



# Pismo Lake Natural Resources Inventory

December 2010

Prepared for:  
California Department of Parks and Recreation  
Oceano Dunes District, CA

Prepared by:  
Coastal San Luis Resource Conservation District  
Morro Bay, CA



## **Acknowledgements**

The many surveys described in this report were completed in partnership with biological, cultural and natural resource experts, who invested their time in completing the document research, field work and report writing. The CSLRCD recognizes the significant investment made by these individuals, and would like to thank them for their participation: Susan Christopher, Neil Havlik, Douglas Rischbieter, Stephanie Little, Kevin Merk, Alicia C. Perez and State Parks staff. In addition, Bradley Buxton and Brendan Escobar supported map creation.

Funding and staff support for the Natural Resource Inventory was provided by California Department of Parks and Recreation, Oceano Dunes District.

## Table of Contents

Chapter	Page
1. Introduction.....	1
2. History & Restoration Efforts .....	4
3. Soils.....	10
4. Botanical Inventory .....	13
5. Bird Inventory .....	24
6. Fish Inventory .....	32
7. Mammal Inventory .....	35
8. Reptile and Amphibian Inventory.....	39
9. Cultural Resources Inventory .....	46
10. Bathymetric Survey .....	49
11. Sensitive Areas.....	52
12. Recommendations.....	55
References .....	57

### Figures

Figure 1.1	Photo of Pismo Lake.....	1
Figure 1.2	Map of Pismo Lake Vicinity and Watershed.....	2
Figure 1.3	Map of Land Ownership .....	3
Figure 2.1	Photo of Pismo Lake Area in 1905.....	4
Figure 2.2	Photos of Erosion in 1930's.....	5
Figure 2.3	Aerial Photos from 1959 and 2006 of Pismo Lake Area .....	5
Figure 2.4	Photos of Sedimentation from Development on James Way .....	7
Figure 2.5	Chronology of Activities in the Pismo Lake Area.....	9
Figure 3.1	Map of Soils.....	10
Figure 4.1	Plant Communities Observed Onsite .....	16
Figure 4.2	Map of Plant Communities Surveyed.....	17
Figure 4.3	Photos of Sensitive Plant Communities .....	22
Figure 4.4	Photos of Sensitive Plant Species, Black flowered figwort ( <i>Scrophularia atrata</i> ).....	23
Figure 5.1	Map of Bird Survey Points.....	25

Figure 5.2	Table of Bird Species Observed.....	27
Figure 6.1	Table of Total Fish Species Observed .....	33
Figure 6.2	Map of Fish Survey Location.....	34
Figure 7.1	Table of mammal trap line locations, number of traps per line, and habitat types. ....	35
Figure 7.2	Table of mammal species expected to occur at Pismo Lake, with dates documented. ....	36
Figure 8.1	Table of Reptile and Amphibian Surveys Conducted.....	40
Figure 8.2	Table of Total Amphibian and Reptile Observations From the 2010 Surveys.....	42
Figure 8.3	Map of Reptile and Amphibian Survey Areas.....	45
Figure 9.1	Map of Archeology Survey Areas.....	48
Figure 10.1	Bathymetric Survey Layout.....	51
Figure 11.1	Table of Sensitive Species and Communities Documented in 2010 .....	52
Figure 11.2	Map of Sensitive Areas Based on Surveys.....	54

## Appendices

Appendix A	.....	City Parcel Maps
Appendix B	.....	Map of Pismo Lake Vicinity in 1894
Appendix C	.....	Vegetation Map, 1976
Appendix D	.....	Pismo Lake Restoration Project As-built Drawings
Appendix E	.....	Revegetation Plans, 1985 & 1995
Appendix F	.....	Soils Map
Appendix G	.....	Plant Occurrence List and Special Status Plants
Appendix H	.....	Birds Occurrence List and Species Accounts
Appendix I	.....	Fish Species Accounts
Appendix J	.....	Mammal Species Accounts
Appendix K	.....	Reptile and Amphibian Occurrence List and Species Accounts
Appendix L	.....	Bathymetric Survey
Appendix M	.....	Photo Monitoring Sites
Appendix N	.....	Past Surveys and Permits
Appendix O	.....	4 <sup>th</sup> Street Overlook Concept Drawing

# 1. Introduction

---

## 1.1 Purpose

This inventory of the natural resources of the Pismo Lake property (Property)<sup>1</sup> focused on identifying sensitive species and communities in order to help inform future management decisions by the agency responsible for the property, the California Department of Parks and Recreation (State Parks).

## 1.2 Approach

Surveys conducted for this Natural Resource Inventory (NRI) assessed the following resources: plant communities, birds, fish, small mammals, reptiles and amphibians, cultural resources, and lake bathymetry. Biological surveys conducted for this NRI occurred during a single season (February through October, 2010). The study area generally coincided with the State Park boundary, however some surveys included additional areas such as the City of Pismo Beach parcel adjacent to 4<sup>th</sup> Street, and the City of Grover Beach open space parcel to the southeast of the lake. As with all natural systems, the location of sensitive species may change over time and/or additional species may be identified. Methods used and findings for each survey are included within the relevant chapters. Photo monitoring sites were also established (Appendix M). Throughout the report, species indicated in the color red are introduced species.

## 1.3 Setting

The Pismo Lake property covers 69.4 acres within the City of Pismo Beach and adjacent to the City of Grover Beach in southwestern San Luis Obispo County. To the west, the Property is bound by the Union Pacific Railroad right-of-way and to the east 4<sup>th</sup> Street bisects the edge of the property. The Property lies ½ mile east of the Pacific Ocean. Pismo Lake is part of the Meadow Creek watershed (Pismo Lake watershed is approximately 3,735 acres), with the upper reaches of Meadow Creek feeding into Pismo Lake at 4<sup>th</sup> Street. Pismo Lake then flows into the lower reaches of Meadow Creek at the Union Pacific Railroad crossing and Highway 1. (Figure 1.1 and 1.2) The Union Pacific Railroad borders the west side of the lake while 4<sup>th</sup> Street bisects the lake's eastern portion.

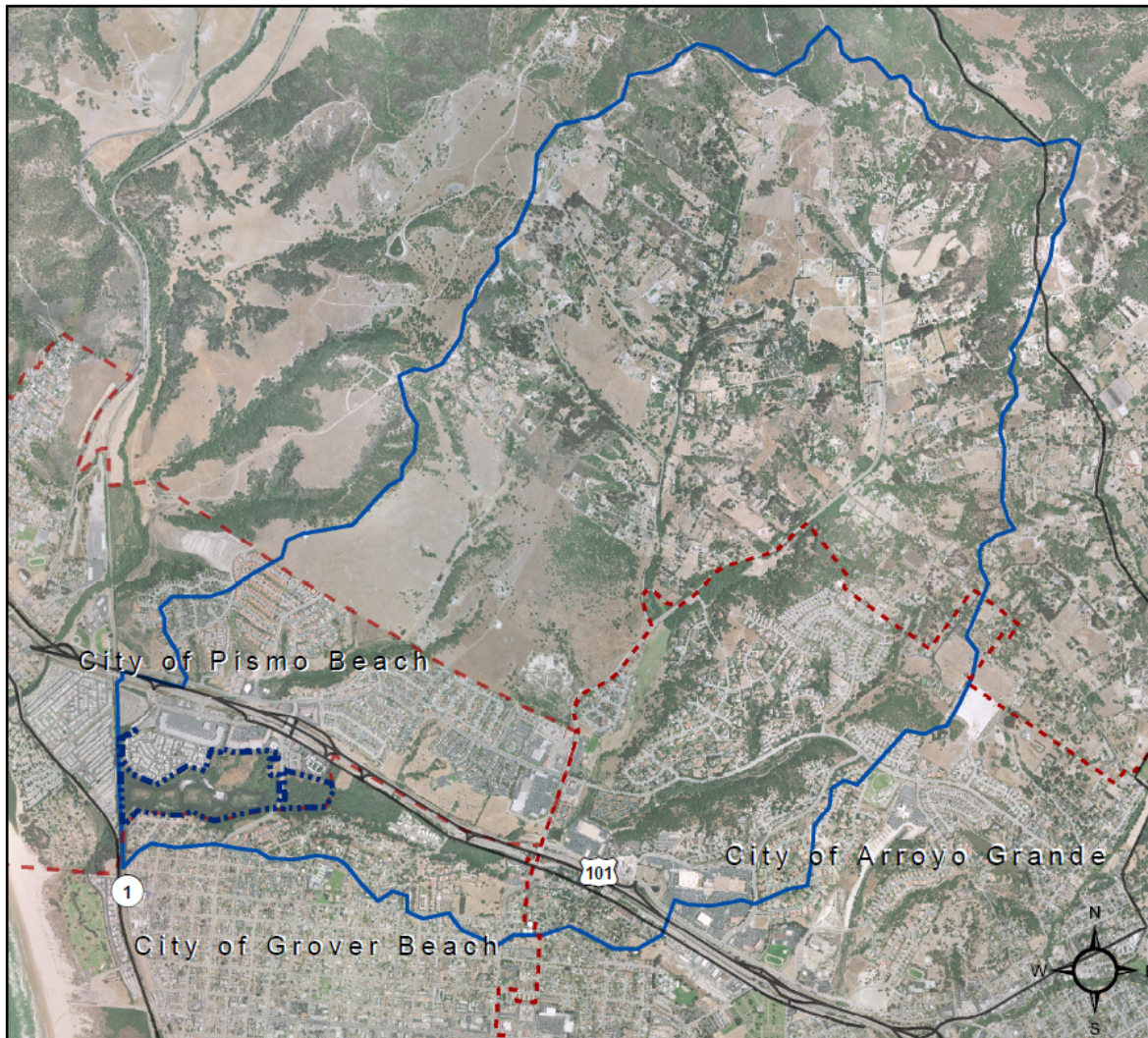
**Figure 1.1 Photo of Pismo Lake**



---

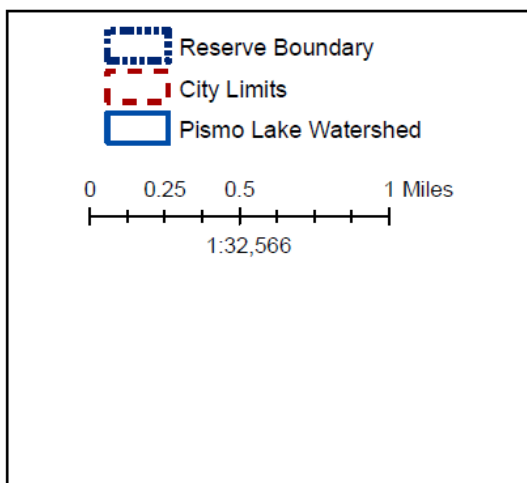
<sup>1</sup> "Ecological Reserve" is a California Department of Fish and Game (CDFG) designation held over from earlier years of CDFG ownership. This designation will be evaluated by State Parks based on the area's natural resources values and community needs in reference to the State Parks land system.

**Figure 1.2 Map of Pismo Lake Vicinity and Watershed**



Brad Buxton - Coastal San Luis RCD - 10/05/2010

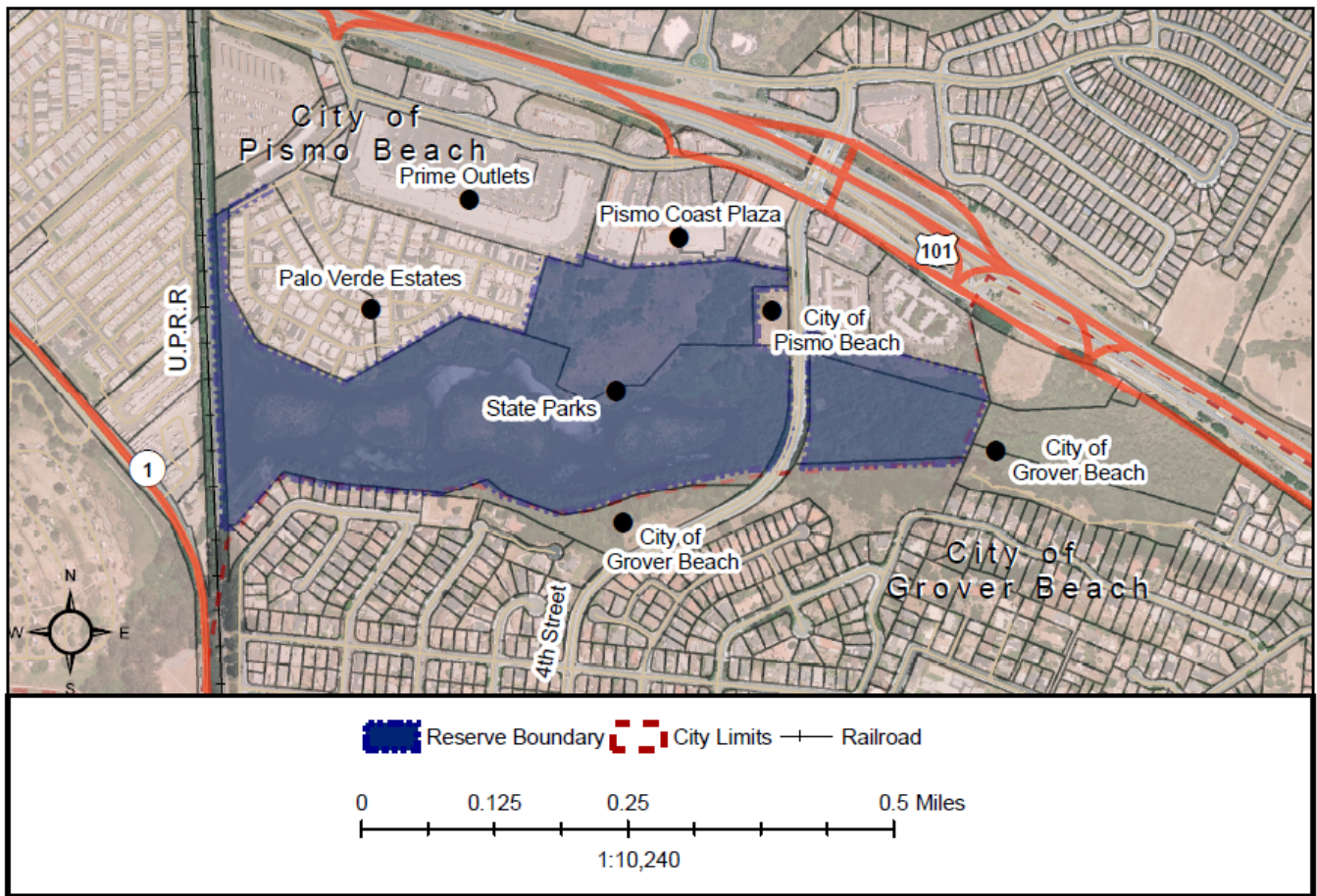
**San Luis Obispo County Vicinity Map**



State Parks owns and manages the Property to protect the coastal wetland habitat, which lies entirely within the coastal zone and the jurisdiction of the California Coastal Commission. There is no public access to the Property at this time.

Residential and commercial areas of the Cities of Pismo Beach and Grover Beach sit immediately adjacent to the Property (Figure 1.3; Appendix A). In 2001, the City of Pismo Beach purchased an adjacent parcel along 4<sup>th</sup> Street with plans for the parcel to serve as a future overlook and public access point (Appendix O). To the southeast of the Property, the City of Grover Beach owns two (2) parcels of dedicated open space consisting primarily of oak woodland habitat. Agricultural and residential land uses dominate the watershed upstream of the Property on the east side of Highway 101. (Figure 1.2)

**Figure 1.3 Map of Vicinity Parcels**



## 2. History & Restoration Efforts

---

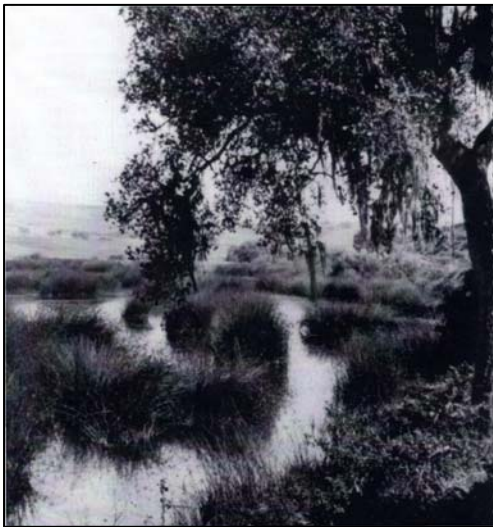
### 2.1 History

Historic photos, scientific documents, news articles, and conversations with individuals paint a picture of the Pismo Lake property's historic land use, hydrology, and human impact. For a summarized chronology of Pismo Lake, see Figure 2.5.

Over the past century, several periods of human manipulation have altered Pismo Lake and its watershed. According to an 1874 U.S. Coast and Geodetic survey, the Pismo Lake area was originally an open body of water (Capelli, 1984). However, early maps differ in their portrayal of the hydrological connection between Pismo Lake and Pismo Creek (Chipping, 1989). An 1880 map showed drainage from Pismo Lake joining Pismo Creek in a wooded wetland complex to the southwest of Pismo Lake, in the present location of the North Beach Campground. However, a map from 1886 showed Pismo Creek flowing into what is now the northwest corner of Pismo Lake, and showed that Pismo Lake was elongated in this area.

The construction of the Union Pacific Railroad bed, which borders the west side of Pismo Lake, was likely one of the first major alterations to the area's hydrology. "The first train reached San Luis Obispo in 1894, and it is presumed that railroad construction would have started across the Meadow Creek drainage" (Chipping, 1989). A map from 1894 is included in Appendix B. Anecdotally, artichoke production occurred on the land adjacent to the lake in the early 1900's (Honeycutt, 2008). A photo from that period (1905) showed Pismo Lake with wetland type grasses and small open water areas (Honeycutt, 2008). (Figure 2.1)

**Figure 2.1 Photo of Pismo Lake Area in 1905**

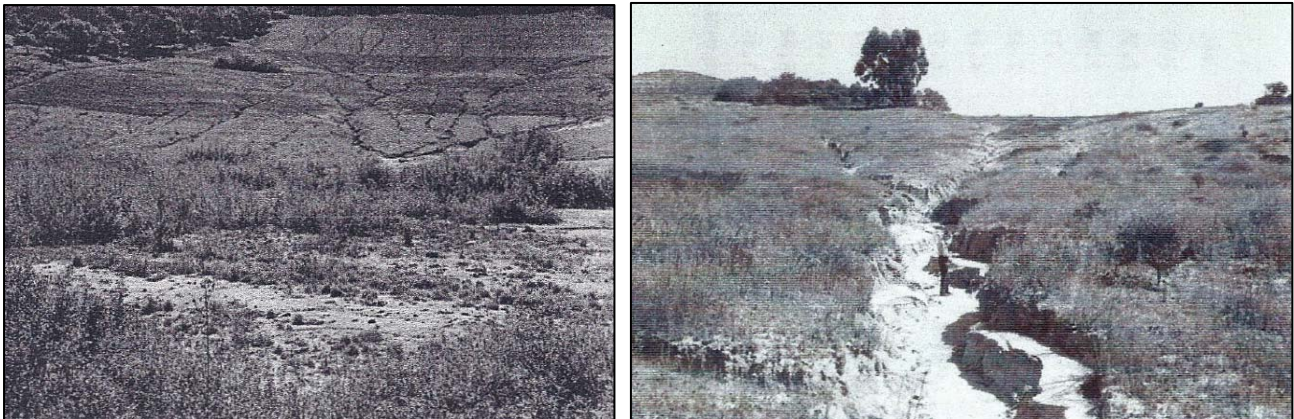


The photo is by Virgil Hodges. Source: Honeycutt, 2008



Heavy livestock grazing and poor farming practices paired with steep erosive soils (largely Arnold and Pismo series per USDA Soil Survey) caused major land failures and gully formation in the 1930's (Figure 2.2). The USDA Soil Conservation Service likened the disaster to the Dust Bowl in a small confined area. The Civilian Conservation Corps and WPA workers built structures and terraces, and planted crops and trees to control hillside erosion. (Honeycutt, 2008)

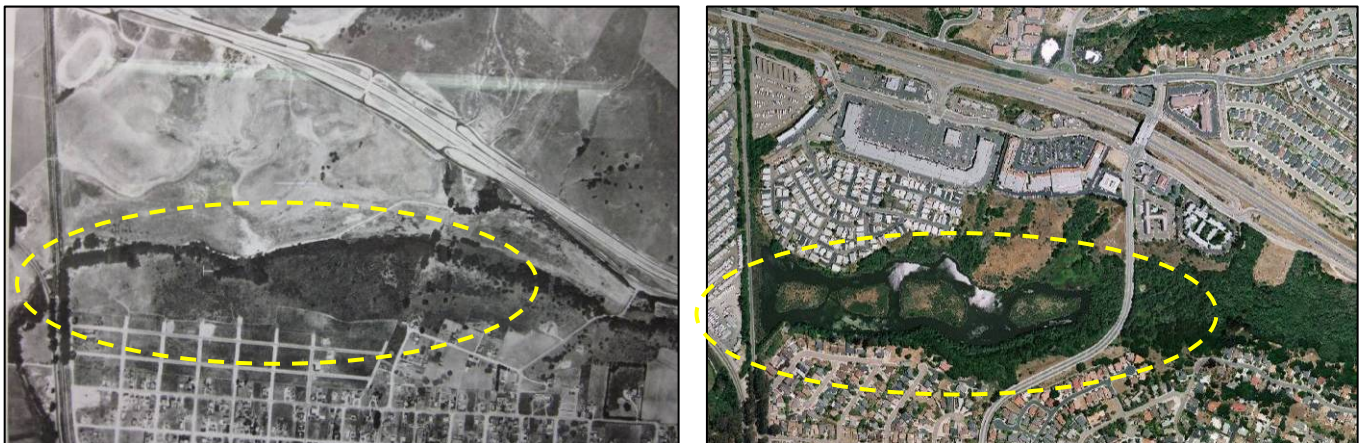
**Figure 2.2 Photos of Erosion in 1930's.**



Hillsides in the Arroyo Grande watershed suffered extreme erosion in the 1930's with deep gullies forming. Source: Honeycutt, 2008.

Below, the aerial photo on the left, from 1959, showed the Pismo Lake area with farming or grazing occurring on the north slope above a tree-lined channel. The land on the south side of the channel appears to be a natural floodplain or wetland area dissected by a road; remnants of this road can still be found today (Figure 2.3). Only limited areas of riparian or oak vegetation are to be seen on the north side of the channel. In contrast, the 2006 aerial, on the right, shows Pismo Lake as it currently appears, with clearly defined islands and areas of open water as created during the 1980's restoration project (Section 2.2.,).

**Figure 2.3 Aerial Photos from 1959 and 2006 of Pismo Lake Area**



The approximate location of the existing Property is outlined. The 1959 aerial shows a limited extent of wetlands and a road to the south. Source: City of Grover Beach office, 1959

Based on documents and experience from the City of Pismo Beach, 4<sup>th</sup> Street was paved in the mid 1950's and then widened in the early 1980's. In addition, the northern side of the Property was developed in the 1960's and 1970's with the mobile home park and a shopping center (now the Prime Outlets). The Pismo Coast Plaza was built later in 1988.

Throughout the 20<sup>th</sup> century, poor soil management, as well as an increase in housing development in the upper Meadow Creek Watershed, contributed to sedimentation of Pismo Lake. In 1978, a record rain event, paired with an absence of erosion control at an upstream housing development, resulted in deposition of large amounts of sediment in Pismo Lake. The California Department of Fish and Game (CDFG) brought a successful lawsuit against the developer for sediment pollution. A report by the USDA stated, "The resultant effects of the accumulation of sediment in Pismo Marsh are accelerated eutrophication and subsequent loss of a key coastal freshwater marsh" (U.S. Department of Agriculture, 1983). According to the *Pismo Lake Ecological Preserve Public Water-Based Wildlife RC&D Measures* (1983), "the year-round, open-water surface reduced from approximately 10 acres to 2.16 acres [between 1977 and 1983]." In 1983 it was approximated that 43 acres of the Property were marsh. A statement by Jerry Czarnecki of the Soil Conservation Service (now NRCS) in 1988 provided a different estimate for the number of acres in open water prior to sedimentation impacts; "Pismo Lake was 30 acres of open water wetland that was reduced to 2 ½ acres" (Honeycutt, 2008, pg 2). The timeframe during which Pismo Lake included 30 acres of open water is unclear and is considered unconfirmed. A map created by the California Department of Fish and Game of the Property's vegetation in 1976 before sedimentation is provided in Appendix C. An environmental impact report developed to satisfy the legal requirements of the CDFG lawsuit helped set the stage for permitting, planning and funding of the subsequent restoration effort in the mid-1980's, described in the section below.

## 2.2 Restoration Efforts

In response to the degradation of the Pismo Lake wetland habitat, culminated by the catastrophic sedimentation event of 1978, the CDFG partnered with the Coastal San Luis Resource Conservation District (CSLRCD) of San Luis Obispo County, California Conservation Corps (CCC), and the local community to undertake a restoration project that aimed to increase the quality and diversity of wetland habitat at Pismo Lake and improve the availability of food, cover, and freshwater for wildlife (CDFG letter, 1983). The final design included restoring open water via excavation of accumulated sediment and creating islands within the lake using the excavated sediment. In 1985, the restoration project moved approximately 78,000 cubic yards of sediment to deepen the lake, and created 30 acres of open water with four (4) islands (Honeycutt, 2008) (Appendix D). Construction included a spillway at the southwestern lake outflow to maintain a five-foot level of water in the lake; the spillway drains into Meadow Creek. An interagency agreement between CDFG, Natural Resource Conservation Service (NRCS), and CSLRCD required annual maintenance inspections. In addition to the restoration of the lake, CSLRCD worked with the County and cities on improving erosion control methods for grading operations and housing developments.

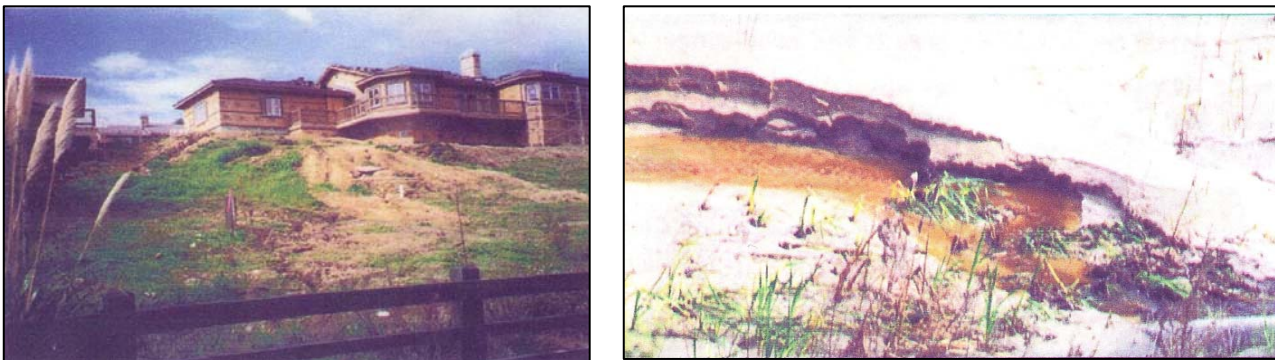
Revegetation of the islands and surrounding land occurred in two (2) phases. After the initial dredging and islands formation, CCC implemented a revegetation plan. The list of species planted is included in Appendix E. Successful revegetation faced the significant issue of migrating birds eating the newly established shoreline plants. To combat this unforeseen stumbling block to revegetation, denuded areas were replanted and protected with cages made of plastic pipe frames with chicken wire. The restoration project also involved the community, in particular the Friends of the Pismo Lake Ecological Reserve which consisted of the Cal Poly Soils Department, the Native Plant Society, California Conservation Corps, and the Sierra Club. The four islands were adopted by the Friends to provide ongoing support for maintenance and management.

In 1995, additional revegetation work focused on the four islands, with approximately 1,200 riparian trees and shrubs planted over five (5) acres and with an irrigation system installed to support plant survival. This second phase of revegetation mitigated for Central Coast Arroyo Willow Riparian Forest habitat loss during the road realignment of Noyes Road. A list of species planted during this 1995 work is included in Appendix E. Monitoring records for plant survival following these efforts have not been kept by the County or CDFG. Based on the botanical survey conducted for this report, these revegetation efforts on the islands were only partially successful. Exotics such as italian thistle (*Carduus pycnocephalus*), black mustard (*Brassica nigra*), and, in some areas, ice plant (*Carpobrotus edulis*) dominate the islands, as well as some disturbed areas on the north slopes of the lake.

Also in the 1990's, the Cities of Arroyo Grande and Pismo Beach installed sediment control facilities along branches of Meadow Creek to mitigate impacts to the Creek and Pismo Lake. One facility is located within the City of Arroyo Grande and the other three are located within the City of Pismo Beach.

In 2000, another large hillside development under construction, and with inadequate erosion control measures during heavy rains, led to the deposition of sediment into the sediment facilities (Figure 2.4) (Honeycutt, 2008). It is unknown how much sediment traveled to Pismo Lake from this event.

**Figure 2.4** Photos of Sedimentation from Development on James Way



Sediment from a new development on James Way deposited in Meadow Creek near Clinton St. in Arroyo Grande after a winter storm in 2000.

Source: Honeycutt, 2008

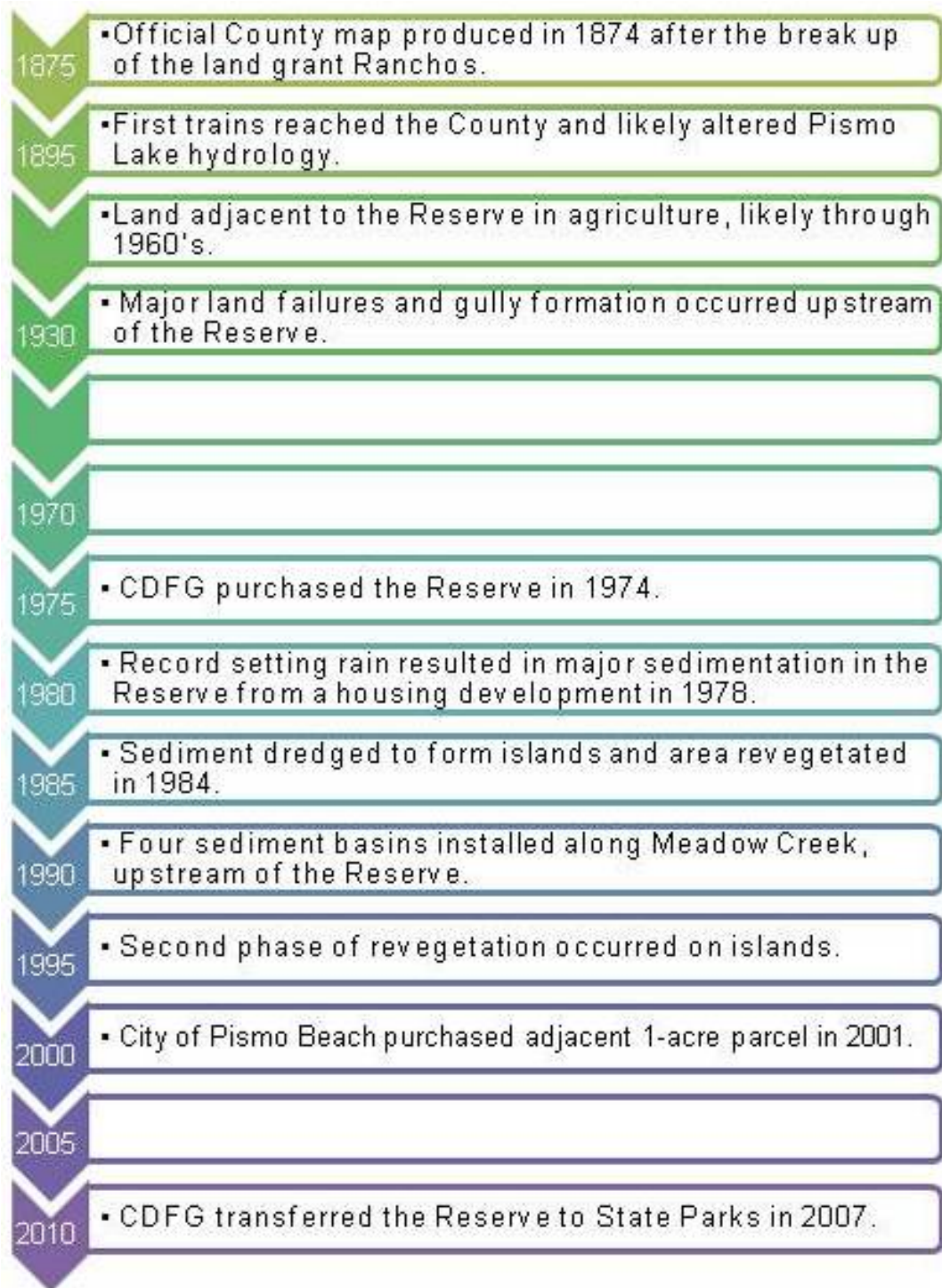
## 2.3 Land Management

The Pismo Lake area was in private ownership before 1976. Between 1976 and 2007, CDFG Wildlife Conservation Board owned the Property. The term “Ecological Reserve” is a hold-over from the property’s ownership by CDFG. Under Fish and Game Code, Section 1584, ecological reserves are “designated areas that provide some level of protection, as designated by the commission, for the benefit of the general public to observe native flora and fauna and for scientific study or research.” The notification of property transfer from CDFG to State Parks occurred in 2007 and had a single constraint: “Development of trails or other facilities by Parks or other entities shall avoid riparian and wetland resources unless otherwise approved by CDFG.” State Parks will designate the Property’s management classification based on this report and other studies.

In 2001, the City of Pismo Beach successfully purchased a one acre tract of land adjacent to 4th Street with the stated purpose of using it as an access point for some appropriate level of public education and enjoyment of the Pismo Lake property. The current studies of the lake and its surroundings have included this site.

Finally in 2004, the Pismo Lake Task Force (CSLRCD, San Luis Obispo County, and the Cities of Arroyo Grande, Grover Beach and Pismo Beach) developed the Pismo Lake Watershed Enhancement Plan to coordinate efforts that protect habitat and recreational values, maintain drainage and sediment management facilities, improve water quality, and reduce flooding impacts. The Task Force could be reactivated in the future to support State Parks land management of the Property.

**Figure 2.5 Chronology of Activities in the Pismo Lake Area**



### 3. Soils

Natural Resource Conservation Service mapped the soils onsite in 1984, immediately prior to the restoration. With this in mind, the location of soils may be altered from the map in Figure 3.1, with the lake edges and islands comprised of dredged sediment. Identified soils were Marimel Sandy Clay Loam, Oceano Sand, Pismo Tierra Complex, Wet Psamments, Fluvents, and Xererts-Xerolls-Urban Land Complex.

**Figure 3.1 Map of Soils**



San Luis Obispo County, California, Coastal Part (CA664)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
169	Marimel sandy clay loam, occasionally flooded	13.0	5.5%
170	Marimel silty clay loam, drained	1.0	0.4%
184	Oceano sand, 0 to 9 percent slopes	32.5	13.8%
185	Oceano sand, 9 to 30 percent slopes	58.2	24.7%
189	Pismo loamy sand, 9 to 30 percent slopes	14.6	6.2%
191	Pismo-Tierra complex, 9 to 15 percent slopes	63.2	26.8%
193	Psamments and Fluvents, wet	44.7	19.0%
221	Xererts-Xerolls-Urban land complex, 0 to 15 percent slopes	8.6	3.7%
<b>Totals for Area of Interest</b>		<b>235.9</b>	<b>100.0%</b>

Source: USDA, 1984.

Mapped soils are described in the NRCS soil survey as follows:

**Marimel Sandy Clay Loam, Occasionally Flooded.** This soil map unit consists of deep, somewhat poorly drained soils that are formed in alluvium from weather sedimentary rock. It is found on flood plains, alluvial fans, and in valleys. It is characterized as having very slow to slow runoff and moderately slow permeability with some areas subject to occasional flooding. Natural vegetation typically associated with Marimel soils include annual grasses, forbs, and water tolerant plants. Land uses include agriculture and wildlife habitat. It is identified as a hydric soil (United States Department of Agriculture Natural Resources Conservation Service 2010).

**Oceano Sand, 9-30% Slopes.** This soil map unit consists of deep, excessively drained soils that are formed from material weathered from sandy eolian (wind-borne) deposits. These soils are found on rolling dune-like topography, usually near the ocean. They are characterized as having very slow runoff, a poorly developed drainage pattern, and rapid permeability. Natural vegetation typically associated with these soils include shrubs and oaks closer to the coast, and annual grasses and forbs further inland or on areas that have been cleared. Some areas are used for irrigated agriculture or have been planted with eucalyptus (*Eucalyptus* sp.). It is not identified as a hydric soil (United States Department of Agriculture Natural Resources Conservation Service 2010).

**Pismo Tierra Complex, 9-15% Slopes.** This soil map unit is a combination of Pismo and Tierra soils. Pismo soils consist of shallow, somewhat excessively drained soils that formed from weathered soft sandstone. Pismo soils are found on uplands and are characterized as having moderately rapid to very rapid runoff and rapid permeability. Natural vegetation typically associated with Pismo soils includes brush with a sparse understory of annual grasses and forbs. Land uses include range, wildlife habitat, watershed management, and recreation. Tierra soils consist of deep, moderately well drained soils that result from weathered sedimentary rocks. Tierra soils are found on terraces and low hills and are characterized as having slow to rapid runoff and very slow permeability. Natural vegetation associated with these soils includes annual grasses and forbs. Land uses include grazing and row crops. This complex is not identified as hydric (United States Department of Agriculture Natural Resources Conservation Service 2010).

**Psamments and Fluvents, Wet.** This soil map unit is a combination of two (2) soils: Psamments and Fluvents. Psamments are very poorly drained soils derived of alluvium and are typically found on basin floors. Psamments experience occasional flooding. Fluvents are very poorly drained soils derived of alluvium and are found on basin floors. They also experience occasional flooding. Land uses for both soil types include rangeland, wildlife habitat, and occasionally cropland. This complex is identified as a hydric soil (United States Department of Agriculture Natural Resources Conservation Service 2010).

**Xererts-Xerolls-Urban Land Complex, 0-15% Slopes.** This soil map unit is a combination of Xererts, Xerolls, and Urban Land Complex. Xererts soils consist of well drained soils formed of residuum

weathered from mudstone, sandstone, and/or shale. Xererts soils experience very little flooding or ponding. Natural vegetation typically consists of annual grasses and forbs. Land uses for Xererts soils include rangeland or cropland. Xerolls soils consist of well drained soils formed of alluvium derived from sedimentary rock and/or residuum weathered from sandstone and shale. Xerolls soils experience very little flooding or ponding. Natural vegetation typically consists of annual grasses, forbs, and oak savannah. Land uses for Xerolls soils include rangeland, cropland, and wildlife habitat. Urban Land represents developed land and is not a soil type. This complex is identified as hydric (United States Department of Agriculture Natural Resources Conservation Service 2010).



## 4. Botanical Inventory

---

Botanical surveys conducted during the Spring and Summer of 2010, described the species present and likely to be present in the Pismo Lake Property with emphasis placed on sensitive species. Kevin Merk, Rincon Consultants, Inc and Dr. Neil Havlik, CSLRCD (surveyors) conducted the inventory.

### 4.1 Methodology

Prior to 2010 field work, a search and review of the California Natural Diversity Database (CNDDDB; California Department of Fish and Game, 2003), maintained by the California Department of Fish and Game (CDFG), was conducted for eight (8) United States Geological Survey (USGS) 7.5-minute quadrangle maps centered on and around the study area, which included: *San Luis Obispo, Lopez Mountain, Santa Margarita Lake, Pismo Beach, Arroyo Grande NE, Tar Springs Ridge, Oceano, and Nipomo*. The search used only eight quadrangles due to the proximity of the project site to the Pacific Ocean. A search range of this extent encompassed a sufficient distance to accommodate for regional habitat diversity and to overcome the limitations of the CNDDDB. The CNDDDB is based on actual recorded occurrences and does not constitute an exhaustive inventory of every resource. A query of the California Native Plant Society's on-line *Inventory of Rare and Endangered Plants of California* (California Native Plant Society, 2010) aided in identifying special status plants occurring in the site vicinity. Review of the Natural Resources Conservation Service Web Soil Survey (United States Department of Agriculture Natural Resources Conservation Service, 2010) and its soil mapping units present within the study area supported the evaluation of special status plants potentially occurring onsite.

Rincon Consultants, Inc., Senior Botanist, Kevin Merk, in collaboration with Neil Havlik, Ph.D. Botany, visited the site a minimum of two (2) times per month from March through June 2010. The survey schedule developed provided adequate cover of the site during the spring and summer bloom period. Additional site visits in July and September inventoried late blooming annual species. Surveys occurred on the following dates:

- March 5, 2010 (Havlik)
- March 19, 2010 (Merk)
- April 2, 2010 (Havlik)
- April 16, 2010 (Merk)
- April 30, 2010 (Havlik)
- May 14, 2010 (Merk)
- May 18, 2010 (Havlik and Merk)
- May 28, 2010 (Merk)
- June 11, 2010 (Havlik)
- June 25, 2010 (Merk)

- July 16, 2010 (Merk)
- September 3, 2010 (Merk)

Surveyors walked meandering transects across the entire study area excluding areas of dense, impenetrable vegetation such as poison oak and willow thickets. The boundaries and species composition of each plant community observed were mapped in the field on color aerial imagery (Google Earth Pro, 2010). Plant communities were plotted in ArcGIS for mapping and area calculations. Plant communities were defined based upon Sawyer et al. (2009) vegetation classification system, and were cross-referenced with Holland's (1986) vegetation classification system for consistency and for comparison to sensitive plant communities identified in the CNDDDB.

Each of the elements reported by the CNDDDB was evaluated for the likelihood of occurrence on the site based upon species' local distribution and habitat requirements (plant community type, soil type, and elevation above sea level). Please refer to Appendix G for a complete list of species known to occur in the region evaluated for this site. The CNDDDB and California Native Plant Society list (CNPS; 2010) identified plant species habitat requirements and flowering periods. *The Vascular Plants of San Luis Obispo County California* (Hoover, 1970) was used to obtain additional information on species' distributions and ecological requirements within San Luis Obispo County. Taxonomy followed CDFG (2010), or Jepson Flora Project (2009).

The botanical inventory surveys conducted also determined the presence or absence of rare, threatened, or endangered plant species (special status or rare plants). Surveys of the study area took place during the specific bloom period of species potentially occurring onsite and evaluated the presence of suitable habitat in accordance with the guidelines recommended by the CDFG (2009) and the U.S. Fish and Wildlife Service (USFWS) (2000). For the purpose of this report, special status species are those plants listed, proposed for listing, or candidates for listing as threatened or endangered by the USFWS under the federal Endangered Species Act (ESA); those listed or proposed for listing as rare, threatened, or endangered by the CDFG under the California Endangered Species Act (CESA); and plants occurring on lists 1, 2, 3, and 4 of the CNPS' *Inventory of Rare and Endangered Vascular Plants of California* (2010) per the CNPS code definitions:

- List 1A Plants presumed extinct in California;*
- List 1B.1 Rare or endangered in California and elsewhere; seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat);*
- List 1B.2 Rare or endangered in California and elsewhere; fairly endangered in California (20-80% occurrences threatened);*
- List 1B.3 Rare or endangered in California and elsewhere, not very endangered in California (<20% of occurrences threatened or no current threats known);*
- List 2 Rare, threatened or endangered in California, but more common elsewhere;*
- List 3 Plants needing more information (most are species that are taxonomically unresolved; some species on this list meet the definitions of rarity under CNPS and CESA);*

*List 4.1 Plants of limited distribution (watch list), seriously endangered in California;*

*List 4.2 Plants of limited distribution (watch list), fairly endangered in California (20-80% occurrences threatened); and*

*List 4.3 Plants of limited distribution (watch list), not very endangered in California.*

Surveyors recorded all plant species observed during the site visits (Appendix G) and photographed the site. When a species required further investigation, collections were made for species that required further investigation, with technical floras and dichotomous keys used to identify or confirm species. All plant species observed were identified to a sufficient level to determine rarity, which was to the genus, species, subspecies or variety levels.

## 4.2 Species List Summary

The inventory of plant species within the State Park boundaries identified a total of 190 species, of which 112 are native and 78 are introduced.

Elements of five (5) primary plant communities (Holland, 1986) observed within the study area included: grassland, coastal scrub, oak woodland, riparian, and wetland. Following recent vegetation classifications developed by Sawyer et al. (2009), these primary plant communities were further delineated into the following plant communities as mapped on Figure 4.2: 1) California bulrush marsh, 2) Sedge, 3) Coyote brush scrub, 4) Ice plant, 5) Arroyo willow thickets, 6) Coast live oak woodland, 7) Pampas grass, 8) Annual brome – wild oats grassland, 9) Purple needle grass grassland, 10) Alkali heath marsh, 11) California sagebrush scrub, and 12) Creeping rye grass tufts. In addition to the above plant communities, surveyors observed and mapped areas of open water, introduced trees, veldt grass (*Ehrharta calycina*), and disturbed (or ruderal) habitat onsite (Figure 4.2). Figure 4.1 provides the approximate acreage of each plant community observed within the study area.

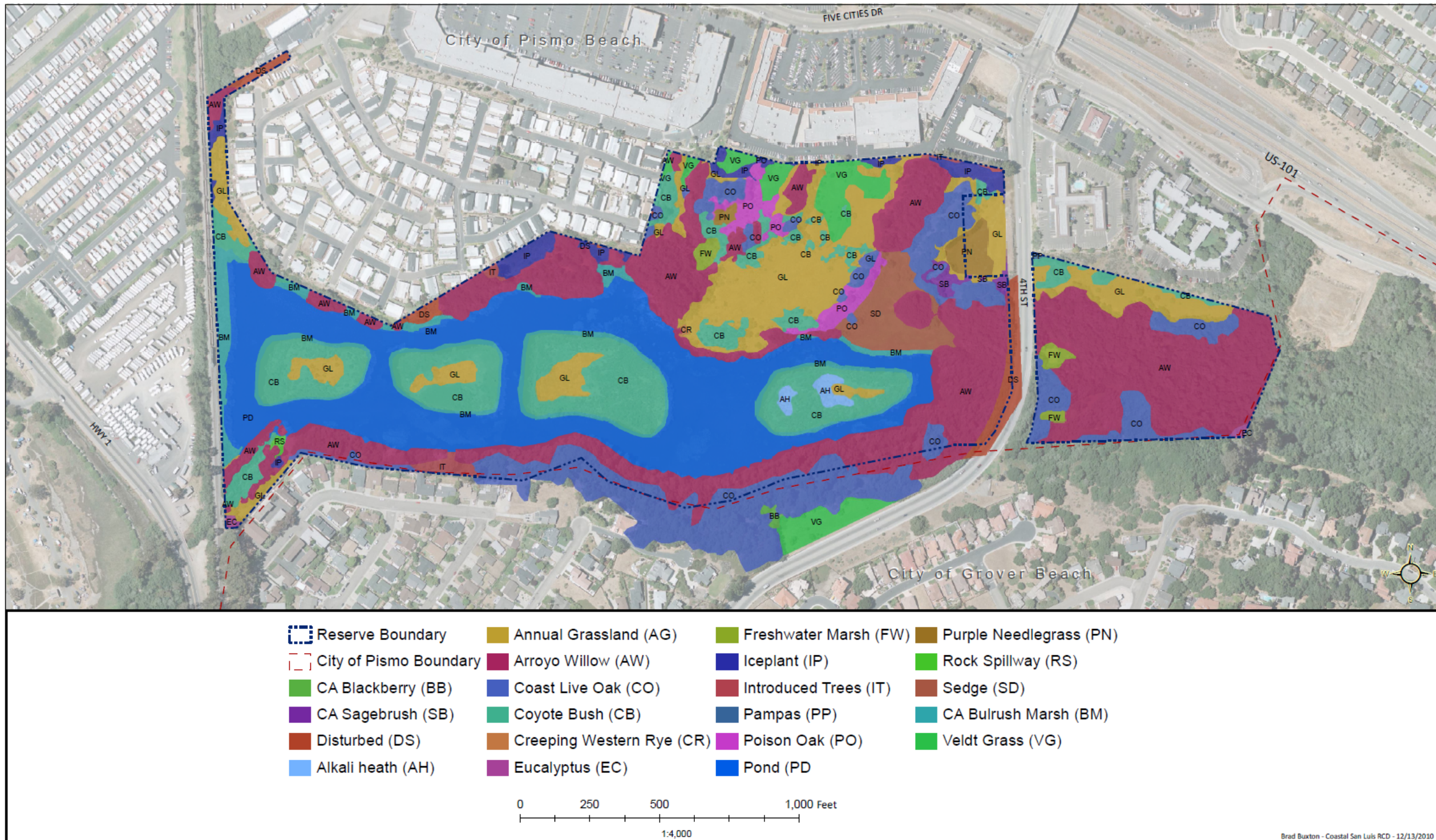
**Figure 4.1 Plant Communities Observed Onsite**

<b>Plant Communities</b>	<b>Area (Acres)</b>	<b>Percent of Site</b>	<b>Origin</b>	<b>Status*</b>
Alkali Heath Marsh	0.3	0.4%	Native	Wetland
Annual Brome – Wild Oats Grasslands	8.5	12.1%	Introduced	None
Arroyo Willow Thickets	20.9	30%	Native	Wetland
California Bulrush Marsh	2.8	4%	Native	Wetland
California Sagebrush Scrub	0.3	0.4%	Native	None
Coast Live Oak Woodland	5.2	7.4%	Native	Local protection
Coyote Brush Scrub	9.5	13.5%	Native	None
Creeping Rye Grass Turfs	0.02	<	Native	Wetland
Eucalyptus Grove	0.1	0.1%	Introduced	None
Freshwater Marsh	0.4	0.6%	Native	Wetland
Ice plant	1.2	1.7%	Introduced	None
Introduced Trees	0.3	0.4%	Introduced	None
Open Water	15.6	22%	-	Waters of the U.S.
Pampas Grass	0.02	<	Introduced	None
Poison Oak/Coyote Brush Scrub	1.0	1.4%	Native	None
Purple Needle Grass Grassland	0.6	0.85%	Native	Local protection
Disturbed	0.6	0.85%	Introduced	None
Sedge	1.6	2.3%	Native	Wetland
Veldt Grass	1.4	2%	Introduced	None
<b>Total Acres</b>	<b>70.3</b>	<b>100%</b>		
<i>Plant community type acreages are approximate and are based on aerial photography.</i>				

**\* Key to Listing Codes**

Wetland: Wetland plant community that may require special treatment from resource agencies  
 Local: Locally protected

Figure 4.2 Map of Plant Communities Surveyed



Plant communities described below follow the Sawyer et al. vegetation classification with cross references to the Holland classification. Subsequent references refer only to the common name.

### **CALIFORNIA BULRUSH MARSH**

---

This plant community occurred along the margins of Pismo Lake and the constructed islands. California bulrush (*Schoenoplectus* [=Scirpus] *californicus*) dominated this plant community with nearly impenetrable thickets. Hard-stemmed bulrush (*Schoenoplectus* [=Scirpus] *acutus*) was also present in varying densities. Other plants observed in this wetland plant community included broad-leaved cattail (*Typha latifolia*), with tall flatsedge (*Cyperus eragrostis*), annual beard grass (*Polypogon monspeliensis*), hyssop loosestrife (*Lythrum hyssopifolium*), and willow dock (*Rumex salicifolius*) occurring along the upland interface. This community most closely corresponds to the Coastal and Valley Freshwater Marsh vegetation community described by Holland (1986). Farming and urban development greatly reduced the extent of marsh and wetland plant communities in California. Considering this and the permits required from resource agencies to affect wetland vegetation, the California bulrush marsh onsite should be treated as a special status plant community.

### **SEDGE**

---

The Sedge plant community occurred within the low topographic area in the northwest portion of the site. It was dominated by several sedges and sedge relatives including small flowered nutsedge (*Scirpus microcarpus*), spikerush (*Eleocharis macrostachya*), and an unidentified species (*Carex* sp.). Seasonal storm runoff and natural hydrology appeared to contribute water to support this habitat. This plant community most closely corresponds to the Coastal and Valley Freshwater Marsh described by Holland (1986) and therefore, should be treated as a special status plant community (see California bulrush description).

### **COYOTE BRUSH SCRUB**

---

The Coyote Brush Scrub plant community within the study area is similar to the Central (Lucian) Coastal Scrub plant community described by Holland (1986) with the exception that it is almost entirely dominated by coyote brush (*Baccharis pilularis* var. *consanguinea*). Within the study area, this plant community occurred within grasslands in the northern portion of the site as well as forming the dominant plant cover on the four constructed islands. Coyote brush dominated the plant community, with a few other sub-dominants present. Native herbaceous perennial plant species such as California broom (*Lotus scoparius*), California rose (*Rosa californica*), and purple needlegrass (*Nassella pulchra*) were also present at varying frequencies. This plant community also formed a mosaic with the Coast Live Oak Woodland, grasslands, and disturbed areas. Portions of this habitat type have large concentrations of poison oak (*Toxicodendron diversilobum*) and were mapped separately on Figure 3.2, and labeled Poison Oak/Coyote Brush Scrub.

## **ICE PLANT MATS**

---

The Ice plant occurrences onsite were likely planted as part of an erosion control or slope stabilization measure in the northern portions of the site adjacent to development. Areas dominated by ice plant do not correspond to any of the plant communities described by Holland (1986) because it is not a natural plant community, but one dominated by an invasive non-native species. The non-native hottentot fig (*Carpobrotus edulis*) covered this area almost exclusively.

## **ARROYO WILLOW THICKETS**

---

The Arroyo Willow Thickets onsite correspond to the Central Coast Arroyo Willow Riparian Forest or Scrub plant communities described by Holland (1986). The Arroyo Willow Thickets onsite are primarily associated with natural drainage features and topographic low areas that surround Pismo Lake. An open to closed canopy of arroyo willows (*Salix lasiolepis*) dominated the overstory of this plant community. The understory ranged from bare soils and leaf litter to areas composed mostly of herbaceous plants typical of wetland and seasonally moist areas along the central coast of California, including willow dock, brown-headed rush, spreading rush (*Juncus patens*), birdfoot trefoil (*Lotus corniculatus*), California blackberry (*Rubus vitifolius*), and poison oak. Central Coast Arroyo Willow Riparian Forest and Scrub are wetland plant communities identified as special status natural communities by the CDFG.

## **COAST LIVE OAK WOODLAND**

---

The Coast Live Oak Woodland onsite correspond to the Coast Live Oak Woodland plant community described by Holland (1986). This plant community occurred primarily along the northern facing slope in the southern portion of the study area, but also included scattered patches throughout the study area. The dominant species in this community was coast live oak (*Quercus agrifolia*). Non-native species such as ripgut grass (*Bromus diandrus*) and Italian thistle (*Carduus pycnocephalus*) dominated the understory vegetation. However, some areas of typical native oak woodland understory were present especially outside the property boundary on the slope below 4th Street and Estuary Way. Species such as hummingbird sage (*Salvia spathacea*), California hedge nettle (*Stachys bullata*), poison oak, goose grass (*Galium aparine*) and California blackberry were present. Several large toyon (*Heteromeles arbutifolia*) shrubs and smaller California coffeeberry (*Rhamnus californica*) shrubs also occurred intermixed with coast live oak trees and neighboring patches of coyote brush. In several locations, large seasonal occurrences of fiesta flower (*Pholistoma auritum*) formed carpets of purple flowers in the spring and early summer. Other areas contained an assemblage of native species such as woodland fern (*Dryopteris arguta*) and snowberry (*Symphoricarpos mollis*).

## **PAMPAS GRASS**

---

Pampas grass, also known as jubata grass (*Cortaderia jubata*), is a non-native species that occurred along the margins of the neighboring development to the northeast of 4th Street and appeared to be planted. This plant community does not correspond to any of the plant communities described by Holland (1986) because it is not a natural plant community. Pampas grass is a tall perennial shrub-like grass that naturalizes well in the Central Coast area, and thrives in disturbed areas of varying soil types.

## **ANNUAL BROME – WILD OATS GRASSLANDS**

---

This grassland plant community corresponds to Non-native Grassland described by Holland (1986), and was previously described by Sawyer et al. (2009) as the California Annual Grassland. Onsite, it was most prevalent in the northern portion of the study area, and was characterized by a mixture of native and introduced herbaceous plant species. Common introduced grass species observed within this plant community included slender wild oat (*Avena barbata*), ripgut grass, soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis* ssp. *rubens*), and Italian ryegrass (*Lolium multiflorum*), along with non-native herbs such as black mustard (*Brassica nigra*), prickly lettuce (*Lactuca serriola*), and prostrate knotweed (*Polygonum aviculare*). Native species observed in this area included California poppy (*Eschscholzia californica*), Carolina geranium (*Geranium carolinianum*), and dove weed (*Croton setigerus*). Small areas supporting purple needle grass and California oat grass were observed in this plant community. These areas were not mapped because they were too small (i.e., less than 100 square feet) or did not support the threshold of 10% cover to warrant delineation as a separate plant community.

## **PURPLE NEEDLE GRASS GRASSLAND**

---

The Purple Needle Grass Grassland plant community onsite corresponds with the Valley Needlegrass Grassland plant community described by Holland (1986). Onsite, this habitat type occurred as two isolated patches in upland areas in the northern portion of the study area. Purple needle grass (*Nassella pulchra*) dominated the area, with other common species including blue eyed grass (*Sisyrinchium bellum*) and red maids (*Calandrinia ciliata*) observed at varying frequencies. Coast tarweed (*Hemizonia corymbosa*) was observed on the 4<sup>th</sup> Street overlook amongst the purple needle grass patches, and black flowered figwort (*Scrophularia atrata*), a CNPS List 1B.2 species, was found along the edge of one of the purple needle grass patches woven into the California sagebrush and coast live oak ecotone. CDFG considers Valley Needlegrass Grassland a sensitive habitat by the due to its greatly reduced extent, and therefore areas of native perennial bunchgrass dominated grassland should be given special status.



## **ALKALI HEATH MARSH**

---

The Alkali Heath Marsh plant community onsite corresponds with the Cismontane Alkali Marsh described by Holland (1986). This plant community was found in several patches on the eastern-most island within Pismo Lake. Alkali heath (*Frankenia salina*) dominated this habitat with other common species including ice plant, fleshy jaumea (*Jaumea carnosa*), and salt grass (*Distichlis spicata*).

## **CALIFORNIA SAGEBRUSH SCRUB**

---

The California Sagebrush Scrub found onsite most closely corresponds with the Central (Lucian) Coastal Scrub described by Holland (1986). It occurred in patches just west of 4<sup>th</sup> Street as well as along the edges of the coast live oak woodland and coyote brush scrub plant communities throughout the site. California sagebrush (*Artemisia californica*) dominated this plant community. Other species present included coyote brush, California blackberry, toyon (*Heteromeles arbutifolia*), and bush monkey flower (*Diplacus aurantiacus*).

## **CREEPING RYE GRASS TURFS**

---

The Creeping Rye Grass Turfs found onsite most closely correspond with the Valley Wildrye Grassland plant community described by Holland (1986). This habitat formed one patch in the central portion of the study site, just north of the lake shore where sufficient soil moisture persists to support the occurrence. Creeping rye grass (*Leymus triticoides*) dominated this habitat.

## **INTRODUCED TREES**

---

Several Introduced Trees were observed at multiple locations along the site boundary. These included non-native species and species that are native to California but not to the specific site, but do not correspond with any specific habitat types described by Sawyer et al. (2009) or Holland (1986). These species included Monterey cypress [*Hesperocyparis* (= *Cupressus*) *macrocarpa*], Monterey pine (*Pinus radiata*), and blue gum (*Eucalyptus globulus*). In the southwestern corner of the site near the spillway, a portion of a blue gum Eucalyptus grove clips the site, and was mapped separately from the Introduced Trees category.

## **DISTURBED**

---

The Ruderal/Disturbed vegetation community was observed throughout the study area in areas disturbed from past grading and earth-moving activities, as well as road ways and other developed areas such as the spillway in the western corner of the study area. This plant community is not described by either Sawyer et al. (2009) or Holland (1986) because it is not a natural plant community. Other plant species observed in disturbed areas onsite included non-native species such as slender

wild oat, ripgut grass, English plantain (*Plantago lanceolata*), pampas grass, and wild radish (*Raphanus sativa*). Native plant species observed in this plant community included arroyo lupine (*Lupinus succulentus*), clustered tarweed (*Deinandra [=Hemizonia] fasciculata*), and red brome (*Bromus rubens*). A disturbed area was also mapped along the mobile home park to the north of the study area where ongoing landscaping and vegetation removal occur.

## **VELDT GRASS**

---

Large areas of veldt grass, a non-native noxious weed, were found in the north-central portion of the study area in uplands adjacent to development. Veldt grass covered these areas almost exclusively and likely developed as a result of past soil disturbance opening the site to its invasion. Neither Sawyer et al. (2009) or Holland (1986) have described this plant community because it is not a natural plant community. However, it does form relatively large occurrences onsite that warrant monitoring and management to deter its spread across the landscape.

### **4.3 CNDDDB Rare and Under-Reported Plant Habitats**

In 2010, the California Natural Diversity Database (CNDDDB) identified occurrences of six (6) sensitive natural communities within the study area region including Central Dune Scrub, Central Foredunes, Central Maritime Chaparral, Coastal and Valley Freshwater Marsh, Northern Interior Cypress Forest and Serpentine Bunchgrass. Of these plant communities, elements of the Coastal and Valley Freshwater Marsh plant community observed onsite included the alkali heath marsh, California bulrush marsh, sedge, and creeping rye grass turfs described above and depicted on Figure 10.4. One sensitive natural community not identified in the CNDDDB search but identified onsite was Central Coast Arroyo Willow Riparian Forest/Scrub, which corresponds to the Arroyo willow thickets described by Sawyer, et al. (2009) and delineated on Figure 4.2. Additionally, coast live oak woodland, a plant community protected by local land use ordinance, was observed in the southern and northern portions of the site, and as scattered individual trees throughout the central portion of the site. Since permitting may be required to remove or trim oaks, as well as the fact that there are trees of potential heritage status, coast live oak woodland onsite should be treated as a special status plant community.

**Figure 4.3 Photos of Sensitive Plant Communities**



Oak woodlands, California bulrush and Arroyo willow communities are pictured above from left to right.  
Source of photos: K. Merk and J. Thomas, 2010

## 4.4 Special Status Plants

The literature review identified 62 special status plant species occurring within the study area. Refer to the table included as Appendix G for ecological and regulatory listing status information for each of these rare species. Of these, five (5) had the potential to occur onsite, and one (1) of these, the black flowered figwort, was onsite during the botanical inventory. No other special status plants were observed during surveys, and based on the results of the field and literature investigation, none are expected to occur.

The black flowered figwort is a perennial herb in the figwort family (Scrophulariaceae). It is included on the California Native Plant Society's List 1B.2. Its rarity code of 2 identifies that it is fairly endangered in California. The species is known to occur in a variety of plant communities in Santa Barbara and San Luis Obispo Counties, including closed cone coniferous forest, chaparral, coastal dunes, coastal scrub, and riparian scrub. It usually blooms from April through July, and is known to occur from near sea level upwards to 500 meters in elevation.

**Figure 4.4** Photos of Sensitive Plant Species, Black flowered figwort (*Scrophularia atrata*)



Source of photos: K. Merk, 2010

One black flowered figwort occurrence was observed on a westerly-facing slope downslope from the 4th Street overlook. Approximately six (6) individual plants were located in this occurrence growing intermixed within coastal scrub at the margins of the grassland - coast live oak woodland ecotone. The occurrence was present along a walking trail bisecting these plant communities. Additional black flowered figwort occurrences were observed during the course of the field investigation, just outside the Property boundaries.

## 5. Bird Inventory

---

Bird surveys conducted in February and June of 2010 as well as August 1992 described the species observed and likely to be present on the Pismo Lake Property. Stephanie Little and other State Park's staff (surveyors) conducted the inventory through field surveys and sightings. Brief descriptions of birds observed are provided as well as active months and status listings if applicable (Appendix H). Species are arranged by family according to the American Birding Association. Species in red indicate introduced or exotic species.

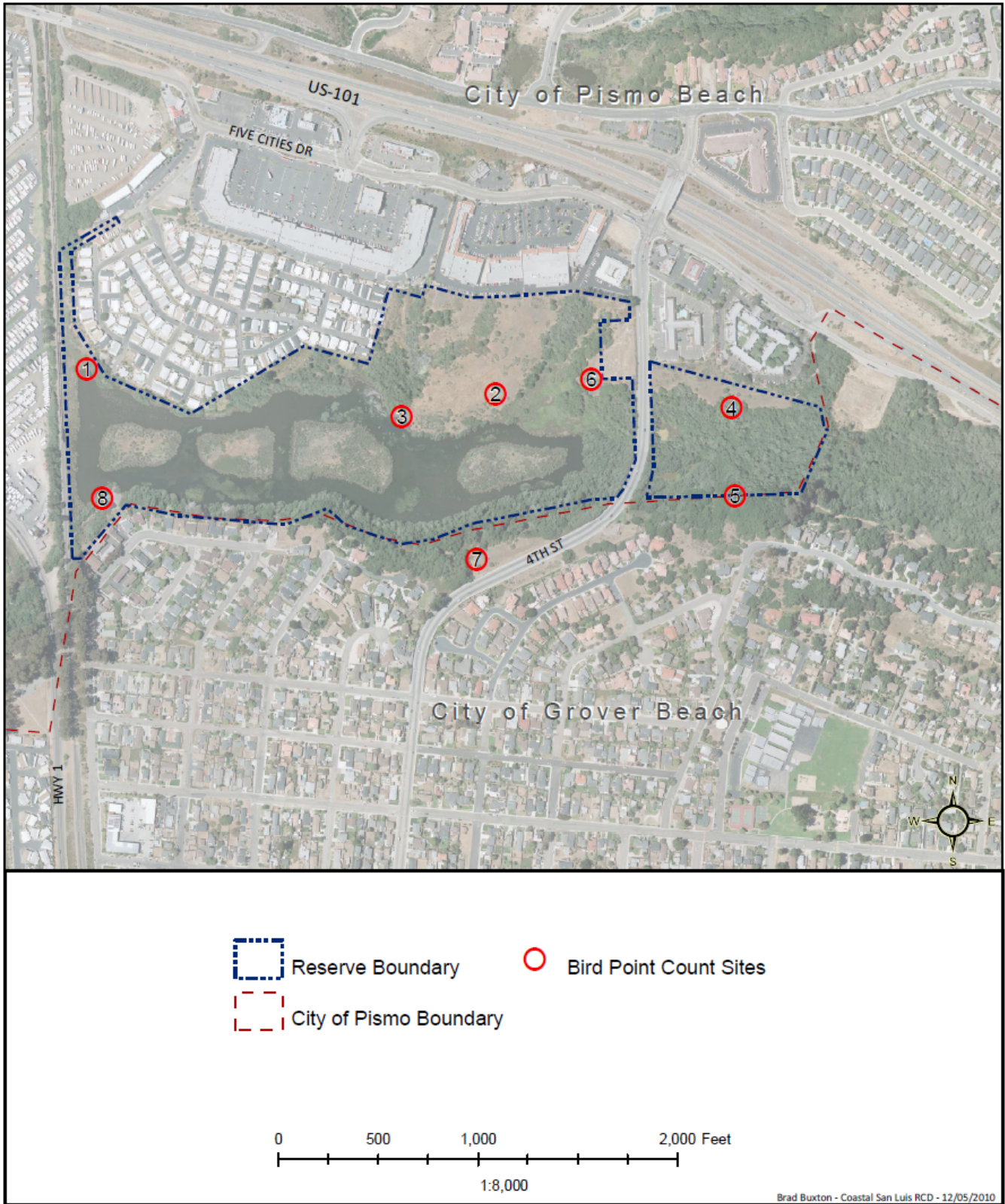
### 5.1 Methodology

Surveyors recorded opportunistic sightings while onsite and combined these with observations from coordinated point count locations (Figure 5.1). Winter and breeding season surveys corresponded with distributional and seasonal changes in species composition to obtain a representation of birds that use the Property. Surveys occurred between 1/2 to 3 1/2 hours after sunrise and included bird identification by plumage characteristics, size, behavioral cues, flight patterns, call notes, and partial song.

All winter and breeding bird surveys used standard point count methodology. Two (2) State Parks staff completed the winter survey on February 18, 2010 and the breeding bird survey on June 15, 2010 between 7:00am and 10:00am. Conditions consisted of foggy weather with no rain on both survey days. Counts began approximately 15 minutes after local sunrise and each of the preselected eight (8) stations were visited for a period of 10 minutes. Survey points were visited in the following order: 1, 4, 5, 8, 7, 6, 2, 3. Travel time between points took 5 to 15 minutes.

Bird species were recorded in the order observed. Individual birds previously recorded at another sampling point were not recorded again to the extent feasible. Surveyors spent at least 10 minutes at each point; visual and auditory observations were recorded and designated as occurring in one of two time intervals: 0 to 5 minutes or 5 to 10 minutes. For each individual detected, surveyors documented the distance from the center of the survey point (using categories <25m, 25-50m, and >50m), the bird behavior that indicated presence ("V" for visual and "A" for auditory), and the bird's action (eat (E), fly (F), hunt (H), nest (N), perch (P), sing (S), swim (SW), and vocalize (V)). In addition, any indications of breeding status were also recorded. No attracting devices or records were used.

**Figure 5.1 Map of Bird Survey Points**



## 5.2 Species List Summary

The 56 bird species identified in the 2010 winter and breeding surveys were all common and expected to be found at the site (Figure 5.2). The most common and abundant birds identified were the cliff swallow, house finch, rock pigeon, mallard, American coot, Eurasian collared-dove, western scrub jay, and American crow. Some of the less common birds were Cooper's hawk, Allen's hummingbird, northern flicker, Pacific-slope flycatcher, downy woodpecker, oak titmouse, warbling vireo, black phoebe, violet-green swallow, Wilson's warbler, and fox sparrow. One (1) federally endangered species was observed (California least tern) and four (4) Audubon Watchlist species were observed (Allen's hummingbird, Nuttall's woodpecker, oak titmouse, and wren).

Of the points surveyed during the winter, point 2 had the highest abundance of individuals (32) and highest diversity of bird species (10). Correspondingly, during the breeding season survey, point 8 (located on western edge of the Property) had the highest abundance of individuals (67) and diversity of bird species (20). It should be noted that points 2 and 8 had good visibility of the birds using Pismo Lake, which might account for the high abundance and diversity that the surveyors recorded from those points.

One red-tailed hawk nest was observed in the eucalyptus trees between points 7 and 8. Several marsh wrens were also seen nesting in the reeds around the southern end of the lake. It is assumed that they were also nesting around the rest of the lake as well. Green herons and black-crowned night herons were also seen exhibiting nesting behavior around the southeastern end of the lake.

Of the nearly 10 nest boxes around the perimeter of the islands, two (2) were seen with nesting swallow species. It is believed that no waterfowl use the boxes, although they were intended for their use when initially installed by CDFG. Many of the boxes are missing roofs or are otherwise in need of repair.

While California least terns were not seen during the two surveys, the species were seen regularly during the months of June through August of 2008 to 2010 (when State Parks staff began surveying the area for California least terns). On one occasion, August 6, 2010, six (6) adults and one (1) juvenile were seen foraging. The adults used the area to teach their offspring to forage, making Pismo Lake a critical resource for California least tern foraging habitat. A description of each species observed onsite is available in Appendix H.

**Figure 5.2 Table of Bird Species Observed**

Scientific Name	Common Name	Number Observed	Occurrence	Status
<b>DUCKS, GEESE AND SWANS</b>				
<i>Anas strepera</i>	Gadwall	3	2010	U, seasonally
<i>Anas platyrhynchos</i>	Mallard*	18	2010	C
<i>Oxyura jamaicensis</i>	Ruddy Duck*	10	2010	C
<i>Anas acuta</i>	<i>Northern Pintail*</i>	0	1992	U, seasonally
<b>GREBES</b>				
<i>Podilymbus podiceps</i>	Pied-billed Grebe*	3	2010	C
<b>PELICANS AND CORMORANTS</b>				
<i>Phalacrocorax auritus</i>	Double-crested Cormorant*	10	2010	C
<b>BITTERNS, HERONS AND EGRETS</b>				
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron*	2	2010	C
<i>Butorides virescens</i>	Green Heron	1	2010	U
<i>Ardea alba</i>	<i>Great Egret*</i>	0	1992	C
<i>Egretta thula</i>	<i>Snowy Egret*</i>	0	1992	C
<i>Ardea herodias</i>	<i>Great Blue Heron*</i>	0	1992	C
<b>VULTURES</b>				
<i>Cathartes aura</i>	Turkey Vulture*	4	2010	C
<b>OSPREYS, KITES, EAGLES AND HAWKS</b>				
<i>Accipiter cooperii</i>	Cooper's Hawk	1	2010	U
<i>Buteo jamaicensis</i>	Red-tailed Hawk*	2	2010	C
<b>RAILS</b>				
<i>Fulica americana</i>	American Coot*	11	2010	U, seasonally
<b>PLOVERS</b>				

Scientific Name	Common Name	Number Observed	Occurrence	Status
<i>Charadrius vociferus</i>	Killdeer*	0	1992	C
<b>GULLS AND TERNS</b>				
<i>Larus occidentalis</i>	Western Gull*	2	2010	C
<i>Sterna antillarum</i>	Least Tern	0	Expected	FE, Red
<i>Sterna caspia</i>	Caspian Tern*		1992	C
<i>Larus delawarensis</i>	Ring-billed Gull*		1992	C
<b>DOVES</b>				
<i>Columba livia</i>	Rock Pigeon*	14	2010	I
<i>Streptopelia decaocto</i>	Eurasian Collared-Dove	12	2010	I
<i>Zenaida macroura</i>	Mourning Dove*	3	2010	C
<b>OWLS</b>				
<i>Bubo virginianus</i>	Great Horned Owl	0	Expected	C
<b>HUMMINGBIRDS</b>				
<i>Calypte anna</i>	Anna's Hummingbird*	5	2010	C
<i>Selasphorus sasin</i>	Allen's Hummingbird	1	2010	BCC, FSC, Yellow
<b>KINGFISHERS</b>				
<i>Ceryle alcyon</i>	Belted Kingfisher*	2	2010	U
<b>WOODPECKERS</b>				
<i>Picoides nuttallii</i>	Nuttall's Woodpecker	2	2010	Yellow
<i>Picoides pubescens</i>	Downy Woodpecker*	1	2010	C
<i>Colaptes auratus</i>	Northern Flicker	3	2010	C
<b>FLYCATCHERS</b>				
<i>Epidonax difficilis</i>	Pacific-slope Flycatcher	1	2010	U, seasonally
<i>Sayornis nigricans</i>	Black Phoebe*	2	2010	C



Scientific Name	Common Name	Number Observed	Occurrence	Status
<i>Contopus sordidulus</i>	Western Wood-Pewee*	0	1992	C
<b>VIREOS</b>				
<i>Vireo gilvus</i>	Warbling Vireo	1	2010	U, seasonally
<i>Vireo cassinii</i>	Cassins Vireo*	0	1992	O
<b>JAYS, MAGPIES AND CROWS</b>				
<i>Aphelocoma californica</i>	Western Scrub-Jay*	12	2010	C
<i>Corvus brachyrhynchos</i>	American Crow*	9	2010	C
<b>SWALLOWS</b>				
<i>Tachycyneta thalassina</i>	Tree Swallow*	14	2010	U, seasonally
<i>Tachycyneta thalassina</i>	Violet-green Swallow	4	2010	U, seasonally
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	7	2010	C
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow*	59	2010	C
<i>Hirundo rustica</i>	Barn Swallow*	6	2010	U
<b>CHICKADEES AND TITMICE</b>				
<i>Poecile rufescens</i>	Chestnut-backed Chickadee*	8	2010	C
<i>Baeolophus inornatus</i>	Oak Titmouse	1	2010	FSC, Yellow
<b>BUSHTITS</b>				
<i>Psaltriparus minimus</i>	Bushtit*	4	2010	C
<b>WRENS</b>				
<i>Thryomanes bewickii</i>	Bewick's Wren*	2	2010	BCC
<i>Cistothorus palustris</i>	Marsh Wren*	14	2010	C
<b>KINGLETS, BLUEBIRDS AND THRUSHES</b>				
<i>Regulus calendula</i>	Ruby-crowned Kinglet	3	2010	C
<i>Catharus guttatus</i>	Hermit Thrush	3	2010	U, seasonally

Scientific Name	Common Name	Number Observed	Occurrence	Status
<b>BABLERS</b>				
<i>Chamaea fasciata</i>	Wrentit*	4	2010	Yellow
<b>MOCKINGBIRDS AND THRASHERS</b>				
<i>Mimus polyglottos</i>	Northern Mockingbird*	1	2010	C
<b>STARLINGS AND MYNAS</b>				
<i>Sturnus vulgaris</i>	<i>European Starling*</i>	0	1992	I
<b>WARBLERS</b>				
<i>Dendroica coronata</i>	Yellow-rumped Warbler	0	Expected	C
<i>Geothlypis trichas</i>	Common Yellowthroat	4	2010	BBB
<i>Wilsonia pusilla</i>	Wilson's Warbler*	1	2010	U, seasonally
<b>TOWHEES AND SPARROWS</b>				
<i>Pipilo maculatus</i>	Spotted Towhee*	8	2010	U
<i>Papilo crissalis</i>	California Towhee*	3	2010	C
<i>Passerella iliaca</i>	Fox Sparrow	1	2010	C
<i>Melospiza melodia</i>	Song Sparrow*	29	2010	C
<i>Junco hyemalis</i>	Dark-eyed Junco	4	2010	C
<i>Passer domesticus</i>	<i>House Sparrow</i>	0	Expected	C
<b>GROSBEAKS AND BUNTINGS</b>				
<i>Guriaca caerulea</i>	Black-headed Grosbeak*	2	2010	U, seasonally
<b>BLACKBIRDS, MEADOWLARKS AND ORIOLES</b>				
<i>Agelaius phoeniceus</i>	Red-winged Blackbird*	8	2010	C
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird*	8	2010	C
<i>Molothrus ater</i>	Brown-headed Cowbird*	2	2010	C
<i>Icterus cucullatus</i>	Hooded Oriole*	2	2010	C

Scientific Name	Common Name	Number Observed	Occurrence	Status
<b>FINCHES</b>				
<i>Carpodacus purpureus</i>	Purple Finch	4	2010	C
<i>Carpodacus mexicanus</i>	House Finch*	40	2010	C
<i>Carduelis tristis</i>	American Goldfinch*	2	2010	C
<i>Carduelis psaltria</i>	<i>Lesser Goldfinch*</i>			C

\* **Key to Listing Codes**

FE: Federally listed endangered species

FT: Federally listed threatened species

SE: State listed endangered species

ST: State listed threatened species

SC: State species of special concern

C: Common, native species

U: Uncommon native species not listed as a sensitive species by regulatory agencies; generally uncommon in isolated habitats surrounded by urban areas

R: Hard to find in the area but common elsewhere.

I: Introduced species

BCC: Birds of Conservation Concern

Red/Yellow: Audubon List

## 6. Fish Inventory

---

The cursory fish survey conducted September 2010 details species observed by Douglas Rischbieter, Ryan Slack, Stephanie Little and Ronnie Glick (surveyors). Surveyors used gillnetting and site observations to identify fish species in Pismo Lake.

### 6.1 Methodology

In September 2010, surveyors used a lightweight three-person rowboat to circumnavigate the two (2) easternmost islands of Pismo Lake. The maximum depth in the lake was approximately five feet with some areas being shallower. Approximately 90% of the lake's surface had rooted aquatic vegetation beginning to flower. Surveyors were unable to determine if inflow was occurring at the east end of the lake under the 4<sup>th</sup> Street bridge due to dense riparian forest cover. However, visible shoreline marks suggested that the lake level had declined several inches recently, and therefore outflow and evaporation/seepage was exceeding inflow.

Few open-water areas, clear of vegetation were suitable for deployment of the gillnet. The selected survey area was located near the southern lakeshore (Figure 6.1) and contained a variety of habitat characteristics, including nearshore waters diurnally shaded by riparian forest canopy, open water areas, and edges of weedy aquatic plant beds.

Surveyors deployed a 100 foot x 5 foot variable-mesh gillnet at the survey area. The net had a weighted bottom line and a floating top line, and was anchored at both ends with five pound weights. Floats were also attached at the top of each end. The net was allowed to passively fish for five daylight hours, from approximately 10:30am to 3:30pm at which point it was emptied and replaced to fish overnight. The duration of the second fishing period was approximately 18 hours, from 3:30pm to 9:30am the next day, when the net was emptied and removed. Collected fish were placed in a pail of water and taken to shore for identification, measurement, and release.

### 6.2 Fish Species List Summary

During the five-hour midday fishing effort, one (1) fish was collected. It was a 13cm (total length [TL]) bluegill collected near the southern end of the net in close proximity to the area shaded by shoreline riparian forest.

During the 18-hour overnight fishing period, 17 additional fish of six species were collected. Species included eight (8) bluegill (12-16 cm TL), four (4) largemouth bass (19, 22, 26, and 40 cm TL), two (2) white crappie (14 and 17 cm TL), one (1) black crappie (14cm TL), one (1) brown bullhead (29cm TL), and one (1) golden shiner (14.5 cm standard length [SL]). If an exact measurement of length could not be taken an estimate was made. The largest bass was not actually gilled in the net, but had ingested a 14cm (TL) white crappie that had been captured by the net – the prey's erect fin spines had prevented

the bass from disgorging it.

Surveyors observed three (3) relatively large fish (>30cm TL), possibly goldfish *Carassius auratus* or common carp *Cyprinus carpio*, dead and decomposing on the surface among weedy aquatic plant beds in widely-separate areas of the lake. These fish bore large scales; however, decomposition made accurate identification difficult.

None of the fish collected during the survey are native to California. The assemblage is typical of an introduced warm water sport fishery. However, research did not indicate that CDFG managed the lake as a sports fishery or that there was an aquatic species reintroduction component of the 1984 restoration effort. During the 2010 amphibian and reptile survey, mosquitofish (*Gambusia affinis*) and red swamp crayfish (*Procambarus clarkii*) were seen in the northeastern tributary. Red swamp crayfish were again observed in the standing water east of 4<sup>th</sup> Street. Non-native fish species have the potential to impact reptile and amphibian species assemblages.

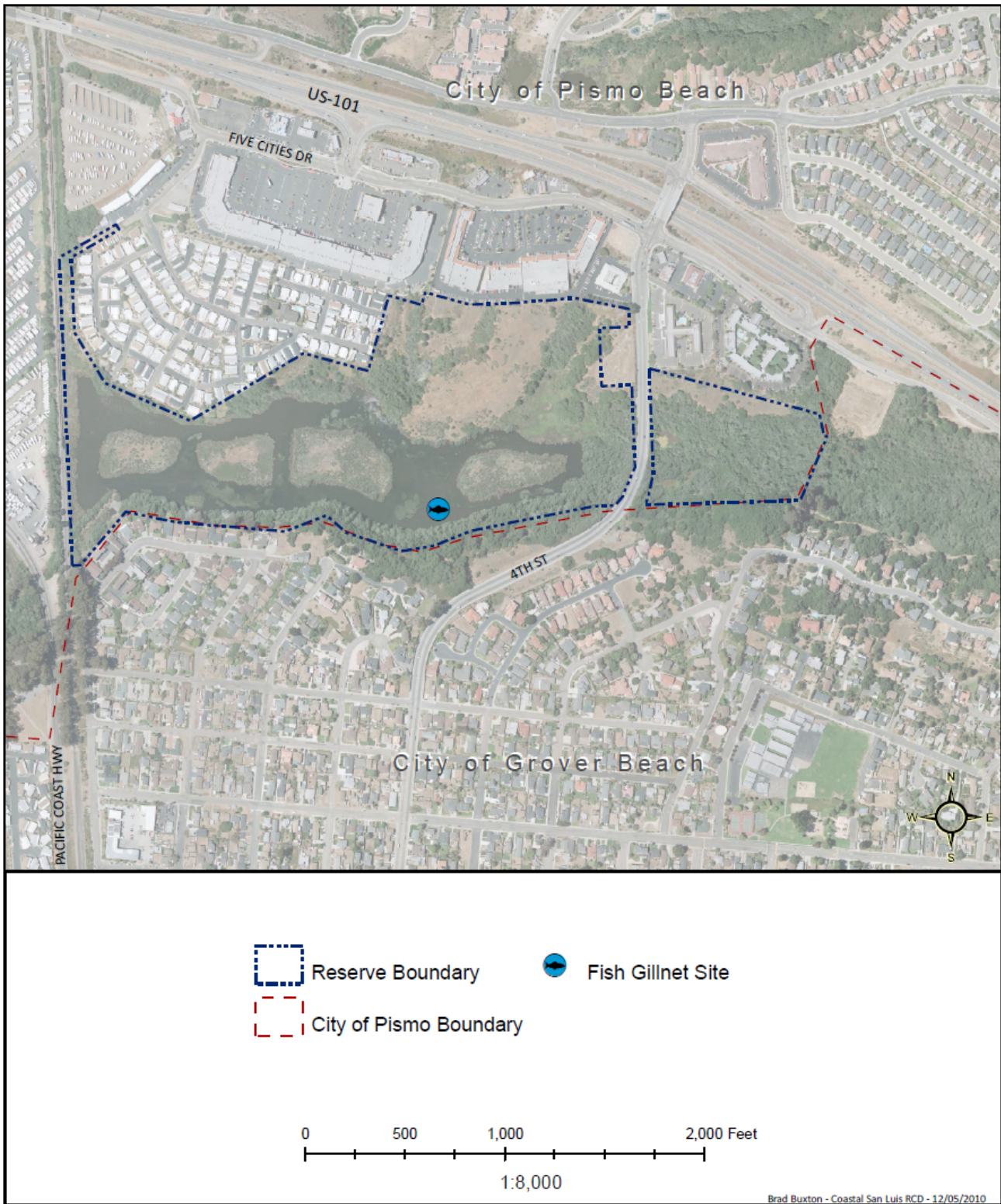
**Figure 6.1 Table of Total Fish Species Observed**

Scientific Name	Common Name	Number Observed	Occurrence	Status*
<i>Lepomis macrochirus</i>	Bluegill	9	2010	I
<i>Micropterus salmoides</i>	Largemouth bass	4	2010	I
<i>Pomoxis annularis</i>	White crappie	2	2010	I
<i>Pomoxis nigromaculatus</i>	Black crappie	1	2010	I
<i>Cyprinus carpio</i>	Common carp	3	2010	I
<i>Notemigonus crysoleucas</i>	Golden shiner	1	2010	I
<i>Ameiurus nebulosus</i>	Brown bullhead	1	2010	I

**\* Key to Listing Codes**

- FE: Federally listed endangered species
- FT: Federally listed threatened species
- SE: State listed endangered species
- ST: State listed threatened species
- SC: State species of special concern
- C: Common, native species
- U: Uncommon native species not listed as a sensitive species by regulatory agencies; generally uncommon in isolated habitats surrounded by urban areas
- R: Hard to find in the area but common elsewhere.
- I: Introduced species

Figure 6.2 Map of Fish Survey Location



## 7. Mammal Inventory

---

The Mammal surveys reflect a combination of small mammal trapping and sightings made by State Parks resource staff (surveyors) between June and October 2010. No surveys were conducted on bats, however the several species may potentially forage in the Pismo Lake area. Life history information is presented in Appendix J.

### 7.1 Methodology

The small mammal trapping surveys were conducted over three (3) consecutive nights with six (6) discrete trap lines. These lines were chosen for ease of access and habitat type. The lines coincided with different habitat community types (grassland, coastal scrub, riparian, wetland, and oak woodland) to adequately assess overall animal diversity (Figure 7.1). Each trap line had stations spaced at 20 meter intervals. Each station had two (2) traps placed 5 to 10 feet apart under or near clearings in vegetation. These locations ensured that mammals would be caught while foraging for seed. Surveyors employed 108 Sherman live traps, with old-fashioned rolled oats as bait. Each trap was set one (1) hour prior to sunset and checked the next day at sunrise. To ensure that recaptures were not biasing the number of individuals caught each day, a Sharpie® marker was used to mark the hind quarter of the mammal. Norway rats were not marked due to their aggressive nature; each Norway rat was immediately let go.

Trapping surveys occurred on the following dates:

- October 19, 2010
- October 20, 2010
- October 21, 2010

**Figure 7.1 Table of mammal trap line locations, number of traps per line, and habitat types.**

Trap Line	# Traps	Trap Line Location Description	Habitat type
1	28	Parallels main dirt road starting from Scolari's parking lot gate toward Pismo Lake	Grassland, coastal scrub
2	36	Along the eastern lakeshore	Riparian, wetland
3	12	Dirt pullout off of 4 <sup>th</sup> Street (across from Motel 6)	Grassland, coastal scrub
4	12	South of 4 <sup>th</sup> Street	Oak woodland
5	10	Most southern island	Grassland, coastal scrub

Trap Line	# Traps	Trap Line Location Description	Habitat type
6	10	2 <sup>nd</sup> to most southern island	Grassland, coastal scrub

## 7.2 Mammal Species List Summary

Three small mammal species were detected during trapping surveys. A total of 63 animals were caught during the three nights including 30 Norway rats (*Rattus norvegicus*), 32 California voles (*Microtus californicus*), and one (1) Western harvest mouse (*Reithrodontomys megalotis*). No sensitive species were caught.

The grassland and coastal scrub community along trap lines 1 and 3 showed a trend of low diversity and low population density with only California voles captured. Population density was extrapolated by sheer number of individuals and discrete species caught. Sixty-three percent, or 39 animals, were captured on the islands (trap lines 3 and 6) including 21 Norway rats and 18 California voles. Of the 18 voles, two (2) were recaptured. No animals were caught at trap line 4. One (1) Western harvest mouse was found at trap line 3.

Based on this limited data, it is difficult to make a meaningful assessment of the mammal population. However, the Property has low small mammal diversity. It is recommended that trapping continue in the future to generate a more comprehensive mammal inventory and to get a better idea of the distribution and number of abundant, common, or rare species occurring at Pismo Lake.

A complete species list is provided in Figure 7.2, below. When a species was visually confirmed, the most recent year it was observed is recorded under "Occurrence." When suitable habitat existed within the Property but the animal was not observed, occurrence is considered "Expected." Life history information for each species, as well as available status listings, is in Appendix J. The life history information represents sightings, trap data, and animals expected to occur, but never caught.

**Figure 7.2 Table of mammal species expected to occur at Pismo Lake, with dates documented.**

Scientific Name	Common Name	Number Observed	Occurrence	Status*
<i>Microtus californicus</i>	California vole	32	2010	C
<i>Peromyscus maniculatus</i>	Deer mouse	0	Expected	C
<i>Rattus norvegicus</i>	Norway rat	30	2010	I
<i>Reithrodontomys megalotis</i>	Western harvest mouse	1	2010	C
<i>Neotoma fuscipes</i>	Dusky-footed woodrat	0	Expected	C



Scientific Name	Common Name	Number Observed	Occurrence	Status*
<i>Spermophilus beecheyi</i>	California ground squirrel	1	2010	C
<i>Sciurus griseus</i>	Western gray squirrel	0	Expected	C
<i>Ondatra zibethicus</i>	Muskrat	1	2010	C
<i>Sylvilagus bachmani</i>	Brush rabbit	0	Expected	C
<i>Felis familiaris</i>	Domestic cat	0	Expected	I
<i>Procyon lotor</i>	Common raccoon	1	2010	C
<i>Castor canadensis</i>	American beaver	3	2010	C
<i>Didelphis virginianus</i>	Opossum	0	Expected	C
<i>Vulpes vulpes necator</i>	Red fox	0	Expected	I
<i>Mephitis mephitis</i>	Striped skunk	0	Expected	C
<i>Canis latrans</i>	Coyote	0	Expected	C
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat	0	Expected	C
<i>Myotis yumanensis</i>	Yuma myotis	0	Expected	SC
<i>Eptesicus fuscus</i>	Big brown bat	0	Expected	C

\* **Key to Listing Codes**

FE: Federally listed endangered species

FT: Federally listed threatened species

SE: State listed endangered species

ST: State listed threatened species

SC: State species of special concern

C: Common, native species

U: Uncommon native species not listed as a sensitive species by regulatory agencies; generally uncommon in isolated habitats surrounded by urban areas

R: Hard to find in the area but common elsewhere.

I: Introduced species

Figure 7.3 Map of Mammal Trapping Points



## 8. Reptile and Amphibian Inventory

---

Reptile and amphibian surveys conducted April to August 2010 and research review detail species observed and expected at the Pismo Lake Property. Surveys were conducted by Dr. Susan V. Christopher under California Department of Fish and Game (CDFG) Collecting Permit 801007-03. Survey assistance was also provided by Cindy Cleveland, Paul Cleveland, Stephanie Little, Greg Baldwin, Kyle Lafever, Patrick Myers and Dano Costello (surveyors).

### 8.1 Methodology

Nomenclature follows Crother (2008), the standard accepted by the American Society of Ichthyologists and Herpetologists, the Herpetologists' League, and the Society for the Study of Amphibians and Reptiles. There is usually a delay for the CDFG to update the taxonomy on their Special Animals (2009) list, as this list references the 2003 edition of Crother and the Center for North American Herpetology.

A search of prior studies and other background information was used to generate a list of species with potential to occur at the Property. Documented localities were identified by consulting the California Natural Diversity Database (CNDDDB), museum collections (Museum of Systematics and Ecology, Museum of Vertebrate Zoology, and the California Polytechnic State University at San Luis Obispo vertebrate collection), unpublished reports, and field guides (Stebbins, 2003). It was found that CDFG conducted wildlife surveys of Pismo Lake 1973, and a list of amphibian and reptile species observed was included in Nakata and Pintler (date unknown). These species are included in the results below. In addition, Dr. Susan Christopher conducted several protocol California red-legged frog (*Rana draytonii*) surveys within the Meadow Creek watershed between 1996 and 2009.

In April through August of 2010, surveyors conducted 19 focused amphibian and reptile surveys within the Property at times appropriate for enhanced species identification. Survey focused on pond-breeding amphibians, turtles, and terrestrial amphibians and reptiles. (Figure 8.3) Survey dates, objectives, environmental conditions and surveyors are provided in Figure 8.1. Collected data for all amphibian and reptile surveys included species, number of individuals by species, and age class: adult, juvenile (pre-breeding), "metamorph" (post-metamorphic amphibians less than one year of age since hatching), larvae, egg masses, and calling (for frogs). Other data recorded included area surveyed, date, begin and end times, names of surveyors, air and water temperatures, a qualitative estimate of wind speed, cloud cover, and percent visibility of moon (night surveys).

**Pond-breeding Amphibian Surveys ("CRLF Surveys")** .Surveyors conducted two (2) day and two (2) night surveys of the lake west of 4<sup>th</sup> Street and one (1) night survey in the northeastern tributary.

Surveys followed methods outlined in the U.S. Fish and Wildlife Service (2005) protocol for California red-legged frog (CRLF) surveys. The surveys used visual and auditory methods for identification of CRLFs and other pond-breeding amphibians. The surveys were conducted during the CRLF breeding period of February to late April when CRLF are more vocal, to increase the probability of detection. In large aquatic habitats, CRLF may occupy dense emergent and shoreline vegetation, and can be difficult to detect using visual survey techniques alone, especially if the population is small. The number of surveyors was limited to two or three in an effort not to disturb the animals and to listen for frog calls. The entire lake was circumnavigated during each survey using kayaks; one pass was made around the outside perimeter of the lake, and a second pass was made around the islands. High intensity, focused-beam lights were used for night surveys to detect frog eyeshine. Binoculars were used to aid in species identification for all surveys.

**Turtle Surveys.** Surveyors conducted three (3) turtle surveys in May and June to coincide with warm, sunny weather conditions preferred by basking turtles. Surveys were conducted visually by kayak and utilizing binoculars. The entire lake was surveyed using two (2) passes similar to the CRLF surveys described above.

**Terrestrial Amphibian and Reptile Surveys (“Salamander/Reptile Surveys”).** Eleven (11) terrestrial amphibian and reptile surveys consisted of walking through upland and riparian habitats and visually searching for snakes and lizards, raking leaf litter, and checking under cover objects. Cover objects included logs, boards, carpet, tents, cardboard, and other debris. These surveys targeted California legless lizard, salamanders and snakes. These 11 surveys included four (4) “salamander surveys”, five (5) “reptile surveys” west of 4<sup>th</sup> Street, and two (2) “reptile surveys” east of 4<sup>th</sup> Street. The four “salamander surveys” were conducted from early April to early May, during the peak period for detecting these species while the ground surface is more cool and moist. The five “reptile surveys” targeting the California horned lizard and other snake species were conducted May through July when these species are most active. An additional two (2) reptile surveys were conducted in August, east of 4<sup>th</sup> Street. Surveys in this area focused on terrestrial amphibians and reptiles and a visual survey of a small area of standing water conducted from the shore.

**Figure 8.1 Table of Reptile and Amphibian Surveys Conducted**

Date	Objective	Environmental Conditions
2 Apr 2010	Site Overview CRLF Habitat Asses.	Sunny, warm, breezy
5 Apr 2010	CRLF Day Survey	Sunny, air 17.0°C, water 18.0°C, windy (5-10 mph)

Date	Objective	Environmental Conditions
6 Apr 2010	Salamander Survey	Partly cloudy, warm, breezy
7 Apr 2010	CRLF Night Survey	Clear, no moon, air 18.0°C at start, air 10.0°C, at end, water 20.0°C, calm wind
24 Apr 2010	CRLF Night Survey	Clear, 60% moon, air 17.5°C, water 19.0°C, calm wind
25 Apr 2010	CRLF Day Survey	Sunny, air 60.0°F, calm wind
26 Apr 2010	Salamander Survey	Partly cloudy, mild, breezy
30 Apr 2010	Salamander Survey	Partly (10%) cloudy, warm sun, very windy
30 Apr 2010	CRLF Night Survey (tributary)	Clear, no moon, no clouds air 13.0°C, 15.5°C, calm wind
7 May 2010	Salamander Survey	Partly cloudy, mild, windy
18 May 2010	Reptile Survey (Islands) Turtle Survey	100% marine layer, mild, breezy
3 Jun 2010	Turtle Survey	10% high clouds, air 28.0°C, water 24.0°C, light breeze
7 Jun 2010	Reptile Survey	20% clouds, air 28.0°C, light breeze
17 Jun 2010	Turtle Survey	Clear, air 26.0°C, water 21.0°C, light steady breeze
23 Jun 2010	Reptile Survey	Clear, warm, breezy
8 Jul 2010	Reptile Survey	Fog clearing, air 22.5°C, windy
15 Jul 2010	Reptile Survey	Clear, air 23.0°C, breezy
15 Aug 2010	East of 4th Street: Site Overview Reptile Survey	Clear, air 24.0°C, slight breeze
21 Aug 2010	East of 4th Street: Reptile Survey Visual of Open Water	80% cover of marine layer, clearing, air 25.0°C, slight breeze

## 8.2 Species List Summary

Three (3) species of amphibians and four (4) species of reptiles were found during the surveys (Figure 8.2). Amphibian species observed included black-bellied slender salamander, American bullfrog, and

Northern Pacific treefrog. Reptile species observed included Coast Range fence lizard, western pond turtle, California alligator lizard and California king snake.

Note that the total number of observations listed in Figure 8.2 is a sum of all of the surveys conducted in 2010; therefore, the same individuals could have been counted more than once during successive surveys. A table of all amphibian and reptile species that may occur at the Property is included in Appendix K.

**Figure 8.2 Table of Total Amphibian and Reptile Observations From the 2010 Surveys**

Scientific Name	Common Name	Adults	Juveniles	Occurrence	Status*
<i>Anaxyrus boreas halophilus</i>	Southern California toad	0	0	1973	U
<i>Aneides lugubris</i>	Arboreal salamander	0	0	Unlikely	U
<i>Batrachoseps nigriventris</i>	Black-bellied slender salamander	6	2	2010	C
<i>Ensatina eschscholtzii eschscholtzii</i>	Monterey ensatina	0	0	Unlikely	U
<i>Lithobates catesbeianus</i>	American Bullfrog	11	0	2010	I
<i>Pseudacris regilla</i>	Northern Pacific treefrog	2	7	2010	C
<i>Actinemys marmorata</i>	Western pond turtle	2	0	2010	SC
<i>Anniella pulchra</i>	California legless lizard	0	0	(Pismo Beach, 1933)	SC
<i>Phrynosoma blainvillii</i>	Blainville's horned lizard	0	0	(Oak Park, 1959)	SC
<i>Plestiodon skiltonianus skiltonianus</i>	Skilton's skink	0	0	Unlikely	U
<i>Sceloporus occidentalis bocourtii</i>	Coast Range fence lizard	37	5	2010	C
<i>Uta stansburiana elegans</i>	Western side-blotched lizard	0	0	Unlikely	U
<i>Elgaria multicarinata multicarinata</i>	California alligator lizard	4	1	2010	C
<i>Diadophis punctatus vandenburghii</i>	Monterey ring-necked snake	0	0	Expected	C

Scientific Name	Common Name	Adults	Juveniles	Occurrence	Status*
<i>Lampropeltis getula californiae</i>	California kingsnake	2	0	2010	C
<i>Pituophis catenifer annectans</i>	San Diego gopher snake	0	0	1973	C
<i>Thamnophis elegans terrestris</i>	Coast gartersnake	0	0	Expected	U
<i>Thamnophis hammondi</i>	Two-striped gartersnake	0	0	Expected	SC
<i>Thamnophis sirtalis fitchi</i>	Valley gartersnake	0	0	1973	U
<i>Crotalus oreganus helleri</i>	Southern Pacific rattlesnake	0	0	Unlikely	U

\* **Key to Listing Codes**

FE: Federally listed endangered species

FT: Federally listed threatened species

SE: State listed endangered species

ST: State listed threatened species

SC: State species of special concern

C: Common, native species

U: Uncommon native species not listed as a sensitive species by regulatory agencies; generally uncommon in isolated habitats surrounded by urban areas

I: Introduced species

The most common species of either amphibian or reptile observed was the Coast Range fence lizard. Other reptiles were observed in much smaller numbers with only two (2) western pond turtle sightings. Western pond turtles are considered a state species of special status. American bullfrogs were observed. This non-native, invasive species has been linked to population declines and local extirpations of native amphibians and reptiles. The black-bellied slender salamander was the only salamander species detected during the surveys, despite suitable moisture and habitat. The northern Pacific treefrog, which is generally a common and abundant species even in suburban areas, was not found in the lake. Breeding calls of this species were heard from Meadow Creek between 4th Street and the lake, and the “northeastern tributary”. Northern Pacific treefrog tadpoles and recently metamorphosed frogs were found in the northeastern tributary and in a ditch along the base of the railroad grade that flowed into the northwestern corner of the lake.

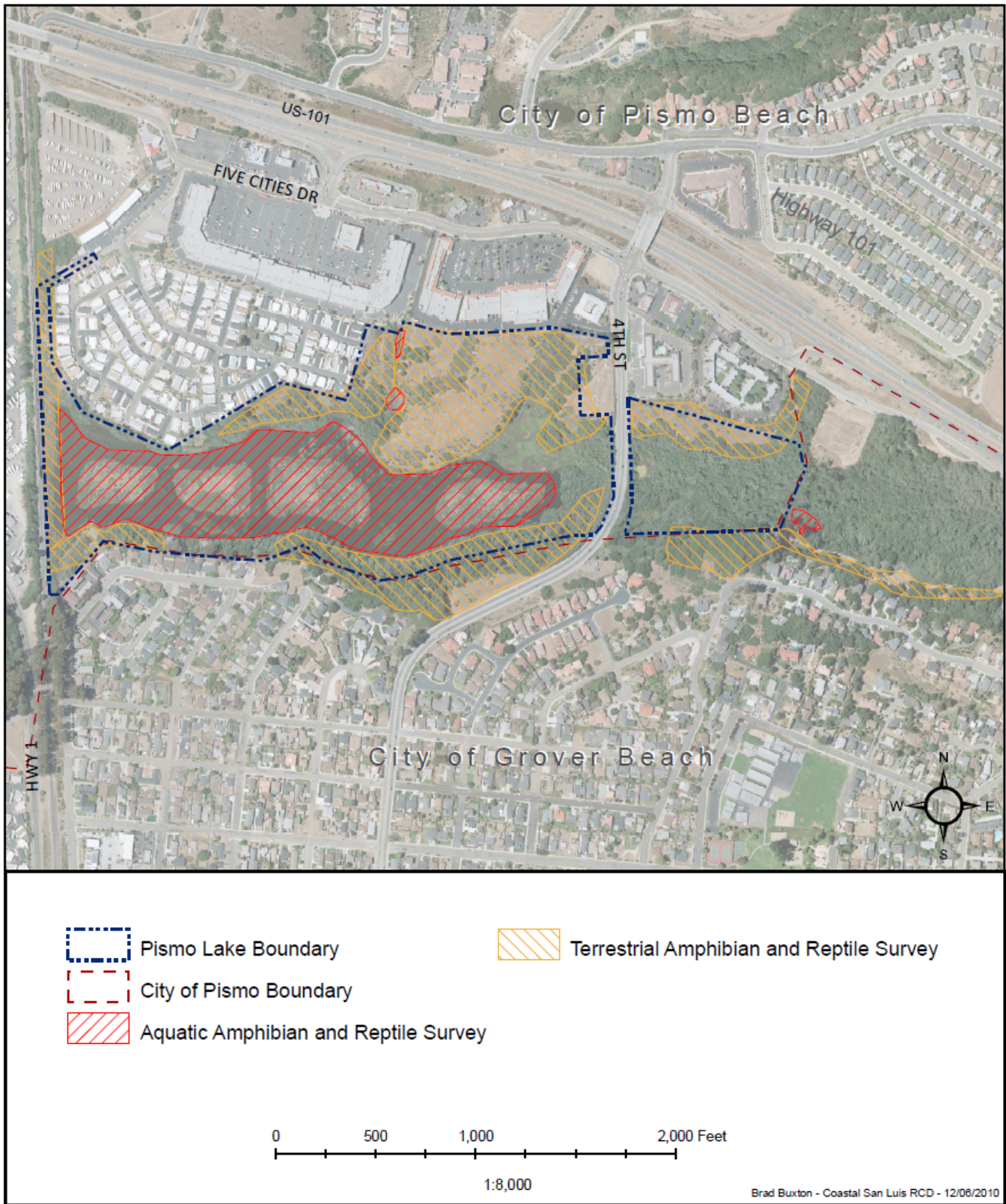
Available habitat around the lake included downed wood and rotting logs in the oak woodland area on the south edge of the site, piles of branches and cut trees on the north edge of the lake, large cut eucalyptus logs on the grassland ridge in the northeastern part of the site, and cover objects associated with the homeless campsites. The eastern and western edges of the site had little downed wood and logs, presumably because it had been removed for firewood by the homeless population living at the site. The “northeastern tributary,” or ditch, also provides suitable habitat with perennial flow from the

storm drain system and water depths in excess of three feet in some areas. The ditch flows into a substantial willow wetland that may be a beaver pond. The willow wetland had water two and one-half (2 ½) feet deep and was covered with duckweed. Many of the trees were dead and had been cut down by beavers, with logs and downed trees throughout the water. The habitat of this willow wetland resembled a central coast back dune pond, and was suitable for the California red-legged frog, but this species was not found during the surveys.

Non-native mosquitofish (*Gambusia affinis*) and non-native red swamp crayfish (*Procambarus clarkii*) were seen in the northeastern tributary. Red swamp crayfish were seen in the standing water east of 4th Street. Fishermen and kids reported that largemouth bass (*Micropterus salmoides*), sunfish, and catfish are present in the lake. Other species that have been introduced to the site that were observed during the surveys were the North American beaver (*Castor canadensis*) and the muskrat (*Ondatra zibethicus*). Raccoons (*Procyon lotor*) were abundant, especially on the islands. In addition, the fish survey completed in 2010 found non-native species such as bass, bluegill, crappie and carp. It is likely that a combination of habitat disturbance and the introduction of non-native predatory species are the cause for the absence or limited California red-legged frogs, Pacific tree frogs and western pond turtles from Meadow Creek and Pismo Lake.



**Figure 8.3 Map of Reptile and Amphibian Survey Areas**



## 9. Cultural Resources Inventory

---

The following chapter on the archeology of the Pismo Lake Property (study area) details historical records, and provides a description of areas that may have yet undetected cultural resources. Surveys were conducted by Associate State Archaeologists, Alicia C. Perez, Kelly Long, and Chris Corey, along with Peggi Odom, Northern Chumash Tribal Representative (surveyors).

### 9.1 Methodology

A record search was conducted of the Property on January 5, 2010 at the Central Coast Information Center at the University of California, Santa Barbara.

Following the record search, an archeological field survey was completed of 12.1 acres of the site on April 28, 2010. The objective of the archaeological survey was to relocate CA-SLO-840 and CA-SLO-772, as well as record new sites. Surveyors intended to use systematic transects, no more than 25 m apart. However, poor ground visibility, access, and safety concerns required the adjustment of survey methods (Figure 9.1).

The Property includes two (2) areas; one (1) to the west of 4th Street and one (1) to the east. The larger western area is densely covered with tall (waist high) grasses, weeds, and poison oak. Other portions are also densely populated with oaks and brush. Ground visibility is very poor at less than 5%. The area contains three (3) low lying ponds. In addition, a large homeless community was observed. Based on poor ground visibility, access through dense vegetation, and safety concerns less than 10% of this area was surveyed. The surveyors tried to maintain transects 20 m apart, however due to vegetation growth and sporadic ground visibility transects were sometimes at arbitrary distances. The smaller eastern area is also densely populated with tall vegetation, poison oak, and oak trees. There is zero ground visibility in the northern portion of the area. Again, the surveyors tried to maintain a 20 m apart transect, but vegetation growth limited transects to more arbitrary distances. An attempt was made to access the southeastern portion of the area using an existing foot path. Dense poison oak, zero ground visibility, and a mosquito infestation greatly limited the extent of the survey. The soil along the foot path was dark brown/black in color with minimal compaction. Pismo (*Tivela*) Clam fragments (2) were identified on the surface at one (1) location.

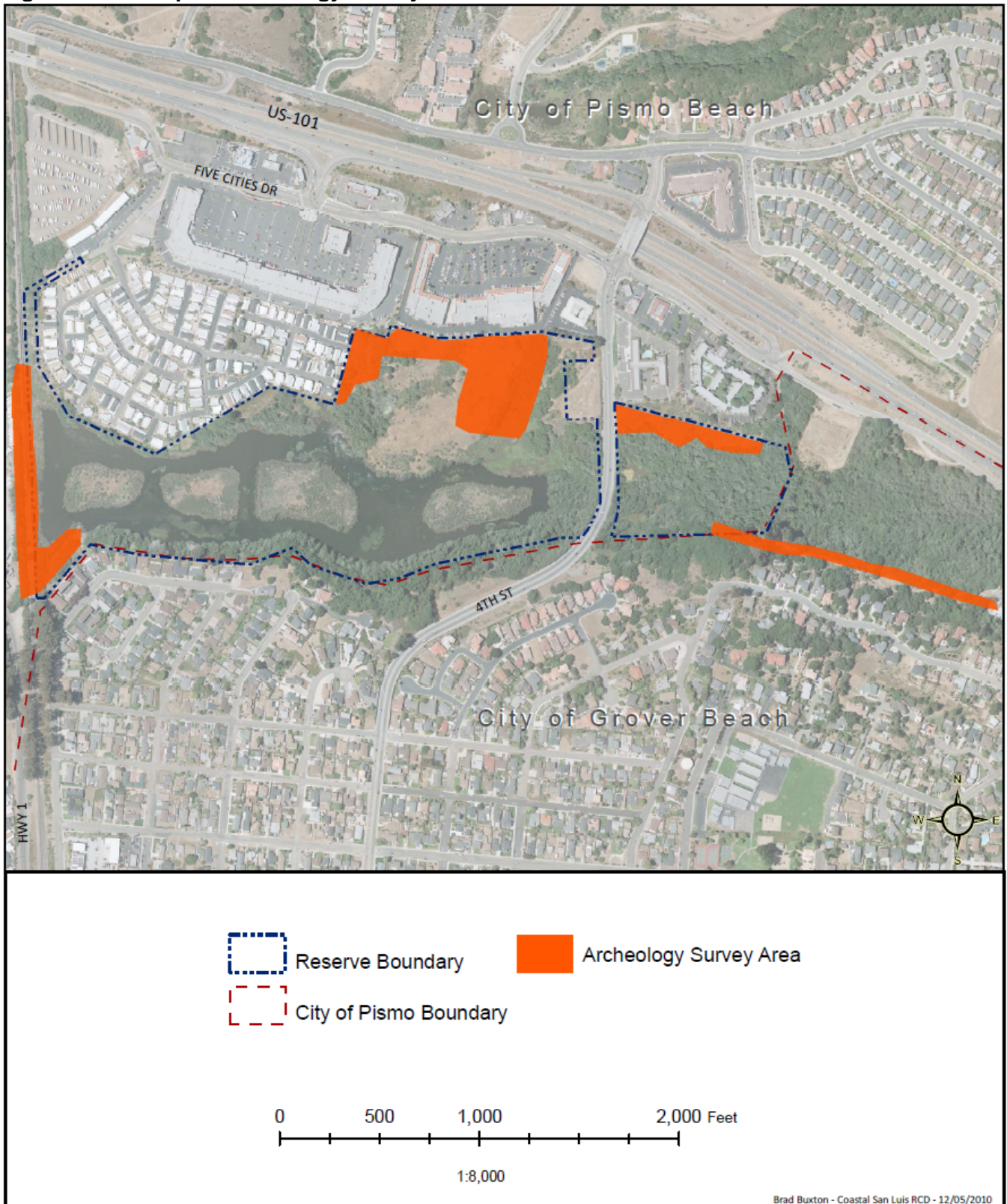
### 9.2 Archeology Findings Summary

The record search revealed two (2) sites located in the study area and one (1) site adjacent to the southern boundary.

Less than 10% of the Property was surveyed due to poor ground visibility, access, and safety concerns. Inadequate survey coverage limited the ability to know if unidentified cultural resources are at the Property below vegetation and/or surface level. Previous surveys of the Property dating back to the

1970's identified three (3) known sites. Sites CA-SLO-840 and CA-SLO-772 were not relocated during this survey because of thick vegetation. Surveyors updated CA-SLO-840 by transecting to the area where the site was previously located. CA-SLO-722 was not updated because surveyors were not able to access within 100 m of the site. An updated DPR 523 site record, along with an Archaeological Site Condition Assessment Record was completed for CA-SLO-840. (Perez, 2010) Additionally, it is likely CA-SLO-840 no longer exists. Based on the 1978 site sketch map and a 1999 test excavation, several impacts have greatly affected the site's integrity. No further site updates or monitoring is necessary unless a project is scheduled for the site area.

Figure 9.1 Map of Archeology Survey Areas



## 10. Bathymetric Survey

---

The bathymetric survey was completed by REESE Water & Land Surveying Services in August 2009. The project was performed to 1) provide a general contour map of the benthic surface for the entire Pismo Lake, where accessible by survey boat, and; 2) provide cross section data as a baseline for future sedimentation monitoring programs. The full report is available in Appendix L.

### 10.1 Methodology

Two (2) permanent survey markers were set on site for horizontal and vertical survey control. Eight (8) permanent markers were set on site with one (1) inter-visible pair set on each island, and some are visible from point 101 or 102.

Sounding data were collected using a sounding pole and RTK GPS along planned lines and around the perimeter of the lake and islands. Equipment and methods employed were intended to provide sufficient resolution to accurately portray current configuration of the lake's benthic surface.

The survey depths and boat position were measured with equipment having a precision of  $\pm 0.1$  feet. Considering the boat drift, wind effects and sounding rod plumb, the horizontal error for sounding position is estimated at  $\pm 0.4$  feet, and the vertical error for depth measurements is estimated at  $\pm 0.2$  feet. There were no formal standards or specifications provided regarding positioning, but the methods used are expected to provide accurate repeatability.

#### Bottom Contours Survey

Elevations and position fixes were made concurrently (Figure 10.1). Data points were collected along planned survey lines in the lake and on a perimeter line around the edge of the lake and islands. The planned survey lines were oriented to north/south on the grid and spaced approximately 50 feet apart. Points along those lines were spaced approximately 25 feet apart. In smaller areas, the planned lines and point spacing were made closer together. The perimeter lines were run on an estimated offset to the edge of the tules, to the edge of the willows or to the water edge and noted for mapping. The position and elevation of the data points were made using RTK GPS, and the elevations were made by vertical offset from the GPS antenna to the bottom of the rod. The rod was set a predetermined height.

#### Cross Section Survey

A total of four (4) cross sections were surveyed (Figure 10.1). Elevations and position fixes were made on specific alignments defined by the prolongation of the lines between the pairs of markers on the islands (11 and 12, 21 and 22, etc). Attention was paid to staying as close as possible to the alignment and stationing along the alignment so that any future data acquisition could be repeated at the same location. The station, offset from the line and elevation of those cross section points are tabulated on

the mapping as “ISLAND (n) CROSS SECTION DATA”. Markers defining the lines were placed as near to the north/south axis of the island as inter-visibility would allow, in order to place the cross section across the channels between the islands and the lake edge.

### Water Surface Elevation & Monitoring

A 5/8 inch x 24 inch rebar and plastic cap with center tack marked “CONTROL POINT” was set at the water surface as a benchmark at point 103 for establishing a water surface “zero” from which depths can be derived. The elevation of the water surface at 10:30am on July 29, 2009 was 10.67 feet. The elevation at point 103 was derived from differential levels from control point 101. The horizontal position for point 103 was derived from RTK GPS survey, using an averaged position from 120 one-second observations. The 3D rms for this point was at the 0.02 feet level and checked within 0.02 feet on subsequent visits for control check. The water surface at Pismo Lake was monitored by use of a gauge board. The observed water surface level at the site fell steadily, to a total drawdown of 0.17 feet over the course of the survey.

### Water Line and Other Features

Perimeter survey lines were run around the lake and the four islands. These perimeter lines were run at varying estimated offsets from the edge of tules, edge of willows or edge of the lake.

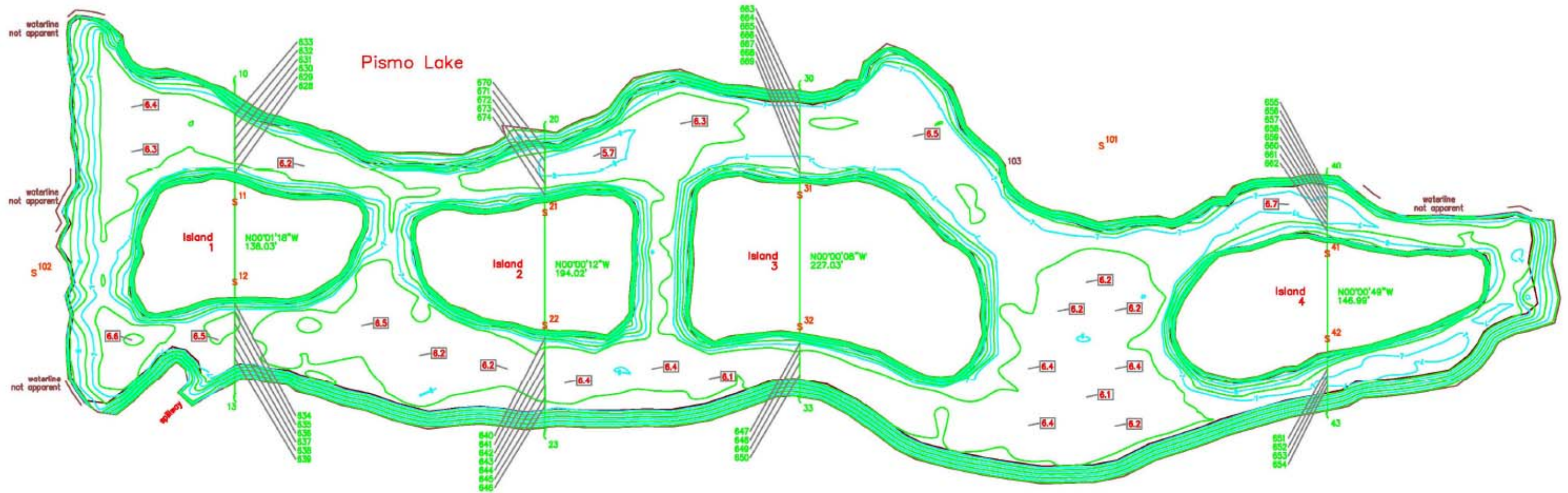
Where a waterline (edge of lake) was visible from the edge of tules or edge of willows, the distance from the edge of the tules or willows to the visible waterline was estimated and noted for mapping. Such areas are noted on the map as “waterline (approx.)”. Points for the digital terrain model were created along the “waterline (approx.)” at an elevation of 10.67 at the noted offset from the sounding and have an elevation of 10.67.

Where a waterline (edge of lake) was not visible from the edge of tules or edge of willows, those areas are noted on the map as “waterline not apparent”. Points for the digital terrain model were created along the “waterline not apparent” at an elevation one foot higher than the sounding at the noted offset from the sounding.

## 10.2 Findings Summary

The lake bottom is fairly regular with sharp inclines along the lake edge and around all four islands. The lowest points of the lake were within 1 ½ feet of each other and uniform throughout. Bottom elevations were in the range of 5.6 to 10.2 feet. Depth below water surface ranged from a minimum of 0.5 and a maximum of 5.1 feet. The approximate elevations of the islands are: Island 1 – 16 feet, Island 2 – 13 feet, Island 3 – 14 feet, and Island 4 – 14.5 feet. The heights of the islands were within four (4) feet of difference of each other. Cross sections and bathymetric images are in Appendix L.

Figure 10.1 Bathymetric Survey Layout



The four (4) cross sections and bottom contour survey locations are identified in the drawing.  
Source: REESE, 2009

# 11. Sensitive Areas

The baseline surveys completed included plant communities, birds, mammals, reptiles and amphibians, fisheries and cultural resources. NRI surveys identified sensitive areas associated with endangered/threatened plant communities, bird nesting habitat, and other high sensitive areas (Figure 11.2). Species were categorized as sensitive if the species was present on federal, state and local lists as endangered, threatened, species of concern or other survey specific and recognized designations.

Sensitive plant communities at the Pismo Lake Property included Alkali Heath Marsh, Arroyo Willow Thickets, Coast Live Oak Woodland, Creeping Rye Grass Turfs, Freshwater Marsh, Purple Needlegrass Grassland, Sedge Series, California Bulrush Marsh. Sensitive plant species only included the black-flowered figwort.

Sensitive wildlife species and areas included western pond turtle and a Red-tailed Hawk nest to the south of the lake. There were no sensitive fish, mammal or amphibian species identified.

The status of each of the above named sensitive species was documented during 2010 surveys (Figure 11.1).

**Figure 11.1 Table of Sensitive Species and Communities Documented in 2010**

Taxonomy		Status*	
Common Name	Scientific Name	State/ Other	Federal
Plants			
Black-flowered figwort	<i>Scrophularia atrata</i>	CNPS List 1B	None
Alkali Heath Marsh	-	Wetland	None
Arroyo Willow Thickets	-	Wetland	None
Coast Live Oak Woodland	-	Local	None
Creeping Rye Grass Turfs	-	Wetland	None
Freshwater Marsh	-	Wetland	None
Purple Needlegrass Grassland	-	Local	None
Sedge Series	-	Wetland	None
California Bulrush Marsh	-	Wetland	None



Taxonomy		Status*	
Common Name	Scientific Name	State/ Other	Federal
Birds			
Caspian Tern	<i>Sterna caspia</i>	None/None	BCC
Wrentit	<i>Chamaea fasciata</i>	None/Yellow	None
Bewick's Wren	<i>Thryomanes bewickii</i>	None/None	BCC
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	2/ None	None
California Least Tern	<i>Sterna antillarum</i>	FP/ None	FE
Caspian Tern	<i>Sterna caspia</i>	None/None	BCC
Allen's Humingbird	<i>Selasphorus sasin</i>	None/ Yellow	BCC/ FSC
Oak Titmouse	<i>Baeolophus inornatus</i>	None/ Yellow	FSC
Common Yellowthroat	<i>Geothlypis trichas</i>	None/ None	BCC
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	None/ Yellow	None
Reptiles/Amphibians			
Western pond turtle	<i>Actinemys marmorata</i>	SSC	None

**\*Key to Listing Codes**

**State Listing**

SE: State listed endangered species  
ST: State listed threatened species  
SSC: State species of special concern  
1,2,3: State priority lists 1,2,3 for birds  
CSC: CDFG, California species of concern  
FP: Fully protected species

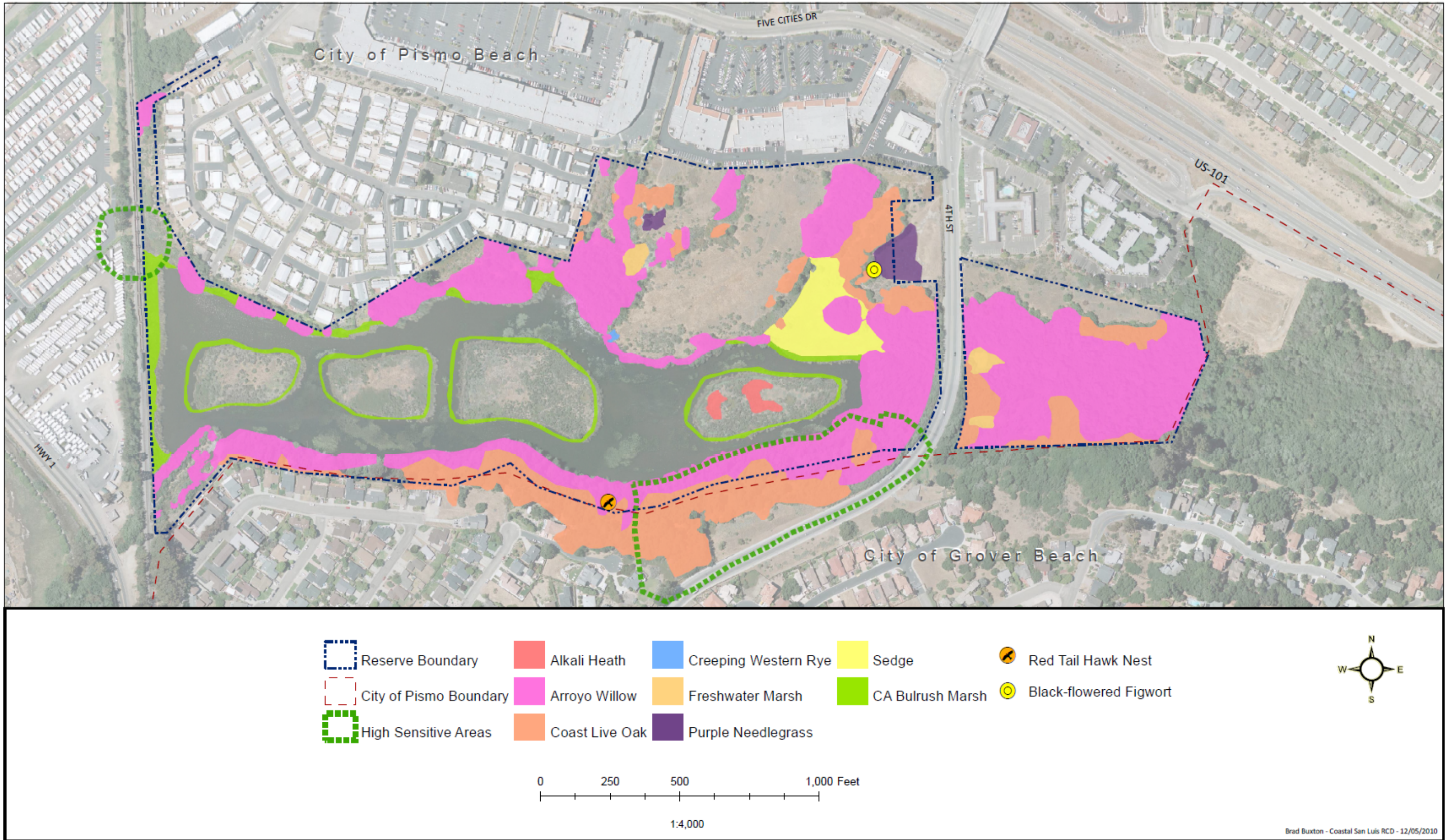
**Federal Listing**

FE: Federally listed endangered species  
FT: Federally listed threatened species  
FSC: Federal species of concern  
BCC: Birds of conservation concern

**Other**

Red/Yellow: Audubon list for bird species  
List 1B.2: CNPS, Rare or endangered in California and elsewhere; fairly endangered in California (20-80% occurrences threatened)  
Wetland: Wetland plant community that may require special treatment from resource agencies  
Local: Locally protected

Figure 11.2 Map of Sensitive Areas Based on Surveys



## 12. Recommendations

---

Recommendations are based on survey findings as well as biologist and other professional input, and are separated into two (2) categories: 1) additional data collection and 2) land management.

### 12.1 Additional Data Collection

The need for additional surveys and data collection is associated with the level, methodology, duration, and extent of surveys.

- a) Preserve and protect oaks along the lake margins and especially along the southern property line where heritage oaks greater than 46 inches in diameter at breast height likely occur.
- b) Inventory all trees onsite.
- c) Monitor native grassland patches to increase extent of aerial cover and non-native veldt grass to decrease extent.
- d) Continue bird point counts to generate a more comprehensive bird inventory that better pinpoints the distribution and number of abundant, common, and rare species nesting and wintering. Additions to methodology for future surveys might include: more frequent surveys during nesting season and more randomized order of point visitation. Additional data collection will also provide a foundation to accomplish the following objectives: (1) acquire baseline information on habitat relationships of breeding birds around Pismo Lake; (2) gather data on frequency of occurrence; (3) gather information to assess habitat quality for restoration proposals; and (4) improve habitat conditions for breeding bird activity.
- e) Conduct a walking survey of the entire site during the breeding season to detect any bird nesting activity missed during point counts.
- f) State Parks to partner with Morro Coast Audubon Society to set up a mechanism for Audubon volunteers to record bird observations throughout the year.
- g) Evaluate the use of nest boxes around the islands.
- h) Continue small mammal trapping surveys to generate a more comprehensive mammal inventory and pinpoint the distribution and number of abundant, common, or rare species occurring.
- i) Conduct additional amphibian surveys in the eastern portion of the Property during the breeding season.
- j) Conduct additional fish surveys in the spring to increase access limited by vegetation growth. Additional methodologies may include use of seine and electrofishing equipment.

- k) Prior to any future ground disturbance, conduct a higher level of archeological review including test excavations following the removal of ground cover.
- l) Conduct a focused bathymetric survey in 1 to 3 years to evaluate the risk of sedimentation at the inflow point of the lake.

## 12.2 Land Management

Management recommendations aim to improve and protect native habitats existing at the Property.

- a) Implement management practices/strategies to remove and restore areas dominated by veldt grass to native coastal grassland and scrub.
- b) Conduct seasonally timed weed abatement to reduce competition with natives, especially on islands.
- c) Develop revegetation plan to screen the adjacent commercial areas from the Property.
- d) Develop revegetation plan for the four islands to include soil building, non-native plant removal and native plantings that increase wildlife habitat.
- e) Reduce non-native fish and bullfrog populations as feasible to decrease predation on western pond turtle and red-legged frog.
- f) Develop a program to reduce or exterminate the population of invasive rats which will in turn reduce predation on nesting birds.
- g) Attempt to remove all pvc pipe irrigation left from previous restoration projects from the Property.
- h) Deter homeless camps and their affects on native vegetation and wildlife habitat.
- i) Limit potential public access to areas with low plant and wildlife diversity, and exclude access from known sensitive areas such as red-tailed hawk nesting sites, wetlands and culturally sensitive areas.
- j) Restrict dog access to protect nesting, wading, foraging, and roosting birds.

## References

---

- Capelli, Mark. (1984). Letter Re: Pismo Lake Ecological Reserve, November 16, 1984.
- Chipping, D. R. (1989). *Hydrology of the Meadow Creek drainage, San Luis Obispo County, California*. Prepared for Meadow Creek Wetlands Evaluation, California Department of Parks and Recreation. California Polytechnic State University, San Luis Obispo, California.
- Honeycutt, Ella. (2008). *Pismo Lake Ecological Reserve*.
- Schuler, James & Mansfield, Terry. (1978). *Resource Protection Zone Proposal for Pismo Lake Ecological Reserve, San Luis Obispo, California*. December, 1978.
- U.S. Department of Agriculture, Soil Conservation Service. (1983). *Pismo Lake Ecological Preserve Public Water-Based Wildlife RC&D Measures*.

### Botanical Survey

- California Department of Fish and Game. 2009. *Protocols for surveying and evaluating impacts to special status native plant populations and natural communities*. November, 2009.
- California Department of Fish and Game. 2001. *Fish and Game Code of California*, Section 3503.5. Gould Publications, Altamonte Springs, FL.
- California Department of Fish and Game. 2003. *California Natural Diversity Database, Rarefind Version 3.1.0*. Accessed March and September 2010. Biogeographic Data Branch, Sacramento, California.
- California Department of Fish and Game. 2010. *Special Vascular Plants, Bryophytes, and Lichens List*. 80 pgs. Biogeographic Data Branch, California Natural Diversity Database. July 2010.
- California Invasive Plant Council. 2010. *California Invasive Plant Inventory Database*. Accessed August 2009 at <http://www.cal-ipc.org/ip/inventory/weedlist.php>.
- California Native Plant Society. 2010. *Inventory of Rare and Endangered Plants*. V.7-08c-Interim 8-22-02. Accessed via: <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>.
- Hickman, James C., Ed. 1993. *The Jepson Manual, Higher Plants of California*. University of California Press, Berkeley, CA.
- Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento.
- Hoover, R.F. 1970. *The Vascular Plants of San Luis Obispo County, California*.

University of California Press, Berkeley, California.

Reed, P. B. 1988. *National list of plant species that occur in wetlands: California (Region 0)*. National Wetlands Inventory, United State Fish and Wildlife Service. 133 pp.

Sawyer, J.O., T. Keeler-Wolf, and J. Evens. 2009. *A manual of California vegetation, second edition*. California Native Plant Society, Sacramento, CA.

United States Department of Agriculture Natural Resources Conservation Service. 2010. Web Soil Survey. National Cooperative Soil Survey. Accessed May 2010 via: <http://websoilsurvey.nrcs.usda.gov>.

United States Fish and Wildlife Service. 2000. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants. January 2000.

### **Bird Survey**

Ehrlich, P.R., D.S. Dobkin, D. Wheye. 1988. *The Birder's Handbook*. Simon and Schuster, Inc. New York, N.Y.

Elphick, C., J.B. Dunning Jr., D.A. Sibley. 2001. *The Sibley Guide to bird Life and Behavior*. Alfred A. Knoph, New York, N.Y.

Morro Coast Audubon Society. 2004. *The Birds of San Luis Obispo County California*. MCAS, Inc. Morro Bay, California.

Sibley, D.A. 2000. *The Sibley Guide to Birds*. Alfred A. Knoph, New York, N.Y.

### **Mammal**

Whitaker, J.O. Jr., 1998. *National Audubon Society Field Guide to North American Mammals*.

### **Reptile and Amphibian Survey**

Balance Hydrologics, Inc. 2008 (August). Hydrology and geology assessment of the Pismo Creek watershed, San Luis Obispo County, California. Prepared for Central Coast Salmon Enhancement, Arroyo Grande, California. Balance Hydrologics, Inc., Berkeley, California.

California Department of Fish and Game. 2009 (July). Special Animals. Biogeographic Data Branch, California Natural Diversity Database.

Central Coast Salmon Enhancement. 2009 (March). Pismo Creek/Edna area watershed management plan. Prepared for State of California Department of Fish and Game on behalf of the Pismo Creek/Edna Area Steering Committee.

Christopher, S. V. 2010 (June). California red-legged frog and tidewater goby habitat assessment for Arroyo Grande Creek, San Luis Obispo, California. Prepared for County of San Luis Obispo Department of Public Works, San Luis Obispo, California.

- Crother, B. I. (Committee Chair) 2008. Scientific and standard names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. Sixth Edition. Standard English and Scientific Names Committee. Published by the Society for the Study of Amphibians and Reptiles, Herpetological Circular No. 37.
- Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptile species of Special Concern in California. California Department of Fish and Game.
- Morro Group. 1989. Draft EIR for the Rancho Grande Phase II, Arroyo Grande, California.
- Nakata, L., and G. Pintler. Date Unknown. A study for the preservation of Pismo Lake.
- Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Houghton Mifflin Company, Boston, Massachusetts.
- U.S. Fish and Wildlife Service. 2005 (August). Revised guidance on site assessments and field surveys for the California red-legged frog.
- U.S. Fish and Wildlife Service. 2010. Revised designation of critical habitat for the California red-legged frog; Final rule. Federal Register 75(51):12816-12959.

### **Cultural Resource Surveys**

- Bente, Vance G. and Hilderman-Smith, Mary. (1980). Diablo Canyon Power Plant Early Warning System Cultural Literature Search and Archaeological Research Report on the Field Investigation of Selected Pole Sittings. Date recorded 11/1/1980.
- Dills, Charles E. (1981). Archaeological Potential at Williams Bros. Project Site at Five Cities, Pismo Beach, CA. Date recorded 11/15/1981.
- Dills, Charles E. (1992). Archaeological Potential of for Maple Lanes Frontage Road Project, Grover City, CA. Date recorded 3/31/1992.
- Gibson, Robert O. (1983). Results of Archaeological Monitoring for The Pismo Beach Waste Water Effluent Disposal System Pismo Beach, California. Date recorded 2/28/1983.
- Sawyer, Col. W.B. (1976). Archaeological Element of the Pismo Beach Proposed Ocean Disposal Facilities Plan.
- Sawyer, Col. W.B. (1976). Archaeological Resource Evaluation Bagwell Property in Grover City Area, San Luis Obispo County, CA. CA-SLO-439, Date recorded 11/25/1976.
- Soule, William E. (1985). Negative Archeological Survey Report for the US Soil Conservation Service and California Department of Fish and Game. Date recorded 7/16/1985.
- Spanne, Laurence W. (1979). An Archaeological Evaluation of an Eleven Acre Property at Highway 101 and Fourth Street Pismo Beach, San Luis Obispo County, California. Date recorded 10/1/1979.