# 4.L BIOLOGICAL RESOURCES

This section describes the regulatory and environmental setting for biological resources. It also describes the impacts on biological resources that would result from implementation of the Seawall Lot 337 and Pier 48 Mixed-Use Project (proposed project) and mitigation measures to reduce these impacts.

Issues identified in response to the notice of preparation (NOP) (Appendix 1) were considered in preparing this analysis. Applicable issues that were identified from the NOP comments include analysis of the potential impacts on the marine environment, as well as state- and federally listed species, and pile-driving impacts on fish, birds, and mammals.

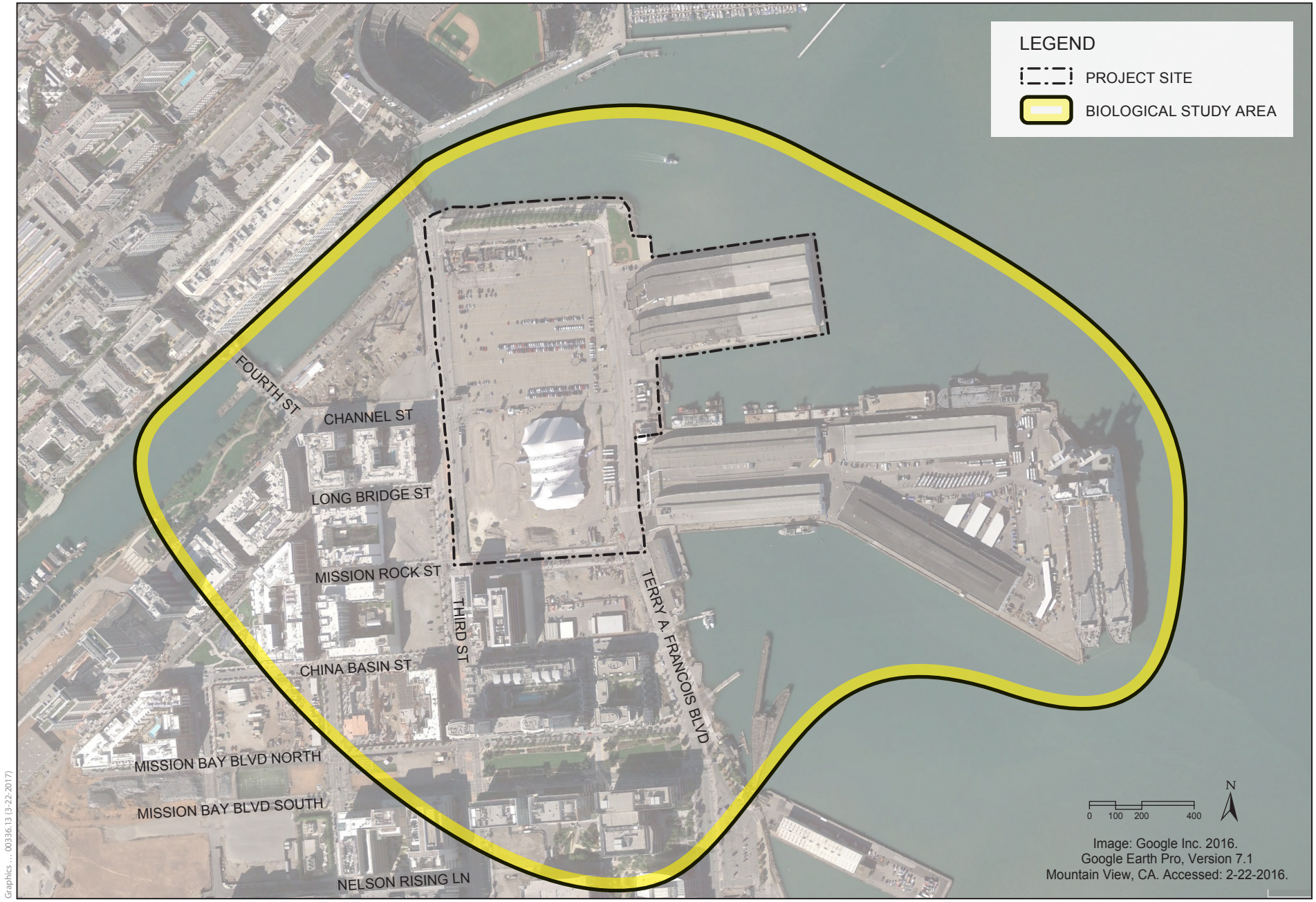
The biological study area for this analysis is defined as the project site, the immediately adjacent Mission Creek and China Basin, and portions of the San Francisco Bay (Bay) (see Figure 4.L-1, Biological Study Area, on the following page).

## ENVIRONMENTAL SETTING

The project site is located in the northeast portion of the city and county of San Francisco, in the China Basin area. The cities of Berkeley, Emeryville, and Oakland are located to the east, on the opposite side of the Bay. Along with other municipalities, they form the eastern edge of the Bay. The San Francisco-Oakland Bay Bridge is a prominent manmade feature, approximately 1 mile north of the project site. Treasure Island is visible from the project site.

Mission Creek, as well as its confluence with the Bay, borders the northern boundary of the project site. On the north side of Mission Creek is AT&T Park, which is used for San Francisco Giants baseball games and other major events. Mission Creek once extended from the Mission neighborhood to the Bay but is now channelized, running from China Basin to approximately Interstate 280 (I-280). Mission Creek Park, which lines the creek to the north and south, includes open grassy areas, pathways, a small amphitheater, overlook areas, a nonmotorized boat launch, sports courts, and a dog play area.

Currently, most of the project site is developed with paved parking areas, which are used principally for events at AT&T Park and Pier 48. About 181,200 gross square feet (gsf) of Pier 48 consists of enclosed warehouse space, including two one-story main sheds (Shed A and Shed B) that are connected by a one-story connector shed (Shed C) at the east end of the pier (Figure 2-3).




Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

**Figure 4.L-1**
**Biological Study Area**

Existing onsite vegetation includes weeds and small shrubs along the perimeter of Seawall Lot 337 and grass and 26 trees in China Basin Park. The project site is generally flat, at an elevation of approximately 100 feet, Mission Bay Datum, which is approximately 5 feet above mean high water. No sensitive natural communities, including wetlands and riparian habitat, were observed at the project site.[1]

The biological study area includes portions of the Bay, as illustrated in Figure 4.L-1 on the previous page. The Bay in the vicinity of the project site is characterized by both estuarine intertidal and subtidal habitat. The intertidal habitat is located between Pier 48 and Pier 50 and dominated by armored shoreline or seawall.[2] The subtidal habitat consists of the remainder of the Bay that surrounds the biological study areas and includes open shallow bay. Open shallow bay provides feeding areas for many fish species including Pacific herring (*Clupea pallasii*), northern anchovy (*Engraulis mordax*), and jacksmelt (*Atherinopsis californiensis*). Harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*) can also be observed in these areas.[3] Eelgrass, a habitat area of particular concern (HAPC), is not present in the biological study area.[4]

San Francisco is located within the Pacific Flyway, a major north–south route of travel for migratory birds along the western portion of the Americas, extending from Alaska to Patagonia, Argentina. Every year, migratory birds travel some or all of this distance, both in spring and in fall, following food sources, heading to breeding grounds or traveling to overwintering sites. Migratory birds, such as warblers, orioles, juncos, robins, goldfinches, and swallows, and waterfowl, such as Canada geese and mallards, could visit the project site given its position relative to the Bay.

The project site is fully developed; however, shrubbery in planting beds and trees on or near the site provide only some ground cover. Although the small patches of landscaped vegetation are unlikely to support the candidate, sensitive, or special-status wildlife species with potential to occur in San Francisco, the trees on or near the project site could provide nesting sites for protected migratory bird species that have adapted to the urban environment, such as house finches (*Haemorhous mexicanus*) and mourning dove (*Zenaida macroura*). Additionally, birds could nest on the ledges, rafters, or beams, as well as in drainpipes or holes in walls and ceilings, of the existing one-story sheds on Pier 48.

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1 ICF staff site visit to Seawall Lot 337 and Pier 48 project site, July 28, 2016.

2 State Coastal Conservancy. 2010. *San Francisco Bay Subtidal Habitat Goals Project*. Conservation planning for the submerged areas of the Bay. Fifty-year Conservation Plan.

3 San Francisco Bay Area Wetlands Ecosystem Goals Project. 1999. Baylands Ecosystem Habitat Goals – A Report of Habitat Recommendations.

4 Data Basin. 2016. San Francisco Bay Eelgrass. 2009 eelgrass distribution. Available: https://databasin.org/maps/new#datasets=7dddaf6dcdba4cfea7e037b3bdc7f4db. Accessed: November 30, 2016.

## AVIAN USES OF THE STUDY AREA

A variety of terrestrial bird species are habituated to urban environments with little habitat diversity. These birds can utilize trees, shrubs, and buildings within the project site as nesting habitat. The most common species documented as nesting in San Francisco include Brewer's blackbird (*Euphagus cyanocephalus*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia),* house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), and brown-headed cowbird (*Molothrus ater*). Less frequently nesters include Anna's hummingbird (*Calypte anna*), common bushtit (*Psaltriparus minimus*), white-crowned sparrow (*Zonotrichia leucophrys*), chestnut-backed chickadee (*Poecile rufescens*), Cooper's hawk (*Accipter cooperi*), and hooded oriole (*Icterus cucullatus*).

Shore and seabirds could also use the study area for foraging and resting. Shore and seabirds that have been previously identified in the vicinity of the study area include double-crested cormorant (*Phalacrocorax auritus*), western gull (*Larus occidentalis*), black-crowned night heron (*Nyctincorax nycticorax*), brown pelican (*Pelecanus occidentalis californicus*), common loon (*Gabvia immer*), terns (*Sternula* spp.), and long-billed curlew (*Numenius americanus*).[5]

## FISH AND MARINE MAMMAL USES OF THE SAN FRANCISCO BAY

Fish species that are frequently found in the open water of the south-central Bay include Pacific herring, northern anchovy, Pacific sardine (*Sardinops sagax caerulea*), English sole (*Parophrys vetulus*), starry flounder (*Platichthys stellatus*), leopard shark (*Triakis semifasciata*), spiny dogfish (*Squalus acanthias*), brown rockfish (*Sebastes auriculatus*), cabezon (*Scorpaenichthys marmoratus*), big skate (*Raja binoculata*), soupfin shark (*Galeorhinus galeus*), sand sole (*Psettichthys melanostictus*), and lingcod (*Ophiodon elongates*).[6] Within the open bay areas are organisms that float in the water column, such as zooplankton; those that swim in the water column, such as fish and mammals; and those that live in the sediment on the bottom, such as benthic invertebrates, crustaceans, and mollusks.

Marine mammals such as harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californicus californianus*), harbor porpoise (*Phocoena phocoena*), and gray whales (*Eschrichtius robustus*) occur in the south-central Bay. Other marine mammals occur in the Bay but are not commonly observed and therefore less likely to occur in the study area. These include humpback whale (*Megaptera noveangliae*), northern elephant seal (*Mirounga angustirostris*), Steller sea lion (*Eumetopius jubatus*), and northern fur seal (*Callorhinus ursinus*).

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[5] California Department of Transportation. 2001. *San Francisco – Oakland Bay Bridge East Spans Seismic Safety Project.* Final Environmental Impact Statement/Statutory Exemption. Volume 1. Available: http://www.dot.ca.gov/dist4/sfobb/sfobbfeis.htm. Accessed: February 3, 2017.

[6] National Marine Fisheries Service. 2012. *Fisheries Management Plan Species Distributions in San Francisco, San Pablo, and Suisun Bays*. Southwest Regional Office.

## SPECIAL-STATUS SPECIES

Special-status plant, wildlife, and fish species with the potential to occur in the study area were identified from a California Natural Diversity Database[7] (CNDDB) query, U.S. Fish and Wildlife Service (USFWS) species list database,[8] and California Native Plant Society[9] (CNPS) Online Inventory of Rare and Endangered Plants for the San Francisco North 7.5-minute U.S. Geological Survey (USGS) quadrangle. The lists are included as Appendix 9. The term *special-status species* includes candidate and sensitive species. Species with potential to occur in the study area are presented in Table 4.L-1, on the following page, along with a description of habitat requirements for each species, protection status, and a brief discussion of its likelihood to occur in the study area.

### PLANTS

Because of the lack of undeveloped surfaces, no special-status plant species have the potential to occur in the study area. Several special-status plant species occurrences overlap the study area, but these are nonspecific occurrences, with an accuracy of 5 miles. Additionally, most of these occurrences are now considered extirpated[10] by the CNDDB. Therefore, special-status plant species are not discussed further in this analysis.

### WILDLIFE

Special-status bird species with the potential to occur in the study area include American peregrine falcon (*Falco pererinus anatum*), brown pelican (*Pelecanus occidentalis californicus)*, black skimmer (*Rynochops nigers*), and California least tern (*Sternula antillarum*). The project site does not provide potential nesting habitat for these species; however, these avian species may forage in or over the Bay near the project site.

Three special-status bat species, big free-tailed bat (*Nyctinomops macrotis*), western mastiff bat (*Eumops perotis californicus*), and Townsend's big-eared bat (*Corynorhinus townsendii townsendii*), have very low potential for occurrence in the study area. Only Townsend's big-eared bat has been documented in the San Francisco North 7.5-minute USGS quadrangle. Bats, and particularly Townsend's big-eared bat, are particularly sensitive to human disturbance and therefore are not expected to be present on the project site because of the extent and frequency of human activity that occurs onsite (i.e., parking for AT&T Park events, The Yard [temporary restaurant and retail space in recycled shipping containers], and special events such as Oktoberfest). Therefore, bat species are not discussed further in this analysis.

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7 California Department of Fish and Wildlife. 2017. *California Natural Diversity Database*. RareFind 5. Available: http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp. Accessed: February 13, 2017.

8 U.S. Fish and Wildlife Service. 2017. *IPaC*. Available: http://ecos.fws.gov/ipac/. Accessed: February 13, 2017.

9 California Native Plant Society. 2017. *Inventory of Rare and Endangered Plants* (online edition, v8-02). Sacramento, CA. Available: http://www.rareplants.cnps.org. Accessed: February 13, 2017.

10 Destroyed, usually by development, and no longer present.

**TABLE 4.L-1. SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE STUDY AREA**

| Common and Scientific Name | Status Federal/State | California Distribution | Habitats | Potential Occurrence in Study Area |
|---|---|---|---|---|
| **Birds** | | | | |
| California brown pelican<br>*Pelecanus occidentalis californicus* | FD/SD | Present along the entire coastline, but does not breed north of Monterey County; extremely rare inland. | Typically in littoral ocean zones, just outside the surf line; nests on offshore islands. | **High.** Species forages within the open bay portion of the study area and could use the pier and other structures for resting areas. Species roosts on Breakwater Island on the south side of the Alameda Point Channel. |
| Bald eagle<br>*Haliaeetus leucocephalus* | FD/SE | Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County. | In western North America, nests and roosts in coniferous forests within 1 mile of a lake, reservoir, stream, or the ocean. | **Low.** Species may forage within the open bay portion of the study area but this is unlikely. |

| Common and Scientific Name | Status Federal/State | California Distribution | Habitats | Potential Occurrence in Study Area |
|---|---|---|---|---|
| Peregrine falcon<br>*Falco pereinus anatum* | --/FP | Occurs throughout California from elevations of 12,000 feet to rivers and coastlines and in cities. | Nests in open landscapes with cliffs, on skyscrapers and bridges. Most common along barrier islands, mudflats, coastlines, lake edges, and mountain chains. | **High**. Species has historically nested on the San Francisco –Oakland Bay Bridge[11] and could forage on birds in the Bay Area and urban areas where rock doves are present. Species could use the pier and other structures for resting areas but is unlikely to nest in the project site. |
| Black skimmer<br>*Rynochops nigers* | --/SSC | Present along the entire coastline from the Bay Area to Baja California. | Nests in colonies on beaches, gravel or shell bars, dredged deposits, islands, saltmarshes, and rooftops. Forages for fish and small crustaceans by skimming the water with its bill. | **Moderate.** Species may forage in the study area. |
| California least tern<br>*Sternula antillarum* | FE/SE, FP | | Nests on sandy or gravelly beaches and banks of rivers or lakes. Forages for small fish and invertebrates in nearby aquatic habitat. | **High.** The closest nesting colony is at the Alameda Naval Air Station, which is directly across the Bay from the study area (4 miles east). Species may forage in the study area. |

[11] California Department of Transportation. 2001. San Francisco – Oakland Bay Bridge East Spans Seismic Safety Project. Final Environmental Impact Statement/Statutory Exemption. Volume 1. Available: http://www.dot.ca.gov/dist4/sfobb/sfobbfeis.htm. Accessed: February 3, 2017.

| Common and Scientific Name | Status Federal/State | California Distribution | Habitats | Potential Occurrence in Study Area |
|---|---|---|---|---|
| **Mammals** | | | | |
| Townsend's big-eared bat<br>*Corynorhinus townsendii townsendii* | --/SSC | Coastal regions from Del Norte County south to Santa Barbara County. | Roosts in caves, tunnels, mines, and dark attics of abandoned buildings. Very sensitive to disturbances and may abandon a roost after one onsite visit. | **Low**. Unlikely to utilize study area for foraging or roosting due to extreme sensitivity to disturbance. |
| Big free-tailed bat<br>*Nyctinomops macrotis* | --/SSC | Distribution in California is uncertain because occurrences are very rare; most likely to be found in southern California, but has been recorded in Berkeley, Alameda County. | Inhabits arid, rocky areas; roosts in crevices in cliffs. | **Low**. Unlikely to utilize study area for foraging or roosting. No CNDDB documented records within the San Francisco North 7.5-minute USGS quadrangle map. |
| Western mastiff bat<br>*Eumops perotis californicus* | --/SSC | Occurs along the western Sierra primarily at low to mid elevations and widely distributed throughout the southern coast ranges. Recent surveys have detected the species north to the Oregon border. | Found in a wide variety of habitats from desert scrub to montane conifer. Roosts and breeds in deep, narrow rock crevices, but may also use crevices in trees, buildings, and tunnels. | **Low**. Unlikely to utilize study area for foraging or roosting. No CNDDB documented records within the San Francisco North 7.5-minute USGS quadrangle map. |
| **Marine Mammals** | | | | |
| Gray whale<br>*Eschrichtius robustus* | FD/-- | The entire California coast. | Mainly shallow coastal waters. | **Moderate.** Species may pass near the study area. |
| Humpback whale<br>*Megaptera noveangliae* | FE/SE | Winters in coastal Central America and Mexico. Migrates along the coast of California to southern British Columbia in the summer and fall. | Coastal and open ocean habitat. | **Low.** Unlikely to be found in the Bay. |
| Harbor porpoise<br>*Phocoena phocoena* | --/-- | Coastal waters from Monterey Bay to the Beaufort Sea. | Commonly found in bays, estuaries, and harbors. | **Moderate.** Species may pass near the study area. |

| Common and Scientific Name | Status Federal/State | California Distribution | Habitats | Potential Occurrence in Study Area |
|---|---|---|---|---|
| California sea lion<br>*Zalophus californicus californianus* | --/-- | Entire California coastline. | Coastal waters with haul-outs on marina docks, jetties, and buoys. | **High.** Species regularly found in and near the study area. |
| Steller sea lion<br>*Eumetopius jubatus* | FD/-- | Coastal waters ranging from central California to Northern California. | Coastal waters with haul-outs on marina docks, jetties, and buoys. | **Low.** Unlikely to be found in the Bay. |
| Northern fur seal<br>*Callorhinus ursinus* | --/-- | San Miguel Island, off of Southern California, to Northern California. | Mainly pelagic, using only certain offshore islands for pupping and breeding. | **Low.** Unlikely to be found in the Bay. |
| Northern elephant seal<br>*Mirounga angustirostris* | --/-- | Entire California coastline. | During breeding seasons, lives on beaches on offshore islands as well as some remote spots on the mainland; the rest of the year, lives far offshore. | **Low.** Unlikely to be found in the Bay. |
| Harbor seal<br>*Phoca vitulina* | --/-- | Entire California coastline. | Nearshore coastal waters and especially rocky islands, sandy beaches, mudflats, bays, and estuaries. | **Moderate.** Species may pass near the study area. |
| **Fish** | | | | |
| Green sturgeon (southern DPS)<br>*Acipenser medirostris* | FT/SSC | Pacific Ocean, Sacramento, Klamath and Trinity Rivers (Moyle 2002). | Live primarily in the Pacific Ocean, then migrate into freshwater systems to spawn. Juveniles rear in brackish water. Adults spawn in large river systems with well-oxygenated water, with temperatures from 8.0 to 14° C. | **Moderate.** Species may migrate through and forage in the study area. |
| Longfin smelt<br>*Spirinchus thaleichthys* | FC/ST | Within California, mostly in the Sacramento River–San Joaquin River Delta but also in San Francisco Bay, Humboldt Bay, the Eel River estuary, and the Klamath River estuary. | Salt or brackish estuary waters with freshwater inputs for spawning. | **Moderate.** Species may forage in the study area. |

| Common and Scientific Name | Status Federal/State | California Distribution | Habitats | Potential Occurrence in Study Area |
|---|---|---|---|---|
| Central California coast steelhead *Oncorhynchus mykiss* | FT/-- | Russian River to Soquel Creek, Santa Cruz County. | Cold, clear water with clean gravel of appropriate size for spawning. Most spawning occurs in headwater streams. | **Moderate.** Species may migrate through the study area. |
| California coastal Chinook salmon *Oncorhynchus tshawytscha* | FT/-- | Russian River to San Francisco Bay. | Cold, clear water with clean gravel of appropriate size for spawning. Most spawning occurs in streams connected to the ocean. | **Moderate.** Species may migrate through the study area. |
| Spring-run Chinook salmon *O. tshawytscha* | FT/ST | Upper Sacramento River and Feather River. | Has the same general habitat requirements as winter-run Chinook salmon. Coldwater pools are needed for holding adults.[12] | **Low.** Species may migrate through the study area, but the area is outside primary migration routes. |
| Sacramento winter-run Chinook salmon *O. tshawytscha* | FE/SE | Mainstem Sacramento River below Keswick Dam (Moyle 2002). | Occurs in well-oxygenated, cool riverine habitat with water temperatures from 8.0°C to 12.5°C. Habitat types are riffles, runs, and pools.[13] | **Low.** Species may migrate through the study area, but the area is outside primary migration routes. |
| Fall-/late fall-run Chinook salmon *O. tshawytscha* | SC/SSC | Sacramento and San Joaquin Rivers and tributary Central Valley rivers. | Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0°C to 12.5°C. Habitat types are riffles, runs, and pools.[14] | **Moderate.** Species may migrate through the study area. |

[12] Moyle, P. B. 2002. Inland Fishes of California. Revised and expanded. University of California Press.

[13] Moyle, P. B. 2002. *Inland Fishes of California*. Revised and expanded. University of California Press.

[14] Moyle, P. B. 2002. *Inland Fishes of California*. Revised and expanded. University of California Press.

| Common and Scientific Name | Status Federal/State | California Distribution | Habitats | Potential Occurrence in Study Area |
|---|---|---|---|---|
| California coastal coho salmon *O. kitusch* | FE/SE | Includes naturally spawned populations from Punta Gorda in Northern California south to and including the San Lorenzo River in Central California as well as populations in tributaries to San Francisco Bay, excluding the Sacramento-San Joaquin River system. | Occurs in coastal streams with water temperatures < 15°C. Needs cool, clear water with instream cover. Spawns in tributaries to large rivers or streams directly connected to the ocean (Moyle 2002). | **None.** Outside of species range. Extirpated in tributaries connected to the Bay. |
| Pacific herring *Clupea pallasi* | --/State Managed Commercial Fishery | Along California coast to northern Baja California.[15] | Spawning occurs in California from Humboldt Bay to San Francisco Bay in intertidal and shallow subtidal zones. January and February are peak spawning months, but spawning can start in October and continue up to mid-March.[16] | **High.** Species could spawn and rear in the project area. |
| Northern anchovy | EFH coastal pelagic species/-- | Along the California coast from the northernmost part of California to Baja California.[17] | Abundant in the California Current. Moves offshore during the winter months. Moves into nearshore waters in the spring.[18] | **High.** Species captured in large numbers in San Francisco Bay fish studies.[19] |

[15] Love, M. 1996. *Probably More than You Want to Know about the Fishes of the Pacific Coast*. Second edition. Santa Barbara, CA: Really Big Press, 335 pp.

[16] California Department of Fish and Wildlife. 2015. *Supplemental Environmental Document*. Pacific herring commercial fishing regulations. Sections 163 and 164, Title 14, California Code of Regulations.

[17] Pacific Coast Fishery Management Council. No date. *Coastal Pelagic Species: Background*. Available: http://www.pcouncil.org/coastal-pelagic-species/background-information/. Accessed: October 14, 2016.

[18] Kucas, S. T., Jr. 1986. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Northern Anchovy.* U.S. Fish and Wildlife Service Biological Report 82(11.50). U. S. Army Corps of Engineers, TR EL-82-4, 11 pp.

[19] Swanson, C. 2007. *2007 San Francisco Bay Fish Index*. A multi-metric index to evaluate the health of San Francisco Bay's fish community in four sub-regions of the estuary. Prepared for the San Francisco Estuary Project Indicators Consortium. November 30, 2007.

| Common and Scientific Name | Status Federal/State | California Distribution | Habitats | Potential Occurrence in Study Area |
|---|---|---|---|---|
| Brown rockfish<br>*Sebastes auriculatus* | EFH/Pacific groundfish species. | Along the California Coast to Baja California.[20] | Lives in shallow waters and bays. Found primarily in waters with depths of less than 175 feet. Use rocks, pilings, kelp, and other substrate as habitat. Sub-adult and adult brown rockfish are residential, although they migrate into deeper water in the winter.[21] | **High.** Species has been caught in the Bay. |

**Status Explanations:**

FE= Federally Endangered
FT = Federally Threatened
FD = Federally Delisted
FC= Federal Candidate
SE = State Endangered
ST = State Threatened
FP = State Fully Protected
SD = State Delisted
SC = Federal Species of Concern
SSC = State Species of Special Concern
EFH = Essential Fish Habitat

**Potential to Occur in the Study Area:**

High = Species has been documented in the study area.
Medium = Habitat available in study area and could occur.
Low = Habitat in the study area, but low quality habitat.
None = No habitat in the study area and/or out of species range.

[20] California Department of Fish and Wildlife. 2016. *Nearshore Finfish Profiles*. Abbreviated life history of brown rockfish (*Sebastes auriculatus*). Available: https://www.wildlife.ca.gov/Conservation/Marine/Nearshore-Finfish#26187350-brown-rockfish. Accessed: October 14, 2016.

[21] Stein, D., and T. J. Hassler. 1989. *Species Profiles and Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Brown Rockfish, Copper Rockfish, and Black Rockfish*. U.S. Fish and Wildlife Service Biological Report 82(11.113). U.S. Army Corps of Engineers, TR EL-82-4, 15 pp.

***MARINE MAMMALS***

Harbor seals, California sea lions, harbor porpoise, and gray whales all occur in the Bay. None of these species are federally or state listed, but they are protected under the federal Marine Mammal Protection Act (MMPA), which outlaws hunting, killing, capturing, or harassing marine mammals.

Harbor seals remain close to shore in subtidal and intertidal zones. In addition, they often venture into bays and estuaries and swim up coastal rivers. They feed on herring, flounder, anchovy, codfish, and sculpin in shallow waters and are present throughout the year. Breeding in California occurs from February to May, with pupping occurring between mid-March and May.[22] Pupping areas in the San Francisco Bay include Castro Rocks, Mowry Slough, and Newark Slough and smaller numbers at Bair Island in Redwood City.[23] The project area could be used by harbor seals as a feeding area.

California sea lions in the Bay occur throughout the year, but the largest numbers are found during the winter herring run (December through February). The numbers decline to a few individuals by June or July. Sea lions use Pier 39 as a haul-out site.[24,25] Sea lions rarely breed in Northern California; instead, breeding occurs from south of San Luis Obispo County to Baja California.[26] Most pups are born in June or July. Breeding takes place a few weeks after the birth of the pups. Sea lions are opportunistic feeders and eat squid, octopus, herring, rockfish, mackerel, and small sharks.[27] The project area could be used by sea lions as a feeding area.

Harbor porpoises returned to the Bay in 2008 after being absent for nearly 60 years. They are present throughout the year and observed regularly at Raccoon Strait and near Angel, Alcatraz and Treasure Islands. They swim under the Golden Gate Bridge during the high tide and feed on herring, anchovy, jacksmelt, rockfish, and squid. Harbor porpoises calve in early summer, followed by breeding. Gestation lasts 10 to 11 months.[28] The project area could be used by porpoises as a feeding area.

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22 Kopec, D. No date. *Harbor seals in the Bay*. U.S. Fish and Wildlife Service.

23 Phipps, N. 2013. Protecting harbor seals in San Francisco Bay. Save the Bay Blog. Available: http://blog.savesfbay.org/2013/10/protecting-harbor-seals-in-san-francisco-bay. Accessed: November 30, 2016.

24 A haul-out site is defined as an area on land where a pinniped (i.e., seals, sea lions) leaves the water between periods of foraging activity.

25 Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife.* Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

26 San Francisco Bay Area Water Trail. 2016. *Mammals: California Sea Lion*. Available: http://sfbaywatertrail.org/discover-the-bay/about-bay-species/california-sea-lion/. Accessed: August 4, 2016.

27 Marine Mammal Center. 2016. California Sea Lion. Available: http://www.marinemammalcenter.org/education/marine-mammal-information/pinnipeds/california-sea-lion/. Accessed: August 4, 2016.

28 Keener, W. 2011. Safe Harbor: Welcoming Porpoises back to San Francisco Bay. In *Bay Nature Magazine*. Available: http://baynature.org/article/safe-harbor/. Accessed: August 4, 2016.

Gray whales, which are protected under the MMPA, have been sighted in the Bay. Observations are typically off the California coast between December and March, during their southward winter migration to Baja California where calves are born in lagoons and bays from early January to mid-February. Northerly migration to the Bering and Chukchi Seas begins in mid-February, primarily between March and June.[29] Gray whales could enter the Bay during these migration times.

#### FISH

Special-status fish species with the potential to occur in the study area include the green sturgeon southern distinct population segment (DPS) (*Acipenser medirostris*), which is federally listed as threatened; longfin smelt (*Spirinchus thaleichthys*), a federal; candidate and state-listed threatened species, the central California coast steelhead DPS (*Oncorhynchus mykiss*); and several Chinook salmon (*Oncorhynchus tshawytscha*) runs, which are federally listed as threatened and endangered (Table 4.L-1, page 4.L-6). All of these species could forage in the Bay.

Essential fish habitat (EFH) is present in the study area for coastal pelagics, Pacific groundfish, and Chinook salmon. Pacific groundfish species include rockfishes, flatfishes, sharks, etc. Coastal pelagic species include northern anchovy and Pacific sardine. Pacific groundfish and coastal pelagic species are discussed below because of their importance as commercially managed species and presence in the study area.

Green sturgeon enter the Bay during spawning runs between mid-February and early May and immediately migrate up the Sacramento River. In the fall, post-spawned adults migrate back to the ocean. After hatching, larvae and juveniles move down into the Sacramento River–San Joaquin River Delta (Delta). After rearing in the Delta for several years, they migrate out to the ocean.[30] The study area encompasses critical habitat for green sturgeon. Critical habitat for green sturgeon is designated up to mean high water (MHW) in the Bay, including the area beneath piers and in the surrounding water.[31] The study area would provide rearing and migratory habitat for juvenile and adult sturgeon.

Longfin smelt are considered pelagic (open water) and anadromous. Both adult and juveniles are found throughout the year in water of various salinities (from freshwater to seawater), although once they are past the juvenile stage, they are found mainly in water with salinities

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[29] National Oceanic and Atmospheric Administration Fisheries. No date. *Marine Mammal Laboratory*. Marine Mammal Species: Gray Whale (*Eschrichtius robustus*) Available: http://www.afsc.noaa.gov/nmml/species/species_gray.php#pub. Accessed: October 17, 2016.

[30] National Marine Fisheries Service. No date. *Green Sturgeon*. Available: http://www.westcoast.fisheries.noaa.gov/protected_species/green_sturgeon/green_sturgeon_life_history.html. Accessed: August 8, 2016.

[31] 74 *Federal Register* 52300, October 9, 2009

from 14 to 28 parts per thousand.[32] Longfin smelt move into freshwater and may spawn as early as November, but typically from January to April. They are thought to be restricted by a water temperature of 22°C (71°F) but may move toward the ocean in the summer months when temperatures rise in the Delta.[33] The study area could provide rearing and migratory habitat for longfin smelt during summer months.

Central California coast steelhead includes populations from the Russian River south to Aptos Creek in Santa Cruz County, including streams that are tributaries to San Francisco and San Pablo Bays. Adults migrate upstream to freshwater from December to March, and juveniles emigrate downstream to the Bay in late winter and spring.[34] The study area could provide rearing and migratory habitat for both adult and juvenile steelhead.

Several Chinook salmon runs, including the federally endangered winter-run Chinook salmon, enter the Bay from the Pacific Ocean during spawning migration, then head north to the Sacramento River. The name for each run is based on the timing for immigration into freshwater streams to spawn. Peak immigration time for winter-run Chinook salmon is March, spring run is May to June, and fall/late fall run is September to December. Juveniles emigrate downstream to the Delta and estuary between October and July.[35] The study area would provide migratory habitat for adults and juveniles and juvenile rearing habitat.

#### *COASTAL PELAGIC SPECIES*

Pacific herring, which spawns periodically in the Bay, is a state-managed commercial fishery because of its importance as a forage fish for many marine and estuarine species and commercial value. Typically, herring spawns between December and February, but spawning activity has been documented as early as October and as late as mid-March.[36] In 2015–2016, spawning began in late November and ended in mid-March. Spawning areas include Richardson Bay, the San Francisco waterfront, Coyote Point, Paradise Cove-Belvedere Cove,

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[32] Coastal seawater has salinity in the range of 33 parts per thousand. Salinity ranges in the project area vary seasonally because of inflows of freshwater and, thus, can seasonally provide suitable habitat for longfin smelts in winter and spring periods when freshwater inflows occur.

[33] Moyle, P. 2002. *Inland Fishes of California*. Revised and expanded. Berkeley, CA: University of California Press.

[34] Center for Biological Diversity. No date. *Natural History*. Central California Coast Steelhead Trout, *Oncorhynchus mykiss*. Available: http://www.biologicaldiversity.org/species/fish/central_California_coast_steelhead_trout/natural_history.html. Accessed: August 8, 2016.

[35] Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

[36] California Department of Fish and Wildlife. 2015. *Supplemental Environmental Document*. Pacific Herring Commercial Fishing Regulations. Sections 163 and 164, Title 14, California Code of Regulations.

Richardson Bay, Point Richmond, and Tiburon.[37] The study area provides spawning habitat for Pacific herring. Pacific herring spawn in intertidal and nearshore zones in and around the Bay. Eggs are adhesive and deposited on pier pilings or other substrate.

Northern anchovy is another important forage species for larger predators and the most abundant fish in the Bay. The peak time in the Bay is generally from April to October. Spawning occurs in channels, and larvae move into shallow habitat where food is more abundant. The study area may provide rearing habitat for larvae and juvenile northern anchovy.[38] Northern anchovy spawn in the winter and spring in inshore shallow water, at depths of less than 10 meters. The eggs are pelagic, and after hatching, larvae float motionless in the water.[39]

#### *PACIFIC GROUNDFISH*

Brown rockfish occur along the California coast from Mendocino County to San Diego. Rockfish are important sport fishing species. Adults less than 5 years of age occur in the Bay. Older brown rockfish are found in deeper water. Females give live birth, and larvae are 5 to 6 millimeters long. The larvae and small juveniles are pelagic for several months to 1 year.[40]

### WATERS OF THE UNITED STATES

Waters of the United States present in the study area include the San Francisco Bay, China Basin, and Mission Creek, each of which is considered to be a traditional navigable water (TNW). TNWs fall within U.S. Army Corps of Engineers (USACE) jurisdiction under the federal Clean Water Act (CWA). No wetlands are present at the project site.

### MARINE AMBIENT NOISE LEVELS

Under existing conditions, ambient noise levels in the project vicinity are elevated because of shipping activity in the Bay. Reported ambient peak sound levels in the Bay (underwater) range from 120 to 155 decibels (dB) because of heavy industrial use, large marine vessels, and other

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[37] California Department of Fish and Wildlife. 2016. *2015–2016 Herring Season Overview*. Available: https://cdfwherring.wordpress.com/. Accessed: August 8, 2016.

[38] Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife.* Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

[39] Kucas, S. T., Jr. 1986. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Northern Anchovy.* U.S. Fish and Wildlife Service Biological Report 82(11.50). U. S. Army Corps of Engineers, TR EL-82-4, 11 pp.

[40] Stein, D., and T. J. Hassler. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Brown Rockfish, Copper Rockfish, and Black Rockfish. U.S. Fish and Wildlife Service Biological Report 82(11.113). U.S. Army Corps of Engineers, TR EL-82-4, 15 pp.

boat traffic (e.g., ferries).[41] Background levels within 100 meters of large ships can be up to 160 dB root mean square (RMS);[42] within 20 meters of a fish trawler passing at low speed, background levels can be up to 140 dB RMS.[43] Fish or marine mammals that swim within 100 meters of large vessels or 20 meters of a fish trawler would experience even higher levels of sound. Thus, common background levels experienced by fish and marine mammals in the project areas can be up to 160 dB RMS but even greater close to vessels.

## REGULATORY FRAMEWORK

This section summarizes key federal, state, and local regulations that are applicable to biological resources with the potential to be present in the study area.

### FEDERAL

**Endangered Species Act.** The federal Endangered Species Act (ESA) protects fish and wildlife species, including their habitats that have been identified by the National Marine Fisheries Service (NMFS) or USFWS as threatened or endangered. *Endangered* refers to a species, subspecies, or DPS that is in danger of extinction through all or a significant portion of their range. *Threatened* refers to a species, subspecies, or DPS that is likely to become endangered in the near future.

The ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 7 and 9 of the ESA are relevant to the proposed project and are summarized below.

**Section 7: ESA Authorization Process for Federal Actions.** Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by federal agencies. Under Section 7, the federal agency conducting, funding, or permitting an action must consult with NMFS or USFWS, as appropriate, to ensure that the proposed project would not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed project "may affect" a listed species or designated critical habitat, the lead federal agency for any construction, permit, or authorization is required to prepare a Biological Assessment (BA) to evaluate the nature and severity of the expected effect. In response, NMFS or USFWS issues a Biological Opinion (BO), with a determination that the proposed project either:

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[41] California Department of Transportation. 2015. *Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish.* Sacramento, CA. November. Available: http://www.dot.ca.gov/hq/env/bio/fisheries_bio_acoustics.htm. Accessed: August 1, 2016.

[42] Decibel RMS is the change in ambient pressure caused by a sound wave over a given amount of time.

[43] California Department of Transportation. 2015.

- May jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or
- Would not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The BO issued by NMFS or USFWS may stipulate discretionary "reasonable and prudent" conservation measures. If a project would not jeopardize a listed species, USFWS or NMFS would issue an incidental take statement to authorize the proposed activity.

*Critical Habitat.* Critical habitat, as defined in ESA Section 3, is:

I. The specific area within the geographic area occupied by a species, at the time it is listed in accordance with the ESA, on which are found those biological features:

   i. Essential to the conservation of the species, and

   ii. May require special management considerations or protection; and

II. Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

**Section 9: ESA Prohibitions.** Section 9 of the ESA prohibits the take of any fish or wildlife species listed under the ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by federal regulations. *Take*, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, or maliciously damaging or destroying federally listed plants on any site that is under federal jurisdiction.

**Magnuson-Stevens Fishery Conservation and Management Act.** The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires that all federal agencies consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect EFH. *EFH* is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds are considered EFH. The phrase *adversely affect* refers to the creation of any effect that reduces the quality or quantity of EFH. Federal activities that occur outside of an EFH but may nonetheless, have an effect on EFH waters and substrate must also be considered in the consultation process.

Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered. The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other federal statutes, such as the National Environmental Policy Act (NEPA), Fish and Wildlife Coordination Act, CWA, and ESA. EFH consultation requirements can be satisfied through concurrent environmental compliance if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH and the notification meets requirements for EFH assessments.

**Clean Water Act.** The federal CWA is the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. CWA empowers the U.S. Environmental Protection Agency (EPA) to set national water quality standards, as well as effluent limitations, and establishes permit review mechanisms to enforce them. Section 404 of the CWA regulates the discharge of dredged and fill materials into waters of the United States, including wetlands and other waters of the United States as well as the following water bodies:

- All areas within the ordinary high-water mark of a stream, including nonperennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

Section 404 requires project proponents to obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States, including streams, ponds, and wetlands, before proceeding with a proposed activity. CWA Section 401 requires applicants for a Section 404 permit to first obtain certification or a waiver from certification from the Regional Water Quality Control Board (Regional Water Board) to ensure that the proposed project complies with state water quality standards.

**Marine Mammal Protection Act.** The Marine Mammal Protection Act (MMPA) (Title 16, United States Code [USC], 1361–1421h), adopted in 1972, makes it unlawful to take or import any marine mammals and/or their products. An incidental harassment permit may be issued by NMFS to cover activities with negligible effects on species for up to 1 year. The MMPA includes two levels of harassment. Level A harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal in the wild. Level B harassment is defined as harassment having potential to disturb marine mammals by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

**Migratory Bird Treaty Act.** The Migratory Bird Treaty Act (MBTA) protects migratory bird species from take. *Take*, under the MBTA, is defined as an action or an attempt to pursue, hunt, shoot, capture, collect, or kill (50 Code of Federal Regulations [CFR] 10.12). The definition differentiates between "intentional" take (take that is the purpose of the activity in question)

and "unintentional" take (take that results from, but is not the purpose of, the activity in question). The U.S. Courts of Appeal, including the Ninth Circuit, have held that unintentional take is not regulated under the MBTA.

**National Invasive Species Act.** Under the National Invasive Species Act of 1996, the U.S. Coast Guard (USCG) established national voluntary ballast water guidelines. The USCG published regulations on June 14, 2004, establishing a national ballast water management program, with mandatory requirements for all vessels equipped with ballast water tanks that enter or operate in U.S. waters. The regulations carry mandatory reporting requirements to aid in USCG's responsibility, under the National Invasive Species Act, to determine patterns of ballast water movement. The regulations also require ships to maintain and implement vessel-specific ballast water management plans.

### STATE

**California Endangered Species Act.** The California Endangered Species Act (CESA), which is administered by the California Department of Fish and Wildlife (CDFW), protects wildlife and plants that have been listed by the California Fish and Game Commission as threatened or endangered under the act. CESA prohibits all persons from taking species that are state-listed as threatened or endangered, except under certain circumstances. The CESA definition of *take* is any action or attempt to "hunt, pursue, catch, capture, or kill."

CESA Section 2081 provides a means by which agencies or individuals may obtain authorization for incidental take of state-listed species, except for certain species designated as fully protected under the California Fish and Game Code. Take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for a Section 2081 permit are similar to those used in the ESA Section 7 process. They include identification of effects on listed species, development of mitigation measures to minimize and fully mitigate effects, development of a monitoring plan, and assurance of funding to implement mitigation and monitoring.

**California Environmental Quality Act.** Under Section 15380 of the California Environmental Quality Act (CEQA) Guidelines, a species that is not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown by a local agency to meet the criteria" for listing. This provides an agency with the ability to protect species from a project's potential impacts until the responsible government agencies have an opportunity to designate the species as protected, if warranted.

**California Native Plant Protection Act.** With respect to rare plant species, CESA defers to the National Plant Protection Act (NPPA) of 1977, which prohibits importing rare and endangered plants into California, taking rare and endangered plants (in certain circumstances), and selling rare and endangered plants. State-listed plants are protected mainly when state agencies are involved in projects under CEQA. The NPPA does not prohibit taking rare and endangered plants incidental to possession or sale of real estate (California Fish and Game Code Section

1908); consequently, it does not prohibit removal of a rare or endangered plant in the course of development of land but, rather, only in the context of removal of the plant for the purposes of sale. Owners of land with known rare or endangered species are required to notify CDFW of plans to change land use a minimum of 10 days prior to the change to allow CDFW time to salvage the plants. However, if CDFW fails to respond within these 10 days, then the land owner may proceed with the land use change (California Fish and Game Code Section 1913(c)).

**Porter-Cologne Water Quality Control Act.** California Water Code Section 13260 requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." Under the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), *waters of the state* are "any surface water or groundwater, including saline waters, within the boundaries of the state." Although all waters of the United States that are within the borders of California are also waters of the state, the reverse is not true. Therefore, California retains authority to regulate discharges of waste into any waters of the state, regardless of whether USACE has concurrent jurisdiction under CWA Section 404. If USACE determines that a wetland is not subject to regulation under Section 404, CWA Section 401 water quality certification is not required. However, the Regional Water Quality Control Board (RWQCB) may impose waste discharge requirements if fill material is placed into waters of the state. In the project area, all of the marine waters are both waters of the United States and waters of California; therefore, the CWA Section 401 water quality certification from the San Francisco RWQCB will address the same waters addressed by the USACE permit under CWA Section 404 (see discussion above).

**California Fish and Game Code.** The California Fish and Game Code provides protection from take for a variety of species, referred to as Fully Protected Species. Section 3511 lists fully protected birds, Section 3515 lists fully protected fish, Section 4700 lists fully protected mammals, and Section 5050 lists fully protected amphibians and reptiles. The California Fish and Game Code, Section 86, defines *take* as any action to "hunt, pursue, catch, capture, or kill or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of Fully Protected Species is prohibited.

Sections 3503 and 3800 of the California Fish and Game Code prohibit the "take, possession, or destruction of birds, their nests, or eggs" and the "take of nongame birds." Section 3503.5 specifically prohibits the take, possession, or destruction of birds of prey (hawks, eagles, owls, and allies, often referred to as "raptors") and their nests. Human disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered take. Removal of vegetation is the most common action that can lead to a violation of these code sections.

**Marine Life Management Act**. Within California, most of the legislative authority over fisheries management is enacted within the Marine Life Management Act. This law directs CDFW and the California Fish and Game Commission to issue sport and commercial harvesting licenses

and also license aquaculture operations. CDFW, through the commission, is the state's lead biological resource agency. CDFW is responsible for enforcement of the state's endangered species regulations and the protection and management of all state biological resources.

**Marine Invasive Species Act**. All shipping operations that involve major marine vessels are subject to the Marine Invasive Species Act of 2003 (Public Resources Code Sections 71200–71271), which revised and expanded the California Ballast Water Management for Control of Nonindigenous Species Act of 1999 (Assembly Bill 703). This act is administered by the State Lands Commission. The act regulates the handling of ballast water from marine vessels at California ports to prevent or minimize the introduction of invasive species from other regions.

**California Species of Special Concern.** CDFW maintains lists of Species of Special Concern that receive special attention from federal agencies during environmental review, although they are not otherwise protected under the ESA. Project-related impacts on such species would be considered significant under CEQA Guidelines Section 15380 and require mitigation. The definition for *Species of Special Concern* includes one or more of the following (not necessarily mutually exclusive) criteria:

- Is extirpated from the state or, in the case of birds, its primary seasonal or breeding role;
- Is listed as federally, but not state, threatened or endangered;
- Meets the state definition of threatened or endangered but has not formally been listed;
- Is experiencing, or has formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status;
- Has naturally small populations, exhibiting high susceptibility to risk from any factor(s) and, if realized, could lead to declines that would qualify it for state threatened or endangered status."

CDFW's Nongame Wildlife Program is responsible for producing and updating Species of Special Concern publications for mammals, birds, and reptiles and amphibians. Section 15380 of the CEQA Guidelines indicates that Species of Special Concern should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein. In contrast to species listed in the federal ESA or CESA, however, Species of Special Concern have no formal legal status.

**Sensitive Natural Communities.** Special-status or sensitive natural communities (vegetation types) have limited distribution statewide or within a county or region. CDFW's Vegetation Classification and Mapping Program (VegCAMP) works to classify and map the vegetation of California and determine the rarity of vegetation types. The current version of CDFW

VegCAMP's List of Vegetation Alliances and Associations (or Natural Communities List[44]) indicates which communities are currently considered rare or highly imperiled. Communities with a state rarity ranking of S1–S3 (based on NatureServe's Heritage Methodology) are considered rare or imperiled, and impacts on such communities may be considered significant under CEQA.

## REGIONAL

**San Francisco Bay Conservation and Development Commission (BCDC) Bay Plan.** BCDC has permit authority over development of the Bay and the shoreline pursuant to the McAteer-Petris Act (California Government Code Section 66000 et seq.). The act requires the BCDC to prepare a "comprehensive and enforceable plan for the conservation of the water of the San Francisco Bay and the development of its shoreline." In 1969, BCDC submitted the completed San Francisco Bay Plan to the governor and legislature. The McAteer-Petris Act was later amended to give the San Francisco Bay Plan the force of law.

BCDC has jurisdiction over all filling, dredging, and changes to uses in the Bay; regulates new development within 100 feet of the shoreline that is subject to tidal action to ensure that maximum public access to the Bay is provided; and ensures that the limited amount of shoreline that is suitable for regional high-priority, water-oriented uses is reserved for such purposes. BCDC jurisdiction over piers that predate its establishment in 1965 is treated differently, depending on the scope of work proposed. Proposed development that does not involve any additional coverage of Bay water or any work on piers or pier substructures is treated within the BCDC shoreline-band jurisdiction. Work that involves removal and replacement of all or a substantial portion of a pier deck to extend the life of the pier or work that changes the use of the structure is treated as work within BCDC's Bay jurisdiction. The project would involve removal of the pier deck and associated wooden pilings, installation of a new pier deck and pilings and change in use. BCDC permits would be required for construction activities, the placement of fill, dredging, and a change in use.

BCDC policies are articulated in the McAlteer-Petris Act, San Francisco Bay Plan, and San Francisco Waterfront Special Area Plan, which outline permitted uses and conditions for those permitted uses on piers and in adjacent areas. These plans are discussed in detail in Chapter 3, *Plans and Policies*.

The Bay Plan also includes the "Replacement Fill Policy," also known as the "50 Percent Rule," which includes certain public access and fill removal requirements that apply to publicly owned pile-supported piers, including piers along the San Francisco waterfront. The 50 Percent Rule

[44] California Department of Fish and Game. 2010. *List of Vegetation Alliances and Associations*. Vegetation Classification and Mapping Program. Sacramento, CA. September.

requires pier development projects that include seismic retrofit or major substructure repair to limit the development to 50 percent of the pier area for water-oriented commercial recreational uses only. The remaining 50 percent of the pier area is required to provide onsite public access, fill removal, or a combination of the two. As explained in Chapter 3, *Plans and Policies*, the California legislature (per Assembly Bill 2797) amended BCDC's Special Area Plan to authorize BCDC to exempt the Pier 48 work from the 50 Percent Rule, thereby alleviating any potential inconsistency.

### LOCAL

**City and County of San Francisco (City) General Plan (General Plan).** The following objectives and policies from the Environmental Protection Element of the General Plan are applicable to the proposed project:

- Objective 1: Achieve a proper balance among the conservation, utilization, and development of San Francisco's natural resources.
- Policy 1.1: Conserve and protect the natural resources of San Francisco.
- Policy 1.2: Improve the quality of natural resources.
- Policy 1.3: Restore and replenish the supply of natural resources.
- Policy 1.4: Assure that all new development meets strict environmental quality standards and recognizes human needs.
- Objective 3: Maintain and improve the quality of the bay, ocean, and shoreline areas.
- Policy 3.1: Cooperate with and otherwise support regulatory programs of existing regional, State, and Federal agencies dealing with the Bay, Ocean, and Shorelines.
- Policy 3.2: Promote the use and development of shoreline areas consistent with the General Plan and the best interest of San Francisco.
- Objective 7: Assure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the city's citizens.
- Policy 7.1: Preserve and add to public open space in accordance with the objectives and policies of the Recreation and Open Space Element.
- Policy 7.3: Require that filling of land adhere to the highest standards of soils engineering consistent with the proposed use.
- Objective 8: Ensure the protection of plant and animal life in the city.
- Policy 8.1: Cooperate with and otherwise support the California Department of Fish and Game and its animal protection programs.

- Policy 8.2: Protect the habitats of known plant and animal species that require a relatively natural environment.
- Policy 8.3: Protect rare and endangered species.

**San Francisco Bird-Safe Building Ordinance.** San Francisco Planning Code Section 139, Standards for Bird-Safe Buildings,[45] focuses on buildings, both public and private, that create location-specific hazards (building location increases bird injury and mortality) and building-feature hazards (increased bird injury and mortality regardless of location).

Location-specific hazards apply to buildings in or within 300 feet of an Urban Bird Refuge and having a direct line of sight. An Urban Bird Refuge is defined as "open spaces 2 acres and larger dominated by vegetation, including vegetated landscaping, forests, meadows, grassland, or wetlands or open water." Section 139 requires 90 percent of glazing in the "Bird Collision Zone" (60 feet above grade, plus 60 feet above an adjacent vegetated roof 2 acres or larger) to be treated (fritted,[46] stenciled, frosted, or covered with netting, screens, grids, or bird-visible ultraviolet patterns, as defined in Section 139). Lighting must also be minimized, and any wind generators must comply with San Francisco Planning Department requirements, "including any monitoring of wildlife impacts that the department may require."

For location-related hazards involving new buildings, the following requirements apply:

- Façade Treatments: A bird-safe glazing treatment is required such that the Bird Collision Zone consists of no more than 10 percent untreated glazing. Building owners are encouraged to concentrate permitted transparent glazing on the ground-floor and lobby entrances to enhance visual interest for pedestrians.
- Lighting Design: Minimal lighting shall be used. Lighting shall be shielded. No uplighting shall be used. No event searchlights should be permitted for the property.

In addition to regulating buildings that pose a locational hazard to birds (buildings in and within 300 feet of an Urban Bird Refuge), Section 139 applies similar standards to all new or substantially remodeled buildings in San Francisco with certain features (feature-related standards). Specifically, all "free-standing glass walls, wind barriers, skywalks, balconies, and greenhouses on rooftops that have unbroken glazed segments approximately 24 square feet and larger in size" must be treated with a bird-safe glazing treatment, such as fritting, netting, permanent stencils, frosted glass, exterior screens, physical grids placed on the exterior of the glazing, or ultraviolet patterns that are visible to birds. For both locational and feature-related

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[45] City and County of San Francisco. 2011. *Standards for Bird-Safe Buildings*. San Francisco Planning Department. July 14. Available: http://sf-planning.org/standards-bird-safe-buildings.

[46] *Fritted glass* refers to glass with ceramic or metal particles that have been fused to glass to create an opaque or textured surface. The particles are generally opaque and can be applied to either the entire surface of the glass or just particular areas to create decorative patterns.

hazards, vertical elements of the window patterns should be at least ¼ inch wide, with a minimum spacing of 4 inches, or have horizontal elements at least ⅛ inch wide, with a maximum spacing of 2 inches.

**Protected Trees.** The Urban Forestry Ordinance (San Francisco Public Works Code Article 16, Sections 800–814) protects significant, street, and landmark trees within the city.[47] Significant trees are located within 10 feet of a public right-of-way and meet certain size requirements: 20-foot or greater height, 15-foot or greater canopy width, or 12-inch or greater trunk diameter measured at 4.5 feet above grade. A permit is required before any significant tree can be removed. A street tree is any tree in the public right-of-way. A tree removal permit is required to remove any street tree in San Francisco. Lastly, landmark trees are trees that have been designated by the Board of Supervisors because of the rareness of the species, size or age, extraordinary structure, ecological contribution, or historical or cultural importance. Trees that have been designated by the City for landmark status are protected from physical damage or removal.

**Biodiversity Policy and Goals.** The City's Biodoversity Policy calls for the City's biological resources to be protected and restored. SF Environment has established a Biodiversity Program to protect, enhance, and restore the biodiversity, habitats, and ecological integrity of San Francisco's natural environment in parks, wildlands, neighborhoods, and the built environment and connect San Franciscans to nature in their city. The goals of the Biodiversity Program include the following:

- Human-Nature Connection. Cultivate a positive and healthy awareness, respect, and celebration of our local nature and biodiversity to create civic pride and mutually beneficial human-nature relationships.
- Biologically Rich Ecosystems. Conserve and restore natural areas and habitats of the indigenous ecosystem and watersheds of the northern San Francisco peninsula, and manage them for the species, habitat diversity, and natural resources as the foundation for our thriving and resilient city.
- A Living City with Habitat Corridors. Integrate biodiversity and natural systems into planning, design, and implementation for the built environment for an improved and enriched quality of life for people and wildlife and a sense of place for all San Franciscans in their neighborhoods.
- Citywide Biodiversity Program and Model Policies. Institutionalize local nature and biodiversity policies and practices among government, businesses, communities, and educational institutions.

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[47] City and County of San Francisco. 2015. *Urban Forestry Ordinance*. Available: http://sfdbi.org/sites/sfdbi.org/files/migrated/ftp/uploadedfiles/dbi/Key_Information/TreeProtectionLegislation.pdf.

# ENVIRONMENTAL IMPACTS

This section describes the impact analysis related to biological resources for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

## SIGNIFICANCE CRITERIA

The proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

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

## METHODS FOR ANALYSIS

### GENERAL IMPACT ANALYSIS METHODS

The presence of special-status species in the study area was determined through a review of CNDDB records, the CNPS list and the USFWS list (Appendix 9 and Table 4.L-1, page 4.L-6). The identification of potential impacts on special-status species was based on which species and habitats were present in the study area and the consequences of project construction and operation on those species and habitats. The significance criteria above were used to determine the level of impact.

### PILE DRIVING THRESHOLDS FOR IMPACT ANALYSIS FOR FISH

The assessment of pile-driving noise impact on fish was based on consideration of specific noise thresholds and ambient noise levels.

Since 2000, transportation agencies, resource agencies, ports, and other entities have been developing criteria for determining impacts and appropriate mitigation measures to protect fish from substantial harm due to underwater pile-driving sounds. In 2004, the California Department of Transportation (Caltrans) established a Fisheries Hydroacoustic Working Group (FHWG) to facilitate the development of interim criteria, based on best available scientific information. The FHWG includes participants from Caltrans, the Washington Department of Transportation, Oregon Department of Transportation, NMFS, USFWS, CDFW, and USACE. The FHWG is supported by a panel of hydroacoustic and fisheries experts and overseen by a steering committee composed of managers with decision-making authority from each of the members' organizations.

In June 2008, member agencies of the FHWG agreed in principle to interim criteria for assessing injuries to fish from underwater sound pressure caused by in-water use of an impact hammer. The criteria identified thresholds, both for the peak sound-pressure level (i.e., the largest absolute value of instantaneous sound pressure) and the cumulative sound exposure level (SEL) (i.e., the sum of acoustical energy over all pile strikes), for the onset of physical injury to fish. Different cumulative SELs are established for fish that are greater than or equal to 2 grams and fish that are less than 2 grams (because smaller fish are more susceptible to injury). Physical injury to fish is expected if either of these thresholds is exceeded. The FHWG thresholds for peak noise levels and accumulated sound levels are set out in Table 4.L-2, below.

**TABLE 4.L-2. SUMMARY OF IMPACT PILE DRIVING NOISE THRESHOLDS FOR FISH**

| | |
|---|---|
| **Peak Noise Level Injury Evaluation** | |
| Injury Threshold (dB) | 206 dB |
| **Accumulated Sound Level Injury Evaluation** | |
| Injury Thresholds (Cumulative SEL) | Fish ≥ 2 g (187 dB); Fish < 2 g (183 dB) |
| **Behavioral Effects Evaluation** | |
| NMFS Threshold (RMS) | 150 dB |
| Upper Range of Background levels | 160 dB |

Sources:
Injury Thresholds: Fisheries Hydroacoustic Working Group (FHWG), as cited in Caltrans 2015.
Behavioral Threshold: NMFS, as cited in Caltrans 2015.
Range of Background Levels: Caltrans. 2015.

The injury thresholds criteria above are not considered appropriate for assessing the effects of project-related vibratory pile driving.[48] Vibratory hammers generally produce less sound than impact hammers in that they generally produce continuous and lower-intensity sound that is below the levels known to cause injury in fish. Vibratory drivers are often included in mitigation measures to reduce the adverse effects on fish that result from impact pile driving. There are no established injury criteria for fish related to vibratory pile driving, and resource agencies in general are not concerned about vibratory pile driving resulting in adverse effects on fish.[49]

Little is known about how pile driving and other sources of human-generated noise actually affect behavior in fish. However, it is thought that underwater noise may disrupt or alter essential behavior or activities (e.g., migration, feeding, sheltering) and affect a fish's ability to grow, survive, or reproduce.[50] NMFS recommends a separate threshold of 150 dB RMS for the behavioral effects of listed salmonids when evaluating impact pile driving.[51] However, there is no scientific support for this criterion or evidence to determine its applicability to particular species. Given that background levels experienced by fish in the central part of San Francisco Bay (including the project site) are up to 160 dB RMS (and greater), the threshold used for the assessment of behavioral effects is the upper range of the background levels (160 dB RMS) instead of the NMFS behavioral threshold for fish. Common and special-status fish species (including salmonids) are present throughout the central San Francisco Bay where vessel and industrial activity results in ambient noise levels far above that which would be encountered in quiescent areas lacking such anthropogenic activity. Noise levels from pile-driving within the range of existing baseline levels would not be expected to result in long-term changes in fish behavior or fish population.

### Pile Driving Thresholds for Impact Analysis for Marine Mammals

The assessment of pile-driving noise impact on marine mammals was based on consideration of specific noise thresholds and ambient noise levels.

NMFS recommends specific thresholds for different marine mammal species to evaluate when auditory effects are likely to occur, including different thresholds for physical injury due to peak noise and accumulated sound levels, disturbance due to airborne noise (e.g., noise at haul-out areas), and behavioral effects.[52]

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48 California Department of Transportation. 2015.

49 California Department of Transportation. 2015.

50 California Department of Transportation. 2015.

51 California Department of Transportation. 2015.

52 National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016. Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing. Underwater acoustic thresholds for onset of permanent and temporary threshold shifts. National Oceanic and Atmospheric Administration Technical memorandum NMFS-OPR-55. July.

Auditory injury effects are defined in terms of either a temporary or permanent threshold shift. A temporary threshold shift (TTS) results in temporary hearing loss. A permanent threshold shift (PTS) results in permanent hearing loss. The NMFS thresholds address impact hammer pile driving and vibratory pile driving and removal separately. NMFS-recommended injury thresholds are listed in Table 4.L-3 (impact hammer pile driving), below, and Table 4.L-4 (vibratory pile driving and removal) on the following page.

NMFS has also developed thresholds for the evaluation of behavioral thresholds for airborne noise and in-water noise. The airborne criteria are most suitable for analyzing impacts to sea lions and harbor seals when they reside above water; specifically this criteria is used to evaluate impacts to marine mammals in haul-out areas. The airborne criteria are listed in Table 4.L-3, below, and Table 4.L-4 on the following page.[53]

**TABLE 4.L-3. SUMMARY OF IMPACT PILE-DRIVING NOISE THRESHOLDS FOR MARINE MAMMALS**

| *Species* | Harbor Seal | Sea Lion | Harbor Porpoise | Gray Whale |
|---|---|---|---|---|
| **Peak Noise Level Injury Evaluation** | | | | |
| Peak Thresholds (dB) | 218 dB | 232 dB | 202 dB | 219 dB |
| **Accumulated Sound-Level Injury Evaluation** | | | | |
| Accumulated Sound Daily Thresholds (Cumul. SEL) | 185 dB | 203 dB | 155 dB | 183 dB |
| **Airborne Noise Evaluation** | | | | |
| Airborne Threshold (RMS, haul-out areas only) | 90 dB (Harbor Seals)/100 dB (Sea Lions) | | | |
| **Behavioral Evaluation** | | | | |
| Behavioral Threshold (RMS) | 160 dB – not used for analysis | | | |
| Upper Range of Background Levels (RMS) | 160 dB – used for analysis | | | |

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.

Source for Airborne and Behavioral Thresholds: National Marine Fisheries Service, No Date.

Source for Background Noise Levels: Caltrans. 2015.

[53] National Marine Fisheries. No Date. Interim Sound Threshold Guidance website. Accessible: http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/threshold_guidance.html. Last accessed, March 23, 1017.

**TABLE 4.L-4. SUMMARY OF VIBRATORY PILE-DRIVING AND REMOVAL-RELATED NOISE THRESHOLDS FOR MARINE MAMMALS**

| *Species* | Sea Lion | Harbor Seal | Harbor Porpoise | Gray Whale |
|---|---|---|---|---|
| **Accumulated Sound-Level Injury Evaluation** | | | | |
| Accumulated Sound Thresholds (Cumul. SEL) | 219 dB | 201 dB | 173 dB | 199 dB |
| **Airborne Noise Evaluation** | | | | |
| Airborne Threshold (RMS, haul-out areas only) | 90 dB (Harbor Seals)/100 dB (Sea Lions) | | | |
| **Behavioral Effects Evaluation** | | | | |
| Behavioral Threshold (RMS) | 120 dB – not used for analysis | | | |
| Upper range of background levels (RMS) | 160 dB– used for analysis | | | |

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.
Source for Airborne and Behavioral Thresholds: National Marine Fisheries Service, No Date.
Source for Background Noise Levels: Caltrans. 2015.

In-water noise associated with pile driving may startle marine mammals and result in dispersion from the study area. NMFS has identified behavior thresholds for impact pile driving (160 db RMS) and vibratory pile driving/removal (120 dB RMS) as well.[54] NMFS guidance states that the behavioral threshold for vibratory pile driving/removal may be adjusted if background noise levels are above the NMFS threshold. Given the industrial nature of activity in the central San Francisco Bay (e.g., port and waterfront industrial activity, large marine vessel movements, and other frequent vessel movements), the behavioral thresholds used by NMFS are considered inappropriate for such an active and noisy environment. These thresholds would be better suited for areas with low ambient noise levels where marine mammals are not routinely exposed to elevated anthropogenic sound levels. Marine mammals in the central Bay already experience elevated sound levels. Given that background levels experienced by marine mammals in the central part of San Francisco Bay (including the project site) are up to 160 dB RMS (and greater), the threshold used for the assessment of behavioral effects is the upper range of the background levels (160 dB RMS) instead of the NMFS behavioral threshold. Harbor seals and sea lions (and occasionally harbor porpoise) are present in the central San Francisco Bay where vessel and industrial activity results in ambient noise levels far above that which would be encountered in quiescent areas lacking such anthropogenic activity. Noise levels from pile-driving within the range of existing baseline levels would not be expected to result in long-term changes in marine mammal behavior or marine mammal populations.

[54] National Marine Fisheries. No Date.

## LAND USE ASSUMPTIONS

As described in Chapter 2, *Project Description*, this environmental impact report (EIR) analyzes two land use assumptions: High Commercial and High Residential. These assumptions represent the full range of land uses and the building program that could be developed on the project site under the proposed flexible zoning for Blocks H, I, and J. Although the land use mix between High Commercial and High Residential would differ, the two assumptions would have a similar total square footage, similar building configuration (with the exception of the building height on Blocks H, I, and J), and similar construction characteristics, including the amount of landside and in-water pile driving. Therefore, the differences between the two assumptions would not result in any meaningful difference in potential impacts on biological resources. As such, the following analysis applies to both the High Commercial and High Residential land use assumptions.

## TOPICS NOT EVALUATED IN DETAIL

The study area is almost entirely paved and located within an urban setting. The project site does not include riparian habitat, sensitive natural communities, or federally protected wetlands, nor are these resources present in areas that would be affected by project construction. Therefore, impacts pertaining to riparian habitat, sensitive natural communities, and federally protected wetlands are not evaluated further. In addition, there are no adopted habitat conservation or natural community conservation plans or locally designated natural areas or conservation plans that apply in the project area. Therefore, impacts pertaining to conflicts with adopted habitat conservation or natural community conservation plans are not evaluated further.

## IMPACTS AND MITIGATION MEASURES

The impact discussion below addresses the project's construction and operational impacts on biological resources under multiple impact headings: Impact BI-1 (water quality impacts), BI-2 (shading and changes in habitat acreage impact on special-status species), BI-3 (pile-driving impacts on fish and marine mammals), BI-4 (impacts on wildlife movement), BI-5 (impacts on migratory birds), and BI-6 (impacts related to local policies or ordinances for protecting biological resources).

**Impact BI-1. Construction and operation of the proposed project would not decrease water quality to the extent that a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS would occur. (Less than Significant)**

#### CONSTRUCTION IMPACTS

Implementation of the proposed project would include construction activities, such as asphalt demolition, rough grading and excavation, pile driving (landside), new building construction, rehabilitation of existing facilities (Pier 48 and associated aprons), paving, and landscaping. Additionally, the seismic upgrading required for Pier 48 would include the installation of approximately 106 new piles below a new, heavily reinforced concrete apron. The modified portions of the aprons would be approximately 12 feet wide, 6 feet deep, and 40 feet long and located at both the north and south perimeter of the pier, replacing portions of the exterior pier deck in these locations. Along with demolition of the existing perimeter deck, approximately 675 existing 24-inch rounded creosote-treated wood piles would be extracted with a vibratory extractor to make way for the new piles. The new pile work would include both precast concrete and cylindrical steel-cased piles.

Construction of the Pier 48 seismic improvements mentioned above, which would last approximately 16 months, has the potential to contribute contaminants into and increase the turbidity of the Bay. Depending on the level of exposure, suspended sediment (i.e., turbidity) can cause lethal, sublethal, or behavioral effects in fish.[55] For salmonids (Chinook salmon and steelhead), an elevated level of suspended sediment (turbidity) has been linked to a number of behavioral and physiological responses (gill flaring, coughing, avoidance, and an increase in blood sugar levels) that indicate some level of stress.[56,57,58] Although turbidity may cause stress,

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[55] Newcombe, C. P., and J. Jensen. 1996. Channel *Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact*. Victoria, BC: Ministry of Environment, Lands, and Parks, Habitat Protection Branch.

[56] Sigler, J. W., T. C. Bjornn, and F. H. Everest. 1984. Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon. *Transactions of the American Fisheries Society* 113:142–150.

[57] Berg, L., and T. G. Northcote. 1985. Changes in Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (*Oncorhynchus kisutch*) Following Short-Term Pulses of Suspended Sediment. *Canadian Journal of Fisheries and Aquatic Science* 42:1410–1417. Vancouver, BC: Institute of Animal Resource Ecology, University of British Columbia. May. Available: http://www.for.gov.bc.ca/hfd/library/ffip/Berg_L1985CanJFishAquatSci.pdf.

[58] Servizi, J. A., and D. W. Martens. 1992. Sublethal Responses of Coho Salmon (*Oncorhynchus kisutch*) to Suspended Sediments. *Canadian Journal of Fisheries and Aquatic Science* 49:1389–1395.

studies[59] have shown that moderate levels of turbidity (35 to 150 nephelometric turbidity units[60] [NTUs]) accelerate foraging rates among juvenile Chinook salmon, most likely because of reduced vulnerability to predators (camouflaging effect). The potential effects would be most acute directly below the construction work area but would decrease with distance from the construction work area as suspended sediment settles out of the water column. Chronic exposure to high turbidity and suspended sediment also may affect growth and survival by impairing respiratory function, reducing tolerance to disease and contaminants, and causing physiological stress. High suspended-sediment concentrations can also indirectly affect fish feeding and growth by burying stream substrates and degrading the quality of the substrate for aquatic invertebrates, an important food source for juvenile salmonids and other fish.

Releases of contaminants, such as gasoline, diesel fuel, lubricants, hydraulic fluid, or other fluids that are contained in construction equipment, including heavy equipment near open water, could result in acute negative effects on special-status fish species such as steelhead, Chinook salmon, longfin smelt, and green sturgeon as well as invertebrates.[61] In addition, long-term effects could result if a spill were not properly remediated. The potential sources of contaminants in the study area would be the construction equipment (lubricating oils and fuel) and debris from the piles being removed from Pier 48, which contain creosote. Temporary water quality effects could occur during pile removal because of the resuspension of sediments containing organic compounds and debris produced during removal. These in-water construction activities would result in short-term disturbance of localized Bay sediments and temporary impacts to water quality. These substances can cause mortality to aquatic organisms through exposure to lethal concentrations or exposure to nonlethal levels that cause physiological stress and increased susceptibility to other sources of mortality, such as disease.[62] Petroleum products also tend to form oily films on the water surface that can reduce dissolved oxygen (DO) levels available to aquatic organisms.

Removal of the creosote-treated wood pilings may release toxic compounds, but there would be an overall long-term benefit in water quality by replacing the old pilings with precast concrete and steel-cased concrete-filled piles. Removal of the wood pilings would reduce the amount of

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[59] Gregory, R. S., and T. G. Northcote. 1993. Surface, Planktonic, and Benthic Foraging by Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in Turbid Laboratory Conditions. *Canadian Journal of Fisheries and Aquatic Sciences* 50:233–240.

[60] Nephelometric turbidity units (NTUs) is the measurement of turbidity (the cloudiness or haziness of a fluid caused by suspended solids).

[61] National Marine Fisheries Service. 2006. *Biological Opinion for the Sacramento River Flood Control Project.* Critical Levee Erosion Repair Project, 151422SWR2006SA00115:HLB. Long Beach, CA. June.

[62] Dupuis, A., and F. Ucan-Marin. 2015. *A Literature Review of the Aquatic Toxicology of Petroleum Oil: An Overview of Oil Properties and Effects to Aquatic Biota.* Department of Fisheries and Oceans Canadian Science Advisory Secretariat. Research Document 2015/007.

creosote that leaches into the Bay. In addition, precast concrete and steel-cased concrete-filled piles are nontoxic. Therefore, long-term improvements to water quality would result. As discussed under Impact HY-1 in Section 4.N, *Hydrology and Water Quality*, the proposed project would not result in a violation of water quality standards or Waste Discharge Requirements. Construction activities within the Bay would be subject to the requirements of a Section 10 permit from USACE, which would receive Water Quality Certification from the Regional Water Board as well as a Major Permit from the BCDC. The permits would specify best management practices (BMPs) and require preparation and implementation of plans for the protection of water quality (e.g., Debris Management Plan, Spill Resource and Countermeasure Plan, Materials Management Disposal Plan), proper fuel transfer procedures, and equipment maintenance to minimize fuel leaks and spills. In addition, barge mooring requirements would be implemented to ensure that construction debris would be captured. Other measures would prevent cement, concrete, and saw water[63] from entering the Bay or ensure the proper disposal of construction material. Therefore, potential surface water quality impacts from project construction would be ***less than significant,*** and potential impacts on special-status fish species from a decrease in water quality associated with project construction would be ***less than significant***.

#### OPERATIONAL IMPACTS

As discussed in Section 4.N, *Hydrology and Water Quality*, Impact HY-1, runoff from impervious surfaces could contain nonpoint pollution sources, which are typical in urban settings. These are normally associated with automobiles, trash, cleaning solutions, and landscaped areas. Stormwater would be drained by new pipes, drainage inlets, and other storm drain facilities, which would be connected to the existing storm drain system that serves the site (Figure 4.N-1, page 4.L-2). All flows from the project site would discharge to new or existing storm drainage facilities and be discharged to the Bay.

For areas draining directly to Lower San Francisco Bay, the proposed project would be required to comply with San Francisco's stormwater management requirements, as outlined in the Stormwater Management Ordinance and the corresponding San Francisco Stormwater Management Requirements and Design Guidelines (SMR). This is because project operations would involve ground disturbance (or impervious surface creation/replacement) of 5,000 gsf or greater. The stormwater management measures utilize low-impact development techniques, such as green roofs, pervious pavements, rain gardens or bio-retention areas, and flow-through planters, to reduce pollutant discharges. These low-impact development features treat stormwater runoff through biological uptake. Plant materials filter pollutants through their

[63] Sawdust from woodcutting that is entrained in water. Water is often used as a dust suppressant for sawdust, which can result in runoff of saw water.

sandy loam substrate while aesthetically enhancing landscape designs. Stormwater management measures would be designed according to the SMR. For further details, see Section 4.N, *Hydrology and Water Quality*, Impact HY-1.

Compliance with both the SMR and Leadership in Energy and Environmental Design (LEED) regulations described in Section 4.N, *Hydrology and Water Quality*, Impact HY-1, would allow the project to achieve its long-term sustainable approach to planning and design as well as meet the stormwater requirements established by the City and the Port of San Francisco (Port) for the municipal separate storm sewer system (MS4).[64] Therefore, potential surface water quality impacts from project operation would be ***less than significant,*** and potential impacts on special-status fish species from a decrease in water quality associated with project operation would be ***less than significant***.

**Impact BI-2. Changes in shading and habitat at Pier 48 would not result in a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS. (Less than Significant)**

This impact discussion addresses the project's construction and operational impacts on candidate, sensitive, or special-status species due to shading and changes in habitat acreage as a result of changes in the amount of fill.

#### CONSTRUCTION IMPACTS

Pier 48 would be seismically upgraded and rehabilitated by replacing the existing creosote-treated wood piles with new precast concrete piles, steel-cased concrete-filled piles, and wood framing. Cap beams, stringers, and decking would be installed on top of the piles, and new asphalt or concrete would be placed on the rebuilt surface. Construction activities at Pier 48 would occur over the course of approximately 16 months. Overwater and in-water structures, including barges associated with construction activities, can alter underwater light conditions and result in a decrease in photosynthesis of diatoms, benthic algae, eelgrass and other aquatic plants, decreasing prey items for fish.[65]

The project site water area under Pier 48 is currently shaded by the structure. Light conditions are limiting productivity under the pier (e.g., no eelgrass is present near or under the pier[66]). Invertebrate, fish, and aquatic plant occurrences under docks have been found to be severely

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[64] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

[65] B. Nightingale and C. Simenstad. 2001. *Overwater Structures: Marine Issues.* Submitted to Washington Department of Fish and Wildlife. Washington Department of Ecology. Washington Department of Transportation. May 9.

[66] Data Basin. 2016. San Francisco Bay Eelgrass. 2009 eelgrass distribution. Available: https://databasin.org/maps/new#datasets=7dddaf6dcdba4cfea7e037b3bdc7f4db. Accessed: November 30, 2016.

limited when compared to adjacent unshaded vegetated habitat in the Pacific Northwest.[67,68] Shading due to barges moving in and out of the project area during project construction may temporarily shade a larger portion of the project area compared with what is currently shaded but would not alter existing conditions in the area because any shading would be of short duration and would not expand the area that is permanently shaded.

Regarding project fill, the project would remove approximately 675 24-inch (diameter) rounded creosote-treated wood piles and replace them with 62 18- or 24-inch-wide square precast concrete piles and 44 steel-cased concrete-filled piles, which are anticipated to be approximately 120 feet in length and either 4 or 6 feet in diameter. As shown in Table 4.L-5, below, with the change in piles at Pier 48, the project would result in a net increase in the amount of subtidal habitat surface area, which would increase the amount of useable habitat for special-status fish and/or marine mammals under the pier. This would benefit special-status fish and/or marine mammals.

**TABLE 4.L-5 CHANGE IN BAY FILL AND SUBTIDAL SURFACE AREA WITH PIER 48 PILE REMOVAL AND INSTALLATION**

| Pile Type | Number | Diameter (inches) | Length in Water (feet)[1] | Fill in Water (cubic yards) | Bottom Surface (acres) |
|---|---|---|---|---|---|
| *Existing timber* | *675* | *24* | 20.75 | 6,519 | *0.19* |
| New precast concrete | 62 | 24[2] | 20.75 | 599 | 0.02 |
| New steel/concrete | 44 | 72[3] | 20.75 | 3,824 | 0.11 |
| *New (Total)* | *106* | | **Total** | **4,423** | ***0.13*** |
| **Net Change** | **-569** | | **Net Change** | **-2,096[4]** | **-0.06[4]** |

Notes:

(1) Depth of water under pier (below mean tide level [MTL]) assumed to be an average of 20.75 feet (National Oceanic and Atmospheric Administration [NOAA] 2013; last correction 11/30/16. Nautical chart shows range of depths below mean lower low water [MLLW] of 16 to 18 feet, and MTL is approximately 3.75 feet above MLLW). If average water depth were higher or lower than this, the absolute fill amounts would change, but the project would still result in the same percentage reduction in fill (28 percent). Bottom surface area estimates would not be affected because they are not dependent on the water depth.

(2) Piles could be either 18 or 24 inches in diameter; conservatively assumed for this analysis to be 24 inches.

(3) Piles could be either 48 or 72 inches in diameter; conservatively assumed for this analysis to be 72 inches.

(4) Negative number corresponds to a decrease in fill areas for piles and decrease in surface area occupied by piles (equivalent to an increase in bottom surface area habitat).

[67] Orth, R. J., and K. A. Moore. 1983. Chesapeake Bay: An Unprecedented Decline in Submerged Aquatic Vegetation. *Science* 22:51–52.

[68] Thayer, G. W., W. J. Kenworthy, and M.S. Fonseca. 1984. *The Ecology of Eelgrass Meadows of the Atlantic Coast: A Community Profile.* FWS/OBSO-84/02. U.S. Fish and Wildlife Service, Washington, D.C.

For the reasons described above, Pier 48 construction impacts on special-status species would be ***less than significant***.

#### OPERATIONAL IMPACTS

Direct overwater structures cast concentrated shadows and can affect the productivity of the habitat directly below the structure. Although the project would not add to the number of structures over water, buildings associated with the project would cast shadows on Mission Creek for approximately 4 hours after sunrise between March and October. China Basin would receive new shadows from morning through early afternoon between mid-October and March, with the longest shadows reaching northward about halfway between the north shore of China Basin Park and the edge of the AT&T Park plaza. On and around the summer solstice (June 21), new shadows would be cast southward in the Bay, past Pier 50. See Section 4.I, *Wind and Shadow*, for additional detail. Although there would be some shadows cast on water from the buildings, these shadows would be a temporary, short-duration condition. In addition, Bay waters are daily subject to high wave and tidal currents that maintain seafloor sediments and sediments in suspension, resulting in turbid water that naturally limit to ambient light penetration and phytoplankton production. For these reasons, the increase in temporary shading from buildings that cast shadows on the water during certain times of the day and year would not be expected to adversely affect fish habitat. The project site is currently developed with the Pier 48 structure, which casts a permanent shadow on the waters below it. Pier 48 would not increase with respect to size (or shadow) as a result of the seismic upgrades; thus, there would be no permanent increase in shading associated with project-related operation of Pier 48. Thus, this impact is considered ***less than significant***.

**Impact BI-3. Impact pile driving and vibratory driving and extraction from construction of Pier 48 seismic upgrades could have a substantial adverse effect on fish and marine mammal species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS. (Less than Significant with Mitigation)**

The Pier 48 seismic upgrade would involve removal of existing wood piles and the installation of new precast concrete and cylindrical steel-cased concrete-filled piles, construction activities that may affect fish and marine mammals.

## CONSTRUCTION IMPACTS

### *FISH*

Noise, vibrations, and other physical disturbances can harass fish, disrupt or delay normal activities, or cause injury or mortality. In fish, the hearing structures and swim bladder and surrounding tissues are particularly vulnerable to high-pressure sounds.[69] The type and severity of effects depends on several factors, including the intensity and characteristics of the sound, the distance of the fish from the source, the timing of actions relative to the occurrence of sensitive life stages, and the frequency and duration of the noise-generating activities. The range of effects includes physical injury (including hearing loss), stress, mortality, and behavioral effects.

***Impact Pile Driving.*** Project-related impact pile driving could harm fish because of the underwater noise it produces. Sound levels from project-related impact pile driving in or near open water often have the intensity to injure or kill fish within a certain radius. These high sound-pressure levels can rupture the swim bladder and damage other sensitive tissues and organs. Noise from project-related pile driving can also damage hearing organs, which can temporarily affect hearing sensitivity, communication, and the ability to detect predators or prey. Pile driving can also produce continuous lower-energy sounds, below the thresholds associated with direct injury, that cause behavioral effects (e.g., startle or avoidance responses) as well as temporary hearing loss or physiological stress, depending on the duration of exposure.

During impact pile driving, noise levels are greatest at the source. The noise levels attenuate as the distance from the source increases. To assess the effect of impact pile driving on fish, NMFS developed a spreadsheet that estimates the distance at which pile-driving sound attenuates to the threshold level (i.e., the maximum distance from the source where pile-driving sounds are predicted to exceed the injury and behavioral threshold levels). This spreadsheet, which is based on the practical spreading loss model, estimates the distance at which peak, accumulated sound (SEL), and RMS sound-pressure levels attenuate to threshold levels to define an area where fish could be exposed to potentially harmful sound levels.[70]

An estimated 62 18- or 24-inch precast concrete piles would be installed using an impact hammer. The assessment of pile-driving noise from an impact hammer was based on measured sound levels from similar pile-driving projects.[71] The sound analysis considered impact pile driving with and without the use of an attenuation method to mitigate underwater sound

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[69] Popper, A. N., T. J. Carlson, A. D. Hawkins, B. L. Southall, and R. L. Gentry. 2006. *Interim Criteria for Injury of Fish Exposed to Pile-Driving Operations: A White Paper.* May.

[70] Refer to California Department of Transportation 2015 for a detailed discussion of the model, sound metrics, and computations (See Section 4.6, Impact Analysis in this reference).

[71] California Department of Transportation. 2015.

levels. The peak sound-pressure level, using an attenuation method (in this case, a bubble curtain), typically decreases sound levels by at least 5 dB. The precast 18- or 24-inch square concrete piles that would be installed with an impact hammer are anticipated to be 30 feet in length. It is estimated that approximately 100 hammer strikes would be required to install each pile.[72] The project engineer estimated that three or four concrete piles would be driven per day during in-water pile-driving operations; based on this rate of construction, impact driving would occur over 16 to 21 working days (the days may not be consecutive).

The resultant sound-level estimates for impact hammer pile driving relative to the injury thresholds as well as the behavioral effects threshold are shown in Table 4.L-6, on the following page.

***Vibratory Pile Driving and Removal.*** Approximately 44 48- or 72-inch steel-cased concrete-filled piles would be installed with a vibratory driver. The piles are anticipated to be approximately 120 feet in length. After the casings are installed, each pile would be drilled to remove soil. The soil would be replaced with reinforced concrete. This vibratory work, which would last up to 7 hours per day, would require about 12 months to complete, with one or two piles being installed per day (actual number of days to install the new 48- or 72-inch piles would be approximately 22 to 44, but the days may not be consecutive). Along with demolition of the existing perimeter deck, approximately 675 existing 24-inch rounded creosote-treated wood piles would be extracted with a vibratory extractor to make way for the new piles. The resultant sound-level estimates for vibratory pile driving and extraction are shown in Table 4.L-7, page 4.L-42.

As noted above, the impact hammer criteria described above are not considered appropriate for assessing the effects of project-related vibratory pile driving.[73] Vibratory hammers generally produce less sound than impact hammers in that they generally produce continuous and lower-intensity sound that is below the levels known to cause injury in fish. Vibratory drivers are often included in mitigation measures to reduce the adverse effects on fish that result from impact pile driving. There are no established injury criteria for fish related to vibratory pile driving, and resource agencies in general are not concerned about vibratory pile driving resulting in adverse effects on fish.[74]

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[72] Knorpp, Jon. Written communication to ICF. November 17, 2016.

[73] California Department of Transportation. 2015.

[74] California Department of Transportation. 2015.

**TABLE 4.L-6. SUMMARY OF EFFECTS OF IMPACT PILE DRIVING ON FISH**

| | |
|---|---|
| **Number and size of piles** | 62 24-inch concrete |
| **Type of equipment** | Impact hammer |
| **Number of blows/day** | Four piles per day, 100 strikes per pile, 400 strikes per day |
| **Peak Noise Level Injury Evaluation** | |
| *Injury Threshold (dB)* | *206 dB* |
| Sound levels without attenuation | 206 dB (3 meters)<br>195 dB (17.5 meters) |
| Sound levels with attenuation | 206 dB (2 meters)<br>190 dB (17.5 meters) |
| **Accumulated Sound Level Injury Evaluation** | |
| *Injury Thresholds (Cumulative SEL)* | *Fish ≥ 2 g (187 dB); Fish < 2 g (183 dB)* |
| Accumulated sound levels without attenuation | 190 dB (17.5 meters)<br>187 dB (28 meters)<br>183 dB (51 meters) |
| Accumulated sound level with attenuation | 187 dB (13 meters)<br>185 dB (17.5 meters)<br>183 dB (24 meters) |
| **Behavioral Effects Evaluation** | |
| *Upper Range of Background levels (RMS)* | *160 dB* |
| Sound levels without attenuation | 176 dB (17.5 meters)<br>160 dB (204 meters)<br>150 dB (947 meters) |
| Sound levels with attenuation | 171 dB (17.5 meters)<br>160 dB (95 meters)<br>150 dB (440 meters) |

Sources:
Injury Thresholds: Fisheries Hydroacoustic Working Group (FHWG), as cited in Caltrans 2015.
Range of Background Levels: Caltrans. 2015.
Project Noise Levels: ICF calculations using NMFS model.

**TABLE 4.L-7. SUMMARY OF VIBRATORY PILE-DRIVING AND REMOVAL-RELATED NOISE LEVELS FOR FISH**

| | |
|---|---|
| Number and type of piles | 44 72-inch (installation)<br>675 24-inch timber (removal) |
| Type of equipment | Vibratory driver (installation)<br>Vibratory extractor (removal) |
| Number of hours of activity/day | 7 hours |
| **Effects Evaluation[1]** | |
| *Upper range of background levels (RMS)* | *160 dB* |
| Vibratory driver (w/out attenuation) | 180 dB (10 meters) |
| Vibratory driver (w/attenuation)[2] | 175 dB (10 meters |
| Vibratory extractor (w/out attenuation) | 162 dB (10 meters) |
| Vibratory extractor (w/attenuation)[2] | 157 dB (10 meters) |

Source for Background Noise Levels: Caltrans. 2015

Source for Project Noise Levels: ICF calculations.

Notes:

1. As discussed above under thresholds, there are no established injury criteria for fish related to vibratory pile driving, and resource agencies in general are not concerned about vibratory pile driving resulting in adverse effects on fish; thus, this analysis is for informational purposes only.

2. Although mitigation is not required for vibratory pile driving or removal relative to impacts to fish, as discussed below, mitigation for effects to marine mammals may require attenuation and thus the attenuated levels are also included in this table.

***Conclusion***. Peak sound levels generated by impact pile driving would exceed the thresholds for the protection of fish only within areas that are less than 2 to 3 meters from pile driving; such sound levels would be unlikely to result in fish injury. However, accumulated sound levels[75] from impact pile driving could cause injury to fish of all sizes within 28 to 51 meters of the source of pile driving (without attenuation). This is based on the conservative assumption that fish remain in the potential zone of injury for an entire day of pile-driving operations. As noted above, vibratory pile driving and extraction are not expected to result in injury to fish.

It should be noted that special-status fish species (Table 4.L-1, page 4.L-6) in the study area during the time of impact pile driving (June 1 through November 30, as required by Mitigation Measure M-BI-3.1, discussed further below) would most likely be large juveniles and adults and therefore capable of moving out of this zone before harmful sound levels are reached. Once impact pile driving begins, individual fish that approach the study area are likely to detect the sounds and avoid or bypass the potential injury impact zone.

[75] The underwater sound pressure level that a fish may experience during pile driving over a day.

Opportunities for fish to avoid impact pile-driving sounds would also occur during periods when pile driving ceases (e.g., while repositioning equipment) and at night when pile driving would be suspended.

In addition to potential injury effects on fish, project-related impact pile driving may also result in behavioral effects if sound levels exceed both the NMFS behavioral threshold (150 dB RMS) and the upper range of background levels (160 dB RMS). The analysis shows that sound levels would exceed 160 dB RMS within 95 and 204 meters of the pile-driving location with and without attenuation, respectively. Therefore, behavioral effects could occur in proximity to pile driving. However, as noted, behavioral effects on fish are not well understood; therefore, it is difficult to assess the definitive significance of such effects in the limited area in proximity to impact pile-driving separate from the injury effects. Given the limited area of effect where sound levels would be above 160 dB (95 to 204 meters, with and without attenuation), the limited duration (16 to 21 likely nonconsecutive days), and the fact that fish are exposed to sound levels above 160 dB when swimming next to large vessels under existing conditions, it is not expected that impact pile-driving effects on fish behavior would result in measurable long-term physical effects on listed or nonlisted fish populations, although individual fish may experience temporary stress. Vibratory pile driving and removal are not expected to have measureable behavioral effects on fish.

Based on the above, impacts on special-status fish species from impact pile driving would be ***significant***.

#### *MARINE MAMMALS*

Four species of marine mammal are known to occur in the study area: harbor seals, California sea lions, harbor porpoises, and gray whales. Harbor seals and California sea lions are more common in the study area; harbor porpoises and gray whales are in the study area infrequently. Potential marine mammal impacts would include temporary or permanent hearing loss (referred to as a temporary or permanent threshold shift) and disorientation due to diminished communication and echolocation clicks. All four species could be disturbed by Pier 48 seismic upgrades, including impact pile-driving and vibratory activities. Although none of the species are under special-status protection, they are protected under the MMPA. Therefore, an analysis of potential impacts on these species is provided.

As distance from pile driving increases, sound attenuation from transmission loss reduces the sound-pressure levels. The potential harmful effects also decrease. Disturbance and noise associated with pile driving may startle marine mammals and result in dispersion from the study area. Pinnipeds (seal and sea lions) frequently occur within the study area and could display disturbance behavior, such as alerting or fleeing. Because of the infrequency of cetacean occurrences (whales, dolphins, and porpoises) within the study area, cetacean behavioral effects are less likely but still possible if cetaceans are present in proximity to pile-driving activity (see further discussion below).

***Impact Pile Driving.*** As discussed above under *Fish*, an impact hammer would be used to install 62 18- or 24-inch precast concrete piles. The sound levels for impact pile driving are shown below in Table 4.L-8, below.

**TABLE 4.L-8. SUMMARY OF IMPACT HAMMER PILE-DRIVING IMPACTS ON MARINE MAMMALS**

| *Species* | Harbor Seal | Sea Lion | Harbor Porpoise | Gray Whale |
|---|---|---|---|---|
| Number and type of piles | 62 24-inch precast concrete piles | | | |
| Number of piles/day strikes/day | Four piles per day, 100 strikes per pile, 400 strikes per day | | | |
| **Peak Noise Level Injury Evaluation** | | | | |
| *Peak Thresholds (dB)* | *218 dB* | *232 dB* | *202 dB* | *219 dB* |
| Without attenuation | 206 dB at 3 meters/195 dB at 17.5 meters | | | |
| With attenuation | 206 dB at 2 meters/190 dB at 17.5 meters | | | |
| **Accumulated Sound-Level Injury Evaluation** | | | | |
| *Accumulated Sound Daily Thresholds (Cumul. SEL)* | *185 dB* | *203 dB* | *155 dB* | *183 dB* |
| Distance to threshold without attenuation | 28 meters | <10 meters | 61 meters | 51 meters |
| Distance to threshold with attenuation | 13 meters | < 10 meters | 28 meters | 24 meters |
| **Airborne Noise Evaluation** | | | | |
| *Airborne Threshold (RMS, haul-out areas only)* | *90 dB (Harbor Seals)/100 dB (Sea Lions)* | | | |
| Distance to threshold without attenuation | 95 meters (90 dB)/30 meters (100 dB) | | | |
| **Behavioral Evaluation** | | | | |
| *Upper Range of Background Levels* | *160 dB* | | | |
| Distance to threshold without attenuation | 204 meters | | | |
| Distance to threshold with attenuation | 95 meters | | | |

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.
Source for Airborne Thresholds: National Marine Fisheries Service, No Date.
Source for Background Noise Levels: Caltrans. 2015
Source for Project Noise Levels: ICF calculations.

***Vibratory Pile Driving and Removal.*** As noted above, approximately 44 48- or 72-inch steel-cased concrete piles would be installed with a vibratory driver, and approximately 675 existing 24-inch rounded creosote-treated wood piles would be extracted with a vibratory extractor to make way for the new piles. The sound-level estimates for vibratory pile driving and extraction are shown in Table 4.L-9 on the following page.

**TABLE 4.L-9. SUMMARY OF VIBRATORY PILE-DRIVING AND REMOVAL-RELATED IMPACTS ON MARINE MAMMALS**

| Species | Sea Lion | Harbor Seal | Harbor Porpoise | Gray Whale |
|---|---|---|---|---|
| Number and type of piles | 44 72-inch (installation)<br>675 24-inch timber (removal) | | | |
| Type of equipment | Vibratory driver (installation)<br>Vibratory extractor (removal) | | | |
| Number of hours of activity/day | 7 hours | | | |
| **Accumulated Sound-Level Injury Evaluation** | | | | |
| *Accumulated Sound Thresholds (Cumul. SEL)* | *219 dB* | *201 dB* | *173 dB* | *199 dB* |
| Distance to threshold w/vibratory driver (without attenuation) | 20 meters | < 10 meters | 683 meters | 462 meters |
| Distance to threshold w/vibratory driver (with attenuation) | < 10 meters | < 10 meters | 317 meters | 214 meters |
| Distance to threshold w/vibratory extractor (without attenuation) | < 10 meters | < 10 meters | 43 meters | 29 meters |
| Distance to threshold w/vibratory extractor (with attenuation) | < 10 meters | < 10 meters | 20 meters | 14 meters |
| **Airborne Noise Evaluation** | | | | |
| *Airborne Threshold (RMS, haul-out areas only)* | *90 dB (Harbor Seals)/100 dB (Sea Lions)* | | | |
| Distance to threshold | 67 meters (90 dB)/21 meters (100 dB) | | | |
| **Behavioral Effects Evaluation** | | | | |
| *Upper range of background levels* | *160 dB* | | | |
| Vibratory driver (w/out attenuation) | 180 dB (10 meters) | | | |
| Vibratory driver (w/attenuation) | 175 dB (10 meters | | | |
| Vibratory extractor (w/out attenuation) | 162 dB (10 meters) | | | |
| Vibratory extractor (w/attenuation) | 157 dB (10 meters) | | | |

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.
Source for Airborne Thresholds: National Marine Fisheries Service, No Date.
Source for Background Noise Levels: Caltrans. 2015
Source for Project Noise Levels: ICF calculations.

***Conclusion***. The distance to the airborne threshold for both impact pile driving and vibratory pile driving (and removal) is within 100 meters of the construction site. The airborne threshold is used only for evaluating impacts on seals that have hauled out of the water. There are no known seal haul-out locations within this area of effect; the nearest known haul-out location is on Yerba Buena Island, which is approximately 4,000 meters away. Thus, impacts related to airborne noise for seals would be ***less than significant.***

With impact pile driving, peak-level injury thresholds of noise for harbor porpoise would be exceeded very close to pile-driving equipment (somewhere between 3 and 17.5 meters from pile driving equipment), while peak-level thresholds for pinnipeds or grey whales would not be exceeded at 3 meters. Accumulated underwater sound levels (before attenuation) could be exceeded within 10 meters for sea lions and up to 61 meters for harbor porpoises from pile-driving activity. Therefore, impact pile driving may result in injury to marine mammals from peak noise and accumulated sound levels.

With vibratory pile driving, accumulated underwater sound thresholds could also be exceeded within 10 meters of pile-driving activity for sea lions and up to 683 meters for harbor porpoises (before attenuation). With vibratory pile removal, accumulated underwater sound thresholds could also be exceeded within 10 meters of pile-driving activity for sea lions and harbor seals and up to 49 meters for harbor porpoises (before attenuation). Therefore, vibratory pile driving and removal may also result in injury to marine mammals from increases in accumulated sound levels. Given that harbor seals and sea lions are known to frequent the project site, impact driving, vibratory driving, and vibratory removal of piles could result in injury to these marine mammals. Impacts on harbor porpoises or grey whales are less likely because of their infrequent presence in the project area but are possible if present during pile-driving activity. Thus, impact pile driving, vibratory pile driving, and vibratory removal could result in physical injury to marine mammals, and this impact would be ***significant***.

It is expected that any behavioral effects would be limited to areas where pile driving would result in sound levels that are much higher than the upper range of background sound levels because marine mammals in San Francisco Bay are used to background sound levels as evidenced by their consistent presence in areas with background sound levels, and would only be expected to change their behavior when sound levels notably exceed the normal conditions they are exposed to every day. The analysis shows that sound levels would exceed 160 dB RMS within 95 and 204 meters with and without attenuation, respectively. Thus, behavioral effects could occur in proximity to pile driving. Given the limited area of effect where sound levels would be above 160 dB (95 to 204 meters), the limited duration (16 to 21 days of actual impact driving and 22 to 44 days of vibratory driving),[76] and the fact that marine mammals are exposed to sound levels above 160 dB when swimming closer than 100 meters to large vessels under existing conditions, it is not expected that temporary pile-driving induced changes in behavior would result in measurable long-term physical effects, although individual marine mammals may experience temporary stress before they leave the areas in proximity to pile driving. The project's construction-related behavioral effects on marine mammals in proximity to the site are thus considered ***less than significant***.

[76] As described above, vibratory removal would result in sound levels within the upper range of background levels and thus would not be expected to result in behavioral effects on marine mammals.

MITIGATION MEASURES. Implementation of Mitigation Measures M-BI-3.1 and M-BI-3.2 would reduce noise impacts on special-status fish species related to project pile-driving activities by prioritizing vibratory pile driving wherever feasible, employing a "soft start" technique that allows fish the opportunity to leave the impact area, implementing noise attenuation measures, and limiting impact pile driving to a season when special-status fish species are unlikely to be in the area. With implementation of Mitigation Measures M-BI-3.1 and M-BI-3.2, peak and accumulated sound levels would be below injury threshold levels (except immediately around the pile driver itself – two meters for peak levels and 13 to 24 meters for accumulative sound levels), fish are not likely to be exposed to accumulative sound levels over a full day of pile driving and the likelihood of affecting special-status species would be remote. This impact would be mitigated to a ***less-than-significant*** level.

Implementation of Mitigation Measure M-BI-3.3 would reduce noise impacts on marine mammals from project pile-driving and removal activities by prioritizing vibratory pile driving, employing a "soft start" technique that allows marine mammals the opportunity to leave the impact area, implementing noise attenuation measures, monitoring marine mammal activity, and shutting down pile-driving activity when marine mammals enter a zone in which injury thresholds would be exceeded. With implementation of Mitigation Measure M-BI-3.3, noise-related impacts on marine mammals would be ***less than significant.***

*M-BI-3.1: Conduct Impact Hammer Pile Driving during Periods that Avoid Special-Status Fish Species' Spawning and Migration Seasons*

In-water pile installation using impact hammers shall occur within the work window of June 1 to November 30, which has been established for dredging in San Francisco Bay to reduce potential effects on special-status fish species.

*M-BI-3.2: Pile-Driving Noise Reduction for the Protection of Fish*

Prior to the start of pile driving in the Bay, the project sponsor shall develop an underwater noise monitoring and attenuation plan and obtain approval from NMFS. The NMFS-approved plan or any modifications shall be provided to the City Planning Department for determination of consistency with the requirements in this measure.

The plan shall provide details regarding the estimated underwater sound levels expected, sound attenuation methods, methods used to monitor and verify sound levels during pile-driving activities, and management practices to be taken to reduce pile-driving sound in the marine environment to below NMFS thresholds for injury to fish. The plan shall incorporate, but not be limited to, the following BMPs:

- All steel pilings shall be installed with a vibratory pile driver to the deepest depth practicable. An impact pile driver may be used only where necessary, as determined by the contractor and/or project engineer, to complete installation of the steel pilings, in accordance with seismic safety or other engineering criteria.
- The smallest pile driver and minimum force shall be used to complete the work necessary to meet NMFS requirements, as determined by the contractor and/or project engineer.
- The hammer shall be cushioned using a 12-inch-thick wood block during all impact hammer pile-driving operations.
- To reduce impacts to levels below injury thresholds, based on hydroacoustic monitoring and the amount of impact pile driving occurring on a particular day, a bubble curtain, wood block cushion, air barrier, or similar technology shall be employed during impact pile-driving activities.
- A "soft start"[77] technique shall be employed upon initial pile-driving activities every day to allow fish an opportunity to vacate the area.
- During impact pile driving, the contractor shall limit the number of strikes per day to the minimum necessary to complete the work, as determined by the contractor and/or project engineer.
- No pile driving shall occur at night.
- During impact pile driving, a qualified fish biologist shall monitor the project site for fish that exhibit signs of distress. If fish are observed exhibiting signs of injury or distress, work shall be halted by the biologist, and the cumulative SEL up to that point shall be examined. If the cumulative SEL is close to the threshold or exceeds the threshold, then pile-driving activities will cease until the next day.
- All pile-driving and pile-removal activity shall be monitored by a NMFS-approved biological monitor before and during all pile driving. The biological monitor shall maintain a monitoring log of daily pile-driving activities, any field sound measurements, fish sightings, and implementation of soft-start and shut-down requirements. A monitoring report shall be prepared for submission to NMFS and the City (submitted monthly and at the completion of all pile-driving/pile removal activities).

[77] Soft starts require an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period between subsequent three-strike sets. Soft starts for vibratory hammers will initiate noise at 15 seconds at reduced energy, followed by a 1-minute waiting period between subsequent starts. This process should continue for a period of no less than 20 minutes.

*M-BI-3.3: Pile-Driving Noise Reduction for Protection of Marine Mammals*

Prior to the start of pile driving in the Bay, as part of the underwater noise monitoring and attenuation plan required by Mitigation Measure M-BI-3.2, the project sponsor shall provide details regarding the estimated underwater sound levels expected, not just from impact hammer pile driving that may affect fish but also from vibratory pile driving and removal because these sound levels may affect marine mammals. The plan shall also address sound attenuation methods, methods used to monitor and verify sound levels during pile-driving activities, and management practices to be taken to reduce pile-driving sound in the marine environment to below NMFS thresholds for injury to marine mammals. As part of implementation of the sound attenuation monitoring plan, the project sponsor shall take actions to reduce the effect of underwater noise transmission on marine mammals. These actions shall include, at a minimum:

- The establishment of initial safety zones, based on the estimated NMFS injury threshold contours for the different marine mammals (as shown in Table 4.L-8, page 4.L-44, and Table 4.L-9, page 4.L-45). The initial size of the safety zones may be modified, based on subsequent analysis of the anticipated noise levels and the actually proposed piles, equipment, and activity prior to construction but only with the approval of NMFS.
- Hydroacoustic monitoring, according to the NMFS-approved sound attenuation and monitoring plan, which shall be completed during initial pile driving to verify projected isopleths for pile driving and removal. The plan shall require real-time hydroacoustic monitoring for a sufficient number of piles to determine and verify modeled noise isopleths. The safety zones established prior to construction may be modified, based on field measurements of noise levels from different pile-driving activities, if the field measurements indicate that different noise threshold contours than those estimated prior to construction are appropriate but only with the approval of NMFS.
- Halting of work activities when a marine mammal enters a safety zone (specific to that species) and resumed only after the animal has not been observed within the safety zone for a minimum of 15 minutes.
- Use of a "soft start"[78] technique each day upon commencement of pile-driving activity, any time after ceasing pile-driving activity for more than 1 hour, and any time after shutdown due to marine mammal entry into a safety zone.

[78] Soft starts require an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period between subsequent three-strike sets. Soft starts for vibratory hammers will initiate noise at 15 seconds at reduced energy, followed by a 1-minute waiting period between subsequent starts. This process should continue for a period of no less than 15 minutes.

- Monitoring by an NMFS-approved biological monitor of all pile-driving and pile-removal activity before and during all pile driving/removal to inspect the work zone and adjacent Bay waters for marine mammals and implement the safety zone requirements described above. The biological monitor shall maintain a monitoring log of daily pile-driving/removal activities, any field sound measurements, marine mammal sightings, and implementation of soft-start, shut-down, and safety-zone requirements. A monitoring report shall be prepared for submission to the City and NMFS (submitted monthly and at the completion of all pile-driving/pile-removal activities).

**Impact BI-4. The project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species, or established native-resident or migratory wildlife corridors. (Less than Significant)**

#### CONSTRUCTION

**Seawall Lot 337.** Onshore construction would not affect the movement of any wildlife species, or any wildlife corridors, because wildlife species do not utilize the developed onshore ground areas for movement. Although birds move through the general project area, flight movement would not be impeded during construction. Thus, the project would have ***a less-than-significant impact*** on wildlife movement due to onshore construction.

**Pier 48.** Construction and rehabilitation of Pier 48 would not substantially interfere with the movement of migratory fish species or marine mammals. Fish and marine mammals may avoid the habitat near the pier during construction because of noise emitted by equipment and pile driving. However, there is suitable habitat adjacent to the pier that provides the same habitat. Additionally, although the area around Pier 48 may be utilized by aquatic species, it does not provide a direct connection between two larger areas of core habitat. Therefore, the area around Pier 48 would not be appropriately considered a wildlife movement corridor, as defined in scientific literature.[79] This would be a temporary impact of limited scope during construction and ***less than significant***.

#### OPERATION

**Seawall Lot 337.** The proposed project would develop Seawall Lot 337 with a new network of buildings and streets. The buildings proposed on Seawall Lot 337 could range in height from 90 to 240 feet (and an additional up to 20 to 40 feet, including nonhabitable area elements/wall extensions), depending on the land use. In general, buildings with primarily commercial

[79] Beier, P. 1992. A Checklist for Evaluating Impacts to Wildlife Movement Corridors. *Wildlife Society Bulletin* 20:434–440; Hilty, J.A., W.Z. Lidicker Jr., and A.M. Merenlender. 2006. *Corridor Ecology*, pp. 89–91. Washington, DC: Island Press.

uses could range in height from 90 feet (six stories) to 190 feet (13 stories), while buildings with mainly residential uses could range in height from 120 feet (11 stories) to 240 feet (23 stories).

Reflective and transparent glass used in project buildings, which mirrors the surrounding environment during daylight hours, could cause birds to collide with the new buildings. Further, during nighttime, new lighting associated with the proposed project could misdirect or confuse birds, resulting in disruption of natural behavioral patterns and navigational cues, similarly resulting in injury or death from colliding with buildings. Because of the project site's proximity to the San Francisco Bay and location within the Pacific Flyway, these impacts could adversely affect migratory birds. However the study area is already developed. It contains artificial lighting and is located adjacent to AT&T Park, which has very bright lights at night during baseball games and other large nighttime events. The project would not be expected to greatly increase light pollution beyond what already exists in the study area and the vicinity. Thus, birds would be minimally affected. Similarly, marine mammals would not experience any adverse effects as a result of an increase in lighting at the project site.

As discussed above, Planning Code Section 139, Standards for Bird-Safe Buildings, focuses on buildings that create both location-specific hazards and feature-related hazards and requires glazing treatment for specific areas to reduce the reflectivity of the building so that birds are able to differentiate the building from the surrounding vegetation. In addition, lighting must be minimized. The implementation of these measure would help reduce the potential for bird collisions and also reduce overwater light increases, which would help to reduce light changes for offshore marine mammals.

Additionally, Planning Code Section 139 has feature-related standards, which apply to all new or substantially renovated buildings in San Francisco, including the proposed project. These feature-related standards require that free-standing glass walls, wind barriers, skywalks, balconies, and greenhouses on rooftops that have unbroken glass segments approximately 24 square feet in size or greater use bird-safe glazing treatments on 100 percent of the feature (Planning Code Section 139(c)(2)). Thus, proposed buildings would have no free-standing glass walls, greenhouses, wind barriers, or other clear barriers on rooftops or balconies without glazing treatments. This treatment would prevent glass transparency so that vegetation behind transparent glass walls is not visible to birds. With compliance with the mandatory requirements of Planning Code Section 139, this impact would be considered ***less than significant***.

**Pier 48.** Operation of Pier 48 would not substantially interfere with the movement of migratory fish species or marine mammals. There would be additional lighting in the existing setting with the project, but lighting restrictions would help to control the amount and intensity of lighting, limiting it to only that necessary for site safety. Because of the adjacent AT&T Park, the general offshore area already experiences substantial lighting levels, especially during night games, and the additional lighting at Pier 48 would result in only a limited change in the ambient levels at

night for offshore areas. The lighting effects attenuate rapidly as one proceeds farther offshore. Thus, Pier 48 lighting is not expected to affect areas farther offshore. Habitat for fish and marine mammals would not be substantially altered or reduced in quality compared to existing conditions, and the Pier 48 operational impact on wildlife movement would be ***less than significant***.

**Impact BI-5. Construction of the proposed project could affect migratory nesting birds. (Less than Significant with Mitigation)**

The existing vegetation and structures, such as the one-story sheds and Pier 48 on the project site, could provide nesting habitat for a variety of protected migratory birds. This habitat is of low quality because of the developed nature of the site and surrounding area and the minimal amount of vegetation present (no trees onsite, other than 26 trees in China Basin Park). As part of the project, additional trees would be planted, and additional buildings would be present on the project site, providing increased nesting habitat for migratory birds. China Basin Park would be expanded to approximately twice its current size, from approximately 2.2 acres to 4.4 acres, and two new parks (Mission Rock Square and Channel Wharf) would be added. Trees planned as part of the proposed project could be native or climate adapted, ranging in height at maturity from 30 to 60 feet. Trees are expected to reach maturity between 5 and 20 years, depending on species and locations. According to the DPW Street Tree Design Guidelines,[80] these could include species such as Monterey cypress, New Zealand Christmas tree, red-flowering gum, Chinese elm, strawberry tree, southern live oak, ginkgo, freeman maple, Brisbane box, red oak cultivar, Victorian box, California pepper, cork oak, or melaleuca. Native or climate-appropriate grasses, shrubs, and ground cover would also be planted.

If construction of the proposed project occurs during the nesting season (February 1 to August 31), removal of existing shrubs and trees and/or rehabilitation of the sheds and piers on the project site could result in the direct mortality of nesting adult or young birds, destruction of active nests, and/or disturbance of nesting adults, causing nest abandonment and/or loss of reproductive effort. This impact to nesting birds would be ***significant***. Native bird species, when nesting, are protected by both state (California Fish and Game Code Sections 3503 and 3513) and federal (MBTA of 1918) laws.

Bird species which forage in the Bay would not be adversely affected by construction activities at the project site and could avoid construction that will occur in the Bay. Construction noise would have very little impact on foraging activities since birds in this area are acclimated to high levels of urban activity and noise.

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[80] San Francisco Urban Forestry Council. No date. Recommended Street Tree Species List – With Notations. Available: http://sfpublicworks.org/sites/default/files/SF%20Street%20Tree%20Species%20List%202016%20Adopted.pdf. Accessed: February 21, 2017.

Operationally, migratory birds may nest in trees planted on the site, but normal operations of the project would not be expected to result in displacement of nesting birds. Thus, there would be no operational effects on bird nests from the project following completion of construction.

MITIGATION MEASURE. Implementation of Mitigation Measure M-BI-5 would reduce impacts on protected nesting migratory bird species from removal of shrubs and trees and/or rehabilitation of the existing sheds and Pier 48 because it would require pre-construction surveys prior to any work occurring during the nesting season and implementation of measures to avoid disturbances to any active nests that are found. With implementation of Mitigation Measure M-BI-5, removal of protected nesting migratory bird species and their active nests would be avoided. Therefore, this impact would be ***less than significant***.

*M-BI-5: Conduct Pre-Construction Surveys for Nesting Migratory Birds*

To facilitate compliance with state and federal laws (California Fish and Game Code and the MBTA) and prevent impacts on nesting migratory birds, the project sponsor shall avoid vegetation/structure removal, ground-disturbing activities, and elevated noise levels near suitable nesting habitat during the nesting season (February 1 through August 31) or conduct pre-construction surveys, as described below. Alternatively, the project sponsor may remove vegetation or structures that may support nesting birds outside of the breeding season such that no breeding habitat would be present should construction start in the normal breeding season.

If it is not feasible to avoid the nesting season and suitable nesting areas remain on the project site, the project sponsor shall hire a qualified wildlife biologist with demonstrated nest-searching experience to conduct surveys for nesting birds, including raptors. The following list details the nesting bird survey requirements for this project.

- One nesting bird assessment is required at the beginning of each year, at the start of the nesting bird season (February), to determine if suitable nesting habitat remains or has been reinstated (e.g., the project site is revegetated).
- If suitable nesting habitat is present, one nesting survey shall be conducted between February and April, and one nesting survey shall be conducted between April and June.
- Additional nesting surveys are required when construction work stops at a portion of the site where suitable nesting habitat remains for more than 15 days or if construction is phased in such a way that no disturbance has occurred in a portion of the project site.
- If active nests are observed during construction when the wildlife biologist is not present, all work within 250 feet of the nest shall stop, and wildlife biologist shall be contacted immediately. All personnel shall move at least 250 feet away from

the nest. To the extent feasible, after consulting with the wildlife biologist, construction equipment shall be shut down or moved 250 feet away from the nest.

Nesting bird surveys shall be performed no earlier than 7 days prior to the commencement of ground-disturbing activities and vegetation removal (including clearing, grubbing, and staging). The area surveyed shall include all construction areas as well as areas within 250 feet outside the boundaries of the areas to be cleared or as otherwise determined by the biologist.

If the wildlife biologist finds any active nests (e.g., a nest with eggs, chicks, or young) during the survey, the biologist shall establish no-disturbance species-specific buffer zones for each nest, marked with high-visibility fencing, flagging, or pin flags. No construction activities shall be allowed within the buffer zones. The size of the buffer shall be based on the species' sensitivity to disturbance and planned work activities in the vicinity; typical buffer sizes are 250 feet for raptors and 50 feet for other birds. The buffer shall remain in effect until the chicks have fledged from the nest or the nest is no longer active, which will be verified by the biologist.

If inactive nests are identified, the project sponsor or its contractor shall remove those nests from the structure/vegetation and install nest exclusion measures on structures (i.e., fine mesh netting, panels, or metal projectors) outside of the nesting season, if deemed necessary and suitable by the qualified wildlife biologist. All exclusionary devices shall be monitored and maintained throughout the breeding season to ensure that they are successful in preventing the birds from accessing the cavities or nest sites.

After each survey and/or after nest-deterrence activities are completed, the wildlife biologist shall complete a memorandum detailing the survey effort and results and submit the memorandum to the project sponsor within 7 days of survey completion.

**Impact BI-6. The proposed project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant)**

The project site contains 26 trees in China Basin Park, all of which will be removed during project implementation. None of the onsite trees are street trees or landmark trees, and all are less than 20 years old. No other trees are present on the project site. The project includes extensive landscaping including planting a substantially larger number of trees than are being removed. The Port-owned project site is not subject to the Urban Forestry Ordinance, which is specific to street trees under the jurisdiction of Public Works or trees designated as landmark trees by the Board of Supervisors. Furthermore, there are no applicable Port of San Francisco

policies related to tree removal in China Basin Park. Therefore, the project would not conflict with local policies or ordinances protecting biological resources, resulting in a ***less-than-significant*** impact.

## CUMULATIVE IMPACTS

Unless otherwise identified below, the geographic context for the analysis of cumulative biological resources impacts includes the city and the Bay. Specifically, the projects considered in this analysis are listed in Table 4-1 of Chapter 4, *Environmental Setting and Impacts.* The impact discussion below addresses impacts on biological resources under multiple impact headings: Impact C-BI-1 (water quality impacts), C-BI-2 (shading and changes in habitat acreage impact on special-status species), C-BI-3 (pile-driving impacts on fish and marine mammals), C-BI-4 (impacts on wildlife movement), C-BI-5 (impacts on migratory birds), and C-BI-6 (impacts related to local policies or ordinances that protect biological resources).

**Impact C-BI-1. The proposed project, in combination with future development in the city, would affect water quality but not to the extent that a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS would occur. As such, the proposed project's contribution would not be cumulatively considerable. (Less than Significant*)***

Construction and operational activities that result in the disturbance or degradation of water quality could adversely affect special-status fish species, critical habitat, and EFH by reducing feeding opportunities, causing fish to temporarily avoid habitat, or resulting in injury or mortality. It is reasonable to expect that there will be construction and operational impacts on habitat through disturbance, degradation, or contamination associated with future offsite development. Special-status species are protected under both the ESA and CESA, and it is assumed that all development would comply with water quality regulations. To prevent short-term (construction) impacts on water quality, construction of nearby projects would need to comply with the requirements of the National Pollutant Discharge Elimination System Construction General Permit and the San Francisco Public Utilities Commission's stormwater management requirements (e.g., the San Francisco Public Utilities Commission's Construction Site Runoff Ordinance). In addition, future cumulative projects would be required to comply with hazardous material requirements, such as the San Francisco Maher Ordinance for soil and groundwater contamination as well as Spill Prevention, Control, and Countermeasure requirements, as necessary. Project operations would be subject to San Francisco stormwater and San Francisco Green Building Ordinance requirements as well as other stormwater requirements established by the City and Port MS4 programs. The applicable regulations, which have been developed to protect water quality as defined in the basin plan, require

implementation of stormwater BMPs. Because the proposed project and other foreseeable cumulative projects in the vicinity would be required to comply with these regulations, cumulative impacts would be ***less than significant***.

**Impact C-BI-2. Future development in the city may result in shading that could result in a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS. However, the project would not result in a net permanent increase in shading of the Bay, and the proposed project's contribution would be not cumulatively considerable. (Less than Significant)**

Other development projects in the city and along the San Francisco Bay shoreline could result in ***significant*** cumulative impacts on special-status fish species and aquatic species. Projects located close to the Bay shoreline that include development of water-side docks in the Bay could affect nearshore aquatic habitat for fish and other aquatic species by shading, which can decrease aquatic productivity and food production in intertidal and subtidal zones. As discussed above under Impact BI-2, the project would not result in a permanent increase in shading due to improvements to Pier 48 or other project buildings. Habitat would increase compared with the existing condition. Any shading associated with construction of the project (barges at Pier 48) would be temporary and in an area already affected by shading. Therefore, the project's contribution to this cumulative impact would be ***less than cumulatively considerable***.

**Impact C-BI-3. The proposed project, in combination with future development in the city, would not have a substantial adverse effect on a fish species or marine mammals identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS due to pile driving. (Less than Significant with Mitigation)**

The proposed project, combined with other development projects in the city and along the San Francisco Bay shoreline, could result in cumulative impacts on special-status fish species and marine mammals if in-water pile driving is needed for other projects. Pile driving is a temporary construction impact on fish and marine mammals. The proposed project and future development would be subject to the Marine Mammal Protection Act as well as mitigation measures to reduce pile-driving noise. Implementation of Mitigation Measures M-BI-3.1, M-BI-3.2, and M-BI-3.3 would reduce noise impacts on fish and marine mammals and reduce the likelihood of injury to fish and marine mammals by reducing the noise levels produced by pile-driving and vibratory equipment. In addition, a qualified biologist would be onsite to monitor pile-driving activity and ensure that the potential for injury to fish would be minimized. It would be unlikely for marine mammals to be injured because of the established safety zone. Upon implementation of Mitigation Measures M-BI-3.1, M-BI-3.2, and M-BI-3.3, the project's contribution to this cumulative impact would be ***less than cumulatively considerable.***

**Impact C-BI-4. The proposed project, in combination with future development in the city, would not interfere substantially with the movement of any native resident or migratory fish or wildlife species, or established native-resident or migratory wildlife corridors. (Less than Significant)**

The proposed project, combined with other development projects in the city and along the San Francisco Bay shoreline, which is located within the Pacific Flyway, could interfere with bird movement and result in ***significant*** cumulative impacts on avian migratory corridors. The proposed project and other future development projects would be subject to Planning Code Section 139, Standards for Bird-Safe Buildings,[81] which focuses on buildings that create both location-specific hazards and feature-related hazards. These provisions would reduce the impact of future projects along the Bay shoreline to a ***less-than-significant*** level. With implementation of Planning Code Section 139 requirements, the proposed project would result in a ***less than cumulatively considerable*** contribution to a cumulative impact on migratory bird habitat.

The proposed project may increase the amount of habitat available to fish species by removing the creosote-treated pilings. Fish would be able to move more freely around the pier. Therefore, the proposed project would result in a ***less than cumulatively considerable*** contribution to a cumulative impact on migratory fish habitat.

**Impact C-BI-5. Construction of the proposed project, in combination with future development in the city, could affect nesting birds. (Less than Significant with Mitigation)**

The proposed project, combined with other development projects in the city and along the San Francisco Bay shoreline, could result in ***significant*** cumulative impacts on avian wildlife. The project would improve nesting habitat by increasing the number of trees and structures on the project site. However impacts could occur during construction if nesting birds are directly affected by grading or vegetation removal or indirectly affected by construction noise. The proposed project and future development would be subject to the provisions of California Fish and Game Code Sections 3503 and 3513 and the MBTA. These provisions would reduce the impact of future projects along the Bay shoreline to a ***less-than-significant*** level. For the proposed project to comply with federal and state laws to protect avian wildlife, Mitigation Measure M-BI-5 would require pre-construction nesting surveys for migratory birds to be conducted during the nesting season (February 1 to August 31) and implementation of measures to avoid disturbances to any active nests that are found. With mitigation, the proposed project would result in a ***less than cumulatively considerable*** contribution to a cumulative impact on nesting migratory birds.

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[81] City and County of San Francisco. 2011. *Standards for Bird-Safe Buildings*. San Francisco Planning Department. July 14. Available: http://sfdbi.org/sites/sfdbi.org/files/migrated/ftp/uploadedfiles/dbi/Key_Information/TreeProtectionLegislation.pdf.

**Impact C-BI-6. The proposed project, in combination with future development in the city, would not result in a considerable contribution to significant cumulative impacts on local policies or ordinances to protect biological resources, such as a tree preservation policy or ordinance. (Less than Significant)**

The cumulative context for an analysis of cumulative impacts related to conflicts with local policies or ordinances to protect biological resources is the city. Activities that result in the removal of significant, landmark, or street trees (as described under Regulatory Framework) could result in conflicts with the City's Urban Forestry Ordinance.[82] With future development in the city, it is reasonable to expect there would be an additional loss of protected trees. It is also reasonable to expect that cumulative projects would replace trees that are removed and likely expand the number of trees overall. Compliance with the measures in the Urban Forestry Ordinance would be required by all future development in the city where trees under Public Works' jurisdiction could be affected. The project is not subject to the Urban Forestry Ordinance and there are no Port of San Francisco policies related to tree protection. In addition, the proposed project includes extensive landscaping including planting a substantially larger number of trees than are being removed. This would result in a ***less-than-significant*** impact at the project level and a ***less-than-significant*** contribution to a cumulative impact on protected trees in the city.

[82] City and County of San Francisco. 2015. *Urban Forestry Ordinance*. Available: http://sfdbi.org/sites/sfdbi.org/files/migrated/ftp/uploadedfiles/dbi/Key_Information/TreeProtectionLegislation.pdf.