6.0 COMMERCIAL AND SPORT FISHERIES

Section 6.0 provides a detailed description of existing commercial and sport fisheries around the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project) study area, including environmental and regulatory settings, and examines the potential for impacts to these resources from continued operation of the Amorco Terminal. The major issues focus on: (1) the effects of continued Project operations, including the associated vessel traffic, on commercial, sport, and subsidence fishery resources and activities; (2) the effects of potential oil spills on fishery resources and activities; and (3) the effects of continued operations and potential oil spills on subsidence fisheries.

6.1 ENVIRONMENTAL SETTING

6.1.1 Methodology and Data Collection

As discussed in Section 1.0, Introduction, information from relevant documents, including the Shell Martinez Marine Terminal Lease Consideration Environmental Impact Report (EIR) (CSLC 2011, State Clearinghouse [SCH] No. 2004072114) and the Shore (now Plains) Terminals LLC Martinez Marine Terminal Lease Consideration EIR (CSLC 2012, SCH No. 2001042022), have been referenced and included, as appropriate for the preparation of this EIR.

The detailed geographic focus of this EIR is from the Carquinez Bridge, encompassing Carquinez Strait (Strait) and Suisun Bay, to the western edge of the legally defined Delta, just west of Pittsburg (approximately 64 square miles). This area encompasses the Amorco Terminal and the areas to the east and west that are most susceptible to oil spills. Vessels using the Amorco Terminal transit through San Francisco Bay, so the area from the Golden Gate to the entrance of Carquinez Strait is the secondary area of study and will be generally described using existing data. Finally, potential for impacts from vessels transiting the outer California coast will be briefly presented by incorporating information from other documents by reference.

To characterize the existing environment in the San Francisco Bay estuary, which extends from the mouth of Coyote Creek near the city of San Jose in the south to Chipps Island at the eastern end of Suisun Bay, California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game) catch and landing statistics and other published materials were used to describe commercial and recreational fisheries. A short description of the CDFW fisheries databases is provided to explain their uses and limitations.

To standardize fish landing reporting, the CDFW divides coastal and bay waters into reporting blocks. The CDFW provides both commercial and charter boat fish landings by fishing area or block (where fish are caught) and by port or region (where the fish are

landed). Fish dealers, processors, or charter boat operators record landings data. For commercial fisheries, data concerning species, weight, catch block, mode (gear type), and price paid to fishing operators are provided to the CDFW. Charter boat operators report to the CDFW the number of fish caught on their boats. (CSLC 2011a).

The collected fish landings data have their limitations. For commercial fisheries, the data may not be entirely accurate or complete as fishing operators may report catches in blocks other than where the fish were actually caught. Catches often occur in more than one block, but may be reported for only one block. Because of these limitations, the CDFW data are supplemented by other information to better describe the fisheries.

For recreational data, the charter boat landings provide the only consistent database that records angler catches, despite the fact that catches from recreational private boats, shore/beaches, and piers make up about 86 percent of total recreational catches (CSLC 2011a). Information from seafood-consumption studies is used to further describe the fisheries, but these data are based on short-term sampling studies that describe a snapshot in time, rather than a long-term history of fishing activity. These databases were used despite these limitations; qualitative updates are provided from other sources, as needed. (CSLC 2011a).

6.1.2 Carquinez Strait/Suisun Bay Fisheries, West of the Legally Defined Delta

Fisheries Overview

San Francisco Bay is divided into three connecting bays: San Francisco Bay proper, San Pablo Bay, and Suisun Bay. The Carquinez Strait links the Sacramento/San Joaquin Delta and Suisun Bay with the San Pablo and San Francisco Bays. This system of bays is influenced by the ocean and its tides, and by large volumes of freshwater runoff from the Sacramento and San Joaquin River watershed; the Strait is where the fresh water and salt water meet. The watersheds begin in the Sierra Nevada and drain California's Central Valley (CSLC 2011a).

One of the environmental influences on the estuary and its fish is movement of the null zone, which marks the upstream edge of seawater influence and the upstream limit of what is known as the entrapment zone. The location of this zone moves upstream and downstream several miles daily, depending on changes in freshwater flows from the rivers and streams. The entrapment zone is an area where suspended materials concentrate as a result of mixing by the outgoing freshwater flow from the Delta above the heavier saltwater flow from San Francisco Bay. The entrapment zone contains concentrations of suspended materials such as nutrients, plankton, and fine sediments that are often many times higher than in areas upstream or downstream of the entrapment zone (Levine-Fricke 2004). This trophically rich habitat is thought to be important for the rearing of many fish species. Its precise location between the lower Delta and Suisun Bay varies according to the strength and phase of the tides, and the level of freshwater inflow from

the Sacramento and San Joaquin Rivers. High freshwater flows from the Delta push the entrapment zone west toward Carquinez Strait; low flows put it closer to the mouth of the Delta.

Historical Summary and Trends

Historically, major native fisheries in the area included shrimp, sturgeon, and Chinook salmon, among others. Striped bass, an introduced species, is also very popular among anglers in the estuary.

The estuary's fisheries have always been important to humans, as evidenced by the tens of thousands of people who lived along its shores before Europeans arrived. By the 1800s, fish were a major resource for settlers, with the primary species being Chinook salmon, sturgeon, striped bass, and Pacific herring. The Bay-Delta region was the largest fishing center on the west coast. However, human use of the Sacramento River system and San Francisco Bay took a heavy toll. Adverse impacts on San Francisco Bay and fisheries began with siltation caused by hydraulic mining in the mid-1800s. As California's population grew, extensive land reclamation, dredging and filling, urban development, water pollution, dams, upstream water diversions, and other water developments altered the estuary to such an extent that San Francisco Bay fisheries declined significantly. Historically, overfishing also took a toll on fisheries. However, in recent years, other activities have caused major declines. (CSLC 2011a).

Another factor that drastically changed San Francisco Bay's trophic structure was the introduction of non-native plant and animal species, beginning in the 19th century. Non-native species have been introduced to San Francisco Bay via a number of vectors, including the deliberate introduction of species for recreational or commercial purposes. America shad, striped bass, carp, and catfish were deliberately introduced. Transoceanic vessel traffic has been identified as one of the major vectors of non-native species, and hull fouling and ballast water are the single largest contributor of non-native species to San Francisco Bay. The most important invasive species in the project vicinity is the overbite clam, *Corbula amurensis*. Thought to have been introduced in San Francisco Bay by ballast water exchange from a cargo ship, this phytoplankton eater species is now so abundant that the current population is capable of filtering the estuary's water column several times a day and has caused a crash in the abundance of phytoplankton in San Francisco Bay (SFEP 2004).

Shrimp

The shrimp fishery began in the early 1860s; by 1871, Chinese immigrants fished using stationary shrimp nets and were exporting large quantities of dried shrimp meal to China. Annual landings peaked in 1890 to over 5 million pounds. By 1915, shrimp were fished by beam trawl and in 1935 landings totaled 3.4 million pounds. Landings steadily declined due to reduced demand for fresh and dried shrimp for food. By the early 1960s, average

annual landings declined to 1,500 pounds. In 1965, this fishery rebounded as a viable source of bait for sturgeon and striped bass sport fishing (CDFG 2001).

Shrimp populations appear to vary widely from year to year. Studies show that abundance of bay shrimp increases with increased river inflow to the estuary, probably because juvenile shrimp favor low-salinity habitat. Harvest management is limited to compiling logbook data and monitoring species composition in bay shrimp landings. Catch limits, closed seasons, or restricting harvest in areas are not considered necessary by fisheries regulators because the limited demand maintains fishing effort at levels that would not threaten long-term sustainability of the species. If freshwater inflows increase due to upstream fishery restoration efforts, there may be a beneficial effect on the shrimp fishery (CDFG 2001).

Sturgeon

Sturgeon remains have been found in Native American middens in the Bay-Delta region. White sturgeon has dominated the fishery, although there have been small catches of green sturgeon. The commercial fishery lasted from the early 1860s to 1901 and concentrated in San Francisco Bay and the Delta. Fishing gear included gillnets, longlines, and multiple unbaited hooks. Landings peaked at 1.65 million pounds in 1887, declined to 0.3 million pounds in 1895 and to 0.2 million pounds in 1901, when the fishery was closed. Sport fishing for sturgeon was later legalized in 1954. In 1964, the small catch increased significantly when the minimum size limit decreased from 50 inches to 40 inches and it was discovered that bay shrimp were effective bait. By the 1980s, the harvest rate was 40 percent greater than the rate during the two earlier decades. In 1992, a minimum size limit of 46 inches and a maximum 72-inch size limit were established to protect the species from over harvest (CDFG 2010). Effective in 2013, white sturgeon must measure between 40 inches and 60 inches (CDFW 2013a). Permitted fishing gear is limited to barbless hook and line.

Sturgeon annual harvest estimates show that angling regulation changes begun in 1990 are reducing harvest rates by about 50 percent of the levels seen in the 1980s (CSLC 2011a). Despite the decreased fishing effort, sturgeon populations vary greatly over the years. Angler catch and mark-recapture study information suggests that strong year classes since 1980 have occurred only during 5 of the 10 years when the Sacramento Valley Water Year Index was rated “wet”. An abundance estimate of 142,000 adult fish was reported in 1997 (CDFG 2010). Annual fish populations vary due to changes in high spring freshwater outflows from the Delta, and scientists attribute the high population levels to the very wet 1982-1983 period. Conversely, experts note the severe 1987-1992 drought adversely affected reproductive success and caused a substantial decline in the adult sturgeon population, as recruitment nearly ceased and reduced growth rates and mortality limited the abundance of fish in the harvestable population (CSLC 2011a). Charter boat catch statistics for block 308 mimic these trends. From 1998 to 2000, only 85 sturgeon were caught, compared to 561 caught from 2002 to 2004. On average, 208

sturgeon per year were reported caught from 2005 to 2012. Of these, approximately 50 per year were kept (see Appendix F).

Pacific Salmon

Of the five species of Pacific salmon found on the Pacific coast, Chinook, *Oncorhynchus tshawytscha*, and coho, *O. kisutch*, are the species most frequently encountered in California fisheries. As with sturgeon, salmon fisheries existed long before European settlers arrived in the 1700s. Harvests of Sacramento/San Joaquin watershed salmon by American Indians may have exceeded 8.5 million pounds annually. Traditional fishing methods included use of gill and dip nets, fishing spears, and communal fish dams. The commercial fishery began with the advent of the gold rush. By 1860 the gillnet fishery was well established in Suisun Bay, San Pablo Bay, and the lower reaches of the two rivers. The canning industry stimulated the growth of the fishery, with canneries operating throughout the river system. In 1882 the fishery reached its peak when 12 million pounds were landed. Shortly thereafter, the fishery collapsed due primarily to pollution and degradation of rivers by mining, agriculture, and timber operations, combined with increased landings. By 1919 the last cannery closed, and in 1957 the last inland commercial fishing area open to the general public was permanently closed (CDFW 2013b).

The ocean troll fishery continued and today's trollers use fishing techniques developed during the 1940s. In addition, electronic equipment has significantly increased the efficiency of the modern troller. Prior to 1990, the fishing industry enjoyed relatively high and consistent harvests, averaging about 7 million pounds annually of salmon. Later commercial harvests have been much more erratic, with the largest catch being 14.4 million pounds in 1988 but generally substantially lower since. In 1993 the retention of coho salmon was prohibited in all California commercial fisheries to protect stocks. A sudden collapse of Sacramento River Chinook salmon in 2007 led to a complete closure of the fishery in 2008 and 2009, and while open in 2010 and 2011 it remained considerably constrained (CDFW 2013b).

The ocean sport fishery became popular with the development of the commercial passenger fishing vessel after World War II. The highest sport landings occurred in 1995 when anglers landed a record 397,200 Chinook. Prior to the 2008 and 2009 closure, lower recreational landings were typically associated with strong El Nino events. After the 2007 collapse, the lowest harvest on record was in 2010 when only 14,800 Chinook salmon were caught statewide (CDFW 2013b). Oceanic and in-river conditions play major roles in salmon catches; however, the variability can also be attributed to changes in fishery regulations. Since 1988, progressively more restrictive regulations have been imposed on the commercial fishery to protect stocks of special concern, including those that are federal and State endangered or threatened species. As an example, the sport fishery is the only allowable salmon fishery in the estuary. (CSLC 2011a).

Striped bass

A major sport fishery has evolved around the striped bass, with an estimated annual value exceeding 47 million dollars in 1985 (CDFG 2001). Striped bass were introduced in 1879 by railcar from the east coast; 132 were unloaded in Martinez and released in the Carquinez Strait. Three years later, 300 more bass were shipped in and released; the entire west coast striped bass fishery evolved from these introductions (CDFG 2001). In the 1970s legal-sized bass (over 18 inches) numbered around 2 million. By 1995, because of pollution and freshwater diversions, the population of legal bass hovered around 800,000 (California State Coastal Conservancy 1995). The primary California population of striped bass is found in the San Francisco Bay estuary, although there have also been introductions in various reservoirs and the ocean in southern California (CDFG 2001). As with salmon, the future of the striped bass fishery is uncertain. The fishery's future depends on present efforts to successfully screen water diversions, to succeed at hatchery programs, and to address population declines that may be caused by invasive species, pollutants, and Bay-Delta water exports (CSLC 2011a).

Fisheries near the Amorco Terminal

The Amorco Terminal is located in CDFW fish block 308. This block encompasses the Carquinez Strait and the western extent of Suisun Bay; block 302 includes the remainder of Suisun Bay. Landings for block 308 are reported below and in Appendix F. For all CDFW blocks, catch block data appear to be sporadic from year to year due to inaccuracies in the reporting of landing locations. The data are supplemented by information from other sources (CSLC 2011a).

Commercial Fisheries

The prominent commercial fishery in the vicinity of the Amorco Terminal is the shrimp trawl fishery. The modern fishery, which began in 1965, has been harvested entirely by beam trawl. Most shrimp are harvested for bait; a small percentage of catch is still reserved for human consumption. Live tanks are used on all vessels and shrimp are transported to local bait shops by truck in either the tanks or iced-down wooden trays.

From 1991 to 2004, recorded landings in block 308 totaled over 21,000 pounds (65 percent of the total catch in the block). These landings compare with over 19.4 million pounds for the entire estuary; by far, most shrimp were caught in South San Francisco Bay. Along with shrimp, trawlers also harvest staghorn sculpin, yellowfin goby, and Chinook salmon, for example totaling 2,558, 2,269, and 3,399 pounds, respectively, (25.5 percent of the catch) over the same time period in block 308 (CSLC 2011a). Between 2005 and 2012, shrimp were harvested from Block 308 only in 2007 (325 pounds) and 2012 (3,391 pounds). Approximately 615 pounds of shrimp have been harvested in 2013 through July (see Appendix F).

Current information indicates that shrimp trawling occurs in San Pablo Bay and Suisun Bay, including waters near the Amorco Terminal (see Figure 6-1). Fishing also occurs in waters less than 20 feet deep in the channels of the estuary's shallow reaches. Fishing occurs year round, but landings usually peak during the months of June through November. Monthly variations in landings may have as much to do with changes in salinity in the water as with fluctuations in demand by sport anglers (CDFG 2001).

Expectations for the shrimp fishery remain as they are now; most of the product is used for angler bait, and little is reserved for human consumption. The market is not expected to change much over the next 20 years.

Charter/Private Boat Sport Fisheries

Marinas near the Amorco Terminal include Martinez, Crockett, Benicia, Glen Cove, and Vallejo. In Suisun Bay, Port Suisun, Suisun Marina, Pierce Harbor, Solano Yacht Club, Harris Yacht Harbor, and McAvoy Yacht Harbor service sport boats. In all, 11 facilities provide launches and berths for charter and private boats.

Martinez Marina and Yacht Club are approximately 1 mile to the west of the Amorco Terminal. The marina is open year round and has approximately 250 slips. It is primarily a fishing marina. The marina harbors about 3 charter fishing boats and 10 oil spill response vessels (CSLC 2011a).

The city of Martinez adopted a Marina Master Plan in 1993 to upgrade and replace the marina. To date they have removed the old ferry pier, constructed a plaza and new boat launch, and performed dredging at the entrance. Additional dredging, breakwater repair, and entrance reconfiguration are planned over the next several years, contingent on funding (City of Martinez 2013).

Figure 6-2 shows the Strait and Suisun Bay provide habitat for and support numerous fisheries, including American shad, Chinook salmon fry, and shallow-water fish.

Compared to the rest of San Francisco Bay, charter boat activity is relatively light, with sturgeon and striped bass the main fisheries of interest. Recorded charter-boat data for CDFW block 308 show that striped bass and sturgeon are the most popular species caught in the area, with occasional landings of halibut, flounder, and leopard shark (see Appendix F). Charter boats are most active out of Martinez Marina during sturgeon season, roughly October to April; private boat anglers are expected to follow similar fishing patterns (CSLC 2011a).

Demand for recreational fishing, in general, may increase as the San Francisco Bay Area (Bay Area) population increases. However, recreational fisheries are on a general decline. As with commercial fisheries, recreational fishing growth is limited more by the supply of healthy fish than by demand. Therefore, if San Francisco Bay's condition

significantly improves, recreational fishing will likely grow. The reverse situation is also possible.

Pier and Shore Fishing

Public piers, shoreline, and beach areas that provide access for fishing are located throughout the Bay Area; however, access to the open water in the immediate area of the Amorco Terminal is limited. Most shoreline access is provided in or near marinas and on or near several piers. Piers and public shoreline areas near the Amorco Terminal include Martinez Marina, Martinez park and public pier, 9th Street Park and pier in Benicia, Benicia Marina and pier, Benicia State Recreation Area, Crockett Marina and Dowrelio Pier, and Vallejo fishing pier and shoreline parks. Anglers have been known to catch flounder, sturgeon, shad, salmon, steelhead, and striped bass from these areas. The Martinez public pier is popular with shoreside anglers going after sturgeon and striped bass (CSLC 2011a).

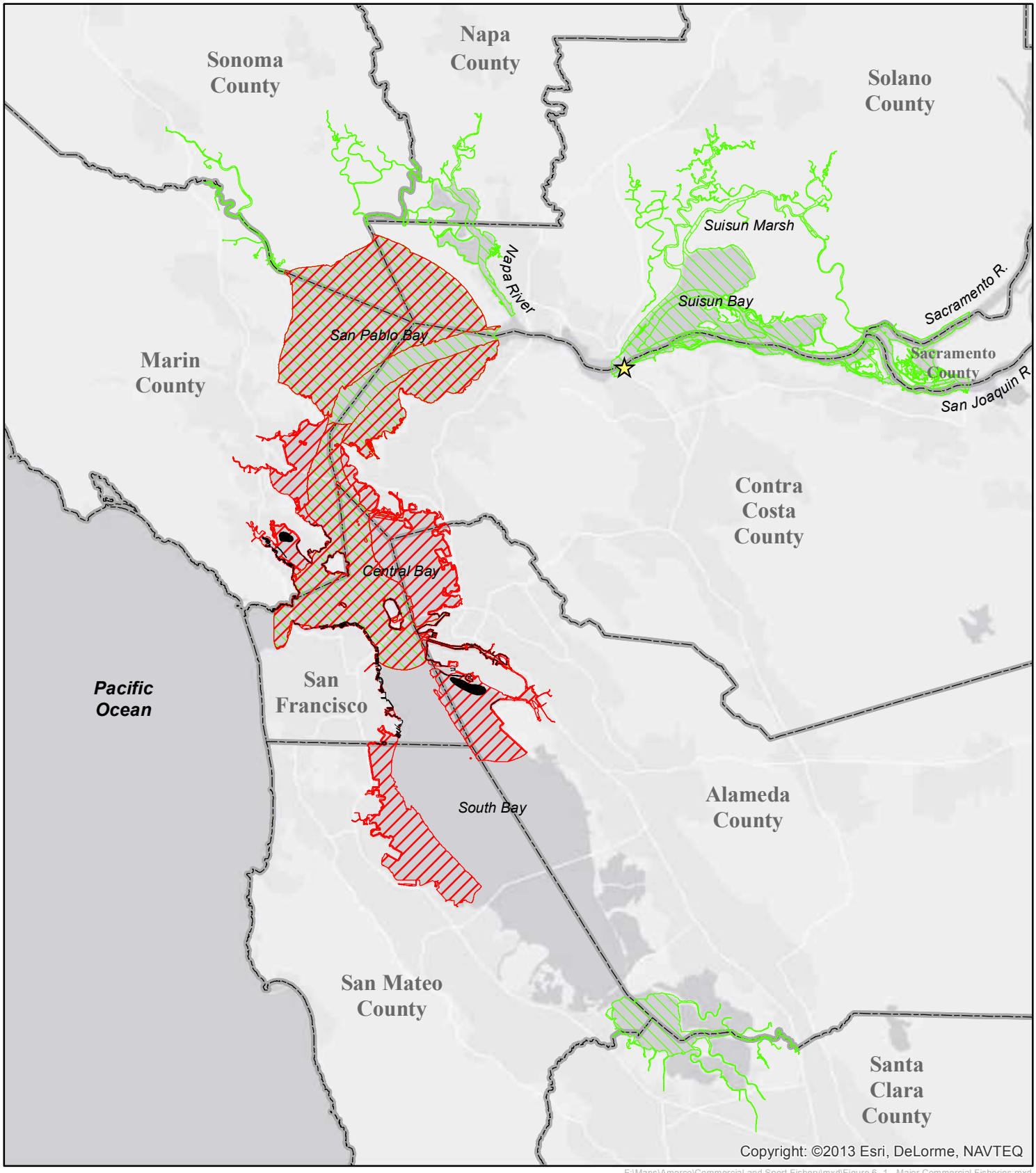
6.1.3 San Francisco and San Pablo Bay Fisheries

Commercial Fisheries

Shrimp

Bay and brine shrimp fishing occurs year round. In 1965, this fishery was developed to supply bay shrimp as live bait for sturgeon and striped bass sport fishing. A small percentage of catch is still consumed fresh. The commercial harvest has been entirely by beam trawl; live tanks are used on all vessels and shrimp are transported to local bait shops by truck in either the tanks or iced-down wooden trays. Staghorn sculpin, yellowfin goby, and long jaw mudsucker are also caught and sold by shrimpers (CSLC 2011a).

Key fishing locations include the South Bay, San Pablo Bay, and Suisun Bay (see Figure 6-1). Fishing also occurs in waters less than 20 feet deep in the channels of the estuary's shallow reaches. Currently, the number of vessels harvesting shrimp ranges from to 8 to 10. Three trawlers fish in the South Bay, six in the North and San Pablo Bays, and one roams throughout the estuary (CSLC 2011a). From 1991 to 2003, recorded landings for San Francisco Bay Area ports totaled 14.9 million pounds and averaged 1.1 million pounds per year. From 2000 to 2003, landings were less than the longer-term average and ranged from more than 972 thousand pounds to more than 607 thousand pounds. (CSLC 2011a). Shrimp landings in 2010 and 2011 were approximately 56 thousand pounds and 38 thousand pounds, respectively, with no reporting of brine shrimp (CDFG 2011a and 2012a).



F:\Maps\Amorco\Commercial and Sport Fishery\mxd\Figure 6 -1 - Major Commercial Fisheries.mxd

Figure 6-1 Major Commercial Fisheries
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

TRC

10/8/2013

Legend

- Amorco Terminal Location
- Pacific Herring Spawning Areas
- Blacktail Bay Shrimp
- California Bay Shrimp

DATA: 1998 NOAA Environmental Sensitivity Indexes

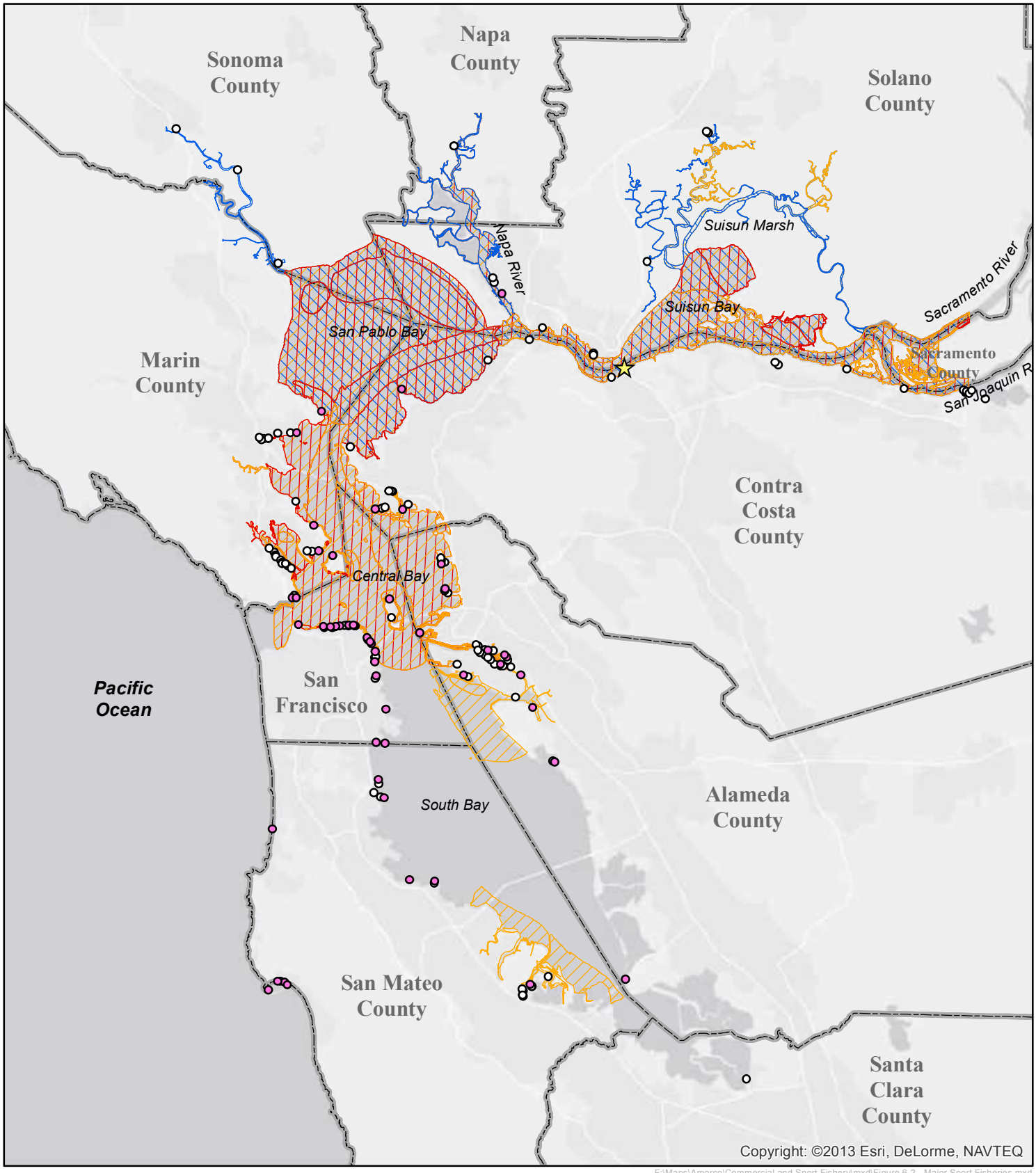
N

1:500,000

1 inch = 8 miles

ft
0 18,750 37,500

THIS PAGE IS INTENDED TO BE LEFT BLANK



F:\Maps\Amorco\Commercial and Sport Fishery\mxd\Figure 6-2 - Major Sport Fisheries.mxd

Figure 6-2 Major Sport Fisheries
California State Lands Commission
Amorco Marine Oil Terminal
Lease Consideration Project

TRC

10/8/2013

Legend

- Amorco Terminal Location
- Fishing Pier
- Marinas
- American Shad
- Striped Bass
- White Sturgeon

Fishing areas are found throughout the Bay.
DATA: 1998 NOAA Environmental Sensitivity Indexes

N

1:500,000

1 inch = 8 miles

ft
0 18,750 37,500

THIS PAGE IS INTENDED TO BE LEFT BLANK

Pacific Herring

Pacific herring is the last remaining commercial fishery within San Francisco Bay (Saving the Bay 2013). The San Francisco Bay Pacific herring harvest occurs during spawning season, generally from December through March, until quotas are filled. The focus of the herring harvest is the roe, which is exported to Japan. Fishing is conducted mainly with gillnets (CDFW regulations phased out use of round haul nets); and a few fishing interests use the roe-on-kelp method. Kelp is harvested from Monterey Bay and southern California and is hung from floating rafts or beneath piers in San Francisco Bay. Herring spawn on the kelp, which is then landed and processed (CDFG 2008).

San Francisco Bay produces from 90 to nearly 100 percent of the State's herring catch (CDFG 2008). Over the last 10+ years, most herring fishing has occurred in CDFW block 488 (Central Bay), according to the CDFW. However, herring spawn, and a portion of the fishery occurs, in the South Bay, especially during years with higher-than-normal rainfall (CSLC 2011a).

Herring fisheries are highly managed by the CDFW through the use of area closures, timing and gear restrictions, and quotas. Regulations change annually based on the previous year's estimates of spawning biomass. Currently, the CDFW allows harvest of about 10 to 15 percent of the herring that are expected to return to spawn (CDFG 2008). The San Francisco Bay Pacific sac-roe herring fishery experiences annual ups and downs (exceeding 20 million pounds landed in 1982, 1989, and 1997 but declining to just 362 thousand pounds in the 2004-2005 season), and was closed in the 2009 season (Saving the Bay 2013). The value of the sac-roe herring fishery peaked during the 1995-1996 season at 19.5 million dollars and has been steadily declining since. The fishing revenue from the 2006 harvest was just 426 thousand dollars (CDFG 2008). Lower harvests have typically occurred during or after El Niño events.

Other Fisheries

Small commercial fisheries also exist for finfish and shellfish, including white croaker, halibut, rockfish, salmon, shark, and Dungeness crab. San Francisco Bay is also a nursery area for Dungeness crab, an important ocean commercial and sport fishery north and south of San Francisco Bay. The Bay Institute reports that the number of young Dungeness crabs in the estuary is on the rise. The recent increase in abundance may be related to improved ocean conditions, as well as efforts to reduce pollution and restore tidal marsh habitat in San Francisco Bay (CSLC 2011a).

Sport Fisheries

San Francisco Bay supports a wide variety of fishes for sport fishing opportunities, including charter fishing, private boat fishing, pier fishing, and beach/shore fishing. The most popular game fishes caught in San Francisco Bay are striped bass and sturgeon. While most salmon fishing occurs in the ocean outside the Golden Gate, striped bass is

caught throughout the estuary, and sturgeon fishing concentrates in San Pablo Bay, portions of the South Bay, and points east. American shad, surfperch, halibut, smelt, rockfishes, sharks, rays, clams, and others also offer fishing opportunities to Bay Area anglers (CSLC 2011a).

Between 1989 and 2003, the number of charter boats operating out of San Francisco Bay ranged from a high of 93 to a low of 44, averaging 59 over the 15 years. In 2003, 44 charter boats operated in San Francisco Bay and the Delta, the total number of anglers was 52,747, and a total of 150,031 fish were caught (CSLC 2011a).

In 2001 the California Department of Health Services and San Francisco Estuary Institute conducted a seafood-consumption study and surveyed anglers throughout the San Francisco Bay estuary. The results of the survey indicate that striped bass, halibut, and sturgeon are the most commonly consumed species of party and private boat anglers (SFEI 2001). Pier and shoreside anglers surveyed by the seafood-consumption study consumed a high percentage of striped bass similar to boating anglers, but ate higher percentages of white croaker and jacksmelt (SFEI 2001).

6.1.4 Outer Coast: Oregon Border to Mexico

Commercial and Sport Fisheries

Commercial fisheries are generally described using port landings for all ports in California, including those in Eureka, San Francisco, Monterey, Santa Barbara, Los Angeles, and San Diego. Collectively, these ports reported a total of 4.9 billion pounds of fish taken from 1989 through 2000 (CSLC 2011a). Based on the annual average, a similar amount (407 million pounds) was taken in 2011. Of this, approximately 65 percent was market squid (CDFG 2012a). For sport fisheries, in northern California a total of 72.9 million finfish were reported taken by surveyed anglers from shore, party boats, and private boats from 1989 to 2001 (CSLC 2011a), averaging approximately 6 million per year. For the same years in southern California, 163.7 million finfish were reported caught by surveyed anglers (CSLC 2011a), averaging approximately 13.6 million per year. In 2010, reported landings in northern and southern California were 484 thousand and 1.35 million, respectively (CDFG 2011b). In 2011, reported landings in northern and southern California were 666 thousand and 1.85 million, respectively (CDFG 2012b).

Marine Aquaculture and Kelp Harvesting

There are 41 registered marine aquaculture facilities along the California coast and marine aquaculture leases totaled 11 in 1998. As of 2001, seven kelp bed lessees leased 24 kelp beds totaling 32.56 square miles from Año Nuevo (San Mateo County) to San Diego (CSLC 2011a).

6.2 REGULATORY SETTING

This section describes the two general types of regulatory tools used to help ensure responsible human activities: Controls on human development and resource harvesting management.

The California State Lands Commission (CSLC) manages and protects important natural resources and uses on public lands, including tidelands. Commercial and recreational fishing, kelp harvesting, and aquaculture are all considered important uses by the CSLC. Permits are issued for development on tidelands, and mitigation is often required to help protect natural resources and access to those resources.

Coastal zone development is regulated by the San Francisco Bay Conservation and Development Commission (BCDC) and the California Coastal Commission (CCC), depending on the location. The BCDC develops and implements plans for the conservation and development of San Francisco Bay waters and regulates shoreline development, including commercial and recreational fishing facilities. The CCC, which has authority along the coast (excluding San Francisco Bay), helps ensure that the biological productivity of coastal resources is maintained, enhanced, and restored for commercial, recreational, scientific, and educational purposes. It ensures that onshore commercial and recreational fishing facilities are protected and, where feasible, upgraded.

National Oceanic and Atmospheric Administration (NOAA) Fisheries is responsible for protecting special-status species under the Endangered Species Act. Additionally, the CDFW, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers have regulatory authority to manage development and ensure the protection of aquatic resources. The CDFW is responsible for enforcement of the State endangered species regulations and the protection and management of all State biological resources. The CDFW's Office of Spill Prevention and Response (OSPR) is also responsible for the State's spill response capability. The OSPR contracts oil spill response organizations to ensure available resources in accordance with the San Francisco Oil Spill Contingency Plan, and monitors these organizations' response capabilities through unannounced drills and other methods. Water quality management and the permitting of discharges into State waters are administered by the California Regional Water Quality Control Board (RWQCB) under the Porter-Cologne Act and the federal Clean Water Act.

Fisheries, aquaculture, and kelp harvesting are overseen by several State and federal agencies, including the CDFW, U.S. Department of Commerce, Pacific Fisheries Management Council (PFMC), and NOAA Fisheries. Fisheries are defined, by broad definition of the Federal Fishery Conservation and Management Act (FCMA), as fish, their habitat, and fishing activities. Salmon, groundfish, and pelagic fish species are managed under individual fisheries management plans authorized under the FCMA, the

Sustainable Fisheries Act, and the American Fisheries Act. Within California, most of the legislative authority over fisheries management is enacted within the Marine Life Management Act. This law directs the CDFW and the Fish and Game Commission to issue sport and commercial harvesting licenses, as well as licenses for aquaculture operations. The PFMC, a regional entity with representatives from the fishing industry, the public, and State and federal biological resource management agencies, imposes seasonal, geographic, and gear limitations to maintain healthy fisheries populations and prevent overfishing. If resources are adversely affected to the extent that productive habitat or populations are reduced, harvesting managers will likely respond by limiting harvests.

6.3 IMPACT ANALYSIS

6.3.1 Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following:

- Reduce any fishery in San Francisco Bay, the Strait, or along the outer coast by 10 percent or more during a season, or reduce any fishery by 5 percent or more for more than one season
- Affect kelp and aquaculture harvest areas by 5 percent or more
- Cause lost harvesting opportunities due to harbor closures; impacts on living marine resources and habitat; and equipment or vessel loss, damage, or subsequent replacement
- Cause substantial or sustained impact to spawning habitat of commercially important species

6.3.2 Assessment Methodology

To determine the impacts associated with routine operations over the life of the CSLC lease, the following facts and assumptions were used.

- Over the last 5 years, tankers made, on average, 69 vessel calls per year, with a low of 53 in 2010 and a high of 85 in 2012. The anticipated level of shipment activity is not expected to change substantially over the 30-year life of the CSLC lease. The anticipated maximum of annual ship and barge traffic can be expected to range from approximately 60 to 90 vessels.
- Vessels will comply with the voluntary agreement made with the CDFW to maintain a minimum distance of 50 nautical miles offshore from the mainland for loaded crude oil tankers transiting between Alaska and California. Vessels will travel within established 1-mile-wide traffic lanes to San Francisco from the north, south, and west until entering the Precautionary Area where eastbound and westbound traffic

is merged west of the Golden Gate. Once inside the Precautionary Area, vessels will traverse through Regulated Navigational Areas (RNAs), the Carquinez Strait, and Bulls Head Channel on their way to and from the Amorco Terminal, as described in Section 2.0, Project Description and shown on Figure 2-5.

- A space-use conflict would arise when the space available to conduct an activity is limited and competing demands are made for the available space.
- The Amorco Terminal can accommodate vessels no longer than 941 feet.
- Fishing operators normally navigate a safe distance from an obstacle to avoid collision and entanglements.
- To maintain the required depth below mean lower low water, the shipping berth area would be periodically dredged over the 30-year life of the lease. The last dredging operation occurred in 2005 and removed approximately 500 yards of material.

6.3.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on commercial and sport fisheries. Where impacts are determined to be significant, feasible mitigation measures (MMs) are described that would reduce or avoid the impact.

Proposed Project

Impact Commercial and Sport Fisheries (CS)-1: Cause space-use conflicts with commercial or recreational sport fisheries as a result of routine Amorco Terminal operations. (Less than significant.)

Amorco Terminal operations occur in CDFW block 308, and the prominent commercial fishery is the shrimp trawl fishery. The Carquinez Strait trawl grounds hug the south shore of the Carquinez Strait and their eastern terminus is the Benicia Bridge. Recreational sport fishing can occur at any location within the Bay-Delta. Boat and shoreside anglers target striped bass, leopard shark, sturgeon, flounder, and halibut. Routine Project operations are considered part of baseline conditions, are not expected to expand, and would not be expected to result in any temporary reduction of commercial or recreational sport fishing, result in lost harvesting time because of harbor closures, damage equipment or vessels, or cause impacts on living marine resources or habitat that would have a significant effect on either commercial or recreational sport fishing. At present, no kelp harvesting or aquaculture is conducted within the Bay-Delta, nor is any projected to occur in the foreseeable future. There would, therefore, be no impact to kelp harvesting or aquaculture.

Mitigation Measure: No mitigation required.

Impact CS-2: Cause space-use and navigation conflicts with commercial fisherman as a result of tanker and barge traffic to and from the Amorco Terminal. (Less than significant.)

Vessels in transit between the Amorco Terminal and the Pacific Ocean pass through active Pacific herring and bay shrimp fishing areas. All tankers and barges are restricted to existing navigation channels through San Francisco Bay and are required to cooperate with the U.S. Coast Guard (USCG) Vessel Traffic Service and pass through RNAs to reduce vessel congestion. They are restricted to the RNAs and established navigation channels while transiting San Francisco Bay. Commercial herring fishing occurs primarily in the South Bay and Central Bay. In the Central Bay, shipping corridors used by vessels calling at the Amorco Terminal pass through herring fishing areas around Angel Island, off Alcatraz, and along portions of the Tiburon shore. Over the past approximately 6 years, Tesoro Refining and Marketing Company, LLC (Tesoro) has had approximately six vessels lighter at Anchorage 9. In the South Bay, lightering operations at Anchorage 9 could continue to interfere with herring fishing operations. In the Central Bay and San Pablo Bay, vessels transiting to and from the Amorco Terminal would continue to pass through shrimp trawl grounds. Commercial fishing boats, primarily trawlers, are able to avoid any large vessels located within the shipping channel. The proposed Project would not result in any increases in vessel trips to and from the Amorco Terminal, so no additional navigational conflicts are anticipated over those that may have occurred in past years and are part of baseline conditions. Therefore, this impact would be less than significant.

Mitigation Measure: No mitigation required.

Impact CS-3: Cause space-use and navigational conflicts with recreational and sport fishing activities as a result of tanker and barge traffic to and from the Amorco Terminal. (Less than significant.)

Sport fishing navigational or space-use conflicts between recreational anglers (operating from either commercial party boats or private vessels) and the tankers and barges transiting between the Amorco Terminal and Pacific Ocean are expected to be minimal. Recreational fishing for starry flounder, shark, rockfish, sturgeon, halibut, striped bass, and American shad occurs from shore and both anchored and drifting boats, depending on the targeted fish species. Since no additional vessel trips are proposed by the Project, no additional conflicts with recreational fishermen are expected over what may have occurred in the past and are part of baseline conditions. Therefore, this impact would be less than significant.

Mitigation Measure: No mitigation required.

Impact CS-4: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical environmental factors as a result of maintenance dredging. (Less than significant.)

Turbidity and suspended-sediment concentration (SSC) can be much greater than ambient conditions in the immediate vicinity of dredging activities. Increased turbidity increases light attenuation, which can reduce phytoplankton productivity, reduce the feeding of some fish species, and change feeding and migration patterns, while increased SSCs can bury the benthic community, reduce the water-filtration rates of filter feeders adjacent to the dredge area, or increase fish gill injury (NMFS 2004). Estimates of the amount of material that is resuspended during dredging range from 0 to 5 percent (Suedel et al. 2008). Dredging at the Amorco Terminal would potentially resuspend 25 cubic yards of sediment over the course of dredging activity. The majority of sediment resuspended during dredging activities resettles within 50 meters of the dredge site within 1 hour (Anchor Environmental 2003), though plume effects can be observed as far downstream as 400 meters (Clarke et al. 2007). Densities of suspended sediment over ambient levels decrease with distance from the dredge site and are more pronounced at the bottom of the water column than near the surface (Clarke et al. 2007). However, sediment plumes are unlikely to have lasting effects given the high background turbidity; in one study in San Pablo Bay, dredging plumes were found to have only a localized effect (Schoellhamer 2002). Resuspended sediments near the surface of the water column are expected to dissipate downstream, where they would not increase sediment significantly above ambient levels. Therefore, impacts from increased turbidity and increased SSC concentrations on pelagic species would be less than significant.

Dredging would remove the existing infauna community and alter the substrate composition and topography at the Amorco Terminal. Following the completion of dredging, the benthic community is expected to undergo typical ecological succession patterns. As previously described, the benthic community at any estuarine location is dependent on salinity levels. Following salinity-change events, it takes several months for the initial group of benthic organisms to settle and grow. Because freshwater flows into San Francisco Bay may change over the course of dredging, it is likely that the benthic community that forms in the dredged area would be composed of species with a different salinity affinity than those that were removed. However, a change in community composition would occur naturally in the absence of the dredging project due to the seasonal variation in salinity levels at the site. Therefore, this impact would be less than significant.

Indirect effects that are anticipated by dredging are the potential spread of nonindigenous species as a result of disturbing the benthic habitat. Dredging would create newly disturbed benthic habitat, making it attractive for settlement by opportunistic nonindigenous species. However, the benthic community at locations near the Amorco Terminal is composed of a mix of introduced and native species, and it is likely that the

benthic community at the marine terminal is similarly composed. As early settlers on the site are recruited from the water column, it is likely that the benthic community that reforms would also be a mixture of native and introduced species. The benthic community that forms at the Amorco Terminal site is unlikely to differ substantially from the community that is present. Therefore, indirect impacts from dredging are expected to be less than significant.

Scheduled maintenance dredging is known sufficiently in advance and Tesoro continues to comply with applicable permits to ensure appropriate assessments are conducted prior to conducting maintenance-related dredging. Dredged spoils are tested and managed according to permits issued by jurisdictional agencies, including the CSLC, U.S. Army Corps of Engineers, BCDC, and San Francisco Bay RWQCB. Because disturbance from dredging operations is intermittent and impacts are temporary, impacts from routine maintenance dredging are anticipated to be less than significant.

Mitigation Measure: No mitigation required.

Impact CS-5: Cause impacts to commercial and recreational sport fisheries as a result of minor fuel, lubricant, and/or boat-related spills. (Less than significant.)

With continuing operation, the Amorco Terminal would remain a potential point location for minor fuel, lubricant, and other boat-related spills. Any uncaptured material would be dispersed into the waters around the Amorco Terminal, degrading the quality of the water column and benthic habitat in the vicinity of the Amorco Terminal. Though minor spills are not an occurrence of normal Project operations, they are reasonably foreseeable as a result of the Project.

Examples of past minor spills from the Amorco Terminal include the release of small amounts of diesel fuel from pipelines or transfer lines into the Strait, discharge of lubricating oil from docking vessels into the Strait, and the accidental release of hydraulic fluid from a boom during an oil spill drill (USCG 2013). In the State of California, any release or threatened release of a hazardous material must be reported to the local emergency response agency and to the California Emergency Management Agency. There is no minimum reporting quantity. All reported releases from the Amorco Terminal were minor, ranging from 7 drops of hydraulic fluid to 1 gallon of diesel. Minor spills are quickly cleaned up using vacuum trucks and absorbent pads to recover the material.

No significant adverse impacts are expected to fisheries from minor spills associated with the ongoing operation of the Amorco Terminal. Tesoro operators have a demonstrated history of quick containment response and reporting for small spills. Any minor amounts of contaminants that are released into the water would be quickly dispersed by the swift currents in the Strait such that concentrations of pollutants would not achieve the levels at which harm to aquatic species is observed.

Tesoro's operators use Consequences of Deviation Tables to monitor, compensate, and correct for operating parameters that deviate due to equipment failure, routine maintenance, feed variations, and other factors. The tables detail mechanical set-point criteria, consequences of deviation from the set point, and the operator response for instrument Critical Operating Limits (COL) and Process Operating Limits (POL). A COL/POL database for current unit operating limits is maintained on the Golden Eagle Intranet. Adherence to these operating ranges and consequences of deviation reduces the potential for minor spills from transfer of crude oil. Although impacts from minor spills are adverse, they are not expected to have a significant effect on fisheries near the Amorco Terminal.

Mitigation Measure: No mitigation required.

Impact CS-6: Cause impacts to commercial and recreational sport fisheries as a result of major fuel, lubricant, and/or boat-related spills. (Significant and unavoidable.)

Shrimp, herring, and sport fisheries in the Central Bay, North Bay, San Pablo Bay, Carquinez Strait, Napa River, and Honker Bay are at highest risk of spill contamination. The Carquinez Strait and Suisun Bay is a migratory corridor and feeding/rearing area for many different sport fish species, including striped bass, sturgeon, and salmon. In addition, San Francisco Bay marinas, launch ramps, and fishing access points may be threatened, contaminated, or closed. Impacts from spills would depend on the quantity spilled. Whereas light oils such as fuel oil are acutely toxic and cause the greatest impacts to species that live in the upper water column, most crude oils that would be delivered to the Amorco Terminal do not mix well with water and can cause severe, long-term contamination to intertidal areas and cause oiling of fishery infrastructures. Heavy oils such as heavy crude weather slowly and may cause severe long-term contamination of intertidal areas and sediments. Depending on the weight of the oil, spills may harden and wash up along the shoreline.

Crude oils contain a large proportion of highly persistent tar-like compounds. Volatile components of crude oil stock disappear over a few days, but the heavier fractions form an emulsion with sea water (called "mousse"), which allows greater dispersal of oil. Some fraction of crude oil will aggregate into tarballs or mats. The more exposed to the elements oil is, the more rapidly it weathers. The heaviest oils may sink in the water, contaminating the water column and being forced by tidal waves into the substrate. Buried oils are not weathered.

Fish can be killed or injured from contact with oil spills. The susceptibility of fish to a spill depends on its growth stage, feeding behavior, and the type of oil. Juvenile fish and bay shrimp that use shallow or near-surface waters are susceptible to acute toxicity from lighter oils, while fish that swim lower in the water column, such as salmon and sturgeon,

are less likely to come in direct contact with oil. Fish may come into direct contact with oil, thus contaminating their gills; they may absorb toxic components of oil through their skin; and they may suffer adverse effects from eating contaminated food. Substrate that herring use for spawning could become oiled by a large spill. Oil from the Cosco Busan container ship spill in 2007 was listed as one of several factors that may have contributed to the steep decline in herring that led to the closure of the fishery in 2009 (Saving the Bay 2013).

Oil Spill Modeling

As presented in Section 4.1, Operational Safety/Risk of Accidents, the average most probable and maximum most probable spills for crude oil shipped through the Amorco Terminal were modeled.

Results of these models indicate that while spills at or near the Amorco Terminal have the potential to travel through Carquinez Strait into San Pablo Bay and into Suisun Bay and its associated marshes, the highest probability of contact with oil occurs within the direct vicinity of the Amorco Terminal. The trajectory of the spill and the extent of its distribution vary seasonally. A spill in winter during the flooding season would be carried by heavy Delta outflows into San Pablo Bay, oiling shorelines and facilities along the Carquinez Strait. During the dry summer months, spills are carried upstream along tidal currents and dispersed by wind into Suisun Bay.

Table 4.2-10 in Section 4.2, Biological Resources shows the biomass of fish and invertebrates that would be impacted from a modeled spill at a Martinez wharf (ASA 2009).

Significant adverse impacts to commercial and sports fisheries would result from oil spill accidents originating at the Amorco Terminal or from transiting tankers going to the Amorco Terminal. The number and type of species impacted by an oil spill depends on the season in which the spill occurs. Table 4.2-11 in Section 4.2, Biological Resources shows fish species that are more than 50 percent likely to be impacted by an oil spill during summer and winter scenarios. As seen in the table, most recreational sport fishes, as well as commercial bay shrimp, would be susceptible to impact from a spill throughout the year.

In addition to the mitigation measures presented below, implementation of MMs OS-1a, OS-1b, OS1-c, OS-4a, and OS-4b (refer to Section 4.1, Operational Safety/Risk of Accidents) and MMs BIO-6a through BIO-6c (refer to Section 4.2, Biological Resources) would reduce impacts to commercial and sport fisheries resources.

Mitigation Measures:

MM CS-6a: Tesoro shall post notices to warn fishing interests of a spill. In the event of an Amorco Terminal or associated vessel spill, Tesoro shall post notices at spill sites, marinas, launch ramps, and fishing access points to warn fishing interests of locations of contaminated sites. Notices shall be written in English and Spanish, and be posted in areas most likely to be seen by fishing interests.

MM CS-6b: Tesoro shall provide compensation for damages from a spill. If damages to fishing operations or related businesses are determined by State, federal, or local authorities to be caused by Tesoro, financial compensation shall be provided by Tesoro as determined by the authorities. Any losses shall be documented as soon as possible after a spill, using methods for determining damages established beforehand. Response for damage losses should include provisions for compensating operators and businesses as soon as possible.

Impact CS-7: Cause impacts to commercial and sport fisheries as a result of the introduction of additional invasive non-native species from international vessels visiting the Amorco Terminal. (Significant and unavoidable.)

The San Francisco Bay and Delta region is among the most invaded aquatic ecosystems in North America. Since 1970, the rate of invasion has been one new species every 24 weeks (Cohen and Carlton 1995). In some parts of the estuary, including Suisun Bay, introduced species account for the majority of species diversity. Introduced species have the potential to dominate the estuary's food webs and may result in profound structural changes to habitat. The results from introductions of species into new habitats are highly unpredictable, and can range from being presumed beneficial to being highly damaging. The striped bass is itself an introduced species, and it continues as an important recreational species. One of the most destructive invasive species is the overbite clam, *Corbula amurensis*. Thought to have been introduced in San Francisco Bay by ballast water exchange from a cargo ship, this phytoplankton-consuming species is now so abundant that the current population is capable of filtering the estuary's water column several times a day and has caused a crash in the abundance of phytoplankton in San Francisco Bay (SFEP 2004). *Corbula* has overgrazed San Francisco Bay's phytoplankton, which young fish rely on for food, and caused a cascade of ecosystem events that has contributed to the decline of all fish species in San Francisco Bay.

The California Aquatic Invasive Species Management Plan identifies commercial shipping as the most important vector for the introduction of aquatic invasive species (OSPR 2008). Commercial ships introduce aquatic invasive species through ballast water exchange or vessel biofouling. These vector routes are addressed in Section 4.2, Biological Resources, and summarized below.

Ballast Water Exchange

In commercial ships, ballast water is taken on in large enough quantities that it is able to support a host of marine species, from plankton to fish, during their relatively long transit times in ballast. Ballast water is, therefore, capable of transporting live aquatic species halfway around the world.

Under the National Invasive Species Act of 1996, the USCG established regulations and guidelines to prevent the introduction of aquatic invasive species from ballast water discharge. At the State level, the CSLC is the lead implementing agency for the State's ballast water management program. As directed by the Marine Invasive Species Act of 2003, the CSLC formulated recommendations to regulate ballast water discharge for vessels operating in State waters. All vessels coming into California from outside the exclusive economic zone are required to submit ballast-water reports to the CSLC that include information about port of origin, how the ballast water was managed, and how much ballast water was discharged.

Compliance with ballast water management requirements in California is extremely high. Between July 2010 and June 2012, 97 percent of forms were submitted as required. The primary vessel-reported practice for ballast water management is retention on board, which is considered the most protective management strategy (CSLC 2013e). Vessels moored at the Amorco Terminal discharge treated ballast water to San Francisco Bay under the terms of the Vessel General Permit and USCG regulatory guidelines, as well as State performance standards for discharge. Many of the vessels visiting the Amorco Terminal receive exemptions from USCG ballast-water treatment standards; however, the Vessel General Permit and State programs do not exempt these vessels from performance standards.

Vessel Biofouling

Many marine organisms that have a sessile life stage in which they are attached to hard substrata can readily colonize ships' hulls or niche areas. The most common fouling organisms are barnacles, but mussels, seaweed, anemones, and sea squirts can also attach themselves to ships' hulls (OSPR 2008). Shrimps, worms, and sea snails can hide in the crevices created by colonies of barnacles and mussels. Fouling organisms are then transported into new environments where they may be transferred from the ship into the new environment by spawning, detachment, or mechanical removal.

Fouling by commercial ships is one of the primary routes through which nonindigenous aquatic species are introduced to the estuary. The CSLC states that all vessels pose some level of risk from biofouling (CSLC 2013e). Beginning in 2008, the CSLC required vessels operating in State waters to submit an annual Hull Husbandry Reporting Form.

Tesoro has no control over, ownership of, or authority to direct vessels that would dock at its marine terminal; therefore, specific details of how vessels manage biofouling cannot be provided as part of the Project (refer to Section 2.0, Project Description). The vessels would be governed by the applicable CSLC standards for biofouling management, which would reduce the potential impact of aquatic species invasion from biofouling.

Under MMs BIO-7a and BIO-7b, Tesoro will ensure that vessels seeking to call at the marine terminal are advised of California's Marine Invasive Species Act and are submitting forms as required by the CSLC, and will be required to provide a share of the funding for actions related to non-indigenous aquatic species. However, the impact of introducing new non-native and invasive species via ballast water and hull fouling in the San Francisco Bay and Delta could potentially be so devastating that even a reduced risk has the potential to cause a significant and unavoidable adverse impacts to commercial and recreational sport fisheries.

Mitigation Measures: No additional mitigation measures available.

Impact CS-8: Cause degradation of Bay-Delta waters from vessel hull antifouling paint. (Less than significant.)

Antifouling paint from tankers and barges using the Amorco Terminal may contribute to the contaminant loading of Bay-Delta waters and sediments. The amount of contaminant material originating from vessels using the Amorco Terminal is assumed to be relatively small and lower than other known sources of similar contaminants to San Francisco Bay, such as the ports of Oakland and San Francisco and the nearby mothballed merchant marine fleet. As a result, any contaminants that might originate from the continued use of the Amorco Terminal are not expected to affect fish species targeted by commercial or recreational fishermen. Therefore, this impact would be less than significant.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact CS-9: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the decommissioning and abandoning in place of existing structures. (Significant and unavoidable.)

As described in Section 3.3, the Amorco Terminal lease would not be renewed, and the Amorco Terminal would be decommissioned and either abandoned in place or partially or completely removed. Decommissioning and/or deconstruction of the Amorco Terminal would cause temporary disturbance to fisheries habitat and nearby sport fishing resulting in short-term adverse, but less than significant impacts. In the long term, fisheries habitat would likely be reclaimed and more area would likely open up for sport fishing, resulting in a beneficial impact.

Crude oil vessel traffic would most likely be transitioned to the nearby Avon Terminal, so there would be little reduction in crude oil tanker traffic transiting the estuary. Thus, there would be no overall reduction in shipping noise, and the risk of hazards from an oil spill and from the introduction of nonindigenous aquatic species introduced via ballast water and hull fouling would be shifted upstream rather than reduced, and the potential impact to the San Francisco Bay estuary and associated biota would be continue to be significant and unavoidable.

Mitigation Measure: No mitigation measures available.

Impact CS-10: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the partial or complete removal of Amorco Terminal structures. (Potentially significant.)

Construction activities associated with partial or complete removal of the Amorco Terminal would cause temporary disturbances to habitat and wildlife that inhabit the Carquinez Strait. Removal of Amorco Terminal structures would result in physical harm or injury to individuals and increased levels of noise that could cause harm to fish and wildlife. Depending on construction timing, noise levels could also impede fish migration. Work that disturbs the channel bottom could release contaminated sediments from the channel floor with potential adverse effects to wildlife. Beneficially, removal of the Amorco Terminal structures would result in a small but probably insignificant lessening of night lights along the Carquinez Strait. Mitigation would be required to ensure that removal of the Amorco Terminal structures was conducted to reduce adverse impacts to habitat and species. Any Amorco Terminal-removal projects would be subject to regulation under existing State and federal regulations, at which point environmental review would be conducted and mitigation measures developed to ensure that the project was in compliance with relevant regulations.

Alternative 2: Imported Crude Supplies from Non-marine Sources

Impact CS-11: Cause impacts to the San Francisco Bay Region and associated biota by decommissioning and removing the Amorco Terminal and shifting crude oil imports to overland transport. (Less than significant.)

Under this alternative, the Amorco Terminal would not be in use, and crude oil would be transported overland through a combination of rail, tanker, and pipelines to the Golden Eagle Refinery. Decommissioning and removing the Amorco Terminal would result in the same level of impacts as the No Project Alternative. However, the overall number of vessels transiting the estuary would be reduced, with a reduction of shipping and the potential for major oil spill or introduction of nonindigenous aquatic species via ballast water or hull fouling, resulting in a beneficial impact to commercial and sport fishing.

Cumulative Impact Analysis

The geographic context for analysis of cumulative impacts to commercial and sport fishery resources includes the San Francisco-San Pablo Bay region, Carquinez Strait, and the outer coast of California. Impacts to commercial and sport fishery resources from the Project that are less than significant may become significant when combined with impacts from related projects in the region. This analysis identifies cumulative impacts and evaluates whether the incremental contribution of the Project to a cumulative impact would be considerable.

Impact CUM-CS-1: Cause cumulative adverse impacts to commercial and sport fishery resources through space-use conflicts as result of routine Amorco Terminal operations. (Less than significant.)

Operations at the Amorco Terminal would continue in conjunction with those of nearby marine oil terminals and marinas. Marine vessels transiting through the Carquinez Strait would continue to use established shipping channels. Terminal uses and the use of shipping channels precludes access to fishing areas, but also concentrates land uses and vessel traffic so other areas are available for fishing. The Project contributes to the cumulative impact caused by space-use conflicts. The number of vessels visiting the Amorco Terminal is less than 1 percent of vessel traffic in the San Francisco region and the Amorco Terminal is located within an industrial zone; therefore, the incremental contribution of the Project is not cumulatively considerable.

Mitigation Measure: No mitigation required.

Impact CUM-CS-2: Cause cumulative impacts to San Francisco Bay estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined. (Significant and unavoidable.)

A major oil spill at the Amorco Terminal or from vessels visiting the Amorco Terminal would potentially affect a wide range of marine and terrestrial biological resources. As discussed in Section 4.1, Operation Safety/Risk of Accidents, operations associated with the Amorco Terminal contribute incrementally to the cumulative risk of an oil spill. Vessel traffic associated with the Amorco Terminal is approximately 4.7 percent of the total probability of a spill from tanker and tank barge traffic in San Francisco Bay. Among the facilities with potential to contribute to the accidental release of petroleum products are the Chevron Richmond Refinery Long Wharf Terminal, Tesoro Avon Marine Terminal, and the Plains All American Martinez Marine Terminal. As discussed in Impact CS-6, major spills of fuel, crude oil, or other materials can be expected to have serious adverse effects on commercial and recreational fishing interests. Fish species could be directly impacted and fisheries infrastructures would be threatened by a major spill. Two major spills into the San Francisco Bay from different sources within the same season would

cause even greater adverse impacts to the fisheries and habitats. MMs BIO-6a through BIO-6c collectively aid in the prevention and cleanup of accidental releases of oil spills. Mitigation Measures CS-6a and CS-6b provide for notification to fishing interest and compensation for damage from a spill; however, a major spill could have a residual impact following spill response and cleanup. Therefore, the impact would be cumulatively considerable and significant cumulative impacts would occur from implementation of the Project.

Mitigation Measure: No additional mitigation measures available.

Impact CUM-CS-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay. (Significant and unavoidable).

The California Ballast Water Management for Control of Nonindigenous Species Act of 1999, as revised and reauthorized by the Marine Invasive Species Act of 2003, and California Public Resources Code sections 71200 to 712717 specify required ballast water and vessel biofouling management practices. These laws and associated regulations were developed to prevent future introduction of nonindigenous species to San Francisco Bay-Delta waters. Prior to the introduction of these management practices, however, a considerable number of nonindigenous species were introduced into the San Francisco Bay-Delta, resulting in a realignment of the biotic communities in San Francisco Bay. All commercial vessel traffic to San Francisco Bay has the potential to introduce nonindigenous aquatic species. Although vessels that call at the Amorco Terminal are required to comply with federal and State provisions, compliance with the current regulations is not enough to ensure full mitigation of this impact. Thus, significant cumulative impacts would occur.

Mitigation Measures: No mitigation measures available.

6.4 SUMMARY OF FINDINGS

Table 6-1 includes a summary of anticipated impacts to commercial and sport fisheries and associated mitigation measures.

Table 6-1: Summary of Commercial and Sport Fisheries Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
CS-1: Cause space-use conflicts with commercial or recreational sport fisheries as a result of routine Amorco Terminal operations	No mitigation required.
CS-2: Cause space-use and navigation conflicts with commercial fisherman as a result of tanker and barge traffic to and from the Amorco Terminal	No mitigation required.
CS-3: Cause space-use and navigational conflicts with recreational and sport fishing activities as a result of tanker and barge traffic to and from the Amorco Terminal	No mitigation required.
CS-4: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical environmental factors as a result of maintenance dredging	No mitigation required.
CS-5: Cause impacts to commercial and recreational sport fisheries as a result of minor fuel, lubricant, and/or boat-related spills	No mitigation required.
CS-6: Cause impacts to commercial and recreational sport fisheries as a result of major fuel, lubricant, and/or boat-related spills	MM CS-6a: Tesoro shall post notices to warn fishing interests of a spill. MM CS-6b: Tesoro shall provide compensation for damages from a spill.

Impact	Mitigation Measure(s)
Proposed Project	
CS-7: Cause impacts to commercial and sport fisheries as a result of the introduction of additional invasive non-native species from international vessels visiting the Amorco Terminal	No additional mitigation measures available. (Refer to MMs BIO-7a and BIO-7b.)
CS-8: Cause degradation of Bay-Delta waters from vessel hull antifouling paint	No mitigation required.
Alternative 1: No Project	
CS-9: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the decommissioning and abandoning in place of existing structures	No mitigation measures available.
CS-10: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the partial or complete removal of Amorco Terminal structures	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Imported Crude Supplies from Non-marine Sources	
CS-11: Cause impacts to the San Francisco Bay Region and associated biota by decommissioning and removing the Amorco Terminal and shifting crude oil imports to overland transport	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Cumulative Impacts	
CUM-CS-1: Cause cumulative adverse impacts to commercial and sport fishery resources through space-use conflicts as result of routine Amorco Terminal operations	No mitigation required.
CUM-CS-2: Cause cumulative impacts to San Francisco Bay estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined	No additional mitigation measures available. (Refer to MMs BIO-6a through BIO-6c, CS-6a, and CS-6b.)
CUM-CS-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay	No mitigation measures available.