# 5.11 Marine Biological Resources

This section describes the applicable federal, state, and local laws, ordinances, and regulations concerning marine biological resources; explains the existing marine biological resources setting, including sensitive and special-status species within a portion of Santa Monica Bay; evaluates the Project's potential impacts on these marine biological resources; and recommends mitigation measures to avoid/lessen potential Project impacts. The information on marine biota was obtained from regional databases, plans, and reports relevant to the proposed Project, including the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database, standard biological literature, biological reports, studies associated with other commercial operations, and California Environmental Quality Act (CEQA) documents of recent marine sited projects located in the Project's vicinity. Appendix 10 includes a discussion of how West Basin considered the California Ocean Plan Amendment (Ocean Plan Amendment, or OPA) for Project site and the intake and discharge method selection.

Refer to Section 5.3, *Biological Resources – Terrestrial*, for a discussion of terrestrial biological resources and avian (bird) taxa associated with dune, beach, and marine habitats.

## 5.11.1 Regulatory Framework

### Federal

#### *Federal Endangered Species Act*

Under the federal Endangered Species Act (FESA) of 1973, the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a plant, fish, or animal species at risk of extinction, as endangered or threatened (16 United States Code [U.S.C.] 1533(c)). Multiple species of fish and marine mammals are listed by the U.S. Fish and Wildlife Service (USFWS) under FESA, as discussed below. Other species are addressed under this law as *candidates* for listing, and although these are not afforded legal protection under FESA, they typically receive special attention from federal and state agencies during the environmental review process. FESA Section 9 regulates the "take" (i.e., harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any of these activities) of federally listed species. The USFWS may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act. Under FESA Section 7, if a project has a *federal nexus* (i.e., occurs on federal land, is issued federal permits, or receives any other federal oversight or funding), the federal agency responsible for the project or for issuing a permit for the project must enter into an informal/formal consultation with USFWS to obtain, if possible, a Biological Opinion (BO) allowing for incidental "take" of the species in question. A BO identifies project changes and measures to avoid/reduce impacts. If a project is on private land and will not require any federal permits, the proponent must prepare a Habitat Management Plan (HMP) to address the impacts for USFWS approval, pursuant to FESA Section 10.

Under FESA, critical habitat is designated at the time of listing of a species or within 1 year of listing. "Critical habitat" refers to habitat or a specific geographic area comprising features essential for the survival and recovery of the species in question. In the event that a project results in "take" or adverse effects to a species' designated critical habitat, USFWS may require the project proponent to implement suitable mitigation to avoid/reduce such impacts. However, consultation for impacts to critical habitat is only required when a project has a federal nexus (i.e., occurs on federal land, is issued a federal permit [e.g., U.S. Army Corps of Engineers (USACE) Section 404 Clean Water Act permit], or receives any other federal oversight or funding). If a project does not have a federal nexus, critical habitat consultations are not required.

### *Magnuson-Stevens Fishery Conservation and Management Act*

The Magnuson-Stevens Fishery Conservation and Management Act, known as the Magnuson-Stevens Act (MSA) of 1976 (16 U.S.C Sections 1801-1884), as amended in 1996 and reauthorized in 2007, is intended to protect, conserve and manage U.S. fisheries resources; develop domestic fisheries; and phase out foreign fishing activities within the U.S. coastal zone. The MSA provided National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service (NMFS) with legislative authority to regulate U.S. fisheries in the area known as "exclusive economic zone" between 3 miles and 200 miles offshore by establishing eight regional Fishery Management Councils that manage the harvest of fish and shellfish resources in these waters. Through MSA Section 303, the NMFS is required to work with regional Fishery Management Councils to develop and implement Fishery Management Plans (FMPs) for the protection of fisheries under their jurisdiction. One of the required FMP provisions is to delineate "essential fish habitat" (EFH), and management goals for all managed fish species, including some fish species that are not protected under the MSA. Federal agency actions that fund, permit, or carry out activities that may adversely affect EFH are required under MSA Section 305(b), in conjunction with Section 7 under FESA, to consult with NMFS regarding potential adverse effects of their actions on EFH and to respond in writing to NOAA NMFS recommendations.

### *Rivers and Harbors Act Section 10 (33 U.S.C. 403)*

The Rivers and Harbors Appropriations Act of 1899 (30 Stat. 1151, codified at 33 U.S.C. Sections 401, 403) prohibits the unauthorized obstruction or alteration of any navigable water. Navigable waters are tidally influenced waters that are presently used, have been used in the past, or could be used in the future to transport interstate or foreign commerce (33 Code of Federal Regulations [CFR] Section 3294). The Rivers and Harbors Act was intended for the protection of navigation and navigable capacity and was later amended to include protection of the environment. The Act authorizes USACE to exercise control over all construction projects (Section 10) and discharge of refuse (Section 13) that occur within navigable waters of the United States. Activities that commonly require Section 10 permits include construction of piers, wharves, bulkheads, marinas, ramps, floats, intake structures, cable and pipeline crossings, and dredging and excavation.

### *Marine Mammal Protection Act (16 U.S.C. 1361-1421H)*

The Marine Mammal Protection Act (MMPA) of 1972, as amended in 1981, 1982, 1984 and 1995, establishes a federal responsibility for the protection and conservation of marine mammal species by prohibiting their take. The MMPA defines "take" as the act of hunting, killing, capture, harassment or death of any marine mammal. The MMPA also imposes a moratorium on the import, export, or sale of any marine mammals, parts, or products within the United States.

These prohibitions apply to any person in U.S. waters and to any U.S. citizen in international waters. All project-related construction activities are prohibited from disturbing marine mammals or disrupting their activities or behavior in known migration routes, feeding areas, or breeding areas. The NMFS is the federal agency responsible for enforcing the MMPA's provisions.

The primary authority for implementing the MMPA belongs to the USFWS and the NMFS. The USFWS is responsible for the protection of sea otters, marine otters, walruses, polar bears, manatees and dugongs. The NMFS is responsible for protecting pinnipeds (seals and sea lions) and cetaceans (whales and dolphins). As amended, the MMPA provides for the "incidental take" of marine mammals during marine activities—such as dredging, construction, boating, and transport—as long as the NMFS finds the take would only affect a small number of individuals and only negligibly impact marine mammal species not listed under FESA, would not result in the regional depletion of a population protected by the MMPA, and would not have an unmitigable adverse impact of subsistence harvest of these species. For example, no permitted subsistence harvesting of whales or marine mammals occurs offshore central California.

### *Marine Protection, Research, and Sanctuaries Act (16 U.S.C. Section 1431 et seq. and 33 U.S.C. Section 1401 et seq.)*

The Marine Protection, Research, and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Act, generally prohibits: (1) transportation of material from the United States for the purpose of ocean dumping; (2) transportation of material from anywhere for the purpose of ocean dumping by U.S. agencies or U.S.-flagged vessels; and (3) dumping of material transported from outside the United States into U.S. territorial seas. Ocean dumping cannot occur unless a permit is issued under the MPRSA. Under MPRSA, the standard for permit issuance is whether the dumping will "unreasonably degrade or endanger" human health, welfare, or the marine environment. In the case of dredged material, the decision to issue a permit is made by USACE, using the United States Environmental Protection Agency's (USEPA's) environmental criteria and subject to USEPA's concurrence.

### *Coastal Zone Management Act*

The Coastal Zone Management Act (CZMA), enacted by the U.S. Congress in 1972 to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone," amended in 1990, is administered by NOAA's Office of Ocean and Coastal Resource Management. The CZMA provides for management of the nation's coastal resources, including the Great Lakes, and balances economic development with environmental conservation. The CZMA outlines two national programs: the National Coastal Zone Management Program and the National Estuarine Research Reserve System. Thirty-four states have approved coastal management programs. The 34 coastal management programs aim to balance competing land and water issues in the coastal zone, while estuarine reserves serve as field laboratories to provide a greater understanding of estuaries and how humans impact them.

Under Section 307 of the CZMA (16 U.S.C. Section 1456), activities that may affect coastal uses or resources that are undertaken by federal agencies, that require a federal license or permit, or that receive federal funding must be consistent with a state's federally approved coastal management program. California's federally approved coastal management program consists of the California Coastal Act, the McAteer-Petris Act, and the Suisun Marsh Protection Act. The California Coastal Commission (CCC) implements the California Coastal Act and the federal consistency provisions of the CZMA for activities affecting coastal resources outside of San Francisco Bay.

### *Clean Water Act*

Under the Clean Water Act (CWA), the EPA seeks to restore and maintain the chemical, physical, and biological integrity of the Nation's waters by implementing water quality regulations. The California State Water Resources Control Board (SWRCB) has primacy for administration of most of the relevant sections of the CWA pertinent to this Project within the state. As discussed in more detail in Section 5.9, *Hydrology and Water Quality*, the CWA primarily applies to marine biological resources when a discharge of some sort, either directly or indirectly from an onshore activity, results in an impairment of the receiving water body and therein poses a risk to beneficial use of the water body, which includes marine habitat and associated biological resources.

Section 401 of the CWA requires that applicants obtain a USACE permit to obtain state certification that the activity associated with the permit will comply with applicable state effluent limits and water quality standards. In California, a water quality certification (or waiver) must be obtained from the Regional Water Quality Control Board (RWQCB) for both Individual and Nationwide Permits. The certification must be based on a finding that the proposed discharge will comply with water quality standards that are defined as numeric and narrative objectives in each RWQCB's Basin Plan. The SWRCB administers CWA compliance primarily through its RWQCB, extending its jurisdiction to all waters of the state and all waters of the United States, including wetlands.

Section 402, Section 316(a), and Section 316(b) of the CWA apply to cooling water intakes. Section 402(p) requires National Pollutant Discharge Elimination System (NPDES) permits to control discharges of waste into waters of the United States and to prevent the impairment of the receiving water for beneficial uses, which includes harm to marine biota. CWA Section 316(a) specifically addresses thermal discharges, which could potentially apply to some desalination facilities, particularly those that commingle brine discharges with cooling water effluent. CWA Section 316(b) indirectly applies to desalination facilities co-located with power plants and other industrial cooling water intakes insofar as a cooling water intake structure, used to withdraw water for use by both facilities, must meet the requirements of the federal statute and applicable regulations.[1] Thus, a desalination facility that collects source water through an existing, operational cooling water intake associated with a power plant, or certain other types of industrial facilities, may be required to comply with technology-based standards for minimizing impingement and entrainment impacts.

Section 404 of the CWA requires that a permit be obtained from USACE prior to the discharge of dredged or fill materials into any "waters of the United States or wetlands." Waters of the United States are broadly defined to include navigable waterways, their tributaries, lakes, ponds, and

1 Under CWA Section 316(b), "existing facilities" only applies to facilities with a design intake flow of ≥2 MGD.

wetlands (33 CFR Section 328.3). Wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that normally do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (USEPA 2017). Some classes of fill activities may be authorized under General or Nationwide Section 404 Permits if specific conditions are met. Nationwide permits do not authorize activities that are likely to jeopardize the existence of a threatened or endangered species listed or proposed for listing under FESA. In addition to conditions outlined under each Nationwide Permit, project-specific conditions can be required by the USACE as part of the Section 404 permitting process. When a project's activities do not meet the conditions for a Nationwide Permit, an Individual Permit may be issued.

Section 303(d) of the CWA requires states to identify impaired water bodies (i.e., 303(d) List of Impaired Water Bodies). In the present study area, there are no identified impaired water bodies that eventually drain into Santa Monica Bay.

### *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 the 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 (California Fish and Game Code Section 2050 et seq.)*

The California Endangered Species Act (CESA) establishes the State's policy to conserve, protect, restore, and enhance threatened or endangered species and their habitats. For projects that affect both a State- and federally listed species, compliance with the FESA will satisfy the CESA if CDFW determines that the federal incidental take authorization is "consistent" with the CESA under California Fish and Game Code Section 2080.[1] For projects that will result in a take of a state-only listed species, the project proponent must apply for a take permit under Section 2081(b). Under CESA, CDFW maintains lists of threatened and endangered species, candidate species, and species of special concern.

### *California Fish and Wildlife Code Sections 3511, 4700, 5050, and 5515*

The classification of "fully protected" was the State's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. The CDFW created lists for fish, amphibians and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA or FESA. CESA-listed endangered and threatened species may not be taken or possessed at any time without a permit from the CDFW (Section 3511 Birds, Section 4700 Mammals, Section 5050 Reptiles and Amphibians, and

Section 5515 Fish), except for the collection of these species for necessary scientific research, and relocation of the bird species for the protection of livestock.

### *Marine Life Protection Act*

The Marine Life Protection Act (MLPA) was adopted in 1999 to protect ecosystem structure and function. Specific mandates of the MLPA are to sustain, conserve, and rebuild depleted populations. The MLPA works in concert with the Marine Life Management Act. Within California, most of the legislative authority over fisheries management is enacted within the MLPA. This law directs CDFW and the Fish and Game Commission to issue sport and commercial harvesting licenses, as well as license aquaculture operations. The CDFW, through the commission, is the State's lead biological resource agency and is responsible for enforcement of the state endangered species regulations and the protection and management of all state biological resources.

An important part of MLPA enactment has been the establishment of Marine Protected Areas (MPAs) along the California coast. Fishing and other consumptive activities are strictly regulated in MPAs to provide refuges within which healthy stocks can be maintained to ensure propagation along the entire coast. Three types of designated (or recognized) MPAs occur in California: state marine reserves (SMRs), state marine parks (SMPs), and state marine conservation areas (SMCAs). The area between Point Conception and the U.S./Baja California border includes 35 South Coast Region MPAs. Additionally, an SMCA and an SMR are located at Point Dume in the Malibu region, and an SMCA and an SMR are located at the Palos Verdes Peninsula.

### *Marine Life Management Act*

The Marine Life Management Act works in concert with the MLPA by advancing fishery management as an important element of ecosystem integrity and sustainability. Under the Marine Life Management Act, implementation of the California Nearshore Fisheries Management Plan and the California Market Squid Fisheries Management Plan affect fish species found in Santa Monica Bay.

#### Nearshore Fisheries Management Plan

The five goals of the Nearshore Fisheries Management Plan are to ensure long-term resource conservation and sustainability, to employ science-based decision-making, to increase constituent involvement in management, to balance and enhance socioeconomic benefits, and to identify implementation costs and sources of funding. The following measures are employed to meet the primary goal of sustainability: a fishery control rule including size limits, time/area closures, or gear restrictions; regional management tailored to conditions specific to each of four regions; marine protected areas; restricted fishery access; and allocation of total allowable catch (CDFG 2001). All of the species regulated by the Nearshore Fisheries Management Plan are primarily associated with rocky substrate.

#### Market Squid Fisheries Management Plan

The Market Squid Fishery Management Plan establishes a management program for California's market squid (*Doryteuthis opalescens*) resource. The goals of the California Market Squid Fisheries Management Plan are to manage the market squid resource to ensure long-term resource conservation and sustainability, reduce the potential for overfishing, and institute a framework for management in light of potential environmental and socioeconomic changes. The tools implemented to accomplish these goals include fishery control rules (e.g., seasonal catch limits, weekend closures), creation of a restricted access program, and establishment of a seabird closure restricting the use of attracting lights for commercial purposes (CDFG 2005).

### *California Coastal Act Section 30000 et seq.*

California Coastal Act Chapter 3 contains policies to: protect water quality and the biological productivity of coastal waters (Public Resources Code [PRC] Section 30231); avoid and minimize dredging, diking, and filling sediments (PRC Section 30233); and mitigate wetland impacts (PRC Section 30607.1). Under the California Coastal Act, "environmentally sensitive area means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments" (PRC Section 30107.5).

The California Coastal Act requires that jurisdictions to protect Environmentally Sensitive Habitat Areas (ESHAs). Specifically, PRC Section 30240 states that:

- Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.
- Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.

The California Coastal Act generally protects ESHAs where they exist and also protects "against any significant disruption of habitat values." California Coastal Act Section 30007.5 states that, where there is a conflict between policies, the conflict:

> *be resolved in a manner, which on balance is the most protective of significant coastal resources. In this context, the Legislature declares that broader policies which, for example, serve to concentrate development in close proximity to urban and employment centers may be more protective, overall, than specific wildlife habitat and other similar resource policies.*

### *Porter-Cologne Water Quality Control Act*

The Porter-Cologne Water Quality Control Act provides state-wide coordination for protection of waters of the state. The Act established the SWRCB as the state agency with primary responsibility for the control of water quality and nine RWQCBs to oversee water quality at the regional level.

### *California Ocean Plan*

The California Ocean Plan establishes water quality objectives and beneficial uses for waters of the Pacific Ocean adjacent to the California Coast (SWRCB 2015). The California Ocean Plan is a key tool employed by the SWRCB to ensure CWA and Porter-Cologne Act compliance for waters of the state and United States. NPDES waste discharge permits set discharge limits that are required to prevent exceedances of the water quality objectives in the California Ocean Plan. The proposed Project would discharge into Santa Monica Bay and therefore is subject to all California Ocean Plan water quality objectives and NPDES requirements. The most relevant objectives to this Project include:

- Marine communities, including vertebrate, invertebrate, and plant species shall not be degraded.
- Waste management systems that discharge into the ocean must be designed and operated in a manner that will maintain the indigenous marine life and a healthy and diverse marine community.
- Waste discharged to the ocean must be essentially free of substances that will accumulate to toxic levels in marine waters, sediments, or organisms.

The basis for water quality objectives established in the California Ocean Plan is the protection of beneficial uses designated for each section of coastline by RWQCBs. The designated beneficial uses relevant to marine resources in the study area are as follows:

- Marine Habitat – Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).
- Shellfish Harvesting – Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption or commercial or sport purposes. This includes waters that have in the past, or may in the future, contain significant shellfisheries.
- Commercial and Sport Fishing – Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
- Rare, Threatened, or Endangered Species – Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

On May 6, 2015, SWRCB approved the California Ocean Plan Amendment (or OPA) to address effects associated with the construction and operation of seawater desalination facilities (i.e., intake and discharge of brine waters) along the California coastline. The OPA supports the use of ocean water as a reliable supplement to traditional water supplies while protecting marine life and water quality, and is aimed at establishing a uniform state-wide approach for the protection of beneficial uses of ocean waters.

Specifically, the OPA requirements include but are not limited to the following:

- New or expanded seawater desalination plants are to use the best available, site, design, technology, and mitigation measures feasible to minimize intake and mortality of all forms of marine life. Based on the best available science, the California Ocean Plan identifies preferred technologies, including the use of subsurface intakes (intake structures located beneath the seafloor), unless subsurface intakes are determined to be infeasible by the RWQCB based upon a comparative analysis of the following factors: geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats, presence of sensitive species, energy use for the entire facility; design constraints (engineering, constructability), and project life cycle cost. If subsurface intakes are not feasible, then screened ocean intakes may be considered. The intake screens must have slot sizes ≤1.0 millimeter (mm) (0.04 in.), and the intake velocity must be ≤0.015 meters per second (m/s) (0.5 feet per second [fps]).

- Alternatives to subsurface intakes and screened intakes can be considered, but the alternative(s) must achieve the same level of entrainment reduction as a screened intake and must be as protective of marine life as the preferred technologies.
- Commingling brine discharge with an existing wastewater (e.g., agricultural, municipal, industrial, power plant cooling water) that would otherwise be discharged to the ocean is the preferred technology for brine discharge to minimize intake and mortality. Multiport diffusers are the next best method for disposing of brine when the brine cannot be diluted by wastewater and when there are no live organisms in the discharge.
- Alternatives to wastewater commingling and multiport diffusers can be considered, but the alternative(s) must achieve a comparable level of entrainment/discharge impacts as wastewater commingling or multiport diffusers.
- Discharges shall not exceed a daily maximum of 2.0 parts per thousand (ppt) above natural background salinity measured no farther than 100 meters (328 feet) horizontally from each discharge point. There is no vertical limit to this zone.

The owner or operator of a facility is required to submit a Marine Life Mortality Report to the RWQCB estimating the marine life mortality resulting from the facility's construction and operation after implementation of the facility's required site, design, and technology measures.

Mitigation is required for the replacement of all forms of marine life or habitat that is lost as a result of the construction and operation of a desalination facility after minimizing intake and mortality of all forms of marine life through best available site, design, and technology.

According to the OPA, the owner or operator shall mitigate for the mortality of all forms of marine life determined in the Marine Life Mortality Report by choosing to either complete a mitigation project or, if an appropriate fee-based mitigation program is available, provide funding for the program. The mitigation project or the use of a fee-based mitigation program and the fee amount that the owner or operator must pay is subject to RWQCB approval.

#### *Marine Invasive Species Act*

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

### Regional and Local

#### *City of El Segundo Municipal Code*

The Project area is located within the City of El Segundo's Coastal Zone. City of El Segundo Municipal Code (ESMC) Chapter 12, Coastal Zone Development Procedures, provides coastal development procedures to ensure that all public and private development in El Segundo's Coastal Zone consistent with the City's certified Local Coastal Plan (LCP). ESMC Section 15-12-2, Permit Application Required, states that a Coastal Development Permit (CDP) shall be required and obtained from the City prior to commencement of any development in the Coastal Zone. ESMC Chapter 12 identifies the procedural requirements for obtaining a CDP, as well as those development activities that may be otherwise exempted from the requirements.

## 5.11.2 Environmental Setting

This section describes the regional oceanographic conditions, marine habitats, and biological resources of Santa Monica Bay, in general, and conditions, which occur within the marine study area specifically. The marine study area is sited within the nearshore coastal region of Santa Monica Bay and includes the coastal waters and intertidal and subtidal habitats occurring immediately offshore of the El Segundo Generating Station (ESGS) and within an area extending approximately 1 nautical mile upcoast and downcoast of the terminus points of the ESGS intake and outfall pipelines and situated parallel to the shoreline and extending approximately 1.5 nautical miles offshore from the beach, ending in approximately 90 feet of water. The marine study area for the Project is shown in **Figure 5.11-1**. Marine species that have the potential to occur in the study area are listed in **Table 5.11-1**.

The marine biological biota found in Santa Monica Bay includes invertebrate infauna[2] and mobile epifauna[3] that inhabit Santa Monica Bay sediments; sessile[4] and encrusting invertebrates and marine vegetation on artificial hard substrate associated with the ESGS pipelines. The marine biota also includes planktonic organisms, fish, marine mammals, and marine birds that inhabit or use the open waters of Santa Monica Bay. These habitats and their associated biological communities are described in more detail below.

### Regional and Local Setting

#### *Location*

The proposed ocean water desalination facility is to be located at the ESGS. The desalination facility Project area lies in Santa Monica Bay in Los Angeles County, adjacent to the Pacific Ocean. The ESGS property is located on a gently sloping coastal terrace and is bordered by Chevron Marine Terminal on the north, 45th Street in the city of Manhattan Beach on the south, Vista Del Mar and the Chevron refinery on the east, and Santa Monica Bay to the west.

The Chevron USA – El Segundo Refinery, the Scattergood Generating Station, and the Hyperion Treatment Plant, with its deep-water discharge, are all located upcoast of the ESGS. Farther upcoast are Marina del Rey Harbor, the mouth of Ballona Creek, and the Ballona Wetland Complex. Manhattan Beach Pier is located downcoast of the ESGS.

2 Organisms living in the sediments of the beach or ocean seafloor.
3 Organisms living on the surface of the seafloor or attached to submerged objects.
4 Organisms that are permanently attached or established on hard substrate habitat and are typically not free to move about.

### *Bathymetry*

Santa Monica Bay is situated in the middle of the Southern California Bight (SCB), which stretches from Point Conception in the north to San Diego in the South. Santa Monica Bay measures 27 miles across from Point Dume in the north to Palos Verdes Point to the South and is characterized by a gently sloping continental shelf which extends seawards to a depth of 80 meters (265 feet) (MBC 2017). The major features of Santa Monica Bay include two submarine canyons, the Redondo Canyon located in southern Santa Monica Bay and the Santa Monica Canyon located in central Santa Monica Bay. The Redondo Canyon is the deepest of the two and bisects the Bay from its outer boundary to the King Harbor/Redondo Beach area (Terry et al. 1956). The majority of the sediments of Santa Monica Bay are composed of sand, with smaller amounts of gravel, silt, and clay. Rocky substrate in the form of rock outcrops are confined to the northern coast, between Point Dume and Malibu, as well as along the Palos Verdes Point coastline to the south (Claisse et al. 2012). There are also up to 40 artificial rock groins in Santa Monica Bay originally constructed for the purpose of beach stabilization (Shaw 2007).

### *Climate and Oceanography*

The climate of Southern California is generally characterized as Mediterranean, which supports short, mild winters and warm, dry summers. Average annual precipitation along the coast is estimated at 37.6 centimeters (cm) (14.8 inches), approximately 90 percent of which falls between November and April (MBC 2017). Santa Monica Bay is not influenced by major freshwater sources and salinity is consistently the same as full-strength seawater at 33.5 ppt (Daily et al. 1993). According to the NOAA gauge located at the Santa Monica Pier, water temperatures typically vary from a low of ~12°C in spring (March) to a high of ~21°C in summer (July–August).

Depending on the season, three different current schemes originating in the SCB influence the prevailing water flow in Santa Monica Bay (Hickey et al. 2003). One is a northward flow of warm water from the south, which results in a cyclonic (initially) or counter cyclonic (later stages) eddy in Santa Monica Bay. This regime dominates in the summer months. A second pattern is a southward flow of cold water from the north, which is concentrated shoreward of the Channel Islands and injected into Santa Monica Bay. This flow regime also results in either counter cyclonic or cyclonic flow of colder water in Santa Monica Bay principally during the winter months. The third regime originates as a result of upwelling of cold water onto the shelf that is channeled shoreward of the Channel Islands and injected in Santa Monica Bay before it flows southward (Hickey et al. 2003).

Tides in the SCB are generally classified as mixed, semi-diurnal, with two unequal high tides (high and higher high tide) and two unequal low tides (low and lower low tide) every day. The tidal range in Santa Monica Bay typically varies from a high of 7 feet to a low of -1.5 feet with a mean tide level of 2.7 feet (Tenera 2014).

## Existing Marine Habitats and Communities

The marine study area includes a variety of habitats that can be broadly divided into intertidal (partially submerged), subtidal benthos (fully submerged bottom), and pelagic (open water), as described in the following subsections.

### *Wetlands*

There are no wetlands present within the marine study area. However, along the shores of Santa Monica Bay, there are 2 small freshwater marshes and 10 brackish water wetlands that are home to numerous insects, amphibians, reptiles, and birds, as well as tules and cattails (Johnston et al. 2011). Of these wetlands, the largest and closest to the marine study area is the Ballona Wetlands Complex at Marina del Rey located approximately 3.75 miles to the north of the Project (Johnston et al. 2011).

### *Intertidal & Nearshore Habitats*

The intertidal zone is located between the highest and lowest tide elevations. Intertidal zones along the Southern California coast include rocky shores, sandy beaches, coastal marshes, and tidal flats located within estuaries and lagoons. The intertidal zone adjacent to the Project area is characterized by sandy beaches and a quarried rock groin upcoast from the Project area that is 200 meters long. The depth of the nearshore zone around the rock groin ranges from -8 feet to +5 feet Mean Lower Low Water (MLLW).

#### Sandy Beach Intertidal

Sandy beaches ecosystems account for 36 percent of the shoreline habitat in Southern California and about 70 percent of the shoreline of the entire California coastline (Dugan et al. 2015). Generally, beaches are highly dynamic environments subject to intense wave-related energy, exposure to air and sun during low tides, constant reworking, and large-scale seasonal substrate variations (Thompson et al. 1993). The distribution of organisms within the sand is subject to aforementioned large-scale seasonal variations as well as daily fluctuations in temperature, salinity, and moisture content of the sand (MBC 2017). Additionally, individual animals that live in the sand are extremely mobile and frequently shift position in the sand. Sand crabs, for example, move up and down the tidal zone with the tide, and are also observed to move laterally along the beach with the wave direction (Dillery and Knapp 1970).

The intertidal community of Santa Monica Bay consists largely of organisms that live in (infauna) or on (epifauna) the sand such as polychaetes, bivalves, and crustaceans. These communities are typified by patchy distributions, temporal variations, and sparse individual abundances (Thompson et al. 1993). Dominant taxa include the sand crab (*Emerita analoga*), the blood worm (*Hemipodus borealis*), Gould bean clams (*Donax gouldi*) and the pismo clam (*Tivela stultorum*) (Thompson et al. 1993, Dugan et al. 2015). Historically, pismo clams are also abundant in the lower intertidal areas of Santa Monica Bay beaches, but are now more rare due to over harvesting and environmental stress (Dugan et al. 2015). Bean clams, pismo clams and Pacific littleneck clams (*Protothaca staminea*) are all harvested recreationally (Pattison 2001). Additionally, regular beach grooming in the Project area removes this source of detritus, degrading the beach habitat for many invertebrate species.

In November of 2006 (Fall) and in the May of 2007 (Spring), two separate surveys along transects perpendicular to shore of the intertidal zone (0 meters to +1.5 meters [0 feet. to +5 feet MLLW) were conducted to characterize seasonal differences in the infauna and epifauna communities of the intertidal zone (0–5 feet or 0–1.5 meter) in the sandy beaches located seaward and adjacent to the ESGS and downcoast of the rock groin located upcoast of the ESGS (Shaw 2007). During the Fall survey, the low and mid intertidal zones were dominated by the bean clam (*Donax gouldii*), the annelid *Scolelepis bulibranchia* and the beach hopper *Megalorchestia benedicti* (Shaw 2007). In the spring survey, total infaunal organism abundances were lower compared with the fall survey, with the exception of the abundance of the annelid worm *Hemipodus borealis* which accounted for 61 percent of the abundance of all the organisms observed. Other organisms that were present in lower abundances during the spring survey included the annelid *S. bullibranchia* and the ribbonworm *Carinoma mutabilis* (Shaw 2007).

### Rocky Intertidal

Natural rocky intertidal habitats and their associated biological communities are only found to the north along the Malibu coast and to the south along the Palos Verdes Peninsula, located approximately 13 and 9 miles from the Project area, respectively. Artificial structures, such as breakwaters, jetties, and groins (including the one offshore of ESGS), also provide hard substrate that allow biological communities to become established in Santa Monica Bay.

When not submerged, rocky intertidal assemblages are predominantly influenced by the period of time they are exposed to drying winds and temperature extremes. Distributions of these assemblages vary with tidal elevation, location, and season. In areas subjected to heavy wave action, the lower intertidal zone may be expanded upwards, and the upper intertidal zone reduced (Ricketts et al. 1968). Species abundance (number of individuals of a taxa present) and species diversity (number of species occurring at a given location) typically increases as you go from the splash zone (highest intertidal zone) to the lower intertidal zone. Vertical zonation in the rocky intertidal habitats of Santa Monica Bay are typified by distinct species assemblages at different tidal levels, although several factors including grazing, wave energy and direction, and variation in local topography (common on riprap structures) may disrupt the patterns (MBC 2017).

The splash zone (highest rocky intertidal zone, above all but the highest tides) is typically dominated by lichens and shelled invertebrate species capable of tolerating exposure to the air for long periods of time. These species typically include periwinkles (*Littorina* spp.), barnacles (*Balanus* and *Chthamalus* spp.), limpets (Acmaeidae) and rock lice (*Ligia* spp.) MBC 2017; Tway 1991; Murray and Bray 1993; Thompson et al.1993). The biological community in the upper intertidal zone, below the splash zone and regularly inundated during high tides, may consist of a number of organisms including sea felt (*Enteromorpha* spp.) sea lettuce (*Ulva* spp.), brown algae (Phaeophyta), various red algae (Rhodophyta), turban snails (*Tegula* spp.), mussels (*Mytilus* spp.), chitons (Polyplacophora), owl limpets (*Lottia gigantea*) and other limpets, hermit crabs (*Pagurus* spp.), and striped shore crabs (*Pachygrapsus crassipes*) (MBC 2017; Tway 1991; Murray and Bray 1993; Thompson et al. 1993). Surveys of the rocky intertidal community of the downcoast (southeastern) side of the rock groin located in the marine study area was conducted in the fall (November) of 2006 and spring (May) of 2007 (Shaw 2007). These surveys identified the occurrence of the green algae, *Enteromorpha/Ulva spp*., the file limpet (*Collisella limatula),* the ribbed limpet (*C. digitali)s*, the checkered periwinkle (*Littorina scutulata*), and the white acorn barnacle (*Balanus glandula)* (Shaw 2007).

The middle intertidal zone biological community consists of both red and brown algae such as rockweed (*Pelvetia spp*.) and the green alga sea bubble (*Colpomenia sinuosa*) (Tway 1991; Murray and Bray 1993). Mussel mats, typically interspersed with gooseneck barnacles (*Pollicipes polymerus*), both of which are filter feeders, are often widespread in the middle intertidal zone. Additionally, a variety of sea anemones (*Anthopleura spp*.), snails, polychaetes (Class Polychaeta), barnacles, isopods, crabs and shrimp (Order Decapoda), and brittle stars (Class Ophiuroidea), while sea slugs (Order Opisthobranchia), sea hares (*Aplysia californica*) and octopus (*Octopus spp*.) also occur in this zone (Tway 1991; Thompson et al. 1993). The 2006-2007 interitdal survey of the rock groin reported the occurrence of the green algae, *E./Ulva spp*., the file limpet (*C limatula),* the ribbed limpet (*C. digitali)s*, the owl limpet (*Lottia gigantea*), the checkered periwinkle (*L. scutulata*), the brown acorn barnacle (*C. fissus)*, the white acorn barnacle (*B. glandula),* the gooseneck barnacle (*Pollicipes polymerus),* the California chiton (*Nuttallina californica)*, the angular unicorn (*Acanthina spirata),* the California mussel (*Mytilus californianus)* and the blue bay mussel *(Mytilus galloprovincialis),* the black turban snail, *(Tegula funebralis),* the colonial anemone *(Anthopleura elegantissima,* the green anemone *(A. xanhogrammica),* the striped shore cr*ab (Pachgraspsus crassipes),* and the rock louse *(Ligia occidentalis*) in the middle intertidal zone (Shaw 2007).

The lower intertidal community is typified by red algae such as the turf weed (*Endocladia*, *Mastocarpus*) a variety of coralline algae (*Corallina spp*., *Pseudolithophyllum spp*. and *Lithothamnion spp*.) and brown algae including wireweed (*Sargassum spp*.) and feather boa kelp (*Egregia menziesii*) (Tway 1991; Murray and Bray 1993). Surfgrass (*Phyllospadix spp*.), a marine flowering plant, can occasionally form extensive meadows through the lower intertidal and subtidal zones. Sponges (Demospongiae), sea anemones, sand castle worms (*Phragmatopoma californica*) and other polychaetes, snails, sea slugs, attached bivalves, octopus, bryozoans (Ectoprocta), amphipods (Order Amphipoda), isopods, shrimps, hermit crabs, crabs, sea stars (Pisaster spp.) and bat stars (*Pateria miniata*), brittle stars, sea cucumbers (*Parastichopus spp*), sea urchins (*Strongylocentrotus spp*), and tunicates (Urochordata) are abundant in the low intertidal zone (MBC 2017; Tway 1991; Thompson et al. 1993). Shaw (2007) reported the occurrence of the green algae, *E./Ulva spp*., the file limpet (*C limatula),* the ribbed limpet (*C. digitalis)*, the checkered periwinkle (*L. scutulata*), the emarginated dogwinkle (Nucella emarginata), the brown acorn barnacle (*C. fissus)*, the white acorn barnacle (*B. glandula),* the gooseneck barnacle (*P. polymerus),* the California chiton (*N. californica)*, the angular unicorn (*A. spirata),* the California mussel (*M. californianus)* and the blue bay mussel *(M. galloprovincialis),* the Pacific littleneck clam (*Leukoma (Protothaca*) *staminea*), the black turban snail, *(T. funebralis),* the colonial anemone *(A. elegantissima,* the green anemone *(A. xanhogrammica),* the ochre star *(Pisaster ochraceous,)* the sand castle worm *(Phragmatopoma california),* and the striped shore cr*ab (P crassipes),* in the lower intertidal zone (Shaw 2007)

Black abalone (*Haliotis cracherodii*), a FESA-listed endangered species, were found historically in the intertidal and shallow subtidal zones of rocky shores of Santa Monica Bay (such as Malibu). However, commercial and sport harvesting and diseases (e.g. withering abalone syndrome) have drastically reduced the black abalone population throughout Southern California. In 1997, a moratorium was placed on recreational and commercial harvesting of black and all other abalone in California south of San Francisco. In 2011, the National Marine Fisheries Services designated critical habitats of black abalone along the coast of California. The closest black abalone critical habitat in Santa Monica Bay is along the rocky shore of Catalina Island and Palos Verdes Peninsula (NMFS 2011).

### *Subtidal Benthic Habitats*

Two subtidal (submerged) types of benthic habitats occur in the marine study area: soft substrate (sandy) and hard substrate (rocky).

#### Sandy Subtidal

The benthic invertebrate infauna are an important part of the marine ecosystem. The organisms are a food source for fish and other larger invertebrates, and contribute to nutrient recycling and detoxification of pollutants (MBC 2017). Some species are highly sensitive to effects of human activities, while others thrive under altered conditions. Depth is a strong influence on community abundance and composition because it determines sediment disturbance (through wave energy and burrowing by organisms), oxygen content, and food availability. In turn, the organisms affect the environment through burrowing, exclusion of other species, and predation.

The benthic infaunal communities inhabiting the sandy sediment offshore of the ESGS have been assessed continuously as part of the NPDES discharge permit monitoring for the ESGS. The most recent assessment in 2015 reported that the benthic infaunal community consists primarily of mollusks (clams and snails), small annelid worms, arthropods (primarily amphipods and other small crustaceans), nemerteans, and nematode worms (Table 5.11-1).

Table 5.11-1 provides a listing of the 30 most abundant infaunal taxa observed at the shallower (B1-B4) and deeper (B5-B8) water sampling locations in 2015 (MBC 2017). The infaunal community inhabiting the deeper stations (B5-B8) that are sited along the same depths as the ESGS intake and outfall structures, were reported to be more diverse and have higher individual species abundances than was observed at the sampling locations located closer inshore (B1-B4). At the deeper stations the most abundant organisms were the clam *Tellina modesta*, nematode worms, the nemertean worm *Carinoma mutabilis*, and the annelid *Spiophanes norrisi*. At the shallower stations the most abundant organism was the annelid *Armandia brevis* (Table 5.11-1). These taxa were consistent with those that have been encountered in the marine study area since 1990 (MBC 2017).

Benthic macrofauna are larger invertebrate species that live on the bottom sediments or are demersal organisms that inhabit the water column immediately above the seafloor. These species tend to be mobile scavengers and predators, and distributions can be patchy and highly variable between locations and seasons. Trawl sampling conducted offshore of the ESGS between 1978 and 2013 have documented the occurrence of a number of different macroinvertebrate species (MBC 2017).

**TABLE 5.11-1**
**THE 30 MOST ABUNDANT INFAUNAL SPECIES FROM THE**
**2015 ESGS NPDES PERMIT MONITORING PROGRAM SAMPLING**

| | **Sampling Station** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **B8** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Phyla** | **Species** | **Shallow Stations** | | | | **Deep Stations** | | | | **Total** | **%** |
| MO | *Tellina modesta* | | 2 | | | 4 | 10 | 9 | | 25 | 5.81 |
| NT | Nematoda | | | | | 12 | 4 | 2 | 5 | 23 | 5.35 |
| NE | *Carinoma mitabilis* | 1 | 1 | | | 2 | 7 | 1 | 9 | 21 | 4.88 |
| AN | *Armandia brevis* | 14 | 1 | 1 | | | | | | 16 | 3.72 |
| AR | *Erichonius brasiliensis* | | | | | | | 16 | | 16 | 3.72 |
| AN | *Spiophanes norrisi* | 1 | | | | 6 | 3 | 3 | 2 | 15 | 3.49 |
| AN | *Goniada littorea* | | 5 | | | 1 | 2 | 2 | 4 | 14 | 3.26 |
| AN | *Polydora sp* | | | | | 11 | 1 | 1 | | 13 | 3.02 |
| AN | *Brania brevipharyngea* | | | | | | 1 | 11 | | 12 | 2.79 |
| AN | *Aphelochaeta glandaria* Cmplx. | | | | | 2 | 8 | 1 | | 11 | 2.56 |
| AR | *Leptochelia dubia* Cmplx. | | | | | | 5 | 4 | 2 | 11 | 2.56 |
| BC | *Glottidia albida* | | | | | 6 | 3 | | 2 | 11 | 2.56 |
| MO | *Leptopecten latiaruatus* | | | | | 4 | 2 | 4 | 1 | 11 | 2.56 |
| AN | *Apoprionospio pygmaea* | | 2 | 5 | | 2 | 1 | | | 10 | 2.33 |
| AN | *Chaetozone setosa* Cmplx. | | | | | 1 | 6 | | 2 | 9 | 2.09 |
| EC | *Dendraster excetricus* | | 3 | | | | 6 | | | 9 | 2.09 |
| CO | Enteropneusta | | 1 | | | | 4 | 3 | | 8 | 1.86 |
| AR | *Harpacticoida* sp. B | | | | | 4 | 1 | 1 | 1 | 7 | 1.63 |
| AR | *Metamysidopsis elongata* | 3 | 4 | | | | | | | 7 | 1.63 |
| KI | Kinorhyncha | | | | | | | | 7 | 7 | 1.63 |
| AN | *Platynereis bicanaliculata* | | | | | 1 | 2 | 3 | | 6 | 1.40 |
| AR | *Mandibulophoxus gilesi* | 4 | | 1 | 1 | | | | | 6 | 1.40 |
| *AR* | *Photis bifurcata* | | | | | 3 | 1 | 2 | | 6 | 1.40 |
| *AR* | *Photis sp.* | | | | | 1 | 1 | 4 | | 6 | 1.40 |
| *NE* | *Tubulanus polymorphus* | | | | | 6 | | | | 6 | 1.40 |
| *AN* | *Nereis sp.* | | | | | 3 | 1 | 1 | | 5 | 1.16 |
| *AR* | *Hartmanodes harmanae* | | 1 | 1 | 1 | | | | 2 | 5 | 1.16 |
| *AR* | *Rhepoxynius menziesi* | | 1 | 4 | | | | | | 5 | 1.16 |
| *MO* | *Garnotia naticarum* | | | | | 3 | 2 | | | 5 | 1.16 |
| *MO* | *Modiolus sp* | | | | | 1 | 3 | | 1 | 5 | 1.16 |

SOURCE: MBC 2017.

During the 2013 trawl survey, the spiny sand star *Astropecten armatus* and the California sand star *A. virilli* were the most abundant species, contributing 57 percent of total macrofaunal abundance, observed to inhabit the marine study area (**Table 5.11-2**). Sand stars are common on sand or muddy bottoms where they can move on or below the sediment surface (Morris et al. 1980). Sand stars feeds primarily on snails, which they detect from a distance, but are also known to feed on dead fish, the sea pansy *Renilla kollikeri*, and the Pacific sand dollar *Dendraster excentricus* (MBC 2017). Other dominant macrofauna included Blackspotted bay shrimp *Crangon nigromaculata* and the California spiny lobster *Panulirus interruptus*, the East Pacific red octopus *rubescens*, and the target shrimp *Sicyonia penicillata*. East Pacific red octopus appears to be more common along the same water depths as the ESGS intake and outfall structures while blackspotted bay shrimp were more common at shallower water depths (Table 5.11-2).

**TABLE 5.11-2**
**THE 13 MOST ABUNDANT MACROFAUNAL SPECIES FROM THE 2013 ESGS NPDES PERMIT MONITORING PROGRAM SAMPLING**

| Sampling Stations | | T1 | T2 | T3 | T4 | T7 | T8 | T9 | T10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Common Name** | **Species Name** | **Trawl Stations** | | | | | | | | **Total** | **%** |
| Spiny sand star | *Astropecten armatus* | 38 | 8 | 7 | 62 | 7 | 13 | 3 | 13 | 151 | 44 |
| California sand star | *Astropecten californicus* | 6 | 4 | - | 6 | 3 | 7 | 20 | - | 46 | 13 |
| East Pacific red octopus | *Octopus rubescens* | 5 | 11 | 2 | 10 | - | 4 | 9 | 4 | 45 | 13 |
| Black spotted bay shrimp | *Crangon nigromaculata* | 18 | 1 | 9 | 3 | 1 | - | 1 | 11 | 44 | 13 |
| Target shrimp | *Sicyonia penicillata* | - | 3 | - | 12 | - | - | 4 | - | 19 | 5 |
| California spiny lobster | *Panulirus interruptus* | - | - | 7 | - | - | - | - | 2 | 9 | 3 |
| Xantus swimming crab | *Portunus xantusii* | - | - | 6 | 1 | - | - | - | - | 7 | 2 |
| Hermit crab | *Pagurus spp.* | - | - | - | - | 4 | 1 | - | - | 5 | 1 |
| Taylor coastal shrimp | *Heptacarpus taylori* | 3 | - | - | - | - | - | - | - | 3 | 1 |
| Intertidal coastal shrimp | *Heptacarpus palpator* | 3 | - | - | - | - | - | - | - | 3 | 1 |
| Sheep crab | *Loxorhynchus grandis* | 3 | - | - | - | - | - | - | - | 3 | 1 |
| Gorgonians | *Muricea spp.* | - | - | - | - | - | 2 | - | - | 2 | 1 |
| Sea pansy | *Renilla koellikeri* | - | - | - | - | 1 | 1 | - | - | 2 | 1 |

SOURCE: MBC 2017.

Blackspotted bay shrimp are common throughout Southern California, and play an important role in the coastal food web. Blackspotted bay shrimp prefers mud and sand bottoms, feeding on small epibenthic and benthic fauna. In turn, blackspotted bay shrimp are preyed on by a number of fish, including Pacific staghorn sculpin (*Leptocottus armatus*), brown smoothhound (*Mustelus henlei*) and white croaker (*Genyonemus lineatus*) (MBC 2017). The benthic macrofaunal community inhabiting the sandy benthic habitats offshore the marine study area is composed of long-term dominant species indicating that a relatively stable assemblage, which is typical of the nearshore, soft-bottomed habitats in Southern California, is found in the Project area (MBC 2017).

### Rocky Subtidal

#### *Benthic Fauna – Rocky Subtidal*

Subtidal hard-bottom substrate in Santa Monica Bay includes naturally occurring hard substrate and artificial structures. Natural hard substrate is limited in Santa Monica Bay to areas adjacent to rocky headlands, submarine canyon edges, and some deep areas with rock outcrops (MBD 2017). There is no natural rocky subtidal habitat located in the marine study area. Artificial structures include outfall pipes, artificial reefs, jetties, groins, and piers. Additonally, hard-bottom substrate provides habitat for attachment of a variety of invertebrates and plants, and shelter for motile organisms such as crabs and fishes.

The only subtidal hard substrate occurring within the marine study area are at the previously mentioned rock groin and the armor rock and concrete of the existing ESGS intake and discharge structures. The groin and armor rock around the intake and discharge structures are relatively steep and irregular, being constructed of large boulders, while the intake and discharge structures are vertical concrete risers. Both of these habitats occur in water depths less than 12 meter (39 feet).

Invertebrates common on shallow rocky structure in Southern California include sessile (anchored or immobile) and motile forms. Sessile species using hard-bottom substrate include mussels, barnacles, and sea anemones in shallower depths, and rock scallops (*Crassadoma gigantea*), sponges, sea fans (*Muricea spp*), feather duster worms (a polychaete, Family Serpulidae), wormsnails (*Vermetidae*), and sea squirts (*Ascidiacea*) slightly deeper to the bottom at the rock/sand interface (MBC 2017; Thompson et al. 1993). These sessile species are generally dominant in the shallow subtidal unless macroalgae are very abundant. Most of these sessile invertebrates feed by filtering plankton and detritus from the water column. Motile invertebrates hide in crevices or are protectively colored. Large species include sea stars, octopus, California spiny lobster, and red and purple sea urchins (*Strongylocentrotus franciscanus* and *S. purpuratus*, respectively). Smaller species include rock crabs (*Cancer spp*.), polychaetes, bivalves, snails, amphipods, and isopods. California spiny lobster is fished recreationally on hard structure throughout Santa Monica Bay.

A 2016 inspection of an onshore segment of the outfall pipeline by commercial divers (Ballard Marine Construction 2016) reported the presence of muscles (*Mytilus spp.),* oysters, tubeworms and small encrusting organisms attached to the inside walls of the existing concrete outfall tunnel. Additionally, California lobsters were also observed inhabiting the outfall tunnel (Ballard Marine Construction 2016).

It is noted that giant kelp (*Macrocystis pyrifera*) currently does not occur on the groin or on the existing ESGS intake or discharge structures ESGS (MBC 2017).

### Demersal Fish

In the SCB's shallow coastal areas, the demersal fish community consists of both juvenile and adult flatfish, including speckled sanddab (*Citharichthys stigmaeus*), spotted turbot (*Pleuronichthys ritteri*) and California halibut (*Paralichthys californicus*) as the most commonly encountered species. Regional demersal fish studies conducted in the SCB in 1994, 1998, 2003 and 2008 found that Speckled sanddab was the most frequently taken fish species at shallow, inner shelf stations. Other frequently occurring species included hornyhead turbot (*Pleuronichthys verticalis*), California halibut, California lizardfish (*Synodus lucioceps*) and English sole (*Parophrys vetulus*).

NPDES monitoring of the resident fish community offshore of the ESGS between 1978 and 2013 determined that speckled sanddab, northern anchovy, California lizardfish, and white croaker were the dominant fish species present in the marine study area. Speckled sanddab are non-schooling, sandy-bottom species. The species is common in the shallow nearshore environment of Southern California and feed mainly during the day, hunting primarily by sight on epifaunal invertebrates (MBC 2017).

California lizardfish are generally found near depths of 18 to 46 meters, but can be found well inshore or offshore of this range. This warm-temperate species responds to warm-water conditions, and during the 1998 regional sampling, which occurred during El Niño conditions, was found in 74 percent of surveyed locations throughout the SCB.

Even though the Project area is predominately sandy, given the presence of subtidal hard substrate provided by the groins and armor rock surrounding the ESGS intake and discharge structures, fish species that may roam around or near the Project's offshore discharge and intake structures may include reef-associated species such as Kelp Bass (*Paralabrax clathratus*), Pile Perch (*Rhacochilus vacca*), Black Perch (*Embiotoca jacksoni*), White Seaperch (*Phanerodon furcatus*), Rubberlip Seaperch (*Rhacochilus toxotes*), Brown Rockfish (*Sebastes auriculatus*), Black Croaker (*Cheilotrema saturnum*), Opaleye, and California Sheephead (Semicossyphus pulcher) as well as species attracted to the rock/sand interface such as Barred Sand Bass, Walleye Surfperch (*Hyperprosopon argenteum*) and White Croaker (*Genyonomus lineatus*) (Cross and Allen 1993).

## *Pelagic (Open Water) Habitat*

The pelagic zone supports a number of planktonic organisms (phytoplankton, zooplankton, and ichtyoplankton) that have little or no swimming ability and float with the currents, as well as nektonic organisms, such as fishes, sharks, and marine mammals that move freely against local and oceanic currents. Information on marine and coastal birds is found in Section 5.3, *Biological Resources – Terrestrial*.

### Plankton

Phytoplankton, the primary producers in the marine pelagic food web, are consumed by many species of zooplankton. In turn, the zooplankton supports a variety of species including small schooling fish (e.g., sardine, herring) and baleen whales (*Mysticeti*).

Organisms that complete their entire life cycle as planktonic forms are called holoplankton and include phytoplankton such as diatoms, and zooplankton such as *Acartia tonsa*. Plankton that only spend part of their life cycle in the plankton form as eggs or larvae, are called meroplankton. Compared with the meroplankton, holoplankton have short generation times (hours to weeks), have the capability to reproduce continually (i.e. are not dependent on a certain season), and are not restricted to specific geographic zones. Relative to the holoplankton, meroplankton make up a small fraction of the total number of planktonic organisms in seawater, have much shorter spawning seasons, are restricted to a narrow region of the coast, and have a much greater likelihood of impacts on their populations from mortality due to entrainment. As a result, all the CWA 316(b)-like entrainment studies in California have been designed to assess the effects on meroplanktonic species as outlined in the original guidance document (USEPA 1977).

In the marine environment, phytoplankton tends to be nutrient limited, explaining why high concentrations of phytoplankton are found near coastlines where inputs from terrestrial sources help promote higher densities. The abundance and species assemblage of phytoplankton in the Santa Monica Bay follow seasonal trends related to water clarity, light availability and nutrient inputs, although the dominant species found close to shore usually include the genera *Pseudonitzschia* and *Lingulodinium* (*Gonyaulax*). While plankton movement in the onshore-offshore direction may be somewhat limited, there is ample replenishment and mixing of species in the alongshore direction by members of the population found upcoast and downcoast of an area (MBC 2017).

A subset of the meroplankton comprising fish larvae and eggs, the ichthyoplankton, have been collected in the ESGS's source water as part of the ESGS CWA 316(b) monitoring requirements; the most recent collection events occurred in 2006 and 2014 (MBC 2017). During the 2014 monitoring year, a total of 1,397 fish larvae in 59 taxonomic groups (including unidentified and/or damaged larvae) were collected in the Project area. Ten taxa comprised over 80 percent of the total mean concentration of fish larvae with the most abundant being jacksmelt (*A. californiensis*), white croaker (*Genyonemus lineatus*), unidentified larval/post larval fishes, herrings and anchovies (Clupeiformes), combtooth blennies (*Hypsoblennius spp*.), roughcheek sculpin (*Ruscarius creaseri*), and garibaldi (*Hypsypops rubicundus*). Jacksmelt comprised approximately 25 percent of the total number of larval fishes collected in the Project area. In addition to surveys of the general Project area, an estimated total of 78,759 fish eggs (adjusted for subsampling) were collected directly from the ESGS intake structure. Of the specimens that could be identified to a lower category, turbot, sanddab, herring, and sand flounder eggs were the most numerous. Also collected from the ESGS intake structure were target invertebrate larvae including Cancer crab megalops, market squid paralarvae (recently hatched), and California spiny lobster phyllosomes. There were 462 invertebrate specimens collected from seven taxonomic groupings. Cancer crabs representing at least four species were the most abundant of the target invertebrate larvae collected (Tenera 2014).

### Fish

Pelagic fish communities tend to be similar throughout the SCB, characterized by small schooling species such as northern anchovy (*Engraulis mordax*) and Pacific sardine (*Sardinops sagax*), schooling predators such as Pacific bonito (*Sarda chiliensis*) and yellowtail (*Seriola lalandei*), and large solitary predators such as blue shark (*Prionace glauca*) and swordfish (*Xiphias gladius*) (MBC 2017). Distribution of northern anchovy, likely the most abundant pelagic species in nearshore waters in the Project area, is patchy, and abundances when taken may be high. Other species that may be common in the nearshore water column are queenfish *(Seriphus politus*), which aggregate near the bottom during the day, white croaker (*G. lineatus*), shiner perch (*Cymatogaster aggregata*), and California scorpionfish (*Scorpaena guttata*) which aggregate in the water column during the day (Tenera and MBC 2008). The aforementioned species disperse to feed at night.

As mentioned above in the discussion of demersal (seafloor associated) fish species inhabiting the Project area, NPDES monitoring of the resident fish community offshore of the ESGS between 1978 and 2013, found four species—speckled sanddab, northern anchovy, California lizardfish, and white croaker—were the dominant fish species present.

White croaker is a schooling species that is generally observed in the sandy nearshore coastal areas of SCP and Santa Monica Bay. Of particular note concerning the occurrence of White croaker in the marine study area, although it historically has been one of the most common and abundant fish species observed inhabiting the pelagic environment in the SCB, it has not been collected offshore of the ESGS and the marine study area since 1980. Northern anchovy is also a schooling species that maintains tight schools during the day, and feeds in the water column. It is common in the SCB and is one of the species most frequently captured in sampling conducted, indicating that it is rather evenly distributed over the mainland shelf of Southern California. It is usually among the most abundant and common species in summer surveys in the marine study area. Northern anchovy is also an important component of Southern California's ecosystem. Anchovy eggs and larvae are prey for vertebrate and invertebrate planktivores. Juveniles in nearshore areas support a variety of predators, including birds and other fishes. Northern anchovy is also important commercially, as it is used in conversion to meal, oil, and protein products, and as live bait.

### Squid

Although pelagic as larvae and adults, California market squid (*Doryteuthis opalescens*) are an important commercial species that spawn and deposit egg masses over shallow, sandy bottoms, most often at depths between 18 and 55 meters (59 and 180 feet), and occasionally deeper (CDFG 2005). During spawning, each female may produce 20 egg capsules, each with about 200 eggs, which are individually attached to the seafloor. Spawning squid form dense aggregations that deposit extensive egg masses of up to 100 meter$^2$ (1,077 feet$^2$) in size. Squid eggs are commonly deposited in areas with water temperatures between 10 and 14°C (50 and 57 °F), and they have an incubation period of 34 to 52 days. While squid may spawn anywhere along the coast that meets the habitat and temperature requirements, major California grounds are found in Monterey Bay and near the Channel Islands in Southern California. Spawning in central California typically occurs from April to October, and in Southern California from October to May, with differences attributable to ocean temperatures rather than biological differences. During the seven surveys conducted offshore of ESGS since 1978, only one California market squid was taken during trawl sampling (MBC 2017), and only one squid paralarva was collected during an entrainment study conducted in the Project area in 2006 (Tenera and MBC 2008).

### Marine Mammals & Sea Turtles

Of the marine mammals that occur in the SCB and in the marine study area, some are year-round residents, while others are only seasonal visitors. Two pinnipeds, the California sea lion (*Zalophus californianus*) and the harbor seal (*Phoca vitulina richardii*), are abundant throughout the Southern California coast. The California sea lion is a more common inhabitant, whereas the harbor seal is considered to be a frequent visitor. Sea lions are commonly seen "hauling out" on hard substrates, such as piers and buoys. A third pinniped species, northern elephant seal (*Mirounga angustirostris*), could potentially occur in the area (MBC 2017).

While stock estimates for California sea lion are considerably higher than in past decades, current population trends are still being evaluated. Current population estimates for harbor seals in California are lower than a peak number reported in 2004, but appear stable, while elephant seal populations appear to be growing in California (MBC 2017).

Cetaceans observed commonly in the coastal nearshore waters of Santa Monica Bay include common long-beaked and short-beaked dolphins (*Delphinus capensis and Delphinus delphis*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and Pacific bottlenose dolphin (*Tursiops truncatus*). Further offshore, toothed whales including sperm whale (*Physeter macrocephalus*) and killer whale (*Orcinus orca*) may occasionally occur. Several baleen whale species, including humpback whale (*Megaptera novaeangliae*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), and sei whale (*Balaenoptera borealis*) migrate annually offshore of Southern California. Historically, most are more commonly found near the Channel Islands and none commonly occur in Santa Monica Bay. However, nearshore sightings of large whales have become more common in recent years, with occasional observations of minke whales (*Balaenoptera acutorostrata scammoni*) and humpback whales in Santa Monica Bay, and annual summer observations of feeding blue and fin whales along the Orange County coast and offshore of Santa Monica Bay and the Palos Verdes Peninsula (MBC 2017).

Of the whale species that occur in the SCB, the California gray whale (*Eschrichtius robustus*) is the most frequently observed. This species passes offshore of Southern California annually during its migration between the Bering Sea and birthing lagoons in Baja California. Traditional southbound paths during the winter months are well offshore of the marine study area. Northward migration through the SCB occurs February through May, with peak occurrence in March (MBC 2017). Northbound migration paths tend to be similar to the southbound path though the SCB, however most mother-calf pairs tend to remain fairly close to shore. As during the southbound migration, most whales using the nearshore route tend to remain slightly offshore in the Santa Monica Bay area without entering the Bay. On occasion, individual whales may swim closer to shore and could pass through the marine study area. All marine mammals are protected under the MMPA.

Sea turtles are air-breathing reptiles with streamlined bodies and large flippers. These reptiles inhabit tropical and subtropical ocean waters. Of the seven species of sea turtles, six are found in U.S. waters, and all six species are afforded protection under FESA. Five species of sea turtles are known to occur in the nearshore waters off Southern California: the green turtle *Chelonia mydas*; the loggerhead turtle *Caretta*; the leatherback turtle *Dermochelys coriacea*; the hawksbill turtle *Eretmochelys imbricata*; and the olive ridley sea turtle (*Lepidochelys olivacea*). Green, loggerhead, and leatherback turtles are the most common in the SCB and are known to occur off the Los Angeles County coastline, while the olive ridley sea turtle has been observed offshore of San Diego (MBC 2017).

These five species have broad geographic ranges and are highly migratory. Green turtles and loggerhead turtles have been trapped on occasion in cooling water intake systems in the Project area. Of these, the green turtle is the most commonly encountered nearshore in the SCB. Individuals are known to reside in and near the San Gabriel River, downcoast of the Project area, at the Los Angeles/Orange Counties' boundary. A population was also identified in a discharge channel in San Diego Bay that received warmed water from the (former) South Bay Power Plant (MBC 2017).

## Special-Status Marine Species

The SCB and the Santa Monica Bay as a major component supports numerous special-status mammals, birds, turtles, and fish. Special-status species include those species that are listed as federal or state endangered, threatened, proposed, and candidate species; and state or local species of concern. For the purposes of this analysis, special-status marine species include:

- Marine species that are listed or proposed or are candidate species for listing as Threatened or Endangered by the USFWS pursuant to FESA.
- Marine species listed as rare, threatened, or endangered by CDFW pursuant to the CESA.
- Marine species managed and regulated under the Magnuson-Stevens Act or MSA.
- Marine species protected under the MMPA.
- Marine species managed and regulated by CDFW under the Nearshore Fisheries Management Plan and the Market Squid Fisheries Management Plan.
- Marine species designated by CDFW as California Species of Concern.
- Marine species not currently protected by statute or regulation but considered rare, threatened, or endangered under CEQA (Guidelines Section 15380).

**Table 5.11-3** presents the FESA, CESA, and MMPA marine species in the SCB and Santa Monica Bay and their potential to occur within the marine study area. As discussed above, the marine study area encompasses the nearshore waters (within 1.5 nautical miles from shore) of Santa Monica Bay and extending 1 nautical mile upcoast and downcoast from the ESGS outfall and intake structures (see Figure 5.11-1). The special-status marine species that have the highest risk of being adversely affected by Project construction and operational activities because of their presence within the marine study area are discussed below. **Table 5.11-4** presents marine fish and invertebrate species that are managed and regulated under the MSA.

### *FESA, CESA, and MMPA Species*

#### Marine Mammals

Of the approximately 40 marine mammals known to occur within the SCB, a much smaller number are observed in Santa Monica Bay (Table 5.11-3) and only 9 have any probability of occurring within the marine study area. Of these 9 species, those with a moderate or high probability to occur in the marine study area are the California sea lion (*E. lutris nereis*), the harbor seal (*P. Vitulina*), the common long and short beaked dolphins (*D. capensis* and *D. delphis*), the bottlenose dolphin (*T. truncates*), the Pacific white-sided dolphin (L. obliquidens), the humpback whale (*M. novaeangeliae*), and the gray whale (*E. robustus*) (Table 5.11-3).

These species of marine mammals can be expected to be present in the marine study area seasonally, when migrating along the coast, or opportunistically when forage is present. There are no established haul-outs, pupping, or birthing sites within the marine study area.

**TABLE 5.11-3**
**SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE STUDY AREA**

| Common Name | Scientific Name | Listing Status | Habitat | Regional Occurrence | Potential to Occur in Study Area |
|---|---|---|---|---|---|
| Marine Mammals | | | | | |
| Southern Sea Otter | *Enhydra lutris nereis* | FT, P | A top carnivore in its coastal range and a keystone species of the nearshore coastal zone. Inhabits kelp forests. | Year-round-Rare | **Not Expected.** No suitable habitat present in Southern CA Bight. |
| California Sea Lion | *Zalophus californianus* | P | Coastal waters and onshore for resting. Commonly observed in the Southern Californian Bight. | Year-round-Common | **High.** Commonly observed. |
| Steller Sea Lion | *Eumetopias jubatus* | FT, P | Coastal waters and onshore for resting. A small population breeds on Año Nuevo Island, north of Monterey Bay. | Seasonal-Rare | **Not Expected.** No sightings within the study area have been reported. |
| Harbor Seal | *Phoca vitulina* | P | Most commonly observed pinniped along coastline. Use the offshore waters for foraging and beaches for resting. Occur on offshore rocks, on sand and mudflats in estuaries and bays, and on some isolated beaches. | Year-round-Common | **High.** Commonly observed. |
| Northern Fur Seal | *Callorhinus ursinus* | FD | Usually come ashore in California only when debilitated, however, few individuals observed on Ano Nuevo Island. Occur off of central California during winter following migration from northern breeding grounds. | Year-round- Rare | **Not Expected.** Usually 18-28 km from shore in California, however, they have been observed on San Miguel Island offshore. |
| Northern Elephant Seal | *Mirounga angustirostris* | P | They are sighted regularly over shelf, shelf-break, and slope habitats and they are also present in deep ocean habitats seaward of the 2,000-meter isobaths. Rookeries are located to the north the study area. Can be found as far as Baja California. | Year-round- Rare | **Not Expected to Low.** Northern elephant seals are widely distributed in Monterey Bay National Marine Sanctuary but have a low probability of occurring in the study area. They have been observed offshore in the Channel Islands, with rookeries on San Miguel and San Nicolas Islands. |
| Guadalupe Fur Seal | *Arctocephalus townsendi* | CT, FT, FD | Breed along the eastern coast of Guadalupe Island,<br>~ 200 Kilometers west of Baja California. Individuals have been sighted in the southern California Channel Islands, including two males who established territories on San Nicolas Island. Guadalupe fur seals have been reported on other southern California islands, and the Farallon Islands off northern California with increasing regularity since the 1980s. | Seasonal-Very Rare | **Not Expected.** No suitable habitat present in Santa Monica Bay. |
| Harbor Porpoise | *Phocoena phocoena* | P | Continental slope to oceanic waters. Observed in shallow sandy bottom areas of the Monterey Bay Shelf where they forage, which is outside of the study area. | Year-round-Rare | **Not Expected.** Generally occur in deeper waters. |

| Common Name | Scientific Name | Listing Status | Habitat | Regional Occurrence | Potential to Occur in Study Area |
|---|---|---|---|---|---|
| Risso's Dolphin | *Grampus griseus* | P | Generally found in waters over the continental shelf near slopes and escarpments. | Year-round-Common | **Not Expected.** They generally occur in deeper waters offshore of the study area. |
| Common Dolphin – Long-beaked | *Delphinus capensis* | P | Found relatively close to shore swimming and foraging. | Year-round-Common | **High.** The common dolphin is the most abundant cetacean found in the coastal waters of California.[3] |
| Common Dolphin – Short-beaked | *Delphinus delphis* | P | A more pelagic species than the long-beaked common dolphin, can be found up to 300 nm from shore | Year-round-Common | **Moderate.** Generally found offshore of the study area. |
| Dall's Porpoise | *Phocoenoides dalli* | P | Mainly pelagic waters of the continental shelf. | Year-round-Rare | **Not Expected.** Generally found offshore of the study area. |
| Bottlenose Dolphin | *Tursiops truncatus* | FD | Includes coastal and offshore populations. | Year-round-Common | **High**. The most common dolphins in Santa Monica Bay, including offshore. |
| Pacific White-sided Dolphin | *Lagenorhynchus obliquidens* | P | Waters over the continental shelf. | Seasonal-Common in late spring and summer | **Low to Moderate.** If forage is present can be found within the study area. |
| Northern Right Whale Dolphin | *Lissodelphis borealis* | P | Deep, cold temperate waters over the continental shelf and slope. | Seasonal-Sightings in later winter and spring-Rare | **Not Expected.** Prefer off shore deep waters. |
| Spotted Dolphin | *Stenella attenuata* | P | Continental shelf to open ocean waters. | Sightings in summer and early fall- Rare | **Not Expected.** Prefer deeper waters. |
| Striped Dolphin | *Stenella coeruleoalba* | P | Continental shelf to open ocean waters | Sightings in summer and early fall- Rare | **Not Expected.** Prefer deeper waters. |
| Long-snouted Spinner Dolphin | *Stenella longirostris* | P | Continental shelf to open ocean waters. | Sightings in summer and early fall- Rare | **Not Expected. Prefer deeper waters.** |
| Rough-toothed Dolphin | *Steno bredanensis* | P | Continental shelf to open ocean waters. | Sighting in summer and early fall- Rare | **Not Expected. Prefer deeper waters.** |
| Minke Whale | *Balaenoptera acutorostrata* | P | Can be in coastal/inshore and over the continental shelf. | Year-round-uncommon | **Not Expected. Prefer deeper waters.** |
| Blue Whale | *Balaenoptera musculus* | FE, FD, P | Blue whales often occur near the edges of physical features where krill tend to concentrate. Blue whales feed only on krill. Blue whales begin to migrate south during November. | Seasonal-Common from June through November | **Low. Prefer deeper waters.** |
| Bryde's Whale | *Balaenoptera edeni* | P | More common farther from shore. | Seasonal-Rare | **Not Expected.** |

| Common Name | Scientific Name | Listing Status | Habitat | Regional Occurrence | Potential to Occur in Study Area |
|---|---|---|---|---|---|
| Humpback Whale | *Megaptera novaeangeliae* | FT, FD, P | Central California population of humpback whales migrates from their winter calving and mating areas off Mexico to their summer and fall feeding areas off coastal California. Humpback whales occur from late April to early December. | Seasonal-Common from May through November | **Low to Moderate.** |
| Fin Whale | *Balaenoptera physalus* | FE, FD, P | More common farther from shore. | Seasonal-Common | **Not Expected. Due to their occurrence mainly farther offshore in deeper waters, it is not likely they would be seen in the study area.** |
| Sperm Whale | *Physeter macrocephalus* | FE, FD, P | Occur in many open oceans; live at the surface of the ocean but dive deeply to catch giant squid. | Seasonal-Rare | **Not Expected. Offshore but mostly in deeper waters.** |
| Dwarf Sperm Whale | *Kogia simus* | FE, P | Occur over the continental slope and open ocean. | Rare | **Not Expected.** |
| Pygmy Sperm Whale | *Kogia breviceps* | FE, P | Occur over the continental slope and open ocean. | Rare | **Not Expected.** |
| Gray Whale | *Eschrichtus robustus* | FDL, P | Predominantly occur within the nearshore coastal waters. This species has been delisted under FESA but remains protected under MMPA. | Seasonal-Common from December through May | **Moderate.** Most likely during northward migration in spring. |
| Killer Whale | *Orcinus orca* | FE, P | Transient species observed throughout coastal California waters. Presence and occurrence can be common but unpredictable. | Seasonal-Rare | **Low.** Generally observed in the deeper waters offshore of the study area. |
| False Killer Whale | *Pseudorca crassidens* | P | Occur over the continental slope and into open ocean waters | Sightings in summer and early fall- Rare | **Not Expected.** |
| North Pacific Right Whale | *Eubalaena glacialis* | FE, FD, P | Seasonally migratory; inhabit colder waters for feeding, and then migrate to warmer waters for breeding and calving. | Seasonal- Rare | **Not Expected.** Although they may move far out to sea during their feeding seasons, right whales give birth in coastal areas. |
| Sei Whale | *Balaenoptera borealis* | FE, FD, P | Cosmopolitan distribution and occur in subtropical, temperature, and subpolar waters around the world. Usually observed in deeper waters of oceanic areas far from the coastline. | Seasonal-Very Rare in spring and summer | **Not Expected to Low.** Given population density, there is a low potential for occurrence within the Project area. |
| Short-finned Pilot Whale | *Globicephala macrorhynchus* | P | Found primarily in deep waters in warmer tropical and temperate waters. Forage in areas with high densities of squid. | Year-round-Very Rare | **Not Expected.** Generally found in deeper water than that in the study area and near the offshore islands. |
| Hubb's Beaked Whale | *Mesoplodon carlhubbsi* | P | Found mainly over the continental shelf and into open ocean waters | Rare | **Not Expected.** |
| Blainville's Beaked Whale | *Mesoplodon densirostris* | P | Found mainly over the continental shelf and into open ocean waters | Rare | **Not Expected.** |

| Common Name | Scientific Name | Listing Status | Habitat | Regional Occurrence | Potential to Occur in Study Area |
|---|---|---|---|---|---|
| Ginkgo-toothed Whale | *Mesoplodon ginkgodens* | P | Found mainly over the continental shelf and into open ocean waters | Rare | **Not Expected.** |
| Perrin's Beaked Whale | *Mesoplodon perrini* | P | Found mainly over the continental shelf and into open ocean waters | Rare | **Not Expected.** |
| Stejneger's Beaked Whale | *Mesoplodon stejnegeri* | P | Found mainly over the continental shelf and into open ocean waters | Rare | **Not Expected** |
| Baird's Beaked Whale | *Berardius bairdii* | FD, P | Inhabit deep offshore waters in the North Pacific. | Seasonal- sightings from late spring to early fall-Very Rare | **Not Expected.** Sightings mostly in deeper waters than the study area. |
| Cuvier's Beaked Whale | *Ziphius cavirostris* | P | Deep pelagic waters (usually greater than 1,000m deep) of the continental shelf and slope. Seasonality and migration patterns are unknown. | Sightings in fall and winter- Rare | **Not Expected.** Generally occur in the deeper waters west of the study area. |
| Marine Turtles | | | | | |
| Leatherback Sea Turtle | *Dermochelys coriacea* | FE | Offshore pelagic environment. Regularly seen off the western coast of the US with the greatest densities found off central CA. In the waters of Southern California nearly all sightings occur in deeper waters seaward of the Channel Islands. | Seasonal-Rare | **Not Expected.** Given population density and lack of known nesting sites on southern California beaches. Leatherback sea turtles are most commonly seen between July and October, when the surface water temperature warms to 15-16° C and large jellyfish, the primary prey of the turtles, are seasonally abundant offshore. |
| Green Sea Turtle | *Chelonia mydas* | FT | Primarily use three types of habitat: oceanic beaches (for nesting), convergence zones in the open ocean, and benthic feeding grounds in coastal areas. Breeding populations in Florida and Mexico. | Seasonal-Uncommon | **Low.** In the eastern Pacific, green turtles have been sighted from Baja California to southern Alaska but most commonly occur from San Diego south. |
| Olive Ridley Sea Turtle | *Lepidochelys olivacea* | FT | Mainly a "pelagic" sea turtle, but has been known to inhabit coastal areas, including bays and estuaries. | Seasonal- Rare | **Not Expected.** In the eastern Pacific, the range of the Olive Ridley turtle extends from Southern California to northern Chile. |
| Loggerhead Sea Turtle | *Caretta caretta* | FE | Occupy three different ecosystems during their lives: the terrestrial zone, the oceanic zone (> 100 fathoms water depth), and the neritic one (< 100 fathoms water depth). | Seasonal-Uncommon | **Low.** In the U.S., most recorded sightings are of juveniles off the coast of California but occasional sightings are reported along the coasts of Washington and Oregon. |

| Common Name | Scientific Name | Listing Status | Habitat | Regional Occurrence | Potential to Occur in Study Area |
|---|---|---|---|---|---|
| Fish | | | | | |
| Steelhead Trout (South Central Coast Evolutionary Significant Unit) | *Onchorhynchus mykiss* | FT, CSC | Trout can be anadromous or freshwater resident (and under some circumstances, apparently yield offspring of the opposite form). Resident forms are usually called rainbow, or redband, trout. Those that are anadromous can spend up to 7 years in fresh water prior to smoltification, and then spend up to 3 years in salt water prior to first spawning. | Seasonal | **Low.** No seasonally accessible watershed or suitable spawning habitat present in the Project area. The nearest critical habitat for this species is the Santa Clara river watershed in Ventura County, north of the study area. |
| Tidewater Goby | *Eucycloglobius newberryi* | FE | Despite the common name, this goby inhabits lagoons formed by streams running into the sea. The lagoons are blocked from the Pacific Ocean by sandbars, admitting salt water only during particular seasons, and so their water is brackish and cool. The tidewater goby prefers salinities of less than 10 parts per thousand (ppt) (less than a third of the salinity found in the ocean) and is thus more often found in the upper parts of the lagoons, near their inflow. | Seasonal- Rare | **Not Expected.** Tidewater gobies are known to occur in the Ballona Wetlands Complex but no life stage occurs in marine waters. These fish can survive in water with salinity over 40 ppt but it's unlikely to find them in the study area. |
| Garibaldi damselfish | *Hypsypops rubicundus* | CP | Endemic to the Eastern Pacific. Occurs over rocky bottoms in clear water, often near small caves. Has occasionally been observed in kelp at depths around 30m. | Year-round- Uncommon | **Not Expected to Low.** No suitable habitat within the study area. |
| Giant Seabass | *Stereolepis gigas* | CSC | Northwest Pacific Ocean from Humboldt, CA to the Gulf of California. Inhabits rock bottoms where kelp beds are nearby. Juveniles usually found near kelp beds on sand or bud bottoms. | Year-round- Rare | **Not Expected to Low.** Seafloor in area is soft and sandy, not sufficient hard, rocky bottom occurs in the study area. |
| White sharks | *Carcharodon carcharias* | CSC | In California, important white shark habitat occurs around Monterey Bay and Greater Farallones, national marine sanctuaries.<br>White shark populations are impacted by purposeful and incidental capture by fisheries, marine pollution, and coastal habitat degradation. | Year-round - Uncommon | **Not Expected to Low.** Present in coastal waters throughout the State but typically north of the study area. |
| Cowcod | *Sebastes levis* | CSC | Juveniles recruit to fine sediment habitat. They have been observed at depths between 40 and 100m. Young cowcod move to deeper habitat within their first year. | Seasonal-Common | **Moderate.** Juveniles documented on soft-bottom habitat in study area. |
| Basking Shark | *Cetorhinus maximus* | CSC | This species movements and migrations are poorly understood. Usually sighted from British Columbia to Baja California in the winter and spring months; where they go once they leave coastal areas is unknown. | Seasonal-Very Rare | **Not Expected.** Basking shark populations were severely depleted by commercial fisheries of the 1950s, and they have never fully recovered due to slow growth and low fecundity. |

| Common Name | Scientific Name | Listing Status | Habitat | Regional Occurrence | Potential to Occur in Study Area |
|---|---|---|---|---|---|
| Marine Invertebrates | | | | | |
| Black Abalone | *Haliotis cracherodii* | FE | Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. | Year-round-Very Rare | **Not Expected.** Study area is not designated as critical habitat due to the lack of preferred habitat (rocky intertidal). Occur on hard substrate areas in the MPAs located to the north and south of the study area. |
| Green Abalone | *Haliotis fulgens* | FSC | Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. | Year-round-Very Rare | **Not Expected.** Study area is not designated as critical habitat due to the lack of preferred habitat (rocky intertidal). Could be present on hard substrate areas to the north and south of the study area. |
| Pink Abalone | *Haliotis corrugate* | FSC | Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. | Year-round-Very Rare | **Not Expected.** Study area is not designated as critical habitat due to the lack of preferred habitat (rocky intertidal). Could be present on hard substrate areas to the north and south of the study area. |
| White Abalone | *Haliotis sorenseni* | FE | Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. | Year-round-Very Rare | **Not Expected.** Study area is not designated as critical habitat due to the lack of preferred habitat (rocky intertidal). Could be present on hard substrate areas to the north and south of the study area. |

NOTES:
FESA = Federal Endangered Species Act
MMPA = Marine Mammal Protection Act
CESA = California Endangered Species Act
CNDDB = California Natural Diversity Database

Potential for Species Occurrence Rankings:
Not Expected - Suitable foraging or spawning habitat is not known to be present and the species has not been documented to occur
Low - Suitable foraging or spawning habitat is present, but the species has either not been documented to be present or if present, the presence is infrequent
Moderate - Suitable foraging or spawning habitat is present and the species has been documented to be present for part of the year
High - Suitable foraging or spawning habitat is present and the species has been documented to be present throughout the year and/or in substantial numbers

STATUS CODES:

Federal: National Oceanographic and Atmospheric Administration (NOAA); MMPA
FD = Depleted Population
P = Federally Protected

Federal: U.S. Fish and Wildlife Service (USFWS), NOAA National Marine Fisheries Service (NMFS); FESA
FDL = Delisted
FE = Listed as “endangered” (in danger of extinction) under FESA
FT = Listed as “threatened” (likely to become Endangered within the foreseeable future) under FESA
FC = Candidate to become a proposed species
FSC = Former “federal species of concern”. The USFWS no longer lists Species of Concern but recommends that species considered to be at potential risk by a number of organizations and agencies be addressed during project environmental review. *NMFS still lists “Species of Concern”.

State: California Department of Fish and Game (CDFG); CESA
CE = Listed as “endangered” under the CESA
CP= Fully protected in California
CT = Listed as “threatened” under the CESA
CSC = CDFW designated “species of special concern”

SOURCE: Allen et al 2010; CDFG 2001; CSLC 2010; Love & Yoklavich 2008; NOAA 2011; NOAA 2014; NOAA 2016a; UC 2017; NOA 2018.

### Birds

FESA and CESA marine and terrestrial birds potentially inhabiting the marine study area are discussed in Section 5.3, *Biological Resources – Terrestrial*.

### Turtles

Five species of sea turtles are known to occur in the nearshore waters off southern California: green (*C. mydas*), loggerhead (*C. caretta*), leatherback (*D. coriacea*), hawksbill (*E. imbricata*) and olive ridley (Leipidochelys olivacea). Of these five turtle species, only the green and loggerhead turtles have any potential of occurring in Santa Monica Bay (MBC 2017). The green turtle is the most commonly encountered nearshore in the SCB; individuals are known to reside in the San Gabriel River, downcoast of the Project area at the Los Angeles/ Orange Counties boundary (MBC 2017).

### Fish

Two species of FESA protected fish and four species of California fish species of special concern have the potential to occur within the coastal waters of Santa Monica Bay (Table 5.11-4). Of these, only two species, the South Central Coast ESU[5] Steelhead trout (*Onchorhynchus mykiss*) and Cowcod (*Sebastes levis*) have any probability of occurring in the marine study area. Of these two taxa, only the Cowcod has any documented occurrence in the marine study area (MBC 2017).

Additionally, three taxa of California fish species of special concern (Table 5.11-3) include the Garibaldi damselfish (*Hypsypops rubicundus*), giant seabass (*Stereolepis gigas*), and white sharks (*Carcharodon carcharias*), have a low potential to occur within the marine study area.

**TABLE 5.11-4**
**FISH SPECIES PRESENT IN SANTA MONICA BAY MANAGED UNDER THE MAGNUSON-STEVENS ACT**

| Fisheries Management Plan | Scientific Name | Common Name | Life Stages Present | Potential to Occur in Study Area |
|---|---|---|---|---|
| All | *Atherinops affinis* | Topsmelt | A | High |
| All | *Atherinopsidae* | Silverside | L, A | Moderate |
| CP (Ecosystem Component Species) | *Atherinopsis californiensis* | Jacksmelt | L, A | Moderate to High |
| PCG | *Citharichthys sordidus* | Pacific sanddab | L, A | High |
| PCG (Ecosystem Component Species) | *Clupea pallasii* | Pacific Herring | L, A | Low to Moderate |
| All | *Diaphus theta* | California Headlight Fish | A | High |
| CP | *Doryteuthis opalescens* | California Market Squid | L, A | Moderate to High |
| CP | *Engraulis mordax* | Northern anchovy | L, A | High |
| PCG | *Hexagrammos decagrammus* | Kelp greenling | A | Moderate to High |

5 Evolutionary Significant Unit

| Fisheries Management Plan | Scientific Name | Common Name | Life Stages Present | Potential to Occur in Study Area |
|---|---|---|---|---|
| PCG (Ecosystem Component Species) | *Hydrolagus colliei* | Spotted ratfish | A | Low |
| All | *Leuresthes tenuis* | California Grunion | L, A | High |
| PCG | *Lythrypnus dallii* | Bluebanded goby | L | Moderate |
| PCG | *Microstomus pacificus* | Dover sole | L, J, A | Moderate to High |
| PCG | *Ophiodon elongatus* | Lingcod | A | Moderate to High |
| PCG | *Parophrys vetulus* | English Sole | L, J, A | High |
| PCG | *Pleuronichthys decurrens* | Curlfin Sole | A | High |
| PCG | *Psettichthys melanostictus* | Sand Sole | A | Moderate to High |
| PCG | *Raja binoculata* | Big Skate | A | Moderate to High |
| PCG | *Raja inornata* | California Skate | A | Moderate to High |
| CP | *Sardinops sagax* | Pacific sardine | L, J, A | High |
| CP | *Scomber japonicus* | Pacific (chub) mackerel | L, A | Moderate to High |
| PCG | *Scorpaena guttata* | California scorpionfish | L, J, A | Moderate |
| PCG | *Scorpaenichthys marmoratus* | Cabezon | L, J, A | Moderate |
| PCG | *Sebastes atrovirens* | Kelp rockfish | L, J, A | Moderate to High |
| PCG | *Sebastes auriculatus* | Brown rockfish | L, J, A | Moderate |
| PCG | *Sebastes carnatus* | Gopher rockfish | L, J, A | Moderate to High |
| PCG | *Sebastes caurinus* | Cooper rockfish | L, J, A | Moderate |
| PCG | *Sebastes chrysomelas* | Black-and-yellow rockfish | L, J, A | Moderate to High |
| PCG | *Sebastes dalli* | Calico rockfish | L, J, A | Moderate to High |
| PCG | *Sebastes diplopora* | Splitnose rockfish | L, J, A | Moderate |
| PCG | *Sebastes melanops* | Black Rockfish | L, J, A | Moderate to High |
| PCG | *Sebastes miniatus* | Vermillion rockfish | L, J, A | Moderate |
| PCG | *Sebastes mystinus* | Blue rockfish | L, J, A | Moderate |
| PCG | *Sebastes paucispinus* | Bocaccio | L, J, A | Low |
| PCG | *Sebastes pinniger* | Orange rockfish | L, J, A | Moderate |
| PCG | *Sebastes rastrelliger* | Grass rockfish | L, J, A | Moderate |
| PCG | *Sebastes rubrivinctus* | Flag rockfish | L, J, A | Moderate |
| PCG | *Sebastes semicinctus* | Half banded rockfish | L, J, A | Moderate |
| PCG | *Sebastes serriceps* | Tree fish | L, J, A | Moderate to High |
| PCG | *Sebastes serrinoides* | Olive rockfish | L, J, A | Moderate to High |
| PCG | *Sebastes serrinoides/flavidus* | Olive/yellowtail rockfish | L, J, A | Moderate |

#### Invertebrates

Four species of marine invertebrates, all abalone, are listed as either endangered or a federal Species of Concern. Black (*Haliotis cracherodii*) and White (*H. sorenseni*) abalone are listed as endangered, while Green (*H. fulgens*) and Pink (*H. corrugate*) abalone are listed as species of special concern. As discussed above, Black abalone were found historically in the intertidal and shallow subtidal of rocky shores of Santa Monica Bay where kelp flourishes (such as Malibu). However, commercial and sport harvesting and diseases (e.g. withering abalone syndrome) have drastically reduced the Black abalone population throughout southern California (MBC 2017). In 1997, a moratorium was placed on recreational and commercial harvesting of Black and all other abalone in California south of San Francisco. In 2011, NMFS designated critical habitats of Black abalone along the coast of California. The closest Black abalone critical habitat in Santa Monica Bay is along the rocky shore of Catalina Island and the Palos Verdes Peninsula (MBC 2017).

No known occurrences of black, green, white, or pink abalone have been reported present on any of the artificial hard (rocky) substrate located within the marine study area.

### *Managed Fish Species*

The Project is located within an area designated as EFH for both the Coastal Pelagic and Pacific Groundfish FMPs (PFMC 2016a, 2016b). One hundred and seven fish species, eight fish species groups, one invertebrate species and two invertebrate groups are listed as managed or as ecosystem component (EC) species in the FMPs. Of these, 46 species (Table 5.11-4) are known to occur as larvae, juveniles, or adults in the marine study area based on their occurrence in trawl surveys (MBC 2017), from impingement surveys at the ESGS and Scattergood Generating Stations (MBC 2017), or from ichthyoplankton surveys (Tenera and MBC 2008; Tenera 2014). Based on occurrence of larvae, one additional fish species has a moderate chance of being taken in the area, and unidentified fish larvae of two FMP species groups (right-eye flounders and rockfishes) and three EC species groups (deepsea smelts, lanternfishes and silversides) suggests that up to 91 species in these five groups may occur locally, although it is probable that these are limited to species otherwise identified in the marine study area.

## Non-native Invasive Aquatic Species

The introduction of non-native invasive aquatic species is one of the greatest threats to the SCB and Santa Monica Bay subtidal and intertidal habitats. The introduction of non-native species into coastal Santa Monica Bay and the Ballona wetlands can result in large-scale changes to aquatic communities. California’s estuaries, in particular, have become home to many non-native or introduced species that have dominated local intertidal and subtidal marine communities.

Although the effects of introduced aquatic species on habitats they colonize is often unknown, some clearly have had serious negative influences. Impacts include decreasing abundance and even local extinction of native species, alteration of habitat structure, and extensive economic costs due to heavy organism and algal growth on vessel bottoms and navigation, scientific, and weather buoys. Historically, the principal mechanism of introduction to California coastal waters and estuaries has been fouling, boring, and release of ballast-dwelling organisms. Introduced species typically include snails, shrimp, plankton, crabs, and algae.

The one documented invasive non-native species occurring within coastal waters and embayments of Santa Monica Bay are the seaweed *Undaria pinnatifida* (VRC 2010). There are no known or reported occurrences of non-native aquatic species in the marine study area or more specifically the areas that will be affected by the Project.

## Significant Ecological Areas

As discussed above, the Project area's beach and coastal habitats are highly modified for human use and recreation. As a result, natural communities, such as those found in isolated areas north and south of the Project area, no longer exist in the area. Furthermore, no sensitive coastal habitats were identified during Project–related surveys.

### *Areas of Special Biological Significance*

The SWRCB designates Areas of Special Biological Significance (ASBS) as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable (MBC 2017). In northern Santa Monica Bay, the coastline from Point Dume to Latigo Point is included in the Mugu Lagoon to Latigo Point ASBS (MBC 2017). This area is located over 18 miles to the northwest of the Project area. No other designated ASBS occur in Santa Monica Bay.

### *Parks, Sanctuaries, and Significant Ecological Areas*

Areas of ecological importance, such as parks, sanctuaries or Significant Ecological Areas (SEAs) may be designated by state or local agencies with the intent to enhance public awareness and provide a level of protection to local resources. The California Department of Parks and Recreation (California State Parks) includes preservation and protection of natural resources as part of its management responsibilities. At a local level, counties or cities may also designate status to local resources. The Malibu coastline, Ballona Lagoon (adjacent to Marina del Rey), the El Segundo Dunes, and the Palos Verdes Peninsula have been designated as SEAs and Coastal Resource Areas (CRAs) by the County of Los Angeles.

The Project area is not designated as a park, sanctuary, or SEA by any county or city agency. Further, the beach inshore of the proposed intake is not a State Beach or State Seashore.

### *National Estuary Program*

The Santa Monica Bay National Estuary Program (SMBNEP) was established under 1987 CWA Section 320 and is intended to protect and restore Santa Monica Bay's resources. The Santa Monica Bay Restoration Commission (SMBRC) is responsible for developing, updating, and implementing the Bay Restoration Plan (BRP). The SWRCB and The Bay Foundation (TBF), a non-profit entity, serve as the hosting entity that provide physical locations, staffing, and matching funds to support the SMBNEP activities. The Bay Foundation also receives, administers, and uses grant funds from different entities to implement many projects identified in the BRP.

### *Marine Protected Areas*

As stated above, the Marine Life Protection Act is intended to protect the natural diversity and abundance of marine life and marine ecosystems. There are three types of MPAs designated (or recognized) in California: SMRs: SMPs: and SMCAs. As stated previously, a SMCA and SMR are located over 22 miles to the northwest of the Project area at Point Dume in the Malibu region, and a SMR and a SMCA are located over 7 miles south of the Project area at the Palos Verdes Peninsula, all established in 2012 (**Figure 5.11-2**).

### *Environmentally Sensitive Habitat Areas*

Under the California Coastal Act, Environmentally Sensitive Habitat Areas (ESHA) are defined as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments." According to El Segundo's Local Coastal Program, there are no ESHAs in El Segundo's coastal zone, thus, Coastal Act Sections 30240(a) and (b) are not applicable (City of El Segundo 1980). Section 5.3, *Biological Resources – Terrestrial* discusses the presence of artificially introduced buckwheat, which is the host plant for the protected El Segundo blue butterfly.

### *Critical Habitat*

The Project area is not located within a federally designated Critical Habitat. However, western snowy plover designated Critical Habitat Subunit 45C, Dockweiler South, is located immediately upcoast of the ESGS along Dockweiler State Beach. Subunit 45B, Dockweiler North, is approximately 2.5 miles north of the ESGS and Subunit 45D, Hermosa State Beach, is approximately 3.25 miles to the south. No onshore construction or operational activities are proposed within either of these identified Critical Habitat areas. No other Critical Habitat is located within a 5-mile radius of the Project area. Refer to Section 5.3, *Biological Resources – Terrestrial*, for discussion of avian species.

### *Essential Fish Habitat*

EFH encompasses all types of aquatic habitat, including wetlands, coral reefs, seagrasses, and rivers, where fish breed, spawn, feed, and grow to maturity. NOAA and the regional Fishery Management Councils identify EFH for all life stages of every federally managed fish species. Under the provisions of MSA Section 305(b), consultation with NMFS for impacts to EFH is only required for projects with a federal nexus. Of the eight designated U.S. fisheries regions, the Project area is located within the Pacific Region.

The Project area is located within EFH for both the Coastal Pelagics and Pacific Groundfish[6] FMPs (MBC 2017). A total of 107 fish species, 8 fish species groups, 1 invertebrate species, and

6 The groundfish covered by the Pacific Council's groundfish fishery management plan (FMP) include over 90 different species that, with a few exceptions, live on or near the bottom of the ocean. These are made up of the following species: **Rockfish**. The plan covers over 64 different species of rockfish, including widow, yellowtail, canary, and vermilion rockfish; bocaccio, chilipepper, cowcod, yelloweye, thornyheads, and Pacific ocean perch. **Flatfish**. The plan covers 12 species of flatfish, including petrale sole, Dover sole, starry flounder, arrowtooth flounder, and Pacific sanddab. **Roundfish**. The six species of roundfish included in the fishery management plan are lingcod, cabezon, kelp greenling, Pacific cod, Pacific whiting (hake), and sablefish. **Sharks and skates**. The six species of sharks and skates are leopard shark, soupfin shark, spiny dogfish, big skate, California skate, and

2 invertebrate groups are listed as managed or as EC species in the FMPs. Of these, 34 species are known to occur as larvae, juveniles, or adults in the marine study area based on their occurrence in trawl surveys, from impingement surveys at the ESGS and Scattergood Generating Station, or from ichthyoplankton surveys (MBC 2017). Based on occurrence of larvae, one additional fish species has a moderate potential of being affected by the Project taken in the Project marine study area, and unidentified fish larvae of two FMP species groups (right-eye flounders and rockfishes) and three EC species groups (deepsea smelts, lanternfishes and silversides) suggests that up to 91 species in these five groups may occur locally, although it is probable that these are limited to species otherwise identified in the marine study area. EFH for groundfish ends at the high tide line.

## 5.11.3 Significance Thresholds and Criteria

Impacts on marine biological resources could occur as a result of alterations to or deterioration of marine aquatic habitats, which in turn would be expected to result in direct or indirect effects on marine taxa, communities, and food webs. Direct and indirect effects are expected to impact marine and aquatic taxa in the Project marine study area in proportion to their population sizes and susceptibility to disturbance. If a candidate, sensitive, or special-status species is present in a large abundance and is not particularly susceptible to disturbances, then an effect is not expected to have a greater impact on their population than compared with non-listed taxa. The evaluation criteria used for marine resources consider the potential effects of the proposed Project on habitat, special-status taxa, and any species considered in local, regional or federal resource management plans.

The criteria used to determine the significance of impacts related to marine resources are based on Appendix G of the CEQA Guidelines, Environmental Checklist form. The issues presented in the Environmental Checklist for biological resources have been considered and tailored as applicable for use as thresholds of significance in this section. In addition to the CEQA Guidelines Appendix G thresholds, the following Project thresholds are also taken into consideration: the Office of Planning and Research's CEQA Guidelines Preliminary Discussion Draft (released August 11, 2015); California Ocean Plan Final Amendment (May 2015); and Assembly Bill 52.

Accordingly, the Project would have a significant adverse environmental impact if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, including direct disturbance, removal, filling, hydrological interruption, or discharge, on any species, natural community, or habitat, including candidate, sensitive, or special-status species identified in local or regional plans, policies, regulations or conservation plans (including protected wetlands or waters, critical habitat, EFH) or as identified by the CDFW, USFWS, or NMFS (refer to Impact BIO-M 5.11-1).
- Threaten to eliminate a marine plant or animal wildlife community or cause a fish or marine wildlife population to drop below self-sustaining levels (refer to Impact BIO-M 5.11-2).

longnose skate. **Other species**. These include ratfish, finescale codling, and Pacific rattail grenadier. Source: Pacific Fishery Management Council Website, Groundfish: Background, ttp://www.pcouncil.org/groundfish/background/, Accessed January 9, 2017.

- Interfere substantially with the movement of any native resident or migratory fish or marine wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native marine wildlife nursery sites (refer to Impact BIO-M 5.11-3).
- Introduce or spread an invasive non-native species (refer to Impact BIO-M 5.11-4).

# 5.11.4 Impacts and Mitigation Measures

## Approach to Analyses

The impact analyses determine if, and to what degree, the Local Project and Regional Project could adversely impact the marine resources in the Project marine study area as described in Section 5.11.2, and how the Project could comply with or exceed any regulatory requirements described in Section 5.11.1. The severity of an impact is determined using the evaluation criteria identified in Section 5.11.3. Four aspects of the West Basin Desalination Project have the potential to adversely affect marine biological resources: (1) construction required to modify the existing ESGS ocean intake and outfall tunnels; (2) operation of the screened ocean intake as it relates to entrainment of organisms; (3) operational discharges of brine generated by the West Basin desalination plant via the ESGS modified ocean outfall, and; (4) maintenance of the ocean intake wedgewire screens. As a result, all other terrestrial biological (non-marine) impacts associated with construction and operation of the ocean water desalination facility and the desalinated water conveyance components are addressed in Section 5.3, *Biological Resources – Terrestrial*. Impacts associated with surface water runoff (stormwater) during construction and operation of the desalination facility are addressed in Section 5.9, *Hydrology and Water Quality*.

The evaluation of whether the proposed Project would result in substantial adverse effects considers three principal factors:

- Magnitude and duration of the impact (e.g., substantial/not substantial)
- Rarity of the affected resource
- Susceptibility of the affected resource to disturbance

The evaluation of significance must also consider the interrelationship of these three factors.

CEQA Guidelines Section 15065(a)(1) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to: (1) substantially reduce the habitat of a fish or wildlife species; (2) cause a fish or wildlife population to drop below self-sustaining levels; or (3) substantially reduce the number or restrict the range of an endangered, rare, or threatened species. The environmental factors determined to be potentially affected by the Project are analyzed below. Feasible mitigation measures are recommended, where warranted, to avoid or minimize the Project's significant adverse impacts.

## Methodology

Potential Project impacts on marine biological resources within the Marine Study Area were assessed through a combination of literature, data review (including applicable water quality criteria), results from NPDES offshore monitoring programs, surveys and evaluations of marine intertidal and subtidal habitats, as well as this section preparers' scientific expertise. For oceanographic resources, potential impacts were assessed using results from dilution modeling studies of the proposed multiport concentrate (brine) diffuser system (see Section 5.9, *Hydrology and Water Quality*) and this section preparers' expertise. The following assessments related to marine biological resources are appended to this EIR:

- Intake Effects Assessment Report (Tenera 2014) (**Appendix 4A**).
- Literature Review on Long Term Corrosion and Biofouling Resistance of Copper Nickel Alloys and Stainless Steels for Marine Applications (GHD 2018); Technical Memorandum: Dissolution Estimate of Copper:Nickel Corrosion from Wedgewire Screens (AMS 2018) (**Appendix 4B**).
- Modeling Brine Disposal from the West Basin Seawater Desalination Plant (Roberts 2018) (**Appendix 4C**).
- Ocean Desalination Project Intake Options Area of Production Forgone Estimates derived from El Segundo Generating Station Clean Water Act Section 316(b) Impingement and Entrainment Characterization Study (Tenera and MBC 2008) (HDR 2018), and Peer Review (**Appendix 4D**).

## Special-Status Marine Species

**Impact BIO-M 5.11-1: Would the Project have a substantial adverse effect, either directly or through habitat modifications, including direct disturbance, removal, filling, hydrological interruption, or discharge, on any species, natural community, or habitat, including candidate, sensitive, or special-status species identified in local or regional plans, policies, regulations or conservation plans (including protected wetlands or waters, critical habitat, EFH) or as identified by the CDFW, USFWS, or NMFS?**

The following analysis evaluates potential impacts associated with constructing and operating the offshore Project components for both the Local and Regional Projects. The inland facilities would have no impact on the marine environment. **Table 5.11-5** summarizes the impact significance conclusions.

**TABLE 5.11-5**
**SUMMARY OF IMPACT BIO-M 5.11-1 SPECIAL-STATUS MARINE SPECIES**

| | Ocean Water Desalination Facility | Offshore Intake and Discharge Facilities | Inland Conveyance Facilities |
|---|---|---|---|
| **Impact BIO-M 5.11-1: Impacts on special-status marine species.** | | | |
| **Local Project** | | | |
| Construction | NI | LTSM | NI |
| Operation | NI | LTSM | NI |
| **Regional Project** | | | |
| Construction | NI | LTSM | NI |
| Operation | NI | LTSM | NI |

NOTES:
NI = No Impact, no mitigation proposed
LTSM = Less than Significant impact with mitigation

## Local Project

### Construction-Related Impacts

#### Overview

Implementation of the Local Project would involve modifications to the existing ESGS cooling water ocean intake and outfall tunnel structures. The existing tunnel termini are situated in soft sandy substrate that do not have sensitive ocean habitat such as kelp reefs or natural rock outcroppings present. As part of the Project, soft-bottom habitat would be excavated and filled, and existing riprap and armor rock would be removed and replaced.

As described in detail in Section 3, *Project Description*, it is estimated that modifications to the seawater intake and brine discharge tunnels would require dredging of up to approximately 2.5 acres of soft sediment adjacent to the existing tunnels to install the pipeline insertion segments into the tunnels. In addition, up to approximately 5.5 acres of seafloor would be disturbed and used to stockpile dredge material and accommodate the temporary removal and replacement of the existing armor rock and rip rap at the intake pipeline terminus structure. The dredging, temporary stockpiling of dredged sediments, and temporary removal and replacement of armor rock can be expected to result in the temporary disturbance of both soft-bottom and artificial hard-bottom habitats in the offshore Project work area.

To accommodate the installation of new wedgewire screens, the existing ESGS intake would need to be extended approximately 70 feet seaward. Installation of the buried pipeline extension, the risers, and the wedgewire screens atop the risers would require the driving of six to twelve 12- to 16-inch steel or fiberglass anchor piles. The driving of the anchor piles would primarily be accomplished using a vibratory hammer, although an impact hammer may be required to achieve required burial depth, depending on the underlying geology, such as the compaction and composition of the seafloor sediments. Pile driving using either vibratory or impact hammers could result in underwater noise which can be harmful to both fish and marine mammals.

The execution of all offshore construction activities would require the use of tugboats, specialized crane barges, smaller barges to stockpile the removed anchor rock and rip rap and to transport the wedgewire screens and HDPE pipeline inserts for both the intake and outfall pipelines to the Project area (Section 3, *Projected Description*). These vessels are expected to originate from the Ports of Los Angeles/ Long Beach (POLA/POLB), located approximately 20 miles south of the Project area. The construction of the offshore components of the Project would also require assorted support boats to ferry personnel and supplies from either POLA/POLB or other nearby harbors, such as Marina Del Rey, and installation of temporary anchor moorings and anchors to secure the work vessels while they engage in offshore construction. These vessels have the potential to increase the risk of accidental collisions while transiting from the Project area to their port or harbor of origin, the accidental release of fuel or other pollutants or hazardous materials, and an increased risk of possible interactions with marine mammals.

#### Dredging

As discussed in Section 3, *Project Description*, and Section 5.9, *Hydrology and Water Quality*, dredging of the seafloor immediately seaward of both the existing ESGS intake and outfall structures would be necessary to install the new HDPE pipelines inside each of the existing concrete tunnels. In addition, the dredging of seafloor sediments seaward of the existing ESGS intake structure would be necessary to extend the intake pipeline to accommodate the new wedgewire screen intakes.

The maximum dredged seafloor area at both the intake and outfall termini has been estimated to be approximately 2.5 acres with an additional 5.5 acres temporarily disturbed when dredged sediments are sidecast for temporary storage until replacement in the dredged areas following construction activities. In total, approximately 8 acres, and up to 36,000 cubic yards, would be temporarily disturbed as a result of planned dredging activities for the Project.

Dredging activities could be expected to result in the temporary loss of soft sediment benthic habitat, associated marine infauna and epifauna, and habitat used as foraging area for marine invertebrates and fish inhabiting the Project marine study area. Dredging with clamshell buckets could also result in some entrainment of fish, a short-term, temporary increase in water turbidity resulting from the resuspension of seafloor sediments potentially leading to localized temporary shading.

No sensitive marine habitats, marine protected areas, or Habitat Areas of Particular Concern (HAPC) designated by CDFW, USFWS, or NMFS exist inside or in the vicinity of the Project marine study area, and as such, the Project would not have the potential to impact critical habitat or other sensitive marine habitats. However, the offshore Project construction area is designated as EFH for a variety of MSA managed fish species. Potential Project effects on EFH or MSA managed fish species are discussed in more detail in each subsection below. The effects of dredging on marine habitats and associated marine biological communities and taxa are discussed in more detail below.

#### Habitat Loss

Altering benthic habitat and associated infaunal and epifaunal communities can be expected to result in the temporary loss or reduction of habitat suitable for fish foraging, including any special-status fish species utilizing the Project marine study area.

The infaunal community inhabiting the coarse to fine sand-mud sediment in the Project marine study area is common throughout most of the SCB and the 8 acres disturbed by Project dredging represents less than 0.4 percent of the soft sediment habitat present in the Project marine study area. Following proposed dredging, the replacement of dredged sediments would occur and the marine infaunal and epifaunal communities would begin to recolonize the disturbed sediments almost immediately due to migration from adjacent, undisturbed sediments and recolonization from new larvae. The benthic community inhabiting those sediments would be expected to recover to pre-dredging composition and abundances within a few months to less than 2 years, depending on when dredging occurs and other ecological factors affecting recolonization (Newel et al. 1998; Blake et al. 1996).

Because of the limited area of soft sediment habitat and associated marine community that would be affected by dredging activities, the abundance of comparable habitat and suitable foraging habitat within the Project marine study area, and the anticipated quick recovery to pre-dredging conditions and productivity, the impact from dredging is determined to be less than significant.

### Marine Wildlife Entrainment

Dredging of Santa Monica Bay sediments by clamshell dredging equipment has the potential to entrain (directly remove) fish, and mobile epibenthic (on the sediment surface) invertebrates, such as crabs (Reine and Clark 1998). Mechanical clamshell dredging has been documented to carry a lower risk of fish entrainment (compared to other techniques such as suction or hydraulic dredging) since most fish can sense the pressure wave generated by the clamshell bucket. As a result, fish can avoid the bucket and entrainment. Additionally, most fish have been observed to avoid active dredging locations because of the underwater noise and increased turbidity (Reine and Clark 1998). Since all dredged sediments would be temporarily side-cast and stored on the seafloor immediately adjacent to the dredged area, any entrained fish would be able to swim free, once the dredged sediment is redeposited on the seafloor.

Therefore, with the employment of mechanical clamshell dredging equipment for Project dredging activities, the potential risk to fish and any special-status species that might be present in the Project site during dredging activities would be less than significant.

### Increased Turbidity & Resuspended Sediments

As discussed in Section 5.9.4, *Hydrology and Water Quality*, dredging marine sediments adjacent to the existing ESGS ocean intake and outfall structures would result in the resuspension of some seafloor sediments that can be expected to create temporary turbidity plumes near the dredging operations. The extent of increased turbidity and potential effects on marine taxa, including special-status species, would depend on the composition of the sediments, method of dredging, timing of dredging operations, areal extent of dredged sediments, and application of best management practices (BMPs).

Increased turbidity resulting from dredging approximately 36,000 cubic yards (once for initial removal and again for replacement back into the dredged area) would be expected to be confined to within a few hundred yards of the activity and occur only during those days dredging takes place. The duration of dredging and sediment resuspension is estimated to last up to 60 days while replacement of dredged material back into the dredged area is estimated to last another 30 days. All dredging activities would comply with USACE, USEPA, CCC, and RWQCB regulations and provisions as listed in issued permits (e.g., Section 10 Permit), including BMPs for avoiding or reducing potential impacts related to resuspended sediments. Wind, waves, and tidal currents in Santa Monica Bay and the Project marine study area can be expected to quickly disperse and dilute the turbidity plumes generated from dredging operations. Also, the coarse sediment composition of dredged sediments will result in limiting areal extent of turbidity plumes, since the material would be expected to quickly settle to the seafloor. After initial increases in turbidity levels, normal localized background ocean water turbidity levels would be restored within hours once dredging ceased. Finally, strict adherence to standard BMPs for avoiding or reducing suspended sediments would ensure that the impact from contaminant exposure from resuspension of sediments would be less than significant.

### Water Shading

The temporary use of work barges and support vessels during offshore construction activities, along with the temporarily increased turbidity during dredging operations, would be expected to temporarily shade the water column and subtidal habitats under the vessels and turbidity plume. This shading would occur during daylight hours while the barges and work vessels are on-site, and while dredging and pipe installation is actively underway. Decreased light penetration into Santa Monica Bay waters could have an effect on phytoplankton production (microalgae), as well as the presence and growth of marine macro algae and submerged aquatic vegetation (SAV). As discussed in Section 5.11.2, no known SAV beds or kelp beds currently exist at the artificial rock riprap at the ends of both the ESGS intake and outfall tunnels. Reduced ambient light penetrating to the seafloor from work barges and support vessels would be minimal and would be constantly shifting with the movement of the sun. Decreased sunlight penetration during dredging is expected to last less than 3 months, and the turbidity plume would cover a relatively small area of the Project marine study area. Finally, wind and wave generated currents will move plankton through the potential impact waters quickly, thus limiting the period in which the organisms would be exposed to reduced ambient light. Consequently, impacts from water shading as a result of reduced ambient light transmission from work vessels and dredging would be less than significant.

### Riprap and Armor Rock Removal and Replacement

As discussed in Section 3, *Project Description*, the riprap and armor rock surrounding the existing ESGS intake and outfall tunnel structures would be temporarily removed, and stockpiled on floating barges. The removal of the riprap would result in the temporary loss of hard substrate for the taxa colonizing it. As discussed in Section 5.11.2, no special-status species are known to inhabit or utilize the riprap of the ESGS intake and outfall tunnels. Additionally, no kelp or SAV beds are known to be present at these locations. Therefore, the loss of this riprap anchoring material would have a temporary effect on those fish species known to associate with rocky subtidal habitat, such as rockfish, kelp bass, croaker, and surfperch.

Once the modifications to the screened ocean intake and outfall structures are completed, the temporarily removed armor rock would be replaced to anchor and protect the new seafloor-based intake and outfall structures. Additional armor rock may be required which would provide more artificial hard substrate than is currently present at the Project site. The additional pipeline risers would also provide additional artificial hard substrate that could be colonized by marine organisms. The replaced and newly created armor rock artificial hard substrate at the modified ESGS intake and outfall tunnels can be expected to be re-colonized immediately upon placement back on the seafloor and to recover to pre-disturbance conditions, within a few months to several years, as normal ecological succession occurs (Newell et al. 1998). Because the effects on marine habitats and biological resources from the removal and replacement of artificial hard substrate riprap would be temporary in nature, these habitats would be expected to fully recover to pre-disturbance condition. And because these habitats do not harbor any sensitive or special-status species, and the habitats would potentially be increased in areal coverage, the impact from riprap removal and replacement is assessed to be less than significant.

### Temporary Anchors and Moorings

As discussed in Section 3, *Project Description*, and illustrated in Figure 3-23, temporary moorings and mooring anchors would need to be installed to anchor the work barges involved in the offshore construction activities associated with the modifications to the existing ESGS intake and outfall tunnels and seafloor structures.

The placement of the mooring anchors on the seafloor would result in the smothering and temporary loss of any benthic infauna or epifauna, as well as some unconsolidated sediment foraging habitat immediately under the anchors while the anchors are in use. Offshore construction activities for the Project could take up to 1 year to complete. In the case of the mooring anchors, recovery of the habitat to pre-construction conditions is expected to be quick since the habitat would not be lost and recolonization from adjacent sediments has been shown to be very rapid (Newel et al. 1998; Blake et al. 1996). Additionally, based on the small size of the Project marine study area, as well as the area of Santa Monica Bay that would be affected, the time period over which the habitat would be unavailable for use by marine taxa, and the overall temporary nature of the loss, the potential loss of seafloor habitat from the Local Project mooring and anchoring activities would be less than significant.

### Increased Vessel Traffic

The movement of work barges and other support vessels during the offshore construction activities could increase the risk of unplanned accidental releases or spills of fuel or oil, surface and underwater noise, and the potential for collisions with marine mammals or sea turtles.

Santa Monica Bay, POLA/POLB, and Santa Monica Harbor are subject to a high degree of ongoing commercial and recreational boat traffic and activity, and support the ongoing presence and movement of a wide array of vessels. Local Project ocean intake and concentrate discharge construction vessel traffic to and from the Project site would not be expected to result in any substantive increase in this activity or the number of vessels transiting or operating in the nearshore coastal waters of Santa Monica Bay. These vessel movements would represent a relatively limited percentage of the total vessel traffic present in the surrounding waters. Therefore, the vessel movements required for the offshore construction activities of the Project would not be expected to increase the risk of vessel collisions and any resultant accidental fuel spills. Additionally, Mitigation Measures HAZ-4 and HAZ-5 require the preparation and implementation of a Marine Safety Plan (Mitigation Measure HAZ-4) and a Marine Oil Spill Response Plan (Mitigation Measure HAZ-5), which would further assist in preventing vessel collisions and accidental releases to ocean waters and subsequent potential impacts to marine habitats and associated biota.

Similarly, any surface or underwater noise generated by the movement of these vessels would not be expected to contribute noise levels additional to or above the background noise level contributed by the area ocean vessel work fleet.

As discussed in Section 5.11.2, the risk of marine mammals and sea turtles occurring within the Project marine study area is limited. Transiting to and from POLA/POLB or Santa Monica Marina could result in some limited potential for increased collisions with Project work and support vessels. However, these vessels would have a low probability for encountering migrating whales during their transit to and from the Project site as such species are generally sparsely distributed in nearshore waters. Additionally, whale migration is generally limited to the months of December through April, and occurs further offshore than the Project area. Therefore, the likelihood of such migrating species to be present in the Project marine study area would be very small. Additionally, all of the operators of these vessels routinely work in the coastal waters of Santa Monica Bay, undergo regular training and familiarization on avoiding marine mammals and sea turtles while transiting from port to the worksite. As part of the Project, they will be required to undergo environmental training specific to this Project. The likelihood of offshore construction vessels interfering substantially with the movement of any native, resident, or migratory fish, or, with established, native, resident, or migratory wildlife would be very negligible.

For these reasons, the potential for impact to area marine resources, including marine mammals, fish, sea turtles from Project work and support vessels engaged in Project-related offshore construction would be less than significant.

### Pile-Driving and Other Sources of Underwater Noise

Underwater noise would be produced by marine vessels and in-water construction activities, especially pile-driving and demolition of existing offshore structures, resulting in short-term elevated noise levels near the existing tunnel termini. Depending on the amplitude and frequency of the underwater noise generated, there could be an effect on marine mammals, sea turtles, and fishes utilizing the coastal waters of the Project marine study area. Potential impacts of sound and acoustic pressure on marine species, such as behavioral avoidance of the construction area or injury, are discussed below.

Potential underwater noise generated by vibratory or impact pile-driving hammers used to install fiberglass or steel pipe anchor piles for the modified ESGS intake pipeline could have a deleterious effect on special-status fish species and marine mammals. High-intensity noise can result in acute damage to soft tissues, such as gas bladders or eyes (barotraumas), and/or harassment of fish and marine mammals such that they alter swimming, sleeping, or foraging behavior, or such that they temporarily abandon forage habitat.

Underwater noise, or sound waves, is a physical phenomenon consisting of minute vibrations that travel through the water. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of a sound and is measured in hertz (Hz), while intensity describes the loudness of a sound and is measured in decibels (dB). Decibels are measured using a logarithmic scale (e.g., a 10 dB increase represents a 10-fold increase in sound intensity).

The striking of a piling by a pile-driving hammer creates a pulse of sound that propagates through the pile, radiating out through the water column, seafloor, and air. Sound pressure pulses as a function of time are referred to as a waveform. Peak waveform pressure underwater is typically expressed in dB referenced to 1 micro Pascal (μPa). Sound may be measured as either an instantaneous value as peak level (sound pressure level, SPL) or as the total sound energy present in a sound event (i.e., sound exposure level, SEL, a common unit of total sound energy used in acoustics to describe short-duration events). The SEL is the total sound energy in an impulse that accumulates over the duration of that pulse normalized to 1 second, thus the unit for SEL is dB referenced to 1 μPa/s. Low-frequency sounds are typically capable of traveling over greater distances with less reduction in the pressure waveform than high-frequency sounds. Resource agencies use peak SPL and SEL to assess effects of underwater noise on marine species.

Opening up the seaward side of the intake tunnel would be performed by divers using concrete core saws to cut and break up the concrete into manageable-sized pieces. This activity would generate some underwater noise, but typically less than that generated by pile driving. Similarly, underwater noise levels for dredging are lower than or comparable to those from noise generated by large work vessels (Department for Environment, Food, and Rural Affairs – Centre for Environment, Fisheries & Aquaculture Science 2009).

Consequently, the most significant source of underwater noise from the Project offshore construction activities would be the installation of 6 to 12 fiberglass or steel anchor pilings to anchor the foundation at the intake pipeline for the wedgewire screens. West Basin intends to install these anchor pilings using a vibratory hammer. In the event that seafloor sediments are too compacted or large boulders are encountered to allow achievement of the total burial depth required to securely anchor the wedgewire screen intake structures, an impact hammer would be used only to ensure that the pilings have reached total burial depth. Because vibratory hammers produce sound energy that is generally 10 to 20 dB lower than impact-driving for a particular pile type (Caltrans 2015), a vibratory hammer is routinely used in marine settings to reduce underwater noise generation.

Pile-driving and the associated generation of underwater noise would be an intermittent activity. On days when piles are installed, activities would occur for only a few hours per day, taking approximately 15 to 60 minutes for a typical 12- to 16-inch-diameter piling, plus time between to set up the next pile. Therefore, the total time of underwater noise would be approximately 10 hours spread over several days.

**Table 5.11-6** provides information on the underwater sound levels generated by impact and vibratory hammers on assorted steel and fiberglass pilings of varying diameters. This information is based on actual in-field sound measurements during underwater pile-driving activities (Caltrans 2015; Iafrate et al. 2016). Potential impacts to marine species are dependent on sound source levels and frequencies, animal hearing sensitivities, proximity to the sound source, noise duration, and time of operation. Hearing sensitivities of marine species vary depending upon their anatomy and physiology.

**TABLE 5.11-6**
**ESTIMATED NEAR-SOURCE UNDERWATER NOISE LEVELS FROM PILE DRIVING**

| | Relative Water Depth | Distance from Piling Measurement Taken | Average Sound Pressure | | | Attenuation Device |
|---|---|---|---|---|---|---|
| | | | Peak (dB) | RMS | SEL (dB) | |
| Impact Hammer | | | | | | |
| 12-inch steel pipe pile[1] | ~7 feet (< 2 meters) | ~33 feet (10 meters) | 177 | 165 | 152 | None |
| 13-inch steel pipe pile[1] | ~16 feet (5 meters) | ~33 feet (10 meters) | 185 | 170 | – | |
| 16-inch steel pipe pile[1] | ~10 feet (3 meters) | ~33 feet (10 meters) | 182 | - | 158 | None |
| 16-inch square fiberglass and concrete pilings[2] | ~33 feet (10 meters) | ~33 feet (10 meters) | 175 | - | 149 | None |
| 16-inch square fiberglass and concrete pilings[2] | ~36 feet (10.9 meters) | ~134 feet (41meters) | 165 | - | 142 | None |
| Vibratory Hammer | | | | | | |
| 12-inch steel pipe[1] | ~16 feet (< 5 meters)) | ~16 feet (5 meters) | 171 | 155 | 155 | None |

NOTES:
1 SOURCE: CalTrans 2015.
2 SOURCE: PLOS One 2016.
dB = decibels
RMS = root mean square
SEL = sound exposure level

Scientific investigations on the potential effect of noise on fish indicate that sound levels below 183–187 dB do not appear to result in any acute physical damage (barotrauma) or mortality to fish depending on their size (Dalen and Knutsen 1986; Caltrans 2015). Smaller fish experience acute affects at sound levels > 183 dB and larger fish at 187 dB (Caltrans 2015). Noise levels that result in startle responses in steelhead trout and salmon have been documented to occur at sound levels as low as 140 dB at a frequency of 100 Hz and between 180–186 dB in Pacific herring (San Luis and Delta Mendota Water Authority and C.H. Hanson 1986). Any disturbance to FESA-listed fish species that results in altered swimming, foraging, movement along a migration corridor, or any other altered normal behavior would be considered harassment and a significant impact.

Comparable to the NMFS efforts to determine underwater noise levels that result in acute or startle responses in fish (Caltrans 2015), NOAA adopted a Technical Guidance to assess noise impacts on marine mammals with a new method to calculate the onset of permanent threshold shift (PTS), or Level A harassment (NOAA 2016b). **Table 5.11-7** presents the underwater sound thresholds for Level A harassment for marine mammals for both impulsive (i.e., impact pile-driving) and non-impulsive (i.e., vibratory pile-driving) sounds, established by NOAA. Because of the differences in hearing ability and sensitivity to different frequencies of sound, NOAA established underwater noise thresholds for marine mammals based on their sensitivity to low-, mid-, and high-frequency sounds. Low-frequency sensitive cetaceans include all baleen whales; mid-frequency cetaceans include dolphins, toothed and beaked whales; high-frequency cetaceans include true porpoises, river dolphins, Phocid pinnipeds (true seals), and Otariid pinnipeds (sea lions and fur seals). Table 5.11-7 also presents estimated underwater sound attenuation distances calculated for fish and marine mammals using NOAA and NMFS formulas. The NOAA Technical Guidance did not make any changes with respect to the Level B harassment thresholds; therefore, the previous acoustic threshold for impulsive noise sources (160 dBrms) for impact pile-driving and non-impulsive noise sources (120 dBrms) for vibratory pile-driving established by NOAA are used.

As illustrated in Table 5.11-7, underwater sound levels high enough to potentially cause acute damage to fish is < 1 meter for a vibratory hammer and 1-11 meters for an impact hammer, depending on the pile composition and diameter used for the piling. Behavioral sound levels, depending on the type of pile hammer used, range between 12 and 215 meters. Level A harassment underwater sound levels for marine mammals range between 0.1 and 108-meters, depending on the species, piling composition and diameter, and type of hammer used. Ambient underwater noise for a major harbor like San Francisco is estimated at approximately 150 dB and for coastal locations 138 dB (Wilson et al. 1997; Fabre and Wilson 1997).

It is unlikely that fish would be present within several meters of pile driving activity in the water column or at the seafloor as a result of the disturbances and low level noise transmitted from the work vessels and the initial placement of the anchor piles on the seafloor prior to pile driving. Disturbance of fish, including special-status fish, which may be foraging within several hundred meters of the offshore construction operations, is possible. Similarly, the potential for marine mammals, particularly dolphins, porpoises, sea lions, or seals, to be present within distances from the operations in which Level B harassment may occur remains possible and would be considered significant.

Only a limited number of hearing studies have been conducted on sea turtles (Popper et al. 2014). Sea turtles appear to be sensitive to low-frequency sounds with a functional hearing range of about 100 Hz to 1.1 kHz (Ridgway et al. 1969; Bartol et al. 1999; Ketten and Bartol 2006et al. 2012). As a result, some study authors suggest that sea turtle hearing thresholds should be considered equivalent to Level B harassment thresholds for low-frequency cetaceans (Southall et al. 2007; Finneran and Jenkins 2012); however, the Acoustical Society of America standards committee suggests that turtle hearing is probably more like fish than marine mammals (Popper et al. 2014). Consequently, for this analysis, sea turtle mortality and mortal injury would be expected at pile-driving sound levels greater than a cumulative SEL threshold of 210 dB. In the absence of behavioral impact thresholds, NMFS's Level B harassment thresholds for impulsive (160 dBrms) and non-impulsive (120 dBrms) were used.

The distance calculations to these thresholds indicate that the cumulative SEL of 210 dB would be reached within a few meters of the pile itself. For behavioral disturbance, the 120 dBrms threshold for non-impulsive noise and the 160 dBrms threshold for impulsive noise would be exceeded within a couple hundred meters of the pile-driving activity. Consequently, although acute damage is unlikely for sea turtles swimming or foraging within the Project marine study area, harassment levels of underwater noise could be present.

Sound levels and duration of exposure are likely important factors for impacts to sea turtles, which are slow swimmers and take longer to leave an area (CSLC 2017). As a result, the potential impact of Project pile-driving activities on turtles could be significant if not mitigated. Leatherback and loggerhead sea turtles are endangered species, and green and olive ridley sea turtles are threatened species, so extra precautions would be warranted if they enter the area. However, the likelihood of these species being in the Project marine study area is very low.

Due to potential impact from pile-driving noise, the use of vibratory hammers and application of other BMPs such as soft starts and cushion blocks, have been documented to reduce noise levels so that the potential impact would be less than significant (Caltrans 2015). In addition, OPA-required intake and discharge monitoring and action requirements would minimize impacts from the Project on all forms of marine life. Consequently, underwater noise generated from vibratory or impact hammer installation of anchor piles for the modifications to the ESGS intake pipeline would have the potential to significantly impact marine resources, including special-status marine taxa. These include Magnusson-Stevens Act-managed fish species, protected species such as salmon and steelhead, sea turtles, as well as multiple marine mammal species, including harbor seals, California sea lions, porpoises and dolphins. Implementation of **Mitigation Measure BIO-M1** would reduce the potential impact to less than significant.

Mitigation Measures:

Implement Mitigation Measures HAZ-4, HAZ-5, and BIO-M1.

Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

### Operational Impacts

Operation of the Project could be expected to result in potential long-term impacts to marine biota inhabiting the Project marine study area, from the use of a screened ocean intake system and from the discharge of desalination brine concentrate to the ocean. Operation of a screened ocean intake system could result in the impingement and entrainment of plankton and fish larvae. However, the design and operation of the screened ocean intake system with 1 mm open passive wedgewire screens and operating intake flow at < 0.5 fps would eliminate the potential for impingement and greatly reduce the entrainment of plankton and larval fish. Operation of an open ocean discharge for the brine concentrate could be expected to pose a potential for elevated salinity concentrations and possible other constituents originating in the ocean water and concentrated in the brine discharge to have an effect on marine taxa inhabiting the Project marine study area. Additionally, there could be potential impacts to plankton and other marine taxa inhabiting the marine study area from the release of chlorine/chloramines added to control biofouling in the intake pipeline and from potential physical (shearing) impacts to plankton from entrainment by the high-velocity brine discharge.

Impingement against screens may occur when water is drawn into a pipeline at relatively high intake velocities (i.e. greater than 0.5 fps). Based on video surveys and water sampling of a pilot-scale ocean intake fitted with 1 mm (0.04 inch) or 2 mm (0.08 inch) slot size wedgewire screens and an intake velocity of 0.5 fps, Tenera (2014) determined that impingement of all motile marine organisms would be reduced to zero. As a result, impingement of larval fish or invertebrates would not be expected to occur from the Project, and the potential impact from impingement of larval fish and invertebrates would be less than significant.

## Table 5.11-7
## Estimated Vibratory and Impact Hammer Pile-Driving Sound Levels and Disturbance to Criteria Levels

| Pile Type | Equipment Type | Distance to Sound Level Thresholds (meters) for Non-impulsive Sound Sources[2] | | | | | | | | Attenuation Equipment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 187 dB (Fish ≥2g) | 183 dB (Fish < 2g) | 150 dB (Fish-Behavioral)[3] | 199 dB (Low-Frequency Cetaceans) | 198 dB (Mid-Frequency Cetaceans) | 173 dB (High-Frequency Cetaceans) | 201 dB (Phocid Pinnipeds) | 219 dB (Otariid Pinnipeds) | |
| 12-inch Steel Pipe Pile[1] | Vibratory | 1 | 1 | 12 | 20 | 108 | 29.5 | 12.1 | 0.9 | None |
| 13-inch Steel Pipe Pile[1] | Vibratory | 1 | 1 | 25 | 20 | 108 | 29.5 | 12.1 | 0.9 | None |
| 16-inch Steel Pipe Pile[1] | Vibratory | 0 | 1 | - | 58.5 | 5.2 | 86.5 | 35.6 | 2.5 | None |
| 16-inch Fiberglass/ concrete pile[1] | Vibratory | 0 | 0 | - | 4.3 | 0.4 | 6.4 | 2.6 | 0.2 | None |
| Pile Type | Equipment Type | Distance to Sound Level Thresholds (meters) for Impulsive Sounds Sources[2] | | | | | | | | Attenuation Equipment |
| | | 187 dB (Fish ≥ 2 g) | 183 dB (Fish < 2 g) | 150 dB (Fish-Behavioral) | 183 dB (Low-Frequency Cetaceans) | 185 dB (Mid-Frequency Cetaceans) | 155 dB (High-Frequency Cetaceans) | 185 dB (Phocid Pinnipeds) | 203 dB (Otariid Pinnipeds) | |
| 12-inch Steel Pipe Pile[3] | Impact | 6 | 11 | 100 | 1.1 | 0.1 | 2.2 | 0.7 | 0.0 | None |
| 13-inch Steel Pipe Pile[3] | Impact | 0 | 0 | 215 | - | - | - | - | - | None |
| 16-inch Steel Pipe Pile[3] | Impact | 3 | 5 | - | 2.7 | 0.2 | 5.5 | 1.7 | 0.1 | None |
| 16-inch Fiberglass/ concrete pile[3] | Impact | 0 | 1 | - | 0.2 | 0.0 | 0.5 | 0.1 | 0.0 | None |

NOTES:

1 Vibratory pile driving hammers have been documented to reduce underwater noise levels a minimum of 14-15 dB and up to 28-29 dB, depending on the pile type, water depth, and type of hammers being used (Caltrans 2015). Estimating the potential underwater noise attenuation distances for steel pipe and fiberglass/concrete pilings using a vibratory hammer, underwater noise levels documented for impact hammers were reduced by 14 dB.

2 NOAA 2016b; NMFS 2016; Caltrans 2015

3 Time duration for using an impact hammer to set any pilings to desired depth assuming the vibratory hammer cannot, by itself, achieve required anchor depth was <1 hour. Calculations assumed 14,440 blows per piling, XLogR = 15, pulse duration = 0.8 seconds, 2.5 weighting factor adjustment.

Although limited impingement of larval fish and invertebrates > 1 mm in size is not projected to occur from the Project's ocean intake operations, entrainment of some larval fish and invertebrate organisms < 1 mm in size and some organisms close to 1 mm in size would still occur (Tenera 2014). Entrainment has been modeled using a projected intake flow rate of 41–45 MGD into an unscreened intake pipeline for the Local Project scenario. Empirical transport modeling (ETM) is routinely used for power plants that use ocean water via unscreened intakes for cooling purposes to calculate the proportional mortality of a population of fish ($P_m$), based on the number of larvae entrained in the intake volume, as a proportion of the number of larvae in the source water. This type of calculation is designed for species such as Silversides for which sufficient data exist to make robust estimates (**Table 5.11-8**).

**TABLE 5.11-8**
**FISH LARVAE USED FOR APF CALCULATION, THEIR CONTRIBUTION TO THE LARVAL COMMUNITY AND TO THE APF CALCULATION, PROPORTIONAL MORTALITIES ($P_M$), AND SIZE OF LARVAE**

| | | Contribution to larval community (%) | Contribution to APF calculation (%) | $P_m$ Local[1] | $P_m$ Regional[2] | Mean Size of Larvae[3] (mm) |
|---|---|---|---|---|---|---|
| Fish Taxa | | | | | | |
| Atherinopsidae | Silverside | 14 | 25 | $3.45 \times 10^{-3}$ | $1.04 \times 10^{-2}$ | 9.9/9.1 |
| Engraulidae | Anchovy | 13 | 23 | $2.38 \times 10^{-4}$ | $7.15 \times 10^{-4}$ | 8.9 |
| *Genyonemus lineatus* | White Croaker | 11 | 20 | $4.55 \times 10^{-4}$ | $1.37 \times 10^{-3}$ | 2.4/2.9 |
| *Hypsoblennius spp.* | Combtooth Blenny | 6.5 | 0.2 | $4.33 \times 10^{-4}$ | $1.30 \times 10^{-3}$ | NA /2.35 |
| *Citharichthys spp.* | Sanddab | 5 | 2 | $1.62 \times 10^{-4}$ | $4.88 \times 10^{-4}$ | NA |
| *Paralichthys californicus* | California Halibut | 1.8 | 6 | $2.60 \times 10^{-4}$ | $7.80 \times 10^{-4}$ | 2.0/NA |
| Gobiidae | CIQ Goby | 1.5 | 1 | $2.39 \times 10^{-3}$ | $7.19 \times 10^{-3}$ | NA |
| *Paralabrax spp.* | Sea Bass | 1.3 | 5.5 | $5.41 \times 10^{-4}$ | $1.63 \times 10^{-3}$ | NA |
| *Parophrys vetulus* | English Sole | 1.25 | 2 | $1.19 \times 10^{-4}$ | $3.58 \times 10^{-4}$ | NA |
| *Pleuronichthys guttulatus* | Diamond Turbot | 0.43 | 1.5 | $3.35 \times 10^{-3}$ | $1.00 \times 10^{-2}$ | NA |
| *Seriphus politus* | Queenfish | 0.07 | 1.5 | $5.41 \times 10^{-5}$ | $1.63 \times 10^{-4}$ | NA |
| Sciaenidae | Unid. Croakers | NA | 12.6 | $7.36 \times 10^{-4}$ | $2.21 \times 10^{-3}$ | 2.9 |

SOURCE: HDR 2018. Data based on Tenera and MBC 2008, Tenera 2014.
NOTES: NA = Not Available; [1]Mean of 41 and 45 MGD intake; [2]Mean of 123 and 136 MGD intake; [3] Project marine study area/SCB.

Based on results compiled from field sampling by Tenera and MBC (2008) in the vicinity of the ESGS, larvae from 12 different species/groups of fish were used to scale the ESGS ETM results to estimate proportional mortalities (Table 5.11-8) to the proposed Local and Regional Project intake volumes (HDR 2018; Appendix 4D). These mortalities were then used to calculate the potential impact that entrainment of larval fish and invertebrate taxa could have on the marine ecosystem in terms of loss of energy transfer from one trophic level to another, and overall loss of productivity of the Project marine study area. This loss is referred to as the area of production foregone (APF) and this projected loss must be compensated for through a fee or habitat restoration, in accordance with the OPA.

The ETM/APF calculations encapsulating the impact from loss of planktonic organisms on marine ecosystem productivity were based on mortality estimates of a variety of fish species and fish taxonomic groups that were documented to occur in the Project marine study area. No planktonic forms of any of the FESA- and CESA-listed fish and invertebrate species (Table 5.11-3) that could potentially be present in the Project marine study area were reported in any of the entrainment studies conducted for ESGS over the past decade, and thus were not included in the APF estimates.

The mere absence of rare species (such as giant sea bass and black abalone) from ESGS entrainment assessments does not negate the possibility of their presence in the planktonic community of the source water potentially subject to entrainment. It has been suggested that because these species are rare, any entrainment could potentially have significant effects on their population (CSLC 2017). However, such a scenario could have significant impacts only if a nearby source of larval forms of the special-status taxa exists, such that the larval forms of these species could even be present in the ocean waters being entrained by the Project's intake or discharge. In addition, these larvae need nearby food sources and habitat consistent with their natural life history, in order to be viable and capable of reaching maturity; and their entrainment would need to be present in sufficient abundance to pose some reasonable risk to the further survival or recovery of the species.

As illustrated in **Table 5.11-9**, a 41 to 45 MGD unscreened open ocean intake would be expected to affect an estimated 16.4-18.1 acres of marine habitat, as a result of entrainment of larval fish and invertebrates. The OPA requires that this potential impact to marine habitat be compensated for (SWRCB 2015).

It should be noted that these APF calculations do not take into account the use of wedgewire screens or the intake flow rate and the potential exclusion of larvae that are > 1 mm in size. Tenera (2014) concluded that the entrainment of Silverside fish larvae, which account for approximately 14 percent of the Project marine study area larval fish population (Table 5.11-8), would be excluded from entrainment because of their mean size being 9 mm, and because larvae below 7 mm in size did not occur in the Project marine study area (Table 5.11-8, Tenera 2014). Tenera (2014) also concluded that entrainment of other fish larvae that were > 1 mm in size would be substantially reduced, if not eliminated. Consequently, the calculation of APF for an unscreened ocean intake located offshore of the ESGS (HDR 2018) overestimates the loss of productivity to the marine ecosystem from entrainment, since most of the entrainment will be restricted to larvae < 1 mm (Tenera 2014).

To date, the ocean water intakes that have been evaluated for entrainment have all been unscreened ocean water intakes used by power plants. The potential reduction in entrainment by use of the wedgewire screens and the much lower flow through screen velocity of < 0.5 fps are not included in the APF calculation because it is a new technology with prescriptive operational requirements imposed by the OPA. To date, there have not been any scientific studies designed or conducted to systematically evaluate wedgewire screens' performance in the absence of any appropriate sampling protocols developed to allow for proper assessment. Furthermore, it is difficult to determine the magnitude of the reduction in larval fish entrainment that would potentially occur due to the screen. This is because larvae from each species are distributed over a spectrum of sizes, and the proportion of larvae in the > 1 mm size class varies depending on the species. In addition, entrainment of larvae only slightly > 1 mm in size, such as Halibut and Croaker, may still occur in the presence of wedgewire screens depending on the larval head size and its geometry relative to the screen orientation. It has been suggested that the reduction in APF estimates through the use of wedgewire screens could be as high or higher than 50 percent (SWRCB 2011). Table 5.11-9 illustrates the potential reduction in APF by taking into account expected decreases in the entrainment of larval populations of five fish species that commonly occur in the Project marine study area through the use of a wedgewire screens with slot width of 1 mm (Tenera 2014). On average, entrainment of these species is predicted to decrease by 57.2 percent (Tenera 2014), but they only represent one-third of the species used in the APF calculation; therefore, their impact on the APF calculation is limited. A further reduction in impacts can be calculated by removing the Silversides from the HDR (2018) estimates of APF since all of their life stages in the marine study area exceed 7 mm (Tenera 2014). This exercise demonstrates how calculations of APF due to intake entrainment can vary from 16.4 to 14.2 acres (Table 5.11-9) depending only on whether one takes into account potential reductions in screened intake entrainment of some of the larvae > 1 mm (for which data exist) by the wedgewire screens or not (Table 5.11-9).

At present, the extent of protection that wedgewire screens could provide to prevent entrainment of larval fish and invertebrates in the Project marine study area is unknown. However, the OPA mandates that impacts on all marine life be mitigated. Note that a recent environmental review of another planned coastal desalinization project assessed higher levels of entrainment to be less than significant (CSLC 2017). Regardless of the magnitude of the impact of entrainment, adequate mitigation to restore or enhance marine or coastal habitat must be implemented pursuant to the OPA. Therefore, the implementation of **Mitigation Measure BIO-M2** would reduce Project related entrainment impacts of non-special-status taxa, to less than significant after mitigation.

Finally, as mentioned above, larval forms of special-status taxa have not been detected in entrainment studies and are not expected to be present in the Project marine study area. This assessment is based on the absence of suitable habitat in the Project marine study area, the absence of substantial larval densities of special-status species in the Project marine study area, and the natural life history of special-status species of concern present in the Project marine study area. Therefore, because of the low potential for larval forms of any special-status invertebrate or fish species to be present in the source waters, the potential for Project related entrainment is assessed to pose little or no significant effect on the continued survival or recovery of the special-status species.

For example, most abalone veligers, and black abalone veligers in particular, are in the plankton for a period of about 3-10 days before settlement and metamorphosis (Butler et al. 2009) and have limited capacity for dispersal over distances beyond a few kilometers, and are able to do so only rarely (Butler et al. 2009). With the Project intake and discharge tunnel termini located approximately 9-19 nautical miles away from the only currently known population of black abalone, it is extremely unlikely that any viable veligers would occur in Project source waters. In the case of giant sea bass, this fish species is a pelagic habitat inhabitant, typically found in rocky habitats near kelp beds, ledges, and drop offs at depths of 35 to 130 feet in coastal waters offshore California (Baldwin 2008). Aggregations of giant seabass are predominantly found south of Point Conception and they are commonly seen by recreational scuba divers in California along La Jolla, Catalina Island, and Anacapa Island (Baldwin 2008). The closest known location of Giant sea bass to the Project marine study area are at the Point Dume and Point Vicente MPAs, located 19 and 9 nautical miles away, respectively, where both hard bottom habitat and kelp beds occur.

Female giant sea bass can produce approximately 60 million eggs per year. After spawning, hydrated fertilized eggs with an average diameter of 1.5 mm (0.06 inch) float to the water surface before hatching within 36 hours (Clark 2016). Once hatched, giant sea bass larvae average 4.1 mm in length (Clark 2016) and feed on plankton for the first month before settling on the sea bottom. Consequently, based on the location of suitable spawning and rearing habitat, their natural history and most importantly, the fact that the egg, larvae, and juvenile sizes are all > 1 mm, also make this an unlikely candidate to be subject to Project entrainment.

Based on the absence of suitable habitat in the Project marine study area, the absence of substantial larval densities of special-status species in the Project marine study area, and the natural life history of special-status species of concern present in the Project marine study area, the potential for entrainment of these special-status species is negligible to non-existent. Therefore, the impact would be less than significant.

**TABLE 5.11-9**
**AREA PRODUCTION FOREGONE (APF) ESTIMATES FOR OPEN AND 1 MM WEDGEWIRE SCREENED OCEAN INTAKE FOR THE WEST BASIN DESALINIZATION PROJECT**

| Intake | APF Estimates for an Unscreened Intake[1] (acres) | APF Estimates for a Wedgewire Screen Equipped Intake Accounting for Exclusion of > 1 mm larvae[2] (acres) | APF Estimates for a Wedgewire Screen Equipped Intake with 100% Exclusion of Silverside Larvae[3] (acres) |
|---|---|---|---|
| Local (41 MGD) | 16.4 | 14.52 | 14.2 |
| Local (45 MGD) | 18.1 | 16.03 | 15.64 |
| Regional (123 MGD) | 49.1 | 43.59 | 42.53 |
| Regional (136 MGD) | 54.4 | 48.25 | 47.07 |

SOURCE: HDR 2018
[1]Tenera 2014.
NOTES: [2]APF wedgewire screen values are based on estimated reductions in entrainment of assorted fish and invertebrate larvae (from a spectrum of larval sizes for each species) when a 1.0-mm Wedgewire Screen is utilized and as presented in Tenera 2014.
[3]APF wedgewire screen values are calculated by excluding entrainment of Silverside larvae. All calculations include 1:10 scaling of estuarine: midwater habitat for non-estuarine fish species (Allen and Pondella 2006).

### Dissolution of Wedgewire Screens

The wedgewire screens proposed for the Project would be made of a copper-nickel alloy that provides resistance to seawater corrosion as well as biofouling (Michel et al. 2011). However, copper ions released from the surface of the material can accumulate in the water column and in the sediments, potentially negatively impacting water quality and marine organisms (SWRCB 2015). For example, high copper levels in the ocean have been found to reduce the abundance of plankton, ascidians, and echinoderms (SWRCB 2015).

As described above in, Section 5.9*, Hydrology and Water Quality*, the California Ocean Plan water quality objectives for protection of marine life limits copper to a 6-month median of 3 micrograms per liter (µg/L), a daily maximum of 12 µg/L, and an instantaneous maximum of 30 µg/L.

While the leaching process has not been extensively evaluated due to the lack of suitable standards to assess copper release from solid alloys (Michel et al. 2011), leaching based on mass loss can be estimated using published corrosion rates (Efird and Anderson 1975). A calculation of potential weight loss based on the published corrosion rate, density of screen alloy, and exposed screen area can be combined with ocean water intake volume to give a rough estimate of the potential instantaneous copper concentrations at the solid and liquid interface (AMS 2018). For the Local Project intake, this calculation estimates a loss of copper and nickel of 1 g/d per wedgewire screen, which gives a loss concentration of 0.03-0.05 µg Cu-Ni/L when normalized to the daily volume of water intake (**Table 5.11-10**). As is evident from this calculation, the mean loss concentration of copper and nickel from the wedgewire screens is at a minimum, two orders of magnitude less than the California Ocean Plan 6-month median objective of 3 µg/L, and three orders of magnitude less than the daily maximum of 12 µg/L for copper (Table 5.11-10). It is noted that this estimate conservatively assumed that 100 percent of the copper dissolved would become free copper ions [$Cu^{2+}$] and did not account for copper speciation[7] or precipitation of copper ions as cupric hydroxyl-chloride [$Cu_2(OH)_3Cl$]. Based on these estimates, the use of wedgewire screens composed of copper-nickel alloy would result in some chemical leaching into the water column, but the impacts would be expected to be orders of magnitude below the California Ocean Plan objectives for copper, which is based on established toxic concentrations to marine biota. Therefore, the potential introduction of copper into ocean waters from the wedgewire screens is considered less than significant.

**TABLE 5.11-10**
**LOSS OF COPPER AND NICKEL PER LITER OF WATER INTAKE, PER DAY, IN COPPER:NICKEL (CU:NI) ALLOY WEDGEWIRE SCREENS FROM EITHER FOUR OR TWELVE SCREENS**

| Intake (MGD) | Number of Wedgewire Screens (#) | Wedgewire Screen Alloy Composition (Cu:Ni) | Daily Intake Flow Rate (gallons per day) | Mean Concentration of Cu:Ni Alloy (µg/L) |
|---|---|---|---|---|
| Local – 41/45 | 4 | 90:10 | $45.3 \times 10^6$ | 0.03 |
| Local – 41/45 | 4 | 70:30 | $45.3 \times 10^6$ | 0.05 |
| Regional – 123/136 | 12 | 90:10 | $136.2 \times 10^6$ | 0.03 |
| Regional – 123/136 | 12 | 70:30 | $136.2 \times 10^6$ | 0.05 |

SOURCE: AMS 2018.

7 "Numerous studies testing the response of phytoplankton growth to increasing copper concentrations have demonstrated that the inhibition of growth due to toxicity is proportional to the concentration of free or hydrated Cu2+, and not the total dissolved copper concentration." Bruland, KW, EL Rue, JR Donat, SA Skrabal, JW Moffett, 2000. *Intercomparison of volatmmetric techniques to determine the chemical speciation of dissolved copper in coastal seawater sample.*

### Brine Discharge

The discharge of desalination brine concentrate (water with high concentration of constituents, including salts, that originate from the ocean) has the potential to affect marine organisms either through changes in water quality from the increase in the concentrations of salinity and other constituents, or through mortality resulting from shear stress caused by the turbulent diffuser discharge.

#### Increased Salinity and Other Constituents

The potential changes in water quality that can occur as a result of brine discharge are addressed in detail in Section 5.9, *Hydrology and Water Quality*. These changes could include elevated salinity which could potentially result in salinity toxicity, lowered dissolved oxygen which could potentially result in hypoxia, and increased concentrations of other constituents carried in the brine; one such constituent would be the copper dissolving from the wedgewire screens as described above. The potential effect of the brine discharge on dissolved oxygen levels, as discussed in Section 5.9, *Hydrology and Water Quality*, would be less than significant and is therefore not expected to pose any risk to marine habitats or biota and is not discussed further with respect to its impact on marine organisms.

With respect to constituents other than copper, which are naturally occurring in seawater, their mass would be drawn into the Project Desalination Plant and become concentrated 1.8-fold before being returned to the ocean in the brine discharge. Whereas there would be no net change in their mass, the increase in their concentration could pose a problem if their concentration in the brine were to exceed the California Ocean Plan objectives. As discussed in detail in Section 5.9, *Hydrology and Water Quality*, none of the constituents would exceed existing background levels at the edge of the Zone of Initial Dilution (ZID), and thus would not be expected to pose any risk to marine habitats and taxa, including special-status fish, marine mammals, and sea turtles.

While mortality of small organisms could occur if they were entrained in the higher concentration discharge within the ZID, the impact to pelagic organisms would likely be less than significant because of the small percentage of total open water habitat contained within the ZID and the limited exposure duration. Discharged constituents would also have less than significant impacts on benthic organisms from acute toxicity because the area affected by the discharge plume would be very small. Using the radius of the discharge plumes cited in Section 5.9, *Hydrology and Water Quality* (i.e., 38 feet for the Local Project and 66 feet for the Regional Project) and assuming a water depth above the diffusers of 25 feet, the discharge plume within the ZID for the Local Project would be estimated at approximately 0.002 percent of the water within the Project marine study area. Transfer of bioaccumulated contaminants from benthic infauna to higher trophic levels would also be limited by the very small area of seafloor affected. The seafloor potentially affected by the discharge plume is estimated at approximately 0.1 acres, which accounts for 0.004 percent of comparable habitat within the Project marine study area. Because of the very small area of water column and seafloor potentially affected by elevated seawater constituents, any potential impact to marine biota is estimated to be less than significant.

Potential impacts of elevated salinity in the ZID are based on investigations of salinity tolerance of marine organisms that are representative of those living in the ZID. Organisms expected to occur in the ZID include those living on the concrete structures and the diffusers, as well as infauna and macrofauna inhabiting the sandy habitats surrounding the diffusers. As described in Section 5.11.2, the concrete structures are inhabited by California lobsters, oysters, tubeworms, and mussels. The infaunal community is dominated by clams, nematode worms, nemertean worms, and annelids whereas the macrofauna is dominated by sand stars, bay shrimp, spiny lobsters, and California lobsters.

The salinity tolerance of representative organisms, such as mysid shrimp, was tested to investigate how it compared with expected salinities in the vicinity of the discharge (Weston 2013). No significant effects were observed below 41 ppt for mysid shrimp in a chronic toxicity testing, and no effects were observed below 45 ppt for acute testing. Results from long-term exposures demonstrated no impacts on invertebrates at any of the salinities tested (up to 47 ppt), but demonstrated significant negative impacts on sea urchins and abalone (neither of which are present in the Project marine study area) at 47 ppt. In addition, mesocosm experiments with fish demonstrated no adverse effects at salinities up to 47 ppt (Weston 2013). These results are consistent with salinity tolerances of a range of organisms published in the literature, presented in **Table 5.11-11** for the type of organisms found in the Project marine study area (e.g. shrimp and mussels). It is unlikely that salinity effects will manifest below 41 ppt (Table 5.11-10), which is 6 ppt above the salinity of ocean water.

**TABLE 5.11-11**
**TOXICITY TEST RESULTS AND MEAN EFFECTIVE CONCENTRATIONS OF SALINITY TOXICITY**

| Protocol[a] | Endpoint | Test | Measured Test Solution Salinities (ppt) | Mean Salinity EC (ppt) |
|---|---|---|---|---|
| Red Abalone | Development | 1<br>2 | 34, 35, 36, 37, 38, 39, 40<br>34, 35, 36, 37, 38, 39, 40 | 36.8 |
| Purple Urchin | Fertilization | 1<br>2 | 34, 36, 38, 39, 41, 43, 45, 46, 48<br>34, 38, 41, 42, 43, 44, 45, 46, 47 | 44.2 |
| Purple Urchin | Development | 1<br>2 | 34, 35, 36, 37, 38, 39, 40, 41, 42<br>34, 35, 36, 37, 38, 39, 40, 41, 42 | 38.1 |
| Sand Dollar | Fertilization | 1<br>2 | 35, 38, 39, 41, 43, 45, 47, 48, 50<br>34, 36, 38, 40, 41, 43, 45, 46, 48 | 40.3 |
| Sand Dollar | Development | 1<br>2 | 34, 35, 36, 37, 38, 39, 40, 41, 42<br>34, 35, 36, 37, 38, 39, 40, 41, 42 | 39.6 |
| Mussel | Development | 1<br>2 | 34, 40, 41, 42, 43, 44, 45, 46, 47<br>35, 40, 41, 42, 44, 45, 46, 47, 48 | 43.3 |
| Mysid Shrimp | Survival | 1<br>2 | 35, 41, 45, 50, 56, 61<br>37, 42, 45, 49, 53, 56 | 47.8 |
| Mysid Shrimp | Growth | 1<br>2 | 35, 41, 45, 50, 56, 61<br>37, 42, 45, 49, 53, 56 | > 49.7 |
| Giant Kelp | Germination | 1<br>2 | 34, 45, 49, 54, 59, 64<br>35, 44, 49, 54, 59, 65 | 55.5 |
| Giant Kelp | Growth | 1<br>2 | 34, 45, 49, 54, 59, 64<br>35, 44, 49, 54, 59, 65 | 47.3 |

| Protocol[a] | Endpoint | Test | Measured Test Solution Salinities (ppt) | Mean Salinity EC (ppt) |
|---|---|---|---|---|
| Topsmelt | Survival | 1<br>2 | 35, 45, 50, 55, 60, 65, 70<br>35, 44, 50, 54, 60, 65, 70 | 61.9 |
| Topsmelt | Biomass | 1<br>2 | 35, 45, 50, 55, 60, 65, 70<br>35, 44, 50, 54, 60, 65, 70 | 59.3 |

SOURCE: Phillips et al 2012.
NOTES: [a] Only mussels and shrimp have a likelihood to occur within the Project marine study area.

Based on the hydrodynamic modeling presented in Section 5.9, *Hydrology and Water Quality*, the brine mixing zone (BMZ), where salinities would have the potential to reach 2 ppt or greater above the normal seawater salinity of 35 ppt, would extend 38 feet out from the diffusers. The area of this zone for the Local Project would be 0.1 acres, representing 0.004 percent of the Study Area seafloor and 0.002 percent of Study water column volume. Beyond this zone, salinities are predicted to decrease to 1.9 ppt above the normal seawater salinity by the edge of the near field. Salinity concentrations would be below the OPA salinity standards for brine discharge between the edge of the BMZ and the end of the near field (119 feet); therefore, the brine effluent would be below the 2 ppt salinity threshold well within the maximum allowable BMZ of 328 feet from the discharge structure.

Because marine organisms may move away from regions with elevated salinity if they are negatively impacted, combined with relatively high salinity tolerance of representative organisms such as shrimp, and the small portion of the marine study area being impacted, effects on marine biological resources, including special-status fish, marine mammals, and sea turtles within the Project marine study area due to increased salinity resulting from the brine discharge are estimated to be less than significant.

### Shear Stress

Mortality due to turbulence-induced shearing stress from the discharge of brine can impact plankton, particularly thin-shelled bivalve and gastropod veligers (Jessopp 2007; Zhang et al. 2017). Shearing stress from discharge of water through multiport diffusers has been modeled in a number of scientific studies and has been found to vary depending on a variety of factors, including the angle of the diffusers and water discharge velocities (Foster et al. 2013; Roberts 2018). The discharge of the brine entrains ambient seawater into a turbulent discharge plume wherein marine organisms face a greater risk of shear-induced damage and mortality. For the Local Project, Roberts (2018) used a preliminary and evolving methodology (which has not yet been approved) to estimate that approximately 119-126 MGD of ambient seawater would become entrained by the turbulent discharge of the Project's outfall (see Appendix D3). If it is assumed that all organisms entrained into the turbulent discharge flow will suffer mortality, then the estimated APF of this entrainment would vary from 47-50 acres due to the large volume of water that would be entrained by the discharge (**Table 5.11-12**). This could be considered a potentially significant impact.

However, the ocean produces a substantial amount of natural turbulence due to the action of wind and waves (Mann and Lazier 1991). This "background" turbulence is typically manifested at length scales > 1 mm, depending on forcing intensities. The Project-induced turbulence that needs to be mitigated would occur at length scales of < 1 mm (Roberts 2018). If the APF calculation is adjusted for Project-induced turbulences, i.e. by excluding some organisms > 1 mm for which there exists data, then the APF can initially decrease from 47–50 acres to 39–42 acres for the Local Project (Table 5.11-12).

Additionally, all of the organisms < 1 mm in size are not expected to be affected to the same extent by shear stress due to their natural elasticity and in the case of some invertebrate larvae, the hardness of their shells. Recent studies of turbulence-induced shearing mortalities on invertebrate organisms demonstrate that a number of taxa, including polychaetes, barnacles, cyprids and bryozoans show no effects from turbulent transport at velocities as high as 3 m/s (Jessopp 2007). At a velocity of 3 m/s, which is comparable to the discharge velocities of the Local Project, predicted to vary from 2.7-3.3 m/s (8-10 feet/s), the impact of turbulence-associated shear mortality would principally affect thin-shelled veligers such as those of *Mytilus edulis* and the gastropod *Littorina littorea* (Jessopp 2007). For these types of organisms, shear-induced mortalities vary from 15 to 35 percent of the population (Jessopp 2007; Zhang 2017). Because these types of veligers typically comprise a varying proportion of the plankton < 1 mm in size, taking the mortality of the total plankton population to be the midpoint of this range (25 percent) would represent a worse-case scenario for invertebrates and for fish eggs and larvae, which are typically more elastic and can be expected to withstand minimal levels of shear stress compared to thin shelled mollusks. Applying a 25 percent mortality rate to the discharge entrainment APF calculations further reduces the estimated APF acreage to 9.8-10.4 for the Local Project (Table 5.11-12). However, although the OPA requires mitigation, it is unclear from current policy guidance how to calculate a fair compensation at this time. The RWQCB is currently evaluating methodologies.

As discussed above concerning ocean water intake entrainment, the potential magnitude of entrainment from the Project's brine discharge is uncertain, primarily due to limited and pertinent scientific data concerning invertebrate and larval fish mortality that may actually occur from discharge turbulence. What scientific data that can be applied (Jessopp 2017; Zhang 2017) indicate that turbulence-induced mortality on invertebrates and fish larvae in the open ocean is far less than 100 percent and could be 15 percent or lower. As also discussed above for Project related intake entrainment, although the potential overall magnitude and effect of discharge turbulence-induced entrainment of larvae < 1 mm may be in question, the potential effect of injured or killed marine fish and invertebrates may still have a significant impact on the marine ecosystem.

Regardless of the magnitude of the impact of discharge-induced entrainment, it would be expected to be reduced through the application of mitigation to restore or enhance marine or coastal habitat, which could include a local coastal marsh restoration project such as the Ballona Wetlands Restoration Project. Therefore, the implementation of Mitigation Measure BIO-M2 would reduce Project related entrainment impacts of non-special-status taxa, to less than significant after mitigation.

Finally, as mentioned above, the potential for entrainment of special-status taxa would be negligible to non-existent. For example, the lack of veliger larvae or juvenile fish stages of black abalone and giant sea bass in any of the studies of plankton conducted in the last decade in the Project marine study area (Tenera and MBC 2008; Tenera 2014), the lack of kelp beds or other suitable habitat which provide the primary food source of both black abalone and Giant sea bass (Butler et al. 2009) in reasonable proximity to the intake and discharge tunnels, and the survivability of either taxas larvae to travel the requisite distance to the Project site from existing supporting habitat, as well as the > 1 mm egg and larval body size of giant sea bass, all support a determination of a very low to non-existent potential for substantial larval densities to be effected by Project entrainment that would pose a significant risk to the survivability and recovery of these species. Therefore, potential entrainment impact would be less than significant with implementation of Mitigation Measure BIO-M2.

**TABLE 5.11-12**
**AREA PRODUCTION FOREGONE (APF) ESTIMATES FOR TURBULENT DISCHARGE-ASSOCIATED MORTALITY FOR THE WEST BASIN DESALINIZATION PROJECT**

| Intake | Estimated Entrained Flow (MGD)[1] | 100% Mortality Discharge APF[2] (acres) | < 1 mm Mortality Discharge APF[3] (acres) | 25% < 1 mm Mortality Discharge APF[4] (acres) |
|---|---|---|---|---|
| Local (41 MGD) | 119 | 47.5 | 39.2 | 9.8 |
| Local (45 MGD)) | 126 | 50.3 | 41.6 | 10.4 |
| Regional (123 MGD)) | 678 | 270.8 | 223.6 | 55.9 |
| Regional (136 MGD) | 693 | 276.7 | 228.5 | 57.13 |

NOTES:
1 Voume of estimated entrained flow from Roberts 2018.
2 Mortality assessed as 100% of organisms of all size classes in the entrained flow;
3 100% of organisms < 1mm in size with a proportional percentage of organisms > 1 mm being affected based on Tenera 2014;
4 Assumes 25% mortality of organisms < 1 mm in size, based on observed mortalities of marine taxa from Jessopp 2007 and Zhang et al. 2017. Entrainment includes 1:10 scaling of estuarine:midwater habitat for non-estuarine fish species (Allen and Pondella 2006).

### Chlorine Discharges

In order to control biological growth within the intake piping system, a biofouling control chemical such as chlorine may be applied. If so, a concentrated solution of chlorine would be applied as a shock dosage into the intake piping system between the wedgewire screens and the intake pump station onshore. The solution would be applied for 2 to 12 hours as often as two times per month. Chlorine or a similar chemical might also be used to disinfect the desalinization treatment modules.

As stated in Section 5.9, *Hydrology and Water Quality*, all discharges associated with the disinfection of existing and newly installed pipeline or other components of the desalinization system would be subject to waste discharge requirements under the Statewide NPDES Permit for Drinking Water System Discharges to Waters of the United States (Permit No. CAG140001). The California Ocean Plan water quality objectives are applicable to direct or indirect (via stormwater) discharges to the ocean and are implemented under this general permit. Under this general permit, West Basin would be required to implement BMPs proven to be effective for the control of pollutants associated with pipeline disinfection discharges. At a minimum, West Basin would be required to implement BMPs for planned discharges to prevent aquatic toxicity by using dechlorination chemical additions, implementing equivalent proven dechlorination methods, and/or ensuring that the chlorine in the discharge dissipates naturally, such that the level of chlorine in the discharge is less than 0.019 mg/L prior to entering a receiving water.

The chlorine or similar chemical used to control biological growth in the intake pipeline would be pumped into the pipeline offshore downstream of the wedgewire screens and flow with the intake water onshore, where it would be removed during the desalination process. Consequently, the likelihood of effects of chlorine on marine resources from efforts to control biological growth in the intake pipeline should not occur. As a result, any potential effect of chlorine occurring in the Project discharge being above concentrations known to cause toxicity in marine biota would not occur and would be less than significant.

Mitigation Measures:

Implement Mitigation Measure BIO-M2.

Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

### *Regional Project*

#### Construction-Related Impacts

Construction of the Regional Project would involve less offshore activity than the Local Project. During construction of the Local Project, most of the infrastructure requiring more intrusive construction activities would have already been installed including pipe inserts, piles, and risers. The only new activity needed would be to attach additional screens and diffusers to the previously installed foundations. As a result, construction would result in fewer short-term effects to sensitive species. Nonetheless, similar effects could be experienced during the short-term disturbance. Therefore, Mitigation Measure BIO-M1 would be required to ensure impacts would be less than significant.

Mitigation Measures:

Implement Mitigation Measure BIO-M1.

Regional Project Significance Determination:

Less than Significant with Mitigation Incorporated.

#### Operational Impacts

The Regional Project screened ocean intake and discharge systems would operate in a manner similar to the Local Project's, and would thus have similar operational effects. The assessment of Regional Project's operational effects is included in the discussion above under Local Project. The potential impact from their entrainment would be less than significant with implementation of Mitigation Measure BIO-M2.

Mitigation Measures:

Implement Mitigation Measure BIO-M2.

Regional Project Significance Determination:

Less than Significant with Mitigation Incorporated.

**Mitigation Measures:**

**BIO-M1: Pile Driving Noise Reduction for Protection of Fish and Marine Mammals:** Prior to the initiation of any offshore pile driving activities for the Project, West Basin shall prepare a Construction Plan that outlines the details of the piling installation approach. The information provided in this plan shall include, but not be limited to:

- The type of piling and piling size to be used
- The method of pile installation to be used
- Noise levels for the type of piling to be used and the method of pile driving (vibratory or impact)
- Calculation of potential underwater noise levels that could be generated during pile driving using methodologies outlined in Caltrans 2015 and NOAA 2016b
- A schedule of when pile-driving would occur

If the results of the calculations provided in the detailed Construction Plan for pile-driving indicate that underwater noise levels are < 183 dB for fish at a distance of ≤ 10 meters and 120 dB for marine mammals for a distance ≤ 500 meters, then no further measures are required to mitigate underwater noise. If calculated noise levels are > 183 dB at ≤ 10 meters or 120 dB at a distance of ≤ 500 meters, then West Basin shall develop a NMFS-approved sound attenuation reduction and monitoring plan. This plan shall detail the sound attenuation system, detail methods used to monitor and verify sound levels during pile-placement activities, and describe all BMPs undertaken to reduce impact hammer pile-driving sound in the marine environment to an intensity level of less than 183 and 120 dB. The sound-monitoring results shall be made available to NMFS.

The plan shall incorporate, but not be limited to the following BMPs:

- Pile -driving shall be conducted only between June and November to avoid gray whale migration, unless NMFS in their Section 7 consultation with the USACE determines that the potential effect to marine mammals is less than significant.
- A 1,600-foot (500-meter) safety zone shall be established and maintained around the sound source for the protection of marine mammals and sea turtles in the event that sound levels are unknown or cannot be adequately predicted.
- Work activities shall be halted when a marine mammal or sea turtle enters the 1,600-foot (500-meter) safety zone, and shall cease until the mammal has been gone from the area for a minimum of 15 minutes.
- A “soft start” technique shall be used in all impact hammer sourced pile driving, giving marine mammals an opportunity to vacate the area.
- A NMFS-approved biological monitor will conduct daily surveys before and during impact hammer pile driving to inspect the work zone and adjacent Santa Monica Bay

waters for marine mammals. The monitor will be present as specified by NMFS Fisheries during the pile-driving phases of construction.

Other BMPs will be implemented as necessary, such as bubble curtains or an air barrier, to reduce underwater noise levels to NMFS established acute and chronic levels within a distance of 500 meters (1,600 feet), if feasible.

Alternatively, West Basin may consult with NMFS directly and submit evidence to the satisfaction of the Environmental Review Officer. In such case, West Basin shall comply with NMFS recommendations and/or requirements.

**BIO-M2 – Entrainment Mitigation:** Entrainment of fish and invertebrate larvae, either directly through the West Basin screened ocean intake or through outfall discharge turbulence, regardless of magnitude, will result in some loss of marine ecosystem productivity, species diversity, and trophic level energy transfer.

As part of, and in support of, the Water Code Section 13142.5(b) determination process with the RWQCB, West Basin will develop and conduct an assessment of larval entrainment of both its ocean water intake and its ocean outfall, such that the magnitude of the Project's effect on the marine ecosystem can be more accurately determined and mitigated. The assessment shall estimate the marine life mortality resulting from operation of the facility after implementation of the facility's required site, design, and technology measures. For operational mortality related to intakes, the marine life mortality report shall include a detailed entrainment study. The entrainment assessment period shall be at least 12 consecutive months and sampling shall be designed to account for variation in oceanographic or hydrologic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate. This new assessment will include, but not be limited to:

- Evaluating the population and abundance of fish and invertebrate larvae that are entrained through the 1 mm wedgewire screens.

- Evaluating the magnitude of fish and invertebrate larvae damage and mortality resulting from passage through outfall dispersal jet turbulence. The report shall use any acceptable approach approved by the RWQCB for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge.

Assessment data will be used to recalculate ETM and APF estimates for the Project, which will form the basis of the required habitat restoration or mitigation fee payment. The APF calculation will take into account habitat affinities as designated by Allen and Pondella (2006), where important fish species that spend portions of their natural history in more than one marine habitat, such as kelp bass, barred sand bass, sea bass, and rockfish, are assigned a 1:1 mitigation ratio and open coast soft bottom habitat fish species are assigned a 10:1 mitigation ratio.

This loss will be compensated for by either direct or indirect habitat restoration consistent with California Ocean Plan Chapter III.M.2.e.(3) or by providing monetary payments to an appropriate State-approved fee-based mitigation program consistent with California Ocean Plan Chapter III.M.2.e.(4), or a combination of the two. If elected by the Project, habitat restoration will occur at a location of sufficient marine acreage or alternative coastal lagoon/estuary acreage (e.g. Ballona Wetland Restoration Project), and in a manner acceptable to the RWQCB as part of the Project's permitting process. Final determination of the appropriate mitigation shall be determined by the RWQCB with consideration for: (1) existing level of wetland function at the site prior to mitigation; (2) resulting level of wetland function expected at the mitigation site after the Project is fully successful; (3) length of time before the mitigation is expected to be fully successful; (4) risk that the mitigation project may not succeed; and (5) differences in the location of the lost wetland and the mitigation wetland that affect the services and values they have the capacity and opportunity to generate, consistent with the OPA. As such, mitigation for Project impacts may ultimately be provided at a ratio greater than 10:1, based upon the final determination made by the RWQCB.

If the RWQCB determines that an appropriate fee-based mitigation program has been established by a public agency, however, and if that payment of a fee to the mitigation program will result in the creation and ongoing implementation of a mitigation project that meets the requirements of California Ocean Plan Chapter III.M.2.e.(3), West Basin shall pay a fee to the mitigation program in lieu of completing a mitigation project as an alternative.

## Loss of a Marine Plant or Animal Community

**Impact BIO-M 5.11-2: Would the Project threaten to eliminate a marine plant or animal wildlife community or cause a fish or marine wildlife population to drop below self-sustaining levels?**

The following analysis evaluates potential impacts associated with constructing and operating the offshore Project components for both the Local and Regional Projects. The inland facilities would have no impact on the marine environment. **Table 5.11-13** summarizes the impact significance conclusions.

**TABLE 5.11-13**
**SUMMARY OF IMPACT BIO-M 5.11-2 LOSS OF MARINE PLANT OR ANIMAL COMMUNITY**

| | Ocean Water Desalination Facility | Offshore Intake and Discharge Facilities | Inland Conveyance Facilities |
|---|---|---|---|
| **Impact BIO-M 5.11-2: Impacts on Loss of Marine Plant or Animal Community.** | | | |
| **Local Project** | | | |
| Construction | NI | LTS | NI |
| Operation | NI | LTSM | NI |
| **Regional Project** | | | |
| Construction | NI | LTS | NI |
| Operation | NI | LTSM | NI |

NOTES:
NI = No Impact, no mitigation proposed
LTS = Less than Significant, no mitigation proposed
LTSM = Less than Significant impact with mitigation

### Local Project

#### Construction-Related Impacts

As discussed above in Impact BIO-M 5.11-1, Local Project screened ocean intake and outfall construction-related activities are not expected to result in a loss or substantial decrease in population numbers of marine fish, mammals, invertebrates, or sea turtles that are all mobile organisms. Therefore, populations of these organisms are not expected to fall below self-sustaining levels.

Dredging of soft seafloor sediments would result in the temporary loss of some invertebrate infauna inhabiting the sediments, as well as epifauna located on top of the sediments. In addition, taxa located on the riprap, and on top of the concrete intake structure would also be affected. As discussed in Impact BIO-M 5.11-1 above, the Local and Regional Project screened ocean intake and discharge outfall construction-related impact area is estimated to be less than 0.4 percent of the Project marine study area and would not be expected to eliminate or threaten these communities in such a way that their populations would become reduced below self-sustaining levels. The organisms inhabiting the Project marine study area are common throughout Santa Monica Bay, as well as the SCB, and would be expected to reestablish themselves and return to pre-disturbance distributions and species compositions shortly after restoration of the habitats.

In the event that additional anchor rock is required at the intake pipeline structure, additional artificial hard substrate would be established compared with what existed prior to the Project modifications. This habitat conversion from soft-bottom to hard-bottom habitat would be limited in area and would not substantially reduce soft-bottom habitat and associated infaunal and epifaunal communities in the area. However, a slight increase in hard-bottom habitat would in turn be available to species in the Project marine study area. For these reasons, Local Project screened ocean intake and discharge outfall construction-related activities are not expected to threaten to eliminate a marine plant or animal communities, or to cause a marine fish or wildlife population to drop below self-sustaining levels. As such, impacts would be less than significant.

Mitigation Measures:

None Required.

Local Project Significance Determination:

Less than Significant Impact.

#### Operational Impacts

As discussed above under Impact BIO-M 5.11-1, the Local Project screened ocean intake and discharge operations would result in the loss of limited amounts of planktonic organisms, including eggs and larval stages of some marine fishes, due to entrainment and discharge-related mortality. Entrainment of plankton and invertebrate and fish larvae < 1 mm in size would affect marine resources due to losses in forage organisms, population recruitment, and other elements of the overall productivity of the marine ecosystem of the Project marine study area. As noted in the discussion above, this loss in productivity would be considered a potentially significant impact unless mitigated. Mitigation Measure BIO-M2 would mitigate the impact of entrainment of marine biota to less than significant. Given that ESGS has operated for decades with no restrictions on impingement or entrainment, the planned operation of the Project intake facilities with 1 mm wedgewire screens would result in a net improvement in the survivability and availability of marine invertebrate larvae, plankton, and larval fish, and improve their chances of attaining adulthood thereby improve the existing marine populations. Consequently, the operation of the Project ocean intake is not expected to threaten or eliminate a marine plant or animal community, or cause a marine fish or wildlife population to drop below self-sustaining levels. In this regard, impacts would be less than significant.

With respect to discharge of the brine, as discussed in Section 5.9, *Hydrology and Water Quality* and in the discussion above for Impact BIO-M 5.11-1 concerning potential operational effects of the Local Project scenario, the increased salinity is not expected to have any detectable effect on marine habitats and associated biological taxa, including candidate, sensitive, or special-status species, including marine mammals and sea turtles. As also discussed under the potential operational effects of the periodic chlorine flush of the intake pipelines, the concentration of chlorine at the pipeline terminus will be sufficiently diluted to be of no consequence to marine habitat and taxa in the coastal waters of the Project marine study area and are considered less than significant.

Finally, Local Project screened ocean intake and ocean discharge pipeline temporary maintenance activities would not adversely affect any marine habitat, marine community, candidate, sensitive, or special-status marine species identified above, all of which are mobile and would be expected to avoid maintenance areas during maintenance operations. In fact, the periodic cleaning of the screens would be expected to result in a temporary influx of fish feeding on removed invertebrates as well as mobile scavenger inverts, such as lobster, crabs, sea stars, hermit crabs, etc. to the seafloor under the wedgewire screens. In addition, replacement or repair of certain components would occur sporadically on an as-needed basis. These activities would be temporary in nature, localized within the screened ocean intake and ocean discharge footprint. Consequently, impacts would be considered less than significant for periodic maintenance activities associated with the ocean intake pipeline and wedgewire screens, and are not expected to pose any threat to marine habits or taxa to the point of dropping below self-sustaining levels.

Mitigation Measures:

Implement Mitigation Measure BIO-M2.

Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

### *Regional Project*

#### Construction-Related Impacts

As discussed above for Impact 5.11-1, the Local and Regional Projects involve similar screened ocean intake and discharge development footprints, and construction-related activities would result in similar potential short-term effects with respect to loss of infauna and epifauna. The loss of such resources would not threaten or eliminate them as they would re-establish following completion of the Regional Project construction activities. Therefore, Regional Project screened ocean intake and discharge construction-related activities would not threaten to eliminate a marine plant or animal community, or cause a marine fish or wildlife population to drop below self-sustaining levels. Impacts would be less than significant.

Mitigation Measures:

None Required.

Regional Project Significance Determination:

Less than Significant Impact.

#### Operational Impacts

The Regional Project screened ocean intake and discharge would operate in a manner similar to the Local Project's, discussed above in Impact BIO-M 5.11-1, and would thus have similar operational effects with some exceptions. For the Regional Project, the ZID, where salinities would reach greater than or equal to 2 ppt above ambient conditions, would extend 66 feet beyond the discharge, and cover an estimated area of 0.3 acres around the discharge; this area would be considered potentially altered seafloor habitat. This loss would represent 0.012 percent of the Project marine study area and 0.005 percent of the water volume overlying the marine study area. With implementation of Mitigation Measure BIO-M2, impacts would be reduced to a less than significant level. Furthermore, the Regional Project screened ocean intake and ocean discharge operations are not expected to pose any greater threat or greater potential to eliminate a marine plant or animal community, or cause a marine fish or wildlife population to drop below self-sustaining levels, when compared to the Local Project scenario.

Like the Local Project, maintenance activities related to the Regional Project screened ocean intake and ocean discharge would involve periodic chlorine flushing of the intake pipelines, periodic cleaning of the screens, and replacement or repair of certain components on an as-needed basis. These activities would be temporary in nature, localized within the screened ocean intake and ocean discharge footprint, and would therefore not be expected to pose any potential for eliminating a marine plant or animal community, or cause a marine fish or wildlife population to drop below self-sustaining levels. Consequently, potential impacts would be considered less than significant.

Mitigation Measures:

Implement Mitigation Measure BIO-M2.

Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

### Movement of Marine Organisms

**Impact BIO-M 5.11-3: Would the project interfere substantially with the movement of any native resident or migratory fish or marine wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native marine wildlife nursery sites?**

The following analysis evaluates potential impacts associated with constructing and operating the offshore Project components for both the Local and Regional Projects. The inland facilities would have no impact on the marine environment. **Table 5.11-14** summarizes the impact significance conclusions.

**TABLE 5.11-14**
**SUMMARY OF IMPACT BIO-M 5.11-3 MOVEMENT OF MARINE ORGANISMS**

| | Ocean Water Desalination Facility | Offshore Intake and Discharge Facilities | Inland Conveyance Facilities |
|---|---|---|---|
| **Impact BIO-M 5.11-3: Impacts Movement of Marine Organisms.** | | | |
| **Local Project** | | | |
| Construction | NI | LTSM | NI |
| Operation | NI | LTS | NI |
| **Regional Project** | | | |
| Construction | NI | LTSM | NI |
| Operation | NI | LTS | NI |

NOTES:
NI = No Impact, no mitigation proposed
LTS = Less than Significant, no mitigation proposed
LTSM = Less than Significant impact with mitigation

### *Local Project*

#### Construction-Related Impacts

The Project's offshore construction site does not support any known wildlife migratory corridors for whales, sea turtles, or fish such as steelhead or salmon. However, as discussed in Section 5.11.2, many species of whales, pinnipeds (seals and sea lions), porpoises and dolphins, sea turtles and special-status fish species could swim through the Project marine study area when foraging or moving along the California coastline.

As discussed above in Impact BIO-M 5.11-1, the screened ocean intake and discharge construction activities are expected to potentially result in some disturbance to fish, marine mammals, sea turtles, and to the soft sediment seafloor habitats used for foraging by these taxa. These marine taxa, if present in the Project marine study area, or immediately adjacent to the Project offshore construction area, may be subject to temporary increases in underwater noise, turbidity, and lost foraging habitat. These effects would be expected to be short-term and localized, with no significant impacts on fish, marine mammal or sea turtle movements. As discussed in Section 5.9, *Hydrology and Water Quality*, water quality conditions are expected to rapidly return to baseline conditions once dredging and in-water construction activities are completed. Any disturbance to, and avoidance of, the area by fish, marine mammals or sea turtles would be temporary, and no potential permanent barriers to movement in the ocean would be established.

The implementation of Mitigation Measures HAZ-4 (Marine Safety Plan), HAZ-5 (Spill Prevention and Response Plan), and BIO-M1 (Pile Driving Noise Reduction) are all intended to avoid or reduce to less than significant potential impact levels to fish, marine mammals, and sea turtles from Project offshore construction activities.

For these reasons the Local Project screened intake and discharge construction activities are not expected to interfere substantially with the movement of any native resident or migratory fish or wildlife species (marine mammals and sea turtles), or with the utilization of the Project marine study area by resident or marine taxa. Impacts would be less than significant with implementation of mitigation measures.

Mitigation Measures:

Implement Mitigation Measures HAZ-4, HAZ-5, and BIO-M1.

Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

#### Operational Impacts

As discussed for Impacts BIO-M 5.11-1 and BIO-M 5.11-2 there is little to no potential for the Project ocean intake and discharge operation or maintenance activities to interfere substantially with the movement of any native marine resident or migratory fish, or marine wildlife species.

The increases in salinity and other existing potential seawater contaminants in the discharge water will achieve concentrations that are within the OPA threshold of 2 ppt above ambient ocean water salinity within 38 feet of the outfall. As discussed in the evaluation of Project operational effects on ocean waters and associated marine biota (Impact BIO-M 5.11-1), this represents an area of 0.1 acres or approximately 0.004 percent of the Project marine study area. The water column overlying this area represents 0.002 percent of the Project marine study area water volume. The salinity of the brine and the concentrations of ocean water contaminants discharged from the outfall are insufficient to result in acute or chronic effects to marine taxa, including special-status species such as marine mammals, sea turtles, or protected invertebrates. Additionally, the amount of time a swimming fish, fish larvae, marine mammal, or sea turtle might spend transiting either the ZID or the BMZ is relatively short. As such, exposure to increased salinity or contaminants would not be expected to pose any restriction or limitation to their movement. Additionally, the Project marine study area does not support any known wildlife migratory corridors. Due to the characteristics of the proposed facilities, these would not be expected to interfere with the general movement or migratory patterns of marine life, including marine mammals and sea turtles.

Likewise, long-term maintenance of the intake and discharge pipelines and offshore facilities may require replacement or repair of certain components only on an as-needed basis. Therefore, Local Project screened intake and discharge operations would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife. No impact would occur in this regard. Consequently, the impact of the Local Project scenario operations on the movement of marine organisms, including special-status species, would be less than significant.

Mitigation Measures:

None Required.

Local Project Significance Determination:

Less than Significant Impact.

### *Regional Project*

#### Construction-Related Impacts

As discussed in detail in Impact BIO-M-5.11-1, above, the Local and Regional Project scenarios involve similar offshore screened ocean intake and discharge outfall pipeline structure footprints, as well as similar construction requirements. The Regional Project scenario would require additional offshore construction activities, such as installing additional wedgewire screens or replacing the outfall pipeline diffuser cap and duckbill diffusers, at some time in the future. These delayed construction activities would generate the same kinds of temporary and less than significant effects on marine habitat and biological resources as the Local Project. The implementation of Mitigation Measures HAZ-4 (Marine Safety Plan) and HAZ-5 (Spill Prevention and Response Plan are intended to avoid or reduce to less than significant potential impact levels to fish, marine mammals, and sea turtles from Project offshore construction activities. For these reasons the Regional Project screened intake and discharge construction activities are not expected to interfere substantially with the movement of any native resident or migratory fish or wildlife species (marine mammals and sea turtles), or with the utilization of the Project marine study area by resident or marine taxa. Impacts would be less than significant with implementation of mitigation measures.

Mitigation Measures:

Implement Mitigation Measures HAZ-4 and HAZ-5.

Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

#### Operational Impacts

Refer to the Local Project discussion above, as well as Impact BIO-M 5.11-1 for the potential of the Local Project to affect the movement of marine taxa, including special-status species, through the Project's offshore operations area. The Regional Project's operations would be similar to the Local Project's in character, operations, and potential effects on marine organisms and their movements. Since no known or identified migratory corridors are present in the Project marine study area, the Regional Project operations would not be expected to disturb or disrupt the movement of marine taxa, including special-status species, in the Project marine study area.

Long-term maintenance of Project facilities may require replacement or repair of certain components as-needed. The Project site does not support any known wildlife migratory corridors. In addition, the screened ocean intake and discharge operations would not interfere with the movement or migratory patterns of marine life. Therefore, the Regional Project screened intake and discharge operations would not substantially interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife.

Therefore, Regional Project desalination facility operations would not be expected to interfere substantially with the movement of any native, resident, or migratory fish, or wildlife species. Impacts would be less than significant.

Mitigation Measures:

None Required.

Regional Project Significance Determination:

Less than Significant Impact.

## Introduction of Non-Native Invasive Species

**Impact BIO-M 5.11-4: Would the project introduce or spread an invasive non-native species?**

The following analysis evaluates potential impacts associated with constructing and operating the offshore Project components for both the Local and Regional Projects. The inland facilities would have no impact on the marine environment. **Table 5.11-15** summarizes the impact significance conclusions.

**TABLE 5.11-15**
**SUMMARY OF IMPACT BIO-M 5.11-4 INTRODUCTION OF NON-NATIVE SPECIES**

| | Ocean Water Desalination Facility | Offshore Intake and Discharge Facilities | Inland Conveyance Facilities |
|---|---|---|---|
| **Impact BIO-M 5.11-4: Impacts Introduction of Non-Native Species.** | | | |
| **Local Project** | | | |
| Construction | NI | LTSM | NI |
| Operation | NI | LTSM | NI |
| **Regional Project** | | | |
| Construction | NI | LTSM | NI |
| Operation | NI | LTSM | NI |

NOTES:
NI = No Impact, no mitigation proposed
LTSM = Less than Significant impact with mitigation

### *Local Project*

#### Construction-Related Impacts

Modifications to the ESGS ocean intake and outfall pipeline would require the use of derrick barges, tugboats, dredge barges, diver support boats, utility vessels and barges, and monitoring boats. All vessels used for the ESGS intake and outfall modification are assumed to originate from POLA/POLB. Vessels supporting crew and personnel shift changes are also expected to originate in Southern California and operate either out of the POLA/POLB or Santa Monica Marina.

Use of work barges or other vessels for the Project's offshore construction activities from outside the SCB could be potential vectors for introducing non-native, invasive species to Santa Monica Bay habitats and ecosystems through either ballast water or hull fouling. Although the Project is expecting to use work vessels and barges that originate in Southern California, principally POLA/POLB, barges from San Diego, Northern California, Oregon or Washington may need to be used, depending on final Project scheduling, local barge availability, and the size of the barge(s) needed for the Project. Any barges originating from outside POLA/POLB in excess of 300 gross registered tons will be required to comply with all applicable CSLC regulations concerning ballast water management in order to prevent the introduction and/or spreading of nonindigenous species from ballast water.

As discussed in, many non-native and invasive species are introduced by vessels and boats, either as encrusting organisms on the hulls, on other submerged parts of the vessels, or when ballast water is discharged from the vessels. The introduction of such species could cause permanent alterations of communities including changes in species composition or relationships among species that are recognized for scientific, recreational, ecological, or commercial importance. Ultimately, changes in these communities could prevent re-establishment of native biological populations.

Ports, harbors, and adjacent areas are typically most vulnerable to invasive species as the bulk of marine traffic is concentrated at these sites. The POLA/POLB is proposed as point of origin of the construction vessels, and for transporting Project-related components, to be used during the construction of the Project. If invasive species reside within these harbor facilities, they could be transported to the Project offshore construction site. The risk of transfer to the Project site may be limited since (1) the daily vessels are not expected to remain within the harbor for a sufficient length of time for invasive species to establish on the hulls and (2) ballast water discharge and recharge are strictly controlled within major harbors for large vessels. Despite these limitations, Project barges and utility vessels could spread invasive non-native marine species through ballast water and biofouling, posing a risk to marine habitats and marine biota, including special-status species, and therein pose a Significant Impact. Implementation of **Mitigation Measure BIO-M3** would minimize the Project's potential contribution to the spread of invasive non-native species and any resulting adverse impact on marine biological resources to less than significant with mitigation.

#### Mitigation Measures:

Implement Mitigation Measure BIO-M3.

#### Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

#### Operational Impacts

As discussed above for the Local Project scenario, the use of any work or support vessel originating from outside Santa Monica Bay, or the SCB, has the potential to introduce non-native, invasive marine species. Long-term maintenance of the ocean intake and outfall wedgewire screens and diffusers may require replacement or repair of certain components that would require additional work and support vessels to implement. Although these vessels are expected to originate from POLA/POLB, as a result of unforeseen circumstances it is possible that vessels from outside the SCB might have to be used. In such an eventuality, these work and support vessels from outside the region could introduce non-native invasive species that might pose a threat to local marine taxa and habitats, resulting in a significant impact. Implementation of Mitigation Measure BIO-M3 would minimize the Project's potential contribution to the spread of invasive species from all work and offshore support vessels, and any resulting adverse impact on marine biological resources to less than significant with mitigation.

Mitigation Measures:

Implement Mitigation Measure BIO-M3.

Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

### *Regional Project*

#### Construction-Related Impacts

As discussed in detail in Impact BIO-M-5.11-1, the Local and Regional Project scenarios involve similar offshore screened ocean intake and discharge outfall pipeline activities and will use similar construction requirements. The Regional Project scenario could require additional offshore construction activities, such as installing additional wedgewire screens or replacing the outfall pipeline diffuser caps and duckbill diffusers, which would require the use of additional crane and work barges, diver support boats, and crew and material supply boats at some point in time after the initial Local Project construction activities have been completed. These delayed construction activities would pose the same potential risk of introducing non-native, invasive species to Santa Monica Bay waters with comparable impacts on local marine habitats and biological resources. Consequently, the implementation of the Regional Project would pose the same significant impact to Santa Monica Bay marine habitats and marine biota unless mitigated.

Implementation of Mitigation Measure BIO-M3 would minimize the Regional Project's potential contribution to the spread of invasive non-native species and any resulting adverse impact on marine biological resources to less than significant after mitigation.

Mitigation Measures:

Implement Mitigation Measure BIO-M3.

Regional Project Significance Determination:

Less than Significant Impact with Mitigation Incorporated.

### Operational Impacts

As discussed in detail above for the Local Project scenario and in the discussion under Impact BIO-M-5.11-1, the Local and Regional Project scenarios involve similar offshore screened ocean intake and discharge outfall pipeline maintenance activities and will use similar maintenance efforts and activities of the intake wedgewire screens and outfall diffusers. If work and support vessels for maintenance activities of the offshore Project infrastructure should utilize boats from outside the SCB, implementation of the Regional Project would pose the same Significant Impact to Santa Monica Bay marine habitats and marine biota from non-native invasive species unless mitigated.

Implementation of Mitigation Measure BIO-M3 for all Project vessels and boats engaged in maintenance activities would minimize the Regional Project's potential contribution to the spread of invasive non-native species and any resulting adverse impact on marine biological resources to less than significant with implementation mitigation.

Mitigation Measures:

Implement Mitigation Measure BIO-M3.

Regional Project Significance Determination:

Less than Significant Impact with Mitigation Incorporated.

### Mitigation Measures:

**BIO-M3: Preventing the Introduction of Invasive Non-Native Species:** All Project barges and support vessels shall: (1) originate from POLA/POLB; (2) be continuously based out of POLA/POLB since last dry docking; or (3) have underwater surfaces cleaned before entering the Southern California waters point and immediately prior to transiting to the Project offshore construction area. Additionally, and regardless of vessel size, ballast water for all Project vessels must be managed consistent with California State Lands Commission (CSLC) ballast management regulations, and Biofouling Removal and Hull Husbandry Reporting Forms shall be submitted to CSLC staff.

## 5.11.5 Cumulative Impacts

For purposes of marine biological resource impact analysis, cumulative impacts are considered for cumulative development within the Santa Monica Bay area.

Cumulatively considerable contributions to impacts on marine biological resources are evaluated with respect to both the affected resource and the resource's function within the larger local or regional context. Cumulatively considerable impacts are those that, along with impacts from other past, present, and planned projects, substantially diminish or result in the loss of an important marine biological resource, or those that would conflict with local, State, and/or Federal resource conservation plans, goals, or regulations. Impacts can be locally adverse but not cumulatively considerable because, although they would result in an adverse alteration of existing conditions, they would not substantially diminish or result in the permanent loss of an important resource on a population- or region-wide basis.

Cumulative marine biological impacts are also mitigated through regional, state, and federal regulations such as the California Ocean Plan, CWA, NPDES permitting program, and California Coastal Act. As discussed below, all potential Project impacts are mitigated to less than significant levels, and the Project's contribution toward cumulative impacts is not otherwise considered to be "cumulatively considerable."

The Project components would be sited in a predominantly developed region of Los Angeles County commonly referred to as "South Bay." The Project site lies adjacent to and within Santa Monica Bay, and therefore would have the potential to contribute to cumulative impacts to marine biological resources if Project construction or operation results in adverse impacts to sensitive marine habitat or organisms or water quality and/or conflicts with existing regulations aimed at the protection marine resources. Construction and operation of future desalination projects, both within the Santa Monica Bay region and immediately outside the Bay, would have the potential to adversely affect marine resources. It should also be noted that Redondo Beach Generating Station will cease once-through cooling by December 31, 2020, in compliance with the Statewide Water Quality Control Policy on Coastal and Estuarine Waters for Power Plant Cooling (Once-Through Cooling Policy).

The Project intake and discharge facilities would be constructed within the marine environment, thereby having the potential to contribute to adverse effects on marine biological resources. Project construction would result in short-term, localized water quality impacts concerning increased turbidity, increased dissolved or particulate contaminants, and release of contaminants, such as metals and organics. However, such effects would be temporary and are not anticipated to result in a cumulatively considerable contribution to impacts on water quality over the long-term or along the coast beyond the Project area. As such, conditions would return to back to those present at pre-construction once construction activity ceases. Other construction activities in the ocean are not anticipated to occur nearby at the same time; therefore, effects from the current Project are not considered to have a cumulatively considerable effect on biological marine resources.

The Project would result in entrainment losses of planktonic organisms, including eggs and larval stages of fish and invertebrates. Further, the Project would result in losses as a result of turbulent sheer stress to planktonic organisms, potentially including eggs and larval stages of fish. As discussed above, none of the Project's marine resource effects are considered significant after mitigation under CEQA for marine taxa and habitats. Project operations would also have to comply with numerous regulatory programs, including the NPDES permitting program, Marine MMPA, CWA, and Porter-Cologne Water Quality Control Act. The Project's NPDES permit and California Ocean Plan Amendment compliance would require extensive ongoing monitoring to ensure compliance. Any future cumulative projects would be required to mitigate similar effects and comply with the California Ocean Plan and other federal and State regulations pertaining to water quality and potential effects on sensitive marine habitat. The impacts to marine resources would be evaluated on a project-specific basis at the time when development is proposed.

The Project has been designed to achieve OPA-defined limits for the BMZ. For the Local Project, the diffuser design would allow for concentrate discharges in the effluent plume to not exceed

2.0 ppt above natural background salinity at a distance of 100 meters (328 feet) horizontally from the points of discharge, and throughout the water column. The Local Project design would comply with OPA requirements, and therefore would not contribute to a cumulative impact as the result of conflict with OPA requirements or concerning other waste discharge requirements aimed at water quality. The Regional Project would similarly comply with OPA requirements.

During the construction and operational phases, all future cumulative projects would be required to conform to requirements of applicable NPDES permits and the Water Quality Control Plan to ensure that the potential for such projects to contribute to a substantial degradation in marine water quality does not occur. Additionally, all cumulative projects involving the construction or operation of desalination plants would be required to be designed and constructed in conformance with the requirements of the California Ocean Plan, including the Desalination Amendment. Such measures would ensure that discharge water quality limits (California Ocean Plan Table 1, Water Quality Objectives and Table 2, Effluent Limitations) and receiving water limitations (California Ocean Plan Chapter III.M.3) are addressed and that such facilities do not adversely degrade the marine environment on a cumulative level.

Because of the Project's nature and scope, neither construction nor operation activities would interfere substantially with the movement of any native, resident, or migratory fish, or with wildlife species, or with established native resident or migratory wildlife. Through regulatory permitting compliance, including OPA, the Project's geographic scope of marine resource effects would be limited to the immediate area of the Project's intake and discharge facilities, and adverse effects would be fully offset though OPA compliance. For these reasons, Project impacts to marine biological resources are not considered significant nor would they be cumulatively considerable.

Similarly, all future development with the potential to impact marine biological resources would be required to demonstrate compliance with applicable federal and state regulatory requirements, including General Plan goals and policies of the affected jurisdiction, intended to reduce and/or avoid potential adverse environmental effects. As such, cumulative impacts to marine biological resources would be mitigated on a project-by-project basis, and in accordance with the established regulatory framework, through the established regulatory review process.

## 5.11.6 Significant Unavoidable Impacts

No significant and unavoidable impacts associated with marine biological resources would occur with implementation of the Project.

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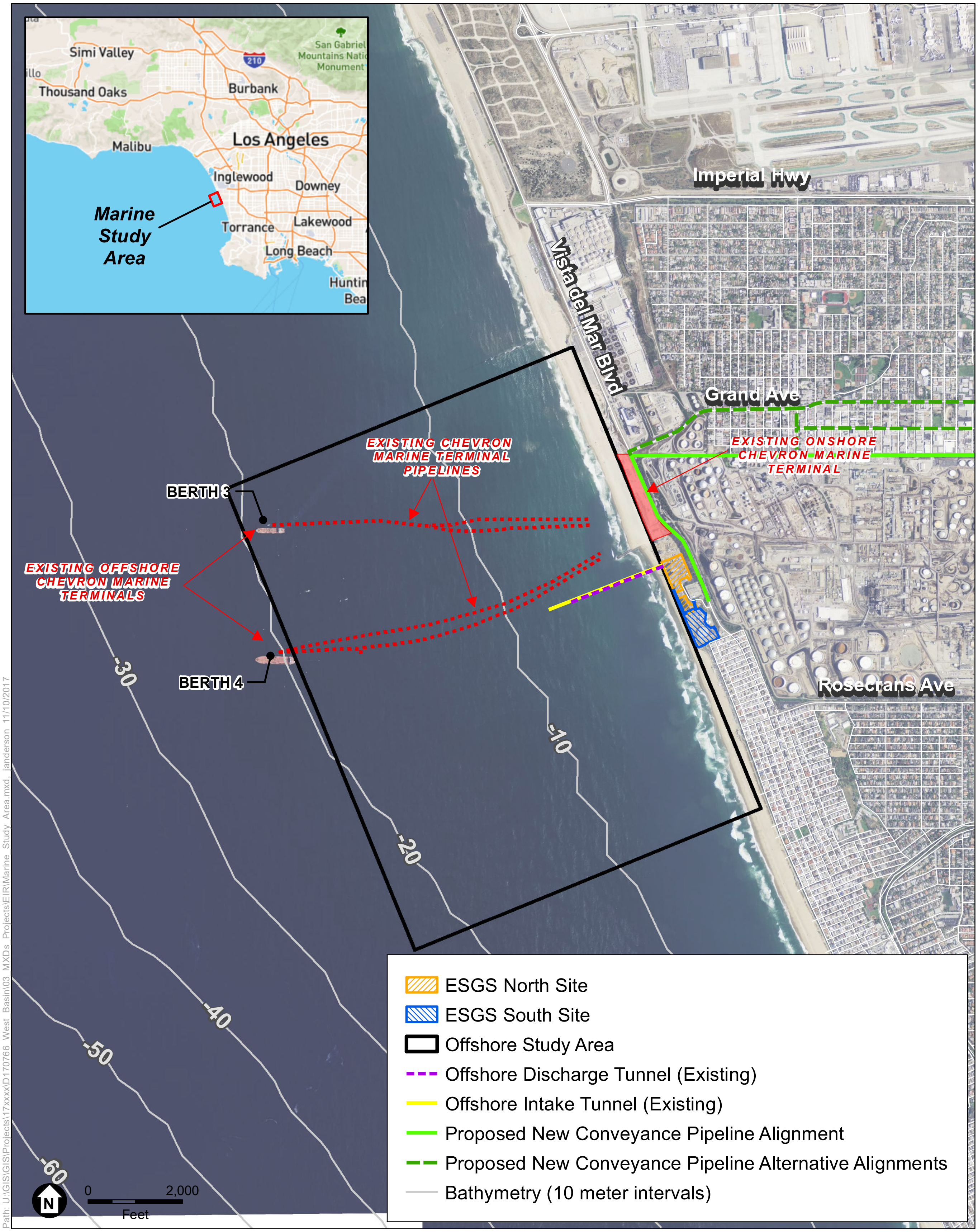


SOURCE: ESRI

**Figure 5.11-1**
Marine Study Area

ESA


SOURCE: CalWater; CDFW

West Basin Ocean Water Desalination Project

**Figure 5.11-2**
Marine Protection Areas

ESA