

Chapter 6

Biological Resources

Setting

Malibu Lagoon is a 31-acre shallow water embayment occurring at the terminus of the Malibu Creek Watershed, the second largest watershed draining into Santa Monica Bay. Malibu Creek runs north-to-south through Malibu Canyon and then empties into the lagoon, contributing freshwater, sediment, nutrients, and urban runoff into the lagoon. Malibu Lagoon empties into the Pacific Ocean at the world famous Surfrider Beach, located along the 23000 block of PCH in the City of Malibu, California.

Historically, the lagoon extended beyond its current boundaries. While urban development has reduced the size of the lagoon, recent restoration projects have been implemented to restore some of these areas. The lagoon is primarily surrounded by development, with Malibu Creek and PCH to the north and Surfrider Beach and the Pacific Ocean to the south.

Soils occurring within and surrounding the lagoon are typical of a coastal valley floor alluvial landform and include Elder sandy loam, Sorrento loam, riverwash, and coastal beach. Imported fill material, including chunks of asphalt also exist within the lagoon structure.

Biological Communities

Vegetation Communities

The habitat conditions within the lagoon are primarily dictated by elevation and hydrology. A field survey was conducted in 2004 to map the existing vegetation communities within the lagoon (Merkel 2004; Figure 6-1 and Table 6-1). Increasing human population and urban development have subjected the lagoon and the surrounding wetlands to considerable disturbance. While this has generally resulted in ecological degradation of the wetland, previous restoration efforts have successfully restored some of the habitat.

Figure 6-1. Malibu Lagoon Vegetation Communities



In addition to expanding the functional area of the lagoon, past restoration efforts have included several revegetation efforts. While the success of many restoration efforts at the lagoon is evidenced by their continued persistence, the resulting mosaic of vegetation communities is often difficult to describe using common habitat classification systems (such as Holland or Sawyer and Keeler-Wolf).

Seventeen vegetation communities and habitats were mapped at the lagoon including: southern willow scrub; atriplex scrub; baccharis scrub; mule fat scrub; Venturan coastal sage scrub; mixed scrub; southern coastal salt marsh; coastal and valley freshwater marsh; brackish marsh; southern sycamore alder riparian woodland (planted as landscaping); disturbed coastal dunes; non-native grassland; disturbed habitat; mud flat; sand beach/sand bar; open water; and urban/developed land (Merkel 2004; Figure 6-1 and Table 6-1).

Table 6-1. Existing Vegetation Communities at Malibu Lagoon

Vegetation Type	Acres
Southern willow scrub	0.52
Atriplex scrub	1.54
Baccharis scrub	0.54
Mule fat scrub	1.40
Venturan coastal sage scrub	0.04
Mixed scrub	0.58
Southern coastal salt marsh	4.98
Brackish marsh	0.22
Coastal and valley freshwater marsh	0.83
Southern sycamore-alder riparian woodland	0.16
Disturbed coastal dunes	0.06
Non-native grassland	0.12
Disturbed habitat	0.01
Mud flat	3.96
Sand beach/sand bar	7.27
Open water	11.65
Urban/developed land	2.49
TOTAL	36.37

Southern Willow Scrub

Southern willow scrub is located in the northwestern portion of the project area, near the State Beach parking lot. This habitat generally consists of mature arroyo willow (*Salix lasiolepis*), with occasional mule fat (*Baccharis salicifolia*) and quail saltbush (*Atriplex lentiformis* ssp. *lentiformis*). The southern willow scrub immediately adjacent to the parking lot entrance may have been planted and sustained by irrigation or runoff from PCH, rather than by Malibu Lagoon.

Atriplex Scrub

This habitat is found primarily along the trails leading from the parking lot to the beach and is composed predominantly of saltbush (*Atriplex* sp.), with occasional coyote brush (*Baccharis pilularis*), mule fat, toyon (*Heteromeles arbutifolia*), California sagebrush (*Artemisia californica*), and elderberry (*Sambucus mexicana*).

Also occurring within this vegetation community are giant coreopsis (*Coreopsis gigantea*) and showy island snapdragon (*Galvesia speciosa*), non-native species naturally occurring on the Channel Islands, but frequently included in revegetation programs. Other non-native elements include Myoporum (*Myoporum laetum*), black mustard (*Brassica nigra*), and hottentot fig (*Carpobrotus edulis*).

The quail saltbush generally forms dense shrubs, several meters in height and width, and occurs in drier, high areas fringing the marsh and access trails. The large area of atriplex scrub occurs in sandy soils immediately north of the beach, on the south side of the lagoon. The quail saltbush is very tall and occasionally interspersed by California sagebrush and coyote brush.

Baccharis Scrub

This upland vegetation community is located along the western edge of the project area, to the east of the access road that skirts the lagoon. The habitat is dominated by coyote brush, and also includes mule fat, quail saltbush, and St. Catherine's lace (*Eriogonum giganteum*). St. Catherine's lace is native to the Channel Islands and was likely planted at the lagoon as part of previous revegetation efforts.

Mule Fat Scrub

Areas dominated by mule fat scrub occur on the margins of the lagoon in between areas of southern willow scrub, baccharis scrub, and atriplex scrub. The mule fat is interspersed with quail saltbush and coyote brush. There is also a large area of mule fat scrub along the trail leading from the parking lot to the beach, which may have been part of earlier revegetation efforts. The mule fat scrub located north of the parking lot entrance may have been planted and may be sustained by irrigation or runoff from PCH, rather than by the lagoon.

Venturan Coastal Sage Scrub

This vegetation type occurs only in very small amounts, primarily along the trail leading to the beach. These areas were likely planted as part of past restoration efforts. Dominant species include California sagebrush and St. Catherine's lace, with giant coreopsis and showy island snapdragon also present. North of the parking lot is another small area of coastal sage scrub composed nearly entirely of laurel sumac (*Malosma laurina*).

Mixed Scrub

This vegetation type has been used to map slightly atypical areas north of the access road on the southwest side of the lagoon. This area contains a variable mix of predominantly native species, with elements of at least four of the vegetation communities described above. The two dominant species within this vegetation community are coyote brush and mule fat, with quail saltbush being the next most abundant shrub.

Other species located within this vegetation community include St. Catherine's lace, lemonadeberry (*Rhus integrifolia*), western ragweed (*Ambrosia psilostachya*) and California sagebrush. This variety of co-occurring species (such as mule fat, which is a wetland indicator species, and coastal sage scrub elements, an upland habitat) again suggests that this may be the site of past restoration efforts. Degraded fencing and irrigation materials are also evident in these areas.

Southern Coastal Salt Marsh

Southern coastal salt marsh is the most abundant, vegetated habitat within Malibu Lagoon. This habitat is dominated by salt grass (*Distichlis spicata*), pickleweed (*Salicornia virginica*,) and marsh jaumea (*Jaumea carnosa*). Other common species include salt marsh dodder (*Cuscuta californica*) and alkali heath (*Frankenia salina*).

This vegetation type occurs at the lowest elevations, generally fringing the mudflat. This habitat likely expands and contracts over time with seasonal inundation and dewatering of the lagoon. Slightly higher portions of the coastal salt marsh that would less frequently experience inundation also support areas of quail saltbush shrubs.

In many places the coastal salt marsh is infested by invasive exotics, primarily perennial pepperweed (*Lepidium latifolium*). The marsh also supports occasional patches of the invasive exotic hottentot fig (*Carpobrotus edulis*), black mustard (*Brassica nigra*), and giant reed (*Arundo donax*).

Coastal and Valley Freshwater Marsh

Coastal and valley freshwater marsh occurs primarily in a large area south of the parking lot, fringing pools of open freshwater. This vegetation type is predominantly composed of two species of bulrush (*Scirpus californicus* and *Scirpus acutus*) and forms tall dense stands of vegetation. A few additional small areas of freshwater marsh are also located near freshwater sources, such as the drain outlet in the southwest corner of the lagoon.

Brackish Marsh

Brackish marsh is located on the east shore of the lagoon, immediately above the mudflat. The mixture of salt marsh and freshwater marsh species reflects the variable salinities that occur in the lagoon as a result of variable hydrological conditions. This area is dominated by salt grass, regularly interspersed with bulrush.

Other species noted within this vegetation community include jaumea, pickleweed, salt marsh dodder, and mule fat. A patch of salt cedar (*Monanthochloe littoralis*), an invasive exotic, was found adjacent to the fence bordering the lagoon. Perennial pepperweed (an invasive species) also occurs in the brackish marsh.

Southern Sycamore-Alder Riparian Woodland

This vegetation type is located immediately south of the parking lot and makes up a very small portion of the project area. This area features large, mature trees, primarily sycamore (*Platanus racemosa*) and occasional California black walnut (*Juglans californica*; a California Native Plant Society [CNPS] List 4 species) and white alder (*Alnus rhombifolia*). This area was likely planted using species found in the riparian forest upstream, and may receive supplemental water from irrigation or parking lot runoff.

Disturbed Coastal Dunes

A small area of disturbed coastal sand dune is located at the far eastern edge of the survey site, above the exposed mud flat. Species occurring within this vegetation community include pink sand verbena (*Abronia umbellata*), silver beach bur (*Ambrosia chamissonis*), hottentot fig, and Bermuda grass (*Cynodon dactylon*).

Non-native Grassland

Non-native grassland is located in a very small area near the edge of the trail south of the parking lot. This is a highly disturbed area vegetated predominantly by weedy bromes (*Bromus madritensis* L. ssp. *rubens*, *B. diandrus*, and *B. hordeaceus*), as well as wild oat (*Avena fatua*). A small number of western ragweed are also mixed with the grasses.

Disturbed Habitat

Disturbed habitat has been used to characterize a small patch of bare ground immediately south of the parking lot entrance road. It is predominantly bare ground supporting no distinct vegetation community.

Mud Flat

Due to the recent breach of the sand berm at the mouth of Malibu Lagoon, the majority of the areas previously inundated were exposed mud flat at the time of the 2004 surveys. Areas mapped as mud flat were unvegetated. While mud flats are typically characterized by finer grained, less mobile sediment particles, in this instance the exact location where mud flat transitioned into sand bar and sand beach was difficult to pinpoint. Therefore, in general, all areas that had been previously inundated and were unvegetated are classified as mudflat, regardless of their constituent grain size.

Sand Beach/Sand Bar

Areas clearly composed of coarser grained particles, resulting from higher energy transport of sand near the mouth of the Lagoon, are classified as sand bar. Large, unvegetated areas of open beach are classified as sand beach.

Open Water

All unvegetated areas that had not been de-watered by the breach of the sand berm are classified as open water. Open water is generally very shallow and persists only in the deeper channels of the lagoon basins. Although this habitat accounts for the largest acreage in the survey area, this area will fluctuate significantly based on hydrological conditions (See Chapter 5, Hydrology and Water Quality). Loss of open water through drainage will be balanced by an increase in mud flat.

Urban/Developed

The areas designated as Urban/Developed comprise the paved parking lot, access roads, access trails, and the grassy park area off the parking lot.

Wetlands and Jurisdictional Non-wetland Waters

Waters under the regulatory authority of the Corps, CCC, CDFG, and RWQCB have been delineated within the lagoon. While much of the lagoon is highly degraded, a significant portion of the project area supports jurisdictional wetlands and other waters (Merkel 2004).

The Corps, through the authority Section 404 of the CWA, is the primary agency involved in wetland regulation. The EPA has the authority to veto any decision by the Corps on 404-permit issuance, as the EPA has the ultimate authority over enforcement of wetland regulations. Prior to the issuance of a Section 404 permit by the Corps, the RWQCB must issue a Section 401 water quality certification or waiver. In this way, the RWQCB regulates actions permitted by the Corps under Section 404 of the CWA. In

addition, the USFWS must be consulted and may also take jurisdiction if any wetland impacts could affect federally endangered species.

The Corps has jurisdiction over “waters of the U.S.,” including wetlands as defined by Section 404 of the CWA. Not all waters of the U.S. are wetlands and not all wetlands are under Corps jurisdiction. The term “waters of the U.S.” covers many types of waters, including: waters currently or historically used in interstate or foreign commerce, including all waters subject to the ebb and flow of tides; all interstate waters including interstate wetlands; all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, etc., the use, degradation, or destruction of which could affect interstate or foreign commerce; all impoundments of waters otherwise defined as waters of the U.S.; tributaries of waters of the U.S.; territorial seas; and wetlands adjacent to waters of the U.S. (USACE 1987). Regulated waters of the U.S. do not include isolated waters. However, isolated waters may be regulated by the RWQCB and the CDFG under the Porter-Cologne Act and the California Fish and Game Code, respectively.

The CDFG has jurisdiction covering lakes, rivers, and streams. Jurisdiction extends across the bed, banks, and channel of these features and includes areas beneath a riparian canopy, even if the canopy areas are well away from the stream channel (such as in oak riparian areas). More typically, the jurisdiction over streambeds is applied from the top of one channel bank to the top of the opposite bank.

The CCC regulates wetlands occurring throughout the California coastal zone, which includes Malibu Lagoon through the Coastal Development Permit (CDP) Process. The California Coastal Act defines “wetland” in Section 30121 of the California Coastal Act as follows: Wetland means lands within the coastal zone that may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats and fens.

The CCC uses the same three-criteria system for defining wetlands as the Corps, and like the CDFG, only one of the three criteria needs to be present for an area to be classified as a wetland. Unlike the CDFG, the CCC’s jurisdiction extends beyond streambeds to include all tidal areas; however, jurisdiction is limited to areas within the coastal zone.

Hydrophytic Vegetation

Vegetation communities which meet the criteria of wetland-associated vegetation are dominated by a preponderance (>50%) of species classified as obligate wetland plants (OBL), facultative wetland plants (FACW), or facultative plants (FAC) based on the *National List of Plant Species that Occur in Wetlands* (U.S. Fish & Wildlife Service 1988). Obligate wetland plants are defined as occurring almost always in

wetlands (estimated probability >99%) under natural conditions. Facultative wetland plants are defined as occurring usually in wetlands (estimated probability 67% to 99%). Facultative plants are defined as having a similar likelihood of occurring in both wetlands and nonwetlands (estimated probability 33% to 67%).

Hydrology

Wetland hydrology was indicated by the presence of surficial characteristics or sub-surficial hydric characteristics. Surficial hydrology was determined through visual observation of surface flow, drainage patterns, watermarks, and/or drift lines. Sub-surficial characteristics included saturated soils or presence of free water in the test pit.

Although non-wetland waters of the U.S./streambeds lack wetland vegetation, they do exhibit wetland hydrologic characteristics.

Hydric Soils

To confirm the presence of hydric soils, samples taken from various depths were examined for physical and chemical evidence of hydric conditions. The color of excavated soils was evaluated using the chroma index from the Munsell Soil Color Charts (Munsell Color 2000). Low-chroma color or gleyed soils are indicators of hydric soils under normal conditions. Additional indicators of hydric soils such as vertical streaking, high organic matter content in the surface horizon, mottling, and sulfidic odor were also evaluated during the delineation.

In general the jurisdictional wetlands include all areas mapped as southern willow scrub, mule fat scrub, southern coastal salt marsh, coastal and valley freshwater marsh, and brackish marsh, with the exceptions noted below (Merkel 2004; Figure 6-1; Table 6-2).

CCC and CDFG jurisdictional boundaries have the most overlap, with deviations only at the mouth of the lagoon and near the State Park parking lot. Although CCC follows the same requirement as CDFG, needing only one of the three criteria for an area to be classified as a wetland, the CCC's jurisdiction extends beyond streambed to include areas of wetland vegetation that are not necessarily dependent on the streambed or adjacent riparian area. Therefore the areas vegetated by mule fat scrub and southern willow scrub north of the parking lot (likely supported by runoff or irrigation rather than Malibu Lagoon) are within CCC jurisdiction only. The other variation in jurisdiction between CDFG and CCC is at the mouth of the lagoon, where CCC continues seaward while CDFG is limited to non-tidal waters.

Table 6-2. Jurisdictional Wetlands and Non-wetland Waters/Streambeds within the Project Area

Wetland Habitat Type	USACE Jurisdiction (acre)	CDFG Jurisdiction (acre)	CCC Jurisdiction (acre)
Southern willow scrub	0.42	0.42	0.52
Atriplex scrub	0.20	0.20	0.20
Baccharis scrub	0.00	0.00	0.00
Mule fat scrub	0.98	1.09	1.40
Venturan coastal sage scrub	0.00	0.00	0.00
Mixed scrub	0.00	0.00	0.00
Southern coastal salt marsh	4.95	4.98	4.98
Brackish marsh	0.22	0.22	0.22
Coastal and valley freshwater marsh	0.83	0.83	0.83
Southern sycamore-alder riparian woodland	0.00	0.16	0.16
Disturbed coastal dunes	0.00	0.00	0.00
Non-native grassland	0.00	0.00	0.00
Disturbed habitat	0.00	0.00	0.00
Mud flat	3.96	3.96	3.96
Sand beach/sand bar	7.27	2.75	7.27
Open water	11.65	11.09	11.65
Urban/developed land*	0.00	0.00	0.00
Total Jurisdictional Waters/Streambed	30.48	25.70	31.19

The Corps jurisdiction deviates from the CDFG and CCC boundary in areas where all three criteria were not met. In the western portion of the lagoon there were areas dominated by wetland indicator species such as mule fat or western sycamores; however, they did not meet the hydric soils criterion.

Common Wildlife Species

Past studies of Malibu Lagoon have identified 200 species of birds (Cooper 2005), 33 species of fish (Dagit & Swift 2005), 1 species of mammal (Natural Resources Assessment, Inc. 2005), 4 species of reptiles and amphibians (Hovore & Associates 2005), and 97 species of invertebrates in the project area (Hovore & Associates 2005). For more detail, existing habitat types, wetland delineation, and alternatives considered, please see the Alternatives Analysis and its appendices.

Several species of aquatic birds have been observed in the lagoon including gadwall (*Anas strepera*), mallard (*Anas platyrhynchos*), common yellowthroat (*Geothlypis trichas*), song sparrow (*Passerella melodia*), black phoebe (*Sayornis nigricans*), pied-billed grebe (*Podilymbus podiceps*), black-necked stilt (*Himantopus mexicanus*), black-crowned night heron (*Nycticorax nycticorax*), great egret (*Ardea alba*), great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and green heron (*Butorides virescens*).

Upland bird species including California towhee (*Pipilo crissalis*), Anna's hummingbird (*Calypte anna*), bushtit (*Psaltriparus minimus*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), western scrub-jay (*Aphelocoma californica*), and house finch (*Carpodacus mexicanus*) have been observed in the upland habitats surrounding the lagoon, which consists predominantly of Venturan coastal sage scrub and mixed scrub habitats.

Lagoon habitats do not support many mammal or reptile species. Most of the available scrub habitat is very dense at ground level as well as higher up, and the southern coastal salt marsh is almost entirely covered by jaumea with very little bare ground exposed. Small mammals generally prefer more open scrub habitats with low openings and sparse ground cover. In addition, the lagoon is almost entirely surrounded by either water (open ocean) or development (housing and commercial).

Some common mammals that are known to occur at the lagoon include mule deer (*Odocoileus hemionus californicus*), Audubon's rabbit (*Sylvilagus auduboni*), and coyote (*Canis latrans*). One mammal was caught during the 2005 mammal trapping effort: black rat (*Rattus rattus*). It is possible that other species, such as the deer mouse (*Peromyscus maniculatus*) and the meadow mouse (*Microtus californica*), are present in the lagoon, but are at such low numbers that capture is difficult.

The surrounding vegetation supports a few common species of reptiles, such as western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta stansburiana*).

The project area provides habitat for a variety of invertebrates (e.g., earwigs, grasshoppers, butterflies, ants, spiders, etc.) including but not limited to ring-legged earwig (*Euborellia annulipes*), field cricket (*Gryllus* sp.), green stinkbug (*Chlorochroa* sp.), western tiger swallowtail (*Papilio rutulus*), common sand beetle (*Coelus ciliatus*), Argentine ant (*Linepithema humile*), and black widow (*Latrodectus hesperus*).

Several fish species are resident within the lagoon and vary depending on the season and status of the lagoon entrance condition. Common species captured during the 2005 surveys include topsmelt (*Atherinops* sp.), carp (*Cyprinus carpio*), California killifish (*Fundulus parvipinnis*), mosquito fish (*Gambusia affinis*), longjaw (*Gillichthys mirabilis*), and opaleye (*Girella nigricans*).

Special-Status Species

Sensitive Plant Species

No federally or state listed plant species were observed within the project area during any of the biological surveys (Wishner 2005). One CNPS List 4 species, California black walnut, was observed during the 2004 vegetation mapping effort (Merkel 2004). Special status plant species with potential to occur in the project area were identified through a search of the California Natural Diversity Data Base (CNDDDB) and include Braunton's milk vetch (*Astragalus brauntonii*) and Lyon's pentachaeta (*Pentachaeta lyonii*) (CNDDDB 2004). These species and their potential to occur within the project area are discussed below.

California Black Walnut

California black walnut, a CNPS List 4 species, is typically associated with chaparral, coastal scrub, and cismontane woodland habitats on slopes and in canyons. This species was observed within the southern sycamore-alder riparian woodland during the 2004 vegetation mapping effort (Merkel 2004).

Braunton's Milk Vetch

This federally endangered and CNPS List 1B species is associated with closed-cone coniferous forest, chaparral, coastal scrub, and valley and foothill grasslands (CNDDDB 2004). While this species was observed in Malibu Lagoon in 1984, it has not been reported since and is assumed to have been extirpated from the area. Therefore, this species is not expected to occur within the project area. As part of the restoration, Braunton's Milk Vetch will be re-established in the appropriate habitat area of the restoration project.

Lyon's Pentachaeta

This federally endangered, state endangered, and CNPS List 1B species is associated with chaparral and valley and foothill grasslands, usually

along the edges of firebreaks. This species was observed along Malibu Creek in 1979 but is now presumed missing from the area. Therefore, this species is not anticipated to occur in the project area and would be highly unlikely to occur in seasonal lagoon habitats.

Santa Monica Mountains Dudleya

This federally threatened and CNPS List 1B species is associated with chaparral and coastal scrub habitats. This species was observed in Malibu Canyon in 1980 but is now presumed missing from the area. Therefore, this species is not expected to occur within the project area and would be highly unlikely to occur in seasonal lagoon habitats.

Marcrescent Dudleya

This federally threatened, state rare, and CNPS List 1B species is typically found in chaparral on sheer rock surfaces and rocky volcanic cliffs. This species was observed along Malibu Creek in 1979 but is now presumed missing from the area. Therefore, this species is not expected to occur within the project area and would be highly unlikely to occur in seasonal lagoon habitats.

Sensitive Wildlife Species

Arthropod Species

While not observed within the project area during the field surveys, a number of agency-listed sensitive arthropod species occur within the coastal portion of the Santa Monica Mountains, including: Trask's shoulderband snail (*Helminthoglypta traskii*), wandering (salt marsh) skipper butterfly (*Panoquina errans*; The Nature Conservancy G2¹ listed species; IUCN Red List near threatened), Busck's gallmoth (*Carolella busckana*; DFG special animal list), Belkin's dune tabanid (*Brennania belkini*; IUCN Red List vulnerable), globose dune beetle (*Coelus globosus*; IUCN Red List vulnerable), Santa Monica Mountains shieldback katydid (*Neduba longipennis*; IUCN Red List critically endangered, proposed federally endangered), and sandy beach tiger beetle (*Cicindela hirticollis gravida*; DFG special animal list, proposed federally endangered) (Hovore & Associates 2005).

Huffman (2002, *Santa Monica Bay Audubon Soc. newsletter*, Vol. 26(1)), reports seeing wandering (salt marsh) skipper at Malibu Lagoon, and while this record remains to be verified, the species may occasionally wander into the project area; its host plant (*Distichlis spicata* and other grasses) is present.

The other species likely would not occur within the project area, primarily because the natural, native habitat values are either lacking or retorted and degraded, or their specific host plants or substrate associations are lacking.

¹ Imperiled globally because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range. (Endangered throughout its range).

Fish

Several sensitive fish species are known from Malibu Lagoon, either historically or presently. These include Pacific Lamprey (*Lampetra tridentata*), southern steelhead trout (*Oncorhynchus mykiss*), arroyo chub (*Gila orcutti*) and Coho salmon (*Oncorhynchus kisutch*). In addition, the tidewater goby (*Eucyclogobius newberryi*) was historically present and re-introduced to the lagoon in 1991. These species and their potential to occur in the project area are discussed below.

Pacific Lamprey. Pacific lampreys are anadromous. The adults enter streams to spawn in November to March, dying shortly after they lay eggs in gravelly areas of the stream. The young, known as ammocoetes, hatch out within two to three weeks and remain in fresh water for an unknown time period, perhaps as long as four to six years. They burrow in soft substrates in well-oxygenated areas, and filter feed on detritus. Pacific lamprey eventually migrate to the ocean and eventually return as adults to spawn.

Populations of Pacific lampreys have declined due to a combination of habitat loss, restricted migratory opportunities, changes in sedimentation and water quality and competition or predation by introduced species. Lampreys, including *L tridentata*, the species found locally, have been petitioned for listing through the U.S. Fish and Wildlife Service (USFWS).

While much of Malibu Creek historically contained suitable habitat and lampreys were present, adults have not been found during any of the surveys since the 1980s (Dagit and Swift 2005).

Southern Steelhead Trout. Estuaries are known to be important transitional habitats for steelhead smolts leaving their natal stream and heading out to sea, as well as critical migratory passageways for adults coming in to spawn during storm events (Swift 1975). In Santa Monica Bay, steelhead typically enter the creeks during winter storms, spawn and either return to the sea while flows are still high, or remain in the creek during the subsequent summer and fall. Patterns of steelhead presence and reproduction in Malibu Creek have been sporadically studied since the 1980s, and monthly snorkel surveys are planned through June 2007.

No steelhead adults or smolts have been documented by any of the fish surveys in the lagoon. During the 2005 surveys, both surface and bottom water temperatures were between 21⁰C and 34.7⁰C. Although able to tolerate temperature spikes into the mid-20s, steelhead prefer to inhabit cooler waters. The temperature limitations of the lagoon could be a major reason for their absence this season (Dagit and Swift 2005). While not observed within the project area during any of the surveys, steelhead are known to occur upstream within Malibu Creek (Dagit et. al. 2005) and could occur within the project area due to the presence of suitable habitat.

Arroyo Chub. This CDFG Species of Special Concern is associated with slow-moving stream sections with mud or sand bottoms and feeds on aquatic vegetation and associated invertebrates. While potentially suitable habitat for this species occurs within the vicinity of the project area, the arroyo chub was not observed during any of the surveys conducted.

Coho Salmon. This federally threatened and state endangered species requires beds of loose, silt-free, coarse gravel for spawning. Habitat requirements also include cover, cool water and sufficient dissolved oxygen. While potentially suitable habitat for this species occurs within the vicinity of the project area, the Coho salmon was not observed during any of the surveys conducted.

Tidewater Goby. This federally endangered species and CDFG Species of Special Concern was historically known to occur within the lagoon. However, studies conducted between the late 1960s and the early 1990s indicated that this species had been extirpated from the area since at least 1970. Current studies have documented the recovery of this species since its re-introduction in 1991, and indicate that the area on the west side of the lagoon both up and downstream of the PCH bridge consistently hosts gobies year round, with size classes and densities varying seasonally (Dagit and Swift 2005).

Amphibians and Reptiles

Sensitive amphibians and reptiles were not observed within the project area during any of the biological surveys (Hovore & Associates 2005). Sensitive amphibians and reptiles known to occur in the vicinity of the project area and their potential to occur within the project area are discussed below.

Coast Range Newt (Taricha t. torosa). This species persists in scattered metapopulations within the upper portions of several drainages on the coastal slope of the Santa Monica Mountains, but has suffered declines due to a variety of anthropogenic effects, including introduced predators (crayfish), changes to creek morphology, roadkill mortality, and post-fire creekbed siltation. It occurred historically within lower Malibu Creek (Hovore 2005) and persists within the canyon within Malibu Creek State Park. However, physical and chemical characteristics of the creek channels within the project area are wholly unsuited to use by coast range newt, which would be highly unlikely to occur in seasonal lagoon habitats.

Silvery Legless Lizard. Legless lizards, a CDFG Species of Special Concern, are much more common than historic accounts would indicate (Hovore 2005), but their fossorial, secretive behavior makes them difficult to census. Although not observed within the project area, this species has potential to occur as areas of loamy soils with dense cover (such as the southern willow scrub near the bridge) and vegetated areas of remnant dune sand provide suitable habitat.

Two-striped Garter Snake. The two-striped garter snake is a CDFG Species of Special Concern known to occur from Coastal California from the vicinity of Salinas to Northwest Baja. Highly aquatic, this species is most commonly found in or near permanent water. It can occasionally be found in small and intermittent streams with rocky beds. Although not observed within the project area, this species has potential to occur.

Birds

Five bird species recorded during the 2005 breeding surveys are considered “sensitive,” in that they are protected by state and/or federal endangered species acts; because they are recognized as threatened or near-threatened by the International Union for Conservation of Nature and Natural Resources (IUCN); or because they are being considered for listing as California Bird Species of Special Concern (Cooper Ecological Monitoring, Inc. 2005).

None nest at the site or in the area, although two have done so in recent history and could conceivably do so again with improved habitat management. One sensitive bird species was also recorded during the 2005 mammal surveys. Sensitive wildlife species observed or detected within the project area include: savannah sparrow (*Passerculus sandwichensis*), California brown pelican (*Pelecanus occidentalis californicus*), western snowy plover (*Charadrius alexandrinus nivosus*), Heermann’s gull (*Larus heermanni*), elegant tern (*Sterna elegans*), and California least tern (*Sterna antillarum browni*).

California Brown Pelican. This federal and state endangered species is a post-breeding dispersant from large breeding colonies in western Mexico, particularly on desert islands in the Sea of Cortez. Rather than flying south for the winter after nesting like most temperate-zone migrants, this species actually flies north, up the coast of California. Their nesting season extends from early winter into spring, so numbers in southern California peak in mid-summer. Up to 210 California brown pelicans were observed at Malibu Lagoon during surveys conducted in 2005, generally roosting along the sand spit separating the lagoon from the sea or on the island in the middle of the lagoon exposed by low tide (until flushed by people); this species does not nest within the project area.

Western Snowy Plover. Two hatch-year (born this spring) western snowy plovers were present briefly along the southern edge of Malibu Lagoon on June 14, 2005, but were soon flushed by people and did not return during the survey. This CDFG Species of Special Concern and federally threatened species was formerly a common nester and winterer along the coast of southern California, and still uses Malibu Lagoon as a major local wintering site. However, due to beach-grooming and disturbance by dogs and people, this species no longer nests in Los Angeles County.

Heermann's Gull. This species, listed on the IUCN Red List as Near Threatened, is a post-breeding dispersant from large breeding colonies in western Mexico, particularly on desert islands in the Sea of Cortez. Rather than flying south for the winter after nesting like most temperate-zone migrants, this species actually flies north, up the coast of California. Their nesting season extends from early winter into spring, so numbers of this species in southern California peak in mid-summer. Heermann's Gulls were invariably found roosting on the sand spit or the beach—this strictly coastal bird is rarely found more than a few meters inland. Up to 70 individuals were tallied during the 2005 surveys, almost all adults (juveniles arrive somewhat later in the summer); this species does not nest within the project area.

Elegant Tern. This CDFG Species of Special Concern is a post-breeding dispersant from large breeding colonies in western Mexico, particularly on desert islands in the Sea of Cortez. Rather than flying south for the winter after nesting like most temperate-zone migrants, this species actually flies north, up the coast of California. Their nesting season extends from early winter into spring, so numbers of this species in southern California peak in mid-summer. The elegant tern can be numerous at Malibu Lagoon, but during the 2005 surveys, only a handful were observed (except for 30 birds early morning on June 3, 2005); this species does not nest within the project area. This tern has recently colonized Los Angeles County as a breeder (Terminal Island; Cooper 2004), and it is possible that some of the birds observed are from these colonies.

California Least Tern. This federal and state endangered species was formerly a common nester on local beaches and is now confined to a handful of protected sites, mainly islands of dirt fill in harbors and bays. The California least tern winters at sea off the west coast of Mexico and Central America. On July 13–14, 2005, a large concentration (up to 42 birds) was present at Malibu Lagoon, roosting along the southern shore and foraging in the main body of the lagoon, with smaller numbers feeding in the west basin. On both days, a total of 14 hatch-year birds were present with adults, many of which were banded. It is likely these were birds from a colony near Terminal Island, Los Angeles Harbor, where several hundred birds were monitored and banded this year (Cooper 2005).

Impacts and Mitigation Measures

Thresholds of Significance

Criteria or thresholds for determining the significance of an impact are presented in the following sections to clarify and quantify, to the extent feasible, at what point an impact to a biological resource is considered significant.

The significance of impacts to flora and fauna observed or expected at the site was determined based on the sensitivity of the resource and the extent of the impact. Sensitive species are defined by State CEQA Guidelines § 15380 as species that are listed by either the state or federal government as endangered, rare, or threatened. This section goes on to state that species need not be officially listed by the state or federal government to be considered sensitive. This is an ecological restoration where resource protection is the highest priority. Therefore, for the purposes of this analysis, sensitive species are those that are recognized by a government agency or conservation or scientific group as being depleted, potentially depleted, declining, rare, locally endemic, endangered, or threatened.

Also included are any species nominated for, or placed on a state or federal rare, endangered, or threatened species list. Habitats supporting species listed as rare, endangered, or threatened by the agencies that enforce the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA) are also regarded as sensitive resources.

According to Appendix G of the State CEQA Guidelines, a project would normally have a significant effect on a biological resource if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to marsh, riparian scrub, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provision of an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan.

Impacts and Mitigation Measures

Potential impacts to the various biological resources described in the previous pages are discussed below. For those resources that could potentially be significantly impacted, mitigation measures are identified that will result in avoidance of the impact, or reduction of the impact to a less-than-significant level.

As final construction-level plans have not yet been completed, quantifying effects to individual vegetation communities and species is not feasible. However, by combining the existing mapped vegetative communities into fewer more general modeled habitat classes, an accurate estimate of changes in wetland habitat area is possible.

Tables 6-3 and 6-4 indicate changes in acreages for each modeled habitat class under both open (Table 6-3) and closed (Table 6-4) lagoon conditions. It must be noted that the habitat acreages are modeled based on specific set elevations necessary for modeling. In reality, these elevations are dynamic and thus the actual acreages will fluctuate within a given range. Because of this fact, it is most appropriate to look at total changes to marsh habitat, rather than individual changes to the various wetland habitat components. As shown in Table 6-3, under open lagoon conditions, total marsh habitat will increase from approximately 6 acres to approximately 13 acres (115% increase).

Total available subtidal and intertidal habitat will increase approximately 4 acres or approximately 15% during open conditions, while total submerged habitat (elevation -2 feet to 0 feet) would increase from approximately 13 acres under existing conditions to approximately 14 acres under project conditions. During closed lagoon conditions with water level at +5 feet, all tidally influenced habitat is submerged under both existing and project scenarios. Since total tidally influenced habitat is increased by over 4 acres under project conditions, so too is total submerged habitat increased. This increase in submerged habitat under both open and closed lagoon conditions is expected to benefit fish species.

Thus, while it is not known with certainty the extent that individual vegetation species may be temporarily disturbed, reduced in population, or increased in population, the overall marsh habitat will be dramatically increased and long-term beneficial impacts will result.

A detailed planting plan will be developed during the final design stage of the project. This plan will estimate how much of each species will be planted. However, as natural processes are favored, natural recruitment of vegetation and subsequent succession will play a large part in the eventual species composition in the wetland habitat.

Table 6-3. Entire Lagoon: Open Conditions at Water Level of 1 Foot below MSL

Habitat Type	Elevation	Existing Acres	With-Project Acres
Subtidal Gravel/Sand Bar	-2 – -1	0.13	0.08
Intertidal Gravel/Sand Bar	-1 – 4	12.55	13.79
Sand Beach	4 – 6	1.95	1.23
Subtidal Softbottom	-2 – 0	0.51	0.24
Mudflat	0 – 1	4.77	1.52
Brackish Marsh	1 – 3	0.17	3.83
Freshwater Marsh	3 – 5	0.81	5.68
Alkali Meadow	5 – 7	4.95	3.26
Salt Panne	varies	0.00	0.00
Available marsh habitat		5.93	12.76
Percent marsh habitat		18%	39%
Coastal Dune/Bluff Scrub	7 – 9	1.32	1.25
Uplands	> 9	0.54	0.58
Roads/Parking/Disturbed/Trails		2.02	1.13
Turf & Ornamental		0.89	0.00
Riparian		1.97	0.00
Available non-marsh habitat		5.42	1.71
Total Area		32.59	32.59

Source: Moffatt & Nichol and Heal the Bay 2005.

Table 6-4. Entire Lagoon: Closed Conditions at Water Level of 5 Feet above MSL

Habitat Type	Elevation	Existing Acres	With-Project Acres
Subtidal Gravel/Sand Bar	-2 – -1	Submerged	Submerged
Intertidal Gravel/Sand Bar	-1 – 4	Submerged	Submerged
Sand Beach	4 – 6	Submerged	Submerged
Subtidal Softbottom	-2 – 0	Submerged	Submerged
Mudflat	0 – 1	Submerged	Submerged
Brackish Marsh	1 – 3	Submerged	Submerged
Freshwater Marsh	3 – 5	Submerged	Submerged
Alkali Meadow	5 – 7	4.95	3.26
Coastal Dune/Bluff Scrub	7 – 9	1.32	1.25
Salt Panne	varies	0.00	0.00
Available marsh habitat		6.27	4.51
Coastal Dune/Bluff Scrub	7 – 9	1.32	1.25
Uplands	> 9	0.54	0.58
Roads/Parking/Disturbed/Trails		2.02	1.13
Turf & Ornamental		0.89	0.00
Riparian		1.97	0.00
Available non-marsh habitat		6.74	2.96

Source: Moffatt & Nichol and Heal the Bay 2005.

Impact BIO-1: Implementation of the project (i.e., changes to the lagoon configuration, improvements to slopes, etc.) would remove southern willow scrub vegetation.

The project would result in impacts to southern willow scrub. Impacts to this riparian habitat, which falls under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, at least a portion of this plant community is being sustained by artificial freshwater inputs such as supplemental irrigation associated with plantings from past restoration efforts and surface runoff from the parking lot and PCH. Furthermore, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated riparian vegetation.

While post-project acreages of southern willow scrub may be reduced from identified pre-project acreages, post-project acreages of wetland habitat would be increased and the functions and values of the biological resources within the lagoon, including riparian vegetation and USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project. Therefore, impacts to southern willow scrub are considered less than significant. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-2: Implementation of the project would remove atriplex scrub vegetation.

The project would result in impacts to atriplex scrub. Impacts to this riparian habitat, which falls under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, this plant community contains Swamp saltbush (*Atriplex amnicola*) which is native to Australia and is known to be invasive in wetlands once it is established. It is not known for sure whether or not this species was mistakenly included into restoration plantings as an

endemic, or if it subsequently colonized the area after restoration plantings were installed. Either way, its presence is undesirable. Furthermore, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated riparian vegetation.

While post-project acreages of atriplex scrub may be reduced from identified pre-project acreages, post-project acreages of wetland habitat would be increased and the functions and values of the biological resources within the lagoon, including riparian vegetation and USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project. Therefore, impacts to atriplex scrub are considered less than significant. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-3: Implementation of the project would remove baccharis scrub.

The project would result in impacts to baccharis scrub. Impacts to this upland habitat may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and surrounding upland vegetation.

While post-project acreages of baccharis scrub may be reduced from identified pre-project acreages, this outcome is consistent with project goals. Much of the upland vegetation in the lagoon is supported now by artificially raised elevations in the lagoon area from a previous land use as a fill disposal site by Cal Trans. Although some of this fill was removed during a previous restoration effort, much still remains. It is anticipated that when these elevations are lowered to a more historically accurate level by removing additional fill, much of the area currently supporting upland vegetation will revert to wetland species more suited to lower elevations typical in an undisturbed lagoon system. Therefore, impacts to baccharis scrub are considered less than significant. No mitigation is required.

Impact BIO-4: Implementation of the project would remove mule fat scrub.

The project would result in impacts to mule fat scrub. Impacts to this riparian habitat, which falls under the jurisdiction of the

USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, at least a portion of this plant community is being sustained by artificial freshwater inputs such as supplemental irrigation associated with plantings from past restoration efforts and surface runoff from the parking lot and PCH. Furthermore, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated wetland habitat.

While post-project acreages of mule fat scrub may be reduced from identified pre-project acreages, post-project acreages of wetland habitat would be increased and the functions and values of the biological resources within the lagoon, including USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project. Therefore, impacts to mule fat scrub are considered less than significant. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-5: Implementation of the project would remove Venturan coastal sage scrub.

The project would result in impacts to Venturan coastal sage scrub. Impacts to this upland habitat may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its wetland habitat.

While post-project acreages of Venturan coastal sage scrub may be reduced from identified pre-project acreages, this outcome is consistent with project goals. Much of the upland vegetation in the lagoon is supported now by artificially raised elevations in the lagoon area from a previous land use as a fill disposal site by Cal Trans. Although some of this fill was removed during a previous restoration effort, much still remains. It is anticipated that when these elevations are lowered to a more historically accurate level by removing additional fill, much of the area currently supporting upland vegetation will revert to wetland species more suited to lower elevations typical in an undisturbed lagoon system. Therefore, impacts to Venturan coastal sage scrub are considered less than significant. No mitigation is required.

Impact BIO-6: Implementation of the project would remove mixed scrub.

The project would result in impacts to mixed scrub. Areas that were classified as mixed scrub did not show any one dominant habitat type. Rather they consisted of a mosaic of opportunistic plant species from several different habitat types. Impacts to mixed scrub are considered less than significant since it is not well defined as an intact plant community. No mitigation is required.

Impact BIO-7: Implementation of the project would remove southern coastal salt marsh.

The project would result in temporary impacts to southern coastal salt marsh. Impacts to this riparian habitat, which falls under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated wetland habitat.

Post-project acreages of southern coastal salt marsh will be substantially increased from identified pre-project acreages. Total marsh habitat is expected to more than double from approximately 6 acres under existing conditions to approximately 13 acres after the project is implemented. Overall post-project acreages of wetland habitat would be increased and the functions and values of the biological resources within the lagoon, including USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project. Therefore, impacts to southern coastal salt marsh are beneficial. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-8: Implementation of the project would remove brackish marsh.

The project would result in impacts to brackish marsh. Impacts to this riparian habitat, which falls under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts

may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated wetland habitat.

While post-project acreages of brackish marsh may be reduced from identified pre-project acreages, total post-project acreages of wetland habitats would be increased and the functions and values of the biological resources within the lagoon, including USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project. Therefore, impacts to brackish marsh are considered less than significant. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-9: Implementation of the project would remove coastal and valley freshwater marsh.

The project would result in impacts to coastal and valley freshwater marsh. Impacts to this riparian habitat, which falls under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, at least a portion of this plant community is being sustained by artificial freshwater inputs such as supplemental irrigation associated with plantings from past restoration efforts and surface runoff from the parking lot and PCH. Furthermore, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated wetland habitat.

While post-project acreages of coastal and valley freshwater marsh may be reduced from identified pre-project acreages, total post-project acreages of wetland habitat would be increased and the functions and values of the biological resources within the lagoon, including USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project. Therefore, impacts to coastal and valley freshwater marsh are considered less than significant. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-10: Implementation of the project would remove southern sycamore-alder riparian woodland.

The project would result in impacts to southern sycamore-alder riparian woodland. Impacts to this riparian habitat, which falls under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, this plant community was installed as a landscape element for the parking lot and interpretive lawn area in the 1980's and is supported by fresh water irrigation as well as surface runoff from the existing parking lot. This landscape element lacks herbaceous riparian understory that one might expect in a more natural southern sycamore-alder riparian woodland and it is unlikely that it would persist in a more natural water regime that is driven by natural lagoon processes rather than by artificial freshwater inputs such as supplemental irrigation and surface runoff.

In addition, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated riparian vegetation. While post-project acreages of southern sycamore-alder riparian woodland may be reduced from identified pre-project acreages, post-project acreages of wetland habitat would be increased and the functions and values of the biological resources within the lagoon, including riparian vegetation and USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project.

Therefore, impacts to southern sycamore-alder riparian woodland are considered less than significant. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-11: Implementation of the project would remove non-native grassland.

The project would result in impacts to non-native grassland. This vegetation community is comprised of undesirable non-native plant species that are considered invasive. It is anticipated that post-project acreages of non-native grassland would be decreased from identified pre-project acreages. This outcome is consistent with project goals to improve the integrity of appropriate native plant communities and to eliminate non-native vegetation within the lagoon area. Therefore,

impacts to non-native grassland are considered less than significant. No mitigation is required.

Impact BIO-12: Post-construction acreage of marsh and mudflat would increase.

The project would result in an increase in marsh and mudflat acreage (see Table 6-3) and thus a beneficial impact. These increases are the most substantial component of the overall increase in wetland habitat. Beneficial impacts would result and no mitigation is necessary.

Impact BIO-13: Implementation of the project would impact sand beach/sand bar.

The project would result in impacts to sand beach/sand bar. Impacts to areas classified as sand beach/sand bar, which fall under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated riparian vegetation. It is anticipated that post-project acreages of sand beach/sand bar would be increased from identified pre-project acreages. In addition, the functions and values of the biological resources within the Lagoon would be improved as a result of implementation of the project.

Therefore, impacts to sand beach/sand bar are considered less than significant. No mitigation is required. However, permits and/or approvals from the USACE/RWQCB, CDFG, and the CCC would be required for impacts to resources under their jurisdiction.

Impact BIO-14: Implementation of the project would impact open water.

The project would result in impacts to open water. Impacts to areas classified as open water, which fall under the jurisdiction of the USACE/RWQCB, CDFG, and CCC, may have a short-term adverse effect on a sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or the USFWS. These impacts may have a short-term adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated riparian vegetation. Post-project acreages of open water would likely be increased from identified pre-project acreages. In addition, the functions and values of the biological resources within the lagoon, including riparian vegetation and USACE/RWQCB, CDFG, and CCC jurisdictional resources, would be improved as a result of implementation of the project. Therefore, impacts to open water are considered less than significant. No mitigation is required.

Impact BIO-15: Implementation of the project could result in impacts to common wildlife species found to occur in the project area.

The project, through direct impacts and/or temporary loss of habitat, could result in impacts to common wildlife species (i.e., birds, fish, mammals, reptiles, amphibians, and invertebrates) found to occur in the project area. Temporary disturbances to wildlife species and habitat due to construction would be adverse, but are less than significant given the temporary and intermittent nature of the impact. No mitigation is required.

Impact BIO-16: Implementation of the project could result in impacts to California black walnut.

The project, through direct or indirect impacts, could result in the loss of California black walnut trees. Impacts to this species could have an adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS. However, impacts to this species would not be considered significant as the individual black walnuts observed in the southern sycamore-alder riparian woodland during the 2004 vegetation mapping (Merkel 2004) do not represent a significant population of this CNPS List 4 species.

Impact BIO-17: Implementation of the project could result in impacts to the wandering (salt marsh) skipper.

The project, through direct impacts and/or temporary loss of habitat (and host plants), could result in impacts to the wandering (salt marsh) skipper. Impacts to this species would have a short-term adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS. However, impacts to this species would not be considered

significant as direct impacts are anticipated to be minimal and as pre-and post-project acreages of suitable habitat for this species would be similar if not identical.

Impact BIO-18: Implementation of the project could result in impacts to southern steelhead trout.

The project, through direct impacts and/or temporary loss of habitat, could result in impacts to southern steelhead trout. Impacts to this species would have a short-term adverse effect on a species identified as a candidate, sensitive, or special status species on local or regional plans, policies or regulations, or by the CDFG, USFWS, or NOAA/NMFS. Impacts to this species may temporarily interfere with the movement of a native resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors.

The project has been designed to ensure that seasonal lagoon openings be maintained to allow interchange of steelhead with coastal waters. Therefore, the project would not effect a detectible change on the suitability of the lagoon to support steelhead migration. Improvements to lagoon water quality, particularly improved dissolved oxygen levels may provide some increased availability of habitat for steelhead juveniles; however, it is not anticipated that lower portions of the lagoon would be used differently by steelhead following enhancement. Therefore, impacts are not significant and mitigation is not required. However, potential direct impacts to this species may be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1: Southern Steelhead Trout.

- Construction and lagoon excavation may occur during steelhead migration. In order to avoid direct impacts to steelhead, wetland excavation shall occur such that grading activity and equipment are separated from surface connections to the existing lagoon by earthen berms. Groundwater that may accumulate in these excavated areas shall be returned to the lagoon, via pump, in a manner that eliminates sediment and the potential to disturb lagoon salinity stratification, substrate, and temperature.
- In certain circumstances, physical or biological constraints may make it infeasible for excavations to be separated by earthen berms from the main body of the existing lagoon. In these situations, impacts shall be avoided by separating construction activity from the main lagoon by the temporary placement of a cofferdam wall, silt curtains, and block nets or a combination of

similar tools. In the event that water must be pumped from these areas during construction, it shall be returned to the lagoon, via pump, in a manner that eliminates sediment and the potential to disturb lagoon salinity stratification, substrate, and temperature. Fish salvage efforts shall be conducted for any surface water that must be separated from the main lagoon. After construction, the area shall be reflooded in a manner that minimizes disturbance of the lagoon salinity stratification and substrate and the release of sediment.

- Reinundation of the western lagoon may provide refuge areas for fish during construction activities in the main lagoon. Block netting and barriers shall be used to exclude adult gobies, migratory steelhead, and other fish from the work areas. On-site monitoring by a USFWS-approved fisheries biologist would be conducted during any channel or bank disturbance. Pages 100 and 101 of the Final Alternatives Analysis prepared by Moffatt and Nichol (March 2005) outline a possible construction sequence in more detail that incorporates several of these ideas.

Impact BIO-19: Implementation of the project would result in impacts to the tidewater goby.

The project, through direct impacts and/or temporary loss of habitat, would result in impacts to the tidewater goby. Impacts to this species would have a short-term adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS. Impacts to this species may temporarily interfere with the movement of a native resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors.

The project, while not specifically designed to improve tidewater goby habitat, was designed to ensure that no significant impact would occur to the main lagoon goby habitat due to implementation of the project and was designed to benefit gobies within the more protected refugia habitats away from the main lagoon.

Therefore, temporary loss of suitable habitat for this species is not considered significant and no mitigation is required. However, potential direct impacts to this species may be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-2: Tidewater Goby.

- Construction of the restoration project shall be timed to minimize disturbance of the western shoreline of the main lagoon when larval tidewater gobies are using the near-shore

habitat. In order to avoid direct impacts to gobies, wetland excavation shall occur such that grading activity and equipment are separated from surface connections to the existing lagoon by earthen berms. Groundwater that may accumulate in these excavated areas shall be returned to the lagoon, via pump, in a manner that eliminates sediment and the potential to disturb lagoon salinity stratification, substrate, and temperature.

- In certain circumstances, physical or biological constraints may make it infeasible for excavations to be separated by earthen berms from the main body of the existing lagoon. In these situations, impacts to gobies shall be avoided by separating construction activity from the main lagoon by the temporary placement of a cofferdam wall, silt curtains, and block nets or a combination of similar tools. In the event that water must be removed from these areas during construction, it shall be returned to the lagoon, via pump, in a manner that eliminates sediment and the potential to disturb lagoon salinity stratification, substrate, and temperature. Fish salvage efforts shall be conducted for any surface water that must be separated from the main lagoon. After construction, the area shall be re-flooded in a manner that minimizes disturbance of the lagoon salinity stratification and substrate and the release of sediment.
- Construction in the main lagoon shall occur outside of the May 1 through November 1 breeding season for the tidewater gobies. Re-inundation of the western lagoon may provide refuge areas for fish during construction activities in the main lagoon. Block netting shall be used to exclude adult gobies, migratory steelhead, and other fish from the work areas. On-site monitoring by a USFWS-approved fisheries biologist would be conducted during any channel or bank disturbance. Pages 100 and 101 of the Final Alternatives Analysis prepared by Moffatt and Nichol (March 2005) outline a possible construction sequence in more detail that incorporates many of these ideas.

Impact BIO-20: Implementation of the project could result in impacts to the California brown pelican.

The project, through direct impacts and /or temporary loss of habitat, could result in impacts to the California Brown Pelican. Impacts to this species may result in a short-term adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the

lagoon and its associated vegetation communities. Moreover, no work will be done in the main lagoon channel that the Brown Pelican uses for roosting habitat - specifically the snags and high sand bar. Post-project acreages of suitable habitat for the California brown pelican would likely be similar, if not identical, to pre-project acreages.

Therefore, temporary loss of suitable habitat for this species is not considered significant and no mitigation is required. However, potential direct impacts to this species would be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-3: California Brown Pelican.

On-site monitoring by a USFWS-approved biologist shall be conducted during any disturbance within suitable/occupied habitat for this species.

Impact BIO-21: Implementation of the project could result in impacts to the western snowy plover.

The project, through direct impacts and /or temporary loss of habitat, could result in impacts to the western snowy plover. Impacts to this species may result in a short-term adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated vegetation communities. Post-project acreages of suitable habitat for the western snowy plover would likely be similar, if not identical, to pre-project acreages.

Therefore, temporary loss of suitable habitat for this species is not considered significant and no mitigation is required. However, potential direct impacts to this species would be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-4: Western Snowy Plover.

Schedule construction activities and ground disturbance in suitable/occupied habitat to avoid the western snowy plover breeding season from mid-March to August 30. On-site monitoring by a USFWS-approved biologist shall be conducted during any disturbance within suitable/occupied habitat for this species.

Impact BIO-22: Implementation of the project could result in impacts to Heermann's Gull.

The project, through direct impacts and/or temporary loss of habitat, could result in impacts to Heermann's gull. Impacts to this species may result in a short-term adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated vegetation communities. Moreover, no work will be done in the main lagoon channel that the Heermann's Gull uses for roosting habitat - specifically the snags and high sand bar. The project will also create protected islands, providing additional habitat for this species. Post-project acreages of suitable habitat for Heermann's gull would likely be similar, if not identical, to pre-project acreages.

Therefore, temporary loss of suitable habitat for this species is not considered significant and no mitigation is required. However, potential direct impacts to this species would be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-5: Heermann's Gull.

On-site monitoring by a USFWS-approved biologist shall be conducted during any disturbance within suitable/occupied habitat for this species.

Impact BIO-23: Implementation of the project could result in impacts to the elegant tern.

The project, through direct impacts and/or temporary loss of habitat, could result in impacts to the elegant tern. Impacts to this species may result in a short-term adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated vegetation communities. Moreover, no work will be done in the main lagoon channel that the elegant tern uses for roosting habitat - specifically the snags and high sand bar. The project will also create protected islands, providing additional habitat for this species. Post-project acreages of suitable habitat for the elegant tern would likely be similar, if not identical, to pre-project acreages.

Therefore, temporary loss of suitable habitat for this species is not considered significant and no mitigation is required. However, potential direct impacts to this species would be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-6: Elegant Tern.

On-site monitoring by a USFWS-approved biologist shall be conducted during any disturbance within suitable/occupied habitat for this species.

Impact BIO-24: Implementation of the project could result in impacts to the California least tern.

The project, through direct impacts and/or temporary loss of habitat, could result in impacts to the California least tern. Impacts to this species may result in a short-term adverse effect on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the CDFG or the USFWS.

However, the project involves the restoration of the lagoon, which would include replanting of native species, removal of non-native species, and ongoing monitoring, and as such would result in long-term benefits to the lagoon and its associated vegetation communities. Moreover, no work will be done in the main lagoon channel that the least tern uses for roosting habitat - specifically the snags and high sand bar. The project will also create protected islands, providing additional habitat for this species. Post-project acreages of suitable habitat for the California least tern would likely be similar, if not identical, to pre-project acreages.

Therefore, temporary loss of suitable habitat for this species is not considered significant and no mitigation is required. However, potential direct impacts to this species would be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-7: California Least Tern.

Schedule construction activities and ground disturbance to avoid the California least tern breeding season and post-breeding season foraging (July to August). On-site monitoring by a USFWS-approved biologist shall be conducted during any disturbance within suitable/occupied habitat for this species.

Post-construction Impacts and Mitigation Measures

Long-term components of the proposed project include the following:

1. Water Management Plan
 - a. A water management plan is incorporated into the project to manage drainage from the parking lot and public use areas to restored habitat areas. It includes Best Management Practices (BMPs) to enhance water quality in the lagoon.
 - b. Circulation of water within the lagoon will be closely monitored and evaluated. The Water Management Plan includes performance criteria and adaptive management options so the plan can be revised if needed to ensure long-term restoration integrity and success.
2. Habitat Plan
 - a. A detailed habitat enhancement and management plan has been incorporated into the project to specify implementation practices and maintenance requirements. The Habitat Plan defines vegetative communities that will be established or enhanced as part of the restoration process. This plan addresses the establishment or enhancement of rare, endangered and regionally uncommon plants and animals that are appropriate for this site and uses an adaptive management framework to ensure long-term restoration integrity and success.
3. Monitoring Plan.
 - a. A detailed monitoring plan has been incorporated into the project to set out a project of field observations and monitoring to be undertaken prior to, during and following implementation. Specific monitoring tasks and decision-points are specified to feed into an adaptive management framework to ensure long-term restoration integrity and success. The Monitoring Plan includes habitat (flora and fauna), water quality (both open and closed conditions), sediment quality (sampling of grain size), and bathymetry (lagoon topography).

These plans would ensure that significant post-construction impacts do not occur as a result of implementation of the project. Therefore, additional mitigation is not required.