

Table D-1: Rare Plants of the San Francisco Bay Estuary and Potential for Occurrence or Impact by Project

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Arenaria paludicola</i> Marsh sandwort	FE/SE/1B.1	Perennial herb of coastal salt marshes, blooms May - August. Documented from San Francisco Bay near Golden Gate, but now considered locally extirpated.	Unlikely. Presumed extirpated in San Francisco Bay area.
<i>Atriplex joaquinana</i> San Joaquin sparscale	-/-1B.2	Annual forb found mainly in chenopod scrub, meadows and seeps, and alkaline grasslands between 1 – 835 m, but also rarely in tidal marsh edges. Blooms Apr – Oct. Recent populations are reported from Fremont, Napa River, and Suisun Bay. Threatened by grazing, agriculture, and development.	Low Potential. Rarely found in tidal marsh edges. Nearest record is five miles east, in grasslands near Golden Eagle Refinery. Has been reported from Suisun Bay area.
<i>Cordylanthus maritimus</i> ssp. <i>palustris</i> Point Reyes bird's-beak	-/-1B.2	Hemiparasitic annual herb, found in coastal salt marshes below 10 m. Blooms Jun – Oct. Once rather common; now greatly reduced by development. Also threatened by foot traffic, non-native plants, hydrological alterations, cattle grazing and trampling. Recent populations are known from Central Bay. Extirpated in South Bay.	Low Potential. Not known from San Pablo or Suisun Bay.
<i>Cicuta maculata</i> var. <i>bolanderi</i> Bolander's water-hemlock	-/-2.1	Perennial herb of coastal, fresh, or brackish water marshes below 200m. Blooms Jul – Sep. Once common in Suisun Marsh, but no recent reports known. Threatened by development, non-native plants, and hydrological alterations.	Unlikely. Has not been observed in Martinez since late 1890s, and may be extirpated in the estuary.
<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i> Suisun thistle	FE/-1B.1	Perennial herb of salt marshes. Blooms Jun – Sep. Rediscovered in 1989 on Grizzly Isl. in the Suisun Marsh; now known from two occurrences. Threatened by altered hydrology and competition from native and non-native plants. Potentially threatened by foot traffic and trampling by cattle. Protected in part at Grizzly Island and Peytonia Slough.	Potential. Found in Suisun Bay tidal marshes. Species is associated with the upper intertidal marsh plain near the smallest branches of natural small creek banks. Not known to occur in recently deposited bay muds.

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Cordylanthus mollis</i> ssp. <i>Mollis</i> soft bird's-beak	FE/SR/1B.2	Hemiparasitic annual herb of coastal salt marshes. Blooms Jul – Nov. Threatened by non-native plants, erosion, feral pigs, trampling, foot traffic, urbanization, and marsh drainage.	Potential. Found in brackish marsh edges of NE San Pablo Bay, Suisun Marsh, and the Contra Costa County shoreline, including the Martinez Marsh Regional Shoreline.
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i> Delta tule pea	-/1B.2	Perennial herb of freshwater and brackish water marshes. Blooms May – Jul, but blooming period may extend into September. Most populations small. Threatened by agriculture, water diversions, and erosion.	Potential. Populations are found along bay shores in the vicinity of the Amorco Terminal, including Pacheco Slough, Peyton marsh, Martinez Marsh Regional Shoreline
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	-/SR/1B.1	Perennial rhizomatous herb of brackish or freshwaters marshes, also found in riparian scrub. Locally common in Suisun Bay. Blooms Apr – Nov. Threatened by erosion, channel stabilization, development, flood control projects, recreation, agriculture, shading resulting from marsh succession, and competition with non-native <i>Eichhornia crassipes</i> . Many populations ephemeral, exploiting newly deposited or exposed sediments.	Potential. Occurs along the bay shore in San Pablo Bay, Suisun Bay, and the Contra Costa shoreline, including Pacheco Slough and Peyton Marsh.
<i>Limosella australis</i> Delta mudwort	-/2.1	Perennial stoloniferous herb of freshwater and brackish water marshes. Threatened by stream bank alteration, levee maintenance, erosion, recreational activities, and foot traffic. Native status in CA is inconclusive; definitive study needed.	Low Potential. Suitable habitat present along Suisun Bay shores. The closest occurrence is 7 miles NW of the Amorco Terminal on north side of Ryer Island.
<i>Suaeda californica</i> California seablite	FE-/1B.1	Perennial evergreen shrub found in coastal salt marshes below 15 m elevation. Blooms Jul – Oct. Formerly known from San Francisco Bay area, where it was extirpated by development. Four populations were established in 2000 in the Central Bay.	Potential. Was extirpated in San Francisco Bay area, but reestablished at four locations in Central Bay in 2000.

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Symphotrichum lentum</i> Suisun Marsh aster	-/1B.2	Perennial rhizomatous herb of fresh and brackish water marshes. Blooms May – Nov. Seriously threatened by marsh habitat alteration and loss, and erosion. Possibly threatened by herbicide application.	Potential. Found in Suisun Marsh and along the Contra Costa shoreline, including nearby Pecheco Slough.
<i>Trifolium hydrophilum</i> saline clover	-/1B.2	Annual herb of marshes, swamps, alkaline grasslands, and vernal pools below 300 m. Blooms Apr – Jun. Many sites likely extirpated; need current information on rarity and endangerment. Recently reported populations in San Pablo Bay between Sears Point and Sonoma Creek.	Low Potential. May occur in diked or brackish tidal marsh in northern San Pablo Bay and in Suisun Marsh.

Sources: CDFW 2013, USFWS 2013, CNPS 2013

Table D-2: Sensitive Fish of the San Francisco Estuary

Name	Status	Ecology and Bay Area Distribution
<p><i>Acipenser medirostris</i> green sturgeon, Southern Distinct Population Segment</p>	<p>FT,FSC/SSC</p>	<p>Long-lived anadromous species found in marine and estuarine waters of the North Pacific which utilizes the Sacramento River and tributaries for spawning. In winter, most adults aggregate in estuaries and migrate north along the North Pacific coastal shelf, overwinter in waters north of Vancouver Island and return to the San Francisco Bay in spring. Some adults may be found in San Francisco Bay throughout the year. Numbers increase in summer with the return of migrants moving into the estuary for feeding, holding, and spawning (Lindley et al., 2011).</p> <p>Sturgeon live from 40 to 60 years and exhibit cohesive social behavior in overlapping age cohorts. They reach maturity between 10 and 15 years and are thought to spawn every two to four years. Sturgeon migrate rapidly up the Sacramento River in March and April, where they spawn and then either return to the estuary or over-summer and migrate out of the river with the first fall flow event (Heublein et al., 2009). Juveniles move from their natal river into the estuary at two years and may remain in the estuary from one to four years before joining the marine migration. In the estuary, green sturgeon are associated with turbid water, where they prey on benthic organisms such as clams and crabs.</p>
<p><i>Eucyclogobius newberryi</i> tidewater goby</p>	<p>FE/SSC</p>	<p>Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels. Believed to be extirpated from the region.</p>
<p><i>Hypomesus transpacificus</i> Delta smelt</p>	<p>FT/SE</p>	<p>A small, annual species endemic to the estuary. Delta smelt are distributed within turbid waters over large shoals (depth < 7 meters) at the freshwater edge of the entrapment zone, where they feed on small crustaceans such as copepods and amphipods in the trophically rich waters (Bennet, 2005). Delta smelt distribution is highly correlated with the location of X2, which in turn depends on the volume of freshwater flow from the Central Valley Project and State Water Project, two of the world's largest water-diversion projects.</p> <p>Delta smelt are weakly anadromous; after the first high-winter flow, mature smelt migrate upstream in pulses between December and April to spawn in fresh water. Most delta smelt die after spawning. By the beginning of June, most larvae have entered a post-larvae state (15 to 25 mm) in which have they developed a swim bladder and drifted passively downstream to rear in the brackish waters of the estuary. By the end of June, most smelt that will survive the winter are in the estuary and have entered the juvenile stage (20 to 40 mm). June through August represents the delta smelt's primary growing season. Delta smelt attain maturity between November and January when they are 50 to 80 mm in length (Bennet, 2005).</p>

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution
<p><i>Spirinchus thaleichthys</i> Longfin smelt</p>	<p>ST</p>	<p>A small, pelagic fish distributed along the Pacific Coast of North America. San Francisco Bay supports the most southerly distributed and largest population in California. Longfin smelt can be found in the San Francisco Bay throughout the year. Longfin smelt mature at two to three years of age. They are partially anadromous, with at least some portion of the population of first-year smelt migrating in spring into coastal waters beyond the Golden Gate Bridge. Little is known about their movements in coastal waters, but they return to the San Francisco Bay in their second winter just before spawning season (Rosenfield and Baxter 2007). Mature fish gradually migrate upstream December through February to spawn in fresh water. Longfin spawning occurs in fresh water over sandy-gravel substrates, rocks, and aquatic plants; the downstream extent of spawning is near the City of Pittsburg (LTMS 2009). Larvae develop a swim bladder and move downstream into the estuary January through March. Longfin smelt juveniles and adults feed on small copepods, though adults will also consume mysid shrimp when available. Juveniles and adults aggregate in cooler waters in deep-water habitats and are thought to be intolerant of higher temperatures (>22°C), thus, between approximately June and September, they are most abundant in the Central Bay (Rosenfield and Baxter 2007). Longfin smelt prefer deep channel areas (> 7 meters).</p>
<p><i>Oncorhynchus kisutch</i> Salmon - central CA coast coho</p>	<p>FE/SE</p>	<p>Widely distributed anadromous salmon in streams along the Northern and Central Californian coasts. Believed to be extirpated from the region.</p>
<p><i>Oncorhynchus mykiss</i> Central Valley steelhead</p>	<p>FT/-</p>	<p>Anadromous species which returns to freshwater to spawn. They are mainly “winter” run, though a small summer-run population exists and migrates into the Sacramento River starting in July. The majority of steelhead begin migration in the fall. Spawning migration peaks in September and October and may continue through February or March. Not all steelhead die after spawning but may return to spawn several times. Most juvenile steelhead spend one to two years in fresh water before migrating toward the ocean in the winter and spring, with an outmigration peak in mid-March (Moyle et al., 2008).</p>

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution
Central Valley spring-run chinook salmon	FT/ST	The spring-run chinook salmon migrate as immature adults in the spring, spend the summer in deep pools of their natal river, and spawn in early fall. Their young may outmigrate after a few months or spend a year in fresh water (Moyle et al., 2008). The spawning migration is generally from February to early July with the peak of the run entering their natal stream in April or May. Throughout the summer, the adult salmon may move gradually upstream from pool to pool. The age of spawning for spring-run chinook varies from two to four years old. The emerged fry may spend a few months in their natal stream, then outmigrate from December through March (USFWS, 1987). Peak downstream migration of juvenile spring-run chinook salmon into the estuary is Nov - Dec (CDFG, 2004).
<i>Oncorhynchus tshawytscha</i> winter-run chinook salmon, Sacramento River	FE/SE	The winter-run chinook begin their spawning migration as immature adults, migrating upstream from January to May with a migration peak in March. Reaching the Sacramento River below Keswick Dam (forming Lake Shasta), they hold for several months until spawning from April through early August (Moyle et al., 2008). Emerging from the gravels between July and mid-October, the young fish rear for 5 to 10 months before outmigrating. Juvenile entry to the Sacramento-San Joaquin Delta is typically from January to April.
<i>Pogonichthys macrolepidotus</i> Sacramento splittail	-/SSC	Endemic inhabitant of brackish waters of the San Francisco Bay. Its distribution is limited to the estuary and estuarine environments of large streams, including lower Walnut-San Ramon Creek, where it inhabits small, shallow, turbid sloughs lined with emergent vegetation (Leidy, 2007). Splittail are benthic feeders of macroinvertebrates and detritus. Feeding activity is greatest in the morning and early afternoon and peak growth is between May and September (Daniels and Moyle, 1983). Splittail reach maturity around two years of age and may live up to seven years. Mature splittail migrate into freshwater floodplains for the winter to forage and hold until spring spawning. Spawning occurs from late February to July, with peak spawning in March and April. Adults return to the estuary after spawning. Young-of-year splittail move into the estuary between April and August where they inhabit broad shoals or channels of intertidal habitat at the mouths of estuarine streams (Feyrer et al., 2005). Juvenile splittail are tolerant of a wide range of temperature and salinity and can adapt to low dissolved oxygen levels and strong water currents (Young and Cech, 1996).

Sources: CDFW 2013, USFWS 2013

Table D-3: Sensitive Birds of the San Francisco Estuary and Potential for Occurrence or Impact by Project

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Accipiter cooperii</i> Cooper's hawk	-/-	Forages in tidal brackish and freshwater marshes. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks. Has been recorded nesting in San Leandro.	Potential. Potential to forage at site, unlikely to nest.
<i>Agelaius tricolor</i> tricolored blackbird	-/-	Highly colonial nester in freshwater marshes, croplands, often near or over water. Nests primarily in dense blackberry thickets, cattails, and tules. Resident species, most numerous in the Central Valley. In the San Francisco Bay Area, colonies are found along the shoreline on the north edges of the San Pablo Bay marshes. Colonies in Suisun Bay and marsh are thought to be extirpated.	Potential. In 1980, a colony was observed at the Mountain View Sanitation District Sewage Ponds in East Martinez. Although this colony is considered extirpated, suitable roosting and nesting habitat for this species is found on site.
<i>Aquila chrysaetos</i> golden eagle	-/-	Uncommon permanent resident and migrant throughout California. Requires open terrain for hunting. Nests on cliffs and in large trees.	Unlikely. May transit through project area, but not likely to forage on site due to lack of suitable foraging habitat.
<i>Ardea herodias</i> great blue heron	-/-	Near water, nest in trees or brushes along water at elevations up to 1,500 m. Colonies are found on Mare Island, Da Silva Island in Richardson Bay, and Bair Island near Redwood City.	Potential. Potential nesting, roosting, and foraging habitat on site.
<i>Asio flammeus</i> short-eared owl	-/-	Commonly found in treeless areas using fence posts and small mounds as perches. Requires dense vegetation for resting and roosting cover. Distributed throughout the Estuary, from Suisun Marsh to South Bay.	Potential. Often found in coastal scrub/marshland habitat. May forage through marshlands, and nest in denser patches of scrub vegetation.
<i>Athene cunicularia</i> burrowing owl	-/-	Inhabits open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation; nests underground, usually in abandoned California ground squirrel (<i>Spermophilus beecheyi</i>) burrows. In decline throughout the San Francisco Bay Area.	Unlikely. Closest occurrences are in grasslands approximately 8 miles from the project site. No suitable nesting areas on site.

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Branta hutchinsii leucopareia</i> cackling (=Aleutian Canada) goose	D/-	Tundra breeders. In winter and during migration they are found on fresh and brackish waters, and in grasslands near water. Herbivores, they eat grasses, sedges, seeds, and berries. They are highly gregarious during migration.	Potential. Flocks may forage and rest in the marshes on site.
<i>Buteo regalis</i> ferruginous hawk	-/-	Roosts in on utility poles or tall trees in open areas. Requires open terrain for hunting.	Unlikely. No suitable roosting or foraging terrain on site.
<i>Charadrius alexandrinus nivosus</i> western snowy plover	FT, BCC/SS C	Requires sandy, gravelly or friable soil substrate for nesting. Forages in wet and dry beach sand. Nests primarily in the South Bay, though has also been present and is assumed extant in the San Pablo Bay marshes.	Unlikely. Listing applies to nesting habitat. No suitable habitat on site.
<i>Circus cyaneus</i> northern harrier	-/-	Wide open habitats, including grasslands and marshes. Nesting occurs throughout the estuary.	Potential. Nesting pair observed in 2004 at upper end of Southampton Bay, 4.5 miles northwest of project site. Habitat at nesting site consisted of coastal salt marsh dominated by <i>Grindelia stricta</i> , <i>Salicornia virginica</i> , <i>Scripus</i> and <i>Typha</i> spp.
<i>Elanus leucurus</i> white-tailed kite	-/-	Breeds in savannas, riparian woodlands, grassy foothills. Resident species found throughout the estuary.	Unlikely. Though it's possible this species may transit through the site, it is unlikely to forage or nest on site due to the lack of suitable habitat.
<i>Falco peregrinus anatum</i> American peregrine falcon	D/SFP	Lives along mountain ranges, river valleys, coastlines, and in cities. Permanent resident in California.	Potential. May forage at project site. Known to nest in vicinity of Martinez.
<i>Geothlypis trichas sinuosa</i> saltmarsh common yellowthroat	-/-	Resident of San Francisco Bay herbaceous wetlands and salt marshes; forages in dense marsh vegetation; nests in thick herbaceous vegetation just above ground or over water.	Potential. Suitable breeding and foraging habitat exists on site.

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Haliaeetus leucocephalus</i> bald eagle	FD/SE	May be found throughout most of California at lakes, reservoirs, rivers, and some rangelands and coastal wetlands. Breeding habitats are mainly in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers.	Potential. May transit through site or forage in marshes, but suitable nesting habitat is absent from the site.
<i>Laterallus jamaicensis coturniculus</i> California black rail	-/ST	Occurs in tidal salt marsh heavily grown to pickleweed; also in fresh-water and brackish marshes, all at low elevations throughout the estuary.	Likely. Suitable habitat exists on site. Known from Pacheco Marsh in the east and Martinez Harbor to the west of the site.
<i>Melospiza melodia maxillaris</i> Suisun song sparrow	-/-	Resident of brackish-water marshes surrounding Suisun Bay; forages in marsh vegetation and on ground. Nests on ground or in herbaceous vegetation or bush.	Likely. Suitable nesting, roosting, and foraging habitat exists in the lease area.
<i>Melospiza melodia samuelis</i> San Pablo song sparrow	BCC/SC	Resident of brackish-water marshes surrounding San Pablo Bay.	Potential. The onsite marshes provide suitable habitat for this species.
<i>Pandion haliaetus</i> osprey	-/-	Nest near water, mainly freshwater but also occasionally on coastal brackish waters. Shows nesting fidelity. Growing numbers of breeding pairs in the estuary; known from San Pablo and Suisun Bay.	Likely. Nests at the Amorco Terminal.
<i>Pelecanus occidentalis californicus</i> California brown pelican	-/SFP	In estuarine, marine subtidal, and marine pelagic waters. Fairly common to common June to November, rare the rest of the year. Feeds mainly on fish caught by diving. Rests on water and rocks, but may also utilize sandy beaches, mudflats, wharfs,	Unlikely. This species may forage and/or rest near the lease, but is not known to nest in the vicinity.

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Phalacrocorax auritis</i> Double-crested cormorant	-/CSC	Diving bird, eats mainly fish but sometimes amphibians and crustaceans. Colonial breeders. There are large colonies on the San Francisco-Oakland Bay Bridge and the Richmond-San Rafael Bridge. Populations have underwent sharp declines 2009 – 2010 but appear to be recovering (PRBO, 2009)	Potential. May forage at the Amorco Terminal or rest on the wharf, though no likely nesting habitat is present.
<i>Rallus longirostris obsoletus</i> California clapper rail	FE/SE	Distributed throughout the estuary. Inhabits fully tidal marshes with well-developed system of natural channels, apparently absent from areas that are not at least marginally saline. Needs tall emergent monocots, prefers marshes that are 100 hectares or larger.	Potential. Occurs on site, where suitable habitat is present. Was observed during protocol level surveys in 2008.
<i>Sternula antillarum browni</i> California least tern	FE/SE	Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas. Found in the South Bay and along the south shore of Suisun Bay.	Unlikely. No suitable nesting habitat occurs on site. Nearest nesting site is approximately 8 miles east in the City of Pittsburg.
<i>Xanthocephalus xanthocephalus</i> yellow-headed blackbird	-/-	Colony nester in marsh vegetation. Forages in marsh, fields, or on the ground for seeds and insects. Most recently recorded in Pinole in 1899.	Unlikely. May migrate through project area, but colonies have not been documented in the area in the past century.

Sources: CDFW 2013, USFWS 2013

Table D-4: Sensitive Mammals of the San Francisco Estuary and Potential for Occurrence or Impact by Project

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Antrozous pallidus</i> pallid bat	-/-	Common species of low elevations. Occupies grasslands, shrublands, woodlands, and forests, though most common in open, dry habitat with rocky areas for roosting. Roosts in caves, crevices, mines, occasionally hollow trees and buildings. May night roost in more open spaces such as porches. Very sensitive to roosting site disturbance.	Potential. Potential to forage in and around site. Unlikely to roost, as no roosting habitat and activity on the bridge would disturb this sensitive species.
<i>Lasiurus cinereus</i> hoary bat	-/-	Broadleaved upland forests/open space mosaics near water. Roosts in foliage of medium to large trees.	Unlikely . Closest occurrence is 5 miles to the southwest. No suitable broadleaf trees in project area.
<i>Nyctinomops macrotis</i> big free-tailed bat	-/-	Rugged, rocky terrain. Migratory species that prefers rocky cliffs, but have been found in buildings and larges conifers and, in the desert, shrubs.	Potential. CNDDDB occurrence indicates the species has been found in Martinez.
<i>Dipodomys heermanni</i> <i>berkeleyensis</i> Berkeley kangaroo rat	-/-	Open, grassy hilltops and open spaces in chaparral and blue oak/grey pine woodland.	Unlikely. There is no suitable habitat for this species on site. Closest occurrence in approximately 10 miles south of the site.
<i>Microtus californicus</i> <i>sanpabloensis</i> San Pablo vole	-/-	Herbivorous salt marsh species, feeding mainly on grasses and sedges. Crepuscular or nocturnal.	Unlikely. Though adequate habitat is present in the tidal marshes, the distribution of this subspecies appears to be restricted to the vicinity of Wildcat Creek in the San Pablo Bay.
<i>Reithrodontomys</i> <i>raviventris</i> salt-marsh harvest mouse	FE/SE	Only in the saline emergent wetlands of San Francisco Bay and its tributaries. They live in nests. Most of their nests are found in marshes where there is pickleweed. It likes shady slopes and grassy places.	Potential. Suitable habitat available on site. Known to occur in Concord marshes.

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Scapanus latimanus insularis</i> Angel Island mole	-/-	Little is known about the ecology of this species, including whether it is extinct.	Unlikely. Known only from historical collections on Angel Island.
<i>Scapanus latimanus parvus</i> Alameda Island mole	-/-	Little is known about the ecology of this species, including whether it is an occupant of salt marshes.	Unlikely. Known only from historical collections on Alameda Island.
<i>Sorex vagrans halicoetes</i> Salt-marsh wandering shrew	-/SSC	Tidal marshes. Nests and forages in dense low-lying cover above the mean high tide line.	Unlikely. This subspecies of wandering shrew is found in the South Bay.
<i>Sorex ornatus sinuosus</i> Suisun shrew	-/SSC	Tidal marshes. Nests and forages in dense low-lying cover above the mean high tide line.	Potential. Suitable habitat is available in the muted tidal marshes.
<i>Vulpes macrotis mutica</i> San Joaquin kit fox	FE/ST	Inhabits annual grasslands or grassy open stages with scattered shrubby vegetation; needs loose-textured, sandy soils for burrowing and suitable prey base.	Unlikely. No suitable habitat on site. No CNDDDB occurrences within 10 miles of project site.
<i>Zalophus californianus</i> California sea lion	MMPA	The most recent population estimate is 296,750 individuals. Since censuses began in the mid-1970s with the passage of the MMPA, populations have trended upwards and are now considered stable. Within the San Francisco Bay, a large haul-out is found at San Francisco's Pier 39. This species breeds on islands off the coasts of southern and Baja California. Populations are impacted by El Nino, accidental mortality associated with commercial fishing, and poisoning from toxic algal blooms.	Potential. California sea lion are known to use wharfs in San Pablo and Suisun Bays for haul out and cover sites.

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<p><i>Phoca vitulina richardii</i> Harbor seal</p>	<p>MMPA</p>	<p>Harbor seals are permanent residents in San Francisco Bay. They are widely distributed in the North Pacific. Most recent population estimates for the California stock of harbor seals is 30,196 individuals. Although overall populations of harbor seals have increased since passage of the MMPA, the population of harbor seals in San Francisco Bay has held steady at approximately 600 individuals. Harbor seals show site fidelity in choice of resting sites. They feed on fish in the deeper waters of the bay. Feeding frequency is greater at night. Pups are born in spring. This species is not considered to be at risk from human-related activities that might cause mortality; however, they are susceptible to human-caused disturbance and will flush from haul-out sites from disturbances occurring as far away as 300 meters. The primary colonies in the bay are at Castro Rocks in San Pablo Bay, Yerba Buena Island in Central Bay, and Mowry Slough in the South Bay.</p>	<p>Potential. Although the most important haul outs for harbor seal are located in the Central and South Bays, there are haul outs in Suisun and San Pablo Bays.</p>
<p><i>Eumetopias jubatus</i> Steller sea lion</p>	<p>FE, MMPA</p>	<p>The largest of the eared seals, it forages near shore and pelagic waters. Rookeries are found on the Farallon and Ano Nuevo Islands, and Steller sea lion may visit the Central Bay to feed. Populations of western Steller sea lion have decreased steeply since 1985, and the western distinct population was listed as endangered in 1997.</p>	<p>Unlikely. Steller sea lion occasionally visit the Central Bay to feed, but are unlikely to be impacted by operations at the Amorco Terminal.</p>
<p><i>Eschrichtius robustus</i> Gray whale</p>	<p>FE, MMPA</p>	<p>Visits Central Bay during spring migration between calving grounds in Baja, California and feeding grounds in Alaska and Canada. Preys mostly on soft bottom benthic invertebrates.</p>	<p>Unlikely. Gray whales only occasionally visit the Central Bay to feed. They are unlikely to be impacted by Amorco Terminal operations.</p>

Appendix D. Biological Resources in the Project Study Area

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Megaptera novaengliae</i> Humpback whale	FE, MMPA	A wide-ranging species and occasional visitor to Central Bay where it forages on plankton and small fish.	Unlikely. Humpback whales only occasionally visit the Central Bay to feed. They are unlikely to be impacted by Amorco Terminal operations.
<i>Phocoena phocoena</i> Harbor porpoise	MMPA	Mostly preys on small schooling fish and invertebrates.	Unlikely. Harbor porpoise only occasionally visit the Central Bay to feed. They are unlikely to be impacted by Amorco Terminal operations.
<i>Enhydra lutra</i> California sea otter	MMPA	Diurnal species, most active at sunrise and before sunset, sleeps afternoons. They hunt by diving for invertebrates.	Unlikely. Though individuals may visit the Bay to forage, they are not known to breed there.

Sources: CDFW 2013, USFWS 2013

Table D-5: Sensitive Amphibians and Reptiles of the San Francisco Estuary and Potential for Occurrence or Impact by Project

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence or Impact
<i>Ambystoma californiense</i> California tiger salamander	FT/ST	Needs underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding.	Unlikely Not known to occur along the coast.
<i>Rana draytonii</i> California red-legged frog	FT/-	Prefers shorelines with extensive vegetation. Requires 11 to 20 weeks of permanent water for larval development.	Potential Site is within the species range, and CRLF are known to tolerate brackish water.
<i>Emys marmorata</i> western pond turtle	-/SSC	Found in rivers, streams, lakes, ponds, wetlands, reservoirs, and brackish estuarine waters from sea level to 6,500 feet. Prefers habitats with large areas for cover and basking sites. Overwinters in both aquatic and terrestrial habitats.	Potential Known from Pacheco Slough, approximately 2.5 miles to the southwest.
<i>Masticophis lateralis euryxanthus</i> Alameda whipsnake	FT/ST	Closely associated with chaparral; will venture into adjacent habitats, such as grasslands or woodland.	Unlikely. Suitable habitat for this species is not present on site.
<i>Thamnophis gigas</i> Giant garter snake	FT/ST	Forages in permanent or seasonal slow-moving water with emergent vegetation, mud bottoms, and dirt banks. Occurs in irrigation ditches year-round, and rice fields during the growing season. Absent from waters with predatory fish. Requires upland sites or	Unlikely. Species range is not known to extend as far west as the project site. The nearest CNDDDB occurrence is outside the 10-mile radius.

Sources: CDFW 2013, USFWS 2013

Table D-6: Habitat Support Function Matrix

	Terminal Structures	Deep Bay	Shallow Bay	Tidal Flat	Low Tidal Marsh	Middle Tidal Marsh	High Tidal Marsh	Muted Tidal Marsh	Diked Marsh	Agricultural Baylands	Lagoon	Storage/Treatment Pond	Coastal Scrub	Ruderal
Acres in project study area	-	1,097	238	77	227		5	105	95	14	6		3	
San Joaquin spearscale							U							
Soft bird's-beak							T							
Delta tule pea							T							
Mason's lilaeopsis							T							
Suisun marsh aster							T							
Saline clover							U							
Green sturgeon		F	F											
Delta smelt			F	F	RF									
Longfin smelt		F	F	F										
Chinook salmon		F	F	F	RF	RF	RF							
Steelhead		F	F											
Sacramento splittail			RF	RF										
Longfin smelt		F	F	F										
Cooper's hawk					F	F	F	F	F					
Tricolored blackbird							RFB					RFB		
Great blue heron	R			F	F	F	F	F	F		F			F
Short-eared owl						F	F	F		F				F

Appendix D. Biological Resources in the Project Study Area

	Terminal Structures	Deep Bay	Shallow Bay	Tidal Flat	Low Tidal Marsh	Middle Tidal Marsh	High Tidal Marsh	Muted Tidal Marsh	Diked Marsh	Agricultural Baylands	Lagoon	Storage/Treatment Pond	Coastal Scrub	Ruderal
Cackling goose									F	F	F	F		F
Northern harrier					F	F	F	F	F	F				F
American peregrine falcon					F	F	F	F	F	F			F	F
Saltmarsh common yellowthroat							RFB	RFB	RFB					
Bald eagle			F	F	F	F	F	F	F	F	F	F		
California black rail					RF	RF	RFB	RFB						
California clapper rail					RF	RF	RFB							
Suisun song sparrow							RFB	RFB						
San Pablo song sparrow							RFB	RFB						
Osprey	BR	F	F											
Double-crested cormorant	R		F	F							F			
Salt marsh harvest mouse					RF	RFB	RFB	RFB	RFB	RF	RFB			
Suisun shrew					F	RFB	RFB		RF	RF				
North American River Otter		F	F		RFB	RFB	RFB	RFB			RFB	RF		
California sea lion		RF	RF											
Harbor seal		F	F	RB	RF						F			
California red-legged frog						RFB	RFB	RFB	RFB	RFB	RFB			
Western pond turtle					RF	RF	RF	RF	RFB	RFB	RF			

Source: Adapted from Monroe *et al.* 1999

Key: U = Uncommon association, T = Typical association, R = Resting, F = Foraging, B = Breeding