horned Lark	-	-	-	1	8	-	6
Scrub Jay	-	-	-	-	-	1	-
Common Crow	1	-	-	-	2	20	4
Bushtit	32	5	40	80	53	65	33
Bewick's Wren	2	1	2	1	2	-	3
House Wren	1	-	1	2	-	-	-
Marsh Wren	5	2	3	2	-	-	-
Black-tailed Gnatcatcher	-	-	-	-	1	-	-
Swainson's Thrush	-	-	-	-	-	-	1
Wrentit	2	1	1	2	1	1	-
European Starling	-	-	-	-	3	2	2
Warbling Vireo	1	-	-	-	-	-	-
Orange-crowned Warbler	1	-	1	2	-	-	-
Yellow Warbler	5	1	2	-	-	2	-
Common Yellowthroat	2	-	1	4	3	3	2
Yellow-breasted Chat	2	-	-	2	2	1	2
Black-headed Grosbeak	2	2	-	2	2	2	1
Lazuli Bunting	-	-	1	-	-	-	-
Rufous-sided Towhee	4	3	1	3	1	2	3
Brown Towhee	-	2	1	-	-	1	1
Song Sparrow	14	15	11	7	14	3	5
Red-winged Blackbird	-	-	-	-	-	3	-
Brown-headed Cowbird	3	1	1	8	-	8	3
Northern Oriole	2	-	1	1	-	2	-
House Finch	16	1	12	1	11	39	120
Lesser Goldfinch	4	1	14	5	2	2	-
American Goldfinch	6	7	6	2	3	7	6
Totals, individuals	146	149	123	183	172	228	242
species	26	22	24	29	23	28	24

Table V-2 (cont.). Birds of the San Mateo Creek Study Area, West of Interstate 5, August through October.

Species	date of survey					
	8-17	8-21	9-12	9-14	9-21	10-12
Say's Phoebe	-	-	-	-	-	1
Western Kingbird	-	4	-	-	-	-
N. Rough-winged Swallow	3	-	5	-	-	1
Barn Swallow	4	-	2	2	2	2
Scrub Jay	-	1	-	-	-	-
Common Crow	-	11	1	-	1	4
Bushtit	14	25	50	55	55	67
Bewick's Wren	-	4	6	5	11	4
House Wren	-	-	2	-	-	-
Marsh Wren	3	8	4	1	2	2
Ruby-crowned Kinglet	-	-	-	-	-	1
Blue-gray Gnatcatcher	-	-	1	-	-	2
Black-tailed Gnatcatcher	-	-	3(1)	-	-	1
Wrentit	2	3	9	3	8	7
N. Mockingbird	1	-	-	-	-	-
California Thrasher	1	-	2	-	-	3
Loggerhead Shrike	1	-	-	-	-	-
European Starling	-	-	1	-	-	-
Bell's Vireo	-	-	1	-	2	-
Warbling Vireo	-	-	2	-	1	-
Orange-crowned Warbler	-	8	3	2	6	5
Yellow Warbler	1	-	1	-	-	-
Yellow-rumped Warbler	-	-	-	-	-	2
MacGillivray's Warbler	-	-	1	-	-	1
Common Yellowthroat	7	19	12	10	12	9
Wilson's Warbler	-	-	6	-	3	-
Yellow-breasted Chat	-	2	-	-	-	-
Black-headed Grosbeak	-	6	-	-	-	-
Blue Grosbeak	-	-	-	1	-	-
Rufous-sided Towhee	-	2	2	2	3	3
Brown Towhee	6	3	5	4	4	2
Rufous-crowned Sparrow	-	1	-	-	-	-
Song Sparrow	45	56	30	18	35	31
Golden-crowned Sparrow	-	-	-	-	-	1
White-crowned Sparrow	-	-	-	-	-	6
Red-winged Blackbird	-	6	25	23	35	4
House Finch	40	15	11	26	35	110
Lesser Goldfinch	2	3	1	4	-	3
American Goldfinch	-	-	-	4	-	-
Totals, individuals	256	279	300	245	308	419
species	28	38	44	28	35	50

Numbers in parentheses are young birds.

Table V-3. Birds of the San Mateo Creek Study Area, West of Interstate 5, November and December.

Species	date of survey								
	11-5	11-14	11-21	11-26	12-3	12-10	12-17	12-24	12-31
Red-throated Loon	-	-	-	-	-	-	1	-	-
Pied-billed Grebe	11	10	11	9	9	8	7	6	6
Western Grebe	-	-	-	-	-	1	-	1	11
Brown Pelican	-	-	-	-	-	1	1	1	-
Double-crested Cormorant	-	-	1	3	1	1	-	-	5
Great Blue Heron	-	1	-	-	-	-	-	-	-
Great Egret	1	-	-	-	-	-	1	-	1
Snowy Egret	1	1	1	-	-	-	1	-	1
Cattle Egret	-	-	-	-	-	-	-	1	-
Black-cr. Night Heron	5	1	3	2	3	1	5	2	1
Green-winged Teal	-	-	-	9	2	-	-	-	-
Mallard	17	8	6	16	-	2	-	14	10
Cinnamon Teal	2	-	-	-	2	2	-	4	1
Gadwall	8	-	16	7	6	13	2	6	6
American Wigeon	-	-	-	-	-	1	-	-	-
Canvasback	-	-	-	2	10	6	16	13	15
Redhead	-	-	-	-	1	1	6	-	2
Ring-necked Duck	-	1	27	8	5	6	15	6	5
Lesser Scaup	-	-	-	10	48	25	40	38	25
Oldsquaw	-	-	-	-	-	-	1	-	-
Surf Scoter	-	-	1	-	-	-	-	-	-
Bufflehead	2	-	3	6	9	13	15	13	8
Red-breasted Merganser	-	-	9	-	3	1	-	1	1
Ruddy Duck	6	1	6	7	6	8	20	22	16
Cooper's Hawk	1	1	-	-	-	-	1	1	-
Red-shouldered Hawk	-	-	1	-	-	1	-	2	2
Red-tailed Hawk	-	-	-	-	-	-	1	1	1
Virginia Rail	-	1	-	-	1	1	-	-	-
Common Moorhen	16	10	12	4	1	1	6	2	4
American Coot	165	96	138	155	80	90	85	64	53
Black-bellied Plover	-	-	-	-	1	4	-	-	-
Snowy Plover	-	-	-	-	-	2	-	-	-
Killdeer	-	1	-	-	-	-	1	1	-
Willet	-	-	-	-	3	16	-	9	6
Whimbrel	-	-	-	-	1	-	-	-	-
Marbled Godwit	-	-	-	-	-	1	-	-	-
Sanderling	-	-	-	-	6	2	-	-	5
Least Sandpiper	-	-	-	-	2	-	-	-	-
Bonaparte's Gull	20	-	-	6	-	-	-	-	-
Hecrman's Gull	5	1	-	-	-	-	-	-	1
Ring-billed Gull	20	2	40	4	14	8	20	50	20
California Gull	-	-	-	-	-	4	-	-	-
Herring Gull	-	-	-	-	1	1	-	-	-
Western Gull	9	6	10	11	21	12	5	30	32
Forster's Tern	-	-	-	-	-	-	-	-	10
Mourning Dove	-	-	-	4	1	5	-	-	2
White-throated Swift	6	-	-	-	-	-	34	2	4

Table V-3 (cont.). Birds of the San Mateo Creek Study Area, West of Interstate 5, November and December.

Species	date of survey								
	11-5	11-14	11-21	11-26	12-3	12-10	12-17	12-24	12-31
Anna's Hummingbird	15	5	18	27	21	26	20	35	41
Nuttall's Woodpecker	-	1	1	-	1	1	3	1	2
Downy Woodpecker	-	-	-	-	-	-	-	-	1
Northern Flicker	2	1	1	1	-	-	2	-	1
Black Phoebe	3	1	1	1	3	3	2	2	4
Say's Phoebe	-	-	-	1	-	-	-	-	-
Common Crow	-	-	-	6	1	2	-	3	7
Bushtit	16	9	12	105	14	65	35	41	37
Bewick's Wren	-	2	-	4	5	3	8	8	10
Marsh Wren	9	4	4	1	4	2	3	2	2
Ruby-crowned Kinglet	6	4	3	4	2	1	5	-	2
Blue-gray Gnatcatcher	1	-	-	1	-	-	2	-	1
Black-tailed Gnatcatcher	3	-	2	4	-	3	1	2	2
Wrentit	7	3	3	4	3	4	14	7	11
California Thrasher	-	-	-	2	1	1	2	2	2
Water Pipit	-	-	-	1	-	-	-	-	-
Loggerhead Shrike	1	-	-	1	1	-	1	1	-
European Starling	1	-	-	-	-	-	-	-	-
Orange-crowned Warbler	3	1	1	-	1	1	3	1	-
Yellow-rumped Warbler	3	2	-	2	3	8	9	8	-
Common Yellowthroat	6	4	9	14	9	4	10	5	8
Rufous-sided Towhee	1	-	-	-	1	-	-	-	-
Brown Towhee	2	-	2	5	4	4	4	9	6
Song Sparrow	24	13	37	28	41	27	28	25	30
Golden-crowned Sparrow	-	-	-	4	12	14	4	-	6
White-crowned Sparrow	15	30	20	61	15	7	24	10	15
Red-winged Blackbird	13	18	-	16	8	1	14	6	60
House Finch	46	25	57	78	62	14	38	9	38
Lesser Goldfinch	-	-	-	-	-	-	6	-	2
American Goldfinch	-	-	-	3	3	1	-	-	-
Totals, individuals	472	264	456	637	452	430	522	467	542
species	37	31	31	41	47	51	44	43	50

Table V-4. Birds of the San Mateo Creek Study Area, West of Interstate 5, January and February

Species	date of survey					
	1-9	1-14	1-19	2-3	2-9	2-22
Red-throated Loon	1	-	1	-	-	-
Pied-billed Grebe	5	8	13	10	10	-
Eared Grebe	-	-	-	1	-	-
Western Grebe	6	12	-	-	-	2
Brown Pelican	-	1	-	-	-	-
Double-crested Cormorant	1	4	-	-	-	1
Great Blue Heron	1	-	1	-	-	-
Snowy Egret	1	1	-	-	-	-
Black-cr. Night Heron	2	3	3	3	1	-
Green-winged Teal	-	-	-	2	-	-
Mallard	9	-	44	5	2	6
Cinnamon Teal	-	2	-	6	3	-
Cadwall	5	10	4	4	-	-
American Wigeon	-	-	1	-	-	-
Canvasback	10	-	8	-	-	-
Redhead	11	-	6	-	-	-
Ring-necked Duck	9	-	20	-	-	-
Lesser Scaup	30	30	26	21	14	-
Oldsquaw	-	-	1	-	-	-
Bufflehead	4	6	9	8	12	-
Red-breasted Merganser	4	10	11	8	4	11
Ruddy Duck	30	28	15	15	26	-
Cooper's Hawk	-	-	-	-	-	1
Red-shouldered Hawk	2	2	1	1	1	1
Red-tailed Hawk	-	1	1	1	1	-
Virginia Rail	4	-	-	-	-	-
Common Moorhen	2	-	8	2	2	-
American Coot	60	48	40	33	28	5
Black-bellied Plover	2	2	3	2	3	10
Snowy Plover	-	-	7	8	6	11
Killdeer	-	-	-	-	2	-
Greater Yellowlegs	-	-	-	-	-	2
Willet	-	6	6	3	3	8
Whimbrel	-	-	-	1	-	-
Black Turnstone	-	-	-	-	3	4
Sanderling	6	4	15	5	14	42
Least Sandpiper	-	-	-	-	-	20
Heerman's Gull	2	-	-	-	-	-
Ring-billed Gull	40	30	4	4	1	5
California Gull	4	30	1	-	-	-
Herring Gull	-	1	-	1	-	-
Western Gull	45	50	6	10	6	58
Glaucous-winged Gull	-	-	-	-	-	2
Forster's Tern	4	10	-	-	-	-
Mourning Dove	13	15	12	4	3	12
White-throated Swift	6	6	-	-	-	10
Anna's Hummingbird	38	30	22	9	19	22
Nuttall's Woodpecker	1	2	-	-	-	-

Table V-4. (cont.). Birds of the San Mateo Creek Study Area, West of Interstate 5, January and February

Species	date of survey					
	1-9	1-14	1-19	2-3	2-9	2-22
Downy Woodpecker	2	1	1	1	-	1
Northern Flicker	-	-	2	1	-	1
Black Phoebe	2	4	3	2	4	4
Say's Phoebe	-	-	-	-	-	1
Tree Swallow	-	-	4	-	1	7
N. Rough-winged Swallow	-	-	-	-	-	6
Common Crow	1	3	-	8	2	6
Common Raven	-	-	-	-	1	-
Bushtit	46	40	90	8	41	45
Bewick's Wren	12	14	7	8	-	8
Marsh Wren	5	6	-	10	9	3
Ruby-crowned Kinglet	8	4	2	1	2	1
Blue-gray Gnatcatcher	6	2	1	-	-	2
Black-tailed Gnatcatcher	1	1	1	-	-	2
Wrentit	9	10	4	6	5	8
N. Mockingbird	-	-	-	-	-	1
California Thrasher	2	2	-	-	2	3
Loggerhead Shrike	1	-	-	-	-	-
European Starling	-	-	3	2	-	-
Orange-crowned Warbler	-	-	1	1	2	3
Yellow-rumped Warbler	-	6	23	4	4	13
Common Yellowthroat	6	5	3	5	12	8
Rufous-sided Towhee	2	-	1	4	1	3
Brown Towhee	8	6	3	1	2	7
Song Sparrow	35	31	18	46	43	52
Golden-crowned Sparrow	6	4	10	-	-	-
White-crowned Sparrow	25	10	10	-	3	4
Red-winged Blackbird	66	120	8	1	6	4
House Finch	35	20	36	38	29	66
Lesser Goldfinch	-	-	-	-	12	-
American Goldfinch	-	-	-	18	9	24
Totals, individuals	636	641	520	332	354	516
species	51	46	48	44	42	46

Table V-5. Birds of the San Mateo Creek Study area, West of Interstate 5, March and April

Species	Date of Survey						
	3-5	3-14	3-26	3-31	4-12	4-19	4-28
Arctic Loon	-	-	-	-	1	-	-
Pied-billed Grebe	1	-	-	-	2	2(2)	4
Brown Pelican	3	2	-	-	-	-	-
Double-crested Cormorant	1	1	2	-	-	-	-
American Bittern	-	-	-	-	-	-	1
Snowy Egret	-	-	-	-	1	-	-
Green-backed Heron	-	-	-	1	-	1	-
Black-cr. Night Heron	-	-	-	-	-	-	1
Mallard	-	4	3	4	2	3	3
Surf Scoter	-	10	-	-	-	-	-
Red-breasted Merganser	4	6	3	-	4	-	-
Black-shouldered Kite	2	2	-	-	-	-	1
Cooper's Hawk	1	-	-	1	-	-	-
Red-shouldered Hawk	1	-	-	-	-	-	1
Red-tailed Hawk	1	-	-	-	-	-	-
California Quail	-	-	-	1	-	-	-
Virginia Rail	-	-	-	-	-	-	1
Common Moorhen	-	3	4	4	4	4	3
American Coot	2	6	-	-	-	1	3
Black-bellied Plover	-	1	4	-	-	-	-
Snowy Plover	8	9	20	16	13	2	-
Semipalmated Plover	-	-	-	-	-	-	2
Killdeer	6	2	2	1	1	1	2
Black-necked Stilt	-	-	-	-	-	-	1
Greater Yellowlegs	2	-	-	-	-	-	-
Willet	6	6	-	3	11	-	3
Whimbrel	2	2	-	1	2	1	2
Wandering Tattler	-	-	-	-	-	-	1
Ruddy Turnstone	2	-	-	-	2	-	-
Black Turnstone	5	-	1	-	3	8	-
Surfbird	-	-	-	-	1	-	-
Sanderling	6	-	-	15	45	85	-
Western Sandpiper	-	-	-	-	85	53	3
Least Sandpiper	-	83	-	-	-	5	-
Short-billed Dowitcher	1	-	-	-	-	-	-
Bonaparte's Gull	-	-	-	18	-	8	25
Heerman's Gull	-	-	-	12	6	1	1
Ring-billed Gull	6	60	8	30	100	50	7
California Gull	-	10	-	10	120	12	-
Herring Gull	-	4	-	-	-	-	-
Western Gull	6	12	9	6	15	8	14
Elegant Tern	-	-	-	-	-	2	16
Common Tern	-	-	-	2	-	-	-
Forster's Tern	3	4	1	-	3	4	2
Least Tern	-	-	-	-	-	-	1
Mourning Dove	14	8	13	13	5	5	10
White-throated Swift	30	20	-	-	-	-	-
Anna's Hummingbird	16	24	9	23	6	14	6

Table V-5 (cont.). Birds of the San Mateo Creek Study area, West of Interstate 5, March and April

Species	Date of Survey						
	3-5	3-14	3-26	3-31	4-12	4-19	4-28
Belted Kingfisher	-	-	1	-	-	-	-
Nuttall's Woodpecker	-	1	-	1	-	-	-
Downy Woodpecker	-	1	-	1	1	-	-
Northern Flicker	1	3	1	1	-	-	-
Black Phoebe	6	2	4	3	1	4	2
Tree Swallow	24	12	17	25	8	12	10
N. Rough-winged Swallow	16	15	2	5	-	22	-
Cliff Swallow	-	-	120	100	100	60	70
Barn Swallow	-	7	-	-	2	-	-
Common Crow	6	1	4	4	2	3	2
Common Raven	-	-	-	-	2	-	1
Bushrit	32	28	14	31	21	30	6
Bewick's Wren	8	7	11	6	3	6	-
House Wren	-	-	1	2	4	5	3
Marsh Wren	10	15	10	13	17	15	18
Ruby-crowned Kinglet	-	-	1	-	-	-	-
Black-tailed Gnatcatcher	2	1	1	-	-	1	1
Hermit Thrush	-	1	-	-	-	-	-
Wrentit	17	8	5	5	8	8	1
N. Mockingbird	-	1	-	-	-	-	-
California Thrasher	4	4	-	2	-	-	-
European Starling	-	-	-	2	-	-	-
Orange-crowned Warbler	5	5	6	6	6	4	2
Yellow Warbler	1	-	-	-	-	-	-
Yellow-rumped Warbler	9	28	3	18	-	11	1
MacGillivray's Warbler	-	-	-	-	-	1	-
Common Yellowthroat	15	19	12	11	8	8	8
Wilson's Warbler	-	-	-	-	-	3	-
Yellow-breasted Chat	-	-	-	-	-	5	7
Black-headed Grosbeak	-	-	-	-	3	2	-
Rufous-sided Towhee	5	4	2	1	5	6	2
Brown Towhee	4	4	1	3	1	2	-
Chipping Sparrow	-	-	-	-	-	-	1
Song Sparrow	33	40	33	35	32	30	25
Golden-crowned Sparrow	8	8	-	-	-	3	-
White-crowned Sparrow	2	10	-	-	-	18	-
Red-winged Blackbird	1	1	-	-	-	1	2
Tricolored Redwing	-	-	5	-	-	-	-
Brown-headed Cowbird	-	6	14	26	6	21	12
Northern Oriole	-	-	-	2	-	1	-
House Finch	37	26	38	9	21	24	17
Lesser Goldfinch	-	9	5	8	2	7	-
American Goldfinch	12	12	7	9	2	7	3
Totals, individuals	387	558	397	490	687	592	308
species	47	51	38	44	44	50	46

parentheses = young birds

Table V-6. Birds of the San Mateo Creek Study area, West of Interstate 5, May and June

Species	Date of Survey						
	5-4	5-15	5-20	5-29	6-6	6-18	6-24
Pied-billed Grebe	2	(3)	2	-	1	-	1
Western Grebe	6	-	-	-	-	-	-
Brown Pelican	-	5	-	2	-	3	3
Green-backed Heron	1	-	1	2	-	1	2
Mallard	5	1	12(7)	3(3)	9	4(10)	8
Gadwall	-	-	-	2	-	-	-
Surf Scoter	-	-	3	-	-	-	-
Red-breasted Merganser	2	-	-	-	-	-	-
Turkey Vulture	-	-	1	-	-	-	-
Black-shouldered Kite	2	1	2	-	2	1	-
Red-shouldered Hawk	-	-	1	-	1	2	-
Virginia Rail	-	-	-	2	-	-	-
Common Moorhen	2	-	2	-	-	4(9)	3(11)
American Coot	2	-	-	-	-	-	-
Killdeer	-	1	-	-	-	2	2
Bonaparte's Gull	5	-	-	-	-	-	-
Heerman's Gull	-	-	-	2	-	-	5
Ring-billed Gull	6	5	3	-	-	-	-
Western Gull	-	40	25	60	4	2	5
Forster's Tern	-	-	2	-	-	-	-
Elegant Tern	1	15	3	5	-	-	7
Caspian Tern	-	-	-	-	-	-	1
Mourning Dove	15	8	15	15	17	12	8
Vaux's Swift	5	6	-	-	-	-	-
White-throated Swift	30	60	30	20	8	20	-
Anna's Hummingbird	12	3	7	3	2	-	1
Nuttall's Woodpecker	-	-	-	-	-	-	1
Downy Woodpecker	-	-	-	-	-	1	2
Northern Flicker	-	-	1	-	-	-	3
Ash-throated Flycatcher	-	-	-	1	-	-	-
Western Wood Pewee	-	1	-	1	-	-	-
Black Phoebe	4	2	4	1	2	4	1
Cliff Swallow	100	190	120	130	100	150	150
Barn Swallow	20	4	-	-	-	-	-
Tree Swallow	20	10	6	6	8	13	5
N. Rough-winged Swallow	10	5	16	16	-	15	10
Common Crow	6	2	4	2	10	3	-
Common Raven	2	6	-	-	-	1	-
Bushtit	45	51	41	21	95	124	50
Bewick's Wren	2	3	4	1	4	2	2
House Wren	4(3)	2	3	-	-	-	1
Marsh Wren	17	14	17	13	15	1	6
Black-tailed Gnatcatcher	6	4	1	3	-	2(2)	3
Wrentit	4	4	6	5	5	6	3
California Thrasher	1	1	-	1	2	-	2
Cedar Waxwing	12	20	15	-	-	-	-
European Starling	-	-	2	4	-	6	2
Warbling Vireo	2	1	-	-	-	-	-

Table V-6 (cont.). Birds of the San Mateo Creek Study area, West of Interstate 5, May and June

Species	Date of Survey						
	5-4	5-15	5-20	5-29	6-6	6-18	6-24
Orange-crowned Warbler	4	-	3	2	2	-	1
Yellow Warbler	6	1	-	-	-	2	-
Bl.-thr. Gray Warbler	1	-	-	-	-	-	-
Common Yellowthroat	9	6	10	11	11	17	8
Wilson's Warbler	4	2	-	-	-	-	-
Yellow-breasted Chat	14	5	8	9	8	7	6
Black-headed Grosbeak	2	2	4	4	2	2	1
Rufous-sided Towhee	9	4	11	5	8	12	7
Brown Towhee	1	2	4	1	2	1	2
Song Sparrow	36	27	20	12	22	26	13
Red-winged Blackbird	9	5	-	25	4	-	15
Tricolored Redwing	-	-	-	-	-	-	1
Brown-headed Cowbird	18	7	15	16	16	10	8
House Finch	29	16	30	31	36	29	64
Lesser Goldfinch	-	3	2	-	12	8	10
American Goldfinch	11	15	16	10	16	24	24
Totals, individuals	507	563	479	450	424	538	458
species	45	42	40	36	29	34	40

Numbers in parentheses are young birds

Table V-7. Birds of the San Mateo Creek Study Area, East of Interstate 5, August through October.

Species	date of survey					
	8-17	8-21	9-12	9-14	9-21	10-12
Green-backed Heron	1	-	-	-	-	-
Turkey Vulture	-	1	-	-	-	-
Cooper's Hawk	-	-	1	-	-	-
Red-shouldered Hawk	1	1	-	2	-	1
American Kestrel	-	-	1	-	1	1
California Quail	15	3	-	40	10	-
Killdeer	-	-	-	-	-	1
Feral Rock Dove	20	-	4	-	-	-
Mourning Dove	6	4	10	4	2	-
White-throated Swift	-	48	-	28	40	-
Anna's Hummingbird	1	3	11	20	10	3
Allen's Hummingbird	-	1	-	-	-	-
Nuttall's Woodpecker	1	1	1	2	1	-
Northern Flicker	-	-	-	1	-	-
Willow Flycatcher	-	-	-	1	-	-
Western Flycatcher	-	-	1	2	2	-
Black Phoebe	1	3	2	1	1	1
Say's Phoebe	-	-	-	1	-	-
N. Rough-winged Swallow	1	-	-	-	-	-
Cliff Swallow	12	-	-	-	-	-
Barn Swallow	-	1	-	-	-	-
Common Crow	225	200	20	5	8	20
Common Raven	50	230	100	20	20	1
Bushtit	15	66	40	60	25	11
Bowick's Wren	-	3	4	15	6	1
Marsh Wren	-	-	-	-	-	1
Ruby-crowned Kinglet	-	-	-	-	-	4
Black-tailed Gnatcatcher	-	1	-	-	-	-
Wrentit	-	1	-	7	3	3
California Thrasher	-	-	2	4	-	-
European Starling	-	4	-	-	5	-
Warbling Vireo	-	-	-	3	-	-
Orange-crowned Warbler	-	1	1	4	3	1
Nashville Warbler	-	1	-	-	-	-
Yellow Warbler	-	-	-	3	-	-
Yellow-rumped Warbler	-	-	-	-	-	5
Black-throated Gray Warbler	-	-	-	1	-	-
Blackpoll Warbler	-	-	-	-	1	-
MacGillivray's Warbler	-	-	-	-	1	-
Common Yellowthroat	3	3	9	5	4	-
Wilson's Warbler	-	-	2	3	1	-
Black-headed Grosbeak	1	1	-	-	-	-
Blue Grosbeak	1	1(2)	-	-	-	-
Lazuli Bunting	-	-	-	-	3	-
Rufous-sided Towhee	-	2	2	10	1	-
Brown Towhee	1	2	2	9	2	-
Brewer's Sparrow	-	-	-	-	3	-
Savannah Sparrow	-	-	-	-	-	22

Table V-7. (cont.). Birds of the San Mateo Creek Study Area, East of Interstate 5, August through October.

Species	date of survey					
	8-17	8-21	9-12	9-14	9-21	10-12
Song Sparrow -	25	49	30	61	25	20
Lincoln's Sparrow	1	-	-	-	-	-
White-crowned Sparrow	-	-	-	-	-	1
Red-winged Blackbird	85	350	50	70	30	6
Northern Oriole	1	-	-	-	-	-
House Finch	-	15	5	50	5	15
Lesser Goldfinch	-	3	5	1	-	-
American Goldfinch	-	-	-	5	-	-
Totals, individuals	467	1001	303	438	213	118
species	21	28	22	30	26	19

Numbers in parentheses are young birds.

Table V-8. Birds of the San Mateo Creek Study Area, East of Interstate 5, November and December

Species	date of survey									
	11-5	11-14	11-21	11-26	12-3	12-10	12-17	12-24	12-31	
Canada Goose	-	-	2	-	-	-	-	-	-	-
Great Blue Heron	-	-	-	-	-	1	-	-	-	-
Green-winged Teal	-	-	-	-	12	15	-	-	-	-
Turkey Vulture	1	-	-	-	-	-	-	-	-	-
Sharp-shinned Hawk	-	1	-	-	1	-	-	-	-	-
Red-shouldered Hawk	-	-	1	-	-	-	-	-	-	-
Red-tailed Hawk	-	-	-	2	1	1	1	1	1	1
American Kestrel	2	-	-	-	1	-	-	-	-	-
California Quail	-	15	-	-	-	-	24	-	-	-
Black-bellied Plover	-	-	-	2	1	-	-	-	-	16
Killdeer	-	-	-	1	1	-	1	-	-	-
King-billed Gull	-	-	-	1	-	-	2	5	6	-
Mourning Dove	-	-	-	-	-	-	-	-	-	1
White-throated Swift	35	18	8	7	6	-	10	2	25	-
Anna's Hummingbird	3	8	11	14	12	2	12	10	12	-
Northern Flicker	1	-	-	2	1	-	-	-	-	1
Black Phoebe	2	-	1	1	1	-	1	3	2	-
Say's Phoebe	2	1	-	1	-	1	-	1	-	-
Common Crow	1	-	6	20	-	-	12	35	21	-
Common Raven	1	-	-	2	-	-	-	2	5	-
Bushtit	50	18	36	10	60	22	21	10	-	-
Bewick's Wren	1	-	-	2	6	-	4	3	3	-
Marsh Wren	-	-	-	-	-	1	-	-	-	-
Ruby-crowned Kinglet	-	1	1	2	2	-	5	1	-	-
Wrentit	1	1	1	1	2	1	2	2	2	-
California Thrasher	-	-	-	-	1	-	-	-	-	-
Water Pipit	2	30	25	24	2	30	-	3	4	-
European Starling	-	-	3	-	-	-	-	-	-	-
Loggerhead Shrike	-	1	-	-	1	-	1	1	1	-
Orange-crowned Warbler	-	-	1	-	-	-	-	-	-	-
Yellow-rumped Warbler	1	3	2	11	4	3	6	-	-	-
Common Yellowthroat	4	-	2	2	5	2	2	1	2	-
Rufous-sided Towhee	-	1	-	1	-	-	-	-	-	-
Brown Towhee	1	3	1	2	-	1	2	2	1	-
Savannah Sparrow	4	-	-	1	-	-	2	-	-	-
Song Sparrow	12	12	6	7	14	8	11	10	17	-
White-crowned Sparrow	9	26	16	36	3	7	24	15	6	-
Red-winged Blackbird	-	2	-	-	-	-	-	-	-	-
Western Meadowlark	3	2	1	19	1	6	-	12	-	-
House Finch	2	14	11	3	2	2	6	3	3	-
American Goldfinch	-	-	-	8	-	-	-	-	-	-
Totals, individuals	138	157	135	182	140	103	149	122	129	
species	21	18	19	26	23	16	20	20	19	

Table V-9. Birds of the San Mateo Creek Study Area, East of Interstate 5, January and February

Species	date of survey					
	1-9	1-14	1-19	2-3	2-9	2-22
Green-winged Teal	-	-	15	6	8	-
Sharp-shinned Hawk	-	-	-	1	-	-
Cooper's Hawk	-	-	1	1	1	-
Red-tailed Hawk	1	1	1	-	-	-
American Kestrel	1	1	1	-	-	-
California Quail	20	-	8	-	-	-
Killdeer	-	-	-	2	-	-
Ring-billed Gull	12	20	-	-	-	-
Mourning Dove	5	4	21	16	6	-
White-throated Swift	30	21	8	15	16	-
Anna's Hummingbird	14	12	8	3	8	-
Nuttall's Woodpecker	-	-	1	1	-	-
Downy Woodpecker	1	-	-	-	-	-
Northern Flicker	-	-	-	1	1	-
Black Phoebe	4	4	5	1	1	-
Say's Phoebe	1	-	1	1	1	-
Tree Swallow	-	-	-	4	-	-
Common Crow	1	-	9	-	-	-
Common Raven	-	2	-	2	-	-
Bushtit	15	22	21	37	45	-
Bewick's Wren	6	3	2	2	4	-
Marsh Wren	-	-	-	1	1	-
Ruby-crowned Kinglet	3	2	1	1	2	-
Wrenit	4	2	3	3	5	-
California Thrasher	-	2	-	1	-	-
Water Pipit	-	-	50	3	18	-
Loggerhead Shrike	1	-	-	-	-	-
Orange-crowned Warbler	1	-	-	-	1	-
Yellow-rumped Warbler	6	3	11	1	4	-
Common Yellowthroat	2	1	-	1	3	-
Rufous-sided Towhee	-	-	-	3	3	-
Brown Towhee	-	2	2	1	2	-
Savannah Sparrow	-	-	-	1	-	-
Song Sparrow	25	24	68	21	23	-
Lincoln's Sparrow	-	-	15	-	-	-
Golden-crowned Sparrow	-	4	-	-	-	-
White-crowned Sparrow	20	25	4	-	6	-
Red-winged Blackbird	-	-	1	-	3	-
Western Meadowlark	16	14	7	12	12	-
House Finch	20	21	188	40	22	-
Lesser Goldfinch	-	-	-	7	-	-
American Goldfinch	-	-	31	6	-	-
Totals, individuals	209	190	483	195	196	-
species	23	21	26	30	24	-

Table V-10. Birds of the San Mateo Creek Study area, East of Interstate 5, March and April

Species	Date of Survey					
	3-5	3-26	3-31	4-12	4-19	4-28
American Bittern	-	1	-	-	-	-
Green-winged Teal	4	-	-	-	-	-
Mallard	-	10	6	-	3	-
Cinnamon Teal	11	2	10	-	4	-
Gadwall	8	-	-	-	-	-
American Coot	1	-	2	-	-	-
Great Egret	-	-	-	1	-	-
Green-backed Heron	-	-	-	-	-	1
Cooper's Hawk	-	-	1	-	-	-
Red-tailed Hawk	-	-	3	2	-	-
Mourning Dove	-	2	-	1	2	-
Ring-billed Gull	-	2	-	-	-	-
California Quail	4	15	-	12	2	4
White-throated Swift	15	45	40	40	30	30
Anna's Hummingbird	4	4	6	2	-	-
Nuttall's Woodpecker	1	-	-	-	1	-
Downy Woodpecker	1	-	-	-	-	-
Cassin's Kingbird	-	-	1	-	-	-
Black Phoebe	1	1	-	1	-	-
Say's Phoebe	1	-	-	-	-	-
N. Rough-winged Swallow	-	4	30	1	-	9
Cliff Swallow	-	60	-	7	100	-
Tree Swallow	-	2	2	1	4	8
Common Crow	-	2	-	-	-	-
Common Raven	2	-	-	-	-	-
Bushtit	11	6	19	3	15	30
Bewick's Wren	4	3	2	1	-	-
House Wren	-	-	1	1	-	-
Marsh Wren	4	1	-	1	4	3
Ruby-crowned Kinglet	1	-	-	-	-	-
Wrentit	2	1	5	3	-	1
Orange-crowned Warbler	1	1	3	2	-	-
Yellow Warbler	-	-	-	1	-	3
Yellow-rumped Warbler	15	4	7	9	-	-
Common Yellowthroat	2	3	2	-	1	2
Yellow-breasted Chat	-	-	-	1	1	3
Black-headed Grosbeak	-	-	-	1	-	2
Rufous-sided Towhee	3	2	3	2	1	1
Brown Towhee	-	1	3	-	-	3
Song Sparrow	18	16	18	14	9	16
White-crowned Sparrow	-	4	7	-	-	-
Northern Oriole	-	-	-	1	-	-
Brown-headed Cowbird	-	-	-	2	-	12
House Finch	-	16	16	-	30	4
Lesser Goldfinch	-	5	6	1	2	3
American Goldfinch	-	2	-	1	4	-
Totals, individuals	114	215	193	112	213	135
species	22	27	23	26	17	18

5.5 Discussion.

5.5.1 Census Variation

Despite the attempt to standardize census methods, several variables other than time of year were beyond the control of the observers and had an effect on census results. These variables are discussed below.

Tide

At low tide, a wide stretch of pebbly intertidal zone was exposed which attracted more shorebirds than were found on the beach at high tide. This effect on census results was minimized somewhat by weekly censusing, which resulted in two low tide and two high tide censuses each month.

Water level

Except for a period between late February and mid April, the lagoon at the mouth of San Mateo Creek was full. Water extended into the reed margin of the lagoon and no mudflats were exposed, the only shoreline being along the beach edge of the lagoon. During the period when the lagoon was empty, San Mateo Creek flowed directly into the sea and the lagoon bottom was dry except for a small creek running down its center. Waterbird use of the lagoon during this time was drastically diminished while shorebird activity increased slightly. High tides in early February flooded marsh areas both north and south of the lagoon causing changes in the salinity which effected the vegetation of these areas. While the rise in water level made use of these areas by waterbirds possible, the influx of salt water killed fresh water algae and some marsh plants, decreasing food availability.

Human Disturbance

Surfers were present off shore every day of censusing, but were more numerous on weekends and during summer months. Increased use of the beach area affected use of the beach by birds.

In the agricultural area east of the Interstate 5, the cycle of crops changing from corn in the fall to cauliflower in the winter and spring affected bird use of the fields. Plowing of weedy areas in February and the removal of a 15 foot wide strip of willows from the south edge of the agricultural fields in March also may have affected bird numbers in this area.

Irregular Movements of Birds

Although some species of birds are resident in the study area, many use the area for only a portion of their daily activities and move in and out of it on an irregular basis. Observed numbers of these species can vary dramatically from day to day. In the San Mateo Creek study area, birds that fit this category are the gulls and terns, which irregularly rest on the beach, blackbirds and house finch which were irregular visitors to the agricultural fields, and several species of the coastal sage habitat such as California jay and mockingbird, which live on mesas bordering San Mateo Creek and irregularly moved in and out of the study area.

5.5.2 Census Error

The accuracy of visual censusing of birds varies according to species, as some types of birds are more difficult to observe than others. This problem has been recognized in most strip censusing techniques (Emlen, 1971) by varying the width of the strip utilized for each species according to the visibility of that species. Bird movement also varies according to species and care must be taken during a census to avoid counting the more

mobile species more than once.

In the San Matco Creek bird censuses it is felt that counts for water birds, such as ducks, shorebirds and gulls as well as for the more obvious land birds, such as raptors, crows, shrikes, etc. are very accurate. These species occur in open habitat and are not usually hidden in vegetation. The census routes used in this survey were such that nearly 100% of the individuals of these species occurring in the study area were counted. Also, movement of these birds between census areas was taken into account to insure that each individual was counted only once.

For other land birds, census counts are less accurate. In terms of coverage, the routes through the terrestrial habitat were such that only about 40% of the smaller land species were counted on individual surveys.

For the smaller land species, counts were most accurate when the presence of male birds was indicated by their singing during courtship or territorial defense. At other times, when birds were not singing, many of the more secretive species were missed. For example, counts of the resident marsh wren in the marshes west of Interstate 5 varied from a low count of zero and several counts of less than 5 during the non-breeding season to a high count of 18 in April at the height of territorial defense. In the case of song sparrows, a resident species that is, however, more visible when not singing, counts varied from a low of 12 during the non-breeding season to a high of 52 during the period of territorial defense.

The high counts of resident species that occurred during the height of territory establishment were accomplished in part by the use of a tape recorder to play songs of territorial males and thus elicit singing responses. These high counts are probably a very accurate reflection of the numbers of individuals present at that time. They are not, however, an

accurate reflection of the breeding population in the area. Typically, populations fluctuate during the year. After nesting, young birds tend to stay in the area until the following nesting season. At this time the surviving territorial birds of the previous year plus their young and any young of previous years that have so far failed to hold a territory all compete for territorial ownership. Eventually, ownership is established and the excess population of non-territorial birds is driven out of the area. Thus, at the beginning of territorial defense, there are more birds singing and attempting to establish territory than there are successful territorial birds. This is well shown in the case of yellow-breasted chat. Soon after the migratory chats reappeared in the study area in the spring, a high of 14 singing males was counted. Thereafter, the number stabilized at about 8. It is felt that the earlier higher number represents chats attempting to establish territory in the area. The lower number represents those that were actually successful as shown by their continued presence and singing through the following month. Attempts to calculate the number of breeding birds in this study take into account this difference between maximum number of individuals observed defending territory and the somewhat smaller number that were active on territory for longer periods of time.

5.5.3 Bird Populations by Habitat Areas

The San Mateo Creek study area can be divided into four aquatic habitats: the ocean, the lagoon, and fresh and salt water marshes. There are also four major terrestrial habitats; beach, agricultural field areas, coastal sage scrub and riparian woodland. A special and unique habitat not covered by these categories is the concrete bridge carrying Interstate 5 over San Mateo Creek which serves as a nesting site for some species. Each

of these habitats will now be discussed in turn.

Ocean

Bird observations offshore from the San Mateo Creek Study area involved wintering species and a few summer observations of non-nesting individuals of such species as western gull and pelican (Table V-12). Generally, there were few birds observed in the ocean. A small flock of red-breasted mergansers foraged off the beach in late winter and spring but very few fish eating birds were observed and those that were present (pelican, terns, grebes, loons) were not feeding. Sea ducks were also uncommon. Part of this scarcity of ocean birds may be due to the almost continuous presence of surfers in the water during the year, but it may be that the offshore environment is not very rich in food for these species.

Lagoon

The lagoon at the mouth of San Mateo Creek was full at the beginning of this study, maintained by a small inflow of fresh water. Water in the lagoon was fresh and extended well into the reeds along the sides of the lagoon. A well developed sand barrier separated the lagoon from the ocean. The lagoon remained in this condition through the winter and was utilized by numbers of ducks and coots (table V-12) which fed on fresh water algae. In early February, high tides pushed salt water into the lagoon but did not breach the beach. This change in salinity killed most of the algae in the lagoon and duck numbers decreased. Heavy rains in late February washed out check dams upstream of the study area and the resultant flood breached the lagoon mouth, allowing the lagoon to drain. The lagoon remained empty until mid April when the sand barrier at its mouth was reestablished and the lagoon filled again with fresh water. There are few fish in the lagoon and this is reflected in the general lack of fish eating birds. A group of

Table V-12. Selected Bird Populations at the San Mateo Creek Study Area
(number of species) number of individual birds observed

Date	lagoon waterbirds	shorebirds	ocean birds	gulls and terns
8-17	(5) 53	-	-	(3) 51
8-21	(5) 41	(2) 7	(1) 1	(3) 7
9-12	(4) 36	(1) 2	(1) 1	(2) 11
9-14	(5) 55	(3) 14	-	-
9-21	(7) 38	(1) 3	-	-
10-12	(5) 87	(2) 5	(2) 5	(3) 14
11-05	(8) 227	-	-	(4) 54
11-14	(6) 126	(1) 1	-	(3) 9
11-21	(8) 219	-	(3) 11	(2) 50
11-26	(11) 233	-	(1) 3	(3) 21
12-03	(12) 179	(5) 13	(2) 4	(3) 36
12-10	(13) 176	(5) 25	(4) 4	(4) 25
12-17	(11) 213	(1) 1	(2) 2	(2) 25
12-24	(11) 188	(2) 10	(3) 3	(2) 80
12-31	(12) 151	(2) 11	(3) 17	(4) 63
1-09	(11) 175	(2) 8	(4) 12	(5) 95
1-14	(7) 132	(3) 12	(4) 27	(5) 121
1-19	(13) 195	(4) 31	(2) 12	(3) 11
2-03	(10) 105	(5) 19	(1) 8	(3) 15
2-09	(8) 97	(6) 31	(1) 4	(2) 7
2-22	(2) 11	(7) 97	(3) 14	(3) 65
3-05	(2) 3	(9) 38	(3) 8	(3) 15
3-14	(3) 13	(6) 103	(4) 19	(5) 90
3-26	(2) 7	(4) 27	(2) 5	(3) 18
3-31	(2) 8	(5) 36	-	(6) 78
4-12	(3) 8	(9) 163	(2) 5	(5) 244
4-19	(4) 12	(7) 155	-	(7) 85
4-28	(4) 13	(7) 14	-	(7) 66
5-04	(4) 11	-	(2) 8	(3) 12
5-15	(2) 4	(1) 1	(1) 5	(3) 60
5-20	(3) 23	-	(1) 3	(4) 33
5-29	(2) 8	-	(1) 2	(3) 67
6-06	(2) 10	-	-	(1) 4
6-18	(2) 27	(1) 2	(1) 3	(1) 2
6-24	(3) 23	(1) 2	(1) 3	(4) 18

night herons were present in the grasses by the lagoon but fed primarily at low tide along the rocky beach. Breeding species in the marsh include coot, pied-billed grebe and moorhen which nest in the marshy edges of the lagoon as do yellowthroat and marsh wren. Nesting of aquatic species appears to vary from year to year, depending on the presence of water and food availability. When the lagoon emptied, the bottom was found to be sand, deposited by recent flooding. There was apparently little development of a bottom invertebrate fauna. Despite the lagoon being empty during spring shorebird migration, very few shorebirds were observed to feed in the lagoon area.

Fresh Water Pond

A depression on the east side of Interstate 5 (Figure V-1) was dry during the summer and fall months but filled with water during the winter rains in early February. Despite some recharge from agricultural runoff, this pond continually shrank through the remainder of the study period. The pond became covered with aquatic plants, mostly Ruppia, soon after filling. A green-backed heron nested in this marsh during 1986 as did marsh wren and yellowthroat. Gadwall, mallard green-winged and cinnamon teal were regularly observed in the marsh through the spring but apparently did not nest here. It is thought that the area was too small to afford adequate protection for these species from raccoons, which are numerous. Nesting may occur in other years when more water is present.

Brackish Water Ponds

The marsh area behind the beach on the south side of the study area (Figure V-1) was dry from the beginning of the study period through the winter. It filled with sea water during high tides in early February, 1986

and had water in it until the June, although water level dropped through the spring and summer. The marsh is brackish and composed of rushes (Juncus sp.) rather than cattail (Typhus) which cannot tolerate salt water. Pied-billed grebe nested in the marsh in 1986 as did yellowthroat and marsh wren. Virginia rails were heard in the marsh on several occasions but were probably transient rather than resident. The amount of rail activity did not seem to indicate breeding. Two species of special concern in California, Belding's savannah sparrow and the light-footed clepper rail were not observed during this study, nor have they been observed in the area during previous specific studies of these species. Belding's savannah sparrow is known to prefer marsh habitat where common pickleweed (Salicornia) is present. There is very little common pickleweed in the San Mateo Creek study area.

Beach

The beach strip bounding the San Mateo Creek study area consists of a narrow higher sand area fronted by a steep sand beach leading to a flat cobble low intertidal area. People were present on the beach every day but were more numerous on weekends and during summer months. Most of the observed shorebirds were migrants which foraged on the beach at low tide (table V-12). A small flock of snowy plover wintered on the beach but left the area in the spring. A pair of killdeer were present on the beach sporadically most of the year but did not nest. A single least tern was reported as nesting here in 1981 (Unitt, 1984) but no nesting activity was observed during this study. Gulls and terns roosted on the beach sporadically (table V-12). At low tide, green-backed heron and night heron were observed fishing along the rocks near the lower tide line. Occasionally crows, ravens and pigeons scavenged around garbage cans.

During the summer, swallows regularly flew low over the beach foraging for insects.

Agricultural Fields

The agricultural field area east of Interstate 5 was in continuous use during this study. The fields were planted in the fall with corn. When this crop was harvested they were replanted in cauliflower, peppers and gladioli. A small portion of the fields lay fallow through the winter and early spring but were plowed and put into production in March. The corn crop was especially attractive to blackbirds, crows and ravens, and the woody areas attracted finches and sparrows during the winter. A few horned larks were present on the gladiolus field during the summer and may have nested.

Coastal Sage Scrub

The dry bluff areas bordering the San Mateo Creek study area support a well developed stand of coastal sage scrub. This vegetational type also occurs in the study area, most obviously on the embankments along the railroad and the old and new routes for Interstate 5. The drier areas within the lowland sections of the study area also support some coastal sage plants. Characteristic bird species of this habitat; wrentit, black-tailed gnatcatcher, California thrasher and brown towhee were regularly observed during the study. However, lack of well developed stands of cactus and of more open sandy areas resulted in the lack of many species of the coastal sage, such as cactus wren and roadrunner. These species were observed on the bluffs bordering the study area but rarely if ever in the study area itself.

Riparian Woodland

The undisturbed bottomland along the course of San Mateo Creek

supports a riparian woodland. This habitat varies from a wet condition along the creek, which supports mostly willow, to drier areas away from the stream where cottonwood, oak and sycamore are more common. The understory similarly varies with water availability. Dead snags of willow in several of the marshy areas in the study area indicate that in past years the willow woodland has been more extensive but has been killed by flooding in these low lying areas. A band of willow woodland about 15 feet in width bordering the agricultural area was removed in March, 1986, destroying about half the willow woodland along this field edge (Figure V-1).

The wetter riparian areas were inhabited by such species as yellow-breasted chat, song sparrow, and yellow warbler while drier woodlands were used by orange-crowned warbler, Bewick's wren, bushtit and goldfinch. Abundant woodpecker holes in dead snags made nesting by wrens and swallows possible. Special care was taken to search for nesting least Bell's vireo but no territorial or nesting activity was observed.

Interstate 5 Bridge

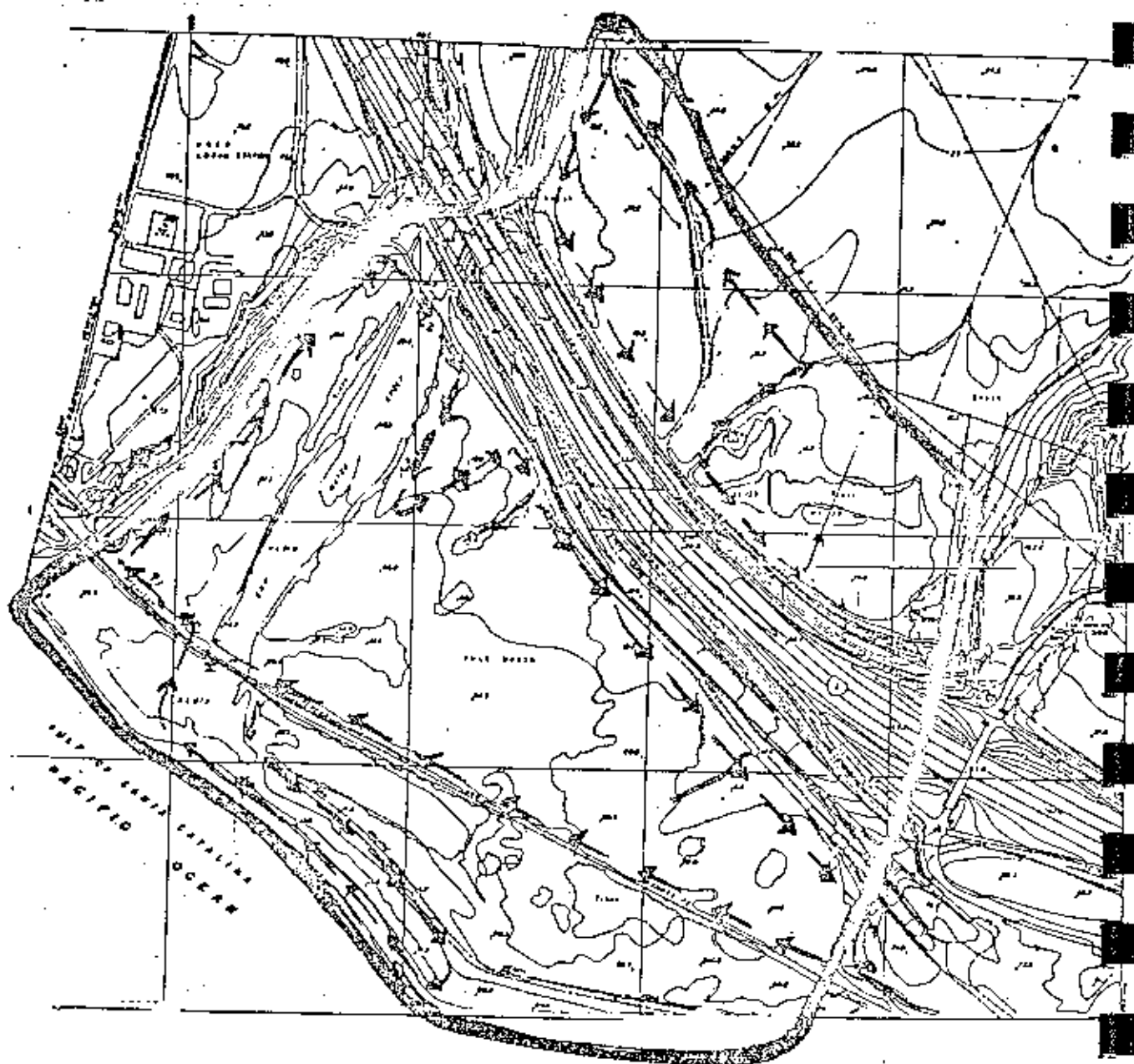
The concrete bridge over which Interstate 5 crosses San Mateo Creek provides nesting sites for two cliff and rough-winged swallows and for white-throated swift. Feral pigeons also were observed around the bridge several times.


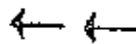
5.5.4 Individual Accounts of Breeding and Resident Species

Pied-billed Grebe

Grebes with young were observed in the lagoon in August of 1985 and in the salt marsh pool in April and May of 1986. This species was not recorded as nesting in the area by Unitt (1984) but he recorded it as

Figure V-1. Map of the San Mateo Creek Study Area, showing Avian Census Routes



-  - Study Area Boundary
-  - Avian Census Route

commonly nesting in salt marshes elsewhere in San Diego County.

Green-backed Heron

A pair of green-backed herons were present in the study area through the year, foraging in tidepools along the coast at low tide and in ponds along San Mateo Creek. In June of 1986, a heron was observed carrying food into the fresh water ponds east of Interstate 5; this is taken as a sign of nesting. Green-backed herons were not recorded as nesting in the area by Unitt (1984) but nest regularly elsewhere along the coast in San Diego County.

Gadwall

Gadwall wintered in the lagoon at the mouth of San Mateo Creek and a few individuals were observed in the fresh water marsh east of Interstate 5 in late spring. Although this species has breed at the mouth of the Santa Margarita River and might be expected to nest here, no nesting occurred during the study period, presumably due to the low water in the lagoon and marsh areas.

Mallard

Mallards were present throughout the year in the study area. Numbers observed fluctuated as a resident flock containing some hybrids with domestic ducks moved between the lagoon and neighboring areas outside the study area during the winter. At least two pair of mallards nested in the marshes surrounding the lagoon in the spring of 1986, and a family of mallards was still present in the lagoon in August of 1985. Neither Unitt (1984) nor Dixon (1907) reported nesting at the San Mateo Creek mouth.

Cinnamon Teal

A few cinnamon teal wintered on the San Mateo lagoon and several pairs

were observed well into the spring in the fresh water marsh east of Interstate 5. Although breeding has occurred at the mouth of the Santa Margarita River (Unitt, 1984), no breeding was observed in the study area, presumably due to the low level of water in the fresh water marsh during late spring.

Turkey Vulture

Turkey vultures were reported by Dixon (1906) to be common around San Onofre and to breed in the area. As noted by Unitt (1984), this species has greatly decreased in San Diego County. Turkey vultures were only infrequently observed in the San Mateo Creek study area, appearing to be visitors from further upstream where they are resident.

Black-shouldered Kite

A pair of kites appeared in the riparian woodland of the study area west of Interstate 5 in March and were present through June. Although regularly observed in the area, there was no indication of nesting. Kites do nest along the coast in similar habitat in Orange and San Diego Counties (see Unitt, 1984) and nesting in the area would not be unexpected. Kites normally hunt in open grassy areas which are no longer abundant nearby.

Cooper's Hawk

A single individual of this species was observed through the winter months but not after March, 1986. This species was reported by Unitt (1984) to have definitely bred in the vicinity of the study area, a record apparently based on Dixon's (1906) observation of a pair in March, 1905.

Red-shouldered Hawk

The red-shouldered hawk is a common breeding species in the lowlands

of San Diego County, nesting in sycamore and other riparian trees. Nesting is reported for the San Mateo Creek area by Unitt (1984, based on nests found by Dixon in 1904-06). A pair of red-shouldered hawks was regularly observed throughout the study period and courtship behavior was observed in the spring. No young were observed, however and nesting in the study area did not occur.

Red-tailed hawk

Red-tailed hawks were present in the area through the winter and up until June, 1986. Most individuals were observed sitting on power poles east of Interstate 5. There are no open areas in the study area where foraging would normally occur and most hawks observed appeared to be visitors from further upstream where more fallow fields and grassy areas occur. Based on Dixon (1906), Unitt (1984) reported nesting in the area. Dixon found this species common along San Mateo Creek. Its frequency in the area has decreased dramatically with the loss of suitable hunting habitat.

American Kestrel

One or two kestrels were present in the vicinity of the agricultural fields during the winter months but not present after late January. Kestrels were reported to nest in the sycamores along San Mateo Creek by Dixon (1906) but have become rarer in the area with the elimination of grasslands on the surrounding mesas.

California Quail

A covey of quail were regularly observed in the coastal sage habitat east of Interstate 5 and a nest containing 15 eggs was found in June of 1986. Both Unitt (1984) and Dixon (1906) reported quail as nesting in the area.

Common Moorhen

Moorhens were observed on the lagoon throughout the year with a high number of 25 in September. Moorhens disappeared briefly while the lagoon was empty in February but reappeared soon after the lagoon refilled. At least two pair successfully raised young at the lagoon in 1986 with a high count of 11 chicks observed on June 24th. This species has not previously been reported to breed at San Mateo Creek (Unitt, 1984) but breeds regularly in other localities along the southern California coast.

American Coot

Coot were also present throughout the year. A large population of this species wintered on the lagoon, reaching a count of 165 in November. Coot began to disappear in January and February as available food declined and totally disappeared after the lagoon emptied in February. Coot were only observed sporadically after this date. Young birds were observed in August of 1985, indicating nesting success that year. This species has not been previously recorded as nesting at San Mateo lagoon (Unitt, 1984) but is a common nesting species in fresh and brackish water areas in southern California.

Killdeer

One or two killdeer were regularly observed in the study area, either feeding on the agricultural fields east of Interstate 5 or foraging in the sandy areas in back of the beach. Although this species might be expected to nest in these areas, no evidence of nesting was observed during the study period.

Mourning Dove

Doves were present throughout the study period with large numbers

observed in the fall when seed were available. The suspected migration of doves out of the area in winter (see Unitt, 1984) is supported by the small numbers present during the winter months. The continuous presence of about 15 individuals during breeding season and evidence of courtship and young verifies the breeding of from 5 to 8 pairs of doves in the riparian habitat of the study area.

Barn Owl

Dixon (1906) recorded barn owls as nesting both in hollow sycamore trees and in crannies in the coastal cliffs. Only a single individual was observed during the study period and there was no sign of nesting. Barn owls hunt over grassy fields and their presence in the area has been reduced since Dixon's study by loss of hunting grounds.

Great horned Owl

A single individual was observed during the study period and there was no evidence of nesting or regular roosting in the study area. Great horned owls were once common breeders along San Mateo Creek (Dixon, 1906) and are today probably more common upstream from the study area where there is less human activity and where more open fields occur.

White-throated Swift

Dixon (1906) reported swifts present near cliffs about 5 miles up San Mateo Creek. Swifts were observed on nearly every visit foraging around the concrete bridge for Interstate 5. Although it is hard to count these aerial acrobats accurately, it appears that at least 20 pair probably nest in crevices under this bridge and roost here during non-breeding season.

Anna's Hummingbird

Anna's hummingbirds were observed during every visit to the study

area. This species was extremely numerous in early January and February when courtship and territorial activity were at a maximum. Nesting was observed in February and March. By April, most Anna's hummingbirds had moved out of the study area. Only a few remained in the denser coastal sage along the sides of the creek channel. This local movement probably explains why this species was not mentioned as present by Dixon (1906).

Roadrunner

Although roadrunners were regularly observed in the coastal sage habitat on the mesas along San Mateo Creek to the east of Interstate 5, an individual was observed in the study area only once. Dixon's (1906) record of probable breeding for this species may refer to these bordering mesas areas.

Nuttall's Woodpecker

One or two Nuttall's woodpeckers were observed throughout the study in denser woodland areas and probably bred east of Interstate 5 in dense riparian growth. Dixon (1906) recorded this species as probably breeding.

Downy Woodpecker

A pair of Downy woodpeckers were intermittently observed throughout the study period and although no nesting or young were observed, probably bred. The species has not been recorded as breeding in the area (Unitt, 1984) but does breed in coastal riparian habitat in San Diego County.

Common Flicker

A family of flickers was present throughout the winter but disappeared during April and May. A family reappeared in the riparian woodland west of Interstate 5 in June. They probably nested outside of the study area.

Dixon (1906) recorded this species as breeding in sycamores along San Mateo Creek.

Ash-throated Flycatcher

An individual of this species established territory in the riparian habitat east of Interstate 5 during May of 1986 but was apparently not successful in attracting a mate. The species breeds in the coastal sage habitat on the mesas on either side of the study area and Dixon's (1906) report of their presence probably refers to this area.

Black Phoebe

This species was observed on every visit to the study area. Pairs of black phoebes nested under two wooden trestles on the railroad right of way and under the Interstate 5 bridge over San Mateo Creek. Dixon (1906) recorded this species nesting on a section building on the railroad right of way.

Tree Swallow

Tree swallows appeared in the study area in mid January and thereafter were regularly observed feeding over the beach and perching on dead willows in the marshes on both sides of interstate 5. Between 8 and 12 pair nested in old woodpecker holes in these willow snags. Dixon (1906) reported tree swallows nesting in the area, which is near the southern limit of the breeding range of this species (Unitt, 1984).

Northern Rough-winged Swallow

Rough-winged swallows appeared in the study area in late February and were present through early August. Several were observed exploring cliffs near the lifeguard station on the south side of the mouth of San Mateo Creek. They were regularly observed flying near the Interstate 5 bridge

and nested in drainage holes in this structure. Similar nesting has been observed at Oceanside (Unitt, 1984). Dixon (1906) recorded this species only as a migrant.

Cliff Swallow

Cliff Swallows arrived in the study area in late March and were present through mid August. Up to 60 pairs nested on the underside of the Interstate 5 bridge. Interestingly, they apparently did not use the still-standing nests from 1985 on the east side of the bridge but constructed a new set of nests on the west side of the bridge. Cliff swallows foraged widely over beach and marsh sections of the study area. Dixon (1906) reported this species nesting on a section house along the railroad right of way.

Horned Lark

Larks were not observed in the study area until May of 1986 when a few appeared in a newly planted field of gladioli east of Interstate 5. Courtship flights were observed in May and June and nesting may have been attempted. Dixon (1906) reported larks nesting on the mesas alongside the San Mateo Creek channel.

Scrub Jay

Jays were observed only twice in the study area. Dixon (1906) saw scrub jays only three times and considered them rare in the area. Despite this, Unitt (1984) listed them as probable breeders in the area. Jays breed in the suburban areas on the mesas north of the study area but rarely visit the bottomlands along San Mateo Creek.

Common Crow

Small numbers of crows were regular visitors to the study area, roosting in the riparian woodland and foraging on the beach. Large numbers visited the agricultural fields in the fall when the crop was corn. One or two pair nested in the riparian area west of Interstate 5.

Common Raven

Ravens were numerous visitors to the agricultural fields when corn was available but were only occasionally seen during the rest of the year. Ravens once bred on sea bluffs in the study area (Dixon, 1906) but now nest only further upstream in the wilder parts of Camp Pendleton.

Bushtit

Bushtits were common residents throughout the study area. Numbers fluctuated greatly as foraging flocks moved on and off of the study area. Fewer were seen in March and April when foraging flocks broke up into individual pairs. Nesting occurred in all woodland areas.

Bewick's Wren

Bewick's wrens were present in the willow thickets and sycamore groves on both sides of Interstate 5 throughout the study period. Observations were most numerous during the breeding season when wrens were singing. A maximum of 20 individuals was observed on the study area and young were present in May and June. For some reason Dixon (1906) failed to observe this species and it is therefore not listed as present in the area by Unitt (1984).

House Wren

House wrens are summer residents in San Diego County (Unitt, 1984). Wrens were present from March through September and two or three pairs of house wrens nested in the sycamore trees just west of the Interstate 5

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bridge over San Mateo Creek.

Marsh Wren

Marsh wrens were common in all marsh areas on the study area. The number of this secretive bird that were observed were low from June to February when there was little singing. Starting in March and lasting until the end of May, marsh wrens actively defended their territories and were easily located by song. The high count for this period was 21 birds. Most wrens were found in the marshes west of Interstate 5, but two or three pair also bred in the small marsh east of Interstate 5.

Black-tailed Gnatcatcher

At least three pair of gnatcatcher were observed west of Interstate 5 intermittently through the study period. Two of these pair were observed feeding young in June of 1986.

Swainson's Thrush

The only observation of this species was of a single bird in dense riparian willow thicket on June 24th. This species is reported as probably breeding (Unitt, 1984) in coastal riparian habitat elsewhere in San Diego county and such an occurrence at San Mateo Creek might be expected.

Wrentit

Wrentit indicated their presence through their distinctive song throughout the year in the study area. They were not confined to the coastal sage borders of the creek bottom but were found throughout the riparian woodland areas as well. Numbers were highest in December through March when territorial establishment seemed greatest. A maximum number of 19 were observed on a single visit and at least 10 pair probably nested

in the study area.

Northern Mockingbird

Mockingbirds were very rare in the study area, being observed only three times during the study. Dixon (1906) found them to be common in cactus patches on the mesas beside the creek bed. With the clearing of the mesa north of the creek most of these cactus beds have been removed.

California Thrasher

Thrashers were regularly observed in the coastal sage habitat along the sides of the study area and established territories in three areas bordering the study area during early spring of 1986.

Orange-crowned Warbler

Orange-crowned warblers were present throughout the year, but most noticeably during February through May, when they sang on territory. All were located in riparian woodland or nearby. At least 6 pair nested in the study area.

Yellow Warbler

Yellow warblers arrived in the study area in early March and were regularly heard through September. Territorial singing was heard in dense riparian habitat on both sides of Interstate 5 with a maximum number of 6 territorial males.

Common Yellowthroat

Yellowthroats were common residents in marshy areas on the study site. Territory defense peaked in February and March, but singing occurred to some extent throughout the year. As many as 20 pair may have nested in the study area.

Yellow-breasted Chat

Chats arrived in the study area in mid April and were observed regularly through late August. During the height of territorial activity, a maximum count of 16 individuals was obtained. Only 8 territories were eventually established, however. Chats occurred in most riparian areas on the study site. This is another species that Dixon (1906) failed to observe and that is, therefore, not listed for the area in Unitt (1984).

Black-headed Grosbeak

Grosbeak were present in the study area from early April through late August. Territorial defense and pair formation occurred in two areas of drier woodland along the bluff on the north side of the study area.

Rufous-sided Towhee

This species was present throughout the year in riparian woodland. Secretive and seldom observed during the winter, a maximum of 14 were observed when territorial singing was occurring in May and June. Several pair nested on the study area.

Brown Towhee

A few individuals of this common species of the coastal sage were present throughout the year. They were usually observed in coastal sage habitat on the bluffs bordering the study area, occasionally entering the creek bottom to forage.

Song Sparrow

Probably the most abundant year-round resident in the study area, this species was present in all habitats. During winter, flocks were observed foraging in the agricultural areas. Territorial defense occurred during

March through May. By June, this species was mostly silent. At least 30 pair nested in the study area.

Red-winged Blackbird

A flock of up to 350 redwings were regular visitors to the corn fields east of Interstate 5 during August and September and roosted in the nearby marshes. After the corn was harvested in October the numbers observed dropped sharply. Thereafter, throughout the year, small numbers of birds, mostly juveniles, were intermittently observed in the marshes west of Interstate 5 but there was no evidence of territorial display or other breeding activity. Dixon (1906) found this species to be abundant in the marshes on the study area in 1905 and 1906 and they commonly breed in other salt marshes along the southern California coast (Unitt, 1984).

Tricolored Redwing

Neff (1937) reported a colony of 100 nests of tricolored redwings "near San Clemente" in 1935, referring either to the mouth of San Mateo or San Onofre Creek. Dixon (1906) failed to observe this species and during this study tricolored redwings were observed only twice. They are not currently breeding in the study area and must be considered as visitors or migrants.

Brown-headed Cowbird

Cowbirds appeared in the study area in early March and were much in evidence through June with a maximum count of 26 individuals. During this period cowbirds were regularly observed prowling the riparian woodland habitat.

Northern Oriole

A small number of orioles were observed through the spring and summer in sycamore trees east of Interstate 5. At least one pair probably bred in

the study area.

House Finch

House finch were present throughout the year and nested in heavy brush near the highway bridge over San Mateo Creek. Large flocks were occasionally seen foraging in weedy agricultural fields east of Interstate 5 and in weedy areas behind the beach. Most of these individuals seemed to be visitors from areas outside the study area.

American Goldfinch

Although goldfinch are permanent residents in the study area, few were observed through fall and winter months, a time when they may leave the study area to forage on seeds elsewhere. Courtship flights began in February and lasted through June. During this period, goldfinch were very much in evidence throughout the stands of brushy willows along San Mateo Creek. Approximately 15 to 25 pair nested in the study area.

Lesser Goldfinch

This species was also present in the study area throughout the year. However, only small numbers were seen during winter, presumably as many individuals left the study area for better forage elsewhere. It was not until June that larger numbers were observed in the drier woodland section of the study area. A small number nested on the study site.

5.5.5 Other Species Observed During the Study

Oceanic Birds

Red-throated Loon
Arctic Loon
Western Grebe

Brown Pelican
Double-crested Cormorant
Surf Scoter
Red-breasted Merganser

Most oceanic bird observations were either wintering birds (loons, grebe, cormorant, ducks) or non-breeding individuals present during the summer months (pelican). Red-breasted mergansers were observed feeding in tide pools at the mouth of San Matco Creek at low tide. Most other species in this category were transient, observed flying past the area over the ocean or observed swimming off shore for brief periods. The numbers of oceanic birds observed was small (table V-12), perhaps due to the nearly constant presence of surfers in the water offshore of the study area.

Migratory Shorebirds

Black-bellied Plover
Snowy Plover
Scalpated Plover
Black-necked Stilt
Greater Yellowlegs
Willet
Whimbrel
Marbled Godwit
Wandering Tattler
Ruddy Turnstone
Black Turnstone
Surfbird
Sanderling
Western Sandpiper
Least Sandpiper
Short-billed Dowitcher

Southern California is within the wintering range of many shorebirds and it is hard to separate migrants from wintering individuals. Southward migration commences in July and August and was missed in this study. Small numbers of several species wintered in the area, feeding during low tide and moving along the shore to undisturbed areas during high tide periods. Most notable among these was a flock of snowy plover which were regularly observed from mid January through mid April. Snowy plover

breed on several beaches in southern California, including the mouth of the Santa Margarita River (Unitt, 1984). Failure to breed in the San Mateo Creek area may be due to the heavy use that this beach receives from people and dogs. Migrating shorebirds were observed in small numbers during March and April. With the exception of resident killdeer, shorebirds were generally absent from the area in May and June.

Lagoon Birds; Wintering and Migratory Grebe, Ducks, Geese and Coot

Eared Grebe
Canada Goose
Green-winged Teal
Mallard
Northern Pintail
Cinnamon Teal
Gadwall
American Wigeon
Canvasback
Redhead
Ring-necked Duck
Lesser Scaup
Oldsquaw
Bufflehead
Ruddy Duck
American Coot
Common Moorhen

A few strictly migratory waterbirds were noted on the lagoon in August through October. Wintering ducks were present from November through February, their numbers decreasing in January after winter storms had pushed salt water into the lagoon, killing the algae growing there and decreasing the amount of food available for ducks. When the lagoon emptied in February all ducks left the area. A few resident coot, moorhen, mallards, cinnamon teal and gadwall remained through the spring and summer; the former two species nesting successfully. Both ruddy duck and gadwall might be expected to breed as they are known to breed elsewhere in fresh water marshes along the southern California coast (Unitt, 1984). No individuals were observed, however, after the emptying of the lagoon in

February and nesting was not reported by either Unitt (1984) nor Dixon (1906).

Lagoon Birds; Herons and Egrets

Great Blue Heron
Great Egret
Snowy Egret
Cattle Egret
Green-backed Heron
Black-crowned Night Heron

With the exception of resident green-backed heron and wintering black-crowned night heron, all egrets and herons observed during this study were either wintering or migratory birds. Black-crowned night heron roosted regularly along the margin of the lagoon through the winter but left the area in April. Although the study area is in the range of possible nesting by this species and provides nesting sites, food availability is low and may not support a nesting colony. Single great blue herons were sighted only on 5 occasions during the year. Willet (1912) reported two small nesting colonies near San Onofre in 1905, presumably in tall eucalyptus or sycamore trees in the area. There are no more recent records on nesting in the area and the amount of food available in the area probably would not support a breeding colony today.

Migratory and Wintering Marsh Birds

American Bittern
Virginia Rail

American bitterns winter in southern California and the occurrence of a bittern on two occasions during migration is not surprising. Virginia rails were heard and observed several times during the periods of fall, winter and spring. Lack of any courtship or territorial activity suggest that this species, which does nest elsewhere on the coast of southern California,

did not attempt nesting in the study area.

Non-resident Gulls and Terns

Bonaparte's Gull
Heerman's Gull
Ring-billed Gull
California Gull
Herring Gull
Western Gull
Glaucous-winged Gull
Common Tern
Forster's Tern
Elegant Tern
Caspian Tern
Least Tern

Groups of gulls and terns were regularly observed roosting on the beach or flying past the study area over the ocean. Numbers of these species were greatest during winter and during migration (table V-12). In the summer small numbers of non-breeding individuals remained in the area. The numbers of terns and gulls fluctuated with tide conditions and the numbers of people and dogs on the beach. Only a single least tern was observed during the study period; a migrant flying past the mouth of the lagoon in late April. Unitt (1984) records a single nesting pair of least terns at the mouth of San Mateo Creek in the Summer of 1981. The area is not a good spot for nesting due to the amount of human use of the rather narrow beach and the lack of suitable small fish in the lagoon.

Wintering Land Birds

Sharp-shinned Hawk
Say's Phoebe
Ruby-crowned Kinglet
Blue-gray Gnatcatcher
Water Pipit
Cedar Waxwing
Yellow-rumped Warbler
Savannah Sparrow
Lincoln's Sparrow
Golden-crowned Sparrow
White-crowned Sparrow
Western Meadowlark

Small numbers of wintering land birds were present from October through May in riparian areas and from October through February in weedy patches near the agricultural fields. These latter areas were plowed in February resulting in the disappearance of several wintering species (water pipit, savannah sparrow, meadowlark).

Migratory Land Birds

Vaux's Swift
Rufous Hummingbird
Allen's Hummingbird
Belted Kingfisher
Cassin's Kingbird
Western Wood Pewee
Hammond's Flycatcher
Willow Flycatcher
Western Flycatcher
Barn Swallow
Hermit Thrush
Bell's Vireo
Warbling Vireo
Black-throated Gray Warbler
Blackpoll Warbler
MacGillivray's Warbler
Wilson's Warbler
Nashville Warbler
Blue Grosbeak
Lazuli Bunting
Rufous-crowned Sparrow
Chipping Sparrow
Brewer's Sparrow

Migratory birds were noted during spring and fall periods. Several of these species, notably willow flycatcher, Bell's Vireo, blue grosbeak and western flycatcher, nest in riparian habitats in southern California and might be expected to nest at San Mateo Creek. A blue grosbeak was shot in the area in May, 1904 by Dixon (1906). Special efforts to discover the presence of these species through the use of taped calls failed to find any evidence of nesting activity or presence during most of the breeding season. All these species are parasitized by cowbirds and in decline as nesting species in southern California. Their absence, while regrettable, is not

surprising.

5.6 Changes in Avian Population: Previously Observed Species not Observed in this study

Peregrine Falcon
Golden Eagle
Screech Owl
Burrowing Owl
Acorn Woodpecker
Lesser Nighthawk
Black-chinned Hummingbird
Western Kingbird
Purple Martin
Violet-green Swallow
Western Bluebird
Brewer's Blackbird
Lark Sparrow
Dark-eyed Junco

Dixon reported sighting several species in the vicinity of the San Mateo study area that were not observed during this study. Some of these, notably the peregrine falcon and golden eagle, were seen by Dixon several miles inland along San Mateo Creek. Their absence at the mouth of the creek is not unexpected (the former species has also been decimated by pesticides). Other species on this list, notably black-chinned hummingbird, burrowing owl, lesser nighthawk, Brewer's blackbird, and lark sparrow are birds to be expected in more agricultural or open field habitats. These species were present in Dixon's time in agricultural lands on the mesas bordering the study area and still may be present there today. These areas were not part of the present study. Failure to observe junco as a wintering species and violet-green swallow as a migrant are not significant.

The remainder of species on this list are ones that might be expected to occur in riparian habitat and were observed by Dixon as nesting in the sycamores along stream beds in the area. The disappearance of purple

martin over much of its range in southern California is well known. Loss of bluebirds and kingbird is also not unexpected. Both species forage over grazing lands and might be expected further inland rather than near the coast were such grazing lands no longer exist. Absence of acorn woodpecker is also not unexpected as there are very few oaks in or near the study area. Western screech owls are another species that has declined in southern California over the years. Dixon saw only three individuals of this species during his study in 1906.

Two species not observed by Dixon or anyone else at the San Mateo marsh are the light-footed clapper rail and Belding's race of the savannah sparrow. Unitt (1984) reports that these species, which nest elsewhere along the southern California coast, have never been observed in the marshes at the mouth of San Mateo Creek. Special effort, through the use of tapes, was taken to elicit calls from these species during the breeding season but no individuals could be found. Clapper rails prefer tidal marshes and the habitat in the study area should be considered at best marginal for this species. Belding's savannah sparrow requires Salicornia, a plant that is rare in the study area.

5.7 Breeding Birds

Table V-13 presents numbers of breeding birds observed in the San Mateo Creek Study area. The numbers of aquatic species, larger terrestrial species such as hawks and crow, and of species nesting on the Interstate 5 bridge are totals for the whole study area. For other terrestrial species, the counts are only for the actual area surveyed.

Division of the study area into habitat types and a presentation of breeding birds by habitat is somewhat arbitrary. While certain species, such as marsh wren, are restricted to a single habitat, other species, such as song sparrow, have a broader range and may even prefer edges between habitats. Song sparrows, for instance, foraged in marsh and coastal sage areas but seemed to nest mostly in riparian areas, including brush on the edges of marshes.

Each habitat is in some ways unique, making comparisons between habitats difficult. However, comparison with breeding bird censuses published in American Birds for 1982-1984 allows a few generalizations.

The numbers of breeding birds in marsh habitat, including open water areas is small compared to similar counts for other southern California marshes. This is due in large part to the lack of fish availability, causing low numbers of herons and grebes. Also involved is the seasonal nature of water availability and lack of a continual water supply to the marshes. The lagoon drained just when breeding of water birds should have commenced, and the marshy areas, which were filled by winter rains, dried sufficiently by late spring to make them unsafe nesting areas for water birds.

Breeding coastal sage birds seem low, but this habitat is marginal in the survey area, being much more plentiful on the mesas on both sides of

Table V-13. Breeding Birds of the San Mateo Creek Study Area

Species	West of Interstate 5			East of Interstate 5				
	marsh	riparian	coastal sage	marsh	riparian	coastal sage	I-5 bridge	field
Pied-billed Grebe	2	-	-	-	-	-	-	-
Green-backed Heron	-	-	-	1	-	-	-	-
Mallard	2	-	-	-	-	-	-	-
Black-sh. Kite	-	1?	-	-	-	-	-	-
Red-sh. Hawk	-	1?	-	-	-	-	-	-
California Quail	-	-	-	-	4	-	-	-
Common Moorhen	2	-	-	-	-	-	-	-
American Coot	1	-	-	-	-	-	-	-
Mourning Dove	-	5	-	-	3	-	-	-
White-th. Swift	-	-	-	-	-	-	30	-
Anna's Hummingbird	-	-	-	-	-	-	-	-
Nuttall's Woodpecker	-	-	-	-	1	-	-	-
Downy Woodpecker	-	1	-	-	-	-	-	-
Black Phoebe	-	3	-	-	1	-	-	-
Tree Swallow	-	10	-	-	5	-	-	-
N. Rough-w. Swallow	-	-	-	-	-	-	10	-
Cliff Swallow	-	-	-	-	-	-	70	-
Horned Lark	-	-	-	-	-	-	-	2?
Common Crow	-	2	-	-	-	-	-	-
Bushtit	-	15	5	-	10	4	-	-
Bewick's Wren	-	8	-	-	3	-	-	-
House Wren	-	3	-	-	1	-	-	-
Black-t. Gnatcatcher	-	-	3	-	-	1	-	-
Swainson's Thrush	-	-	-	-	1	-	-	-
Wrentit	-	5	3	-	-	2	-	-
Calif. Thrasher	-	-	3	-	-	-	-	-
Orange-cr. Warbler	-	5	-	-	2	-	-	-
Yellow Warbler	-	3	-	-	2	-	-	-
Common Yellowthroat	12	-	-	4	-	-	-	-
Yellow-br. Chat	-	8	-	-	2	-	-	-
Black-h. Grosbeak	-	1	-	-	1	-	-	-
Rufous-s. Towhee	-	8	-	-	3	-	-	-
Brown Towhee	-	-	3	-	-	2	-	-
Song Sparrow	10	20	-	5	10	-	-	-
Brown-headed Cowbird	-	8	-	-	4	-	-	-
Northern Oriole	-	-	-	-	1	-	-	-
House Finch	-	10	-	-	6	-	-	-
Lesser Goldfinch	-	4	-	-	3	-	-	-
American Goldfinch	-	10	-	-	4	-	-	-
<u>Total</u>	29	131	17	10	67	9	110	2
<u>Census Acreage</u>	2.74	10.32	8.04	1.14	2.76	3.44	-	2.98
<u>Breeding Birds/Acre</u>	10.6	12.7	2.1	8.8	24.3	2.6	-	0.67

San Mateo Creek.

The riparian habitat was by far the most important zone in the study area for breeding birds. Comparison of species composition and numbers with censuses conducted along the Santa Margarita River in 1982 (American Birds, 1982, censuses 130 - 133) show greatest similarity with the Willow Woodland with Dense Riparian Understory Census (133) which was the nearest census to the ocean along Santa Margarita River. Major differences between the census are that the Santa Margarita census was in a wetter area, as shown by presence of red-wing blackbirds and rails, and that the Santa Margarita census was in a younger stand of willows. Younger willows seem to be preferred by Bell's Vireo. Numbers of breeding birds observed per acre in the San Mateo Creek Study area are higher (12-14 per acre) than along the Santa Margarita River (6 per acre). This is due in part to the mixed habitat in the San Mateo study area, incorporating more coastal sage species.

It was thought during the study that breeding birds in the San Mateo census area would be affected by the constant noise from Interstate 5 and by the nearly constant presence of humans. While human activity undoubtedly kept breeding species on the beach and agricultural areas to a minimum, few humans were ever encountered in the vegetated parts of the study area. The constant freeway noise seems not to have reduced breeding or territorial activity.

6.0 MAMMALS

6.1 Introduction

The present study covers only terrestrial mammals. No attempt was made to survey bats or marine mammals.

6.2 Methodology

A variety of techniques were used to survey the terrestrial mammalian fauna of the San Mateo Creek study area. Direct visual observations were made in conjunction with other visits to the area on the average of twice a month from August, 1985 through June, 1986. In addition, pit traps were established for shrews (figure IV-1) and scent stations were established for carnivores (see figure VI-1). Trackways in mud areas along the edges of the agricultural fields and along the stream were regularly inspected. Finally, live traps were set out in several traplines (see figure VI-1).

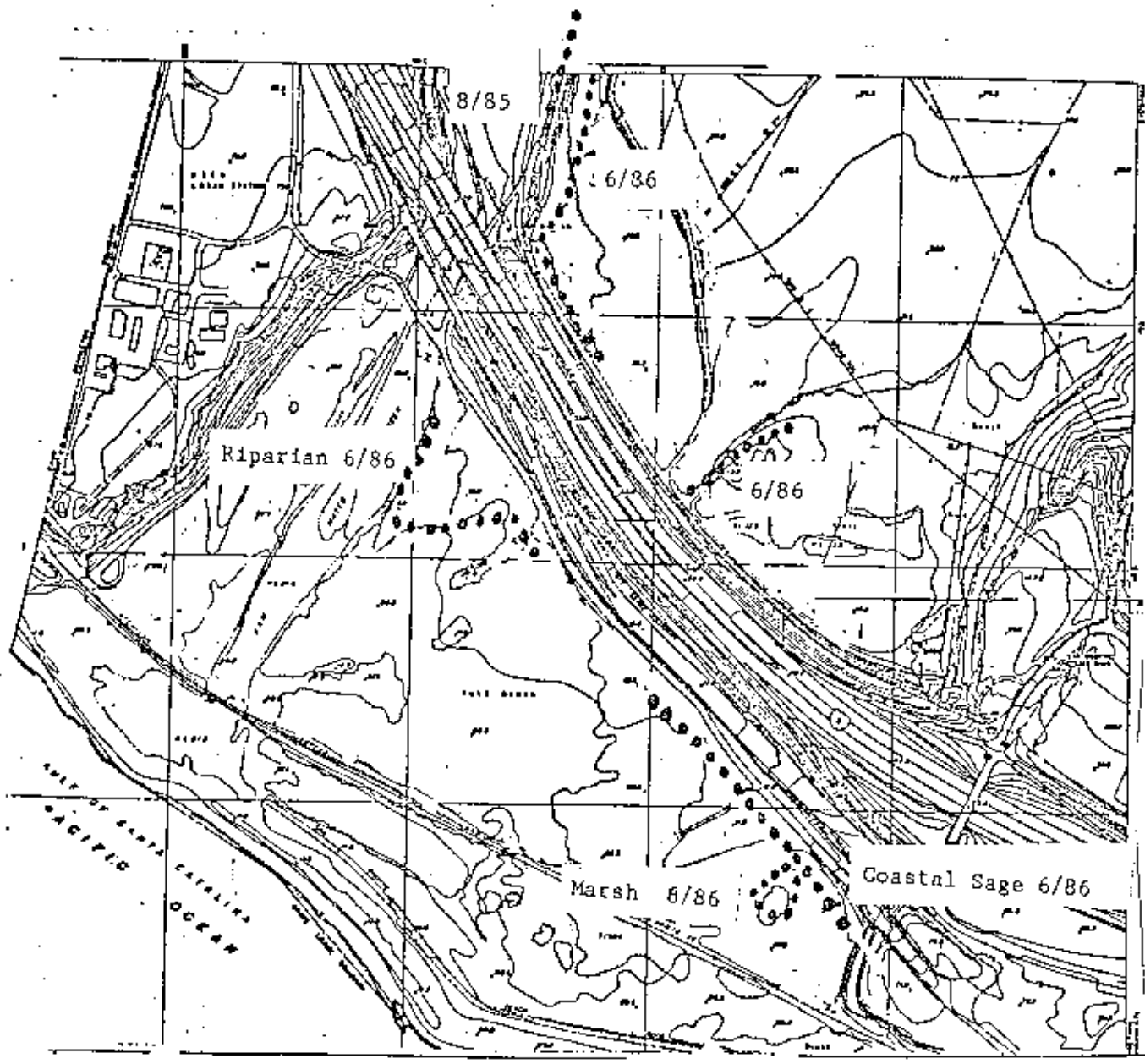
6.3 Results

A list of all species of mammals that, based on the range maps in Ingles (1965), might be expected to occur in the San Mateo Creek Study area is presented in table VI-1. Species observed in this study are indicated by a (+). The results of live trapping are presented on tables VI-2 and VI-3.

6.4 Discussion

Of the 28 species of terrestrial mammals that might be expected to occur in the San Mateo Creek Study Area, 17 actually were observed. The only real surprise in this list is the beaver (Castor canadensis). A beaver was found dead on the railroad right of way in August of 1985 and there was evidence of beaver activity and a beaver dam along San Mateo Creek below the Interstate 5 bridge. However, there was no sign of new beaver activity or evidence of beaver presence from August, 1985 until

Figure V-1. Mammal trap lines in the San Mateo Creek Study Area.



▬ trap line location

June, 1986 when new cuttings by beavers were found above the lagoon at the mouth of San Mateo Creek. It seems that beavers were absent from the study area most of the study period but recolonized it in June 1986.

The remainder of the San Mateo study area mammalian fauna is composed of species that have generally broad habitat requirements and might be expected in a coastal riparian, marsh and disturbed coastal sage area. Species not observed but expected fall into either one of two categories; species normally in low population densities and rarely encountered, such as shrews and some carnivores, and species that require a drier and less disturbed coastal sage habitat. In this latter category are the pocket mouse, kangaroo rat and jackrabbit, all of which occur in coastal sage habitat on the mesas upstream from the study area but did not venture into the study area itself during this study.

A group of 6-8 deer were regularly seen on both sides of Interstate 5, and a deer was hit by a train during the fall of 1985. A bobcat was also killed by a train during the fall and bobcat tracks were regularly observed along San Mateo Creek. Deer and racoon were especially numerous when corn was available in the fields east of Interstate 5.

Table VI-1. Mammals of the San Mateo Creek Study Area

Common Name	Scientific Name	Status
Common Opossum	<u>Didelphis marsupialis</u>	+
Ornate Shrew	<u>Sorex ornatus</u>	
Gray Shrew	<u>Notiosorex crawfordi</u>	
Broad-handed Mole	<u>Scapanus latimanus</u>	+
Black-tailed Hare	<u>Lepus californicus</u>	
Audubon Cottontail	<u>Sylvilagus audubonii</u>	+
Beechey Ground Squirrel	<u>Otospermophilus beecheyi</u>	+
Botta Pocket Gopher	<u>Thomomys bottae</u>	+
San Diego Pocket Mouse	<u>Perognathus fallax</u>	
California Pocket Mouse	<u>Perognathus californicus</u>	
Pacific Kangaroo Rat	<u>Dipodomys agilis</u>	
Beaver	<u>Castor canadensis</u>	+
Western Harvest Mouse	<u>Reithrodontomys megalotis</u>	+
Deer Mouse	<u>Peromyscus maniculatus</u>	+
Cactus Mouse	<u>Peromyscus eremicus</u>	+
Brush Mouse	<u>Peromyscus boylii</u>	
California Mouse	<u>Peromyscus californicus</u>	+
Dusky-footed Wood Rat	<u>Neotoma fuscipes</u>	+
California Vole	<u>Microtus californicus</u>	
House Mouse	<u>Mus musculus</u>	+
Gray Fox	<u>Urocyon cinereoargenteus</u>	
Coyote	<u>Canis latrans</u>	+
Raccoon	<u>Procyon lotor</u>	+
Long-tailed Weasel	<u>Mustela frenata</u>	
Striped Skunk	<u>Mephitis mephitis</u>	+
Spotted Skunk	<u>Spilogale putorius</u>	
Bobcat	<u>Lynx rufus</u>	+
Mule Deer	<u>Odocoileus hemionus</u>	+

+ = observed.

Table VI-2. Small Mammal Trapping Data. Total number of different individuals trapped over three days.

Date: Sept 12 - 14 , 1985 Weather ; 50 - 80 sunny, some high clouds

locality; wash above freeway - a loop from dirt road to freeway (see fig. VI-1).

line characteristics; 100 traps, 50 stations, 20 m apart -200 trap nights.

Species	habitat		
	wash	willows	coastal sage
<u>Reithrodontomys megalotis</u>	2	3	0
<u>Peromyscus maniculatus</u>	16	13	6
<u>Peromyscus californicus</u>	1	4	1
<u>Peromyscus eremicus</u>	1	4	1

One P. maniculatus had a baby in trap and several females looked pregnant

Table VI-3. Small Mammal Trapping Data. Total number of different individuals trapped over a Three Day Period.

Date: June 19 - 21 , 1986 Weather ; 60 - 80 sunny, some high clouds

Spacing; 2 traps every 100 ft., localities shown in figure VI-1.

Trap line:	coastal sage	marsh	riparian	East of I -5
Number of trap stations	28	10	12	41
Species				
<u>Peromyscus maniculatus</u>	30	5	9	46
<u>Peromyscus californicus</u>	21	2	22	22
<u>Reithrodontomys megalotis</u>	4	9	1	21
<u>Mus musculus</u>	1	-	-	-
<u>Neotoma fuscipes</u>	6	1	1	-

7.0 CONCLUSIONS AND RECOMMENDATIONS

Sensitive Species

The lower portion of the San Mateo Creek system provides several different habitats for plant and animal species. Fresh water marsh, riparian, freshwater stream and lagoon are all present. Although, most of the habitat is not disturbed, few listed sensitive species of plants and animals were present.

Of the 15 sensitive plant species that could occur within the study area, only Lotus nuttallianus (Nuttal's lotus) was found during this survey. It occurs at the base of the western bluff, below the U.S. Coast Guard station and above the railroad tracks.

The least Bell's vireo was the only sensitive animal found on the site. At least two sitings of this federally protected species occurred during fall migration. Neither bird was singing or had any evidence of nesting in the willows along San Mateo Creek. The riparian habitat along the creek is probably large enough to support several pairs of vireos but the area is probably too small to support a continuously viable population of this species. Also, a large number of cowbirds populate the area, and because nest parasitism by cowbirds presents a serious threat to the least Bell's vireo, an eradication program would be required to make the San Mateo system a viable habitat for least Bell's vireo.

The tidewater goby, Eucyclogobius newberryi has been collected from the stream within the past few years and it may still be present. In addition, the native crayfish (Pacifasticus lenesculus) is also present in the stream and lagoon. Pond turtles (Clemmys marmorata) are also present.

Although, not sensitive or protected, these species and many other animals such as mule deer, beaver, bobcat, skunk, and other large mammals populate this interesting portion of aquatic and riparian habitat on the

edge of the City of San Clemente. The preservation of habitat for birds and mammals in this area for the general enjoyment of these natural resources is strongly recommended.

Plant Control

A number of exotic plant species have become established in the San Mateo Creek area. Some of these species could be removed to improved the quality of the area's wildlife habitat and also its visual appearance as a natural area. Large stands of Arundo donax (giant reed) are present on the beach near the lagoon and along the stream channel. In addition, castor-bean (Ricinus communis), tamarisk (Tamarix ramosissima) and pampas grass (Cortaderia jubata) are unsightly, non-native species that, along with the giant reed, should be removed. Other introduced species such as Canary Island palm (Phoenix canariensis), myoporum (Myoporum laetum) and eucalyptus (Eucalyptus globulus) all provide some cover for birds and mammals, and probably could remain.

Access

The present limited access to the area along footpaths has kept impact of the marsh south of the I-5 bridge to a minimum. There is, however, considerable trampling of the coastal strand vegetation along the beach. In order to allow this increasingly rare community to maintain itself, we recommend some type of fencing of a portion of the dune habitat south of the railroad trestle and track. If giant reed was also removed from the beach area, a natural coastal strand community could be restored to this section of the San Mateo area.

Above the I-5 bridge, considerable impacts are present. The only native vegetation present on the valley floor appears to be present on wetland

soils that are too moist for crops. Several new cuts into the riparian vegetation were observed during the study and the presence of farm tractors and other vehicles probably reduces wildlife use of this portion of the study area.

If this upper portion of the study area were opened to camping, picnicing and other recreational use, further impacts from human presence, increased vehicular use, and other activities would undoubtedly occur. In the State of California's proposed plan for the area (Briner, 1984), a multiple use plan of the site was outlined. If the proposed hiking trails, campgrounds, picnic areas and increased vehicular access are implemented, the value of the area as a wildlife habitat will greatly decrease.

The presence of only a few listed rare, threatened, or endangered plant and animal species may be considered as a justification for increased disturbance of the area. It must be pointed out, however, that a sizeable amount of good quality habitat is present. Freshwater marsh and brackish marsh, riparian as well as coastal strand associations are rare in Orange and San Diego Counties. Most of the San Mateo Creek system has been preserved from development in the past and the loss of habitat as part of future plans to increase recreational areas to meet demands would be most unfortunate.

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Species	H	S	Aq	Mar	JM	JR	IS	WR	SCW	AC	AT	DF	CSb	CSS	Rud	CStr
POTAMOGETONACEAE - Pondweed Family																
Potamogeton pectinatus	P	K	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Ruppia maritima	P	V	+	-	-	-	-	-	-	-	-	-	-	-	-	-
SPARGANIACEAE																
Spartogonium eurycarpum	P	V	-	1	-	-	-	0-1	-	-	-	-	-	-	-	-
TYPHACEAE - Cat-Tail Family																
Typha domingensis	P	V	-	4	-	-	+	0-1	0-1	-	-	-	-	-	-	-
Typha latifolia	P	V	-	4	+	+	+	0-1	-	-	-	-	-	-	-	-
ZANNICHELLIACEAE - Horned-Pondweed Family																
Zannichellia palustris	P	V	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Subclass Dicotyledonae																
AIZOACEAE - Carpet-Woed Family																
Carpobrotus aequilateralis	P	V	-	-	0-2	0-2	-	-	-	-	-	-	-	0-1	+	0-2
*Carpobrotus edulis	P	SK	-	-	+	-	-	-	-	-	-	-	-	-	+	+
*Malephora procea	P	V	-	-	+	-	-	-	-	-	-	-	-	-	+	-
*Massambryanthemum crystallinum	A	V	-	-	+	-	-	-	-	-	-	-	-	0-1	-	0-1
*Massambryanthemum nodiflorum	A	V	-	-	-	-	-	-	-	-	-	-	-	0-1	-	0-1
*Tetragonia tetragonioides	A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	+
AMARANTHACEAE - Amaranth Family																
*Amaranthus albus	A	V	-	-	-	-	+	-	-	-	-	+	-	-	-	-
ANACARDIACEAE - Sumac Family																
Malosma laurina	S	V	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Rhus integrifolia	S	V	-	-	-	-	-	1	+	-	-	-	1	0-3	-	-
Rhus ovata	S	SK	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Schinus terebinthifolius	S,T	V	-	-	-	0-1	-	+	-	-	-	-	-	-	-	-
Toxicodendron radicans subsp. diversifolium	S,V	SK	-	-	1	+	-	1-2	2	-	-	0-2	1-2	0-1	+	+
APIACEAE - Carrot Family																
*Aptium graveolens	P	SK	-	-	-	-	-	1-3	+	-	-	-	1	-	-	-
*Conium maculatum	B	V	-	-	-	-	-	1-2	1-2	0-1	-	1-2	-	0-1	-	-

Species	Common Name	H	S	Aq	Mar	JM	JR	IB	WR	SDW	AC	AT	OF	CSb	CSS	Rud	C9tr
<i>Encelle californice</i>	California Encelle	S	V	-	-	-	-	-	-	-	-	-	-	-	+2	-	-
<i>Eriophyllum confertiflorum</i>	Long-Stem Golden-Yarrow	HS	V	-	-	-	-	-	-	-	-	-	+	-	+	-	-
var. <i>confertiflorum</i>																	
<i>Filago californica</i>	California Filago	A	S	-	-	-	-	+	-	-	+1	+	-	-	-	-	-
* <i>Filago gallica</i>	Narrow-Leaf Filago	A	S	-	-	-	-	-	-	-	+	-	-	-	-	-	-
<i>Gnaphalium beneolens</i>	Fragrant Everlasting	P	K	-	-	-	-	-	-	-	-	-	-	-	+	-	-
<i>Gnaphalium bicolor</i>	Bicolor Cudweed	B,P	V	-	-	-	-	-	-	-	0-1	-	-	-	+	-	+
<i>Gnaphalium californicum</i>	California Everlasting	B	V	-	-	-	-	-	-	-	-	-	-	-	+	-	-
<i>Gnaphalium leuccephalum</i>	White-Head Cudweed	S	V	-	-	-	-	-	-	-	+1	1-2	-	-	-	-	-
* <i>Gnaphalium luteo-album</i>		P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gnaphalium microcephalum</i>	White Everlasting	B,P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gnaphalium palustre</i>	Lowland Cudweed	A	V	-	-	-	-	1	-	-	-	-	-	-	-	-	0-1
<i>Gnaphalium stramineum</i>	Cotton-Button Plant	A,B	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Helenium puberulum</i>	Sneezeweed	A,B	V	-	-	-	-	-	0-1	-	-	-	-	-	-	-	-
<i>Hemizonia fasciculata</i>	Fasciated Yarrow	A	V	-	-	-	-	-	-	-	-	-	-	-	+	-	-
<i>Heterotheca grandiflora</i>	Telegaph Weed	A,B	V	-	-	-	-	-	-	-	+1	0-1	-	-	-	-	-
* <i>Hypochaeris glabra</i>	Smooth Cat's-Ear	A	V	-	-	-	-	+	+	-	0-1	-	-	-	-	-	-
<i>Isocoma venata</i>	Coastal Goldenbush	S	V	-	-	-	-	-	-	-	0-1	-	1	+	0-2	-	0-2
subsp. <i>vernonioides</i>																	
<i>Iva oxillaris</i>	Western Marsh-Elder	P	S	-	+	-	-	-	-	-	-	-	-	-	-	-	-
subsp. <i>robustior</i>																	
<i>Jaumea carnosa</i>	Salty Susan, Fleshy Jaumea	P	V	-	-	-	3-4	0-4	-	-	-	-	-	-	-	-	-
* <i>Lactuca scariola</i>	Wild Lettuce	A	V	-	-	-	-	-	0-2	-	-	-	-	-	-	+	-
var. <i>integrata</i>																	
<i>Lepidosperum squamatum</i>	Scalo Broom	S	V	-	-	-	-	-	-	-	0-1	1-2	-	-	-	-	-
* <i>Osteospermum fruticosum</i>	Freeway Daisy	P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Pteris ochtoides</i>	Bristly Ox-Tongue	A	V	-	-	-	-	-	+	-	-	-	-	-	-	+	-
<i>Pluchea odorata</i> var. <i>odorata</i>	Salt-Marsh Fleabane	A,P	V	-	-	-	+	+	+1	-	-	-	-	-	-	-	-
* <i>Sunecio mikanioides</i>	German Ivy	P	V	-	-	-	-	+	+	-	-	-	-	-	-	-	-
* <i>Sonchus vulgaris</i>	Common Groundsel	A	V	-	-	-	-	+	+	-	0-1	-	-	-	-	-	-
* <i>Silybum marianum</i>	Milk-Thistle	A	SK	-	-	-	-	+	+	-	-	-	+	-	-	+	-
<i>Solidago occidentalis</i>	Western Goldenrod	P	V	-	-	-	+	+	+	-	-	-	-	-	-	-	-
* <i>Sonchus asper</i>	Spiny-Leaf Sow-Thistle	A	V	-	-	-	-	-	+2	+	-	-	-	+	-	-	-
* <i>Sonchus oleraceus</i>	Common Sow-Thistle	A	V	-	-	-	-	-	-	-	+	-	+	-	+	-	+
<i>Stephanomeria diegenata</i>	San Diego Wreath-Plant	A	V	-	-	-	-	-	-	-	+	0-1	-	-	+	-	-
<i>Stephanomeria virgata</i>	Virgate Wreath-Plant	A	V	-	-	-	-	-	-	-	+	-	+	-	+	-	-
<i>Stylocline gnaphalioides</i>	Everlasting Nest-Straw	A	V	-	-	-	-	-	-	-	+	-	+	-	+	-	+

Species	Common Name	H	S	Aq	Mar	JM	JR	IS	WR	SCW	AC	AT	DF	DSB	CSS	Rud	DBtr	
<i>Opuntia oricola</i>		S	SK	-	-	-	-	-	-	-	-	-	-	-	+	+	-	
<i>Opuntia prolifera</i>	Coastal Cholla	S	SK	-	-	-	-	-	-	-	-	-	-	-	+	+	-	
CANNABACEAE																		
* <i>Cannabis sativa</i>	Hemp, Marijuana	A	V	-	-	-	-	-	+	-	-	-	-	-	-	-	-	
CAPPARACEAE - Capar Family																		
<i>Cleome leonaria</i>	Bladderpod	S	V	-	-	-	-	-	+	+	-	-	+1	+	1-2	-	-	
CAPRIFOLIACEAE - Honeysuckle Family																		
<i>Sambucus mexicana</i>	Desert Elderberry	T	V	-	-	-	-	-	+2	1-2	-	-	+2	-	0-2	-	-	
CARYOPHYLLACEAE - Pink Family																		
<i>Polycarpon depressum</i>	California Polycarp	A	V	-	-	-	-	-	-	-	+	-	-	-	-	-	-	
<i>Silene</i>		P	V	-	-	-	-	-	-	-	-	-	+	-	-	-	-	
<i>Spergularia macrotheca</i> var. <i>macrotheca</i>	Sticky Sand-Spurry	P	V	-	-	-	-	-	-	-	-	-	-	-	+	-	-	
<i>Spergularia marina</i>	Salt Marsh Sand-Spurry	A	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	
* <i>Stalleria media</i>	Common Chickweed	A	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	
CHENOPODIACEAE - Goosefoot Family																		
<i>Atriplex lentiformis</i> var. <i>breweri</i>	Dwarf Saltbush	S	V	-	-	2	-	-	-	-	-	-	+	-	-	-	0+	
* <i>Atriplex patula</i> subsp. <i>haetata</i>	Halberd-Leaf Saltbush	A	V	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
* <i>Atriplex semibaccata</i>	Australian Saltbush	P	V	-	-	+	-	-	-	-	-	-	-	-	-	+	+	
* <i>Chenopodium album</i>	Lamb's Quarters	A	V	-	-	-	-	-	-	-	-	-	-	-	-	+	-	
* <i>Chenopodium ambrosioides</i> var. <i>ambrosioides</i>	Mexican Tea	A	V	-	-	-	-	+	-	-	+	+	-	-	-	-	-	
<i>Chenopodium berlandieri</i> var. <i>sinuatum</i>	Pitted Goosefoot	A	V	-	-	-	-	+	-	-	-	-	+	-	-	-	-	
<i>Chenopodium californicum</i>		P	V	-	-	-	-	-	-	-	-	-	-	-	0+	-	-	
* <i>Chenopodium murale</i>	Nettle-Leaf Goosefoot	A	V	-	-	-	-	-	0+	-	-	-	-	-	-	-	+	
* <i>Chenopodium rubrum</i>		P	V	-	-	-	-	+	-	-	-	-	-	-	-	+	-	
<i>Salicornia virginica</i>	Woody Glasswort	S	V	-	-	2	-	-	-	-	-	-	-	-	-	-	-	
* <i>Salsola australis</i>	Russian-Thistle	A	V	-	-	-	-	-	-	-	-	-	-	-	+	+	+	

Species	Common Name	H	S	Aq	Mar	JM	JR	IS	WR	SCW	AC	AT	OF	CSb	CSS	Rud	CStr
GERANIACEAE - Geranium Family																	
*Erodium cicutarium	Red-Stem Filarea	A	V	-	-	-	-	-	-	-	+	+	-	-	-	+	-
Geranium dissectum/carolinianum		A	V	-	-	-	-	-	-	-	-	-	-	-	0+	-	-
GROSSULARIACEAE - Currant Family																	
Ribes speciosus	Fuchsia-Flower Gooseberry	S	V	-	-	-	-	-	+	+	-	-	-	1	-	-	-
HYDROPHYLLACEAE - Waterloof Family																	
Erodium cicutarium	Verbe Santa	S	V	-	-	-	-	-	-	-	0+	-	0+	-	0+	-	-
Eucryphia chrysanthemifolia		A	V	-	-	-	-	-	-	-	-	-	+	-	0+	-	-
Nemophila pedunculata		A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phacelia cicutaria	Caterpillar Phacelia	A	V	-	-	-	-	-	+	+	-	-	-	-	-	-	-
var. hispida																	
Phacelia grandiflora		A	V	-	-	-	-	-	-	-	-	-	-	-	0+	-	-
Phacelia minor	Wild Canterbury-Bell	A	V	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Phacelia suffrutescens		P	V	-	-	-	-	-	+	+	0+	-	+	-	-	-	-
LAMIACEAE - Mint Family																	
Marrubium vulgare	Horehound	HS	SK	-	-	-	-	-	-	-	-	-	1	-	+	-	-
Salvia apiana var. apiana	White Sage	S	SK	-	-	-	-	-	-	-	-	0+	-	-	0+	-	-
Salvia mellifera	Black Sage	S	SK	-	-	-	-	-	-	0+	0+	-	1	0+	0+	-	-
Stachys rigida subsp. rigida	Hedge-Nettle	P	V	-	-	-	-	-	+	+	-	-	-	-	-	-	-
LYTHRACEAE - Loosestrife Family																	
Lythrum californicum		P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lythrum hyssopifolium	Grass Poly	P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MALVACEAE - Mallow Family																	
*Malva parviflora	Cheeseweed	A	V	-	-	-	-	-	-	-	+	-	-	-	-	+	-
NYOPORACEAE																	
*Nyoporum laetum		S	V	+	-	0-1	-	-	0-2	-	-	-	-	-	-	-	-
MYRTACEAE - Myrtle Family																	
*Eucalyptus globulus	Tasmanian Blue Gum	T	V	-	-	-	-	-	-	-	-	-	0-1	-	0+	-	-

Species	Common Name	H	S	Aq	Mar	JM	JR	IB	WR	SCW	AC	AT	DF	CSb	CSS	Rud	CStr
NYCTAGINACEAE - Four-O'Clock Family																	
<i>Abrotia maritima</i>	Red Sand-Verbena	P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Mitrobia californica</i> var. <i>californica</i>	Coastal Wishbone Plant	P	V	-	-	-	-	-	-	-	-	-	-	-	0-1	-	-
OLEACEAE - Olive Family																	
<i>Fraxinus velutina</i> var. <i>coriacea</i>	Ash	T	V	-	-	-	-	-	r	+1	-	-	-	-	-	-	-
CNAGRACEAE - Evening-Primrose Family																	
<i>Camissonia biortata</i>	Southern Sun Cup	A	V	-	-	-	-	-	-	-	+	-	-	-	+	-	-
<i>Camissonia chatranthifolia</i> subsp. <i>suffruticosa</i>	Beach Evening-Primrose	P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Camissonia robusta</i>		A	V	-	-	-	-	-	-	-	+	-	-	-	+	-	-
<i>Camissonia lowisii</i>		A	V	-	-	-	-	-	-	-	+	-	-	-	-	-	-
<i>Epilobium adenocaulon</i>	Willow-Herb	P	V	-	-	-	-	+	+	-	-	-	-	-	-	-	-
<i>Epilobium ciliatum</i> subsp. <i>ciliatum</i>	Willow-Herb	P	V	-	-	-	-	+	+	-	-	-	-	-	-	-	-
<i>Ludwigia populoides</i> subsp. <i>peploides</i>	Willow Water-Weed	P	V	+	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Oenothera elata</i> H.B.K. subsp. <i>hirsutissima</i>	Great Marsh Evening Primrose	P	SK	-	-	+	-	-	-	-	-	-	-	-	-	-	-
OXALIDACEAE - Wood-Sorrel Family																	
* <i>Oxalis corniculata</i> subsp. <i>corniculata</i>	Yellow Sorrel	P	V	-	-	-	-	-	-	-	-	-	-	-	-	+	-
* <i>Oxalis cernua</i>	Sandwich-Buttercup	P	V	-	-	-	-	-	-	-	-	-	-	-	-	+	-
PAPAVERACEAE - Poppy Family																	
<i>Echscholtzia caespitosa</i>	Tufted Gold-Poppy	A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PLANTAGINACEAE - Plantain Family																	
* <i>Plantago lanceolata</i>	Rig-Bress	P	V	-	-	-	-	-	+	-	-	-	-	-	-	+	-
* <i>Plantago major</i>	Common Plantain	P	V	-	-	-	-	-	+	-	-	-	-	-	-	+	-
PLATANACEAE - Plane Tree Family																	
<i>Platanus racemosa</i>	California Sycamore	T	V	-	-	-	-	-	-	r-2	p	-	+	-	-	-	-

Species	Common Name	R	S	Aq	Mar	JF	JR	IS	WR	SCW	AC	AT	DF	ESB	ESS	Rud	ESR
POLYGONACEAE - Buckwheat Family																	
<i>Eriogonum fasciculatum</i>	Flat-top Buckwheat	S	V	-	-	-	-	-	-	-	+	-	-	-	Dist	-	-
subsp. fasciculatum																	
<i>Eriogonum parvifolium</i>	Bluff Buckwheat	S	K	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Parsifloria amphibie</i>	Marsh Knotweed	P	V	-	+	-	-	+	-	-	-	-	-	-	-	-	-
var. emersa																	
<i>Parsifloria leptophyllum</i>	Willow Smartweed	A	V	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Parsifloria punctata</i>	Perennial Smartweed	P	V	-	-	-	-	+	-	-	-	-	-	-	-	-	-
* <i>Polygonum arenastrum</i>	Yard Knotweed	A	V	-	-	-	-	-	-	-	+	-	-	-	-	-	+
<i>Pterostegia drymarioides</i>	Granny's Hairnet	A	V	-	-	-	-	-	+	-	-	-	-	-	-	-	+
* <i>Rumex crispus</i>	Curly Dock	B,P	V	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Rumex salicifolia</i>	California Dock	P	V	-	-	-	-	+	-	-	-	-	-	-	-	-	-
var. denticulatus																	
<i>Rumex salicifolia</i>	Willow Dock	P	V	-	-	-	-	+	-	-	-	-	-	-	-	-	-
var. salicifolia																	
PORTULACACEAE - Purslane Family																	
* <i>Portulaca oleracea</i>	Common Purslane	A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PRIMULACEAE - Primrose Family																	
* <i>Anagallis arvensis</i>	Scarlet Pimpernel	A	SK	-	-	-	-	-	+	-	-	-	-	-	-	-	-
<i>Semulus parviflorus</i>	Water-Pimpernel	P	V	+	-	-	-	-	-	-	-	-	-	-	-	-	-
RANUNCULACEAE - Crow-foot Family																	
<i>Clematis pauciflora</i>	Small-Leaf Virgin's-Bower	V	V	-	-	-	-	-	+	+	-	-	-	-	-	-	-
<i>Thalictrum polycarpum</i>	Meadow-Rue	P	V	-	-	-	-	-	+	+	-	-	-	-	-	-	-
ROSACEAE - Rose Family																	
<i>Heteromeles arbutifolia</i>	Toyon	S	V	-	-	-	-	-	-	+	-	-	-	-	-	-	0-3
<i>Potentilla glandulosa</i>	Sticky Cinquefoil	P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	+
subsp. glandulosa																	
<i>Rosa californica</i>	California Rose	S	V	-	-	-	-	-	+	+	-	-	-	-	-	-	-
<i>Rubus ursinus</i>	California Blackberry	V	K	-	-	-	-	-	+	+	-	-	-	-	-	-	-

Species	H	S	Aq	Mar	JM	JR	IS	WR	SCW	AC	AT	OF	CSb	CSS	Rud	CStr
RUBIACEAE - Bedstraw Family																
<i>Galium angustifolium</i>	P	V	-	-	-	-	-	-	-	-	-	+	-	-	-	-
subsp. <i>angustifolium</i>																
* <i>Galium aparine</i>	A	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Galium nuttallii</i>	P	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
subsp. <i>nuttallii</i>																
SALICACEAE - Willow Family																
<i>Populus fremontii</i>	T	V	-	-	-	-	-	-	3	-	-	-	-	-	-	-
var. <i>fremontii</i>																
<i>Populus trichocarpa</i>	T	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
subsp. <i>trichocarpa</i>																
<i>Salix hindsiana</i>	S	V	-	-	-	-	2	-	-	-	0+	-	-	-	-	-
var. <i>leucodendroides</i>																
<i>Salix laevigata</i>	S,T	V	-	-	-	-	-	1-2	0-1	+2	0-1	-	-	-	-	-
<i>Salix lasiolepis</i>	S,T	V	-	0+	+1	0-2	1	4-5	2	+2	-	-	+2	-	-	-
<i>Salix lasiolepis</i>	T	V	-	-	-	-	+	-	-	-	-	-	-	-	-	-
var. <i>lastandra</i>																
SAURACEAE																
<i>Anemopsis californica</i>	P	SK	-	-	+	2-3	-	+2	+2	-	-	-	-	-	-	-
SCROFULARIACEAE - Figwort Family																
<i>Antirrhinum nuttallianum</i>	B	V	-	-	-	-	-	-	-	-	-	-	-	-	0+	-
<i>Castilleja stenantha</i>	A	V	-	-	-	+	-	-	-	-	-	-	-	-	-	-
<i>Diplacus aurantiacus</i>	S	V	-	-	-	-	-	-	+	-	-	-	-	-	0+	-
subsp. <i>australis</i>																
<i>Diplacus puniceus</i>	S	V	-	-	-	-	-	-	-	-	-	-	+	-	-	-
<i>Mimulus cardinalis</i>	P	V	+	-	-	+	-	-	-	-	-	-	-	-	-	-
<i>Mimulus floribundus</i>	A	SK	-	+	-	-	-	-	-	-	-	-	-	-	-	-
var. <i>floribundus</i>																
<i>Mimulus nasutus</i>	A,P	V	-	-	-	+	-	-	-	-	-	-	-	-	-	-
<i>Mimulus pilosus</i>	A	V	-	-	-	+	-	-	-	-	-	-	-	-	-	-
<i>Scrophularia californica</i>	P	V	-	-	-	-	-	9+	-	-	-	-	-	+	-	-
var. <i>floribunda</i>																
<i>Veronica anagallis-aquatica</i>	P	V	+	-	-	+	-	-	-	-	-	-	-	-	-	-

Species	Common Name	H	S	Aq	Mar	JM	JR	IS	WR	SCW	AC	AT	OF	CSb	CSS	Rud	CStr	
SOLANACEAE - Potato Family																		
Datura wrightii	Thorn-Apple, Jimsonweed	P	V	-	-	-	-	-	-	-	+	-	1	-	0-+	-	-	
Lycium californicum	California Desert Thorn	S	V	-	-	-	-	-	-	-	-	-	-	-	0-1	-	-	
*Nicotiana glauca	Tree Tobacco	S,T	V	-	-	-	-	-	-	-	0-1	-	-	-	-	-	-	
Nicotiana clevelandii	Cleveland's Tobacco	S,T	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nicotiana bigelovii var. waltacei	Wallace's Tobacco	S,T	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Solanum douglasii	Douglas' Nightshade	P	V	-	-	-	-	-	+1	-	-	-	0-+	-	-	-	-	
Solanum elaeagnifolium	White Nightshade	A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TAMARICACEAE - Tamarisk Family																		
*Tamarix racemosa	Tamarisk	S,T	V	-	-	2	-	+1	0-+	0-+	0-1	0-+	-	-	-	-	-	
URTICACEAE - Nettle Family																		
Hesperochinida tenella	Western Nettle	A	V	-	-	-	-	-	-	-	-	-	-	-	0-+	-	-	
*Soleirolia soleirolif	Hoery Nettle	A	V	-	-	-	-	-	-	-	-	-	-	0-+	0-+	-	-	
Urtica dioica subsp. holosericea	Dwarf Nettle	P	SK	-	-	0-+	-	-	+1	+1	-	-	-	-	-	-	-	
*Urtica urens	Dwarf Nettle	A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	+	
VERBENACEAE - Verbena Family																		
Verbena lasiostachys	Western Vervain	P	V	-	-	-	-	-	+	-	-	-	-	+	-	-	-	

TOTAL SPECIES	13	14	40	21	66	106	45	77	38	51	23	25	56	32
INTRODUCED SPECIES	3	0	12	3	21	33	7	34	16	21	2	23	44	14

SUMMARY

	Growths Form
Total Species =	316
Total Introduced Species =	97
Total Families =	74
Annuals =	119
Biennials =	18
Perennials =	138
Half-Shrubs =	4
Shrubs =	48
Trees =	16

Species	Common Name	H	S	Aq	Mar	JM	JR	IS	WR	SCW	AC	AT	OF	CSb	CSS	Rud	DStr
SOLANACEAE - Potato Family																	
Datura wrightii	Thorn-Apple, Jimsonweed	P	V	-	-	-	-	-	-	-	+	-	1	-	0+	-	-
Lycium californicum	California Desert Thorn	S	V	-	-	-	-	-	-	-	-	-	-	-	0-1	-	-
*Nicotiana glauca	Tree Tobacco	S,T	V	-	-	-	-	-	-	-	0-1	-	-	-	-	-	-
Nicotiana glauca	Cleveland's Tobacco	S,T	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nicotiana bigelovii	Mullein's Tobacco	S,T	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
var. wallecei																	
Solanum douglasii	Douglas' Nightshade	P	V	-	-	-	-	-	+-1	-	-	-	0+	-	-	-	-
Solanum americanum	White Nightshade	A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YAMARICACEAE - Tamarisk Family																	
*Tamarix ramosissima	Tamarisk	S,T	V	-	-	2	-	+-1	0+	0+	0-1	0+	-	-	-	-	-
URTICACEAE - Nettle Family																	
Hesperochloa tenella	Western Nettle	A	V	-	-	-	-	-	-	-	-	-	-	-	0+	-	-
*Soleirolia soleirolif		A	V	-	-	-	-	-	-	-	-	-	-	0+	0+	-	-
Urtica dioica	Hoary Nettle	P	SK	-	-	0+	-	-	+-1	+-1	-	-	-	-	-	-	-
subsp. holosericea																	
*Urtica urens	Dwarf Nettle	A	V	-	-	-	-	-	-	-	-	-	-	-	-	-	+
VERBENACEAE - Verbena Family																	
Verbena leuostachys	Western Yervain	P	V	-	-	-	-	-	+	-	-	-	-	+	-	-	-
SUMMARY																	
Total species				13	14	40	21	66	108	45	77	38	51	23	85	56	32
Introduced species				3	0	12	3	21	33	7	34	18	21	2	23	44	14

Totals

Total Species = 316
 Total Introduced Species = 97
 Total Families = 74
 Annuals = 119
 Biennials = 18
 Perennials = 136
 Half-Shrubs = 4
 Shrubs = 45
 Trees = 16
 Vines = 8
 Parasites = 2

Table X. Previous Bird Observations in San Mateo Creek Area.

The following is based on a review of Quitt, 1984. The Birds of San Diego County. Memoir 13. San Diego Society of Natural History.

Most published records are from Dixon, 1906. Land Birds of San Onofre, California. Condor 8:91-98. His records are for a six mile radius from the San Onofre railroad station, on the coast. Therefore, many records are for upstream of the study area. For instance, his record of Peregrine falcon nesting is for 5 miles from the railroad; well inland from the study area. Unpublished records are based on recent bird observations turned in to Unitt.

Species	published		unpublished	
	definite breeding	probably breeding	definite breeding	probably breeding
Great Blue Heron	x Willet, 1912 - two small colonies in 1905			
Turkey Vulture	formerly			
Cooper's Hawk		x	x	
Red-shouldered Hawk		x	x	
Red-tailed Hawk	x		x	
American Kestrel	x			
Peregrine Falcon	x (5 miles upstream)			
California Quail	x			
Least Tern	x 1981 1 pr at mouth of San Mateo River in Unitt			
Mourning Dove		x		
Greater Roadrunner		x		
Barn Owl	x			
Western Screech Owl		x		
Great Horned Owl	x			
Burrowing Owl		x formerly		
Lesser Nighthawk		x		
White-th. Swift		x		
Black-chinned Hummingbird		x	x	
Acorn Woodpecker		x		
Nuttall's Woodpecker		x		
Common Flicker		x		
Black Phoebe	x			
Ash-throated Flycatcher		x		
Western Kingbird	x			
Horned Lark		x		
Tree Swallow	x formerly			
Purple Martin	x in the "horno area"			
Cliff Swallow	x			
Scrub Jay		x		
American Crow	x			
Common Raven	x			
Bell's Vireo				x
Plain Titmouse		x		
Common Bushtit		x		
Cactus Wren	x			
Marsh Wren				x
House Wren	x			
Northern Mockingbird	x			
California Thrasher		x		

APR 15 1999

Table X (cont'd)

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Species	published		unpublished	
	definite breeding	probably breeding	definite breeding	probably breeding
Western Bluebird	x			
Wrentit				x
American Goldfinch				
Lesser Goldfinch		x	x	
House Finch		x		
Common Yellowthroat	x			
Black-headed Grosbeak		x		
Blue Grosbeak		x		
Brown Towhee		x		
Lark Sparrow	x			
Song Sparrow		x		
Western Meadowlark	x			
Red-winged Blackbird		x		
Tricolored Redwing	x			
Brewer's Blackbird	x			
Northern Oriole	x			

x 100 prs in 1935 (Neff, 1937 Condor)