LAKE LOS CARNEROS COUNTY PARK
GOLETA, SANTA BARBARA COUNTY, CALIFORNIA

1999 UPDATED MANAGEMENT PLAN

Prepared for:

Santa Barbara County Parks Dept.
610 Mission Canyon Road
Santa Barbara, CA 93105

Contact: Coleen Lund
(805) 568-2461

Prepared by:

Hunt & Associates
Consulting Biologists
5290 Overpass Rd., Ste 108
Santa Barbara, CA 93111

Contact: Lawrence E. Hunt
(805) 967-8512

25 January 2000

TABLE OF CONTENTS

Tables

TABLE OF CONTENTS (continued)

Figures

Appendices

LAKE LOS CARNEROS COUNTY PARK
LAKE MANAGEMENT PLAN
1999 UPDATE

1.0 INTRODUCTION

This management plan evaluates several maintenance activities by the Santa Barbara County Parks Department on Lake Los Carneros, a man-made reservoir in Lake Los Carneros County Park in Goleta, California. This plan details the wildlife resources inhabiting the park, with an emphasis on sensitive species. This plan recognizes the biological and recreational value of the lake and its resources and proposes several management recommendations that will enhance these resources. These management recommendations are based on the goal of maintaining high-quality wildlife habitat in the park, while allowing moderate-intensity recreational use.

Previous management plans (i.e., the Lake Los Carneros Limnological and Management Study (Fast and Glenn, 1978) and addendum (Penfield and Smith, 1983), the Final EIR for the Lake Los Carneros Master Plan (Planning Land Use Services, 1986) and the Lake Los Carneros Natural and Historical Preserve Study (Penfield and Smith et al 1987), focused on recreational uses of the park. This plan maintains a balance between the biological and recreational uses of the park.

This document updates information on the status of wildlife resources known or expected to occur within and around Lake Los Carneros, to formulate management recommendations for four proposed County Parks activities in and around Lake Los Carneros. These activities are: (a) tule control; (b) control of sediment input and sediment removal; (c) mosquito control, and; (d) maintenance of water quality for aesthetic and recreational (fishing) purposes.

2.0 REGULATORY SETTING

A number of federal, state, and local regulations have been enacted to protect specific biological resources and natural habitats. These are summarized below. Several local plans, policies, and regulations that address environmental protection issues in coastal regions were initiated by federal and state laws and/or regulations.

Besides the local land use control authority, five state and federal agencies also have jurisdiction over the wildlife resources in the project area. The Army Corps of Engineers has jurisdiction over the discharge of materials into wetlands and waters of the United States under Section 404 of the Clear Water Act. The United States Environmental Protection Agency has oversight responsibilities related to 404 permits, while Section 401 of the Clean Water Act provides for certification of permitted actions under Section 404 by the State Regional Water Quality Control Board. The Army Corps of Engineers must consult with the U.S. Fish and Wildlife Service regarding the issuance of 404 permits, and the U.S. Fish and Wildlife Service has also issued wetland mitigation policies. Local California Department of Fish and Game representatives are also required to be consulted regarding the issuance of Section 404 permits. The California Department of Fish and Game is considered a trustee agency under CEQA, with the responsibility of protecting the biological resources of California. The California Department of Fish and Game also has authority under Section 1600 et. seq., of the Fish and Game Code to reach an agreement regarding conservation of fish and wildlife resources whenever a project alters the natural flow or bed, channel, or bank of any river, stream, or lake. The U.S. Fish and Wildlife

Service and the California Department of Fish and Game also have regulatory authority over any endangered or threatened species that may occur at the project site under their respective Endangered Species Acts, as discussed below.

2.1 Federal Regulations

Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.). Protects threatened or endangered species, as listed by the U.S. Fish and Wildlife Service (USFWS), from unauthorized take, and directs Federal agencies to ensure that their actions do not jeopardize the continued existence of such species. Section 7 of the Act defines Federal agency responsibilities for consultation with the USFWS. The Act requires preparation of a Biological Assessment to address the effects on listed species and species proposed for listing of a project requiring an EIS.

Migratory Bird Treaty Act of 1972, (16 U.S.C. Sections 703 through 711). Protects migratory waterfowl and all seabirds by limiting the transportation, importation, kill, or possession of those birds.

Clean Water Act of 1977, (33 U.S.C. 1251 et seq.). Provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the Act prohibits the discharge of dredged or fill materials into waters of the U.S., including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers and Environmental Protection Agency. A National Pollution Discharge Elimination System (NPDES) permit is required for all discharges to reduce pollution that could affect any form of life. The California Regional Water Quality Control Boards implement NPDES requirements.

Executive Order 11990, Protection of Wetlands. Requires governmental agencies to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out their responsibilities. Each agency is to consider factors relevant to a project proposal's effect on the survival and quality of the wetlands by maintenance of natural species and habitat diversity and stability, hydrologic utility, fish, and wildlife. Agencies are required to provide for early public review of any plans or proposals for new construction in wetlands.

2.2 State Regulations

California Environmental Quality Act (CEQA) of 1970 (Public Resources Code Section 21000-21177; Guidelines at Section 15000 et seq.). Provides that a plant or animal not included on state lists shall nevertheless be considered to be endangered if the species can be shown to meet the criteria for listing under the Endangered Species Act (see below). In the mandatory findings of significance (para. 15065), CEQA states that, "...any project which reduces the number or restricts the range of a rare plant or animal is significant." CEQA requires the preparation of an Environmental Impact Report (EIR) for projects that may significantly affect the environment.

California Endangered Species Act of 1984 (as amended Sept. 1984, California Fish and Game Code Section 2050 - 2098, and California Native Plant Protection Act of 1977, California Fish and Game Code Sections 1900 - 1913). State agencies are required to consult with CDFG on actions that may affect rare, threatened, or endangered species and candidate species (those under formal review for listing by the Fish and Game

Commission). Recent amendments now require state lead agencies to consult with the California Department of Fish and Game if a project may affect a state-listed endangered or threatened species.

California Fish and Game Code (Sections 1601 and 1603 - Streambed Alteration Agreement). Regulate developments in onshore waters, including intermittent streams. Section 1603 requires that private entities obtain a Streambed Alteration Agreement from the CDFG prior to undertaking any construction activity within streambeds, including all intermittent as well as perennial streams. Section 1601 imposes similar requirements on state and local government agencies. Through this agreement CDFG attempts to ensure than any approved construction activity is protective of stream resources through design, construction planning, and specific mitigation measures.

Coastal Act of 1976 (California Public Resources Code, Section 30000 et seq.). Regulates development and provides protections for biological resources in the coastal zone. Provisions of the act related to onshore biological resources are administered at the county level. General Coastal Act policies that address issues of environmental protection include:

- **Policy 30231** - "The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained, and where feasible, restored..."

- **Policy 30233** - "The diking, infilling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division..."

- **Policy 32040** - a) "Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas. b) Development in areas adjacent to environmentally sensitive habitat areas...shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas."

The Coastal Act defines an "environmentally sensitive area" in Section 30107.5 as any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

2.3 Local Plans, Policies, and Ordinances

Santa Barbara County Comprehensive Plan of 1982. This document contains several elements that include recommendations for protecting biological resources, including: Land Use Element (1982), Conservation Element (1979), and Environmental Resources Management Element (1982). The Land Use Element includes policies to protect hillsides and watersheds, streams and creeks, and flood hazard areas. The Conservation Element discusses sensitive species and communities and provides recommendations for their management. The County Environmental Thresholds and Guidelines Manual (1992), establishes criteria for determining the significance of potential impacts to biological resources from a project. The Guidelines also include protection of (a) trees; (b) habitats, areas, or species protected by state and federal laws, including reserves, county parks, and riparian vegetation in general; (c) habitats, areas, or species designated as locally sensitive

but not given legal protection by other resource agencies or regulations, and; (d) vegetation communities important to wildlife or of limited geographical distribution within the county and/or state.

Goleta Community Plan. Lake Los Carneros County Park is within the Goleta Community Plan. Policies within this plan parallel those of the Local Coastal Plan, which requires that projects within environmentally sensitive habitats or within 250 feet of such areas shall conform to land use policies. The Plan provides for the preservation of wetlands, native grasslands, vernal or other seasonal pools, monarch butterfly trees, white-tailed kite habitat, and native plant communities, including endangered and rare plant species, native oak trees, streams.

Sensitive plant communities, such as oak woodlands, eucalyptus woodland used by monarch butterflies as roost sites, seasonal wetlands, and native grasslands are designated as Environmentally Sensitive Habitats by Santa Barbara County (County of Santa Barbara, 1995). All wetland habitats are considered sensitive under federal, state, and county policies.

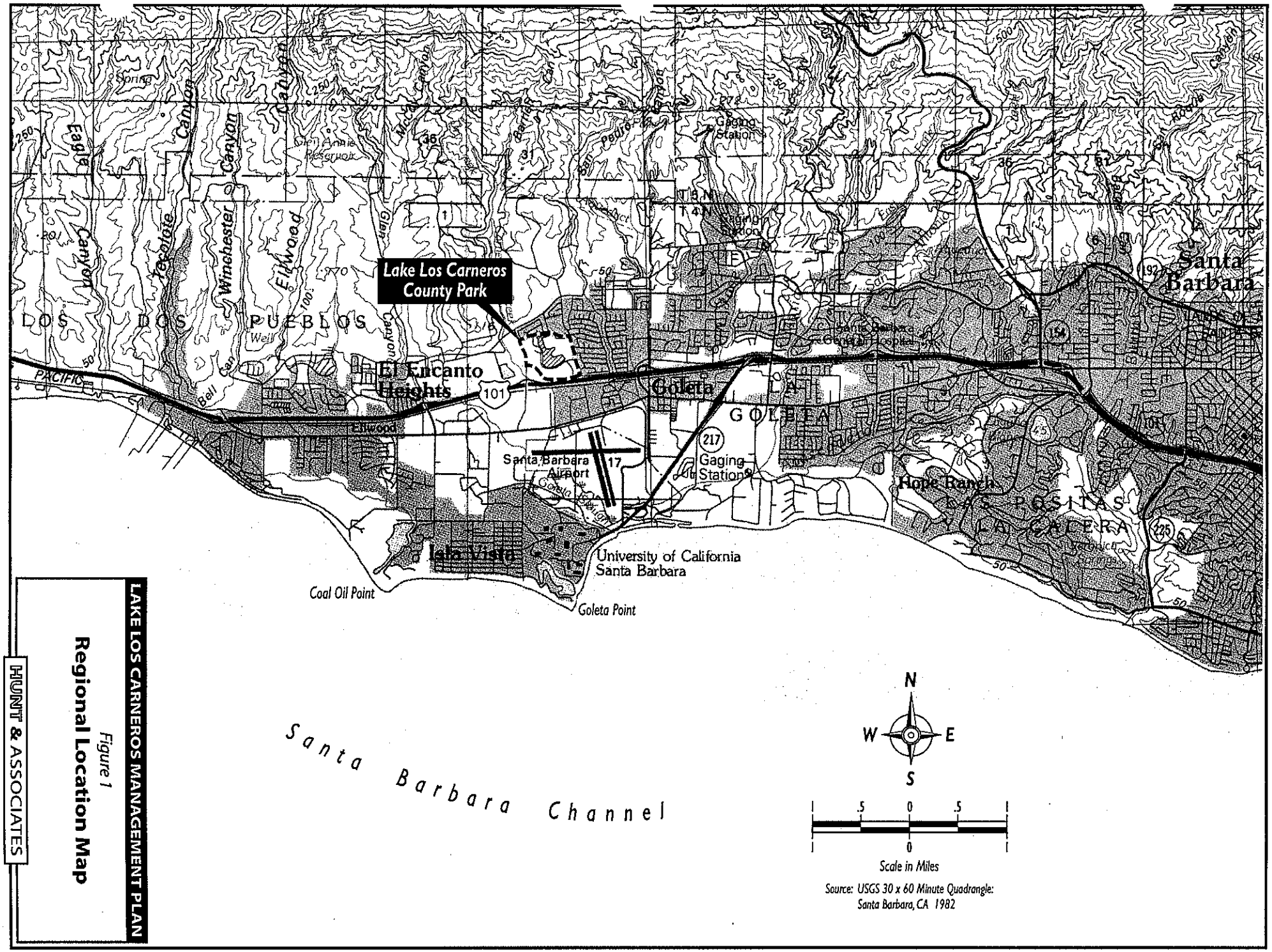
3.0 EXISTING PHYSICAL CONDITIONS

Regional Setting. Lake Los Carneros County Park is situated on the coastal plain of the south coast of Santa Barbara County. Lake Los Carneros lies approximately two air miles north of the Pacific Ocean and approximately five air miles south of the crest of the Santa Ynez Mountains (Fig. 1).

Project Area. Lake Los Carneros is situated in a low-lying area that apparently formerly held a small natural wetland. Fast and Glenn's report (1978) describes the condition of the lake in 1890 as, "...little more than a small weed-choked stock pond, [which] had little if any open water during the summer months and was filled with ... aquatic plants the rest of the year". This wetland may have been either seasonally or permanently connected to estuarine habitats in Goleta Slough via Carneros Creek, San Pedro Creek, or other wetlands extending southward through existing Highway 101, Union Pacific Railroad tracks, and Hollister Avenue.

The present Lake Los Carneros is a man-made expansion of the original wetland. Agricultural, residential, and commercial development has modified or eliminated most of these wetlands to such an extent that the physical and, in most cases, biological connections between them have been fragmented or completely eliminated. Lake Los Carneros County Park is now an "island" of open space, bordered on the south by Calle Real and U.S. Highway 101, on the north by Covington Way and residential development, on the west by Los Carneros Road and agricultural development, and on the east by La Patera Lane and residential development. Since its preservation for wildlife habitat, fishing, and open space in 1974, the local and regional biological importance of Lake Los Carneros has increased as surrounding open space, and especially adjacent wetlands, have been isolated or eliminated by development (Fig. 2).

In 1873 agricultural development of Rancho La Patera (originally part of the Los Dos Pueblos Rancho), was initiated. These activities included construction of a six-foot high earth-filled dam that doubled the storage capacity of the original natural wetland. In 1932 the height of the dam was increased to 19 feet, and in 1947 major improvements were made to the ranch's water control system, including raising the elevation of the dam again. This last series of improvements increased the surface area of the lake at capacity to 51 acres with an impound capacity of 500 acre-feet. These improvements required 35,000



LAKE LOS CARNEROS MANAGEMENT PLAN

Figure 1

Regional Location Map

HUNT & ASSOCIATES

Figure 2

Lake Los Carneros County Park Site Map

PRENT & ASSOCIATES

cubic yards of soil, some of which was imported and some of which apparently came from excavating the lakebed (Planning Land Use Services, 1986, but see historical photo on p. 3 of Penfield and Smith et al (1987). The increased storage capacity resulted in the formation of a small island near the southeastern shore of the lake when it was full (Planning Land Use Services, 1986). The spill elevation of 57.5 feet in 1947 was lowered to its present elevation of 47.7 feet in the mid-1960's as a safety precaution in anticipation of residential development of the surrounding land. This reduced the size of the lake to its present surface area of approximately 31 acres at capacity and a maximum storage capacity of about 300 acre-feet (Planning Land Use Services, 1986; Penfield and Smith et al, 1987).

Agricultural production on the Lake Los Carneros portion of the Stow Ranch was limited to cattle and horse grazing due to insufficient topsoil for agricultural production. Apparently, much of the open, undeveloped land on La Patera Ranch was plowed regularly to prevent recolonization of native shrubs and trees (Planning Land Use Services, 1986).

Conversion of Rancho La Patera from agriculture to residential housing began in 1960. In 1963 additional lands were converted to planned residential and highway commercial use. At this time, approximately 13 acres of land bordering La Patera Lane was donated to become Stow Grove County Park. Additional ranch lands, including the lake and surrounding area, were purchased in 1963 for golf course and residential development. The lake and 20 acres surrounding it were donated to the County as recreational open space however, the golf course and planned residential development on the remaining parcel never took place. The lake and surrounding land remained undeveloped until 1974, when approximately 153 acres, including Stow House and grounds, was acquired by the County for use as a regional park. The Master Plan was adopted in 1987 with the intention that the lake and surrounding lands were to be preserved as wildlife habitat and recreational open space, including fishing.

Surface Hydrology and Sedimentation. Lake Los Carneros County Park contains three freshwater resources. The principal one is Lake Los Carneros. The other two are seasonal wetlands: the overflow pond below the dam, which may hold surface water through the dry season in exceptionally wet years, and; a small vernal pool located in the southeastern corner of the preserve, bordered on the south by Calle Real and on the east by La Patera Lane.

The watershed contributing to Lake Los Carneros covers approximately 190 acres. The lower part of the drainage basin has been converted to residential use while the upper part is a combination of agriculture (orchards and row crops), and open space. Runoff from the upper watershed is fairly rapid and is conveyed to the lake by a 36-inch culvert beneath the residential areas between Cathedral Oaks Road and Covington Way, then is discharged into the lake at Covington Way and Covington Place. Runoff from the residential area enters a storm drain system and discharges into the lake via the 36-inch culvert at the same location. The spillway elevation at the dam on the south side of the lake is approximately 12 feet below the dam crest, giving the lake/reservoir enough capacity to contain precipitation and runoff from 19 inches of rainfall and 16 inches of runoff in a 72-hour period before the overflow drain is reached (Planning Land Use Services, 1986).

The two principal sources of water gains at Lake Los Carneros are direct precipitation and surface runoff. Subsurface inflows appear to be very limited. However, inputs to the lake were not limited to inflow from the lake's watershed when the ranch was operational. Between 1930 and the mid-1960's, water was diverted from San Pedro Creek, which

formed the eastern boundary of the ranch, into an upstream reservoir and then by overflow into Lake Los Carneros. In 1950 a diversion structure was built on Los Carneros Creek and water was diverted directly into the lake by pipeline. Up until 1966-67 the lake was used primarily for agricultural irrigation (Fast and Glenn, 1978).

Inflows to the lake from the small watershed are highly variable, both seasonally and between years. There is probably little or no water gain to the lake during the dry season each year, at a time when maximal surface evaporation and transpiration by plants occurs (Fast and Glenn, 1978). According to Penfield and Smith et al (1987), the lake requires a minimum of 108-acre feet, or 35,191,800 gallons of water from all sources to maintain a level at the spillway elevation. Inflows equal or exceed evapotranspiration only for about half of the year. Consequently, the lake experiences large seasonal and annual fluctuations in water level, especially in dry years.

The estimated storage capacity of the lake decreased from 167 acre-feet to 134 acre-feet between 1932 and 1977 due primarily to sediment input from residential development adjacent to the park in the 1960's and expansion of agricultural activities in the upper watershed (Fast and Glenn, 1978). Development of the upper watershed for orchard crops such as walnuts, lemons, and avocados, and other soil disturbance increased the amount of sediment transported into the lake, resulting in decreased storage capacity and decreased water quality. Although sediment inputs from residential development have mostly disappeared, agricultural activities in the upper watershed continue to impact the lake (Photo 30). Fast and Glenn (1978), concluded that, given sedimentation rates existing at the time, and with no sediment removal, the lake will essentially disappear within 150-200 years.

4.0 EXISTING BIOLOGICAL CONDITIONS

4.1 Methodology

Descriptions of wildlife resources, i.e., wildlife and their habitats, are based upon an assessment of the distribution and quality of the wildlife habitats found on-site and their potential for restoration and/or enhancement, as well as a review of existing literature information. This review verifies and synthesizes information contained in previous management documents for Lake Los Carneros County Park, regional faunal studies, other technical reports. Discussions with agency biologists and other local biologists and environmental groups, such as the Santa Barbara Audubon Society, Urban Creeks Council, and Environmental Defense Center, provided additional information. Other sources of information included museum records and field notes in the Museum of Systematics and Ecology at the University of California-Santa Barbara and the Santa Barbara Museum of Natural History. In addition to these sources, several site visits between January and June 1999 and covering all areas of the park, were conducted to verify existing habitat conditions and map aquatic and upland vegetation around the lake. Together, these sources and site visits allow characterization and evaluation of the diversity and quality of wildlife resources found within Lake Los Carneros County Park, as well as an analysis of the regional importance of the park.

The following description of vegetation within and around Lake Los Carneros consolidates several standardized vegetation categories proposed by Holland (1986), into distinct habitat types that are important to wildlife. The distribution of these wildlife habitats types was mapped in the field using aerial photographs flown 5 November 1998, and recent County of Santa Barbara Flood Control District maps of the park (Fig. 3).

LAKE LOS CARNEROS MANAGEMENT PLAN

Figure 3

Generalized Wildlife Habitat Types

HUNT & ASSOCIATES

OS	Oak Savannah	O	Ornamentals
EW	Eucalyptus Woodland	G	Non-native Annual Grassland
OW	Open Water (Lake)	R	Ruderal
FM	Freshwater Marsh	SW	Seasonal Wetland
WRW	Willow Riparian Woodland	BS	Baccharis Scrub

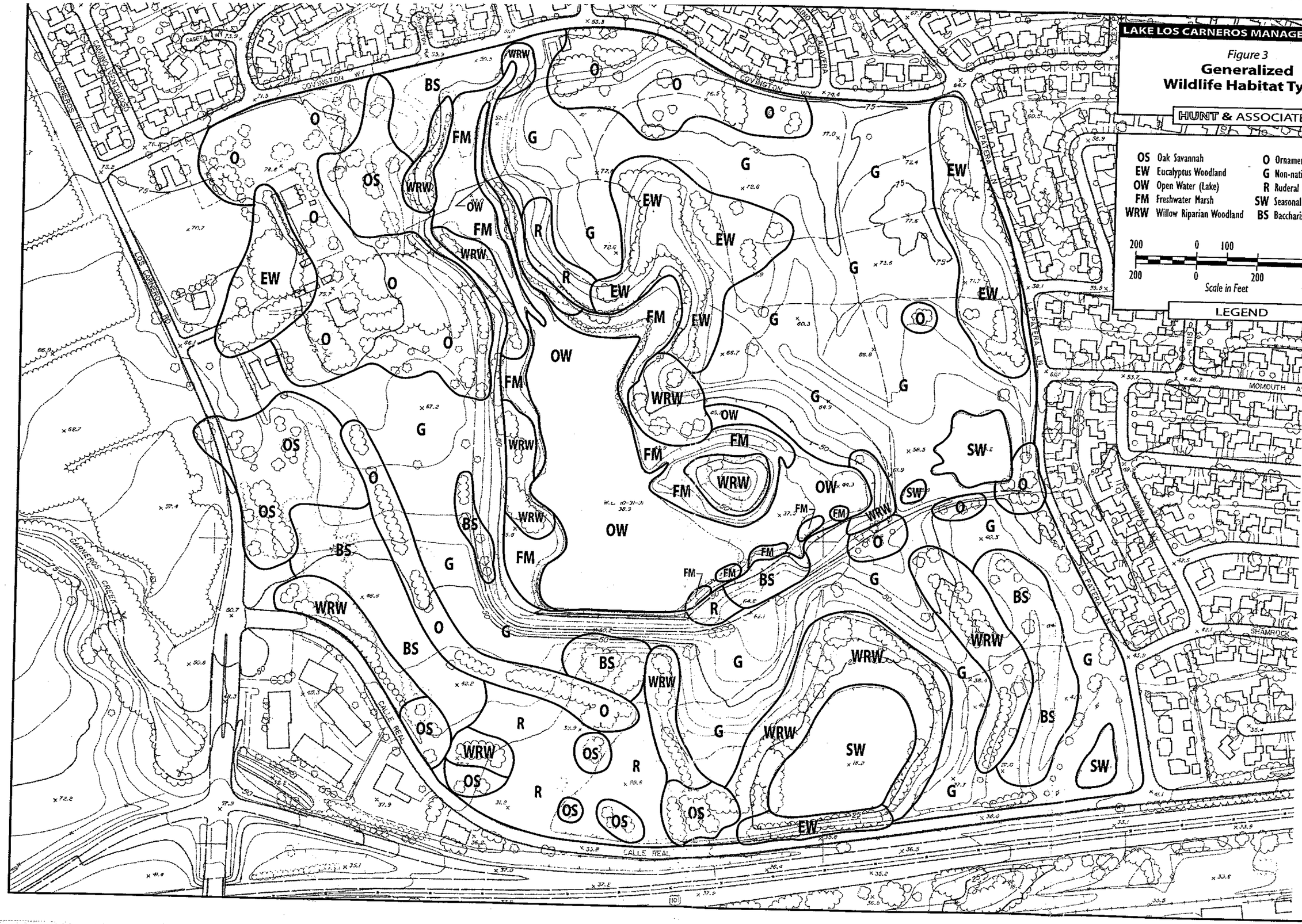
200 0 100 400

200 0 200 400

Scale in Feet

N

LEGEND



4.2 Wildlife Habitats

Natural vegetation on lands subsequently included in Lake Los Carneros County Park were eliminated or severely disturbed while La Patera Rancho was active. Native habitats have been allowed to revegetate since designation of the park as open space in 1974, with the result that existing vegetation now consists of a mosaic of native, ruderal, and ornamental vegetation.

Open space in the park can be subdivided into ten broad wildlife habitat types: non-native annual grassland, ruderal habitats, *Baccharis* scrub, willow riparian woodland, oak savannah, open water (lake), seasonal aquatic habitats, freshwater marsh, ornamental trees and landscaping, eucalyptus woodland. In most cases, because of the relatively small geographic area of the park, the past and present land uses, and the current stage of vegetation succession, these habitats are intermixed. The geographic distribution of existing wildlife habitats in the park is illustrated in Figure 3.

Ruderal. Ruderal plant communities are habitats such as roads, road shoulders, ditches, and work areas that are subjected to frequent human disturbance and are either regularly disturbed or in an early stage of plant succession following a disturbance event. Consequently, they are composed of non-native, invasive, weedy annual plant species that reproduce rapidly. In general, most of the ruderal habitats within the park hold relatively little value for most wildlife species because of regular human disturbance, the absence of structural or biotic diversity, and the generally arid aspect of this annual vegetation. However, some non-native plant species, such as thistles (genera *Centaurus*, *Cirsium*, and *Carduus*), can be an important food resource for seed-eating birds and rodents.

This habitat type is widespread in the park and closely associated with non-native annual grassland (Fig 3). Ruderal habitats are found along trails, roadways, and in the vicinity of the dam or other areas around the lake subject to regular human disturbance (Photo 1). In general, ruderal habitats are of relatively little value to most wildlife species because they are either devoid of vegetation or are vegetated with annual weedy plant species of limited wildlife value. Because of regular disturbance and human presence in such habitats, they are inhabited by common, geographically widespread species such as Pacific treefrog, western fence lizard, gopher snake, common kingsnake, seed-eating birds such as finches, goldfinches, and sparrows, Virginia opossum, California ground squirrel, Botta's pocket gopher, deer mouse, western harvest mouse, house mouse, Norway and black rats, raccoon, and striped skunk.

Non-native Annual Grassland. This habitat type is widespread in the park and is closely associated with ruderal habitats, but is primarily found between the lake and La Patera Lane but is also scattered in patches of varying sizes throughout the southern and southwestern portions of the park (Fig. 3; Photos 2-4). Because of previous land uses, grasslands in the park have a significant non-native forb (weed) component. Annual grassland, whether dominated by native or non-native grasses, supports relatively high wildlife diversity because it supports high insect and rodent densities, which are prey items for other vertebrates, and because it typically forms a spatial mosaic with scrub, oak woodland, and riparian woodland habitats. Annual grassland generally does not support amphibian populations because of its arid aspect, however, grasslands in the park have seasonally high densities of Pacific treefrogs because of the availability of permanent and seasonal water sources (Fig. 3). A number of reptile species inhabit grassland habitats in the park, including western fence lizard, western skink, gopher snake, and common

kingsnake. Common bird species that frequent grassland habitats for foraging or nesting include red-tailed hawk, American kestrel, white-tailed kite, turkey vulture, mourning dove, western and Cassin's kingbird, American crow, California towhee, northern mockingbird, and house finch. Mammals using this habitat type in the park include brush rabbit, California ground squirrel, deer mouse, California vole, western harvest mouse, striped skunk, and Virginia opossum and long-tailed weasel.

Oak Savannah. This habitat type currently is very limited in extent in the park, however if current and future restoration efforts are successful at supplementing the existing coast live oak found in the southwestern portions of the park, this habitat type will extend from approximately the train depot south and east to the overflow pond, as well as north and east of Stow House and associated outbuildings (Fig. 3; Photo 28). Aerial photographs of the site taken in 1967 (see Fig. 2 in Fast and Glenn, 1978), shows lemon orchards covering most of what was to become the southwestern corner of the park. Many of the oaks in this portion of the park have appeared since the late 1960's/early 1970's. Oak savannah supports a diverse native fauna. Mature oak savannah and oak woodland can support amphibians such as black-bellied slender salamanders, arboreal salamanders and Pacific treefrogs because of the mesic microhabitats created and maintained by this habitat type. Common reptiles that are known or expected to inhabit oak savannah and oak woodland habitats in the park are southern alligator lizard, silvery legless lizard, western fence lizard, western skink, common kingsnake, ring-necked snake and gopher snake. Bird species diversity in this habitat type may be high because of the foraging, roosting, and nesting features afforded by this habitat type. The following birds are commonly associated with oaks in the park: red-tailed hawk, red-shouldered hawk, acorn woodpecker, Nuttall's woodpecker, common flicker, northern oriole, black phoebe, mourning dove, house wren, oak titmouse, spotted towhee, and yellow-rumped warbler. Common mammals include ornate shrew, broad-handed mole, Botta's pocket gopher, deer mouse, dusky-footed woodrat, California mouse, brush mouse, striped skunk, and raccoon.

***Baccharis* Scrub.** As represented in the park, this habitat type is a degraded remnant of coastal sage scrub that probably covered portions of the area. However, restoration efforts and natural succession can increase shrub species diversity and complexity of the current vegetation. Undisturbed scrub habitats support a wide variety of wildlife species because of the dense vegetative cover, structural diversity, and relative abundance of food it provides. *Baccharis* scrub is closely associated with non-native annual grassland and ruderal habitats in the park as it spreads across these habitat types following disturbance. This habitat type is primarily found in the north-central, southeastern, and southern portions of the park (Fig. 3; Photos 3,4). Amphibians tend to be scarce in scrub habitats because of the lack of water, however this vegetation support high reptile diversity. Common bird species associated with this habitat type include red-tailed hawk, California thrasher, loggerhead shrike, wrentit, California quail, Anna's hummingbird, western and Cassin's kingbird, Bewick's wren, and house finch. Common mammals include brush rabbit, dusky-footed woodrat, California ground squirrel, deer mouse, California mouse, coyote, raccoon, and striped skunk.

Willow Riparian Woodland. This habitat type is scattered throughout low-lying areas of the park, in close association with permanent or seasonal surface or elevated water tables. It is primarily found along the margin of Lake Los Carneros, the channel that extends northward from the lake to Covington Way. Scattered patches of willows are a conspicuous feature of the southwestern corner of the park, as well as the overflow pond south of the lake (Fig. 3; Photos 5,6). Most or all of this growth has appeared since the late 1960's/early 1970's, when this portion of the park was still in lemon production (see Fig. 2 in Fast and Glenn, 1978). Willow woodland supports high wildlife diversity

because of its association with aquatic or mesic sites, its structural diversity, and the dense cover it provides for foraging, roosting, and nesting activities. Common wildlife species associated with this habitat type in the park include black-bellied slender salamander, western toad, Pacific treefrog, western fence lizard, western skink, southern alligator lizard, ringneck snake, common kingsnake, western terrestrial garter snake, white-tailed kite, Bewick's wren, Brewer's blackbird, great-tailed grackle, common yellowthroat, yellow-rumped warbler, song sparrow, Virginia opossum, ornate shrew, brush mouse, dusky-footed woodrat, raccoon, and striped skunk.

Open Water (lake). Open water habitat in the park is restricted to Lake Los Carneros and the overflow pond south of the lake when it contains surface water. These landscape features support a diverse aquatic, semi-aquatic, and terrestrial fauna because they provide a seasonal and permanent source of fresh water and support wetland and riparian vegetation of high wildlife value (e.g., freshwater marsh and willow riparian woodland) (Figs. 3 and 4; Photos 5, 7, 17, 19, 22, and 30). In addition to a number of non-native fishes introduced into the lake for recreational fishing and mosquito control, a diverse native fauna also depends on these habitats, including Pacific treefrog, western toad, southwestern pond turtle, garter snakes, a broad diversity of wintering ducks and other waterbirds, great blue heron, common egret, snowy egret, western gull, California gull, black phoebe, common raven, cliff swallow, Bewick's wren, Brewer's blackbird, red-winged blackbird, western bluebird, European starling, common yellowthroat, yellow-rumped warbler, song sparrow, Virginia opossum, ornate shrew, broad-footed mole, brush mouse, California mouse, dusky-footed woodrat, California vole, coyote, opossum, raccoon, bobcat, striped skunk, ringtail, and black-tailed deer.

Freshwater Marsh. Freshwater marsh habitat in Lake Los Carneros County Park is locally and regionally important because of the location of the park on the coastal plain, the quality of this habitat type at this location, and its relative local rarity. Marsh habitat around the lake is almost wholly dominated by the California bulrush, or tule, *Scirpus californicus*. Here it forms dense stands over six feet tall and extending from five feet to 50 feet outward from the shoreline, depending on substrate topography. Most growth occurs in water less than five feet deep (Figs. 3 and 4; Photos 7-10, 23, and 24). Tules flourish in fine-grained, anoxic substrates. Tule marsh provides critical foraging and breeding habitat for a diversity of wildlife, especially birds. Typical wildlife found here includes Pacific treefrog, western toad, southwestern pond turtle, ringneck snake, garter snakes, a wide variety of birds, including uncommon marsh-nesting species such as least bittern, Virginia rail, common gallinule, sora, and tricolored blackbird. Mammal use includes ornate shrew, dusky-footed woodrat, western harvest mouse, Virginia opossum, raccoon, and striped skunk.

Seasonal Aquatic Habitats. These man-made seasonal wetlands include the overflow pond southeast of the dam, a smaller wetland bordered on the east by La Patera Lane and on the south by Calle Real, in the southeastern corner of the park, and a small low-lying depression extending along the northern edge of the main paved trail (old ranch road) that connects La Patera Lane and Stow House (Figs. 2 and 3; Photos 4, 11, and 12). Although ephemeral, these wetlands significantly increase habitat for many wildlife species in the park. The overflow pond is the largest seasonal water source in the park and an important wildlife habitat feature. In wet years it contains surface water through October. In dry years it may not hold surface water at all. When the water recedes, vegetation on the floor of the pond undergoes natural succession from forbs, mulefat to willows. In years of below-normal precipitation willows and other wetland vegetation extends across the floor of the pond. When flooded for an extended period of time, much of this vegetation dies. The depression is surrounded by dense willow woodland (with scattered black cottonwood and coast live oak) on the east, north, and west sides, and by a

eucalyptus windrow on the south, which shields it from Calle Real. The depression in the southeastern corner of the park holds water only during the winter and spring months of wet years. It is a major local breeding site for Pacific treefrogs in certain years, and is used by ducks and shorebirds as foraging habitat. The depressions along the northern edge of the main paved trail extending west from La Patera Lane, are poorly developed, but could be enhanced by minor grading and non-native vegetation removal.

Ornamental Trees and Landscaping. This habitat type occurs around the grounds of Stow House and its outbuildings and consists of native and non-native trees and shrubs and lawns planted for aesthetic purposes. It also occurs as windrows and isolated individuals of Monterey pine, *Pinus radiata*, and Monterey cypress, *Cupressus macrocarpa*, south, north, and northeast of Stow House (Fig. 3; Photos 13 and 14). This vegetation, whether live or dead, provides foraging, roosting, and nesting habitat for many birds, including a variety of uncommon fall and winter vagrants and provides critical roosting habitat for raptors. Other common wildlife expected to use this habitat type include red-tailed hawk, red-shouldered hawk, turkey vulture, great horned owl, barn owl, acorn woodpecker, common flicker, oak titmouse, California towhee, Anna's hummingbird, white-crowned sparrow, European starling, house mouse, Norway rat, black rat, dusky-footed woodrat, and Virginia opossum.

***Eucalyptus* Woodland.** Eucalyptus trees were planted at various locations around the park for use as agricultural windrows and as a landscaping species. The most extensive eucalyptus stands occur northeast of the lake and along the northeastern edge of the park bordering La Patera Lane (Fig. 3; Photo 15). Both of these groves have greatly expanded in size in the past 30 years (see Fig. 2 [1967 air photo] in Fast and Glenn, 1978). These non-native trees form tall, dense, stands that provide important roosting and nesting habitat for some wildlife (e.g., monarch butterflies and raptors), but in general, it provides less suitable habitat than native woodland habitats for most wildlife species because of the allelopathic qualities of its leaves and bark in preventing native understory growth.

4.3 Wildlife Movements, Habitat Connections, and Lake Los Carneros County Park as Wildlife Habitat

Regional considerations. Management of Lake Los Carneros County Park for wildlife requires an understanding of the fundamental dynamics of wildlife populations as they relate to body size, wildlife movements, park size, and habitat connectivity both within and between the park and adjacent open space, is essential.

Movement, i.e., dispersal between patches of suitable foraging and nesting habitat, is critical to long-term local and regional viability and persistence of wildlife populations. The potential for wildlife species to move within and between habitat patches in the Lake Los Carneros County Park depends on the size of the patch, its relative isolation from other such patches, the presence of habitat elements that may link patches (Harris, 1984; Adams and Dove, 1989; Mackintosh, 1989), and, probably most importantly, on the body size of individual species and their ability to traverse natural or man-made barriers to dispersal. These factors determine wildlife species diversity within the park.

In most wildlife populations, individuals occupy habitat patches of differing quality. Those in highly productive habitats may be successful in producing offspring, while individuals in poor habitats may suffer poor reproductive success or survival. The fate of a population as a whole may depend on whether the reproductive success of individuals living in "good" habitats outweighs the lack of success by individuals living in "poor"

habitats (Meffe and Carroll, 1997). The idea that population dynamics may depend on the relative quality of good and poor habitats is called "source and sink dynamics", and is an important concept in conservation design and the design of open space reserves (Pulliam, 1988; 1996; Doak, 1995). Good habitats are called "sources", and are defined as areas where local reproductive success exceeds local mortality. Populations in source habitats produce an excess of individuals who disperse outside the habitat patch in which they were born, in order to find a place to settle and breed. Poor habitats are called "sinks", where local mortality exceeds local productivity. Without immigration from other areas, populations in sink habitats inevitably go extinct. A population that consists of several subpopulations linked by immigration and emigration is called a "metapopulation" (Meffe and Carroll, 1997), and a a key factor in local and regional patterns of species diversity.

Determining which habitats are sources and which are sinks requires detailed information on the spatial variability of demographic parameters in different habitats, as well as basic information on the natural history of a species, such as dispersal ability, length of time to sexual maturity, etc. Without such knowledge it is impossible to design a conservation or management plan that considers realistic population dynamics. Studies to obtain such basic information are critical in planning management and conservation strategies that incorporate the natural variability in populations demographics found in most populations, but such data are difficult and time-consuming to acquire. Even less attention has been paid to the overall size of complex landscapes that make effective conservation or management units. Pulliam et al (1995), define "spatial autonomy" as the level of population independence reached by a landscape of a particular size. How large does a management area need to be before the population dynamics within it are independent of external forces? Ideally, management units should be large enough to confer a high degree of spatial autonomy on the wildlife populations contained in the unit, yet this is typically not the case, especially for regional parks such as Lake Los Carneros County Park.

Lake Los Carneros County Park consists of 153 acres of former agricultural land bordered on all sides by barriers of varying difficulty for non-flying wildlife. Flying insects, birds, and bats can and do traverse such barriers. These barriers include transportation corridors ranging from residential streets, to an interstate freeway and railroad right-of-way, extensive residential and commercial development, and agriculture. Only the western side of the park currently contains open space to and from which wildlife can disperse (Fig. 2). Additionally, this open space (Bishop Ranch), contains the Carneros Creek riparian corridor, which runs in a north-south direction and separates orchard on the eastern side of the floodplain from grazing land to the west. Carneros Creek riparian corridor lies approximately 300 feet southwest of the southwestern corner of the park.

In addition to Lake Los Carneros being a rare landscape element on the south coastal plain, the lake is locally and regionally important for birds because they are one of the few groups of vertebrates that have the ability to traverse the overwhelming man-made barriers presented by residential development and transportation corridors that all but prevent colonization of the site by most other terrestrial vertebrates. For the largest carnivores that inhabit the park, such as coyote and bobcat, the park may not support resident individuals, but may represent an essential piece of open space in the overall home range of one or more individuals of these species. Man-made barriers to dispersal are proportionately greater for smaller-sized animals, but even the movements and home ranges of large mammals are affected by features such as roads (Mader, 1984; Bleier, 1993). Existing development south, east, and north of the park limits movement in these directions. There is still some degree of movement of non-avian wildlife species (e.g., ground squirrel, opossum, raccoon, skunk, coyote, bobcat, and fox), across Los Carneros

Road between the park and Bishop Ranch, but this roadway is also a source of mortality for these species (Hunt, pers. obs.).

Theoretical models of source and sink dynamics have shown that only a fraction of the total population may be located in source habitats. For example, Pulliam (1988) showed that as little as 10% of a metapopulation may be found in source habitats, but this fraction is still responsible for maintaining the other 90% of the population that resides in sink habitats. Critical habitats have typically been defined as places where a species is most common. However, these studies suggest that source habitats are defined by demographic characteristics, i.e, habitat-specific reproductive success and survivorship, not simply population density. Source habitats could easily be ignored if the focus is preserving habitat only where a species is most common, not where it is most productive. If source habitats are not protected in a management plan, the whole metapopulation could be threatened (Meffe and Carroll, 1997). Two factors make Lake Los Carneros County Park is a sink habitat for many wildlife species: its relative isolation and the influx of feral predators such as cats and dogs. This fact is likely demonstrated by the relatively low diversity of non-avian wildlife, especially mammals, found in the park. Another example may be the absence or rarity of ground-dwelling and ground-nesting birds, such as California quail and roadrunner in the park, which were likely present when the area was connected to other open space. Once isolated from surrounding open space, mammal populations remaining in the park can be expected to either go extinct because of insufficient area requirements, or decrease in size from some pre-isolation level because they no longer experience immigration from adjacent source habitats. Development of Bishop Ranch west of Lake Los Carneros County Park will effectively isolate the park from all potential source habitats outside the park. The result will be attrition of large, wide-ranging mammals such as bobcat and coyote in the park, which do not currently maintain residents within the park, but whose home range encompasses the park. Other ground-dwelling species can be expected to gradually go extinct through local attrition and loss of opportunities for recolonization from adjacent areas.

The fact that Lake Los Carneros County Park is used by a variety of raptorial birds may be explained by the fact that the park supplies only part of their home range requirements, e.g., a roost or nest site, from which foraging forays are made over the park as well as the much larger, adjacent habitats. Once these adjacent foraging habitat is lost, these individuals may become rarer or abandon the park as a roosting or nesting location, even though this habitat has not changed, because the roost or nest is now too far from other remaining foraging habitat.

Wildlife dispersal within the park. Movements of small and medium-sized wildlife species within the park are complex and species-specific. Body size is of overriding importance in any discussion of wildlife movement and park size. Species with small body size tend to have proportionately smaller home ranges. Consequently, these species can establish and maintain self-sustaining populations in relatively smaller areas, compared to larger species. However, the environment is more "coarse-grained" for small species, so that barriers to dispersal and habitat fragmentation are more onerous for small, non-flying species. Changes in the patterns of movement and genetic subdivision within populations of small mammals and insects even appear when linear features, such as trails only a few feet wide, are created (Mader, 1984; Swihart and Slade, 1984). An example within Lake Los Carneros County Park is the network of trails cross-crossing homogeneous grassland habitat east of the lake (Fig. 2). The effects of habitat fragmentation are manifested in re-adjustments of species' home ranges, breeding territories, and foraging habits in response to changes in prey movements, cover, and

intensity of disturbance. Fortunately, habitat fragmentation can be reversed through habitat restoration.

Summary. Although the park may support viable populations of a diverse fauna of small body size (Appendix 1), its relative isolation from other patches in the area will limit the overall contribution of the park to maintaining regional wildlife diversity via dispersal. If the project area is fully isolated by Bishop Ranch development to the west, then species diversity, especially mammal diversity in the park will decline. Short- and long-term persistence of species within the park is dependent on patch size and connections between habitat patches within the park, as well as total size of the park (Harris, 1984; Soule, et al. 1988).

5.0 WILDLIFE RESOURCES

5.1 Vertebrate Species Diversity

Wildlife resources discussed in this report include sensitive insects, and all species of amphibians, reptiles, birds, and mammals known from Lake Los Carneros County Park. Approximately 261 species are known or potentially may occur in Lake Los Carneros County Park, including 6 species of fish, 1 species of insect, 6 species of amphibians, 12 species of reptiles, 199 species of birds, and 37 species of mammals (Appendix 1a). The monarch butterfly, the single non-vertebrate on this list, is included here because it is a sensitive species that is conspicuously observed in the park.

The report prepared by Fast and Glenn (1978), lists 230 species of birds, including 67 breeding species, observed in the "Lake Los Carneros region", without describing the geographical limits of these observations. Bird species included in this list, as well as the list found in the Planning Land Use Services (1986) report, indicates that the "region" listed therein extends well beyond the park boundaries to include coastal areas and Goleta Slough (e.g., brown pelican and surf scoter). Consequently, in order to characterize resource sensitivities for the proposed activities covered in this report, a new list of birds was generated which relies only on bird sightings made within the boundaries of Lake Los Carneros County Park (Appendix 1a). Appendix 1b contains the bird list presented in Fast and Glenn (1978) and the list found in Planning Land Use Services (1986).

The list of wildlife species in Appendix 1a contains most or all of the vertebrates that may occur on-site. Approximately 234 species, or 90% of the total, have been observed in the park, including 5 species of fishes, 1 species of insect, 4 species of amphibians, 7 species of reptiles, 199 species of birds, and 18 species of mammals. The remaining 27 vertebrate species are potential occurrences. About 70% of these potential species are mammals, specifically bats, whose local and seasonal distribution is poorly known. Several species, such as the red bat and big free-tailed bat, are included because they may forage over the park from permanent roost sites elsewhere, or during migration. Many of these bat species are considered uncommon or rare visitors to the coastal plain of southern Santa Barbara County.

Birds comprise the overwhelming majority of vertebrate diversity in the park--about 77% of the total number of species listed in Appendix 1a. Approximately 84 species, or 42%, of the 199 species of birds listed in Appendix 1a, are either known breeders (58 species, or 69%), or potential breeders (26 species). High bird diversity in the park in general, and breeding bird diversity in particular, can be attributed to the variety of habitats that are attractive to birds, specifically, Lake Los Carneros and the freshwater marsh and willow riparian woodland surrounding it. Lake Los Carneros County Park is known

locally as an especially good place to observe landbirds in fall, winter, and spring, and is considered one of the three most important freshwater marsh habitats remaining on the south coast of Santa Barbara County (Lehman, 1994).

Approximately 21 species of the birds included in Appendix 1a are known breeders in the *Scirpus* beds and willows around Lake Los Carneros. Another eight species are potential breeders. This means that at least 36% of the known breeding birds in the park depend primarily on the aquatic and semi-aquatic habitats associated with the lake and overflow pond for breeding, including several uncommon or rare species whose populations are declining regionally. At least 133 species, or 67%, of the 199 species listed in Appendix 1a make significant use of freshwater marsh and willow riparian woodland habitats surrounding the lake.

The ornamental and landscaped habitats in the park also are particularly attractive to birds. Of the 58 species of birds known to breed in the park, approximately 41 species, or 72%, do so in ornamental and landscaped habitats, and an additional 17 species of birds are potential breeders in these habitats.

Upland habitats are significantly used by only about 14 species, or 25%, of the 57 species of birds known to breed in the park. However, these habitats are important habitats for practically all the amphibian, reptilian, and mammalian vertebrates found in the park (Appendix 1a), and this habitat is critical to the breeding ecology of southwestern pond turtles.

5.2 Sensitive Species

The term, "sensitive species", includes rare, threatened, or endangered animal species. Habitats are also considered sensitive if they exhibit a limited distribution, have high wildlife value, contain sensitive species, or are particularly susceptible to disturbance. Sensitive habitats within the park include: freshwater marsh, willow riparian woodland, and seasonal wetlands.

This section addresses animal species of special interest that are known from or potentially may occur within the park boundaries (Appendix 1a; Table 1). Special status species include federal and state-listed or proposed animals (CDFG, 1996), former federal candidates for listing (USFWS, 1994, 1996), and species recognized as rare or of Special Concern by the California Department of Fish and Game (CDFG, 1996). Besides the federal- and state-listed species and the federal former candidate species, there also are species of local concern that have been recorded from the park. Animals in this latter category are of interest to biologists because they have limited distributions, are experiencing local or regional population declines, are vulnerable to current or future threats to their preferred habitat, and/or are of unusual scientific, recreational, or educational value. These sensitive species are either listed as Species of Special Concern on various watch lists published by State wildlife agencies (Remsen, 1978; Williams, 1986; Moyle, et al. 1989; Jennings and Hayes, 1994; CDFG, 1992; 1996; USFWS, 1995; and Laymon et al, 1996), or are considered by local biologists to be of concern.

Candidate species formerly were classified either as "Category 1", meaning there is, "...substantial information on biological vulnerability and threats to support proposals to list them as endangered or threatened species.", or as "Category 2" taxa, meaning that, "...sufficient information now in the possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules."

(USFWS, 1994). Most, if not all, of these species are also considered State Species of Special Concern (CDFG, 1996).

Under revisions instituted in 1996, only those candidate species formerly classified as "Category 1" will continue to be called "Candidate" species. The Service will no longer maintain a list of "Category 2" candidate species. These species are now classified as "Federal Sensitive Species" (FSS). The Service will continue to monitor these sensitive species regarding the need for listing (USFWS, 1996). Although "Candidate" species and "Federal Sensitive Species" have not yet been proposed for federal listing, they meet the definition of "rare" under Section 15380 of the State CEQA Guidelines, and are included herein.

Species recognized by the California Department of Fish and Game and other resource agencies as "Species of Special Concern" (CDFG, 1996) are rare, and locally or regionally declining. Many of these taxa do not currently receive formal recognition by federal resource agencies as a listed or candidate species, but remain on Federal "watch lists" (USFWS, 1996), and also meet the definition of "rare" taxa under Section 15380 of the State CEQA Guidelines. As such, they qualify for protection and mitigation under this Act.

The following species accounts vary in detail, with generally more information provided on species that are either federally- or state-listed, or are relatively sessile and thus are subject to direct impacts from maintenance activities. Resource sensitivities are summarized in Table 1.

Insects

Monarch butterfly. The monarch butterfly, ***Danaus plexippus*** (*Lepidoptera: Danaidae*), is a well-known insect in coastal California because of its annual migratory and roosting habits. In California, monarchs from throughout western North America congregate and overwinter at sites south of Mendocino County, usually along the immediate coast between October and March (Arnold, 1998). Stands of tall trees, including stands of introduced species such as eucalyptus (*Eucalyptus*), are selected as autumnal and overwintering roosts. The butterflies are highly selective about where in these stands they aggregate. Aggregation sites are typically sheltered in the center of the stand in an opening above or near a watercourse, which provide suitable temperature and moisture conditions out of the wind. Aggregation sites frequently have a southern aspect, and are located near nectar sources that bloom during the winter. The larvae feed on various species of milkweed (*Asclepias*).

Monarchs were observed around all parts of Lake Los Carneros County Park during field surveys for this report. Important monarch roost sites are located along the south coast of Santa Barbara County, specifically the Ellwood area approximately three air miles southwest of Lake Los Carneros (Nagano and Lane, 1985; Calvert, 1991). Calvert (1991) describes small clusters of monarchs (< 50 individuals) in eucalyptus stands between the lake and Covington Way and in the large stand in the northeastern corner of the site west of the intersection of La Patera Lane and Avenida Gorrion, but because these stands do not provide suitable microhabitat conditions for butterflies, he considers these to be "...very minor aggregation sites." However, subsequent surveys by Meade (1999), established that the Lake Los Carneros area was an important overwintering site for monarchs. The Los Carneros Creek riparian corridor, northwest of the intersection of Los Carneros Road and Calle Real, is one of the few sites in Santa Barbara County where monarch aggregations occur on native trees. Significant autumnal and overwintering sites

within the park include: eucalyptus trees north of Stow House (autumnal roost, 15-145 butterflies observed); northeast shore of Lake Los Carneros (overwintering roost, 267-5760 butterflies observed); west side of La Patera Lane between Covington Way and Momouth Avenue (autumnal roost, 6-75 butterflies observed) (Meade, 1999). The park may contain nectar sources for adults, but milkweed plants used by larval butterflies as food sources, are generally lacking from the grassland portions of the park. Management of existing eucalyptus stands in the park should include management of the groves for this species (See Section 7.0).

Amphibians

California red-legged frog. The California red-legged frog, *Rana aurora draytonii*, is listed as Threatened by the USFWS. Currently two subspecies of red-legged frog are recognized: the northern red-legged frog, *R.a. aurora*, found in coastal drainages in northern California between the San Francisco Bay Area and the Oregon border, and the California red-legged frog, formerly distributed in coastal drainages, Central Valley drainages, and western Sierra Nevada drainages between of the San Francisco Bay area southward to northwestern Baja California Norte, Mexico (Storer, 1925; Slevin, 1928; Stebbins, 1951; 1954; 1985). These taxa are morphologically, behaviorally, and probably genetically distinct enough to warrant specific recognition (Jennings and Hayes, 1994). Once the most abundant ranid frog throughout most of lowland California, *draytonii* has been extirpated from at least 99% of its former Central Valley and adjacent Sierra Nevada foothill localities. Only four populations are known to remain between the Santa Clara River in Ventura County southward to the Mexican border. Significant numbers of California red-legged frogs occur only in the relatively small coastal drainages between Point Reyes in Marin County and Santa Barbara in Santa Barbara County (Jennings and Hayes, 1994). Factors responsible for the precipitous decline of this species center around habitat alteration for flood control purposes, streamflow regulation due to dam construction, and the introduction and rapid spread of exotic predators, such as the bullfrog (*Rana catesbeiana*), sunfish (*Lepomis*), mosquitofish (*Gambusia affinis*), bass (*Micropterus*), and a host of other species.

California red-legged frogs breed between late November and late April in pond habitats (Jennings and Hayes, 1994), but up to mid- to late May in stream habitats (Hunt, pers. obs.). Egg masses containing 2,000 to 6,000 2-3 mm (in diameter) eggs are attached to an emergent vegetation or submerged stick brace (Storer, 1925; Hunt, pers. obs.). Embryos hatch 6-14 days after fertilization and remain as larvae for an extended period of time (4-5 months), to metamorphose between July and September.

Preferred aquatic habitat of California red-legged frogs is characterized by dense, shrubby, or emergent riparian vegetation, such as arroyo willow (*Salix lasiolepis*), cattails (*Typha* spp.), and bulrushes (*Scirpus* spp.), associated with deep (> 2 feet), still or slow-moving water (Jennings, 1988; Hayes and Jennings, 1988). An important microhabitat feature appears to be emergent vegetation such as willow boughs or overhanging banks formed by willow or other tree root masses in contact with relatively deep water for predator escape (Hayes and Jennings, 1988; Jennings and Hayes, 1994; Hunt, pers. obs.). Although this species can occur in ephemeral or permanent streams or ponds, population probably cannot be maintained in ephemeral streams in which all surface water disappears. Juvenile frogs appear to favor open, shallow aquatic habitats with dense submergents and overhanging banks or stick masses (Hunt, pers. obs.).

Adult red-legged frogs are highly nocturnal and quite wary (Storer, 1925; Hunt, pers. obs.). In contrast, juveniles are much less wary and are frequently diurnally active.

Adult *draytonii* do not appear to move large distances from their aquatic habitat, although they are known to make long-distance seasonal movements within their local aquatic and terrestrial habitats. Adult *draytonii* move seasonally between the oviposition site and the foraging habitat occupied in spring and summer (Jennings and Hayes, 1994), and other observations indicate that adults move into small mammal burrows or beneath dense leaf litter in riparian thickets well above the stream channel in late autumn (Rathbun et al, 1993). This may be an adaptation common to aquatic amphibians and reptiles that inhabit seasonal drainages that convey high-energy flows during winter storms. Juveniles are frequently found in ephemeral drainages and may represent individuals dispersing from a nearby, more permanent water source (Hunt, pers. obs.).

Red-legged frogs have not been observed in Lake Los Carneros, but focused surveys have never been conducted for this species here. Although the lake is man-made, this species may occur here because of the presence of suitable aquatic habitat, its probable historical occurrence in permanent watercourses adjacent to the park, such as Carneros Creek and San Pedro Creek, and its known dispersal ability. Factors arguing against the presence of this species in the lake include severe habitat disturbance in creating and maintaining this water body, and the presence of non-native, predatory amphibians (bullfrogs) and fish (bass) in the lake.

Reptiles

Southwestern pond turtle. The western pond turtle, *C. marmorata*, as currently recognized, is divided into two subspecies (Seeliger, 1945). The northwestern pond turtle, *C.m. marmorata*, ranges discontinuously from the Sacramento Valley of California northward to Puget Sound, Washington. The southwestern pond turtle, *C.m. pallida*, is a Federal Category 1 species that occurs from the vicinity of Monterey Bay, Monterey County, southward through the Coast Ranges to Baja California, Mexico. A broad zone of intergradation between these two subspecies occurs in the Central Valley of California from the San Francisco Bay area southward to the southern San Joaquin Valley (Seeliger, 1945; Carr, 1952; Stebbins, 1985). The taxonomic validity of the supposed intergradation between the two subspecies has been questioned by Holland (1991) and Bury and Holland (1994), who state that these geographical units actually may represent three distinct evolutionary units (i.e., species).

Historically, southwestern pond turtles occurred along most of the watercourses and upper reaches of estuaries throughout central and southern California. Today, the primary habitat for this species are small-to-medium-sized streams in foothill regions, the upper reaches of larger streams and rivers, agricultural ponds, and modified watercourses, such as canals and reservoirs (Jennings et al, 1992; Holland, 1991; Hunt, pers. obs.). Habitat alteration, in the form of flood control projects, groundwater pumping and water diversions for agricultural, residential, and commercial use, alteration of upland habitats adjacent to watercourses used for nesting and overwintering, as well as the introduction of non-native predatory fish and amphibians, have significantly reduced or eliminated many populations throughout its range, including the virtual extirpation of this species from the Central Valley (Holland, 1991; Rathbun et al, 1991; Jennings and Hayes, 1994). Recent fieldwork indicates that only 6-8 viable populations of southwestern pond turtles remain south of the Santa Clara River in Ventura County, leading Jennings and Hayes (1994) to consider pond turtles endangered south of this point. In particular, most pond turtle populations examined in this region exhibit an age and size distribution highly skewed towards adults, indicating little or no recruitment is occurring (Holland, 1991).

This species, along with the California red-legged frog (see species account above), was petitioned for listing by Jennings et al (1992). Listing of the turtle was denied on the basis that it was not in imminent danger of extinction or likely to become so in the foreseeable future (USFWS, 1993). Nonetheless, Jennings and Hayes (1994) consider the southwestern pond turtle to be endangered from the Salinas River south along the coast, and throughout the southern San Joaquin Valley; and threatened in the remainder of California.

Although individual turtles are highly mobile, displaying dramatic age-related and seasonal movements, population persistence is tied to the presence of particular habitat elements critical to foraging, predator avoidance, and reproductive success. In-stream and bankside rocks, logs, and matted aquatic vegetation are used as basking sites. These sites must be adjacent to deep pools with overhanging banks, into which subadult and adult turtles can escape when threatened. Hatchling and juvenile turtles are highly vulnerable to predation by birds and mammals and require dense stands of aquatic emergent vegetation and mats of filamentous algae for cover and foraging. Stream terraces vegetated with riparian thickets and elevated above the typical flood flows are used as overwintering sites, and east- and south-facing scrub- or grass-covered slopes adjacent to the riparian corridor are used for nest sites. The overwintering and nesting habits of this species requires that substantial creek setbacks be maintained adjacent to watercourses containing turtles. Radio-tagged individuals have been found to overwinter as much as 1,000 feet from a watercourse and female turtles have been found to nest between 56 and 1400 feet from a watercourse, although most of the females tracked thus far have nested within 150 feet of the watercourse (Holland, 1991; Rathbun et al, 1992).

Typical pond turtle habitat include slow-moving or stagnant aquatic habitat that forms pools at least three feet deep and 6 feet in diameter with some type of bank cover, such as vegetation, tree roots, or rip-rap boulders (Rathbun et al, 1991). Pond turtles are uncommon in high gradient streams (Holland, 1991). A critical habitat features for adults is suitable aquatic basking sites, such as mats of emergent vegetation, submerged mats of aquatic vegetation, exposed logs, rocks, or mud banks. Hatchlings and juveniles require shallow water habitat with relatively dense submergent or short emergent vegetation in which to forage. Population persistence in suitable habitat also requires adjacent suitable upland habitat for overwintering and nesting. Suitable oviposition sites appear to share the following features: exposed, south-facing slopes, open scrub or open grassland vegetation, and dense soils, which apparently provide the high thermal and low hydric potential required for successful egg development (Holland, 1991; Rathbun et al, 1992, 1993). Slopes up to 60 degrees have been used for nesting, but most nests have been found on slopes less than 25 degrees. Mating typically occurs in late April or early May. Females emigrate from the aquatic site to an upland location that have been recorded as far as 1,300 feet from the aquatic site however, most nesting occurs within 600-700 feet of the aquatic site (Storer, 1930; Holland, 1991; Rathbun et al, 1992; County of Santa Barbara, 1997). Movements away from water, except to nest, are rare (Bury, 1972; Rathbun et al, 1993) however, movements within a stream course are highly variable and can exceed 1.5 miles (Hunt, 1994).

Females may lay more than one clutch in a year (Rathbun et al, 1993). Most egg-laying occurs during May and June. The young hatch within about 100 days and apparently overwinter in the nest because hatchling-sized turtles have practically never been observed in an aquatic site during the fall. Most hatchlings are thought to emerge from the nest and move to aquatic habitats in the spring, where they feed on zooplankton (Holland, 1991). Growth in hatchling and juvenile turtles is rapid however, reproductive maturity requires does not occur until turtles are between 7 and 11 years old (Holland, 1991). This species

is long-lived, with a large proportion of adults in a healthy population 20 or more years old (Holland, 1991; Hunt, 1994).

Many of the drainages along the south slope of the Santa Ynez Mountains have historically supported southwestern pond turtles. This species has reportedly been observed in the lake (Planning and Land Use Consultants, 1986), although no specimens are known from this locality. Red-eared sliders, *Pseudemys scripta elegans*, a related species, are present in the lake (Hunt, pers. obs.). If present in the lake, southwestern pond turtles likely suffer predation and/or competetion from bullfrogs and a variety of introduced predatory fish.

Silvery legless lizard. The silvery legless lizard, ***Anniella pulchra pulchra***, is a California Species of Special Concern. It is the only limbless lizard found in western North America, and is endemic to California and northwestern Baja California, ranging from the San Francisco Bay area southward through the Coast Ranges and Sierra Nevada foothills to the coastal slope of northwestern Baja California Norte, Mexico (Stebbins, 1985). As currently recognized, *A. pulchra*, contains two subspecies: *A.p. nigra*, a melanistic form restricted to coastal dune sheets around Monterey Bay recently proposed, but denied, for listing as endangered (USFWS, 1998c); and, *A.p. pulchra*, the wide-ranging subspecies.

The silvery legless lizard has a broad regional distribution but is discontinuously distributed because of its requirement of loose soils with a high sand content, and scrub or woodland vegetation (Hunt, 1997). Legless lizards are habitat generalists but a microhabitat specialists. They occur in a range of habitats from coastal dunes to montane pine-oak woodland, where they typically are found beneath leaf litter under shrubs and trees. All of these habitats and microhabitats possess the common feature of occurring on loose soils containing a significant sand fraction (Hunt, 1983; 1997). Because of these morphological and ecological requirements, dispersal ability is limited and the home ranges of individual lizards are typically small, encompassing a single shrub or limited area beneath trees (Hunt, 1996). Because of the spatially mosaic nature of soil texture and density, populations of legless lizards appear to be highly fragmented (Hunt, 1996; 1997). This lizard appears to be rare within its range, but it may be the most common vertebrate in many local situations, especially in coastal dunes, where densities exceeding 500 individuals/acre have been recorded when exhaustively sampled (Hunt, pers. obs.).

Jennings and Hayes (1994) estimate that approximately 20% of the historic range of this lizard has been converted to unsuitable habitat, and they consider it to be a Species of Special Concern. Factors include urbanization, agriculture, coastal dune development, and the introduction of introduced plants such as veldt grass (*Ehrharta calycina*), ice plant (*Carpobrotus edulis* and related species), eucalyptus (*Eucalyptus* spp.) and other invasive species which displace native vegetation and create unsuitable microhabitat conditions for this lizard (Hunt, pers. obs.). *Anniella pulchra* bears from one to four (typically one) live young between September and November (Miller, 1944; Goldberg and Miller, 1985). Reproductive maturity is reached in two to three years and a given female may not breed each year (Goldberg and Miller, 1985). This species is long-lived, mature adults when captured have been kept in captivity between six and seven years (Hunt, pers. obs.).

This species is undoubtedly more abundant in the Santa Barbara area than the handful of specimen records seem to indicate. Most of the records for the region are concentrated in San Andreas fine sandy loam and Tierra sandy loam soils (Shipman et al, 1981), which occur along the eastern and southern portions of Hope Ranch, portions of the Arroyo Burro floodplain, and eastward to the northern and southern portions of Las Positas Friendship Park and Rancho Las Positas (Jesuit Property), respectively. Soil types within

Lake Los Carneros County Park are classified as Milpitas-Positas and Goleta fine sandy loams (Shipman, 1981). These soils may have a sufficiently high sand content to be marginally suitable for legless lizards. However, previous agricultural practices, specifically repeated grading and disking of upland areas around the lake, have eliminated the possibility of this species occurring there. Legless lizards may occur in the southwestern portions of the park, beneath native coast live oaks, and possibly around Stow House and grounds.

Two-striped garter snake. The two-striped garter snake, *Thamnophis hammondii*, is a Federal Sensitive Species (former Category 2 species). This aquatic snake, formerly considered a subspecies of the western aquatic garter snake, *T. couchii*, is almost exclusively confined to coastal slope drainages from the Monterey Bay southward through Baja California Sur, Mexico (Fitch, 1940; Fitch, 1984; Stebbins, 1985; McGuire and Grismer, 1993). Exceptions to this characterization include several populations from the southeastern slope of the Diablo Range (Alameda County), Santa Catalina Island (Los Angeles County), and several perennial, desert slope stream in San Bernardino, Riverside, and San Diego Counties (Jennings and Hayes, 1994).

Historically this was a relatively common snake of deep, slow-moving, perennial and intermittent small streams possessing rocky or sandy beds bordered by willow thickets or other dense vegetation, as well as stock ponds, reservoirs, and other man-made impoundments if they are bordered by dense emergent vegetation and suitable prey are present (amphibians and fish) (Jennings and Hayes, 1994). The highest densities appear to be associated with arroyos or coastal lagoons with relatively open areas of bare soil, short grass, or large, flat pools with plentiful prey. The exposed areas are used for basking (Rathbun et al, 1991). Today, this snake has disappeared from at least 40% of its historic range, mostly since the mid-1940's, and can only be considered common in eastern San Diego County (Jennings and Hayes, 1994). This decline is attributable to regionwide habitat alteration caused by flood control activities, reservoir construction, livestock grazing, and the introduction of non-native, predatory fish such as bass and sunfish, bullfrogs, and wild pigs, as well as the decline of important prey items such a red-legged frog, foothill yellow-legged frog (*Rana boylei*), and mountain yellow-legged frog (*R. muscosa*) larvae, which are sympatric with this species. These factors have extirpated many populations. Those that remain are reduced in size and further geographically fragmented. Jennings and Hayes (1994) contend that this snake should be listed as threatened throughout its range.

The life history of this species is poorly known. Juveniles and adults emerge from subterranean hibernacula in the spring, although they are sometimes seen above-ground on warm winter days. Mating occurs in the spring and females bear live young in late summer and early fall (Stebbins, 1985; Jennings and Hayes, 1994). Females likely mate each year, although they can store viable sperm for 4-5 years (Stewart, 1972). By November neonates and adults are no longer active above-ground. Snakes apparently move to upland areas adjacent to a watercourse and hibernate in rodent burrows or under large logs and boulders (Rathbun et al, 1991, 1993). Use of particular habitats is seasonal: streamside habitats are occupied in summer; coastal sage scrub and grassland habitats adjacent to riparian corridors are used in winter (Rathbun et al, 1993).

Locality records for two-striped garter snakes along the south coast of Santa Barbara County are discontinuously distributed in permanent drainages between Gaviota Creek and Carpinteria Creek. The nearest records are from upper San Pedro Creek and upper Mission Creek. Although this species is unlikely to occur in or around Lake Los Carneros because of its man-made origin and the presence of non-native, predatory amphibians and fish, the lake does provide excellent habitat.

Birds

Western least bittern. The western least bittern, *Ixobrychus exilis hesperus*, is a California Species of Special Concern and a Federally Sensitive Species. This species is highly secretive and frequents dense stands of bulrushes and cattails surrounding freshwater lakes and marshes. It is considered a very rare visitor to coastal southern California (Lehman, 1994). Least bitterns have occasionally bred in dense stands of *Scirpus* around the southwestern and western edges of Lake Los Carneros within the past five years. The tule habitat found around the lake is among the best nesting habitat remaining for this species in the Santa Barbara region (Holmgren, pers. comm.; Lentz, pers. comm.).

Peregrine falcon. The American peregrine falcon, *Falco peregrinus anatum*, is listed as Federally Endangered. Peregrine falcons are listed by the State Department of Fish and Game as endangered (CDFG, 1997). This rare falcon occurs along coastlines, in mountainous areas, and in riparian habitats throughout the western United States and Canada. It nests from northern Canada southward through the western United States and winters south into Mexico and Central America. The widespread, significant decline in peregrine falcons has been attributed to a combination of factors, including reproductive failure due to pesticide (DDT and DDE) contamination and habitat destruction. By 1975, this species no longer bred in the eastern United States, and the population in western North America reached an all-time low of 324 nesting pairs.

The peregrine falcon was formerly much more common in southern California, particularly as a nesting bird. Peregrine falcons were found along most of the coast, on the Channel Islands, and locally inland (Garrett and Dunn, 1981; Biosystems Analysis, Inc., 1981).

Since the ban on DDT, DDE, and other organochlorine pesticides, as well as implementation of a recovery plan more than 20 years ago, falcons have begun breeding again in many areas throughout California however, DDE-induced eggshell thinning continues to affect individuals that nest in coastal areas of California (Walton, 1990). The recovery plan has been successful in rearing and introducing large numbers of falcons back into historic nest sites to re-establish falcons in the wild (Jurek, 1989). Currently, there are at least 1,593 breeding pairs of peregrine falcons in the United States and Canada, well above the recovery goal of 631 pairs (USFWS, 1998b). By 1991, the breeding population for California was estimated at 111 pairs, including a total of 15 falcons that were released at Gaviota Peak, Santa Barbara County between 1983 and 1988 (BioSystems Analysis, 1981; Linthicum and Walton, 1991).

The increase in the number of peregrine falcons sighted in coastal southern California is a measure of the success of the captive breeding and release program, as well as a decline in pesticide levels in the food chain as a result of the pesticide ban. Their status in the project region is changing, and region-wide, the recovery program has been so successful that the USFWS has proposed de-listing the peregrine falcon (Mesta, et al. 1995; USFWS, 1998b). However, it will still remain a State-listed endangered species.

Peregrine falcons are considered a very rare fall and winter visitor to the coastal plain of southern Santa Barbara County (Lehman, 1994). This species has been observed foraging over Lake Los Carneros and Rancho La Patera to the north, presumably from roosts in the foothills (Appendix 1a; Hunt, pers. obs.).

Merlin. The merlin, *Falco columbarius*, is a California Species of Special Concern. It is considered an uncommon to rare fall and winter transient to the coastal portions of Santa Barbara County. Merlins have been observed over open country such as grassland, agricultural areas, sloughs, beaches, and residential areas (Lehman, 1994). It is occasionally observed foraging over the Goleta Slough and other open space in the area, such as Lake Los Carneros County Park, where waterfowl and shorebirds congregate (Appendix 1a).

Ferruginous hawk. The ferruginous hawk, *Buteo regalis*, is a Federal Sensitive Species and California Species of Special Concern. It is an uncommon fall transient and winter visitor to California. In Santa Barbara County it is typically observed in coastal and interior grasslands, riparian woodlands, and agricultural fields, most commonly in the Cuyama Valley and Santa Maria floodplain (Lehman, 1994). There have been less than 34 sightings of this species along the coastal plain between Carpinteria and Gaviota since 1961 (Lehman, 1994). Ferruginous hawks are a rare fall transient to the vicinity of Lake Los Carneros County Park.

Northern harrier. The northern harrier, *Circus cyaneus*, is a California Species of Special Concern that has a broad continental distribution, but is an uncommon fall transient and winter visitor to the south coast of Santa Barbara County (Lehman, 1994). It typically forages and nests in grasslands and open scrub habitats, freshwater and salt marshes, and agricultural fields. It is considered a rare fall transient to the park.

White-tailed kite. White-tailed kites, *Elanus leucurus*, are a California Species of Special Concern (CDFG, 1992; 1996), and a Species of Local Concern (County of Santa Barbara Planning Department). Although widely distributed along the Pacific Coast in grasslands, marshlands, and agricultural areas, this species experiences dramatic regional population fluctuations that are attributable to year-to-year variation in population densities of its preferred prey, the California vole (*Microtus californicus*) and other small rodents. White-tailed kites are considered to be an uncommon resident and local summer breeder along coastal southern Santa Barbara County (Lehman, 1994). Local population persistence is strongly linked to the presence of suitable communal roost and nest sites within or near extensive foraging habitat. Use of these roost sites is variable from year to year. Locally, they nest in eucalyptus, oak, and riparian woodlands. Kites have been observed foraging in the park in open grassland and scrub habitats around the lake (Hunt, pers. obs.), and it has been recorded as breeding in willow-cottonwood-live oak woodland along the north side of the overflow pond in 1987 (Appendix 1a).

Golden eagle. The golden eagle (*Aquila chrysaetos*), is a California Species of Species Concern and a Federally-Protected Species. Locally, it is an uncommmon fall and winter transient to the south coast of Santa Barbara County. It has been sighted within Los Carneros County Park as a fall transient, but does not roost or breed there. It may occasionally forage over the park from roosts or nests in the Santa Ynez Mountains or interior ranges and valleys of Santa Barbara County.

Osprey. The osprey (*Pandion haliaetus*), is a California Species of Special Concern that specializes on feeding on fish. It is typically observed locally as a fall and winter transient (Lehman, 1994). It has occasionally been sighted foraging and roosting around Lake Los Carneros.

Prairie falcon. The prairie falcon (*Falco mexicanus*) and merlin (*Falco columbarius*), are both California Species of Special Concern. They occurs along the south-coastal plain of Santa Barbara County as fall and winter transients. Both species have been observed foraging over Lake Los Carneros.

Cooper's hawk. The Cooper's hawk (*Accipiter cooperi*), is a Federal Sensitive Species and California Species of Special Concern. This wide-ranging raptor is typically associated with oak woodland and riparian woodlands. It is an uncommon to fairly common transient and winter visitor. Formerly more abundant as a breeding species, it is now a very uncommon to rare breeder in the Santa Barbara area due to habitat loss (Lehman, 1994). Cooper's hawks have been repeatedly observed in oak and eucalyptus woodlands and ornamental trees and around the lake at different times of the year and may breed in the park.

Sharp-shinned hawk. The sharp-shinned hawk (*Accipiter striatus*), is a California Species of Special Concern. It is discontinuously distributed as a resident species over most of the United States. It more commonly occurs as a winter visitor to semi-open and wooded habitats in the U.S. Locally, it is considered an uncommon to fairly common transient and winter visitor, where it is typically associated with riparian and oak woodland habitats (Lehman, 1994). This species has been observed in the park, where it may be expected to forage for birds in the willows and ornamental trees.

Loggerhead shrike. The loggerhead shrike (*Lanius ludovicianus*), is a California Species of Special Concern. Loggerhead shrikes range throughout the southern half of the United States as permanent residents, and northward into southern Canada as spring and early summer breeders. They frequent a variety of open and semi-open habitats including semi-desert scrub, grassland, oak savanna, coastal sage scrub, open riparian woodland, and agricultural areas (Remsen, 1978; National Geographic Society, 1983). It has experienced significant declines in California, especially central and southern California due to habitat loss. It is an uncommon resident and rare breeder along coastal southern Santa Barbara County (Lehman, 1994). Shrikes are considered an uncommon to rare transient in the park during late summer through the winter. When present, they are typically observed in grassland and scrub habitats.

Vaux's swift. Vaux's swift, *Chaetura vauxi*, a California Species of Special Concern, is an uncommon to fairly common, but irregular, spring and fall transient along the south coast of Santa Barbara County. They are very common some years and rare in others. They are most often seen during overcast or cold weather, sometimes in large flocks of several hundred individuals (Lehman, 1994). Vaux's swift have been observed foraging over upland and aquatic habitats around Lake Los Carneros during migratory flights to and from its breeding range in the northwestern U.S. and southwestern Canada.

Yellow warbler. The yellow warbler (*Dendroica petechia*), is a California Species of Special Concern that is a spring and summer breeder over much of the United States. It is considered an uncommon to fairly common spring and fall transient to the south coast of Santa Barbara County (Lehman, 1994), where it occurs in riparian woodlands and willow thickets. Yellow warblers may breed in willow thickets surrounding the lake.

Blue grosbeak. The blue grosbeak (*Guiraca caerulea*), is a California Species of Special Concern that also is widely distributed as a summer breeder across much of the United States. Locally it is considered a rare, localized summer resident (breeder) and fall transient along the south coast of Santa Barbara County (Lehman, 1994). This species typically nests along the outer edge of the riparian corridor, adjacent to weedy fields and grasslands or scrub habitat. The project area contains suitable breeding habitat for this species, although confirmation of breeding is lacking.

Warbling vireo. The warbling vireo (*Vireo gilvus*), is a Species of Local Concern in central and southern California because of regional loss of riparian woodlands and

widespread, intensive brood parasitism by the brown-headed cowbird (*Molothrus ater*). It is considered an uncommon transient and summer resident (breeder) in coastal southern Santa Barbara County (Lehman, 1994), where it is typically associated with riparian woodland. It is known as a breeding species from several local drainages (e.g., San Jose Creek, Maria Ygnacio Creek, etc.), and may breed in the park, although this is unconfirmed.

Tricolored blackbird. The tricolored blackbird, *Agelaius tricolor*, is a California Species of Special Concern and a Federal Sensitive Species. It is an uncommon fall and winter visitor to the south coast of Santa Barbara County, which may occasionally breed in dense *Scirpus* marsh surrounding the lake. The 1996 establishment and subsequent increase of breeding pairs of great-tailed grackles, *Quiscalus mexicanus*, around the lake, may negatively affect breeding by red-wing blackbirds, *A. phoeniceus*, and tricolored blackbirds at this location.

Mammals. The following bats have not been recorded from Lake Los Carneros County Park, but are known from the coastal plain of Santa Barbara County.

Greater western mastiff bat. The greater western mastiff bat (*Eumops perotis californicus*, is a Federally Sensitive Species and a California Species of Special Concern. Available information indicates that this large bat was more common in California, especially the coastal basins, such as the Los Angeles Basin, around the early 1900's, but that urban development of these areas has significantly reduced state-wide populations (Williams, 1986). This large bat is an uncommon inhabitant of scrub and open woodlands from San Francisco Bay eastward through southern Arizona, Nevada, New Mexico, western Texas, and southward into Baja California and mainland Mexico (Ingles, 1965; Hall, 1981; Williams, 1986). The majority of collection records in California come from the southwestern portion of the state (Williams, 1986; Collins, 1993; Constantine, 1998).

Western mastiff bats roost in caves and rock crevices on vertical rock walls and under exfoliating slabs of granite or sandstone (Williams, 1986). The crevice must be sufficiently large to allow the bat to free fall several feet before taking wing. This type of roosting habitat is available regionally along the coastal slope of the Santa Ynez Mountains. Mastiff bats have been observed foraging over a variety of habitats, including cultivated areas, rock outcrops where chaparral and live oak woodland intermingle, as well as sparse vegetation in semi-arid and arid habitats.

Western mastiff bats breed in colonies that usually have fewer than 100 bats, and both sexes can be found in the same colony. Females mate in the spring and give birth to a single young in early to mid-summer (Krutzsch, 1955). This species is resident in the southern California region but generally goes into daily torpor from December through February. They are strong fliers and have been observed foraging as much as 15 miles from their night-time roosts (Brown, pers. comm., 1992).

There is a record of this species from Santa Barbara, Santa Barbara County (Constantine, 1998), and biologists have noted the distinctive calls of several individuals of this species from the upper Santa Ynez River watershed, near White Rock Campground. The presence of multiple individuals of mastiff bats and the presence of suitable rock crevice habitat for roost sites may mean there is a roost somewhere along the upper watershed (Collins, pers. comm.). Given their long foraging distances from roost sites, mastiff bats may occasionally forage over Lake Los Carneros from roosts in the Santa Ynez Mountains. Other collection records for the project region include the upper Ventura

River drainage, upper Santa Clara River drainage near Fillmore, upper Piru Creek drainage (Hunt et al 1992), and city limits of Camarillo (Brown, pers. comm., 1992).

Big-eared bat. The big-eared bat, *Plecotus townsendii*, is a California Species of Special Concern. Two subspecies are known: *P.t. townsendii* is distributed along coastal habitats in northern and central California; *P.t. pallescens* occurs throughout the remainder of the State (Hall, 1981; Williams, 1986). However, the morphological and genetic characterization of these subspecies is based on small sample sizes from widely scattered localities. Consequently the geographic limits of subspecies of this bat are poorly known and the subject of current study (Collins, 1998). Both subspecies apparently occur in Santa Barbara and Ventura County (Hall, 1981).

This species has been found in a wide range of habitats, including coastal conifer and deciduous forests, oak woodland, arid grasslands, deserts, and montane forests and meadows (Williams, 1986). It is apparently most common in mesic sites. Roost sites include caves, mine tunnels, buildings, and other man-made structures. Suitable habitat must contain foraging space and roosting and hibernation sites in close proximity (Williams, 1986), although Brown et al. (1994), Pierson (1988), and Pierson and Rainey (1992), found that this species can fly as much as 20 miles between roost sites and foraging habitat. Females typically roost in large maternity colonies which are highly susceptible to human disturbance (Williams, 1986). Pierson (1988) suggest that the decline of this species in California is due primarily to human disturbance of their roost sites. Big-eared bats hibernates singly or in small clusters from October to April along the coastal plain and they show high roost site fidelity (Handley, 1959; Pierson, 1988).

Foraging habitat appears to be riparian and oak woodlands, where it feeds primarily on moths (especially microlepidopterans) and other insects, which are captured in flight or on foliage (Ross, 1967). The only record for the south coast of Santa Barbara County comes from Santa Barbara (Hunt, 1992), although it undoubtedly occurs in the region more commonly than this record would indicate. A large colonies are known to roost beneath bridges over the Santa Ynez River (Collins, 1998). Big-eared bats may be expected to occasionally forage over Lake Los Carneros County Park, especially coast live oak and eucalyptus woodland and the lake.

Pallid bat. The pallid bat, *Antrozous pallidus*, is a California Species of Special Concern. Pallid bats are distributed throughout much of the western North America in mesic lowlands and canyonlands (Ingles, 1965). It regularly forages over grassland and open scrub habitats where it feeds on Jerusalem crickets, beetles, scorpions, and other large, nocturnal arthropods (Ross, 1967; Brown, 1980). Several of the Channel Islands have resident colonies of this species, but there appears to be little or no dispersal between mainland and island populations. This species has been found regularly along the south coast of Santa Barbara and Ventura counties (e.g., Vandenberg Air Force Base (Collins, 1998) and the lower Ventura River floodplain (Hunt and Lehman, 1992). Based on its wide foraging habits, its regional distribution, and the presence of suitable foraging habitat, pallid bats may be expected to occasionally forage over Lake Los Carneros County Park. It roosts in rock crevices and buildings.

5.3. Summary of Faunal Resource Sensitivities

Resource sensitivities occur at both the habitat and species level in Lake Los Carneros County Park. Sensitive habitats are those that support unique or rare animal species, are especially valuable to wildlife, or are examples of a particular biotic community that is declining locally and/or regionally. Freshwater marsh, willow riparian woodland, and

seasonal wetlands are considered sensitive habitats within Lake Los Carneros County Park. Such habitats are afforded protection by various County regulations. Development within certain habitats, such as riparian woodland or streambeds, is also regulated by the California Department of Fish and Game and the U.S. Army Corps of Engineers. Federal- and State-listed species, as well as Federal candidate species and former candidate species (now called Federal Sensitive Species), are regulated by the U.S. Fish and Wildlife Service. Species of Special Concern in California are regulated by the California Department of Fish and Game. Finally, several of the bird species listed in Appendix 1a have been given additional recognition on the basis of regionally-declining habitat or populations.

The ornamental/landscaped portions of the park are attractive to a wide variety of birds in the fall, winter, and spring. The uplands north, east, and south of the lake provide foraging habitat for a variety of raptors and mammals. However, it is the aquatic and riparian habitat surrounding Lake Los Carneros, freshwater (*Scirpus californicus*) marsh and willow riparian woodland, as well as the seasonal wetlands south and southeast of the lake, that are regionally important as bird habitat. Freshwater marsh habitat has been greatly reduced in size or eliminated throughout coastal central and southern California, and is one of the most uncommon and threatened habitats in the county.

Nineteen sensitive animal species are known from Lake Los Carneros County Park. Six sensitive taxa may potentially occur here. Table 1 presents these species by regulatory category. Arguably 16 of the 25 sensitive species in this table, or approximately 65% of these taxa, utilize aquatic and riparian habitats associated with Lake Los Carneros and adjacent seasonal wetlands as foraging habitat, and in many cases, breeding habitat. Two federally-listed taxa are included in Table 1. One species, peregrine falcon, has been observed foraging over Lake Los Carneros. The other species, California red-legged frog, has not been observed in the lake, although focused surveys for this species have not been conducted. The latter species is included in the table below on the presence of suitable foraging and/or breeding habitat in and around the lake, as well as their known occurrence in the vicinity of the park. There are seven federal candidate taxa known or potentially occurring in the park, including two species of birds (western least bittern and tricolored blackbird), known to nest in Lake Los Carneros. The remaining 16 taxa are California Species of Special Concern or of Local Concern.

Table 1. Known and Potential Sensitive faunal resources of Lake Los Carneros County Park.

Common Name	Scientific Name	State/Federal Status [a]	Occurrence
Federal- and/or State-listed:			
California red-legged frog	*Rana aurora draytonii*	CSC/T	Potential
American peregrine falcon	*Falco peregrinum anatum*	E/E	Observed
Federal Candidate Species and Federal Sensitive Species:			
Southwestern pond turtle	*Clemmys marmorata pallida*	CSC/C1	Observed
Silvery legless lizard	*Anniella pulchra pulchra*	CSC/FSS	Potential
Two-striped garter snake	*Thamnophis hammondii*	CSC/FSS	Potential
Western least bittern	*Ixobrychus exilis hesperis*	CSC/FSS	Observed
Ferruginous hawk	*Buteo regalis*	CSC/FSS	Observed
Tricolored blackbird	*Agelaius tricolor*	CSC/FSS	Observed
Greater western mastiff bat	*Eumops perotis californicus*	CSC/FSS	Potential

Table 1 (continued).

Common Name	Scientific Name	State/Federal Status [a]	Occurrence
State Species of Special Concern and rare or regionally-declining species:			
Monarch butterfly	*Danaus plexippus*	CSC	Observed
Sharp-shinned hawk	*Accipiter striatus*	CSC	Observed
Cooper's hawk	*Accipiter cooperi*	CSC	Observed
Golden eagle	*Aquila chrysaetos*	CSC	Observed
White-tailed kite	*Elanus caeruleus*	CSC	Observed
Northern harrier	*Circus cyaneus*	CSC	Observed
Osprey	*Pandion haliaetus*	CSC	Observed
Prairie falcon	*Falco mexicanus*	CSC	Observed
Merlin	*Falco columbarius*	CSC	Observed
Loggerhead shrike	*Lanius ludovicianus*	CSC	Observed
Vaux's swift	*Chaetura vauxi*	CSC	Observed
Warbling vireo	*Vireo gilvus*	Rare	Observed
Yellow warbler	*Dendroica petechia*	CSC	Observed
Blue grosbeak	*Guiraca caerulea*	CSC	Observed
Pallid bat	*Antrozous pallidus*	CSC	Potential
Western big-eared bat	*Plecotus townsendii*	CSC	Potential

(a) Status Codes: E = Federal or State Endangered; T = Federal or State Threatened; C1 = Federal Category 1 Species; FSS = Federal Sensitive Species (former Federal Category 2 Species; CSC = California Department of Fish and Game (CDFG) Special Concern Species; Rare = Watch List Declining Species

6.0 MAINTENANCE ACTIVITIES AND MANAGEMENT RECOMMENDATIONS

The previous sections document the valuable and important avian foraging and breeding habitat provided by Lake Los Carneros. Several of these breeding species are locally and regionally rare because of the degradation or loss of freshwater aquatic habitats. Freshwater marsh and willow riparian woodland habitat associated with Lake Los Carneros and seasonal wetlands south of the lake are among the most important wildlife habitats of this type remaining along the south coast of Santa Barbara County.

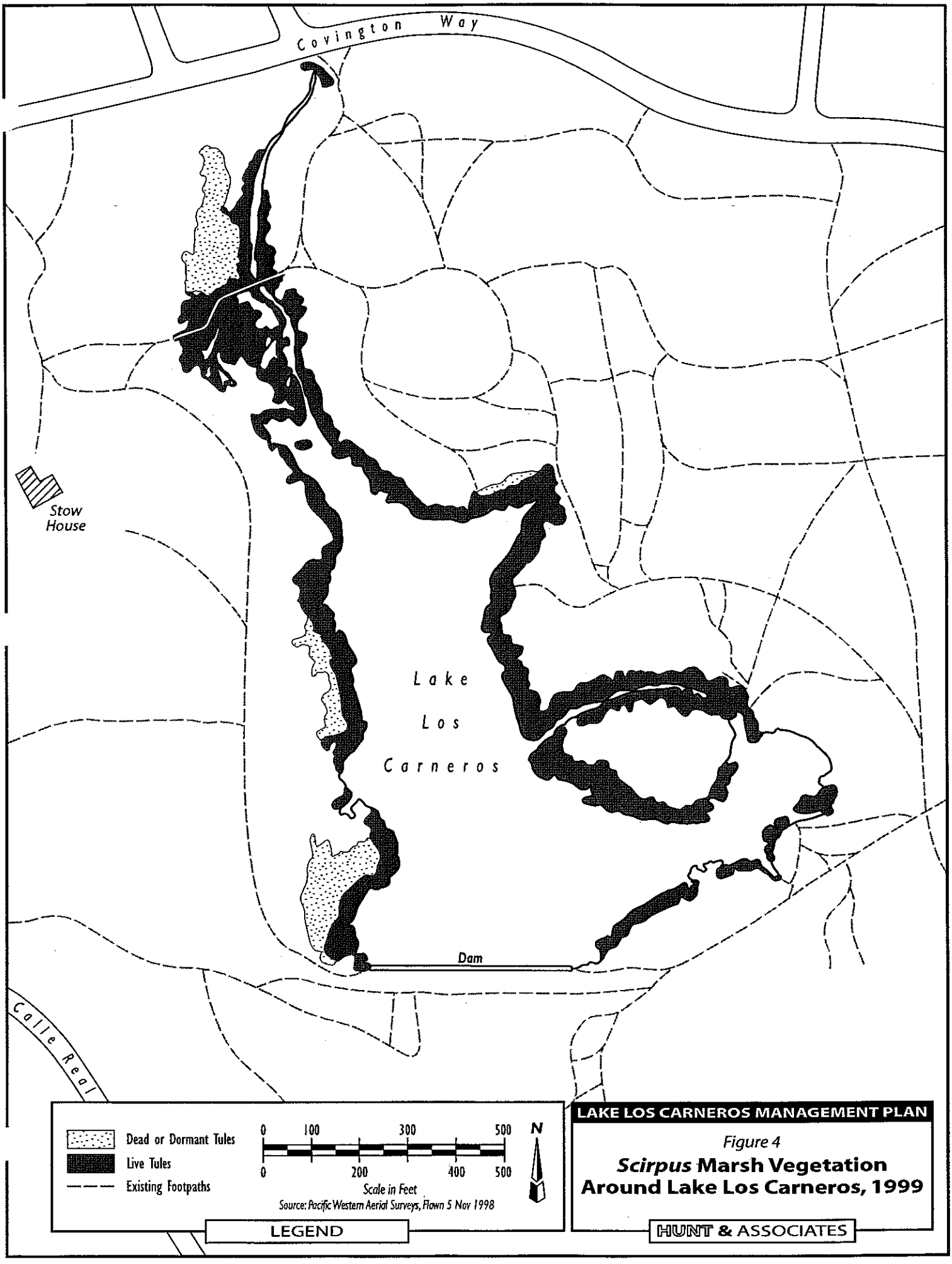
This section reviews, and where appropriate, incorporates previous management recommendations put forth in the Lake Los Carneros Limnological and Management Study (Fast and Glenn, 1978); Lake Los Carneros Study Addendum (Penfield and Smith, 1983), the Final EIR for the Lake Los Carneros Master Plan (Planning Land Use Services, 1986) and the Lake Los Carneros Natural and Historical Preserve Study (Penfield and Smith et al., 1987), and proposes a series of management recommendations for the lake and surrounding areas that reduce or eliminate potential conflicts between the dual mission of Lake Los Carneros County Park (wildlife habitat preservation and low- to moderate-use recreational use), and required maintenance activities. Many of these management recommendations have been proposed before in the documents mentioned above, but were not implemented. In each case, previous management recommendations were evaluated in light of current resource sensitivities, regulations and policies, and existing conditions in Lake Los Carneros County Park. In some cases, previous recommendations were eliminated completely and new ones are proposed; in other cases, they are modified to fit existing conditions.

Santa Barbara County Parks Department plans to conduct the following maintenance activities to retain wildlife and recreational values of Lake Los Carneros: (1) tule control; (2) water quality control; (3) vector control; (4) sediment control and removal, and; (5) dam safety. These activities should incorporate the following management recommendations to protect and enhance wildlife resources and fishing opportunities in the park, especially around Lake Los Carneros.

6.1 Tule Control

Tules, or bulrushes, genus *Scirpus*, occur around permanent and seasonal bodies of fresh water and can be the dominant freshwater marsh indicator plants in soils with a high silt and clay fraction, i.e., anoxic soils. There are several species of tules, or bulrushes, in California. The California bulrush, *Scirpus californicus*, forms dense, monotypic stands around Lake Los Carneros.

The upper and lower limits of tule growth around the lake is a dynamic boundary controlled largely by seasonal and annual fluctuations in water levels. Sediment input from the upper watershed exacerbates the situation by creating shallow-water habitat. In wet years, when the lake is at or near capacity, because of continued inflows and elevated water tables, the upper limits of tule growth extend along flat, nearshore areas, such as the southwestern and northwestern corners of the lake (Figs. 3 and 4). When water levels drop these extensive stands dry out and the tules either die or become dormant. Active tule growth is then restricted to a narrow band of tules around the new, lower lake level (Fig. 4; Photo 17). The lower limits of tule growth also are controlled by water depth. Tules occur in shallow water, generally five feet deep or less. Tule growth follows receding water levels during the summer. When water levels subsequently increase, plants in these lower elevation areas either die if they are


Covington Way
Stow House
Lake Los Carneros
Dam
Calle Real
Dead or Dormant Tules
Live Tules
Existing Footpaths
0 100 300 500
0 200 400 500
Scale in Feet
N
Source: Pacific Western Aerial Surveys, Flown 5 Nov 1998
LEGEND
LAKE LOS CARNEROS MANAGEMENT PLAN
Figure 4
Scirpus Marsh Vegetation Around Lake Los Carneros, 1999
HUNT & ASSOCIATES

completely inundated, or persist if most of the aerial portions of the plant are not submerged.

Comparison of aerial photographs from 1932, 1977, and 1982, as well as observations of several long-time residents, showed that the amount of tules around the margin of the lake increased significantly during this time, accelerating after ranch operations ceased in the early 1960's (Penfield and Smith, 1983; also see Fig. 2 [1967 aerial photograph] in Fast and Glenn, 1978). When the ranch was operating, tule growth was controlled by a combination of cattle grazing and a rapid drop in water levels in the spring and summer when the lake was the source of irrigation water for the ranch. Tules also were controlled by submerging them in the winter, then maintaining a high water level in the lake to prevent colonization (Penfield and Smith, 1983).

Soil erosion caused by agricultural and residential development around the lake and elsewhere within the watershed, resulted in large sediment accumulations in the lake, which made it shallower and more conducive to tule encroachment. Fast and Glenn (1978) concluded that sediment input to the lake probably peaked in the late 1960's and early 1970's, during adjacent residential development. A long-term drought in the mid to late 1980's significantly lowered lake levels and allowed tule growth to encroach towards the center of the lake (Planning Land Use Services, 1986), however, much of this vegetation was killed when inundated during subsequent years of normal and above-normal precipitation in the early 1990's.

Justification for tule control. The need for tule control at Lake Los Carneros is not based on studies of tule encroachment, but rather on the observations and general consensus of various groups, including birdwatchers, recreational users, and vector control agencies, as well as the previous management documents. Each agree that a limited amount of tule removal and a benign control method would benefit the overall aesthetic, biological, and recreational uses of the lake.

Fast and Glenn (1978) recommended removal of tules from at least 40% of the shoreline of the lake and recontouring of the shoreline with soil cement to permanently prevent tule encroachment. This proposal would have eliminated a significant amount of wildlife habitat around the lake, while significantly increasing opportunities for fishing. Penfield and Smith (1983) and Penfield and Smith et al. (1987), recommended limited tule control by mechanical means when water levels were either artificially or naturally low, but did not detail where removal should occur. Paul Lehman, a noted local ornithologist, recommended that no more than 10% to 20% of the tules be permanently removed (Planning Land Use Services, 1986), but again, no recommendations were made as to the specific method, frequency, or location of tule removal.

Almost 20 years ago Penfield and Smith (1983), stated that large-scale clearing of tules, as recommended by Fast and Glenn (1978), should be deferred until sufficient data were gathered on both the rate of tule encroachment and the sensitivity of wildlife populations to habitat alteration. They proposed a long-term data collection program to, "... provide a scientific basis for deciding when and to what extent sediment and tule removal is needed for lake preservation....If after several years of monitoring, it appears that succession will eliminate the lake in a relatively short time,..., major modifications to the lake may be necessary. The options range from dredging the entire lake with extensive tule removal and shoreline modification to sediment removal in the open water areas up to the tules with minimal tule removal. To preserve the lake as an open water habitat with minimal loss of wildlife habitat, the latter would be preferable." (Penfield and Smith, 1983). The 1986 EIR by Planning Land Use

Services (1986) concurred with this recommendation. The 1987 plan by Penfield and Smith et al., proposed two or three monitoring stations from which tule encroachment would be documented on a bi-annual basis over several years. To date, none of these recommendations have been implemented. Consequently, the present report and management recommendations again rely on anecdotal information and the inevitable natural succession of man-made reservoirs regarding the need for tule control.

Previous reports stated that representatives of the Santa Barbara Audubon Society, when contacted regarding proposed tule control activities at Lake Los Carneros, noted a significant decrease in the number and diversity of ducks and other waterfowl using the lake between the late 1970's and early 1980's. They attributed this to tule encroachment and a corresponding areal decrease in open water habitat at the lake (Penfield and Smith, 1983). More recently, local birdwatchers have expressed an interest in limited tule control around the lake as a means of improving birdwatching opportunities (Lentz, pers. comm.). Individuals who have fished the lake for years have also noted a general decline in the quality of fishing that they partially attribute to a combination of declining shoreline access and loss of spawning areas caused by tule encroachment, as well as recent fish-kills resulting from seasonal fluctuations in water quality (Wallis, pers. comm.).

Previous reports, conversations with local interest groups, and current conditions generally concur that without some form of tule control the amount of open water in Lake Los Carneros will continue to decrease, with a corresponding decline in species diversity and use by waterfowl. Natural succession of open water to tule marsh with a small amount of open water would benefit certain wildlife species that use tule marsh for foraging and/or breeding, but would reduce the size and quality of open water habitat used by waterfowl, diminish the ability of the lake to support recreational fishing, significantly increase periodic mosquito outbreaks, and generally reduce aesthetic values. Anecdotal reports and opinions are generally supportive of tule control, as long as the extent of control is limited in a single year, preserves extensive areas of tules for wildlife, causes the least amount of impact to wildlife resources, and is completed under the supervision of a qualified ornithologist or wildlife biologist.

A supplement, or possible alternative to mechanical removal of tules involves maintaining relatively constant water levels in the lake. This management recommendation was put forth in several previous plans (Fast and Glenn, 1978; Planning Land Use Services, 1986; Penfield and Smith et al., 1987). If employed as the primary method of control, this technique could reduce, but probably not eliminate, the need for mechanical control of tules. This control strategy has not been implemented because there is no source of water for maintaining water levels. Currently, there are no water wells on park property that can be used to deliver the minimum 70 acre-feet of water, or 50 gallons/minute for 10 months, estimated by Planning Land Use Services (1986), that would be required to maintain a steady lake water level throughout the year. Costs associated with construction and operation of this well may be prohibitive (Wheeler, pers. comm.), and may result in a drawdown of the local water table with potential impacts to existing wetlands around the lake (Penfield and Smith, 1983; Planning Land Use Services, 1986). Previous reports suggested diverting additional instream flow from Carneros Creek and San Pedro Creek during the winter, using historic, but existing, flow diversion structures (Penfield and Smith et al., 1987). Given current county, state, and federal policy regarding protection of instream flows, the likelihood of this proposal being implemented is even more remote than drilling on-site water wells.

Consequently, reducing the width of the fringe of tules around certain portions of the lake by mechanical means appears to be the least expensive and most viable method of tule control at this time. Effective control of sediment input in the future also could significantly reduce the frequency and intensity of tule cutting. Sediment control, in itself, will maintain lake depth and limit tule encroachment towards the center of the lake (see separate section below on sediment control). Preservation of the aesthetic, recreational, and biological values of Lake Los Carneros is a stated goal of the County Parks Department. Therefore, an integrated maintenance program of limited mechanical removal of tules, together with sediment removal, control of sediment input, and habitat restoration, will likely result in a net benefit to wildlife resources in the park, especially for birds, as well as enhancement of recreational fishing opportunities in the lake.

Method of Tule Removal. Santa Barbara County Parks Department proposes to employ mechanical means as the least expensive method of tule control. They have purchased an hydraulically-operated underwater weed cutter to cut tules (Appendix 3). The cutter and power supply is supported on a metal, foam-filled pontoon powered by an 8 hp outboard motor. An hydraulic pump provides energy for operating the two hydraulic motors for the cutting head and paddle propulsion. An hydraulic cylinder provides power to lift and lower the cutting sickles to any level from about five feet below the surface of the water to about 18 inches above the water surface, to allow above-water vegetation to be cut along the shoreline. Underwater plants are cut at substrate level or above, leaving the underground portions of the plant intact. The unit is self-propelled and can cut plants in as little as 10 inches of water with paddle propulsion. According to the product literature, the paddles will not kill fish or damage sensitive fish breeding areas. The main sickle is 10 feet wide and, depending on the density of tules, this unit can cut up to 12 acres of vegetation per day. The tules are cut at substrate level or above and the cut stems float to the surface where they can be pushed to a shoreline collection point for disposal, using either a 10-foot wide rake attached to the front of the unit (Appendix 2), or gathered using a boom (similar to an oil containment boom), attached to a boat and pulled to the shoreline removal point.

Timing and frequency of tule removal. This aspect of the control program is critical because of potentially significant impacts to breeding birds, including several sensitive species. Tule removal activities should be limited to late summer, between 15 August and 30 September, in order to occur well after the breeding season for birds that nest in tules and willow thickets around the lake, but prior to the arrival of fall vagrants and other early winter visitors. This interval also falls beyond the typical post-breeding molt cycle of ducks, geese, and other water birds, at which time they are flightless and highly vulnerable to disturbance and predation. This activity window will also avoid the breeding season for aquatic-associated amphibians and reptiles. A qualified biologist should survey any areas proposed for tule removal immediately prior to work to assess occupancy by amphibians, reptiles, and birds. **If it is necessary to conduct limited tule removal before or after the 15 August - 30 September time frame, then a qualified biologist should survey the proposed work area immediately prior to tule removal to assess potential impacts to birds, amphibians, and aquatic reptiles.** The biologist should be familiar with the breeding habits of all of these groups. The surveys should follow established USFWS protocol for egg masses, larvae, juveniles, and adults (i.e., two daytime and two nighttime surveys). Frog and turtle surveys can be done concurrently.

Location, extent, and frequency of tule removal. Lake Los Carneros supports approximately 4.5 acres of live tule growth, as measured from an aerial photo taken 5 November 1998 (Fig. 4). Under the recommendations detailed below, approximately

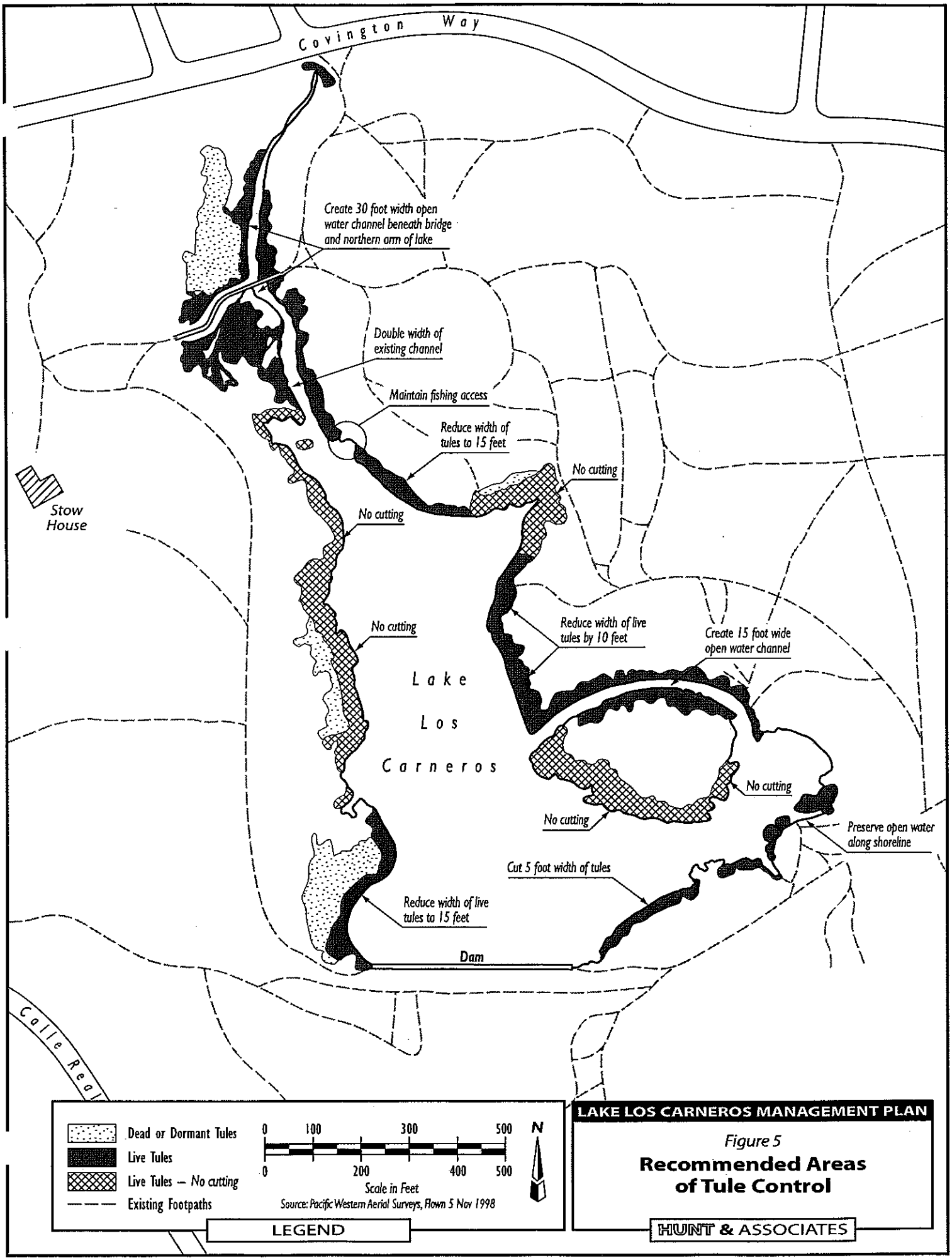
0.8 acres, or about 17% of the total live tule habitat would be cut during the first-year effort. Tule removal is only to be conducted in areas of live (green) tule vegetation. Areas of predominately dead or dormant tules behind the live tules are not considered for control here and should be preserved as wildlife habitat (Fig. 4; Photo 17). This vegetation grew when water levels were high. These areas of dead tules are extensively used by marsh-nesting birds and should be preserved. In the following recommendations, the extent and location of tule cutting was determined by considering the amount of cover required by least bitterns, common gallinules, and rails for roosting and nesting. These species require denser, relatively more extensive tule patches than other marsh-nesting birds, so maintaining suitable habitat for these species will presumably benefit other marsh-dwelling birds as well.

The locations of tule removal described below are intended to serve as a first-year effort. Impacts to birds from tule cutting activities will be difficult to document because avian use of these habitats naturally varies seasonally and between years. A tule encroachment monitoring plan, modeled on the recommendations provided by Penfield and Smith (1983) and Planning Land Use Services (1986), could more objectively determine the location and magnitude of tule encroachment, and would serve as the basis for directing future tule removal efforts. If the first-year effort has not significantly impacted wildlife resources, then subsequent control should be directed to the same areas in order to maintain the first-year's effort.

All tule cutting activities should be closely monitored by a local biologist familiar with the habitat requirements of waterbirds and riparian birds, as well as the regional importance of this habitat type. The biologist should be present during all tule cutting operations to direct both the extent and location of cutting. At least 10 feet of live (green) tule vegetation, as measured from the shoreline outward to open water, should be left in place along the shoreline in areas that are being cut, in order to minimize shoreline erosion and disturbance to wildlife by people and dogs.

Southeastern shoreline. The eastern and northern edges of the "island" located in the east-central/southeastern area of the lake are currently connected to the shoreline by dense tule growth (Fig. 5; Photo 18). Maintaining an open channel around the eastern and northern edges of this "island", while maintaining tule growth at its current levels around the southern and western edges of this "island", could reduce predation on breeding birds that nest in this area by feral cats, opossums, and other carnivores that routinely search the shoreline for prey. Human access to this island is currently blocked by dense tule growth, but domestic dogs can access it rather easily. Maintaining an open channel between the island and the near shoreline would present an additional barrier to humans and domestic dogs. The open water channel should be no more than 15 feet wide and should concentrate on cutting tules along the "mainland" section of shoreline, leaving at least a 10 foot wide band of tules along the shoreline in this area (Fig. 5).

The shoreline immediately east of the dam, between the dam and the overflow pipe, currently contains several large clumps of tules that extend at least 20 feet out from the shoreline. These clumps could be reduced to a minimum of 10 feet wide (Fig. 5). Willows growing along this section of the shoreline should be preserved. The patches of open shoreline currently found in this area should be maintained for fishing access (Photos 19-21). Extensive areas east of the dam, dominated by pure stands of willow smartweed, *Polygonum lapathifolium*, and which are inundated only during high lake levels, should be preserved.


Covington Way
Create 30 foot width open water channel beneath bridge and northern arm of lake
Double width of existing channel
Maintain fishing access
Reduce width of tules to 15 feet
No cutting
No cutting
Stow House
No cutting
Reduce width of live tules by 10 feet
Create 15 foot wide open water channel
Lake Los Carneros
No cutting
No cutting
Preserve open water along shoreline
Cut 5 foot width of tules
Reduce width of live tules to 15 feet
Dam
Calle Real
Dead or Dormant Tules
Live Tules
Live Tules — No cutting
Existing Footpaths
0 100 300 500
0 200 400 500
Scale in Feet
N
Source: Pacific Western Aerial Surveys, Flown 5 Nov 1998
LEGEND
LAKE LOS CARNEROS MANAGEMENT PLAN
Figure 5
Recommended Areas of Tule Control
HUNT & ASSOCIATES

The shoreline between the overflow pipe and the "island" should be treated similarly--isolated clumps of tules should be maintained as isolated islands of vegetation, separated from the shoreline by open water. Current patches of bare shoreline should be preserved as fishing access points (Fig. 5).

Southwestern shoreline. The southwestern corner of the lake, north of the west end of the dam, contains a 15-20-foot wide fringe of tules backed by an extensive area of dead or dormant tules over 50 feet wide that has harbored one or more least bitterns in the recent past, and which should be managed for this species (Fig. 4). The dead tules should be preserved and the live tules should be cut leaving a swath no less than 20 feet wide. Tule cutting should extend northward no more than 300 feet north of the dam in this area (Fig. 5; Photo 17).

Western shoreline. Tule vegetation forms a relatively narrow band between open water and early successional willow riparian woodland along the western shoreline between the northern terminus of tule removal area previously described, and the mouth of the northern arm of the lake (Fig. 4; Photos 17 and 22). This may be due to the steeply sloping shoreline along this reach (Fig. 14 in Fast and Glenn, 1978). Consequently, tule cutting should not be allowed in this area.

Northern arm. The existing open water channel extending northward from the mouth of the northern arm to Covington Way should be widened by 50% from its current width of approximately 10-15 feet (Fig. 5). Willow growth in this area should not be disturbed. The small island of tules near the mouth of this channel should remain but should be maintained at its present size to prevent additional lateral growth and channel closure (Fig. 5). The extensive areas of tules along the western and central portions of the northern arm of the lake have provided important habitat for several pairs of least bitterns, rails, and other birds in recent years, and should be preserved and managed as such (Figs. 4 and 5). Tules should be cut beneath the boardwalk bridge, extending laterally outward for a distance of 15 feet on either side of the bridge (total width of cut not to exceed 30 feet). Regular human presence along the bridge makes tule habitat directly beneath the bridge less attractive for birds, but maintaining open water here would significantly increase fishing access in this area (Fig. 5; Photos 9, 16, 23-24).

Northeastern and eastern shoreline. The width of tule growth along this shoreline is highly variable, ranging from less than ten feet to more than 30 feet in some places, depending on the substrate topography of the lake (Fig. 14 in Fast and Glenn, 1978). However, most of the shoreline currently supports less than 20 feet of tule growth (Fig. 4; Photo 7). The small inlet in the northeast corner of the lake contains an extensive area of tules that also has supported least bitterns in recent years. Tule growth along this inlet should be maintained at its current width. Tule removal should occur only along the shoreline northwest and southeast of the inlet and should remove no more than 5 feet of tules along these reaches (Fig. 5).

Tule disposal. Once tules are cut, the floating stems should be gathered using a boom, similar to an oil containment boom, attached to a boat. The cut stems should be pulled either to the face of the dam or to barren shoreline at the southeastern edge of the lake for disposal Fig. 2; Photo 21). Care should be taken to prevent excessive damage to the shoreline during disposal activities. The tules should be taken to an on-site location, chipped, and disposed of in the large scar located in the meadow east of the lake in order to increase organic matter in the soil for habitat restoration (Fig. 6).

Lake access for fishing. The recommendations presented below are designed to enhance both fishing potential and wildlife habitat by focusing fishing activity to certain

portions of the lake where fish habitat can been created and maintained, and limiting public access to other areas to be managed for birds and other wildlife. Directing fishing activities to particular areas of the lake will reduce human presence and wildlife disturbance to areas of the shoreline that currently receive uncontrolled, moderate to heavy use. The reader is also referred to the section below dealing with dam safety for additional recommendations on this topic.

Public access to tule habitat around the lake for fishing and walking is currently uncontrolled, but could be more focused by constructing the boardwalk and lake observation platform recommended and described in Penfield and Smith et al. (1987). The boardwalk and observation platform should be located along the eastern shoreline, not the western shoreline as recommended in Penfield and Smith et al. (1987), consistent with other recommendations to manage the western shoreline as wildlife habitat with minimal human intrusion. An elevated boardwalk and platform should be connected to the maintained trail along this side of the lake, in order to keep human and domestic dog intrusion along the western shoreline to a minimum (Fig. 6; Photo 7).

In addition to the platform, a fishing access point cut through the tules to the shoreline could be located along the northeastern shoreline (Fig. 5). The vegetation should be cut back at a 45 degree angle on either side to permit casting. Large stones should be submerged at the outer edge of the tules in these areas to attract fish. These piles of stones should protrude above the surface of the water to provide basking sites for turtles.

There are several areas along the southeastern shoreline and overflow pipe area that currently are heavily fished. The shoreline in these areas is mostly devoid of vegetation (Photos 18, 20-21). Piles of large stones should be placed between the "island" and the southeastern shoreline to attract fish (Fig. 6). See Item 5 below dealing with dam safety for additional enhancement opportunities of this type.

Tule removal beneath and adjacent to the bridge over the northern arm of the lake, as described in item (b) above, will provide increased fishing opportunities in this area.

6.2 Improving lake water quality

Lake Los Carneros is a man-made lake and, because of its size, depth, and land use activities in the upper watershed, it is naturally eutrophic. Eutrophic lakes are characterized by dense plant growth, turbid, green water, anoxic substrates which emit a characteristic "rotten egg" odor caused by hydrogen sulfide and other sulfur compounds, low oxygen levels at depth, thermal stratification of the water column, and fish kills. Excessive nutrient levels, specifically phosphorus and nitrogen, are the primary causes of eutrophication. While not overly eutrophic, Fast and Glenn (1978), noted that Lake Los Carneros did contain high levels of these nutrients and had very low dissolved oxygen concentrations at depth. The latter condition helps release more of these nutrients, especially phosphorus, from the lake substrate. Occasionally, aquatic conditions in the lake have deteriorated to the point that significant fish kills have occurred. This happens when phytoplankton densities in the near-surface waters increase to the point that they completely screen sunlight from deeper waters. A strong thermocline is established, the water changes from a transparent light green to an opaque, pea-green color, and conditions are set for oxygen depletion throughout the water column. Although these photosynthetic organisms contribute to high dissolved oxygen concentrations near the surface during the day, at night respiration rapidly depletes oxygen levels in these shallow waters. Several days of cloudy weather can kill

the phytoplankton, causing a proliferation of bacteria which feed on them. Dissolved oxygen levels drop throughout the water column and fish start dying, beginning with the larger individuals. This situation is infrequent in Lake Los Carneros, but last occurred in early summer, 1997. Fast and Glenn (1978) did not recommend a significant, long-term water quality restoration effort for the lake, but did note that artificial circulation of the water should prevent thermal stratification and oxygen depletion of the deep water.

Aeration can be a relatively low cost, effective means of improving water quality with little or no impact to wildlife. Chemical and/or bacterial control methods are expensive and may have detrimental side effects on wildlife or their prey. Simple, relatively inexpensive aeration systems have been used to improve water quality in lakes and ponds at several zoological gardens, including a 10-acre surface area lake at the San Diego Wild Animal Park. The basic system consists of two major components: a submerged aerator/disperser, which is a high-volume water pump and aerator that adds oxygen to the water, and; a control/pump unit that requires a 15 amp, 120 volt, single phase, grounded electrical connection (Appendix 4). The aerator/disperser is placed on the bottom of the lake and directs air upward through a tube, which creates an efficient water pump. The upward movement of the air acts as a pumping force by drawing large volumes of water through the water intake and into the tube. The tube has internal devices that break large air bubbles into smaller bubbles, significantly increasing the oxygen level throughout the body of water (Appendix 4). The system also has the ability to introduce flocculating agents through the air lift tube that precipitate and settle suspended solids in the water column, as well as bacteria that digest phytoplankton and other nutrients in the water. However, application of these chemical and/or biological controls is not recommended because of their unknown effect on non-target aquatic insects and other wildlife, and the prohibitive cost of treating a body of water the size of Lake Los Carneros. The goal is to improve water quality in a benign way that is consistent with maintaining wildlife habitat quality. Discussions with a local sales representative concerning several types of aerators (Parks, pers. comm.), led to the following recommendations for Lake Los Carneros: the lake probably needs five or six aerators, scattered throughout the lake: one at either end of the dam at the deepest part of the lake, one in the center of the lake, one on the east side, one on the west side, and one near the mouth of northern arm (Fig. 6). The air lines would run through PVC pipes sunk on the bottom of the lake and weighted to prevent disruption by fishing lines. The system could be run from a 5-hp pump/compressor. The pump could be mounted on a trailer to prevent vandalism that could occur to a fixed unit. The trailer could be moved to the fixed air line hook-up point each day and the pump could be run for a little as 4 hours/day and still provide benefits to the lake.

The pump/air line hook-up should be located near the northwestern end of the lake near the bridge over the northern arm (Fig. 6). The air lines and PVC pipe could enter the lake beneath the bridge run down the middle of the northern arm channel, then down the middle of the lake to each aerator (Fig. 6). Impacts to wildlife, specifically birds, from the operation of this system should be negligible. The aerators operate quietly and result in a slight disturbance to the surface of the water. Periodic maintenance of the pump unit is required after about 800-1,000 hours of operation. The rest of the system requires minimal maintenance. Total cost for this system is roughly estimated to be about $ 20,000-$ 25,000, plus installation. Contact Dale Parks, at Dale Parks Landscape and Ranch Maintenance, 4648 Via Clarice, Santa Barbara, CA 93111, (805) 964-1318, for a complete cost estimate.

LAKE LOS CARNEROS MANAGEMENT PLAN

Figure 6

Additional Management Recommendations

HUNT & ASSOCIATES

- Maintained Trail System
- Area of Potential Land Acquisitions
- Locations of Rock Piles for Fish Habitat
- Swallow and Bat Roost Structure Locations
- Aerator Locations
- 1 Location Of New Sediment Control Basin
- 2 Sediment Removal
- 3 Aerator Hook-up Location
- 4 Fishing Access Point Through Tules
- 5 PVC Distribution Lines for Aerators
- 6 Face of Dam
- 7 Observation Platforms
- 8 Sediment Disposal Location

200 0 100 400

200 0 200 400

Scale in Feet

N

LEGEND

6.3 Vector control

Mosquito control can be accomplished with chemical, mechanical, and biological methods. Each of these insect control methods have known or potential negative environmental consequences of varying magnitude. The local Mosquito Abatement District has in the past, used all of these methods (see Appendix B in Fast and Glenn, 1978). Chemical control methods have not been employed at Lake Los Carneros for several years because of adverse environmental impacts.

Biological controls have typically involved the use of western mosquitofish, *Gambusia affinis*, a small, non-native fish that preys heavily on mosquito larvae; however, the widespread introduction of this fish to most bodies of water and many watercourses in California is not without environmental consequences for native species. There is evidence that this fish competes with native fishes for food and space and it may also feed upon the eggs and hatchlings of native amphibians, including the California red-legged frog, a listed species (Jennings and Hayes, 1994; Lawler, et al. 1999). Mosquitofish likely reduce, but do not control larval mosquito densities in Lake Los Carneros because of the dense, fringing growth of tules that prevent this fish from entering many shallow-water habitats where mosquitoes breed; however, tule control conflicts with protection of this vegetation as cover, foraging, and/or breeding habitat for birds.

Recently, the Santa Barbara Coastal Vector Control District has periodically inoculated Lake Los Carneros with bacteria, such as *Bacillus thuringiensis*, that attack the gut of mosquito larvae. Host specificity of this bacteria is not well-known, any may not be limited to mosquito larvae. The potential negative consequence of this vector control method could be infection of other species of aquatic and terrestrial insects (e.g., butterfly and moth larvae) in Lake Los Carneros that function as prey for fish, birds, and bats.

A more environmentally benign mechanical control method is being investigated by the Vector Control District (Bernstein, pers. comm.). This method involves the addition of a biologically inert compound that self-disperses a single-molecule-thick layer across the water. This molecular layer prevents mosquito larvae from respiring. The effects of this compound on the egg laying ability of adults or larval respiration in non-target species of aquatic insects is unknown. Currently, the Vector Control District relies on an integrated pest management technique, which involve trapping and identifying adult mosquitos, estimating relative abundance of each species, then determining an appropriate course of treatment (Bernstein, pers. comm.).

Limited removal and control of tules and other dense, fringing aquatic emergent vegetation from around the shores of Lake Los Carneros has been proposed by County Parks Department as a method of mosquito control. This would reduce the amount of suitable breeding and larval microhabitat for mosquitos and would permit mosquitofish and other predators to forage along the shoreline in these area. But in order to be effective, a significant amount of the existing tule vegetation around Lake Los Carneros would have to be removed, resulting in significant and unacceptable impacts to breeding birds and other wildlife. The location and amount of tule removal has been previously discussed in this document; however, the limited tule removal program recommended herein is intended to occur in conjunction with other chemical/mechanical and biological control methods (see previous paragraphs).

Another facet of mosquito control that has not been exploited around Lake Los Carneros is the use of insect-eating birds and bats, to control certain types of flying

insects. These species are capable of consuming a significant proportion of their body weight in insects in a day. However, the extent to which bats feed on mosquitos is species-specific (Ross, 1967). Storer (1926), [in Ross, 1967]), found that the Mexican free-tailed bat, *Tadarida brasiliensis*, a common local species, did not consume mosquitos at his Texas and California study sites because it forages at or above the canopy where it specializes on moths and beetles. Smaller species that forage closer to the ground, on the surface of water bodies, and around vegetation, such as the Yuma myotis (*Myotis yumanensis*) and the California myotis (*M. californicus*), include mosquitoes as a significant part of their diet (P. Collins, pers. comm.). Both of these species are locally common and they can be expected to consume large numbers of mosquitos, as well as other insects such as midges (Family Chironomidae), the adults of which seasonally occur in huge numbers around Lake Los Carneros. The local Mosquito Abatement District has identified 10 species of mosquitos at Lake Los Carneros. The behavior and microhabitat preferences of adult mosquitos is species-specific, but adults of the most common species found around the lake typically stay close to aquatic emergent and riparian vegetation (Bernstein, pers. comm.).

Encouraging swallows and bats to nest/roost around the lake would not only provide an insect control measure, but is also consistent with wildlife habitat preservation and enhancement goals of the park. Swallows forage in the daytime, bats at night, so insect predation could be constant. Lake Los Carneros County Park is currently visited by at least seven species of swifts and swallows, of which at least four species are known to breed there (Appendix 1a). Cliff and barn swallows are by far the most numerous species of swallows in the park. These birds construct communal mud nests beneath overhanging eaves of buildings. Frequently, nest sites are located in places that are inconvenient or unsightly to humans, and are destroyed. Artificial swallow nesting structures could be constructed and placed at several locations around the lake (Fig. 6). Each structure should be capable of housing at least 50-100 nests.

At least 12 species of bats are known from or potentially occur within the boundaries of the park (Appendix 1a). Bat shelters should be situated adjoining the swallow nest structures. The size, configuration, and orientation of these boxes is species-specific. For example, Yuma myotis a colonial species, forms roosts of several hundred individuals, while the California myotis, also a colonial species, forms roosts of only a dozen or so individuals (P. Collins, pers. comm). Bat boxes can also be hung from buildings and on tree trunks, and any existing bat roosts in the park should be protected (Fig. 6). The structures should be elevated and located away from areas frequented by park users. Interpretive signs could be installed to educate the public about this biological control method. A biologist familiar with nesting requirements of these species should direct the design and placement of these structures, and they should be periodically monitored for occupancy for at least a year following installation, in order to assess orientation and other attributes of use by bats. Labor for constructing, installing, and monitoring these structures could come from the local community, as well as environmental groups, such as the Santa Barbara Audubon Society and the Urban Creeks Council that have expressed interest in such activities in the park. Consequently, costs associated with implementing this recommendation may only involve materials and consultation with a biologist as to constructing and siting these structures.

In summary, a combination of biological control (mosquitofish, bacteria, and insectivorous birds and bats), mechanical control (molecular film), and limited tule removal, may offer the best and most benign methods of vector control.

6.4 Sediment Removal and Control

A concrete sediment control basin/channel was constructed in the early 1980's to intercept sediment before it enters the lake. This channel has not been maintained by County Flood Control or the County Parks Department. Consequently, sediment-laden water from the upper watershed is free to enter the lake from the northern arm. Deferred maintenance of this structure has allowed willows and other riparian vegetation to proliferate and form valuable wildlife habitat along the northern and eastern edges of the northern arm (Fig. 3; Photos 6, 16, and 24). Removal or disturbance of this vegetation now would constitute a significant alteration of important willow riparian woodland and avian habitat.

Studies by Fast and Glenn (1978), indicated that residential and agricultural sources in the lake watershed were responsible for substantial nutrient loading in the lake. Sediment removal alone will not control nutrient input from these sources, and therefore may not significantly affect the long-term eutrophication potential of the lake. However, removing existing sediment from the northern arm, then controlling the inflow of additional sediments into the lake will help control tule growth and maintain sufficient water depths for recreational fishing.

Sediment removal. The record 1997/98 rainy season transported a large amount of sediment into the lake. Currently, the northern arm is no more than two feet deep when the lake is at capacity, and is exposed for most of the year when water levels recede (Fig. 6; Photo 24). A few years ago this channel was several feet deep and contained water for most or all of the year (Wallis, pers. comm.). Sediments should be dredged from this channel in order to maintain channel and lake depth. This activity would require a 404 permit from the U.S. Army Corps of Engineers, but could be expedited through a cooperative effort with the Santa Barbara County Flood Control District under their permit program.

Dredging of the northern arm should occur only between 15 August and 30 September, in order to minimize impacts to breeding birds. A qualified biologist should survey the work area for turtles and other wildlife prior to commencing dredging activities and should monitor the dredging effort. The dredging should deepen the channel at least four to six feet from its present elevation and should extend from approximately 20 feet downstream from the bridge northward to Covington Way. The channel could be widened to approximately twice its current width, but the widening should occur mostly along the western edge in order to avoid impacts to willow vegetation along the eastern shore of the channel. Access to the northern arm for dredging poses a problem. The most accessible area is along the west side of the channel (Fig. 6). This would prevent disturbance to mature and successional willow riparian woodland along the northern and eastern edge of this channel. Only rubber-tired vehicles should be used in order to minimize soil disturbance to and from the access points. Shrubs in the work area should be cut at ground level to allow the root stock to re-sprout following work in these areas. Forbs and other herbaceous vegetation can be left in place. Rubber or metal track mats should be placed over the vegetation throughout the work area and heavy equipment should drive over these mats. The excavated sediment should be used on site for habitat restoration, e.g., the large, unvegetated depression in the grassland east of the southeast side of the lake (Fig. 6). However, care must be taken to ensure that sediments are not transported to seasonal wetlands south of this depression (Fig. 3).

Costs associated with sediment removal and control within the park can be estimated by the Flood Control District, and a cooperative effort between these agencies could be

established to complete this work. Contact Maureen Spencer or Larry Faucett at 568-3440 for additional information.

Sediment control. Two alternatives are presented for sediment control at the northern input location. The existing sediment control basin should be left in its current state in favor of construction of one or two additional basins:

(1) a small basin should be constructed in ruderal habitat adjacent to the west edge of the northern arm (Fig. 6; Photo 25). This basin could be easily maintained without disturbance to sensitive riparian habitats adjacent to the basin. Construction of this basin should be coordinated to occur at the same time as dredging (15 August to 30 September).

(2) A more effective means of sediment control could be achieved by containing sediment at the source, i.e., the upper watershed. A sediment control basin should be constructed on La Patera Ranch to intercept sediment before it reaches the lake (Photo 30). County Parks should work with La Patera Ranch landowner(s) to install and maintain other erosion control measures on their lands, such as mulch and silt fence. Erosion from the upper watershed is threatening the viability of the lake and will cost the County thousands of dollars to treat the symptoms, when a cooperative effort could alleviate the problem at its source. Funding for installation and maintenance of sediment control measures such as the upper sediment control basin, may be available from the Natural Resource Conservation Service (formerly the U.S. Department of Agriculture Soil Conservation Service) through their Watershed Health and Environmental Quality Incentive Programs. Contacts with additional information on this funding source are: Theresa Stevens, Santa Barbara County Planning and Development Department (568-2007); and Brian Trautwein, Environmental Defense Center (963-1622).

6.5 Dam safety and fishing enhancement

Fast and Glenn (1978), made a number of recommendations for management of Lake Los Carneros, but gave highest priority to re-contouring the face of the dam to increase public safety and make fishing from the dam more attractive. This portion of the lake receives the highest fishing intensity because it is the only large section of lake shoreline that is clear of tules and provides needed underwater structure for fish. Fast and Glenn recommended re-contouring the face of the dam from the existing 1.95:1 slope to a 4:1 slope; construction of a two-foot high concrete bulkhead at the dam shoreline for erosion control; construction of an eight foot wide concrete walkway along the face of the dam; and construction of two or three sets of stairs extending from the top of the dam to the water.

These recommendations have merit, but should be modified to reduce construction-related impacts to the lake and fauna:

(a) do not re-contour the face of the dam as described in Fast and Glenn (1978), as this would likely involve draining the lake, with significant impacts to wildlife and the fishery;

(b) instead of constructing a concrete walkway across the face of the dam, cement irregularly-shaped stones into the face of the dam, extending from the existing walkway down the dam face to several feet below the water surface (Fig. 6). This would not only significantly roughen the face of the dam and increase

public safety, but would greatly enhance fish habitat in this area by providing much-needed underwater refugia (Fig. 6).

(c) construct two or three stairways (one on either end of the dam and one in the middle of the dam), extending from the top of the dam to the waterline to allow access to the water (Fig. 6).

Specific areas that already receive heavy fishing and visitor use, such as the southeastern corner of the lake, also could be made more attractive to fish as an alternative to creating more lakeshore access points through the tules for fishing (Photos 20 and 21). Fishing in these areas could be enhanced by submerging large piles of rocks to create underwater refugia for fish. These rock piles should be placed well off shore and project out of the water to create protected basking sites for aquatic turtles, including the native southwestern pond turtle. At least three stone piles also should be created near the shoreline at the base of the dam (Fig. 6). These structures should extend through the entire water column, to the surface of the water, to allow fish to occupy varying depths according to water temperature and dissolved oxygen concentrations.

Rocks could also be grouted into the face of the dam to increase public safety and improve fish habitat.

Any of these activities requires lowering the water levels of the lake in order to access the face of the dam. Work should commence in late summer or early fall (August/September) in order to reduce potential impacts to breeding and/or wintering waterfowl. The work should be done in a year of predicted normal or above normal rainfall in order to refill the basin to pre-project levels as soon as possible and prevent tule invasion at lower than existing levels. Water levels should be lowered to approximately the lower limit of existing tule distribution so that the rhizomes are not completely desiccated.

By focusing fishing activities to the dam face and bridge over the northern arm of the lake the need to create and maintain fishing access at multiple locations around the lakeshore could be reduced or eliminated. This will reduce human presence and wildlife disturbance along areas of the shoreline that currently receive regular use.

7.0 ADDITIONAL MANAGEMENT RECOMMENDATIONS

The following management recommendations are presented to further offset potential impacts to wildlife that may result from current and future management practices, such as tule control, vector control, and sediment removal. These measures will enhance open space areas in the park for native plants and wildlife and allow controlled access and use by visitors engaging in activities such as fishing, hiking, birdwatching, educational activities, and social events (at Stow House and associated outbuildings).

1. Non-native vegetation control. Approximately 50% or more of the plant species found in Lake Los Carneros County Park are non-native, ranging from mature ornamental trees around Stow House, to dense stands of eucalyptus trees northeast of the lake and west of La Patera Road, to annual grasses covering most of the park. While many of these non-native plants are not invasive and have some wildlife value, there are several invasive species that should be eliminated and periodically monitored

to prevent re-invasion. Other species, such as non-native annual grasses and forbs, are so thoroughly established that eradication is not possible.

The most significant invasive is pampas grass, *Cortaderia atacamensis*, which has formed almost monotypic stands in the southwestern corner of the park north of Calle Real (Fig. 7; Photo 26). Effective control measures include complete removal of the plant and root system, then chemically treating all sprouts and new plants with a systemic glyphosate herbicide (e.g., Roundup, manufactured by Monsanto Corp.), over a period of three to five years, and at the same time re-planting the area with native species. Other areas where individual pampas grass plants have recently become established are: the small seasonal wetland in the southeastern corner of the park; the southeast shoreline of the lake, approximately 150 feet east of the east end of the dam, the "island", and; the eastern border of the small inlet at the northeast corner of the lake.

Giant reed, *Arundo donax*, is a hydrophilic, invasive plant that can completely dominate riparian habitats if not eliminated. A single colony of this plant occurs on the northern shoreline of the small inlet at the northeast corner of the lake (Fig. 7). Control is accomplished by a combination of mechanical and chemical means. The stems are cut approximately one foot above ground with a machete in late summer or early fall and the cut surface must painted with a strong solution of glyphosate-based herbicide within 1-2 minutes after cutting. All cut parts of the plant must be removed and chipped to prevent re-sprouting. The cut stem and root mass should be inspected the following spring and if it shows any green vegetation (including the stem), it must be cut and treated again.

Nasturtium, *Tropaeolum majus*, periwinkle, *Vinca major*, and German ivy, *Senecio mikanioides*, are invading small areas of the woodland between the old road to Stow House and the western shoreline of the lake (Fig. 7; Photo 1), and should be controlled now to prevent further spread into these native habitats. The leaves and stems of these species should be sprayed with a glyphosate-based herbicide in late summer or early fall, then inspected and re-treated if necessary, the following spring.

Extensive portions of the upland areas of the park are infested with thistles, including yellow star thistle, *Centaurea solstitialis*, common thistle, *Cirsium vulgare*, and especially Italian thistle, *Carduus pycnocephalus*. The latter species has formed extensive monotypic stands along trails leading to the west end of the bridge and in uplands between the trail leading from the east end of the bridge and the eastern shoreline of the lake ((Fig. 7; Photo 1). Although thistles are used extensively as a food source by several species of seed-eating birds, monotypic stands should be eliminated in favor of a mixture of annual grasses and forbs. Thistles should be sprayed with a glyphosate-based herbicide in spring when leafy growth is young and well before the plant has set seed. The sprayed areas should be seeded with annual brome grasses, genus *Bromus*, the following fall. Repeated treatments for two or three growing seasons may be necessary.

Ice plants, *Mesembryanthemum* spp., and other related genera, such as *Carpobrotus*, are established at various locations in the park, most notably around the northern end of the inlet channel at the north end of the lake south of Covington Way, and at several other locations along this roadway (Fig. 7; Photo 25), and between the west side of the lake and the Stow House road. Control consists of spraying with glyphosate-based herbicide several times over a month, then leaving the dead material in place to decay and prevent soil erosion. The dead mats can be broken up and seeded with native forbs and non-native grasses.

LAKE LOS CARNEROS MANAGEMENT PLAN

Figure 7

Proposed Areas of Non-native Vegetation Removal

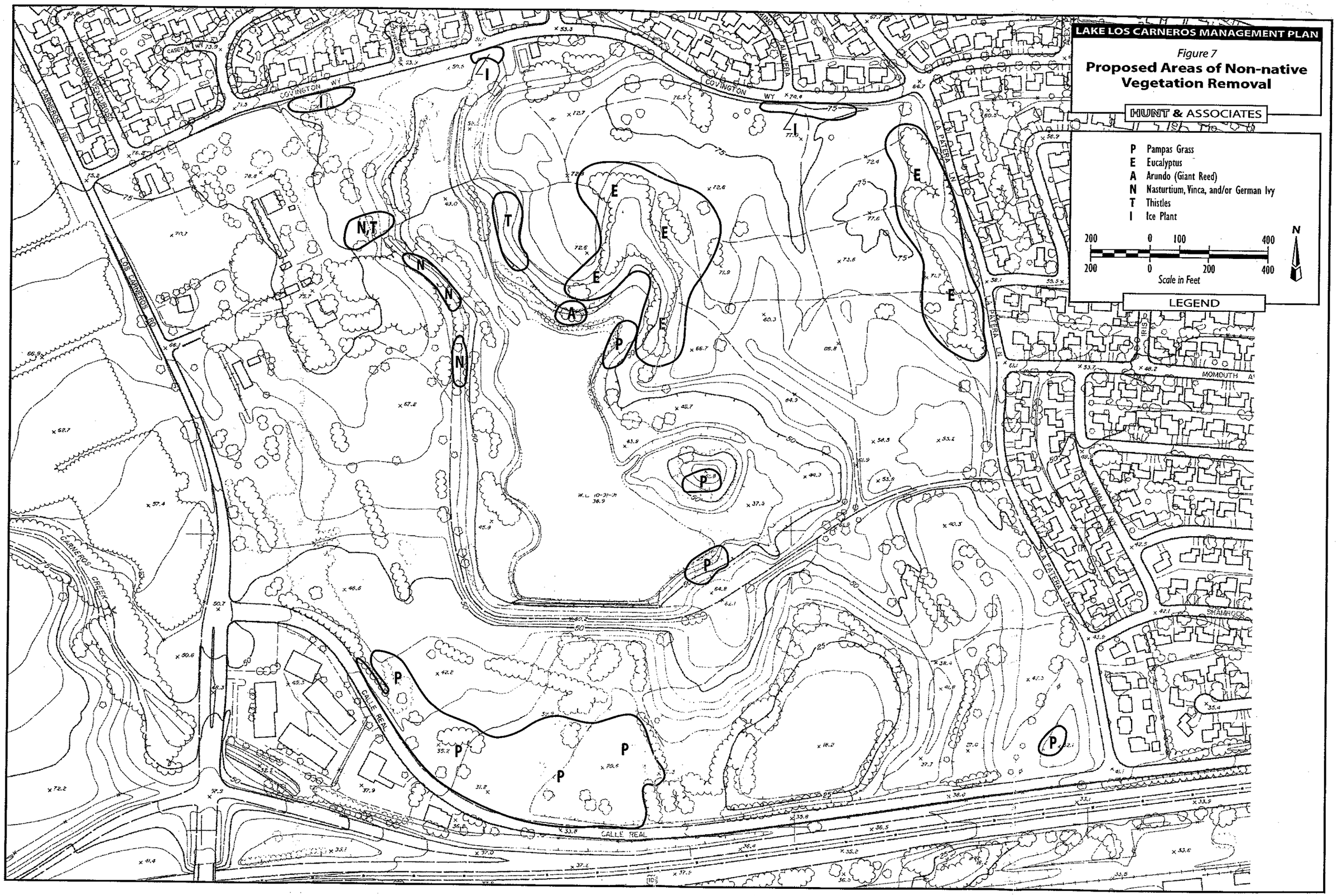
HUNT & ASSOCIATES

P Pampas Grass
E Eucalyptus
A Arundo (Giant Reed)
N Nasturtium, Vinca, and/or German Ivy
T Thistles
I Ice Plant

200 0 100 400
200 0 200 400
Scale in Feet

N

LEGEND



Blue gum, *Eucalpytus globulus*, was planted in the late 1930's and early 1940's, in several parts of the park when it was a ranch. However it has spread to form dense thickets along the northeastern edge of the lake and the eastern border of the park along La Patera Lane (Figs. 3 and 7; Photo 15). Mature individual trees and stands should be left alone, as they provide valuable roosting and nesting habitat for birds, specifically raptors, as well as autumnal and overwintering roosts for monarch butterflies. However, saplings and seedlings should be controlled. Control is by cutting with a chain saw, then pouring a glyphosate-based herbicide solution into a series of holes drilled at least two or three inches deep into the cut stump. The downed wood should be left in place or distributed to other areas of the park as microhabitat. When mature trees die or are blown down, they should be replaced with native trees, such as coast live oak and sycamore. By preventing eucalyptus germination while leaving existing mature trees, and replacing trees that die of natural causes with native trees, potential impacts to monarchs can be reduced and butterflies may switch to these native species as roost sites.

2. Habitat Restoration. This management recommendation must be implemented is close association with non-native vegetation control. The tules should be mulched and disposed of in the large scar located east of the lake in order to increase organic matter in the soil for habitat restoration (Fig. 6).

Lake Los Carneros County Park presents several outstanding opportunities for habitat restoration that would enhance wildlife resources and visitor enjoyment of the park, as well as further increase the status of the park as locally and regionally important bird habitat. These areas are:

Lakeshore. The aesthetic and biological values of the lake can be significantly increased by a program of native tree planting. Western sycamore and black cottonwood can be planted at various locations above the maximum lake water level. Candidate areas include the shoreline east of the dam and the southeastern corner of the lake (Fig. 8). The latter site already supports several volunteer specimens of black cottonwood. Planting sites for these species should be located in areas where the water table is relatively close to the surface. Coast live oak can be planted in upland areas around the lake. Because of the lack of water for oaks in upland areas where the water table is too far below the surface to support new plantings, these plantings would have to be hand-watered until established.

Southwestern corner. Santa Barbara Flood Control District has identified the southwestern corner of the park as a potential mitigation "bank" site and is actively seeking funding sources for non-native vegetation control and native plant restoration. A cooperative effort between County Parks and this agency would facilitate this task. Flood Control is also investigating the possibility of re-routing storm runoff from Los Carneros Road into the low-lying areas of this portion of the park. This additional seasonal input of water will increase subsurface soil moisture and enhance growth of the wetland vegetation already present in these low-lying areas. Following removal of pampas grass, the area should be heavily planted with a combination of coast live oak, in slightly elevated areas where their roots won't contact saturated soil, and western sycamore, *Platanus racemosa*, and black cottonwood, *Populus trichocarpa* var. *trichocarpa*, in low-lying areas (Fig. 8).

Seasonal Wetlands. The overflow pond and the small wetland in the southeastern corner of the park are important wildlife habitats. For example, 1995 breeding record for the northern end of the overflow pond was one of the few places along the south

LAKE LOS CARNEROS MANAGEMENT PLAN

Figure 8

Proposed Habitat Restoration

HUNT & ASSOCIATES

200 0 100 400

200 0 200 400

Scale in Feet

N

LEGEND

Increase native hardwood diversity

Eliminate and restore informal trails (See Figure 6)

Plant coast live oak around borders of eucalyptus grove

Remove young eucalyptus from grove; replace dead or windfall trees with native oaks

Plant native forbs and wildflowers

Mulch tules and place in eroded rovine with sediment removed from northern arm of lake

Maintain ornamental tree diversity

Increase native hardwood diversity

Leave dead trees and downed wood in place

Reduce informal trails to single, maintained trail

Increase native hardwood diversity

Install observatian platform at end of trail with information sign

Install split-rail fence around wetland with informational sign

Increase native hardwood diversity

Plant a screen of vegetation here

CARNEROS RD

LOS CARNEROS RD

COVINGTON WY

CASETA WY

CAMINO VENTUROSO

LA PATERA LN

IRIS PARK

MOMOUTH

KAMAI WY

SHAMROCK

CARNEROS CREEK

CALLE REAL

W.L. 10-31-77 38.9

101

coast of Santa Barbara County where wood ducks have successfully bred in recent years (Appendix 1a). The existing woodland habitat around the western, northern, and eastern edges of the overflow pond primarily consists of mature willow, with scattered coast live oak along the outer northern and western edge of the willows. One or two mature black cottonwood now occur along the northern edge of this seasonal wetland. Habitat restoration in this area should focus on increasing hardwood species density and diversity by additional planting of black cottonwood and coast live oak (Fig. 8). Black cottonwood should be grown from cuttings taken from mature trees in the Carneros Creek and San Pedro Creek watersheds, and coast live oak can be grown from either acorns or nursery trees grown from acorns collected from several trees in the park.

In order to control human and domestic dog access to this wetland and reduce the number of informal trails leading to and around it, a single, formal trail should be established. The trail should use the existing track that runs northeast and east of this wetland. The trail should terminate in an observation platform, situated along the northeast corner, that has educational signs relating to the habitat values of this wetland and the wetland in the southeast corner of the park (Fig. 8). See the Master Plan for the park prepared by Penfield and Smith et al. (1987), for an excellent series of recommendations regarding number and location of maintained trails.

In general, the overflow pond should be managed as wildlife habitat, i.e., leave it alone. Recent erosion control repair work around the outlet valve at the base of the dam (Photos 27 and 28), will reduce sediment inputs to the wetland, but the overflow channel must be maintained to prevent further erosion. If water becomes available in the future the overflow pond could be managed as foraging habitat for shorebirds by keeping it flooded with about one foot of water or less between March and June and between September and December. This may greatly increase the attraction of the park for shorebirds.

The small seasonal wetland in the southeastern corner of the park needs the following measures to protect its value to wildlife: pampas grass removal (this species has recently invaded the center of the depression); construction of a split-rail fence completely around this depression to keep visitors and their dogs from entering the wetland when it contains water, and; establishing a row of native shrubs and trees, such as toyon (*Heteromeles arbutifolia*), coyote brush, and coast live oak, between the wetland, Calle Real on the south, and La Patera on the east, to screen traffic noise and human activities (Fig. 8). The planted material must be situated so not to shade the seasonal wetland (Photo 12).

Eastern meadow. The attractiveness of the extensive grasslands northeast and east of the lake can be significantly improved by eliminating the network of informal trails crisscrossing this area (see detailed recommendation below), and by controlling invasive, non-native forbs, such as thistles, mustard (genus *Brassica*), and others. Coast live oak plantings should be widely spaced in this area to create oak savannah habitat. Coast live oak and sycamore should also be planted along the borders of the eucalyptus groves along the western and eastern edges of this area, but well outside the leaf fall zone, in order to gradually introduce these native trees as a replacement to existing non-native eucalyptus. Eucalyptus saplings should be removed and the area should be monitored periodically for re-invasion. Native forb and wildflower diversity should be increased by planting species such as California poppy, lupine, blackberry, etc. (Fig. 8). Any native seed mix should also include milkweed (*Asclepias*) species attractive to monarch butterflies as larval food sources.

Ornamentals. The existing variety of ornamental conifers and palms around Stow House and elsewhere in the park attract a variety of migratory passerine birds, including winter vagrants such as hermit warbler and palm warbler (Appendix 1a; Photos 13 and 14). These trees should be maintained and replaced with the same species when a specimen dies. The windrow of Monterey pine, *Pinus radiata*, and Monterey cypress, *Cupressus macrocarpa*, southwest of the lake, as well as the scattered clumps of Monterey cypress northwest, north, and northeast of the lake along Covington Way, should be planted with native trees, such as California live oak, when a specimen dies. If possible, the snags should be left in place to provide roosting and foraging habitat for raptors, owls, and other birds. Additional plantings of these species should occur along Covington Way (Fig. 8).

3. Trail maintenance. Currently there is no formal trail system in the park. The result is a network of poorly maintained, heavily eroded, informal trails that fragment the open space, especially the grasslands northeast and east of the lake, and increase disturbance to wildlife by allowing humans and dogs to wander anywhere in the park. Significant benefits to wildlife can accrue by eliminating most of the informal trails in the park in favor of maintaining a few, strategically placed trails (Fig. 6). The Master Plan prepared by Penfield and Smith et al. (1987), presented an excellent series of recommendations and locations for a maintained trail system. The final configuration of trails should incorporate recommendations shown in Fig. 6, as well as the 1987 Master Plan. Maintained trails should be lined with chipped wood in order to reduce or eliminate erosion. The closed trails should be ripped and planted with non-native annual grasses and thorny shrubs such as wild rose (*Rosa californica*) or blackberry (*Rubus* spp.), and posted with signs to direct visitors to the maintained trails. Most visitors will stay on a system of maintained trails.

4. Existing dead trees. Dead and dying trees should be left standing to decay naturally and provide valuable foraging and roosting habitat for a number of birds, including woodpeckers and raptors (Fig. 8; Photo 14). Downed trunks and limbs should be left on the ground where they can provide microhabitat for amphibians, reptiles, and small mammals.

5. Public Education. A maintained series of trails lend themselves to installing interpretive signs that can educate the public about the wildlife and recreational functions of the park, the local and regional importance of the park as wildlife habitat, the historical importance of the park, the need to keep domestic dogs and cats (and feral cats) out of native habitats in the park, the lake as a man-made feature and associated problems, such as maintenance of water quality, tule control, and vector control. Informing visitors of the local and regional importance of Lake Los Carneros and the surrounding County Park as wildlife habitat and an educational resource is consistent with maintaining its "rural" or unimproved, nature. Information regarding the various maintenance activities that must be conducted could contribute to a better understanding of the park management program. The Master Plan prepared by Penfield and Smith et al. (1987), contains an excellent series of recommendations for visitor education. Related recommendations include:

(a) manage large areas of the park as open space to serve as wildlife habitat;
(b) limit recreational use to existing uses, such as low- or moderate-intensity, such as fishing (from shore or from floats), hiking, birdwatching, and other educational and scientific activities;
(c) prohibit boating on the lake, including model motorized boats, as inconsistent with the wildlife, fishing, and safety issues at such a small lake;

(d) limit fish introductions to bass, bullhead, and sunfish, golden shiner, and mosquitofish, i.e., a warm-water fishery, consistent with the size and budget for the park; do not manage lake for a winter "put-and-take" introduction of rainbow trout;
(e) enforce leash laws more strictly. Stray dogs have a significant negative impact on waterfowl and other birds in the lake; prohibit dogs from entering the lake or seasonal wetlands;
(f) adopt and enforce a "no feeding" policy at the southern and southeastern shoreline of the lake; current inputs of food may greatly contribute to eutrophic conditions in these shallow-water areas;
(g) remove domestic waterfowl from the lake as they can transmit diseases to native waterfowl;
(h) conduct bi-monthly trash pick-ups around the lakeshore and throughout the park; volunteers could be used for this purpose.

6. Bullfrog control. Bullfrogs, *Rana catesbeiana*, are introduced predators on a variety of native wildlife, ranging from frogs, snakes, and turtles to young waterfowl and small mammals. They have been implicated in the regional demise of a number of sensitive amphibians and aquatic reptiles, such as the California red-legged frog, southwestern pond turtle, and two-striped garter snake (Holland, 1991; Jennings and Hayes, 1994). Pond turtles have been observed in Lake Los Carneros, and the other two species may occur here because of extensive suitable habitat in and around the lake as well as their known occurrence in the vicinity of the park. Currently, Lake Los Carneros supports a dense population of bullfrogs (Hunt, pers. obs.).

The 1986 EIR of the Master Plan evaluated impacts to native amphibians arising from stabilization of lake water levels. Impacts associated with increasing the amount of open water habitat included proliferation of bullfrogs in the lake, resulting in a potential increase in emigration of young adults to neighboring streams, e.g., Carneros Creek.

The EIR proposed a bullfrog control and monitoring program, but gave no specifics. Eradication and control of bullfrogs at Lake Los Carneros can only be attained by implementing a four-step program, involving: (a) nighttime shooting of adults and subadults using pellet guns; (b) temporary elimination of aquatic habitat to kill amphibian larvae; (c) a multi-year monitoring and control program, and (d) educating residents, visitors, and agencies about releasing these invasive predators into the lake. At Lake Los Carneros, such a program can only be instituted if and when the lake is drained. The control program must be implemented by qualified biologists capable of discriminating between bullfrogs, native amphibians, and other wildlife. The shooting effort should be conducted over two consecutive nights at least four times each year for two years before draining the lake and five years after the lake has been drained. Even with this program it is doubtful that bullfrogs can be eliminated at Lake Los Carneros because the lake is a permanent water body. Costs associated with this control program would probably run between $ 3,000 and $ 5,000 per year.

7. Off-site land acquisition. The small (less than one acre) parcel at the northeast corner of the intersection of Los Carneros Road and Calle Real should be purchased and planted with native vegetation (Fig. 6; Photo 29). Suitable understory and canopy species are coast live oak, *Quercus agrifolia*, and coyote brush, *Baccharis pilularis* var. *consanguinea*, California sagebrush, *Artemisia californica*, and other coastal sage scrub/oak savannah species. While this parcel will not substantially increase the size of the park, it will protect an extensive area of open space and native habitat to the north and east from the direct and indirect effects of development of this parcel, such as

increased noise and human presence, increased night-lighting, and trash, and it could interfere with Flood Control plans to increase storm runoff to the area north and east of this parcel. The recommendation to purchase this small parcel was made in the Master Plan for the park, prepared by Penfield and Smith et al. (1987), at a time when the cost was affordable. Currently (June, 1999), the parcel is listed at $ 399,000, and it appears unlikely that the park will be able to acquire it unless the seller can be convinced to sell at a lower price.

Santa Barbara County Parks Department should immediately investigate the possibility of purchasing a portion of Bishop Ranch west of Los Carneros Road, extending from the intersection of Highway 101 and Los Carneros Road northward to Cathedral Oaks Road, and from Los Carneros Road westward to at least 500 feet west of the Carneros Creek riparian corridor (Fig. 6). Currently, the land between Carneros Creek and Los Carneros Road is under lemon and avocado production, which could eventually be restored as native habitat, developed for picnic area or other social use, or remain in agricultural production. The Carneros Creek riparian corridor and grassland and scrub west of the creek are important wildlife habitats. Purchase and preservation of this piece of land would serve two important purposes: (a) it would preserve the last remaining habitat connection between Lake Los Carneros County Park and open space in the foothills. Without this connection, the park is a population "sink" for many wildlife species. Large mammals, such as coyote and bobcat can be expected to disappear from Lake Los Carneros County Park if the open space and agricultural land west of Los Carneros Road is developed. Although the park is separated from Bishop Ranch by Los Carneros Road, this barrier is permeable for many species of wildlife, especially birds, and; (b) preservation of this piece would protect a significant reach of Carneros Creek that would be further degraded when Bishop Ranch is developed for residential and possibly commercial use. Open space preservation must extend at least 500 feet west of the Carneros Creek riparian corridor to allow an adequate upland habitat buffer for wildlife species such as the southwestern pond turtle and California red-legged frog, which are known from this watercourse and which require extensive areas for overwintering and/or nesting. The Carneros Creek riparian canopy is fringed by eucalyptus, which supports a locally important and unique autumnal site for monarch butterflies. It is one of the few sites in the County where monarchs utilize native coast live oak and sycamore trees as roost sites (Calvert, 1991; Meade, 1999).

The cost of purchasing this area west of Los Carneros Road could be offset by approaching the developer of this property now to donate all or part of this land to the County as a park, as a mitigation offset for development elsewhere on the Bishop Ranch property. In any event, this possibility should be investigated sooner rather than later, while development plans for Bishop Ranch are still in an early stage of planning. The natural attributes of this open space will complement and, in many cases, enhance wildlife resources in Lake Los Carneros County Park.

8. Funding Sources. Many of the management recommendations presented above can be done with County Parks Department staff, or a cooperative effort between County Parks and County Flood Control. Recommendations that require increased manpower, such as non-native vegetation removal, habitat restoration, bird and bat nesting boxes, educational signs, garbage pick-up, etc., should rely heavily on volunteer support. Residents near the lake and several environmental organizations have already expressed a willingness to volunteer their time to these efforts. Involving local residents and other members of the community as much as possible in the enhancement and maintenance of the park will create a personal attachment to the park that will benefit long-term management goals.

Acquisition and management of off-site lands (Recommendation 7 above), would require significant negotiation, but exploratory contacts between the landowners and the County should begin immediately before the opportunity to preserve these areas is permanently lost by development. Coastal Resource Enhancement Funds (CREF) might be a source of partial funding for this effort.

8.0 INDIVIDUALS AND ORGANIZATIONS CONTACTED IN PREPARING THIS REPORT. The following individuals and organizations were contacted between February and June, 1999, for information or opinions regarding the proposed management activities:

Mitch Bernstein, Mosquito Abatement District
Charis Bratt, Santa Barbara Botanic Garden
Karen Bridgers, Santa Barbara Audubon Society (964-1316)
Paul Collins, Associate Curator, Santa Barbara Museum of Natural History
Mark Holmgren, Associate Curator, Museum of Systematics and Ecology, UCSB
James Isaacs, Santa Barbara County Parks Department
David Kisner, Local Ornithologist
Joan Lentz, Santa Barbara Audubon Society (969-4397)
Colleen Lund, Santa Barbara County Parks Department
Dale Parks, Dale Parks Landscape and Ranch Maintenance
Valerie Smith, Ranger, Stow Grove County Park
Maureen Spencer, Biologist, County of SB, Flood Control District
Dr. Theresa Stevens, Biologist, County of SB, Planning and Devel. Dept.
Kate Symonds, Biologist, U.S. Fish and Wildife Service, Ventura Field Office
Brian Trautwein, Environmental Defense Center
Karl Treiberg, Biologist, County of SB, Flood Control District
Scott Wallis, long-time recreational fisherman at Lake Los Carneros (648-3131)
Douglas Weddle, Golf Course Superintendent, La Cumbre County Club
Morgan Wehjte, Biologist, California Department of Fish and Game
Rick Wheeler, Santa Barbara County Parks Department

9.0 LITERATURE CITED

Adams, L.W. and L.E. Dove. 1989. Wildlife reserves and corridors in the urban environment: A guide to ecological landscape planning and resource conservation. Natl. Inst. for Urban Wildlife, Columbia, Md.

Arnold, R.A. 1998. Consulting Entomologist, Entomological Consultants, Inc., Pleasant Hill, CA. Communication regarding habits and distribution of monarch butterflies in California. June.

Bleier, P. 1993. Determining minimum habitat areas and habitat corridors for cougars. Conserv. Biology, 7: 94-108.

Brown, P. 1980. Distribution of bats of the California Channel Islands, pp. 751-756, *In:* Powers, D. (ed.). The California Islands: Proceedings of a multidisciplinary symposium. Publ. by the Santa Barbara Mus. Nat. Hist., 787 pp.

_____. 1992. Personal communication regarding distribution of mastiff bats in coastal Ventura County. July.

_____, R. Berry, and C. Brown. 1994. Foraging behavior of Townsend's big-eared bats (*Plecotus townsendii*) on Santa Cruz Island, pp. 367-370, In: Halvorson, W. and G. Maender (eds.). The Fourth California Islands Symposium: Update on the Status of Resources. Santa Barbara Museum of Natural History, Santa Barbara, CA.

Bury, R.B. 1972. Habits and home range of the Pacific pond turtle, *Clemmys marmorata*, in a stream community. Unpubl. Ph.D. Dissertation, University of California, Berkeley.

Bury, R.B. and D.C. Holland. 1994. *Clemmys marmorata* (Baird and Girard 1852), Western Pond Turtle, In: Pritchard, P.C.H. and A.G.J. Rhodin (eds.). Conservation biology of freshwater turtles. Intern. Union for the Conserv. of Nature (IUCN) Spec. Publ., Basel, Switzerland. 14 pp.

Calvert, W. 1991. Monarch butterfly overwintering site locations in Santa Barbara County, California. Center for Conservation Biology, Stanford University, Palo Alto, CA. 15 pp.

Carr, A. 1952. Handbook of turtles: The turtles of the United States, Canada, and Baja California. Cornell Univ. Press, Ithaca, N.Y. 542 pp.

CDFG (California Department of Fish and Game). 1992. Bird species of special concern. Nongame Bird and Mammal Section, Wildl. Mgmt. Div., Calif. Dept. Fish and Game, Sacramento, CA.

_____. 1996. Natural Diversity Data Base: Special Animals. The Resources Agency, Natural Heritage Division, Sacramento, CA. 24 pp.

_____. 1997. Endangered and threatened animals of California. State of California, The Resources Agency, Natural Heritage Division, Natural Diversity Data Base. 11 pp.

Collins, P. 1993. Pacific Pipeline Project, Draft EIR, Vol. III, Technical Appendix I - Biological Assessment. Prepared for the California Public Utilities Commission, Applic. Number: 91-10-013. April.

Collins, P. 1998, 1999. Associate Curator, Vertebrate Zoology Dept., Santa Barbara Museum of Natural History. Communications regarding the local occurrence of bats in southern Santa Barbara County.

Constantine, D.G. 1998. Range extensions of ten species of bats in California. Bull. So. Calif. Acad. Sci., 97(2): 49-75.

County of Santa Barbara. 1992, 1995. Environmental thresholds and guidelines manual. Planning and Development Department, Santa Barbara, CA.

_____. 1997. Offshore oil and gas status report: "*Southwestern pond turtles found at Barranca Honda Creek*". Planning and Development Dept., Energy Div., February. 4 pp.

Fitch, H.S. 1940. A biogeographical study of the *ordinoides* artenkreis of garter snakes (genus *Thamnophis*). Univ. Calif. Publ. Zool., 44(1): 1-150.

_____. 1981. *Thamnophis sirtalis*. Catalogue of Amer. Amphibians and Reptiles, 2760.1-270.4.

_____. 1984. *Thamnophis couchii*. Catalogue of Amer. Amphibians and Reptiles, pp. 351.1-351.3.

Goldberg, S. and C.M. Miller. 1985. Reproduction of the silvery legless lizard, *Anniella pulchra pulchra* (Anniellidae) in southern California. The Southwestern Naturalist 30(4): 617-619.

Grinnell, J. 1937. Fur-bearing mammals of California: Their natural history, systematic status, and relations to man, 2 vols. Univ. Calif. Press, Berkeley, CA. 1152 pp.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Cooper Ornithological Club Publ., No. 27. 608 pp.

Hall, E.R. 1981. Mammals of North America. 2 vols. Roland Press, New York.

Handley, C., Jr. 1959. A revision of American bats of the genera *Euderma* and *Plecotus*. Proc. U.S. Natl. Mus., No. 10.

Harris, L. 1984. The fragmented forest: Island biogeography theory and the preservation of biotic diversity. Univ. Chicago Press, Chicago.

Hayes, M. and M. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): Implications for management. pp. 144-158, *In:* R. Szaro et al. (tech. coord.). Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. Printed by USDA, Forest Service, General Tech. Rept RM-166. 458 pp.

Holland, D. 1991. A synopsis of the ecology and status of the western pond turtle (*Clemmys marmorata*) in 1991. Prep. for U.S. Fish and Wildlife Service, Natl. Ecology Res. Center, San Simeon Field Station, San Simeon, CA.

Hunt, L.E. 1983. A nomenclatural rearrangement of the genus *Anniella* (*Sauria: Anniellidae*). Copeia 1983(1): 79-89.

_____. 1991. Draft report on vertebrate resources along portion of the proposed Gaviota to Los Angeles Oil Pipeline route for the Pacific Pipeline Project. Texaco Trading and Transportation, Inc. Prep. for Riverside Technology, Inc., Fort Collins, Colorado. 49 pp.

_____. 1994. Relocation and movements of southwestern pond turtles (*Clemmys marmorata pallida*), Gibraltar Dam Strengthening Project, Santa Ynez River, Santa Barbara, California. Prepared for City of Santa Barbara, Dept. of Public Works and Woodward-Clyde Consultants. 80 pp.

_____. 1996. Microhabitat selection in a limbless lizard, *Anniella pulchra.* Unpubl. Ph.D. Diss (part), University of California-Santa Barbara.

_____. 1997. Geostatistical modeling of species distributions: Implications for ecological and biogeographical studies, pp. 427-439, *In*: A. Soares et al., (eds.). Geostatistics for Environmental Applications. Kluwer Academic Publishers, London. 505 pp.

Hunt, L.E., P.E. Lehman, and M.H. Capelli. 1992. Vertebrate resources at Emma Wood State Beach and the Ventura River Estuary, Ventura County, California: Inventory and Management. Prepared for the City of San Buenaventura, California Coastal Conservancy, and the State of California Department of Parks and Recreation. 108 pp.

Ingles, L. 1965. Mammals of the Pacific States. Stanford Univ. Press, Stanford, CA. 506 pp.

Jennings, M., M. Hayes, and D. Holland. 1992. A petition to the U.S. Fish and Wildlife Service to place the California red-legged frog (*Rana aurora draytonii*) and the western pond turtle (*Clemmys marmorata*) on the list of endangered and threatened wildlife and plants. 24 pp. (published on October 5, 1992 in the Federal Register, Vol. 57, p. 45761).

Jennings, M. and M. Hayes. 1994. Amphibian and reptile species of special concern in California. Final report subm. to Calif. Dept. Fish and Game, Inland Fisheries Div., Rancho Cordova, CA. Contr. No. 8023, 255 pp.

Jurek, R. 1989. Five-year status report, American peregrine falcon. Calif. Dept. Fish and Game, Wildl. Mgmt. Div., Nongame Bird and Mammal Section Report.

Krutzsch, P.H. 1955. Observations on the California mastiff bat. J. Mammal., 36:407-414.

Lawler, S., D. Dritz, T. Strange, and M. Holyoak. 1999. Effects of introduced mosquitofish and bullfrogs on the threatened California red-legged frog. Conserv. Biology 13(3): 613-622.

Laymon, S., B. Garrison, and J. Humphrey. 1988. Historic and current status of the bank swallow in California, 1987. Calif. Dept. Fish and Game, Wildl. Mgmt. Div., Admin. Rept., 88-2.

Laymon, S., P. Williams, and Z. Labinger. 1996. 1996 list of declining and sensitive bird species in California. Unpub. report prep. for the Calif. Dept. Fish and Game.

Lehman, P. 1994. The birds of Santa Barbara County, California. Publ. by the Vertebrate Museum, University of California-Santa Barbara. 337 pp.

Lentz, Joan. 1999. Santa Barbara Audubon Society. Communication regarding bird habitats and habitats use around Lake Los Carneros. June.

Linthicum, J. and B. Walton (*eds.*). 1991. Peregrine falcon monitoring, nest management, hack site, and cross-fostering efforts in 1991. Annual report of the Santa Cruz Predatory Bird Research Group, Univ. California-Santa Cruz.

Mackintosh, G., ed. 1989. Preserving communities and corridors. Defenders of Wildlife, Washington, D.C.

Mader, H.J. 1984. Animal habitat isolation by roads and agricultural fields. Biol. Conserv. 29:81-96.

McGuire, J. and L. Grismer. 1992. The taxonomy and biogeography of *Thamnophis hammondii* and *T. digueti* (*Reptilia: Squamata: Colubridae*) in Baja California, Mexico. Herpetologica 49(3): 354-365.

Meade, D.E. 1999. Monarch butterfly overwintering sites in Santa Barbara County, California. Prep. for the County of Santa Barbara Planning and Development Dept. 114 pp.

Mesta, R., T. Swem, and S. Lawrence. 1995. Advance notice of a proposal to remove the American peregrine falcon from the list of Endangered and Threatened wildlife. Federal Register, 60(126):34406-34409.

Moyle, P., et al., 1989. Fish species of special concern in California. California Dept. Fish and Game, The Resources Agency, Non-Game Heritage Program, Sacramento, CA. 222 pp.

Munz, P. 1974. A Flora of Southern California. University of California Press, Berkeley, California.

Nagano, C.D. and J. Lane. 1985. A survey of the location of monarch butterfly overwintering roosts in the State of California. Report to the World Wildlife Fund-US, WWF-US Grant No. US-374. 30 August. 30 pp., plus tables.

National Geographic Society. 1983. Field guide to the birds of North America. National Geographic Book Service, Washington, D.C. 464 pp.

Pierson, E. 1988. The status of Townsend's big-eared bat (*Plecotus townsendii*) in California. Preliminary results: *P.t. townsendii* in coastal California, 1987-1988. Calif. Dept. of Fish and Game, Wildl. Mgmt. Div. Progress Rept.

Pierson, E.D. and W. Rainey. 1992. The distribution, status and management of Townsend's big-eared bat (*Plecotus townsendii*) in California. Calif. Dept. of Fish and Game. 43 pp.

Rathbun, G., K. Worcester, D. Holland, and J. Martin. 1991. Status of declining aquatic reptiles, amphibians, and fishes in the lower Santa Rosa Creek, Cambria, San Luis Obispo County, California. Prepared for Greenspace Land Trust, Cambria, CA. 21 pp.

Rathbun, G., N. Siepel, and D. Holland. 1992. Nesting behavior and movements of western pond turtles (*Clemmys marmorata*). The Southwestern Naturalist 37(3): 319-324.

Rathbun, G.B., M.R. Jennings, T.G. Murphey, and N.R. Siepel. 1993. Status and ecology of sensitive aquatic vertebrates in lower San Simeon and Pico Creeks, San Luis Obispo County, California. Unpubl. Rept., Natl. Ecology Research Center, Piedras Blancas Research Station, San Simeon, California, prepared under Cooperative Agreement (14-16-0009-91-1909).

Remsen, J. 1978. Bird species of special concern in California: An annotated list of declining or vulnerable bird species. Calif. Dept. Fish and Game, Nongame Wildl. Invest., Wildl. Mgmt. Branch, Admin., Sacramento, CA, Rept. No. 78-1.

Ross, A. 1967. Ecological aspects of the food habits of insectivorous bats. Proc. Western Found. of Vert. Zoology, 1(4): 205-264.

Seeliger, L. 1945. Variation in the Pacific mud turtle. Copeia 1945(3): 150-159.

Shipman, G. 1981. Soil survey of Santa Barbara County, South Coastal Part. U.S. Dept. Agric., Soil Conservation Service, Washington, D.C., 149 pp.

Slevin, J. 1928. The amphibians of western North America. Occ. Papers Calif. Acad. Sci., 16, 144 pp.

Smith, H.M. 1971. Handbook of lizards: Lizards of the United States and of Canada, 3rd ed. Cornell Univ. Press, Ithaca. 557 pp.

Smith, Valerie. 1999. Park Supervisor, Stow Grove County Park. Conversation regarding fishes in Lake Los Carneros. June.

Soule, M., D. Boulger, A. Alberts, R. Sauvajot, J. Wright, M. Sorice, and S. Hill. 1988. Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. Conserv. Biology 2: 75-92.

Stebbins, R.C. 1951. Amphibians of western North America. Univ. Calif. Press, Berkeley. 125 pp.

_____. 1954. Amphibians and reptiles of western North America. McGraw-Hill Book Company, New York. 528 pp.

_____. 1985. A field guide to western reptiles and amphibians, 2nd ed., revised. McGraw-Hill Book Co., Boston. 336 pp.

Stewart, G. 1972. An unusual record of sperm storage in a female garter snake (genus *Thamnophis*). J. Herpetology 28(4): 346-347.

Storer, T. 1925. A synopsis of the amphibia of California. Univ. Calif. Publ. Zoology, 27: 1-342.

_____. 1926. Bats, bat towers and mosquitoes. Jour. Mammalogy. 7: 85-90.

_____. 1930. Notes on the range and life-history of the Pacific fresh-water turtle, *Clemmys marmorata*. Univ. Calif. Publ. in Zoology 35(5): 429-441.

Swift, C., T. Haglund, M. Ruiz, and R. Fisher. 1993. The status and distribution of freshwater fishes of southern California. Bull. So. Calif. Acad. Sci., 93(3): 101-167.

Swihart, R. and N. Slade. 1984. Road crossing in *Sigmodon hispidus* and *Microtus ochrogaster*. J. Mammal. 65:357-360.

USFWS (U.S. Fish and Wildlife Service). 1993. Notice of 1-year petition finding on the western pond turtle. Federal Register, 58(153): 42717-42718.

_____. 1994. Animal candidate review for listing as endangered or threatened species. Federal Register, 59(219): 58982-59028. November 15.

_____. 1995. Migratory nongame birds of management concern in the Untied States: The 1995 list. Prepared by ....

_____. 1996. Review of plant and animal taxa that are candidates for listing as endangered or threatened species. Federal Register 61(40): 7596-7613.

_____. 1997. Guidance on site assessment and field surveys for California red-legged frogs, with appendix on California red-legged frog ecology and distribution. Prep. by the USFWS, Regional Office, Portland, Oregon. 3 pp., + 2 pp. appendix.

_____. 1998a. List of Proposed Species as of May 31, 1998.

_____. 1998b. Proposal to delist the American Peregrine Falcon (*Falco peregrinus anatum*). Federal Register

_____. 1998c. Withdrawal of proposed rule to list the black legless lizard as endangered. Federal Register, Vol. 63(155): 43129-43135.

Walton, B. 1990. Peregrine falcon recovery in California. pp. 63-68, *In:* Endangered wildlife and habitats in southern California. P. Bryant and J. Remington (eds.). Memoirs of the Natural History Foundation of Orange County, No. 3.

Williams, D. 1986. Mammalian species of special concern in California. The Resources Agency, Calif. Dept. of Fish and Game, Sacramento, CA. Wildl. Mgmt. Div. Admin. Rept. No. 86-1.

APPENDIX 1a. FAUNAL RESOURCES OF LAKE LOS CARNEROS COUNTY PARK

The following lists contain species that have been observed within the boundaries of Lake Los Carneros County Park, or may potentially occur there based on the presence of suitable habitat and their known occurrence in the vicinity of the park. This list was prepared by David Kisner, local ornithologist, with input from Mark Holmgren, Museum of Systematics and Ecology, University of California-Santa Barbara; and Joan Lentz and Karen Bridgers, Santa Barbara Audubon Society.

NON-AVIAN RESOURCES- HABITAT USE OF LAKE LOS CARNEROS COUNTY PARK

Habitat Areas

Lake: areas in and around the three wetlands including the associated willows.

Landscaped/Ornamental: the garden around the Stow House, and the Eucalyptus and Cypress groves. Some native plants are intermixed within these areas.

Upland: the drier mixed scrub, ruderal, and non-native annual grassland areas.

Occurrence - Observed, known due to field notes or specimens, potential, or source of sighting records.

Species (*Genus species*)	Lake	L/O	Upland	Occurrence
Insects				
Monarch Butterfly (*Danaus plexippus*)		✓	✓	Observed
Fish				
Black Bullhead (*Ameiurus melas*)	✓			Observed
Bluegill Sunfish (*Lepomis marcochirus*)	✓			Observed
Smallmouth Bass (*Micropterus dolomieui*)	✓			Potential
Largemouth Bass (*Micropterus salmoides*)	✓			Fast and Glenn, 1978
Golden Shiner (*Notemigonus crysoleucas*)	✓			Fast and Glenn, 1978
Common Carp (*Cyprinus carpio*)	✓			Smith, 1978
Mosquitofish (*Gambusia affinis*)	✓			Observed
Amphibians - Salamanders				
Arboreal Salamander (*Aneides lugubris*)			✓	Potential
California Slender Salamander (*Batrachoseps nigriventris*)		✓	✓	Observed
Amphibians - Frogs and Toads				
Western Toad (*Bufo boreas*)	✓	✓	✓	Observed
Pacific Chorus Frog (*Hyla (= Pseudacris) regilla*)	✓	✓	✓	Observed
California Red-legged Frog (*Rana aurora draytonii*)	✓			Potential
Bullfrog (*Rana catesbeiana*)	✓		✓	Observed
Reptiles - Turtles				
Southwestern Pond Turtle (*Clemmys marmorata pallida*)	✓		✓	Observed
Red-eared Slider (*Pseudemys scripta elegans*)	✓		✓	Observed
Reptiles - Lizards				
Western Fence Lizard (*Sceloporus occidentalis*)	✓	✓	✓	Observed
Western Skink (*Eumeces skiltonianus*)	✓	✓	✓	Known - UCSB
Southern Alligator Lizard (Gerrhonotus multicarinatus)	✓	✓	✓	Observed
Reptiles - Snakes				
Common Kingsnake (*Lampropeltis getulus*)	✓	✓	✓	Known - UCSB
Gopher Snake (*Pituophis melanoleucus*)	✓	✓	✓	Known - UCSB
Ringnecked Snake (*Diapohpis punctatus*)		✓	✓	Potential
Western Terrestrial Garter Snake (*Thamnophis elegans*)	✓		✓	Potential
Common Garter Snake (*Thamnophis sirtalis*)	✓		✓	Potential
Two-striped Garter Snake (*Thamnophis hammondii*)	✓		✓	Potential
Western Rattlesnake (*Crotalus viridis*)		✓	✓	Potential

Species (*Genus species*)	Lake	L/O	Upland	Occurrence
Mammals - Marsupials				
Virginia Opossum (*Didelphis virginianus*)	✓	✓	✓	Observed
Mammals - Insectivores				
Ornate Shrew (*Sorex ornatus*)	✓		✓	Potential
Trowbridge Shrew (*Sorex trowbridgii*)	✓		✓	Potential
Broad-handed Mole (*Scapanus latimanus*)	✓	✓	✓	Observed
Mammals - Bats				
Pallid Bats (*Antrozous pallidus*)	✓	✓	✓	Potential
Big Brown Bat (*Eptesicus fuscus*)	✓	✓	✓	Observed
Yuma Myotis (*Myotis yumanensis*)	✓	✓	✓	Observed
California Myotis (*Myotis californicus*)	✓	✓	✓	Potential
Fringed Myotis (*Myotis thysanodes*)	✓	✓	✓	Potential
Long-legged Myotis (*Myotis volans*)	✓	✓	✓	Potential
Red Bat (*Lasiurus borealis*)	✓	✓	✓	Potential
Western Pipistrelle (*Pipistrellus hesperus*)	✓	✓	✓	Potential
Big-eared Bat (*Plecotus townsendii*)	✓	✓	✓	Potential
Mexican Freetailed Bat (*Tadarida brasiliensis*)	✓	✓	✓	Potential
Big Free-tailed Bat (*Nyctinomops macrotis*)	✓	✓	✓	Potential
Western Mastiff Bat (*Eumops perotis*)	✓	✓	✓	Potential
Mammals - Lagomorphs				
Brush Rabbit (*Sylvilagus bachmani*)	✓	✓	✓	Observed
Mammals - Rodents				
California Ground Squirrel (*Spermophilus beecheyi*)		✓	✓	Observed
Botta's Pocket Gopher (*Thomomys bottae*)		✓	✓	Observed
California Pocket Mouse (*Perognathus californicus*)			✓	Potential
Western Harvest Mouse (*Reithrodontomys megalotis*)			✓	Potential
Brush Mouse (*Peromyscus boylei*)			✓	Potential
Deer Mouse (*Peromyscus maniculatus*)		✓	✓	Observed
Dusky-footed Woodrat (*Neotoma fuscipes*)			✓	Observed
California Vole (*Microtus californicus*)			✓	Observed
House Mouse (*Mus musculus*)		✓	✓	Observed
Black Rat (*Rattus rattus*)	✓	✓	✓	Potential
Norway Rat (*Rattus norvegicus*)	✓	✓	✓	Potential
Mammals - Carnivores				
Coyote (*Canis latrans*)	✓	✓	✓	Observed
Feral Dog (*Canis familiaris*)	✓	✓	✓	Observed
Gray Fox (*Urocyon cinereoargenteus*)	✓	✓	✓	Potential
Red Fox (*Vulpes vulpes*)	✓	✓	✓	Observed
Raccoon (*Procyon lotor*)	✓	✓	✓	Observed
Striped Skunk (*Mephitis mephitis*)	✓	✓	✓	Observed
Long-tailed Weasel (*Mustela frenata*)	✓	✓	✓	Potential
Bobcat (*Felis rufus*)	✓	✓	✓	Known - UCSB
Feral Cat (*Felis catus*)	✓	✓	✓	Observed

AVIAN RESOURCES - SEASONAL AND HABITAT USE OF LAKE LOS CARNEROS COUNTY PARK

Seasonal Periods
Spring: March 1 to May 31
Summer: June 1 to July 31
Fall: August 1 to November 30
Winter: December 1 to February 28

Breeding Areas
Lake: the areas in and around the three wetlands including the associated willows.
Landscaped/Ornamental: the garden around the Stow House, and the Eucalyptus and Cypress groves. Some native plants are intermixed within these areas.
Upland: the drier mixed scrub, ruderal, and non-native annual grassland areas.

Frequency of Occurrence
C = Common (5 or more individuals per day).
U = Uncommon (fewer then 5 individuals per day).
R = Rare (approximately one individual per week).
V = Very Rare (very few records in last 10 years).

Frequency of Breeding Events
Y = Yearly (almost every year).
O = Occasionally (2 or 3 times within a 5 year period).
X = Sporadic with very few records in last 10 years.

Notes - notes on interesting breeding and behavioral events.

Status
Federally Endangered (FE) -
State Endangered (SE) -
Species of Management Concern (SMC) - *Migratory Nongame Birds of Management Concern in the United States: the 1995 List*, U.S. Fish and Wildlife Service, September 1995.
Species of Special Concern (SSC) - *Bird Species of Special Concern*, California Department of Fish and Game, July 1992.
Declining Species (DS) - *1996 List of Declining and Sensitive Species of California*, S. Laymon, P. Williams, and Z. Labinger, April 1996.

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Grebes													
Pied-billed Grebe	C	C	C	C	Y								
Horned Grebe													
Eared Grebe			U	U									✓
Pelican													
American White Pelican			V									✓	✓
Cormorant													
Double-crested Cormorant	C	U	C	C								✓	

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Herons													
American Bittern			R	R				Confirmed breeding in 1978			✓		✓
Least Bittern	R	U	U	R	O						✓	✓	✓
Great Blue Heron	U	U	C	U									
Great Egret	U	R	U	U									
Snowy Egret	U	R	U	U									
Cattle Egret	V			V									
Green Heron	U	U	U	U									
Black-crowned Night Heron	U	U	C	C				Roost site near bridge					
White-faced Ibis	V										✓	✓	✓
Geese and Ducks													
Greater White-fronted Goose			V	V									
Snow Goose			V	V									
Ross's Goose			V	V									
Brant			V	V									
Canada Goose	V	V	R	R									
Wood Duck	R	R	R	R	X			Bred in s. lake 1995					
Green- winged Teal	R	R	C	C									
Mallard	C	C	C	C	Y			Breeder					
Northern Pintail	R		U	R									
Blue-winged Teal	V		R	V									
Cinnamon Teal	U	R	U	U									
Northern Shoveler	C		C	C									
Gadwall	C		C	C									
Eurasian Wigeon			V	V									
American Wigeon	R		U	C									
Canvasback			V	R									
Redhead	R		U	U									✓
Ring-necked Duck	R		U	U									
Greater Scaup			V	V									
Lesser Scaup			R	R									
Bufflehead	R		U	C									✓
Hooded Merganser			R	R									
Red-breasted Merganser	U		U	U									
Ruddy Duck	C	C	C	C	Y			Breeder					

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Vuture													
Turkey Vulture	C	U	C	C				roost site					
Hawks and Falcons													
Osprey			V	V								✓	✓
White-tailed Kite	R	R	U	U		X		nested near southern lake in 1987			✓		✓
Northern Harrier			V									✓	✓
Sharp-shinned Hawk	R		U	U								✓	
Cooper's Hawk	U	R	U	U								✓	
Red-shouldered Hawk	U	U	C	U		Y							
Red-tailed Hawk	C	U	C	C		Y							
Ferruginous Hawk			V								✓	✓	✓
Zone-tailed Hawk			X	X				Seen 1994 to 1999					
Golden Eagle			V									✓	✓
American Kestrel	C	U	C	C		Y							
Merlin			R	R								✓	
Prairie Falcon			V									✓	✓
Peregrine Falcon			V						✓	✓			
Quail													
California Quail			U	U				Historically bred					
Rails													
Virginia Rail	U	U	C	C	X								
Sora	U	V	C	C	X			Bred in 1992					
Common Moorhen	V	V	R	V	X			Bred in 1996					
American Coot	C	C	C	C	Y								
Shorebirds													
Killdeer	R		U	U									
Greater Yellowlegs			U	R									
Solitary Sandpiper			V										
Spotted Sandpiper			R	R									
Least Sandpiper			R	R									
Pectoral Sandpiper			V										
Long-billed Dowitcher			R	V									
Common Snipe	V		V	R									
Wilson's Phalarope	R		V										
Red-necked Phalarope	V		V										

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Gulls and Terns													
Franklin's Gull			V										
Bonaparte's Gull	U		U	U									
Mew Gull	R		R	U									
Ring-billed Gull	C	R	C	C									
California Gull	C	R	C	C								✓	✓
Forster's Tern	V		R										✓
Doves and Pigeons													
Rock Dove	C	C	C	C									
Band-tailed Pigeon			R	R									
Spotted Dove	R												
White-winged Dove			V										
Mourning Dove	C	C	C	C		Y	Y						
Eurasian Collared Dove			V	V									
Common Ground Dove			V	V		X							
Roadrunner													
Greater Roadrunner			V	V									
Owls													
Barn Owl	R	R	R	R		O							
Great Horned Owl	U	U	U	U		Y							
Goatsucker													
Lesser Nighthawk	V		V										
Swifts													
Vaux's Swift	U		U								✓	✓	✓
White-throated Swift	R		R	R									
Hummingbirds													
Black-chinned Hummingbird	R		R										
Anna's Hummingbird	C	C	C	C	O	Y	O						
Costa's Hummingbird	R		R								✓		
Rufous Hummingbird	U		R	U							✓		
Allen's Hummingbird	C	U	U	U	O	O					✓		
Kingfisher													
Belted Kingfisher	R		R	R									✓
Woodpeckers													
Acorn Woodpecker	C	C	C	C		Y							
Red-naped Sapsucker				V									

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Woodpeckers (continued)													
Red-breasted Sapsucker			R	R							✓		
Nuttall's Woodpecker	U	R	U	U		O							
Downy Woodpecker	C	U	C	C	O								
Hairy Woodpecker	R	R	U	R		O							
Northern Flicker	C	U	C	C		Y							
Flycatchers													
Olive-sided Flycatcher	V										✓		✓
Western Wood-Pewee	R		R										
Willow Flycatcher			R						✓	✓			
Pacific-slope Flycatcher	U	R	U			Y					✓		
Black Phoebe	C	C	C	C	Y	Y							
Say's Phoebe	R	V	U	U									
Ash-throated Flycatcher	C	R	C			O							
Tropical Kingbird			V	V									
Cassin's Kingbird	U	U	U	R		Y							
Western Kingbird	U	R	R										
Swallows													
Tree Swallow			U	V									✓
Violet-green Swallow	C	R	C										
Northern Rough-winged Swallow	U	C	U										
Cliff Swallow	C	C	C			Y							
Barn Swallow	C	C	R	V		Y							
Jays													
Western Scrub Jay (Scrub Jay)	C	C	C	C		Y	Y						
American Crow	C	C	C	C		O							
Titmice													
Oak Titmouse(Plain Titmouse)	C	C	C	C		Y							
Bushtit													
Bushtit	C	C	C	C	Y	Y	Y						
Nuthatches													
Red-breasted Nuthatch			R	V									
White-breasted Nuthatch		V	R	R									

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Wrens													
Bewick's Wren	C	C	C	C		Y	O				✓		
House Wren			U	U									
Winter Wren			V										
Marsh Wren			U	U									
Thrushes and Allies													
Ruby-crowned Kinglet	R		C	C									
Blue-gray Gnatcatcher	U		C	C									
Western Bluebird	U	R	U	U		O							
Swainson's Thrush	U		R										
Hermit Thrush	R		U	U									
American Robin	U	U	C	C		Y							
Varied Thrush				V									
Wrentit	U	U	U	U			Y						
Thrashers													
Northern Mockingbird	C	C	C	C		Y	Y						
California Thrasher	U	R	U	U		O	Y				✓		
Pipit													
American Pipit			V	V									
Waxwing													
Cedar Waxwing	U		C	C									
Silky Flycatcher													
Phainopepla			R	R									
Shrike													
Loggerhead Shrike		V	R	R							✓	✓	
Starling													
European Starling	C	C	C	C		Y							
Vireos													
Cassin's Vireo (Solitary)	R		R										
Plumbious Vireo (Solitary)	V		V										✓
Hutton's Vireo	U	R	U	U		Y							
Warbling Vireo	U	R	R										✓
Red-eyed Vireo			V										

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Warblers													
Tennessee Warbler			V										
Orange-crowned Warbler	C	R	U	U		O	O						
Nashville Warbler	U		R										
Yellow Warbler	U	U	C					Former breeder				✓	✓
Chestnut-sided Warbler			V										
Yellow-rumped Warbler	U		C	C									
Yellow-rumped Warbler (Myrtle)			R	U									
Black-throated Gray Warbler	U	V	U	V									
Townsend's Warbler	R		U	U									
Hermit Warbler			V								✓		
Palm Warbler			V										
Black-and-white Warbler			V	V									
American Redstart			V										
Northern Waterthrush			V										
Ovenbird			V										
MacGillivray's Warbler			R										
Common Yellowthroat	C	C	C	C	Y								
Wilson's Warbler	C	R	U	V									
Canada Warbler			V										
Tanagers and Grosbeaks													
Summer Tanager			V	V								✓	✓
Western Tanager	C	R	U	V									
Rose-breasted Grosbeak	V		V										
Black-headed Grosbeak	C	C	R	V		Y							
Blue Grosbeak			R										
Sparrows													
Lazuli Bunting	R		V										
Spotted Towhee (Rufous-sided)	C	U	C	C		O	Y						
California Towhee	C	C	C	C		O	Y						
Lark Sparrow			R	V							✓		
Savannah Sparrow			R	R									
Fox Sparrow			R	R									
Song Sparrow	C	C	C	C	Y	Y	Y						
Lincoln's Sparrow			R	R									

Species	Spring	Summer	Fall	Winter	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Sparrows (continued)													
Swamp Sparrow			V	V									
White-throated Sparrow			V	V									
Golden-crowned Sparrow	U		U	C									
White-crowned Sparrow	U		C	C									
Dark-eyed Junco	R	V	R	U									
Blackbirds and Orioles													
Red-winged Blackbird	C	C	C	C	Y								
Tricolored Blackbird			R	R							✓	✓	✓
Western Meadowlark	U		U	C									
Yellow-headed Blackbird			R	R									✓
Brewer's Blackbird	U		U	U									
Great-tailed Grackle	C	C	C	U	Y			First bred in 1996					
Brown-headed Cowbird	U	R	U	U									
Orchard Oriole			V										
Hooded Oriole	C	C	R			Y							
Bullock's Oriole (Northern Oriole)	C	U	R	V		Y							
Finches													
Purple Finch	R	R	U	U	X								
House Finch	C	C	C	C		Y	Y						
Pine Siskin													
Lesser Goldfinch	U	U	C	C		Y	Y						
Lawrence's Goldfinch			V								✓		
American Goldfinch	U	R	C	C									
Old World Sparrows													
House Sparrow	C	C	C	C		Y							

AVIAN RESOURCES - KNOWN OR EXPECTED BREEDING BIRD SPECIES WITHIN LAKE LOS CARNEROS COUNTY PARK

Breeding Areas

Lake: areas in and around the three wetlands including the associated willows.

Landscaped/Ornamental: the garden around the Stow House, and the Eucalyptus and Cypress groves. Some native plants are intermixed within these areas.

Upland: the drier mixed scrub, ruderal, and non-native annual grassland areas.

Frequency of Breeding Events

Y = Yearly (almost every year).

O = Occasionally (2 or 3 times within a 5 year period).

X = Sporadic with very few records in last 10 years.

? = Potential breeder though confirmed breed records are lacking.

Notes - notes on interesting breeding and behavioral events.

Status

Federally Endangered (FE) -

State Endangered (SE) -

Species of Management Concern (SMC) - *Migratory Nongame Birds of Management Concern in the United States: the 1995 List*, U.S. Fish and Wildlife Service, September 1995.

Species of Special Concern (SSC) - *Bird Species of Special Concern*, California Department of Fish and Game, July 1992.

Declining Species (DS) - *1996 List of Declining and Sensitive Species of California*, S. Laymon, P. Williams, and Z. Labinger, April 1996.

Species	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Grebes									
Pied-billed Grebe	Y								
Herons									
American Bittern				Confirmed breeding in 1978			✓		✓
Least Bittern	O						✓	✓	✓
Green Heron	?								
Geese and Ducks									
Wood Duck	X			Bred in s. lake 1995					
Mallard	Y			Breeder					
Ruddy Duck	Y			Breeder					

Species	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Hawks and Falcons									
White-tailed Kite		X		nested near southern lake in 1987			✓		✓
Cooper's Hawk		?						✓	
Red-shouldered Hawk		Y							
Red-tailed Hawk		Y							
American Kestrel		Y							
Quail									
California Quail		?	?	Historically bred					
Rails									
Virginia Rail	X								
Sora	X			Bred in 1992					
Common Moorhen	X			Bred in 1996					
American Coot	Y								
Shorebirds									
Killdeer			?						
Doves and Pigeons									
Rock Dove		?							
Spotted Dove		?							
Mourning Dove		Y	Y						
Eurasian Collared Dove		?							
Common Ground Dove		X							
Owls									
Barn Owl		O							
Great Horned Owl		Y							
Hummingbirds									
Anna's Hummingbird	O	Y	O						
Allen's Hummingbird	O	O					✓		
Woodpeckers									
Acorn Woodpecker		Y							
Nuttall's Woodpecker		O							
Downy Woodpecker	O								
Hairy Woodpecker		O							
Northern Flicker		Y							

Species	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Flycatchers									
Pacific-slope Flycatcher		Y					✓		
Black Phoebe	Y	Y							
Ash-throated Flycatcher		O							
Cassin's Kingbird		Y							
Western Kingbird		?	?						
Swallows									✓
Tree Swallow	?	?							
Violet-green Swallow	?	?							
Cliff Swallow		Y							
Barn Swallow		Y							
Jays									
Western Scrub Jay (Scrub Jay)		Y	Y						
American Crow		O							
Titmice									
Oak Titmouse(Plain Titmouse)		Y							
Bushtit									
Bushtit	Y	Y	Y						
Nuthatches									
White-breasted Nuthatch		?	?						
Wrens									
Bewick's Wren		Y	O				✓		
Marsh Wren	?	?							
Thrushes and Allies									
Blue-gray Gnatcatcher		?	?						
Western Bluebird		O							
American Robin		Y							
Wrentit			Y						
Thrashers									
Northern Mockingbird		Y	Y						
California Thrasher		O	Y				✓		
Starling									
European Starling		Y							

Species	Lake	L/O	Upland	Notes	FE	SE	SMC	SSC	DS
Vireos									
Hutton's Vireo		Y							
Warbling Vireo		?	?						✓
Warblers									
Orange-crowned Warbler		O	O						
Yellow Warbler				Former breeder				✓	✓
Black-throated Gray Warbler		?							
Common Yellowthroat	Y								
Tanagers and Grosbeaks									
Black-headed Grosbeak		Y							
Sparrows									
Blue Grosbeak			?						
Lazuli Bunting			?						
Spotted Towhee (Rufous-sided)		O	Y						
California Towhee		O	Y						
Lark Sparrow		?					✓		
Song Sparrow	Y	Y	Y						
Dark-eyed Junco		?							
Blackbirds and Orioles									
Red-winged Blackbird	Y								
Tricolored Blackbird	?						✓	✓	✓
Western Meadowlark			?						
Yellow-headed Blackbird	?								✓
Brewer's Blackbird		?							
Great-tailed Grackle	Y			First bred in 1996					
Brown-headed Cowbird	Y	Y	Y	Brood parasite					
Hooded Oriole		Y							
Bullock's Oriole (Northern Oriole)		Y							
Finches									
Purple Finch	X								
House Finch		Y	Y						
Lesser Goldfinch		Y	Y						
American Goldfinch			?						
Old World Sparrows									
House Sparrow		Y							

APPENDIX 1b. OTHER FAUNAL LISTS FOR LAKE LOS CARNEROS REGION.

The following species lists are taken from previous management plans for Lake Los Carneros County Park (Fast and Glenn, 1978; Penfield and Smith, 1983, and; Planning Land Use Services, 1986), but the species contained therein were observed in the vicinity of the park, not necessarily within the park boundaries.

Bird list from Lake Los Carneros Limnological and Management Study by Fast and Glenn (1978)

APPENDIX D

BIRDS OF THE LAKE LOS CARNEROS REGION. THIS LIST WAS PREPARED BY JOY PARKINSON AND MRS. PETER BRATT OF THE SANTA BARBARA AUDUBON SOCIETY. IT WAS COMPLETED DURING NOVEMBER 1977.

SANTA BARBARA AUDUBON SOCIETY, INC.

A branch of the National Audubon Society

Post Office Box 2067

Santa Barbara, California

BIRDS of the LAKE LOS CARNEROS REGION

Compiled from records of the Santa Barbara Audubon Society and the Santa Barbara Museum of Natural History

The following species have been found nesting in the area:

COMMON NAME	SCIENTIFIC NAME
Pied-billed grebe	Podilymbus podiceps
Mallard	Anas platyrhynchos
Gadwall	Anas strepera
Cinnamon teal	Anas cyanoptera
Wood duck	Aix sponsa
Ruddy duck	Oxyura jamaicensis
White-tailed kite	Elanus leucurus
Red-shouldered hawk	Buteo lineatus
American kestrel	Falco sparverius
California quail	Lophortyx californicus
Virginia rail	Rallus limicola
Sora	Porzana carolina
American coot	Fulica americana
Killdeer	Charadrius vociferus
Band-tailed pigeon	Columba fasciata
Mourning dove	Zenaidura macroura
Barn owl	Tyto alba
Anna's hummingbird	Calypte anna
Allen's hummingbird	Selasphorus sasin
Common flicker	Colaptes auratus
Acorn woodpecker	Melanerpes formicivorus
Downy woodpecker	Picoides pubescens
Nuttall's woodpecker	Picoides nuttallii
Western kingbird	Tyrannus verticalis
Cassin's kingbird	Tyrannus vociferans
Ash-throated flycatcher	Myiarchus cinerascens
Black phoebe	Sayornis nicricans
Western flycatcher	Empidonax difficilis
Western wood pewee	Contopus sordidulus
Barn swallow	Hirundo rustica
Cliff swallow	Petrochelidon pyrrhonota
Scrub jay	Aphelocoma coerulescens
Common crow	Corvus brachyrhynchos
Plain titmouse	Parus inoratus
Wrentit	Chamaea fasciata
House wren	Troglodytes aedon
Long-billed marsh wren	Cistothorus palustris
Mockingbird	Mimus polyglottos
California thrasher	Toxostoma redivivum
American Robin	Turdus migratorius

Bird species found nesting at Lake Los Carneros, contd.

COMMON NAME	SCIENTIFIC NAME
Western bluebird	Sialia mexicana
Phainopepla	Phainopepla nitens
Starling	Sturnus vulgaris
Hutton's vireo	Vireo huttoni
Warbling vireo	Vireo gilvus
Orange-crowned warbler	Vermivora celata
Yellow warbler	Dendroica petechia
Common yellowthroat	Geothlypis trichas
Wilson's warbler	Wilsonia pusilla
House sparrow	Passer domesticus
Western meadowlark	Sturnella neglecta
Red-winged blackbird	Agelaius phoeniceus
Tricolored blackbird	Agelaius tricolor
Hooded oriole	Icterus cucullatus
Brewer's blackbird	Euphagus cyanocephalus
Brown-headed cowbird	Molothrus ater
Black-headed grosbeak	Pheucticus melanocephalus
Purple finch	Carpodacus purpureus
House finch	Carpodacus mexicanus
American goldfinch	Carduelis tristis
Lesser goldfinch	Carduelis psaltria
Rufous-sided towhee	Pipilo erythrophthalmus
Brown towhee	Pipilo fuscus
Lark sparrow	Chondestes grammacus
Dark-eyed junco	Junco hyemalis
Chipping sparrow	Spizella passerina
Song sparrow	Melospiza melodia

67 species

SANTA BARBARA AUDUBON SOCIETY, INC.

A branch of the National Audubon Society

Santa Barbara, California

BIRDS of the LAKE LOS CARNEROS REGION Contd.

The following species have been seen in the area at various times of the year

COMMON NAME	SCIENTIFIC NAME
Common loon	Gavia immer
Red-throated loon	Gavia stellata
Horned grebe	Podiceps auritus
Eared grebe	Pidiceps nigricollis
Western grebe	Aechmorphorus occidentalis
White pelican	Pelecanus erythrorhynchos
Brown pelican	Pelecanus occidentalis
Double-crested cormorant	Phalacrocerax auritus
Great blue heron	Ardea herodias
Green heron	Butorides striatus
Cattle egret	Bubulcus ibis
Great egret	Casmerodius albus
Snowy egret	Egretta thula
Black-crowned night heron	Nycticorax nycticorax
Least bittern	Ixebrychus exilis
American bittern	Botaurus lentiginosus
White-faced ibis	Plegadis chihi
Whistling swan	Olor columbianus
Canada goose	Branta canadensis
White-fronted goose	Anser albifrons
Snow goose	Chen caerulescens
Ross' goose	Chen rossii
Fulvous whistling duck	Dendrocygna bicolor
Gadwall	Anas strepera
Pintail	Anas acuta
Green-winged teal	Anas cresca
Blue-winged teal	Anas discos
European wigeon	Anas penelope
American wigeon	Anas americana
Northern shoveler	Anas clypeata
Redhead	Aythya americana
Ring-necked duck	Aythya collaris
Canvasback	Aythya Valisineria
Lesser scaup	Aythya affinis
Greater scaup	Aythya marila
Common goldeneye	Bucephala clangula
Bufflehead	Bucephala albeola
Oldsquaw	Clangula hyemalis
Harlequin duck	Histrionicus histrionicus
Surf scoter	Melanitta perspicilata
Common merganser	Mergus merganser
Red-breasted merganser	Mergus serrator

SANTA BARBARA AUDUBON SOCIETY, INC.

A branch of the National Audubon Society | Santa Barbara, California

BIRDS of the LAKE LOS CARNEROS REGION, contd.

COMMON NAME	SCIENTIFIC NAME
Turkey vulture	Cathartes aura
Sharp-shinned hawk	Accipiter striatus
Cooper's hawk	Accipiter cooperii
Red-tailed hawk	Buteo jamaicensis
Swainson's hawk	Buteo swainsoni
Rough-legged hawk	Buteo lagopus
Ferruginous hawk	Buteo regalis
Golden eagle	Aquila chrysaetos
Bald eagle	Haliaeetus leucocephalus
Marsh hawk	Circus cyaneus
Osprey	Pandion haliaetus
Peregrine falcon	Falco peregrinus
Merlin	Falco columbaris
Ring-necked pheasant	Phasianus colchicus
Common gallinule	Gallinula chloropus
Semipalmated plover	Charadrius semipalmatus
Black-bellied plover	Pluvialis squatarola
Common snipe	Capella gallinago
Long-billed curlew	Numenius americanus
Whimbrel	Numenius phaeopus
Spotted sandpiper	Actitis macularia
Solitary sandpiper	Tringa solitaria
Willet	Catoptrophorus semipalmatus
Greater yellowlegs	Tringa melanoleucus
Lesser yellowlegs	Tringa flavipes
Pectoral sandpiper	Calidris melanotos
Least sandpiper	Calidris minutilla
Dunlin	Calidris alpina
Short-billed dowitcher	Limnodromus griseus
Long-billed dowitcher	Limnodromus scolopaceus
Stilt sandpiper	Micropalama himantopus
Western sandpiper	Calidris mauri
Marbled godwit	Limosa fedoa
Sanderling	Calidris alba
American avocet	Recurvirostra americana
Black-necked stilt	Himantopus mexicanus
Wilson's phalarope	Steganopus tricolor
Northern phalarope	Phalaropus lobatus
Glaucous-winged gull	Larus glaucescens
Western gull	Larus occidentalis
Herring gull	Larus argentatus
California gull	Larus californicus
Ring-billed gull	Larus delawarensis
Mew gull	Larus canus
Bonaparte's gull	Larus philadelphia

BIRDS of the LAKE LOS CARNEROS REGION, contd.

	COMMON NAME	SCIENTIFIC NAME
	Heermann's gull	Larus heermanni
	Black-legged kittiwake	Rissa trydactyla
	Forster's tern	Sterna forsteri
	Common tern	Sterna hirundo
	Royal tern	Sterna maximus
	Black tern	Chlidonias niger
	Rock dove	Columba livia
	Spotted dove	Streptopelia chinensis
	Roadrunner	Geococcyx californianus
	Screech owl	Otus asio
	Great horned owl	Bubo virginianus
	Burrowing owl	Athene cunicularia
**	Short-eared owl	Asio flammeus
	Poor-will	Phalaenoptilus nuttallii
	Common nighthawk	Chordeiles minor
**	Lesser nighthawk	Chordeiles acutipennis
	Vaux's swift	Chaetura vauxi
	White-throated swift	Aeronautes saxatalis
	Black-chinned hummingbird	Archilochus alexandri
	Costa's hummingbird	Calypte costae
	Rufous hummingbird	Selasphorus rufus
	Belted kingfisher	Megaceryle alcyon
	Lewis' woodpecker	Melanerpes lewis
	Yellow-bellied sapsucker	Sphyrapicus varius
	Hairy woodpecker	Dendrocopes villosus
	Tropical kingbird	Tyrannus melancholicus
	Say's phoebe	Sayornis saya
	Alder flycatcher	Empidonax alnorum
	Hammond's flycatcher	Empidonax Hammondii
	Olive-sided flycatcher	Nuttallornis borealis
	Horned lark	Eremophila alpestris
	Violet-green swallow	Tachycineta thalassina
	Tree swallow	Iridoprocne bicolor
	Bank swallow	Riparia riparis
	Rough-winged swallow	Stelgidopteryx ruficollis
	Purple martin	Progne subis
	Common raven	Corvus corax
	Bushtit	Psaltriparus minimus
	Red-breasted nuthatch	Sitta canadensis
	Brown creeper	Certhia familiaris
**	Winter wren	Troglodytes troglodytes
	Bewick's wren	Thryomanes bewickii
	Varied thrush	Ixoreus naevius
	Hermit thrush	Hylocichla guttata
	Swainson's thrush	Hylocichla ustulata
**	Townsend's solitaire	Myadestes townsendi

** one sighting

BIRDS of the LAKE LOS CARNEROS REGION, contd.

COMMON NAME	SCIENTIFIC NAME
Blue-gray gnatcatcher	Polioptila caerulea
Golden-crowned kinglet	Regulus satrapa
Ruby-crowned kinglet	Regulus calendula
Water pipit	Anthus spinoletta
Cedar waxwing	Bombydilla cedrorum
Loggerhead shrike	Lanuis ludovicianus
Solitary vireo	Vireo solitarius
Black-and-white warbler	Mniotilta varia
Nashville warbler	Vermivora ruficapilla
Yellow-rumped warbler	Dendroica coronata
Black-throated gray warbler	Dendroica nigrescens
Townsend's warbler	Dendroica townsendi
MacGillivray's warbler	Oporornis tolmiei
Yellow-breasted chat	Icteria virens
American redstart	Setophaga ruticilla
Yellow-headed blackbird	Xanthocephalus xanthocephalus
Northern oriole	Icterus galbula
Western tanager	Piranga ludeviciana
Scarlet tanager	Piranga olivacea
Lazuli bunting	Passerina amoena
Pine siskin	Spinus pinus
Lawrence's goldfinch	Carduelis lawrencei
Savannah sparrow	Passerculus sandwichensis
Vesper sparrow	Pooecetes gramineus
Lark sparrow	Chondestes grammacus
White-crowned sparrow	Zonotrichia leucephrys
Golden-crowned sparrow	Zonotrichia atricapilla
White-throated sparrow	Zonotrichia albicollis
Fox sparrow	Passerella iliaca
Lincoln's sparrow	Melospiza lincolnii

163 species

A total of 230 species of birds have been recorded at Lake Los Carneros, of which 67 species have been found nesting in the area.

This record was compiled by:

T. Nelson Metcalf, Field notes compiler, Santa Barbara Audubon Society
Richard Webster, Author: A Checklist of Birds of the Santa Barbara Area
Leslie C. Cook, former Education Chairman and Field Trip Chairman
Mrs. Peter Bratt, Christmas Count Chairman, Santa Barbara Audubon Society
Joy Parkinson, President, Santa Barbara Audubon Society
Waldo G. Abbott, Assistant Director, Santa Barbara Museum of Natural History

Revised and updated, November, 1977

Bird list from Lake Los Carneros Study Addendum by Penfield and Smith (1983)

APPENDIX B: REVISED BIRD LIST FOR THE LAKE AREA

Table B-1. Updated bird list for Lake Los Carneros County Park, including freshwater marsh and Stowe House habitats.

Breeding Birds

Common Name	Scientific Name
Pied-billed grebe	Podilymbus podiceps
Mallard	Anas platyrhynchos
Gadwall*	A. strepera
Cinnamon teal*	A. cyanoptera
Ruddy duck	Oxyura jamaicensis
White-tailed kite	Elanus leucurus
Red-shouldered hawk	Buteo lineatus
California Quail	Lophortyx californicus
American coot	Fulica americana
Killdeer	Charadrius vociferus
Band-tailed pigeon**	Columba fasciata
Mourning dove	Zenaida macroura
Spotted dove	Streptopelia chinensis
Anna's hummingbird	Calypte anna
Allen's hummingbird	Selasphorus sasin
Black-chinned hummingbird**	Archilochus alexandri
Common flicker	Colaptes auratus
Acorn woodpecker	Melanerpes formicivorus
Downy woodpecker	Picoides pubescens
Nuttall's woodpecker	P. nuttallii
Ash-throated flycatcher	Myiarchus cinerascens
Black phoebe	Sayornis nigricans
Western flycatcher**	Empidonax difficilis
Western wood pewee**	Contopus sordidulus
Barn swallow**	Hirundo rustica
Rough-winged swallow**	Stelgidopteryx ruficollis
Cliff swallow	Petrochelidon pyrrhonota
Scrub jay	Aphelocoma coerulescens
Common crow	Corvus brachyrhynchos
White-breasted nuthatch	Sitta carolinensis
Plain titmouse	Parus inoratus
Common bushtit	Psaltriparus minimus
Wrentit	Chamaea fasciata
House wren	Troglodytes aedon
Bewick's wren	Thryomanes bewickii
Mockingbird	Mimus polyglottos
California thrasher	Toxostoma redivivum
Starling	Sturnus vulgaris
Hutton's vireo	Vireo huttoni
Orange-crowned warbler	Vermivora celata
Common yellowthroat	Geothlypis trichas
House sparrow	Passer domesticus
Western meadowlark	Sturnella neglecta

Red-winged blackbird	Agelaius phoeniceus
Tri-colored blackbird*	A. tricolor
Hooded oriole	Icterus cucullatus
Brewer's blackbird	Euphagus cyanocephalus
Brown-headed cowbird	Molothrus ater
Black-headed grosbeak	Pheuticus melanocephalus
House finch	Carpodacus mexicanus
American goldfinch	Carduelis tristis
Lesser goldfinch	C. psaltria
Rufous-sided towhee	Pipilo erythrophthalmus
Brown towhee	P. fuscus
Dark-eyed junco	Junco hyemalis
Song Sparrow	Melospiza melodia

Non-breeding Birds

Common loon	Gavia immer
Red-throated loon	G. stellata
Horned grebe***	Podicps auritus
Eared grebe	P. nigricollis
Western grebe	Aechmorphorus occidentalis
White pelican***	Pelecanus erythrorhynchos
Brown pelican***	P. occidentalis
Double-crested cormorant	Phalacrocorax auritus
American bittern***	Botaurus lengitinosus
Great blue heron	Ardea herodias
Green heron	Butorides striatus
Cattle egret	Bubulcus ibis
Great egret	Casmerodius albus
Snowy egret	Egretta thula
Black-crowned night heron	Nycticorax nycticorax
Least bittern	Ixebrychus exilis
American bittern	Botaurus lentiginosus
White-faced ibis	Plegadis chihi
Whistling swan	Olor columbianus
Canada goose	Branta canadensis
White-fronted goose***	Anser albifrons
Snow goose	Chen caerulescens
Fulvous whistling duck	Dendrocygna bicolor
Gadwall	Anas strepera
Pintail	A. acuta
Green-winged teal	A. cresca
Blue-winged teal	A. discos
American wigeon	A. americana
Northern shoveler	A. clypeata
Cinnamon teal	A. cyanoptera
Redhead	Aythya americana
Ring-necked duck	A. collaris
Canvasback	A. valisineria
Lesser scaup	A. affinis
Greater scaup***	A. marila
Common goldeneye***	Bucephala clangula
Bufflehead	B. albeola
Oldsquaw***	Clangula hyemalis

Common merganser***	Mergus merganser
Red-breasted merganser	M. serrator
Hooded merganser***	Lophodytes cucullatus
Turkey vulture	Cathartes aura
Sharp-shinned hawk	Accipiter striatus
Cooper's hawk	A. cooperii
Red-tailed hawk	Buteo jamaicensis
Marsh hawk	Circus cyaneus
Osprey	Pandion haliaetus
Prairie falcon***	Falco mexicanus
Peregrine falcon***	F. peregrinus
Merlin	F. columbarius
Common gallinule	Gallinula chloropus
Common snipe	Capella gallinago
Spotted sandpiper	Actitis macularia
Solitary sandpiper	Tringa solitaria
Greater yellowlegs	T. melanoleucus
Lesser yellowlegs	T. flavipes
Least sandpiper	Calidris minutilla
Long-billed dowitcher	Limnodromus scolopaceus
Western sandpiper	Calidris mauri
Wilson's phalarope	Steganopus tricolor
Northern phalarope	Phalaropus lobatus
Glauous-winged gull	Larus glaucescens
Western gull	L. occidentalis
Herring gull***	L. argentatus
California gull	L. californicus
Ring-billed gull	L. delawarensis
Mew gull	L. canus
Franklin's gull	L. pipixcan
Bonaparte's gull	L. philadelphia
Heermann's gull	L. heermanni
Black-legged kittiwake***	Rissa trydactyla
Forster's tern	Sterna forsteri
Rock dove	Columba livia
Roadrunner	Geococcyx californianus
Screech owl***	Otus asio
Great horned owl	Bubo virginianus
Burrowing owl***	Athene cunicularia
Short-eared owl***	Asio flammeus
Poor-will***	Phalaenoptilus nuttallii
Lesser nighthawk***	Chordeiles acutipennis
Vaux's swift	Chaeutra vauxi
White-throated swift	Aeronautes saxatalis
Costa's hummingbird	Calypte costae
Rufous hummingbird	Selasphorus rufus
Calliope hummingbird***	Stellula calliope
Belted kingfisher	Megaceryle alcyon
Lewis woodpecker***	Melanerpes lewis
Red-breasted sapsucker	Sphyrapicus ruber
Hairy woodpecker	Picoides villosus
Western kingbird	Tyrannus verticalis
Cassin's kingbird	T. vociferans
Tropical kingbird***	T. melancholicus

Say's phoebe	Sayornis saya
Eastern phoebe***	S. phoebe
Willow flycatcher	Empidonax traillii
Hammond's flycatcher	E. hammondii
Olive-sided flycatcher	Nuttallornis borealis
Horned lark***	Eremophila alpestris
Violet-green swallow	Tachycineta thalassina
Tree swallow	Iridoprocne bicolor
Bank swallow***	Riparia riparia
Purple martin***	Progne subis
Common raven***	Covus corax
Red-breasted nuthatch***	Sitta canadensis
Brown creeper	Certhia familiaris
Winter wren***	Troglodytes troglodytes
Robin	Turdus migratorius
Varied thrush***	Ixoreus naevius
Hermit thrush	Catharus guttata
Swainson's thrush***	C. ustulata
Townsend's solitaire***	Myadestes townsendi
Blue-gray gnatcatcher	Polioptila caerulea
Golden-crowned kinglet***	Regulus satrapa
Ruby-crowned kinglet	R. calendula
Water pipit	Anthus spinoletta
Cedar waxwing	Bombycilla cedrorum
Loggerhead shrike	Lanius ludovicianus
Solitary vireo	Vireo solitarius
Black-and-white warbler***	Mniotilta varia
Nashville warbler	Vermivora ruficapilla
Yellow-rumped warlber	Dendroica coronata
Black-throated gray warbler	D. nigrescens
Townsend's warbler	D. townsendi
Black-throated green warbler***	D. virens
MacGillivray's warbler	Oporornis tolmiei
Yellow-breasted chat***	Icteria virens
Wilson's warbler	Wilsonia pusilla
American redstart***	Setophaga ruticilla
Yellow-headed blackbird	Xanthocephalus xanthocephalus
Northern oriole	Icterus galbula
Western tanager	Piranga ludoviciana
Scarlet tanager***	P. olivacea
Summer tanager***	P. rubra
Rose-breasted grosbeak***	Pheuticus ludovicianus
Evening grosbeak***	Hesperiphona vespertina
Lazuli bunting	Passerina amoena
Purple finch	Carpodacus purpureus
Cassin's finch	C. cassinii
Pine siskin	Spinus pinus
Lawerence's goldfinch	Carduelis lawrencei
Savannah sparrow	Passerculus sandwichensis
Vesper sparrow	Pooecetes gramineus
Lark sparrow	Chondestes grammacus
Dark-eyed junco	Junco hyemalus
Tree sparrow***	Spizella arborea
Chipping sparrow	S. passerina

Clay-colored sparrow***	*S. pallida*
White-crowned sparrow	*Zonotrichia leucophrys*
Golden-crowned sparrow	*Z. atricapilla*
White-throated sparrow	*Z. albicollis*
Fox sparrow	*Passerella iliaca*
Lincoln's sparrow	*Melospiza lincolnii*

* Breeds at Goleta Slough but not at Lake Los Carneros.

** Does not breed at Lake Los Carneros County Park, but does breed in nearby habitats such as stream sides or oak-sycamore woodlands.

***Rare or of uncertain status, usually less than five sightings reported.

Faunal list from Lake Los Carneros Master Plan Final EIR by Planning Land Use Services (1986)

Updated Bird List for Lake Los Carneros County Park

Breeding Birds

Pied-billed grabe	Podilymbus podiceps
Mallard	Anas platyrhynchos
Cinnamon teal*	A. cyanoptera
Ruddy duck	Oxyura jamaicensis
Black-shouldered kite	Elanus leucurus
Red-shouldered hawk	Buteo lineatus
American Kestrel	Falco sparverius
California Quail	Lophortyx californicus
American coot	Fulica americana
Killdeer	CHaradrius vociferus
Band-tailed pigeon**	Columba fasciata
Mourning dove	Zenaida macroura
Spotted dove	Streptopelia chinensis
Common Barn Owl	Tyto alba
Anna's hummingbird	Calypte anna
Allen's hummingbord	Selasphorus sasin
Black-chinned hummingbird**	Archilochus alexandri
Common flicker	Colaptes auratus
Acorn woodpecker	Melanerpes formicivorus
Downy woodpecker	Picoides pubescens
Nuttall's woodpecker	P. nuttalli
Ash-throated flycatcher	Myiarchus cinerascens
Black phoebe	Sayornis nigricans
Western flycatcher**	Empidonax difficilis
Western wood pewee**	Contopus sordidulus
Barn swallow**	Hirundo rustica
Northern Rough-winged swallow	Stelgidopteryx ruficollis
Cliff swallow	Petrochelidon pyrrhonota
Scrub jay	Aphelocoma coerulescens
Common crow	Corbus brachyrhynchos
White-breasted nuthatch	Sitta carolinensis
Plain titmouse	Parus inoratus
Bushtit	Psaltriparus minimus
Wrentit	Chamaea fasciata
House Wren	Troglodytes aedon
Bewick's wren	Thyromanes bewickii
Mockingbord	Mimus polylottos
California thrasher	Toxostoma redivivum
European starling	Sturnus vulgaris
Hutton's vireo	Vireo huttoni
Orange-crowned warbler	Vermivora celata
Common yellowthroat	Geothlypis trichas
House sparrow	Passer domesticus
Western meadowlark	Sturnella neglecta
Red-winged blackbird	Agelaius phoeniceus
Tricolored blackbird*	A. tricolor
Hooded oriole	Icterus cucullatus
Brewer's blackbird	Euphagus cyanocephalus

Brown-headed cowbird	Molothrus ater
Black-headed grosbeak	Pheuticus melanocephalus
House finch	Carpodacus mexicanus
American foldfinch	Carduelis tristis
Lesser goldfinch	C. psaltria
Rufous-sided towhee	Pipilo erythrophthalmus
Brown towhee	P. fuscus
Dark-eyed junco	Junco hyemalis
Song sparrow	Melospiza melodia

Non-Breeding Birds

Common loon***	Gavia immer
Red-throated loon	G. stellata
Horned grebe***	Podicps auritus
Eared grebe	P. nigricollis
Western grebe	Aechmorphorus occidentalis
While pelican***	Pelecanus erythrorhynchos
Brown pellican***	P. occidentalis
Double-crested cormorant	Phalacrocorax aruitus
American bittern	Botaurus lengitinosus
Least bittern***	isebrychus exillis
Breat blue heron	Ardea herodias
Breen-backed heron	Butorides striatus
Cattle agret	Bubulcus ibis
Great egret	Casmerodius albus
Snowy agret	Egretta thula
Black-crowned night heron	Nycticorax nycticorax
White-faced ibis	Plegadis chihi
Fulvous whistling-duck***	Dendrocygna bicolor
Tundra Swan	Olor columbianus
Canada goos	Branta canadensis
White -fronted goose***	Anser albifrons
Snow goose	Chen caerulescens
Gadwall	Anas strepera
Northern Pintail	A. acuta
Green-winged teal	A. cresca
Blue-winged teal	A. discos
American wigeon	A. americana
Northern shoveler	A. clypeata
Cinnamon teal	A. cyanoptera
Redhead	Aythya americana
Ring-necked duck	A. collaris
Canvasback	A. valisineria
Lesser scaup	A. affinis
Greater scaup***	A. marila
Common goldeneye***	Bucephala clangula
Bufflehead	B. albeola
Oldsquaw***	Clangula hyemalis
Common merganser***	Mergus merganser
Red-breasted merganser	M. serrator
Hooded merganser***	Lophodytes cucullatus
Turkey vulture	Cathartes aura

Sharp-shinned hawk	Accipiter striatus
Cooper's hawk	A. cooperii
Red-tailed hawk	Buteo jamaicensis
Northern harrier	Circum cyaneus
Osprey	Pandion haliaetus
Prairie falcon	Falcomexicanus
Peregrine falcon***	F. peregrinus
Merlin	F. columbaris
Virginia Rail	Rallus limicola
Sora	Porzana carolina
Common moorhen	Gallinula chleropus
Common snipe	Capella gallinago
Spotted sandpiper	Actitis macularia
Solitary sandpiper***	Tringa solitaria
Greater yellowlegs	T. melanoleucus
Lesser hellowlegs	T. flavipes
Least sandpiper	Califris minutilla
Baird's sandpiper	Calidris bairdii
Pectoral sandpiper***	Calidris melanotos
Short-billed dowitcher***	Limnodromus griseus
Long-billed dowitcher	Limnodromus scolopaceus
Western sandpiper	Calidris mauri
Wilson's phalarope	Steganopus tricolor
Northern phalarope	Phalaropus lobatus
Claucous-winged gull***	larus glaucescens
Western gull***	L. occidentalis
Herring gull***	L. argentatus
Thayer's gull***	L. thayeri
California gull	L. californicus
Ring-billed gull	L. delawarensis
Mew gull	L. canus
Bonaparte's full	L. philadelphia
Meermann's gull***	L. herrmanni
Black-legged kittiwake***	Rissa trydactyla
Caspian Tern	Sterna caspia
Forster's tern	Sterna forsteri
Rock dove	Columba livia
White-winged Dove***	Zenaida asiatica
Roadrunner	Geococcyx californianus
W. Screecheowl***	Otus asio
Great horned owl	Bubo virginianus
Burrowing owl***	Athene cunicularia
Short-eared owl***	Asio flammeus
Common Poor-will***	Phalaenoptilus nuttallii
Lesser nighthawk***	Chordeiles acutipenniss
Black swift***	Cypseliodes niger
Vaux's whift	Chaeutra vauxi
White-throated swift	Aeronautes saxatalis
Costa's hummingbird	Calypte costae
Rufous hummingbird	Selasphorus rufus
Calliope hummingbird***	Stellula callipe
Belted kingfisher	Megaceryle alcyon
Lewis woodpecker***	Melanerpes lewis

Red-breasted sapsucker	Sphyrapicus ruber
Hairy woodpecker	Picoides villosus
Western kingbird	Tyrannus verticalis
Cassin's kingbird	T. vociferans
Tropical kingbird***	T. melancholicus
Say's phoebe	Sayornis saya
Eastern phoebe***	S. phoebe
Willow flycatcher	Empidonax traillii
Hammond's flycatcher	E. hammondii
Olive-sided flycatcher	Nuttallornis borealis
Horned lark***	Eremophila alpestris
Violet-green swallow	Tachycineta thalassina
Tree swallow	Iridoprocne bicolor
Bank swallow***	Riparia riparia
Purple martin***	Progne subis
Common raven***	Covus corax
Red-breasted nuthatch	Sitta canadensis
Brown creeper	Certhis familiaris
Winter wren***	Troglodytes troglodytes
Marsh wren	Cistothorus palustris
American robin	Turdus migratorius
Varied thrush***	Ixoreus naevius
Hermit thrush	Catharus guttata
Swainson's thrush	C. ustulata
Western bluebird	Sialia mexicana
Townsend's solitaire***	Myadestes townsendi
Blue-gray gnatcatcher	Polioptila caerulea
Golden-crowned kinglet	Regulus satrapa
Ruby-crowned kinglet	R. calendula
Water pipit	Anthus spinoletta
Cedar waxwing	Bombycilla cedrorum
Loggerhead shrike	Lanius ludovicianus
Solitary vireo	Vireo solitarious
Warbling vireo	Vireo gilvus
Black-and-white warbler***	Mniotilta varia
Nashville warbler	Vermivora ruficapilla
Yellow warbler	Dendroica petechia
Yellow-rumped warbler	Dendrioca coronata
Black-throated gray warbler***	D. nigrescens
Townsend's warbler	D. townsendi
Black-throated green warbler***	D. virens
Hermit warbler	D. occidentalis
MacGillivray's warbler	Oporornis tolmiei
Yellow-breasted chat***	Icteria virens
Wilson's warbler	Wilsonia pusilla
American redstart***	Setophaga ruticilla
Yellow-headed blackbird	Xanthocephalus xanthocephalus
Northern oriole	Icterus galbula
Western tanager	Piranga ludoviciana
Scarlet tanager***	P. olivacea
Summer tanager***	P. rubra
Rose-breasted grosbeak***	Pheuticus lodovicianus

Evening grosbeak***	Hesperiphona vespertina
Blue brosbeak***	Guiraca caerulea
Lazuli bunting	Passerina amoena
Purple finch	Carpodacus purpureus
Pine siskin	Spinus pinus
Lawrence's goldfinch	Carduelis lawrencei
Savannah sparrow	Passerculus sandwichensis
Vesper sparrow	Pooecetes gramineus
Lark sparrow	Chonestes grammacus
Dark-eyed junco	Junco hyemalus
American tree sparrow	Spizella arborea
Chipping sparrow	S. passerina
Clay-colored sparrow***	S. pallida
While-crowned sparrow	Xonotrichia leucophrys
Golden-crowned sparrow	Z. atricapilla
While-throated sparrow***	Z. albicollis
Fox sparrow	Passerella iliaca
Lincoln's sparrow	Melospiza lincolnii

* Breeds at Goleta Slough but not at Lake Los Carneros

** Does not breed at Lake Los Carneros County Park, but does breed in nearby habitats such as stream sides or oak-sycamore woodlands.

*** Very rare or casual in occurence, less than five sightings reported.

Source: Penfield and Smith, 1983

Updated by Paul Lehman, 1986

List of amphibian, reptile, and mammal species known or expected to be present in Lake Los Carneros County Park.

Black-bellied Slender Salamander *Batrachoseps nitgriventris*	C
Arboreal Salamander *Aneides lubugris*	U
Western Toad *Bufo boreas*	C
Pacific Treefrog *Hyla regilla*	C
Bullfrog *Rana catesbeiana*	C
Western Pond Turtle *Clemmys marmorata*	C
Western Fence Lizard *Sceloporus occidentalis*	C
Side-blotched Lizard *Uta stansburiana*	U
Western Skink *Eumeces skiltonianus*	U
Southern Alligator Lizard *Gerrhonotus multicarinatus*	C
California Legless Lizard *Anniella nigra argentea*	U
Pacific Ring-neck Snake *Diadophis punctatus*	U
Gopher Snake *Pituophis melanoleucus*	C
Common Kingsnake *Lampropeltis getulus*	C
Common Garter Snake *Thamnophis sirtalis*	U
Hammond's Garter Snake *Thamnophis hammondi*	U
Virginia Opossum *Didelphis virginiana*	C
Trowbridge's Shrew *Sorex trowbridgii*	U
Broad-footed Mole *Scapanus latimanus*	U
California Myotis *Myotis californicus*	U

Western Pipistrelle *Pipistrellus hesperus*	U
Big Brown Bat *Eptesicus fuscus*	U
Hoary Bat *Lasiurus cinereus*	U
Brazilian Free-tailed Bat *Tadarida brasiliensis*	U
Brush Rabbit *Sylvilagus bachmanni*	C
California Ground Squirrel *Spermophilus beecheyi*	C
Botta's Pocket Gopher *Thomomys bottae*	C
Western Harvest Mouse *Reithrodontomys megalitis*	C
Deer Mouse *Peromyscuc maniculatus*	C
Brush Mouse *Peromyscus boylii*	U
Dusky-footed Woodrat *Neotoma fascipes*	U
California Vole *Microtus californicus*	C
House Rat *Rattus rattus*	C
House Mouse *Mus Musculus*	C
Gray Fox *Urocyon cinereoargenteus*	U
Raccoon *Procyon lotor*	U
Long-tailed Weasel *Mustela frenata*	C
Badger *Taxidea Taxus*	U
Striped Skunk *Mephitis mephitis*	U

C = expected to be common

U = uncommon or little known

APPENDIX 2. PHOTODOCUMENTATION OF EXISTING CONDITIONS AT LAKE LOS CARNEROS COUNTY PARK

Photo 1. Ruderal vegetation, dominated by invasive, non-native plants such as Italian thistle (*Carduus pycnocephalus*) and nasturtium (*Tropaeolum majus*), is common along trails and other disturbed areas in the park. Photo taken 26 May 1999.

Photo 2. Non-native annual grassland east of Lake Los Carneros. Photo taken 4 June 1999.

Photo 3. *Baccharis* scrub vegetation (in low background), along margins of non-native annual grassland south of Stow House. Trees in background are mostly Monterey cypress (*Cupressus macrocarpa*), an ornamental. Photo taken 26 May 1999.

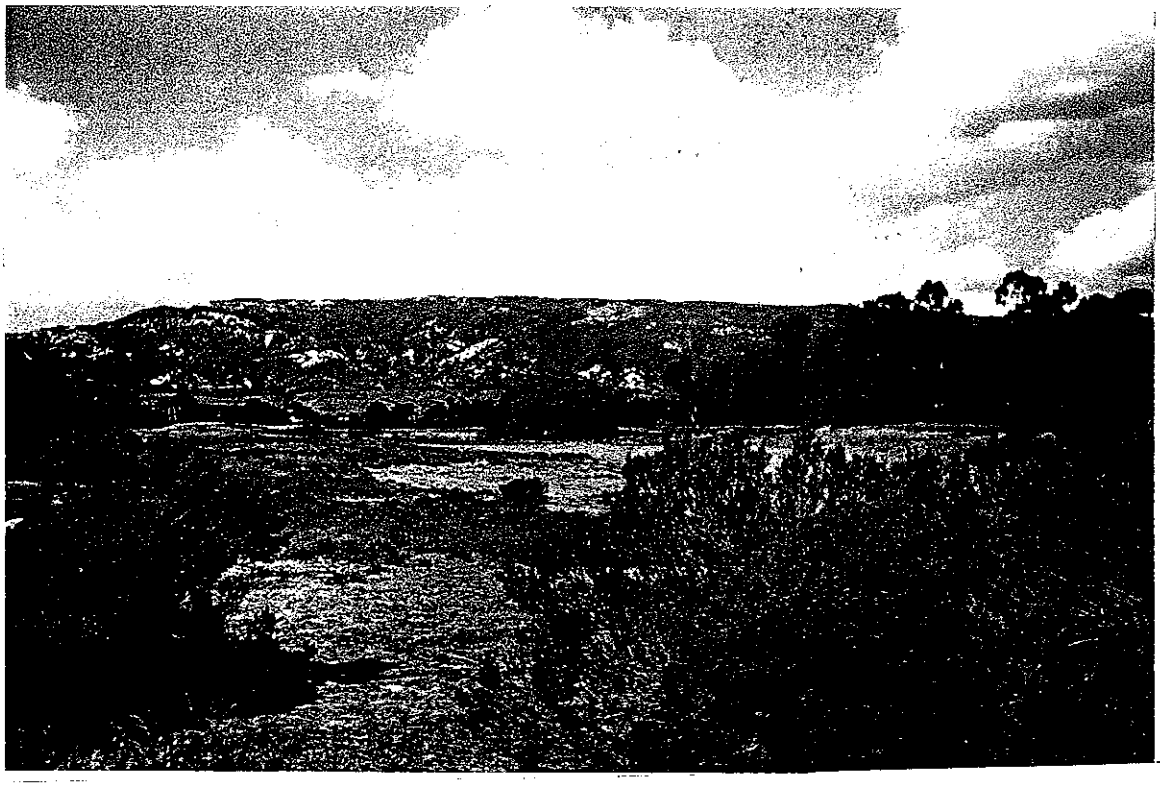


Photo 4. *Baccharis* scrub vegetation along margins of extensive non-native annual grassland east of Lake Los Carneros. Low-lying areas in this grassland to right of photo support man-made seasonal wetland habitat. Photo taken 7 April 1999.

Photo 5. Willow riparian woodland along southeast corner of Lake Los Carneros. Scattered black cottonwood (*Populus trichocarpa* var. *trichocarpa*), also occur at this location. Photo taken 7 April 1999.

Photo 6. Willow riparian woodland around inlet/sediment control basin along south edge of Covington Way. Note stature and density of vegetation. Photo taken 26 May 1999.

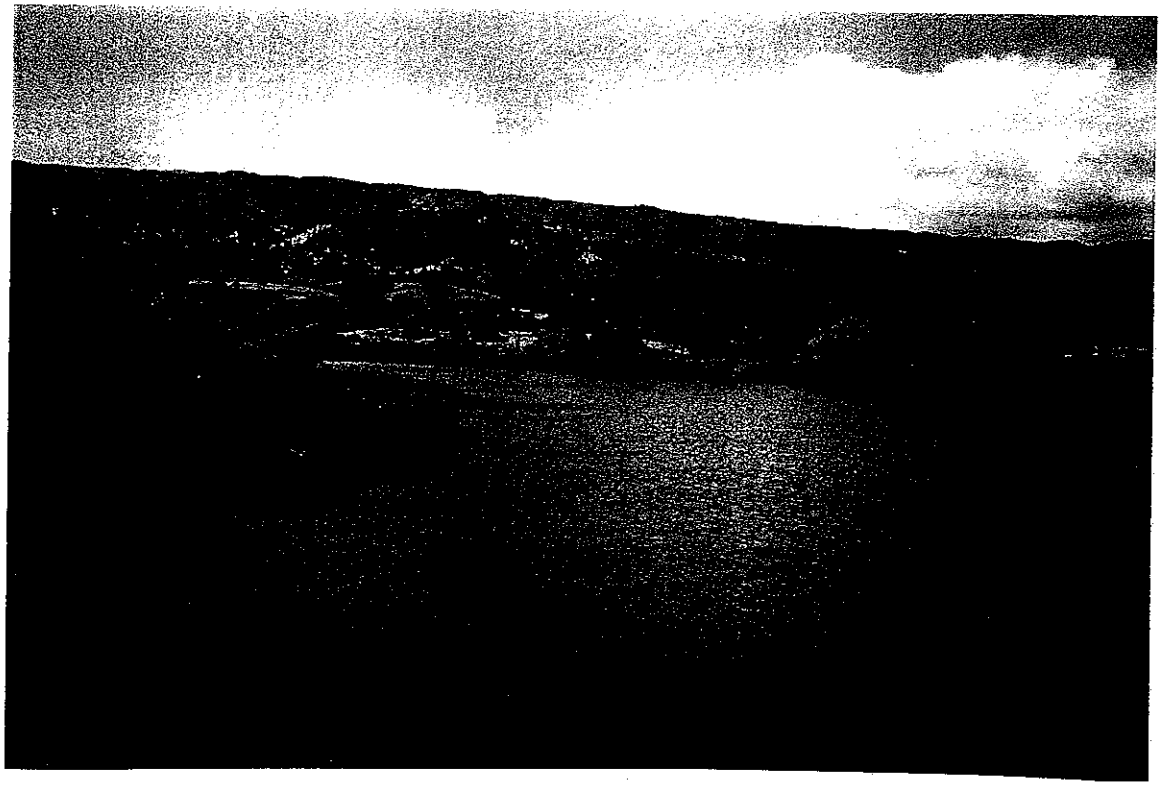


Photo 7. Open water habitat and northeastern shoreline of Lake Los Carneros, looking northeast from dam. Photo taken 7 April 1999.

Photo 8. Freshwater marsh vegetation along southeastern edge of Lake Los Carneros. This vegetation type in the park is almost completely dominated by California bulrush (*Scirpus californicus*). Photo taken 4 June 1999.

Photo 9. Freshwater marsh vegetation along the western side of Lake Los Carneros, looking south from the bridge over the northern arm of the lake. Upland vegetation consists of willow woodland and ornamental trees. Photo taken 26 May 1999.

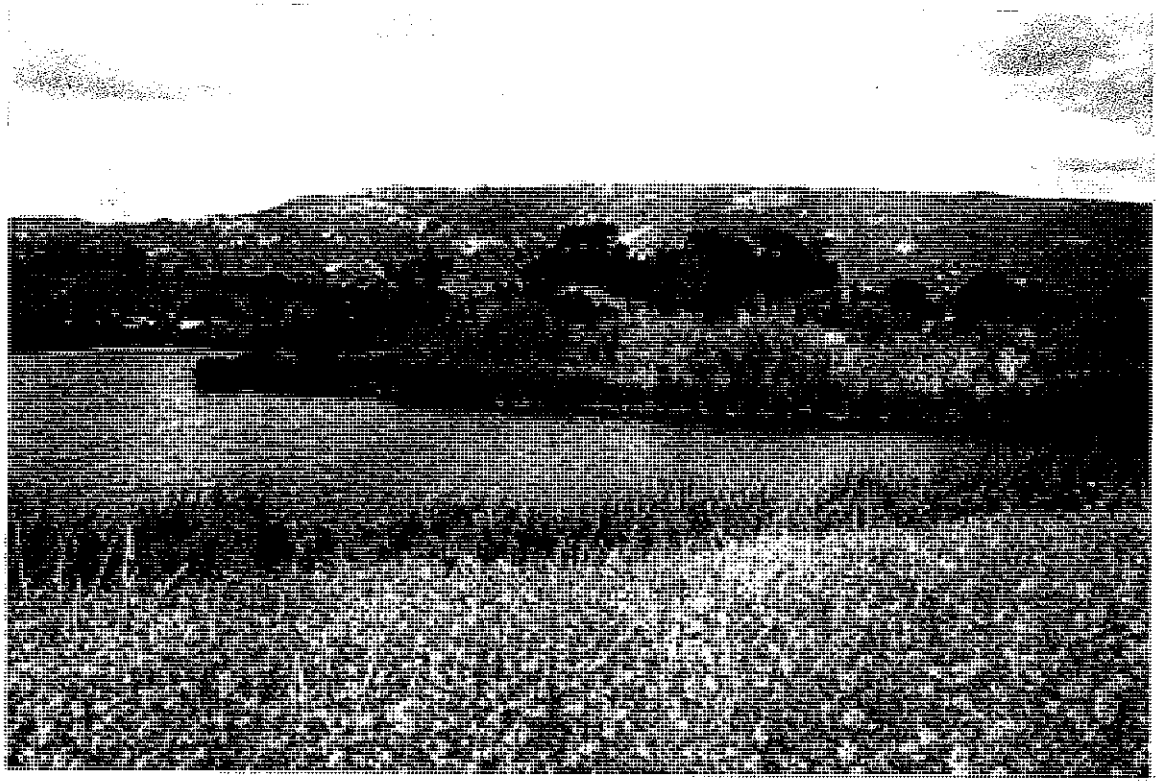


Photo 10. Freshwater marsh vegetation fringing the "island" and shoreline of Lake Los Carneros, east of the dam. Photo taken 7 April 1999.

Photo 11. Seasonal wetland (overflow pond) south of Lake Los Carneros, looking north from Calle Real. Dense fringing vegetation is early successional willow. A mixture of herbaceous vegetation and mulefat (*Baccharis salicifolia*) and young willows cover the bottom of this pond due to below-normal rainfall during the 1998/99 season. Mature willows and one or two black cottonwoods, backed by coast live oak (*Quercus agrifolia*), ring the northern, upland edge of this wetland. Photo taken 4 June 1999.

Photo 12. Small seasonal wetland in southeastern corner of park. This small depression collects surface water in years of normal and above-normal rainfall and is an important breeding site for Pacific treefrogs (*Hyla regilla*), in the park. Vegetation in bottom of wetland primarily consists of weedy forbs such as dock (*Rumex* spp.), with scattered cattails (*Typha* spp.), and bulrush. Upland vegetation is primarily non-native annual grasses and weeds, with scattered coyote brush (*Baccharis pilularis*). Photo taken 26 May 1999.

Photo 13. Ornamental trees and shrubs planted around Stow House include monkey puzzle (*Araucaria imbricata*), star pine (*Araucaria excesa*), coast redwood (*Sequoia sempervirens*), weeping willow (*Salix babylonica*), Canary Island date palm (*Phoenix canariensis*), coconut palm (*Cocos nucifera*), magnolia (*Magnolia grandiflora*), bamboo (*Phyllostachys bambusoides*), and a variety of other exotic trees and shrubs. Photo taken 7 April 1999.

Photo 14. Living and dead Monterey cypress, found in scattered locations throughout the northern, northwestern, and southwestern portions of the park, provide roosting habitat for a number of raptors and other birds. Photo taken 26 May 1999.

Photo 15. Eucalyptus woodland (background) fringing tule and willow woodland vegetation along northeastern edge of Lake Los Carneros. Photo taken 26 May 1999.

Photo 16. Dense tule growth along the northern arm of Lake Los Carneros, looking northeast from the bridge. Sediment inputs from agricultural operations in the upper watershed is creating shallow water habitat and accelerating tule encroachment in this area. Photo taken 16 May 1999.

Photo 17. Dead or dormant tules in level portions of the shoreline along the southwestern and western edges of the lake are inundated only when the lake is at or near capacity. These patches provide important foraging and breeding habitat for a number of birds, including rails and bitterns. Photo taken 4 June 1999.

Photo 18. This "island" in the southeastern corner of the lake, looking north from access road, is surrounded by a dense fringe of tules. Creating and maintaining an open water channel through tule vegetation along the eastern (left side of photo) and northern edges of this "island" and the shoreline of the lake would isolate this feature, making it more attractive to birds. Photo taken 26 May 1999.

Photo 19. Southeastern corner of Lake Los Carneros, looking northeast from dam. The shoreline east of the dam presents some opportunity for tule removal and enhancement of fishing opportunities. Photo taken 4 June 1999.

Photo 20. Southeastern corner of Lake Los Carneros, looking northeast from shoreline. Extensive bare areas of shoreline receive heavy fishing use. Maintaining an area of open water between the shoreline and tule clumps will enhance fishing opportunities. Photo taken 7 April 1999.

Photo 21. Southeastern corner of Lake Los Carneros, looking northwest from shoreline. Extensive areas of bare shoreline receive heavy fishing use. Large-mouth bass and bluegill spawn in the shallow waters offshore in this area. Narrowing the fringe of tules in this area and placing structure, such as submerged piles of rocks, will significantly enhance fish habitat here. Photo taken 7 April 1999.

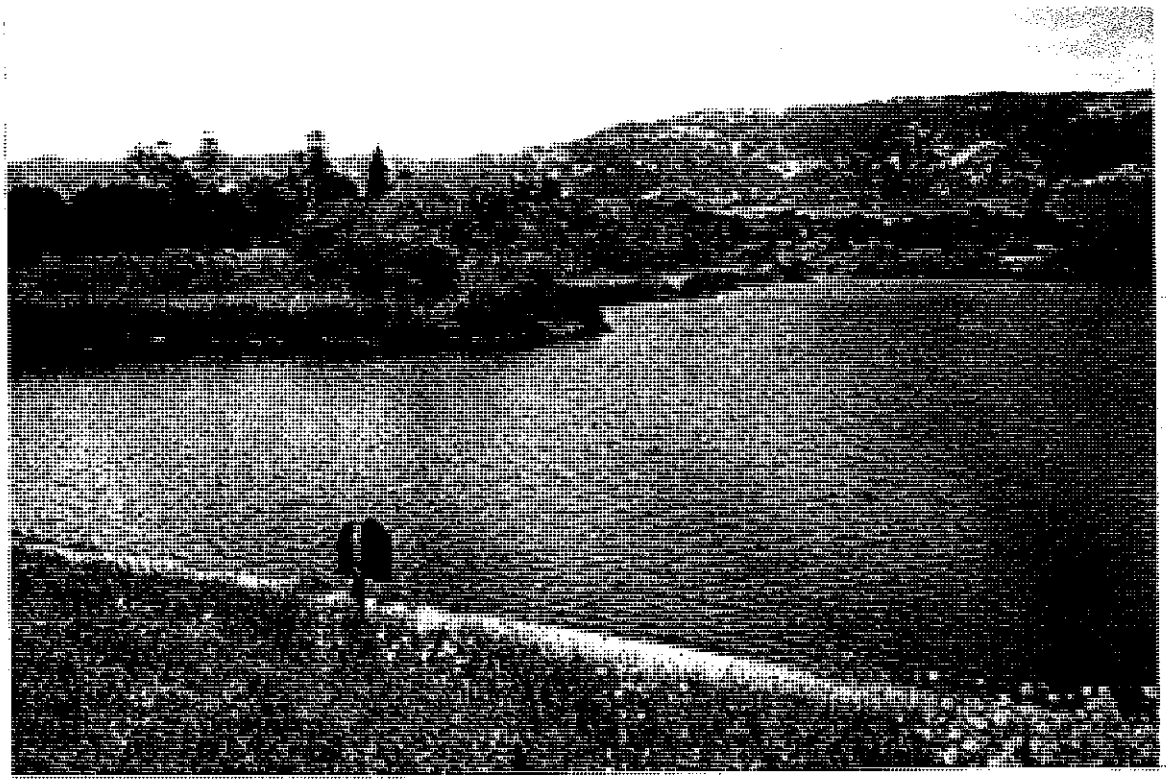


Photo 22. Western shoreline of Lake Los Carneros, looking north from dam. This section of the lake should be managed for birds, i.e, no development and no tule removal. Tule growth appears to have stabilized here because of the steeply sloping topography of the lake along this reach. Photo taken 7 April 1999.

Photo 23. Bridge over northern arm of Lake Los Carneros, looking south from western shoreline. Removal of dense tule growth beneath this bridge would significantly increase fishing opportunities in this area, with minimal impacts to marsh-dwelling and riparian birds. Photo taken 26 May 1999.

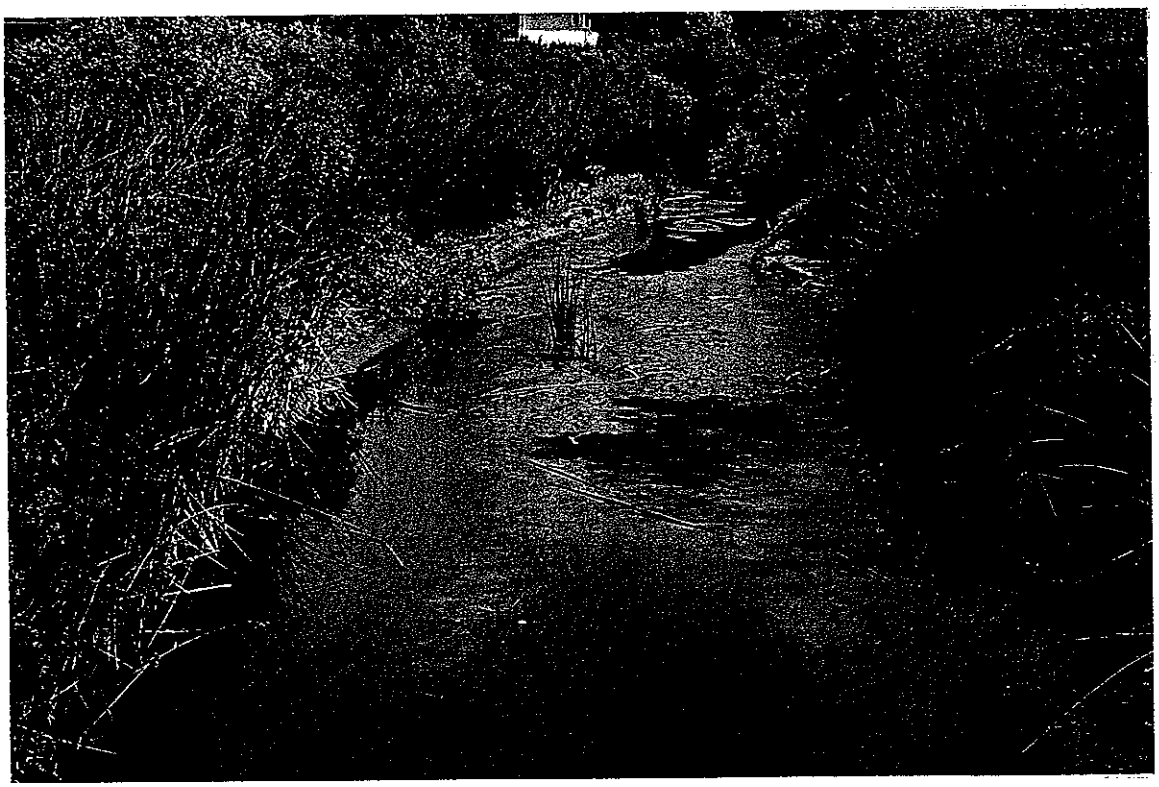


Photo 24. Inlet channel at northern end of lake, looking north from bridge. Sediment inputs from agricultural operations in the upper watershed have filled this channel, creating ideal conditions for tule encroachment. Dredging sediments from this channel, combined with limited tule removal along the edges of the channel, will benefit bird and fish habitat. Photo taken 26 May 1999.

Photo 25. Dense willow riparian woodland along inlet channel at north end of Lake Los Carneros, looking east. Covington Way is at ~~right~~ LEFT ✓ side of photo. Ruderal habitat in foreground of photo is recommended as site for construction of an out-of-channel sediment control basin. Photo taken 26 May 1999.

Photo 26. Dense stands of pampas grass, *Cortaderia atacamensis*, north of Calle Real in the southwestern corner of the park. Shrubs in front of pampas grass are coyote brush; trees in background are mixture of Monterey pine, *Pinus radiata*, coast live oak, and Monterey cypress. Photo taken 7 April 1999.

Photo 27. Outlet for overflow pipe at base of dam, looking south from east end of dam. Erosion of this area occurred during record rainfall season of 1997/98, resulting in significant sediment inflows to the overflow pond. Photo taken 7 April 1999.

Photo 28. Same area as in Photo 27, following re-grading and stabilization of the overflow channel. This channel must be maintained to prevent sediment from entering the overflow pond to the south. Note dense coast live oak and scattered black cottonwood trees surrounding northern and northwestern edges of overflow pond. Photo taken 4 June 1999.

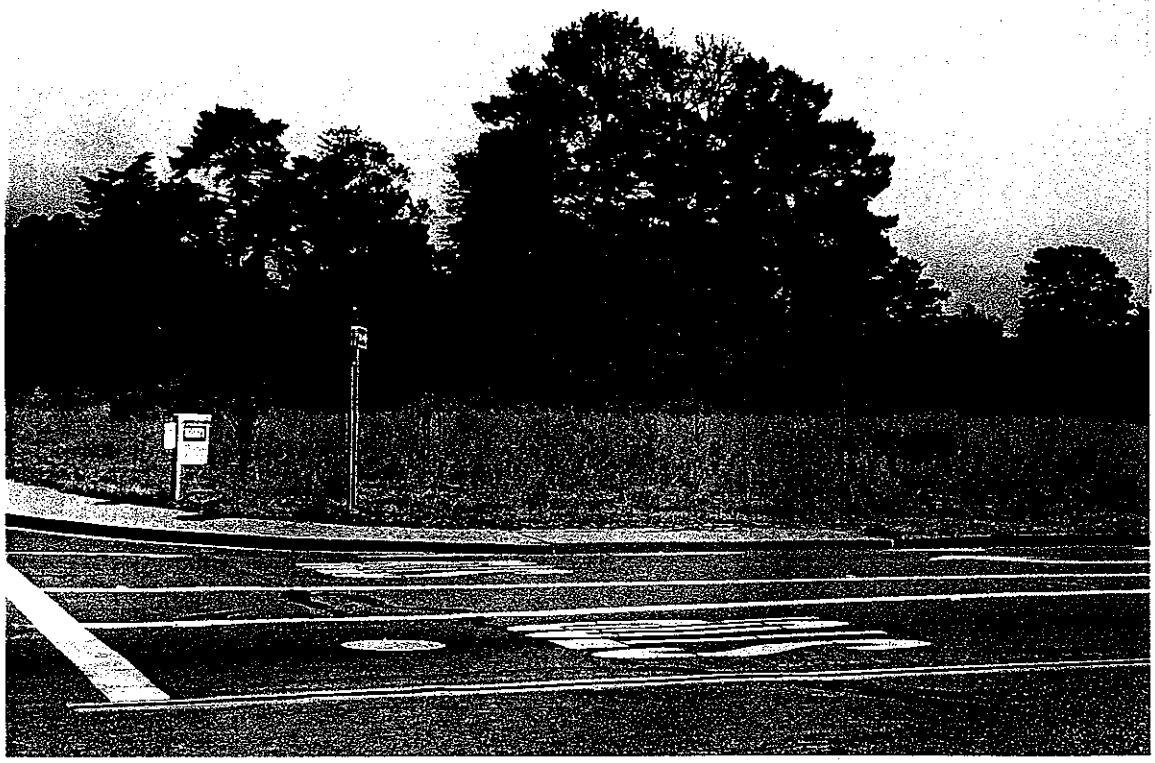


Photo 29. Small parcel for sale northeast of intersection of Calle Real (in foreground) and Los Carneros Road, looking northeast. Photo taken 26 May 1999.

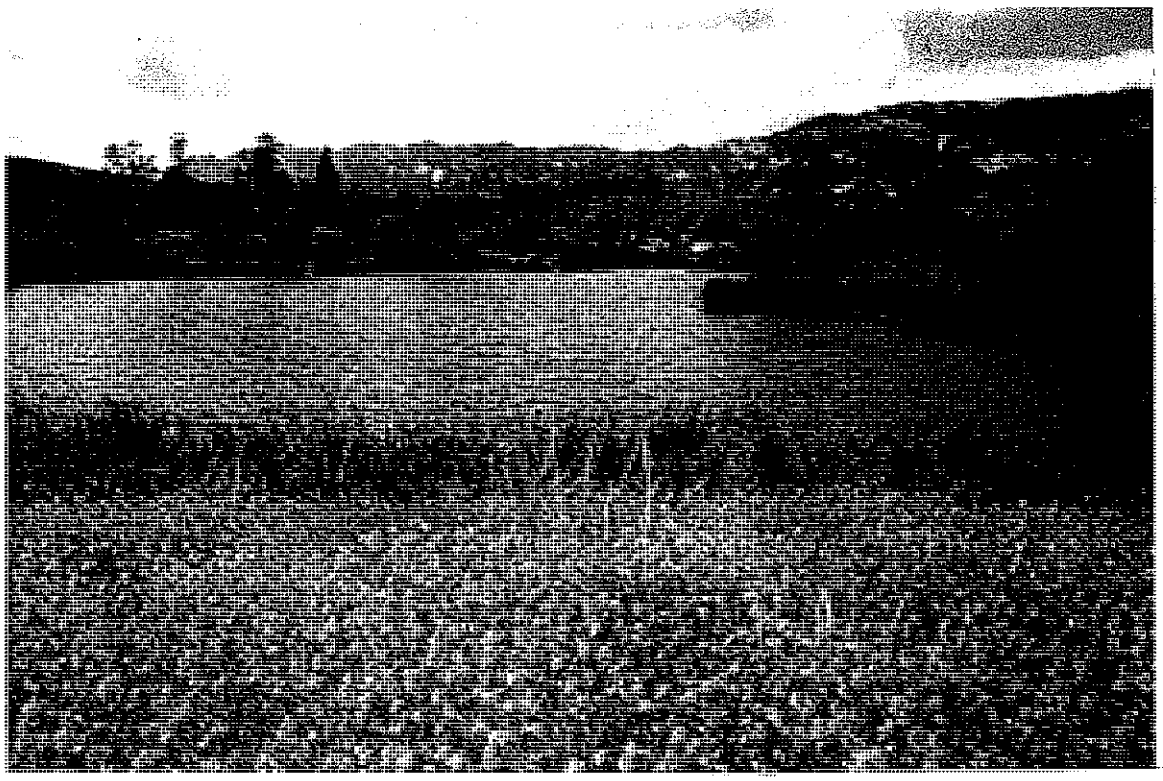
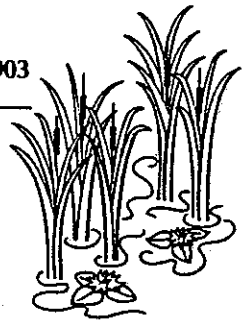


Photo 30. Lake Los Carneros, looking north from dam. Several management features of this plan are shown, including tule marsh, open water, ornamental trees at left of photo, willow woodland backed by eucalyptus grove at right of photo, and orchards along the upper watershed in center of photo that contribute to sediment inputs to the lake. Photo taken 7 April 1999.

APPENDIX 3. PRODUCT LITERATURE FOR HOCKNEY UNDERWATER WEED CUTTER

HOCKNEY COMPANY

Underwater Weed Cutters since 1903



913 Cogswell Drive
P. O. Box 1000
Silver Lake, Wisconsin 53170
Telephone (414) 889-4581 or (414) 862-2628

Dear Customer:

Enclosed is our literature describing the Underwater Weed Cutters our company manufactures and their current prices. Both units are of **rigid, quality construction.** Both units will **cut and control all weeds that root to the bottom** of a body of water.

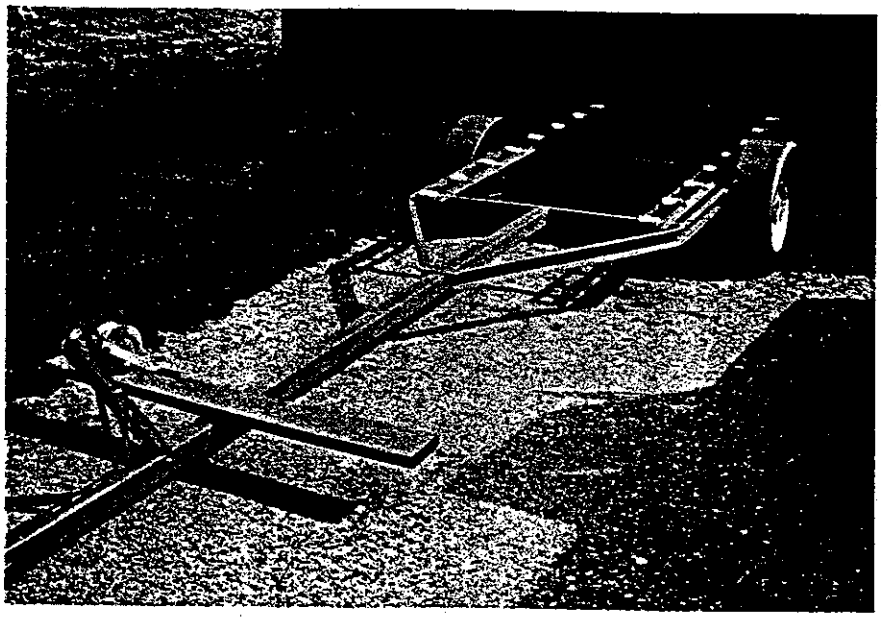
MODEL HC-10H "ALL HYDRAULIC" Underwater Weed Cutter is priced at **$10,945.00** f.o.b. Silver Lake, WI. It consists of an all metal, air-tight, **90% foam-filled** pontoon. A single 8 HP Industrial/ Commercial, Briggs & Stratton engine with **electric start** is standard. A hydraulic pump provides energy for operating the two hydraulic motors for the cutterhead and paddle propulsion, with **forward,neutral and reverse.** A hydraulic cylinder provides power to lift and lower the sickles to any level from about 5 feet below the water to about 18 inches above the surface of the water, allowing cutting of vegetation like cattails and bullrushes on the shoreline. All controls for operating this unit are located within **easy reach of the seated operator.** This unit will self-propel and cut weeds in water **as shallow as 10 inches.** The Main Sickle is 10 foot wide, but other widths are available. The working weight being only about 1200 pounds is protection against damage when hitting hidden objects. Depending on the thickness of the growth of weeds, the Model HC-10H will cut up to 12 acres a day. Collection of the cut weeds may cause one to choose to cut less acreage a day.

MODEL HP-7 CH MTE "PORTABLE" Underwater Weed Cutter is priced at **$3,425.00** f.o.b. Silver Lake, WI. It consists of a 5 HP Industrial/ Commercial Briggs & Stratton engine and a hydraulic powered sickle lift and lower system. A clutch to engage and disengage the sickle drive makes for easier starting and raking. The HP-7 has the same **rigid, quality construction** as the Model HC-10H cutterhead. The Main Sickle cuts a 7 foot swath any depth from about 4 feet below the surface of the water to about 15 inches above the water. The HP-7 is adaptable to any 14 foot or longer rowboat, scow, or pontoon type boat. Suggested mounting instructions come in the Instruction and Maintenance manual.

HOCKNEY COMPANY

SINCE 1903

OPTION SHEET



CUSTOM-FITTED TRAILERS

1800 pound capacity

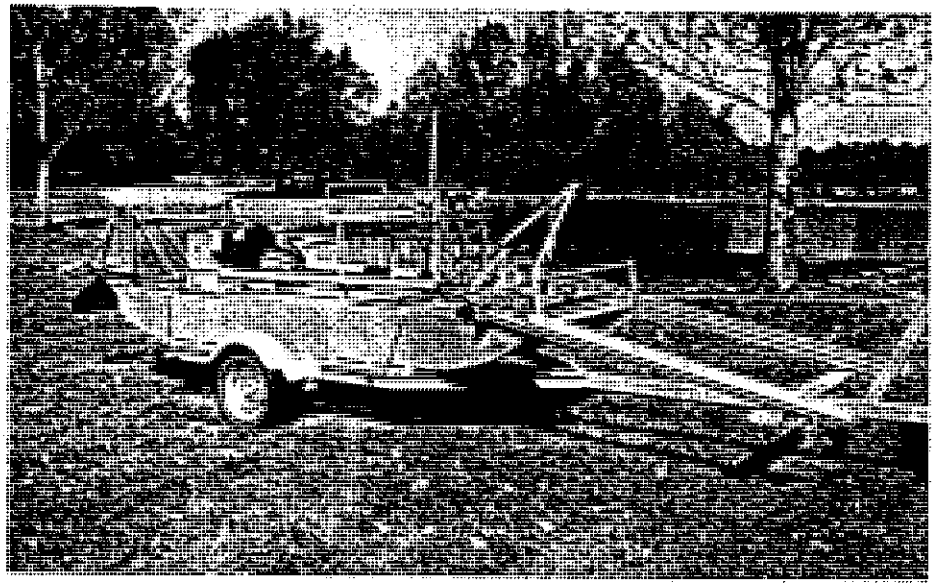
$1095.00

QUALITY CONSTRUCTION

LARGE TIRES for launching in soft shoreline areas and safer over-the-road travel

HOCKNEY TRAILER
ALLOWS TRAVEL
WITH MINIMUM ASSEMBLY

APPLY THE
MAIN SICKLE AND RUDDER
(after launching)
AND YOU ARE READY
TO GO TO WORK



*** MAIN SICKLE OPTIONS ***

STANDARD 10 ft. MAIN SICKLE may be replaced with 5 ft. 6in. , 7 ft. or 8 ft. MAIN SICKLE
Shortened MAIN SICKLE allows easier cutting between piers and docks and also desirable when cutting thick cattails or bullrushes

EXTRA MAIN SICKLES $625.00 (all sizes)

*** ENGINE OPTIONS ***

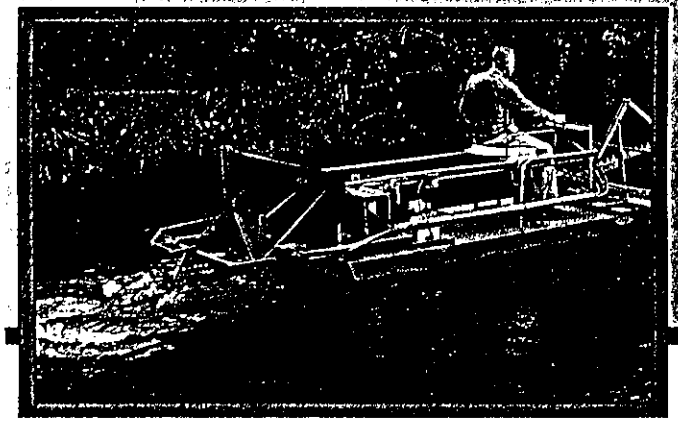
Several Engine Options are available up to 12½ HP. All are of INDUSTRIAL/COMMERCIAL QUALITY. Discuss pricing and availability when purchasing.

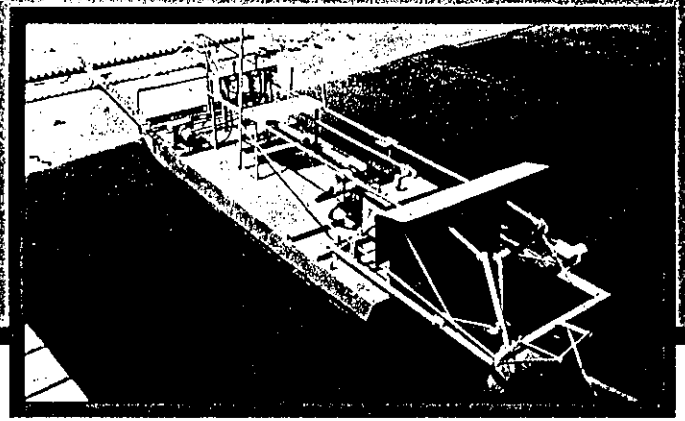
ALL OPTIONS AND PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ECONOMICAL QUALITY CONSTRUCTION

ECOLOGICALLY SAFE

WEED CONTROL





The Hockney Model HC-10H is completely hydraulic powered for easy and trouble-free operation

THE HOCKNEY MODEL HC-10H

The new, all hydraulic powered HC-10H was designed to withstand difficult weed growth problems in commercial and recreational areas. This is a complete unit including the pontoon, paddle propulsion, sickles and rake attachment.

Cuts up to 12 acres of weeds a day easily and economically. The main sickle cuts a 10-foot swath of weeds from 18 inches above the surface of the water and any depth to 5 feet below the surface of the water. Two side sickles keep the unit free of accumulating cut weeds. The rake then pushes the cut weeds to shore.

Easily navigates in water as shallow as 10-inches with paddle propulsion. The paddles will not destroy fish or damage sensitive breeding areas.

Easy-to-use controls are conveniently located and hydraulic powered for safe one-man operation.

Easily assembled and ready for service in only minutes on shore. The optional trailer makes it easy to launch, transport and store.

Available for shipment in two weeks.
All parts are in stock and are often shipped the same day as ordered. Complete one-year warranty means that the Hockney Company will replace any defective part for one full year.

SPECIFICATIONS*

ENGINE

Engine: Single 8-HP Briggs & Stratton Industrial/Commercial air-cooled engine with electric start. Other engine options are available at extra cost. Completely hydraulic powered for easy and trouble-free operation.

POWER

Power: A single hydraulic pump produces energy to operate two hydraulic motors and the lifting cylinder. One hydraulic motor powers the cutter head sickles. A second motor operates the paddle propulsion system with forward, neutral and reverse. Bearings of ball, roller, and bronze construction. All hydraulic functions can be used independently and simultaneously.

SICKLES

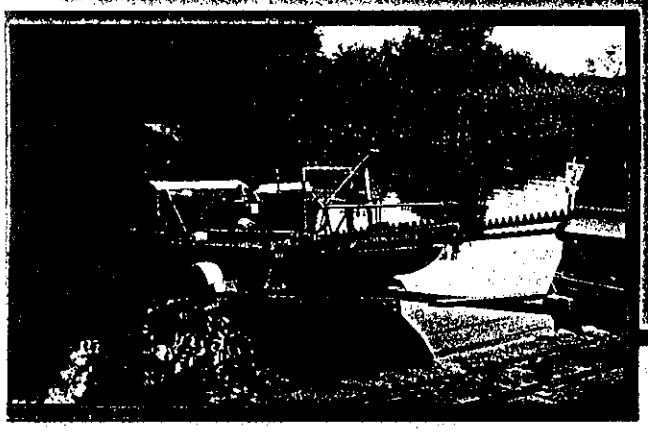
Sickles: One 10-foot wide main sickle and two 7-foot long side sickles. (Used to keep free of accumulating cut weeds.)

PONTOON

Pontoon: 12-ft. × 4-ft. × 1-ft. All metal airtight welded construction of 16-gauge steel with 90% foam flotation.

**Specifications are subject to change without notice.*

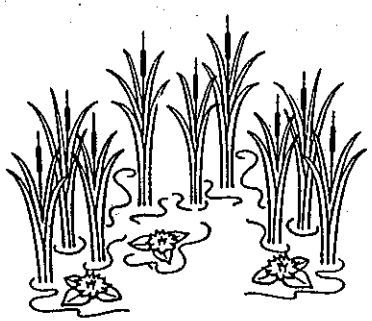
CUSTOM FITTED TRAILOR



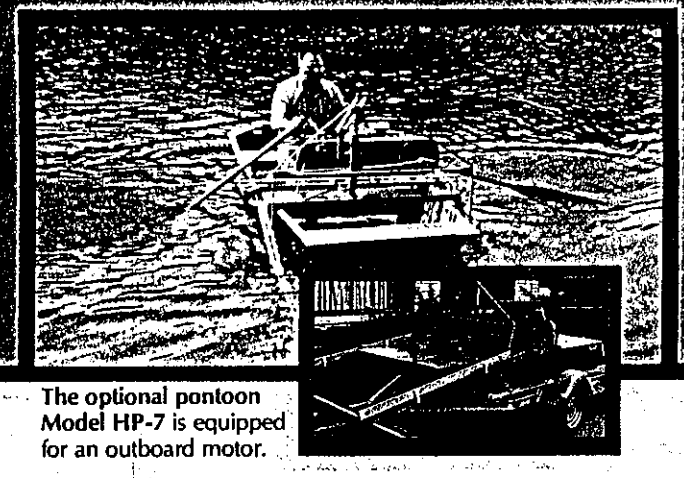
THE OPTIONAL TRAILER

he optional 1800 pound capacity trailer has extra-
arge tires for easier launching in soft shoreline areas
nd allows transportation of assembled unit with
nly main sickle and rudder removed. Perfect for
afe transport and storage of both models.

op-quality products with personal service.
he Hockney Company has been designing,
anufacturing and selling directly to customers for
ver 80 years. Our satisfied customers include the
Jnited States Department of Fish and Wildlife, the
)epartment of Agriculture, the Navy and the Army
:orps of Engineers as well as many state parks, cities,
ake associations and lake front property owners.



THE HOCKNEY PORTABLE MODEL HP-7



The optional pontoon Model HP-7 is equipped for an outboard motor.

Designed for convenience to homeowners, the portable Model HP-7 is also perfectly suited for smaller commercial areas. It features the same rigid, safe, quality construction as the commercial Model HC-10H.

The Hockney Model HP-7 easily mounts on an average boat and is easy to operate with the hydraulic sickle lift.

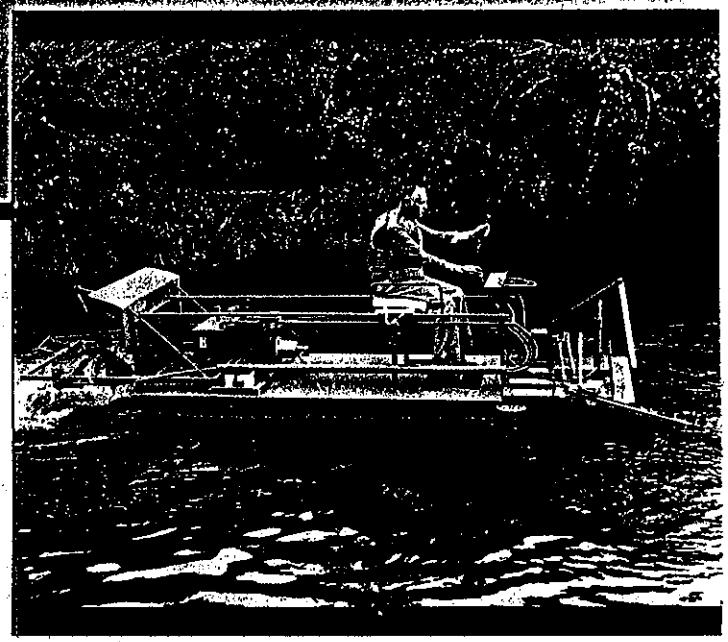
Specifications:*
Engine: 5-HP Briggs & Stratton Industrial/Commercial engine with a 6-to-1 gear reduction is standard. Hydraulic powered sickle lift, double V-Belt drive, clutch to allow the engine to be started without the sickles engaged and bearings of ball, roller, and bronze construction.
Sickles: One 7-foot wide main sickle and two 6½-foot long side sickles. (Used to keep free of accumulating cut weeds.)

Call or Write Today for More Information.

HOCKNEY COMPANY
Underwater Weed Cutters
913 Cogswell Drive
Silver Lake, Wisconsin 53170
Telephone (414) 889-4581

HOCKNEY COMPANY

Underwater Weed Cutters Since 1903

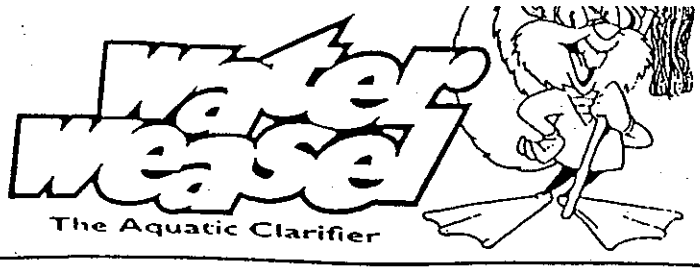


Safely controls weeds in sensitive water areas:

- bathing beaches
- lakes
- reservoirs
- fish hatcheries
- irrigation canals
- private beaches
- ponds
- inland marinas
- golf course waterways
- industrial parks

Better Boating, Bathing, Fishing and Sanitation

APPENDIX 4. PRODUCT LITERATURE ON AERATORS FOR IMPROVING WATER QUALITY IN LAKE LOS CARNEROS



CENTRAL COAST DISTRIBUTOR
4648 Via Clarice, Santa Barbara, CA 93111
Ph.: (805) 964-1318 • Fax: (805) 683-4326
Contractor License #660-954

Water Weasel is a new and innovative product that combines aeration, mixing of pond water, and a metering pump for the dispersing of a specially formulated additive throughout the pond that assists in the coagulation of suspended solids. Our background includes over 20 years in the waste water treatment industry, with an engineering staff on board that can customize our product for any application.

Beginning in the summer of 1994, the Water Weasel was extensively tested in several applications in zoos, resorts, decorative ponds, with exceptional results of dramatically improving water quality to the extent of changing a cloudy, murky pond where aquatic life could not be observed, to ponds where ornamental fish could be observed to a depth of several feet. Since 1995 we have sold a number of units throughout the United States and abroad.

The aquatic clarifier can effectively perform the following functions:

1. Provide the maximum aeration of any device available with comparable specifications to prevent odors and fish kills due to lack of oxygen in the water.

2. Substantially reduce algae bloom on the water surface by creating a slight wave action throughout the pond.

3. Clarify pond water by adding a naturally-occurring coagulant, exclusively available from Water Weasel Company.

4. The potential to effectively add a variety of aquaculture products, such as beneficial bacteria, for water quality management.

5. Cost effective means of aeration and water movement.

6. Relatively low cost installation lends itself to user friendly operation and periodic maintenance.

7. During the winter in northern climates, the pumping action keeps a large area free from ice for water fowl.

We are a member of the American Zoo & Aquarium Association and the National Recreation & Park Association and have attended their trade shows, as related to parks, zoos, and golf courses where ponds and lagoons may need clarification.

I hope this information is of help to you. Should you have any questions or comments, please do not hesitate to contact me.

Sincerely,

Dale Parks

Benefits of the Water Weasel

- Transforms dirty ponds into crystal clear water.
- Aerates water to maintain fish and aquatic life.
- Prevents stagnant, septic smells from "dead" ponds.
- Especially effective in high traffic aquatic gardens where visitors feed fish.
- Surface turbulence helps reduce algae growth.
- Additive is entirely harmless to aquatic life.
- Easy, low cost operation.

MEMBER:

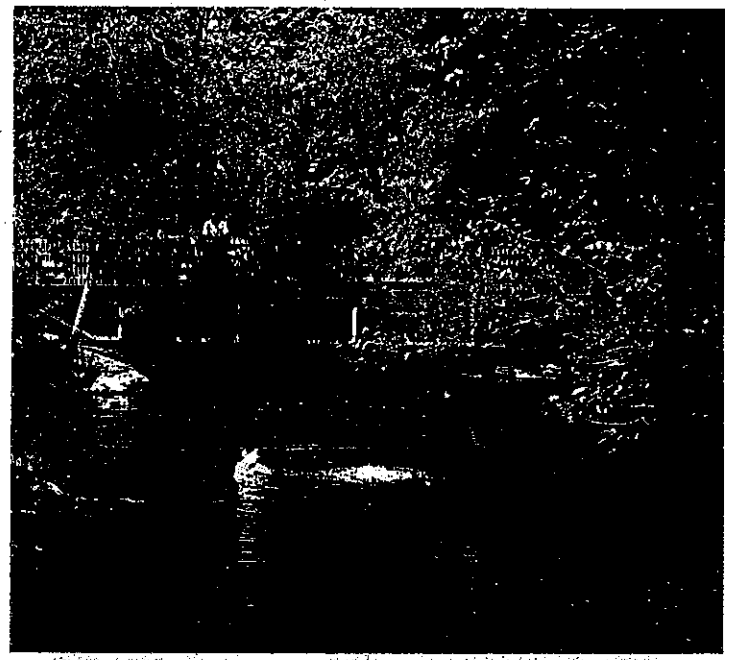
AMERICAN ZOO AND AQUARIUM ASSOCIATION

water weasel™
The Aquatic Clarifier

THE WATER WEASEL
P.O. BOX 8177
SPRINGFIELD, MISSOURI 65801
(417)864-5611 • FAX (417)866-0235

THE WATER WEASEL
P.O. BOX 8177
SPRINGFIELD, MISSOURI 65801

water weasel™
The Aquatic Clarifier



Innovative technology designed to change dirty, silt laden ponds and lagoons into sparkling clear pools of water.

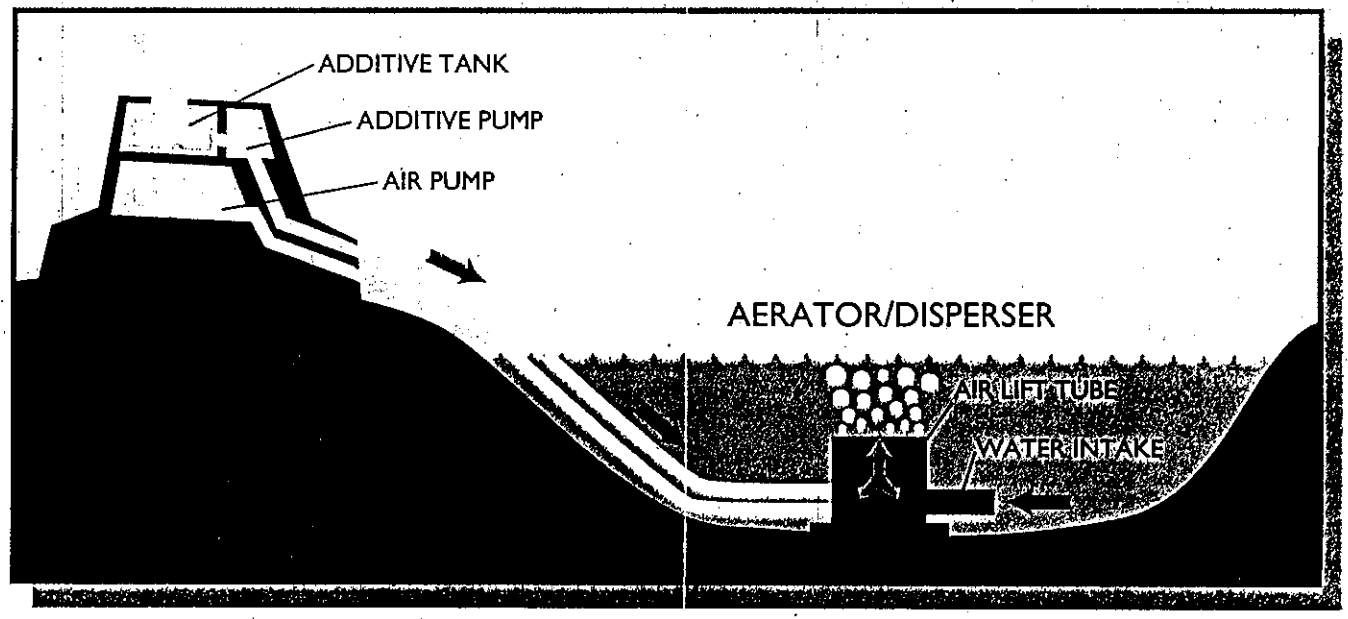
DESIGNED FOR:
Aquatic Gardens • Resorts • Public Parks
Zoos • Golf Courses • Hotels/Motels

The Water Weasel

effectively transforms a murky, dirty pond or lagoon into a crystal clear pool of water and dramatically improves the aesthetics of the aquatic landscaping. This is accomplished by the most advanced technology for aquatic aeration and coagulation of suspended solids which is incorporated into the Water Weasel design.

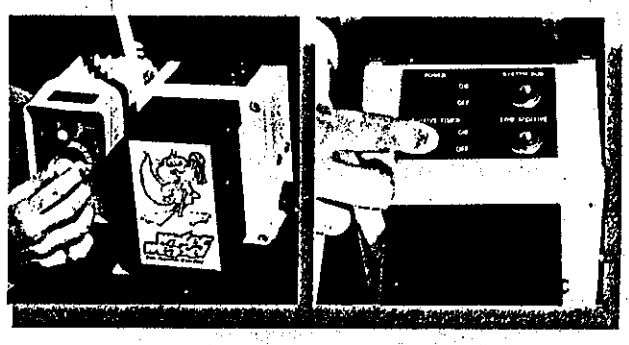
There are two major components that comprise the Water Weasel. A submerged AERATOR/DISPERSER is a high volume water pump and aerator that adds oxygen to a pond or lagoon, circulates the water, and keeps the water fresh. This aeration helps the aquatic animals living in or near the water. A metering pump in the CONTROL/PUMP UNIT injects an additive which coagulates the suspended solids and enhances settling. A pond of one acre or less is usually cleaned within five to ten days.

Installation of the Water Weasel is quick and easy, requiring only a 15 AMP, 120 VOLT, single phase, grounded connection.



How does the Water Weasel work?

The underwater AERATOR/DISPERSER has a unique design that directs air upward through a tube which creates a very efficient water pump. The upward movement of the air acts as a "pumping force" by drawing large volumes of water through the water intake and into the tube. The tube has internal devices that break large air bubbles into smaller bubbles, significantly increasing the oxygen level throughout the body of water. The additive is injected into the air lift tube where it is mixed and released into the pond water. The additive aids in settling the minute suspended solids, creating sparkling clean water. After initial settling, automatic operation of the system for a few hours a day will keep the pond clear.



Controls for automatic on/off operation of the aeration and additive pumps are easy to set. The additive pump timer may be programmed for any on-off cycle desired. After water clarity has been obtained, the CONTROL/PUMP UNIT may be operated manually at various intervals to meet the needs of the individual pond.