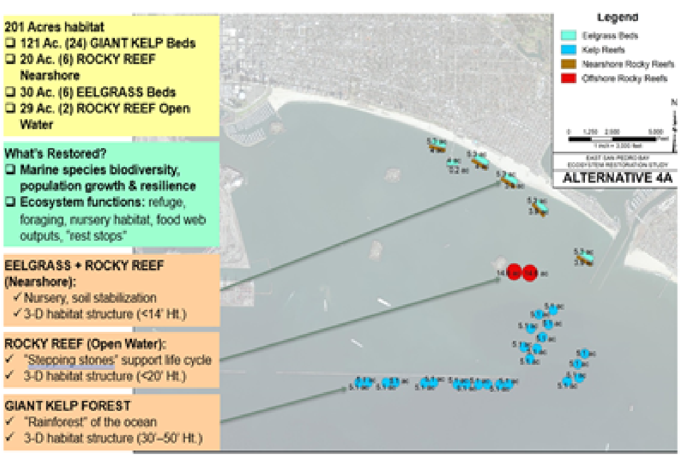
FINAL INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT / ENVIRONMENTAL IMPACT REPORT (EIS/EIR)

APPENDIX H: FISH AND WILDLIFE COORDINATION ACT, ENDANGERED SPECIES ACT, AND ESSENTIAL FISH HABITAT COMPLIANCE

EAST SAN PEDRO BAY
ECOSYSTEM RESTORATION STUDY
Long Beach, California

January 2022



US Army Corps of Engineers ®

CITY OF LONG BEACH INCORPORATED 1897

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From:	Avery, Jon
To:	Siddiqui, Naeem A CIV CESPL CESPD (US); Solek, Christopher W CIV USARMY (US)
Cc:	Carol Roberts; Lovan, Hayley J CIV CESPL CESPD (US); Clifford, Jodi L CIV CESPL CESPD (US); Christine Medak; Bryant Chesney - NOAA Federal; Demesa, Eduardo T CIV USARMY CESPL (US); Jonathan Snyder
Subject:	[Non-DoD Source] Planning Aid Letter for the proposed East San Pedro Bay Ecosystem Restoration Project
Date:	Thursday, May 24, 2018 11:25:10 AM

Naeem and Chris,

This email suffices as our Planning Aid Letter (PAL) for the East San Pedro Bay Ecosystem Restoration Project (Project), as currently proposed. Due to time constraints and timing needs of the Army Corps we are not sending you a PAL as a formal letter, but this email functions in the same way pursuant to the Fish and Wildlife Coordination Act (FWCA).

The U.S. Fish and Wildlife Service (Service) has prepared this PAL for the U.S. Army Corps of Engineers (Corps) on the proposed Project to describe issues and opportunities related to the conservation and enhancement of fish and wildlife resources. The project, as proposed, would involve restoration and enhancement measures in East San Pedro Bay, near Long Beach Harbor and the City of Long Beach, Los Angeles County, California. The purpose of the proposed project is ecosystem restoration in East San Pedro Bay.

The proposed project area would involve portions of the Los Angeles County coast of the eastern Pacific Ocean, within about 2 miles seaward of the historic coastline, near the mouth of the Los Angeles River. These marine and existing estuarine areas have been heavily modified over the last century associated with development of Long Beach Harbor/Port of Long Beach and nearby civil engineering and commercial/urban development. The likely direct project footprint is within and near the boundaries of the Port of Long Beach.

This PAL is provided in accordance with the FWCA of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*), the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*), and the scope of work agreed upon by the Corps and the Service. This PAL does not constitute the report of the Secretary of the Interior as required by section 2(b) of the FWCA, nor does it constitute a biological opinion under section 7 of the ESA. The purpose of this PAL is to deliver recommendations for use by the Corps design team in developing goals, objectives, and alternatives for the project.

Fish and Wildlife Coordination Act

The FWCA directs or authorizes consultation, reporting, consideration, and in many cases, installation/implementation of fish and wildlife conservation features. The authorities of the FWCA are considered to be "supplementary legislation" to the various Federal project authorizations, such as the Corps public works authorizations (Smalley and Mueller 2004). The FWCA conditions or supplements other water development statutes to require consideration of recommendations generated under the FWCA procedures, including portions of the Clean Water Act (Zabel v. Tabb, 430 F2d 199 [5th Cir. 1970] cert. denied 401 U.S. 910 [1972]). For Federal water resources development projects, the FWCA requires that fish and wildlife conservation receive equal consideration by Federal agencies with other project purposes, and that such conservation be coordinated with other project features. The FWCA authorizes the project implementation of means and measures for both mitigating losses of fish and wildlife resources, and for enhancing these resources beyond offsetting project effects (Smalley and Mueller 2004).

Project Area History

In 1542, Juan Rodriquez Cabrillo "discovered" the "Bay of Smokes" that is now San Pedro Bay, describing it from offshore aboard ship. The smoke he described above the bay may have originated from the several Native American villages that existed near the bay along the Los Angeles River at the time. Much of the south-facing San Pedro Bay along the coast was originally a shallow estuary and mudflat. See Figure 1 below.

In 1899 construction of the San Pedro Bay breakwater began near the project area. In 1906 the Los Angeles Dock and Terminal Co. started development of Long Beach harbor by purchasing 800 acres of sloughs and salt marshes associated with the Los Angeles River mouth estuary — an area that later became the inner portion of Long Beach harbor. In 1907 construction began on the Craig Shipyard in the inner harbor; the Craig Shipyard Company was also awarded a contract to dredge a channel from the open ocean to the new inner harbor. In 1911 the State of California granted the tidelands areas of what is now the Port of Long Beach to the City of Long Beach for port operations (Tidelands in California are defined as those lands and water areas along the coast of the Pacific Ocean seaward of the ordinary high tide line to a distance of three miles.). These tidelands were granted to the City of Long Beach in trust for the people of the State. This tidelands trust not only restricts the use of the tidelands, the tidelands and tidelands-related revenues of the Port must be used for purposes related to harbor commerce, navigation, marine recreation, and fisheries. The Port currently includes more than 7,600 acres of wharves, cargo terminals, roadways, rail yards, and shipping channels, and is one of the world's busiest seaports.

An 8.5 mile-long breakwater made of rock stretches across most of San Pedro Bay, with two openings to allow ships to enter the harbor areas behind it. The initial western section of the breakwater, called the San Pedro Breakwater, was constructed between 1899 and 1911 at San Pedro; the middle breakwater was completed from 1911 to 1936, and the Long Beach breakwater was completed after World War II.

Considerable changes have occurred in the harbors since the 1970s. Some of these changes included deepening of navigational channels and basins, constructing substantial landfills at Piers 300 and 400 in Los Angeles Harbor, constructing a transportation corridor out to Pier 400, expanding Pier J in Long Beach Harbor, and constructing the west basin of the Cabrillo Marina complex. As part of mitigation for construction and channel deepening, shallow water habitats were created in formerly deepwater areas near Pier 300, the San Pedro Breakwater, and on the east side of Pier 400. The land/water coastal edge has largely been pushed south and most historically shallow water areas (e.g., estuarine zones) are now heavily modified or eliminated. The transition zones from relatively deep water to land are now largely artificially quite abrupt. Thus, substantial areas that were previously aquatic habitats are now land, some previous areas that were deep water are now shallow, and water circulation patterns within the harbors have been altered. Please see the figures below, including water depths where noted.

Description of the Project Area

The main project area is the coastal area off of the City of Long Beach and the Port of Long Beach; it is located on the Pacific coast of southern California in San Pedro Bay, at the southern end of the City of Long Beach, Los Angeles County; it is less than 2 miles southwest of downtown Long Beach and about 25 miles south of downtown Los Angeles. To the west and northwest of San Pedro Bay are the communities of San Pedro and Wilmington, respectively, and to the east is the community of Seal Beach.

Two competing and independent commercial ports, the Port of Los Angeles and the Port of Long Beach, share the San Pedro Bay marine ecosystem. These man-made harbors have been created through over a century of dredging and filling of the former 3,450-acre Wilmington Lagoon and surrounding areas. The Port of Los Angeles and Port of Long Beach encompass 7,500 acres and 7,600 acres of land and water, respectively. The Port of Long Beach consists of: 3,000 acres of land, 4,600 acres of water, 10 piers, and 80 berths. Uses within both ports are largely industrial, although a variety of other uses (e.g., recreation, commercial fishing) are also supported.

The outer limit of the Port of Long Beach and the coastal waters off of Long Beach are largely defined by breakwaters that were constructed of quarry rock during the early to mid 1900's (MEC 2002). The majority of the harbor waters within the Port of Long Beach currently range in depth from 30 to 60 feet (MEC 2002) with navigation channels dredged to depths of 45 feet and greater (USFWS 2000).

Recommendations

We have three main recommendations per the FWCA for the proposed project:

1) We suggest that more accurate evaluation and "weighting" of the existing functions of natural communities is needed by the Corps in areas where project features are proposed. This is so the environmental "lift", and the potential impacts of proposed project activities, can be effectively analyzed and alternatives more accurately assessed, located, and chosen. You have heard us strongly verbalize this issue at the last several meetings. A fair and frank assessment of what would be subject to effects (both lost and gained) will go a very long way towards having the public and the interested agencies feel comfortable with the Corps' analysis and alternatives for this and other projects. We have had this same problem with other LA District projects and we suggest that this (fairly accounting and analyzing existing pre-project ecological functions) become standard policy on all projects, including those with ecological restoration components. Several months back we commented on how the Corps was treating these existing areas (e.g., sandy bottom marine open water areas) as having essentially no existing ecological value when evaluating proposed project features. Now it appears that the Corps' current analysis trend is to note some value for these areas, but to effectively undervalue the areas where project enhancements are proposed, possibly with the goal of highlighting the ecological gains to be made with proposed activities. The regulatory agencies will internally adjust for representing existing functions this way, but it would improve trust and analysis efficiencies if baseline analyses/assessments by the Corps are more frank and accurate. We understand that these projects often involve ecological conversion of one ecological community type to another (with trade-offs), and these project should be fully and openly evaluated as such. Just as importantly, accurate analysis of existing ecological functions will provide for much better analysis and comparative choices of alternatives, because relative ecological lifts will be more accurate revealed. For example, in some cases for this project we (USFWS and NOAA) have recently suggested that no ecological enhancement/restoration actions be taken in locations where some substantial project measures were previously proposed by the Corps, based on moderately high functions that currently exist at those locations (but were rather simply evaluated by the Corps as having low or no current ecological value). We stress that this needs to be a fundamental change in how the Corps performs its analysis moving forward on all future projects.

2) We suggest that project alternatives more fully consider the substantial discount in construction costs for the proposed least tern/snowy plover "sandy island" creation near the existing breakwater, if partial breakwater removal is also proposed. This would be because waste rock from partial breakwater removal would be readily available, located nearby, and already being handled with heavy equipment. As such, this waste rock could relatively easily be transported and placed to form the basis for a largely sand-covered island on the north side of the remaining breakwater (out of shipping lanes and ship anchor zones, and protected from most swells and wave action).

3) We suggest that the Corps incorporate modified prioritization of the various ecological enhancement/restoration alternatives, by highlighting two criteria, wherever appropriate:
a) ecological restoration of native habitats or ecological processes that formerly existed in that specific location, particularly those that are now rare and/or important to listed species; b) ecological enhancement/creation (or provide functional substitute) of habitats or ecological processes that occurred in adjacent/nearby areas and that are now artificially quite rare or functionally eliminated (e.g., dunes, upper beach areas, dunes, river deltas, estuaries, eel grass beds, etc.) and/or are important to native biological diversity or sensitive/listed species. These measures should be located in areas that are currently degraded as a first priority, or secondarily otherwise of relatively low ecological function/importance. We suggest that alternatives that support improved status of listed species or sensitive species (e.g., islands with beach zones that are functional substitute for now eliminated sand spits, sandy river mouths, and isolated beach areas), or that enhance/create natural communities/habitats that support particularly high native biological diversity/native biomass (e.g., wetlands, diverse shallow water areas, kelp beds, undisturbed beach zones) have special priorities that are not normally captured in cost/benefit analysis and often warrant additional costs. We can assist you in developing ways to effectively highlight the special values of these habitats/ecological communities.

We do not have a favored alternative of those currently proposed. The sandy islands that we have been promoting as part of the Project over the last year-plus are largely related to lost and heavily degraded nesting areas for California least terns and western snowy plovers that formerly occurred in the project area but were lost to harbor and urban development; these include losses of ephemeral river mouth deltas/flats/sand spits, as well as relatively undisturbed lower and upper beach zones. While we, of course, would encourage inclusion of enhancement measures that would support the listed species under our purview, we are generally supportive of the ecological measures proposed throughout the range of alternatives and continue to look forward to working with you on refining the proposed alternatives.

Thank you,

Jon

Figures:

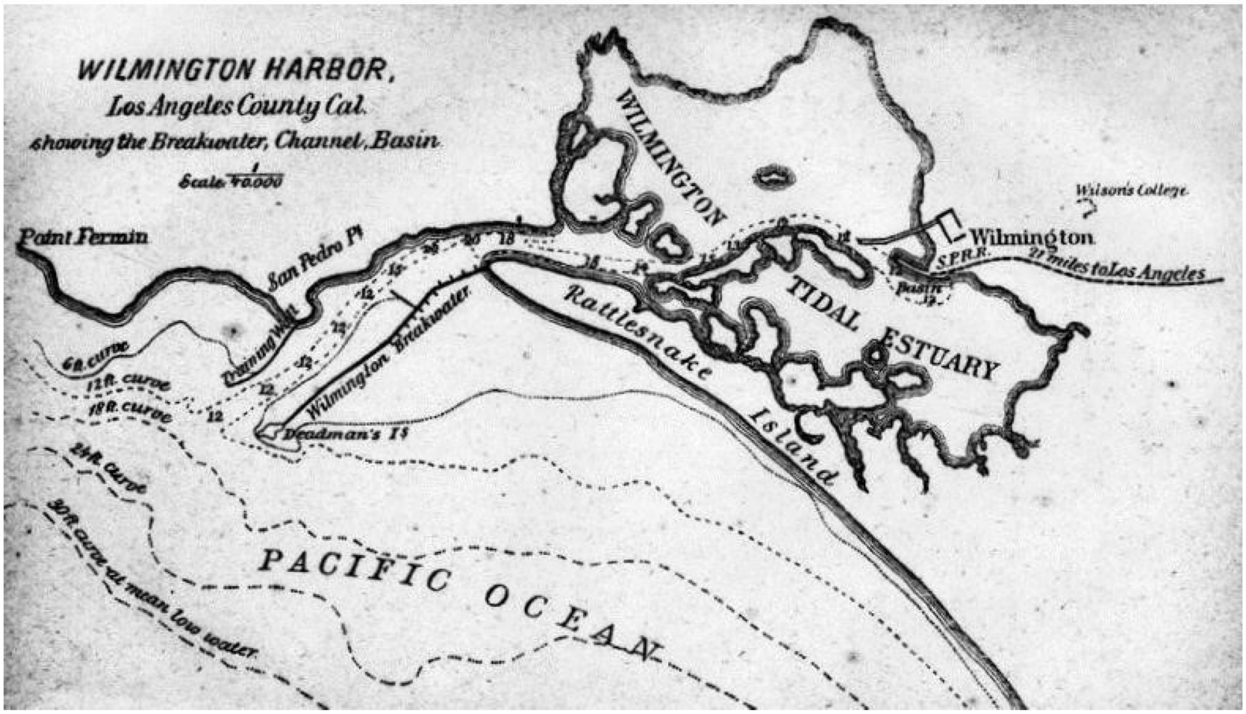

Figure 1. Circa 1880 drawing of Wilmington Harbor. The Future Port of Long Beach is on the east (right) side of the "Wilmington Tidal Estuary." "Rattlesnake Island" would later be expanded to become Terminal Island within the ports of Long Beach and Los Angeles (Water Power and Associates 2014).

Figure 2. Portion of a circa 1880 drawing by William H. Hall of Los Angeles showing the San Pedro Bay coastline, estuaries, and ocean contours (Hall 1880). The future City of Long Beach is in the center of the drawing.

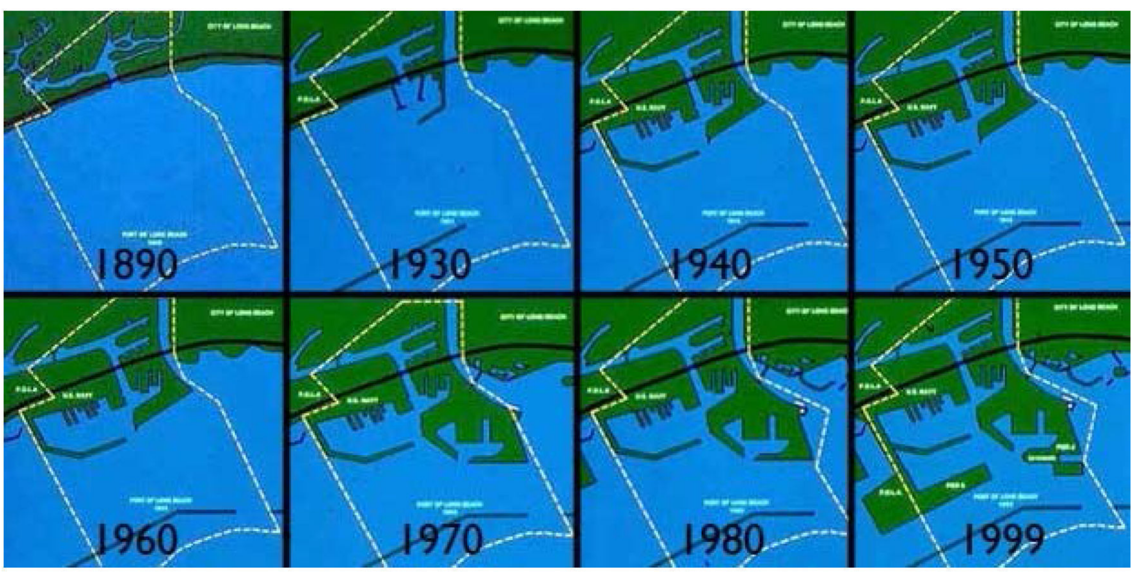

Figure 3. Drawings showing development progression of the Port of Long Beach since 1890 (Port of Long Beach 2014).

~Jon

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Response to Recommendation 1:

As described in detail in the Draft IFR for ESPB, restoration goals for ESPB were developed for six intertidal and subtidal habitat types, in coordination with the Technical Advisory Committee (TAC) members: (1) subtidal rocky reef, (2) kelp forest, (3) eelgrass beds, (4) oyster beds, (5) coastal wetland, and (6) emergent sandy islands. Three (3) alternatives are proposed in the Draft IFR that contain various combinations of these habitat types.

A quantitative habitat model was developed for ESPB in coordination with the TAC members to quantify potential benefits of proposed restoration measures (see Appendix D of the Draft IFR). The model is intended to capture the baseline conditions and predict increases in habitat quality under different future restoration scenarios in a given study area. It should be noted that the model, though generically referred to as habitat evaluation model. During development of this model, soft bottom was considered as one of the targeted habitat types in the model. However, this community type was removed from further development when it was judged by the Project Team (in coordination with the TAC) that soft bottom was an abundant habitat type and not a target of restoration alternatives. It should be noted that the Habitat Evaluation Model does include sandy-bottom habitat that support eelgrass beds. Other soft (muddy) bottom benthic habitats were not considered in the Habitat Evaluation Model for ESPB for a number of technical reasons. The rationale and reasoning behind this are elaborated upon in to Chapters 1, 2 and 4 and Appendix D.1 of the Draft IFR.

The USACE recognizes that restoration of some habitats would result in conversion of others. See Chapter 4.1 of the Draft IFR for key assumptions and considerations. For example, some soft substrate would be lost through restoration efforts focused on the creation of nearshore and open water rocky reefs. The Corps concurs with the FWS that there are ecological trade-offs associated with type-converting one habitat (soft-bottom) to others such as rocky reef, kelp and eelgrass. These have been assessed and described quantitatively and qualitatively in the Draft IFR for the project. For example, there is a quantitative assessment included in Chapter 5 of the Draft IFR in the form of acres and percentages (%) of habitat types lost or gained rather than reflected in habitat units, for reasons outlined below. Qualitative assessment is presented in terms of species use and function of existing and proposed habitat types. Furthermore, Appendix D.1 in the Draft IFR has additional context and rationale on the topic of ecological tradeoffs.

It is recognized that bottom disturbance is a stressor of concern across several habitats, and placement or construction of artificial structures is a potential stressor of concern for soft-bottom and submerged aquatic vegetation, such as eelgrass. However, muddy soft-bottom habitats (with the exception of sandy-bottom eelgrass habitat in nearshore areas), and the water column were not targeted as the goals of this restoration focused on habitat creation and enhancement of scarce habitat types. Muddy soft-bottom is plentiful in the bay. This being said, the USACE fully acknowledges that muddy or sandy soft-bottom habitat is essential for some species and supports valuable ecosystem services.

Response to Recommendation 2:

Breakwater removal is not a component of any of the final array alternatives analyzed in Chapter 5, for the reasons discussed in Chapter 4 of the Draft IFR. Therefore, waste rock from the breakwater is not available for construction of sandy islands or other features. However, during the Preliminary Engineering and Design (PED) phase of the project, any opportunities to utilize excess construction materials most efficiently to the benefit of the project will be explored.

Response to Recommendation 3:

The Corps appreciates the Service's offer to assist in developing ways to effectively highlight the special values of high value habitats/ecological communities. The Corps has appreciated the input of FWS and other agencies as TAC members involved in the development of the study. The study rationale and objectives are described in detail in the report, with the strategy for placement of measures. As a member of the TAC for this project, the FWS has provided valuable feedback on the ecological value of such habitat types as coastal wetlands and sandy islands. Particularly, recommendations on the design features of sandy islands that have been discussed in previous meetings have been useful, as have literature citations on the value of coastal wetlands to threatened and endangered species and responses to information requests on functional aspects of the various habitats and species considerations. We look forward to continuing to work with the resource agencies during the planning and design process.

Furthermore, even though the Corps will extreme care is exercised in the siting of any constructed habitat features, it is possible that constructing rock shoals within the nearshore zone may impact the availability of some other limited inshore habitat or resource, such as eelgrass. The Corps recognizes that soft (or sandy) bottom habitat in nearshore waters of California are spawning areas for market squid (*Loligo opalescens*), which is an important commercial species in California. In addition, sheltered, shallow soft-bottom areas in certain locations (e.g., inside the Los Angeles and Long Beach Harbor breakwaters) provide important nursery areas for several fish species, including California halibut.

During the PED phase of the project, the Corps is committed to working further with the agencies such that limited natural habitats, like existing eelgrass beds, are avoided and/or impacts from project activities are minimized. Because of the inter-and intra-annual variation in the spatial extent of existing eelgrass, the Corps assumes that any analyses and wave modeling will need to be updated to reflect most current conditions so that the placement and construction of nearshore shoals has minimal (if any) impact to existing resources.

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
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In Reply Refer to:
FWS-LA-21B0099-21CPA0061

June 21, 2021
Sent Electronically

Colonel Julie A. Balten
U.S. Army Corps of Engineers – Los Angeles District
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017-3409

Attention: Naeem Siddiqui

Subject: Final Coordination Act Report for the Proposed East San Pedro Bay Ecosystem Restoration Project, Los Angeles County, California

Dear Colonel Balten:

The U.S. Fish and Wildlife Service (Service) has prepared this Final Coordination Act Report (CAR) for the U.S. Army Corps of Engineers (Corps) on the proposed East San Pedro Bay Ecosystem Restoration Project (project) to describe biological resources, outline potential opportunities, and provide recommendations related to the conservation and enhancement of fish and wildlife resources in the project area.

The Corps has worked with the City of Long Beach since 2010 to advance/publish a feasibility study to ecologically enhance portions of the East San Pedro Bay; this study is known officially as the East San Pedro Bay Ecosystem Restoration Study – Draft Integrated Feasibility Report/EIS/EIR (feasibility study), and was released in November 2019. The feasibility study was provided to fulfill both Federal National Environmental Policy Act (NEPA) and State California Environmental Quality Act (CEQA) environmental documentation requirements as the combined Environmental Impact Statement (EIS) and Environmental Impact Report (EIR).

The project, as proposed, would involve a series of marine-related ecological enhancement actions near coast of the City of Long Beach, Los Angeles County, California. The Corps has identified "Alternative 4A (Reef Restoration Plan)" as the National Ecosystem Restoration (NER) Plan and the Tentatively Selected Plan. Proposed enhancement features would include: (1) 24 "kelp bed" rocky reefs intended/designed to support kelp beds (encompassing 121 acres) along a breakwater and in open water, (2) 2 open water rocky reefs (29 acres; not intended to support kelp based on final water depths of rock to be placed), and (3) 6 nearshore/shallow water rocky reef shoals (20 acres) coupled with 6 eelgrass beds (30 acres). The goal of the project is to restore and improve aquatic ecosystem structure and function for increased habitat, species diversity and ecosystem values within the project area. The objective of the project is to restore aquatic habitats such as kelp, rocky reef, coastal wetlands, and other habitat types that were historically present in the San Pedro Bay region, to support diverse resident and migratory species. Proposed project measures considered in the feasibility study also included establishing sandy shorebird habitat and coastal wetlands. The feasibility study mainly evaluated opportunities to provide aquatic substrate habitats with broad ecosystem functions, rather than focusing on enhancing or restoring features for individual species.

The proposed project area (see Figures 1 and 2) involves portions of the Los Angeles County coast of the eastern Pacific Ocean, predominantly within about a mile seaward of the historical coastline near the mouth of the Los Angeles River and the coast of the City of Long Beach; it specifically includes the East San Pedro Bay from the Port of Long Beach, extending south to Seal Beach. The existing shoreline, marine, and estuarine areas of project area and the larger general project region (see Figure 1)[1] have been heavily modified over the last century associated with port development, oil extraction, and commercial/urban development (see Figures 3–5). Before the 20th century, the areas that are now the ports of Los Angeles and Long Beach and coastal Belmont Shore/Seal Beach area of San Pedro Bay, were predominantly estuaries of the Los Angeles and San Gabriel rivers (Port of Long Beach 2011). The formerly extensive natural mudflats and marshlands of the project area historically provided expansive habitats for birds, fish, and invertebrates, and the barrier beaches, river mouths, and sand spits of the area served as nesting and foraging habitats for a variety of seabirds and shorebirds (Arnold 1903; Port of Long Beach 2011). Small remnants of these natural communities/habitats remain intact in the project area.

Several constraints for the project have been noted by the Corps: (1) the project cannot reduce maritime operational capacity in the East San Pedro Bay that is currently available to the Port of Long Beach, United States Navy, and the THUMS oil islands;[2] (2) project measures cannot increase shoreline erosion, wave related damages, or coastal flooding to existing residences, public infrastructure, marinas, other structures, or recreational beaches; and (3) the project will seek to minimize impacts to flood risk management operations on the Los Angeles River and incorporate predicted sea level rise adaptations.

This CAR is provided in accordance with the Fish and Wildlife Coordination Act (FWCA) of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq*.), the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq*.), and the scope of work agreed upon by the Corps and the Service (Corps 2017). This CAR does not constitute a biological opinion under section 7 of the ESA or a "2(b) report" pursuant to the FWCA. The purpose of this CAR is to deliver information and recommendations for use by the Corps design-planning team in developing goals, objectives, and alternatives/modifications to the project.

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[1] The area denoted as the project region in this report is equivalent to the "Study Area" delineated by the Corps in its 2019 feasibility study and as depicted in Figure 1.

[2] The THUMS Islands are a set of four artificial islands that were built in East San Pedro Bay off Long Beach in 1965 to tap into the East Wilmington Oil Field. The landscaping and sound walls used on the islands were designed to camouflage the operations of oil drilling and reduce associated noise.

Figure 1. Project Area and Project Region (The Project Region is equivalent to the Corps' "Study Area" for the project; Corps 2019).

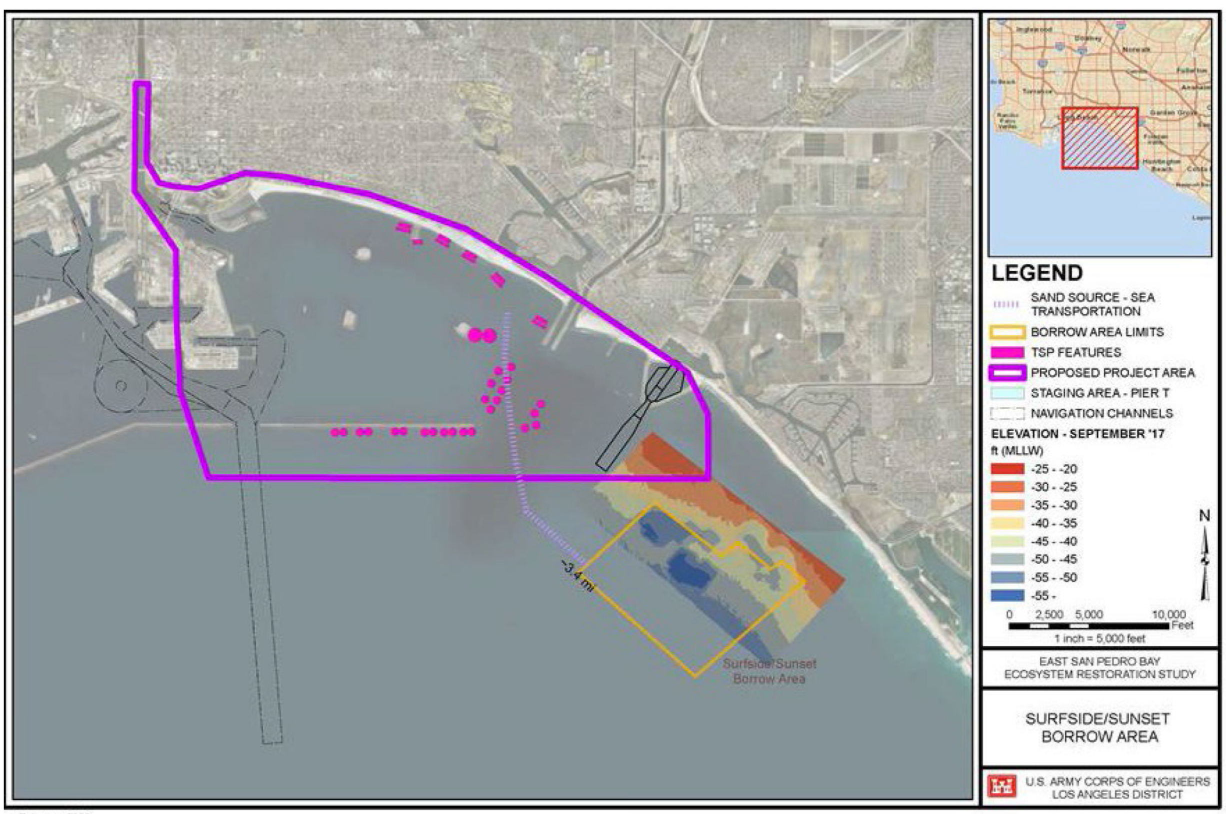

Figure 2. Project Footprint: The project footprint is a combination of the project area, borrow area, and "transportation" transit zones (Corps 2019).

INTRODUCTION

Nearshore ecosystems include many resources that are of high ecological, recreational, subsistence, and economic value. California's nearshore ecosystems[3] are some of the most productive ocean areas in the world (CDFG 2001). These systems are home to a wide variety of fishes, giant kelp, marine invertebrates, and marine mammals, as well as a large number of sea and shorebird species (CDFG 2001). These systems also are subject to influences from a wide variety of natural and human-caused perturbations, which can originate in terrestrial or oceanic environments. Nearshore marine habitats are productive but vulnerable owing to their connections to pelagic and terrestrial landscapes. About 450 species of fish occupy California's nearshore ecosystem within the limits of the continental shelf (CDFG 2001).

San Pedro Bay is a large inlet of the eastern Pacific Ocean along the southwestern continental United States coast, within the Southern California Bight. The Southern California Bight encompasses the marine waters from Point Conception at the northwest end of the Santa Barbara Channel, to a point just south of the border between the United States and Mexico. The Southern California Bight is notable for complex bathymetry and offshore islands and for being adjacent to a highly developed coastal region with substantial anthropogenic inputs into the coastal ocean (Todd *et al*. 2009). More than 22 million people live along southern California's coast (Brothers 2015).

The San Pedro Bay region includes the Port of Los Angeles and the Port of Long Beach, which together form the fifth-busiest port facility in the world and the busiest port in the Americas. San Pedro Bay is bounded by the City of Los Angeles communities of San Pedro on the west, Wilmington on the north, and by the cities of Long Beach and Seal Beach on the north and east.

Coastal development of Long Beach and a century of harbor dredging and filling associated with development of the ports of Los Angeles and Long Beach eliminated thousands of acres of Los Angeles River estuary. In its place, behind manmade breakwaters, remains an open-water marine embayment of relatively high biological diversity and productivity.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act of 1934 (the predecessor to the Fish and Wildlife Coordination Act of 1958 noted above) included requirements that were the first formal expressions in U.S. law of a duty to minimize the negative environmental impacts of major water resource development projects and to compensate for those impacts that remained (Bean 2016).

The FWCA was a response to a U.S. era of big dam building and reflected a concern for the impact of those dams, particularly on anadromous fish (Bean 2016). As originally enacted in 1934, it required consultation with the Bureau of Fisheries (as the Service was then known) prior to the construction of any dam to determine if fish ladders or other aids to migration were necessary and economically practical to minimize impacts on fish populations. It required, as well, the opportunity to use the impounded waters for hatcheries to offset impacts that could not otherwise

[3] The nearshore is defined as the area from the coastal high tide line offshore to a water depth of 120 ft.

be avoided. The duties imposed by the FWCA were reinforced and expanded by the National Environmental Policy Act (NEPA) of 1969 (Bean 2016). Under NEPA and its implementing regulations, all Federal agencies have a duty to assess the impacts of the major actions they propose to undertake and to consider reasonable alternatives to reduce or eliminate those impacts (Bean 2016). The Service, as the Federal agency charged by Congress in the Fish and Wildlife Act of 1956 with the responsibility for management, conservation, and protection of fish and wildlife resources, routinely recommends mitigation measures to Federal agencies through the NEPA and FWCA processes (Bean 2016). Section 2 of the FWCA requires the reports and recommendations of the Service be included in project reports to Congress or any other relevant agency for authorization or approval, and provides authorization to implement Service recommendations, including land acquisition and modification or additions to project structures and operations. Section 6 of the FWCA authorizes appropriations of funds to carry out the purposes of the FWCA.

The FWCA directs and authorizes consultation, reporting, consideration, and installation/implementation of fish and wildlife conservation features. The authorities of the FWCA are considered to be "supplementary legislation" to the various Federal project authorizations, such as the Corps public works authorizations (Smalley and Mueller 2004). FWCA conditions or supplements other water development statutes to require full consideration of recommendations generated under the FWCA procedures, including portions of the Clean Water Act [*Zabel* v. *Tabb*, 430 F2d 199 (5th Cir. 1970) cert. denied 401 U.S. 910 (1972)]. For Federal water resources development projects, the FWCA requires that fish and wildlife conservation receive equal consideration by Federal agencies with other project purposes, and that such conservation be coordinated with other project features. Notably, the FWCA authorizes the Federal project implementation of these noted means and measures for both mitigating losses of fish and wildlife resources, and for enhancing these resources beyond the scope of offsetting of project effects (Smalley and Mueller 2004).

The term mitigation is defined differently by various Federal and State laws, regulations and policies. In a broad sense, mitigation may include a range of measures from complete avoidance of adverse effects to compensation for adverse effects by preserving, restoring or creating similar resources onsite or at offsite locations (NOAA 2014). The Corps and Environmental Protection Agency (EPA) issued regulations governing compensatory mitigation to offset unavoidable adverse effects to waters of the United States authorized by Clean Water Act section 404 permits and other permits issued by the Corps (73 FR 19594; April 10, 2008). For those regulations (33 CFR 332.2 and 40 CFR 230.92, respectively), the Corps and EPA, define "compensatory mitigation" as "the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse effects which remain after all appropriate and practicable avoidance and minimization has been achieved."

PROJECT REGION HISTORY

Much of the south-facing San Pedro Bay along the coast was originally a shallow estuary and mudflat. Historically, estuarine habitats were not distributed evenly along the southern California coast; almost 30 percent of the southern California's estuarine natural communities were formerly found in the relatively small area of San Pedro Bay (Grossinger *et al*. 2011).

The area of the northern San Pedro Bay was historically largely a marsh, particularly associated with the Los Angeles and San Gabriel rivers emptying into the San Pedro Bay. Vegetated wetlands predominated in Alamitos and Anaheim bays, making up about 66-75 percent in each system, with 13-25 percent (unvegetated) intertidal flat, and 6-8 percent subtidal water. Alamitos and Anaheim bays were historically bordered along their inland edges by notably large acreages of freshwater marshes and willow "swamps" (Grossinger *et al*. 2011). Wilmington Lagoon was likely similar.

The San Pedro Bay project region formerly included several undeveloped islands, barrier beaches, and beach/river-mouth sand spits (Arnold 1903; Port of Long Beach 2011). As discussed in more detail below, these sandy-shore islands, isolated barrier beaches, and narrow spits included substantial unvegetated beach and remote open areas that likely historically supported what are now sensitive species, including California least terns [*Sternula antillarum browni* (*Sterna a. b.*); least tern][4] and western snowy plovers [*Charadrius nivosus nivosus* (*C. alexandrinus n.*); snowy plover]. These habitat types are now extremely rare in the project region.

In 1899, construction of the San Pedro Bay breakwater began west of the project region. In 1906, the Los Angeles Dock and Terminal Company started development of Long Beach Harbor by purchasing 800 acres of sloughs and salt marshes associated with the Los Angeles River mouth estuary. In 1911, the State of California (State) granted the tidelands areas of what is now the Port of Long Beach to the City of Long Beach (City) for port operations.[5] By the 1930s, harbor-oriented channelization and landfill projects had largely reshaped the estuaries of the area into open-water harbors.

The 8.5 mile-long San Pedro Bay breakwater is made of rock (excavated rock from construction of the Chatsworth Railroad and quarry rock from Santa Catalina Island) and stretches across much of San Pedro Bay, with two openings to allow ships to enter the harbor areas of the ports of Los Angeles and Long Beach (Turnhollow 1975; Chatsworth Historical Society 2020). The initial western section of the breakwater, called the San Pedro Breakwater, was completed in 1911; the Middle Breakwater was constructed from 1911 to 1936; and the Long Beach Breakwater was completed after World War II (see locations depicted in Figure 1). The San Pedro Breakwater and Middle Breakwater protect the ports of Los Angeles and Long Beach, respectively. A portion of the Middle Breakwater and all of the Long Beach Breakwater are within the project area. The 2.2-mile Long Beach Breakwater is the easternmost breakwater; it

[4] The California least tern was originally and remains federally- and California State-listed under the generic name of *Sterna antillarum browni*; this original name is now otherwise invalid. The American Ornithologists Union in 2006 changed the valid generic name of the least tern to *Sternula*, with the California least tern then becoming *Sternula a. b.*) (Service 2016).

[5] Tidelands in California are defined as those lands and water areas along the coast of the Pacific Ocean seaward of the ordinary high tide line to a distance of 3 miles.

was authorized to provide a protected anchorage for the U.S. Navy's Pacific Fleet and to provide wave protection to the Long Beach shoreline.

Construction of the ports of Long Beach and Los Angeles, occurring predominantly from the early 1900s through the present, heavily changed the physical environment within the project area breakwaters to a partially-enclosed system of relatively deep-water channels and basins (see Figures 3–6). Wave action, current velocities, and the biology of the harbor waters were substantially modified by the construction of the breakwaters, channels, and fills that constitute the two-port complex; these effects were in addition to substantial water quality reductions in the project region that occurred through the 1970s.

The Los Angeles River is a major river and flood management waterway for the Los Angeles watershed basin. The Los Angeles River continues to discharge into east San Pedro Bay in the north-central portion of the project area.

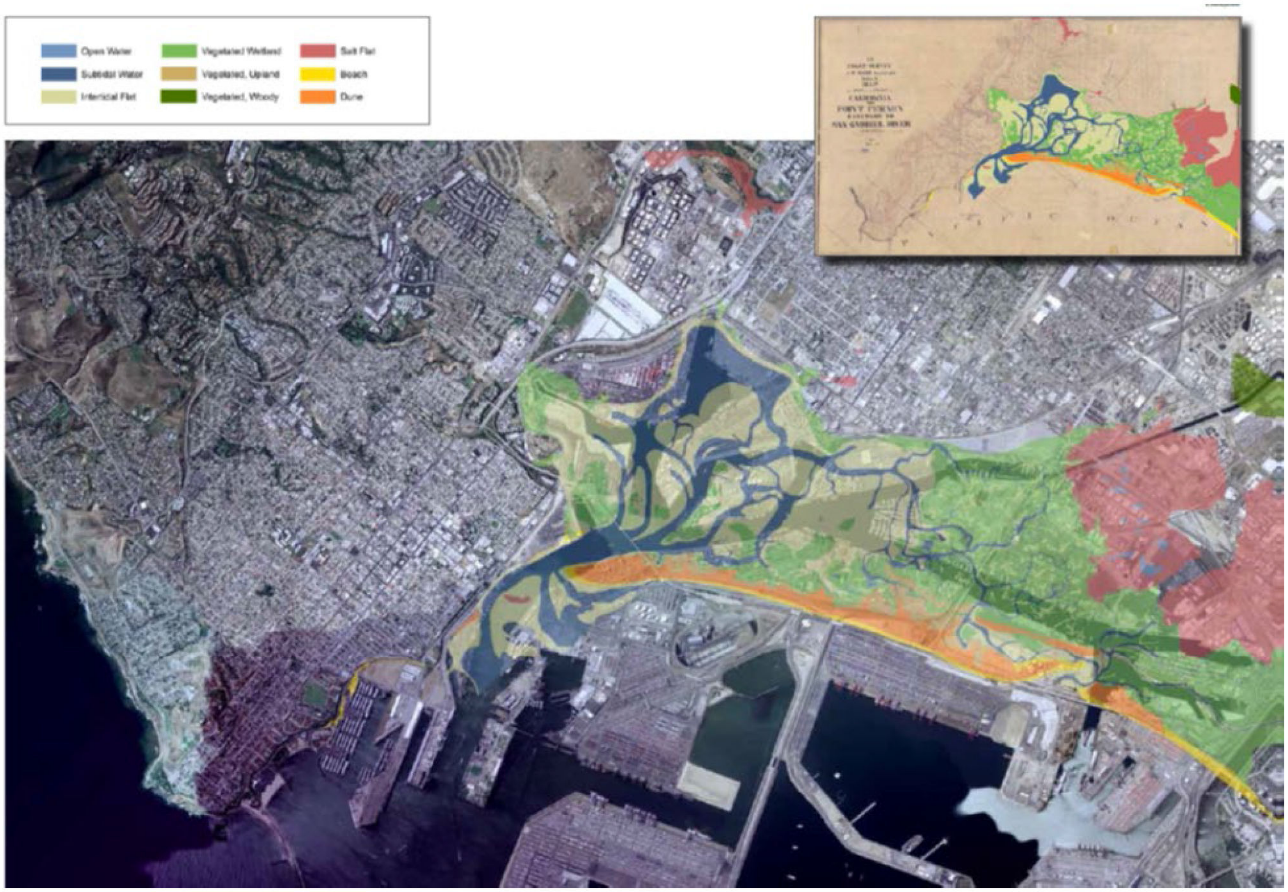

Figure 3. Historical coastal features and natural communities of San Pedro Bay at Point Fermin, San Pedro, and Wilmington digitized from Map T-892 (published 1859), overlaid on 2005 aerial photography (Grossinger *et al*. 2011).

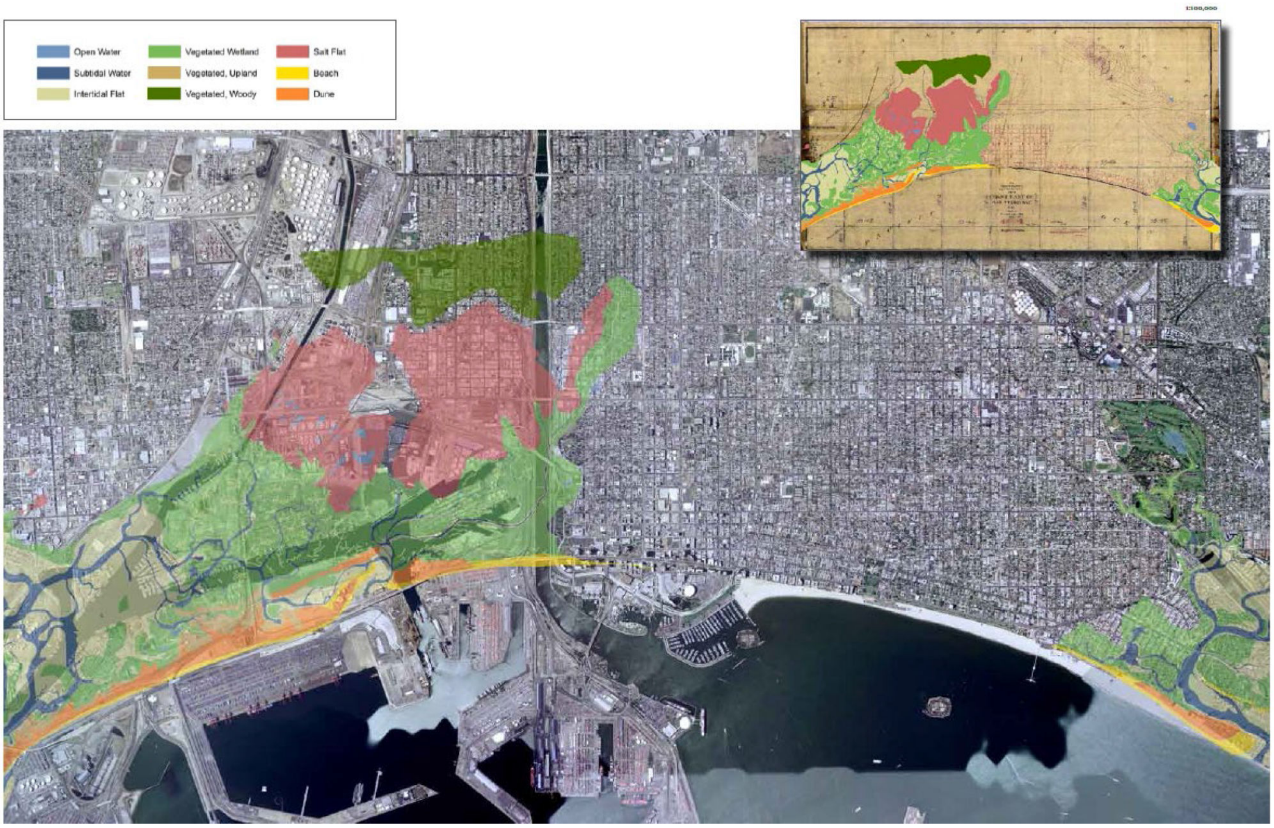

Figure 4. Historical coastal features and natural communities of San Pedro Bay at Wilmington and Long Beach, digitized from Map T-1283 (published 1872), overlaid on 2005 aerial photography (Grossinger *et al*. 2011).

Figure 5. San Pedro Bay, Los Angeles River, San Gabriel River, islands and lagoons 1901, USGS Topographic Viewer.

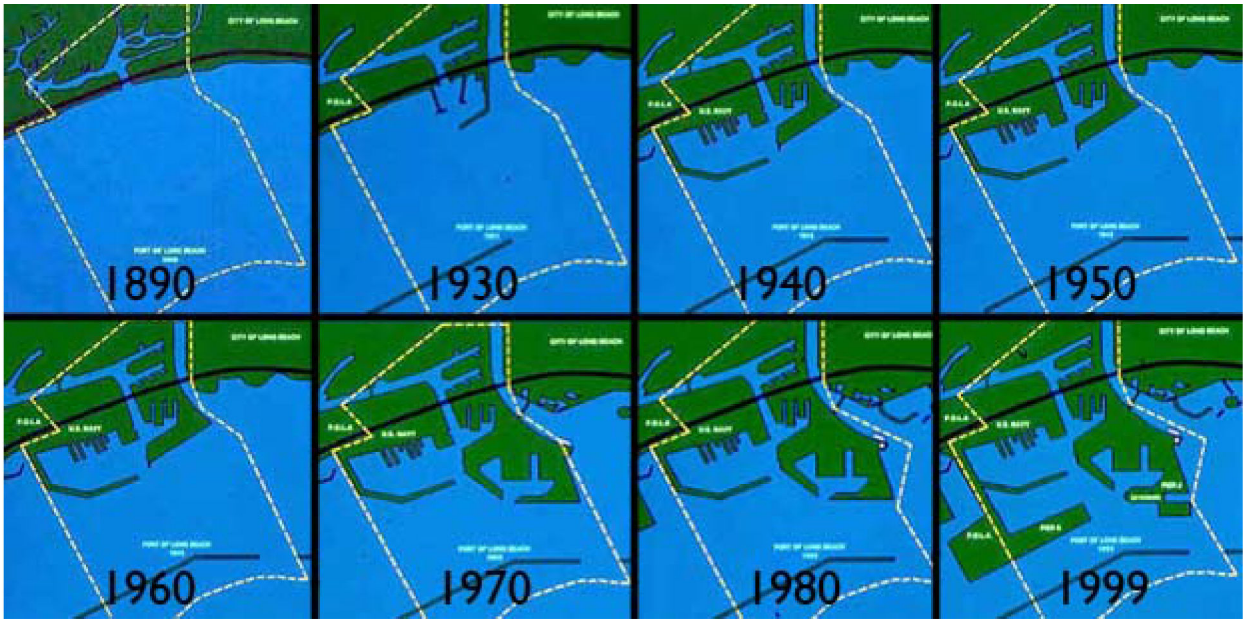

Figure 6. Drawings showing development progression of the ports of Los Angeles and Long Beach since 1890 (Ulaszewski 2013).

PROPOSED PROJECT

Tentatively Selected Plan, "Alternative 4A, Reef Restoration Plan"

The proposed project is termed Alternative 4A, which is the Corps' Tentatively Selected Plan (TSP) for the feasibility study, of the several project alternatives analyzed (Corps 2019). The proposed project Alternative 4A would create new areas of four main substrate/habitat types in the marine areas of the project area: kelp beds, nearshore rocky reef, eelgrass, and open water rocky reef (See "TSP Features" in Figure 2). The total substrate/habitat direct footprint area for the combined enhancement measures would be over 200 acres. The nearshore rocky reef and eelgrass creation areas would be co-located and are referred to in the feasibility study as "shoals" or "shoal complexes." The kelp beds would be created in breakwater and open water zones. It is anticipated it would take approximately 37 months to construct the proposed project Alternative 4A.

Kelp beds. With the proposed project Alternative 4A, 121 acres of giant kelp beds would be created in the breakwater and open water zones of the project area. About 60-plus acres of kelp beds would be developed in 12 roughly 5-acre patches placed at irregular intervals along the seaward side of the existing breakwater in the project area. The kelp beds would be placed along the breakwater, expanding existing kelp forests growing on the submerged breakwater rock. Another 60-plus acres of kelp beds would be created in 12 roughly 5-acre patches placed in open water areas off of the eastern end of the breakwater in the project area. Each kelp bed would be roughly circular in shape, spanning approximately 500 feet (ft) in diameter, with approximately 20 percent total bottom coverage of rock substrate, made up of a single layer of stone.

Nearshore Rocky Reefs. Under Alternative 4A, six nearshore rocky reef shoals totaling more than 16 acres would be placed in shallow (approximately -15 ft MLLW)[6] waters. The purpose of these rocky reefs, aside from directly providing intertidal zone rocky reef habitats, is to reduce the velocity of the surrounding waters and to provide suitable eelgrass habitat conditions in adjacent areas. It is expected that the submerged rocky reef structures would cause some of the incident waves to break, producing a re-distribution of sediments and allowing for the calm, shallow conditions that eelgrass needs. These rocky reefs are also expected to provide a localized level of protection to the nearby shoreline from storm surges and erosive wave action.

All rocky reef to be constructed would be composed of rock outcrops of varying relief or height and configuration of stone large enough so as not to be normally moved by waves and currents. Each reef footprint would be designed as a rectangle with crest limits roughly 1,000 ft long by 175 ft wide, running parallel to the shoreline in about -20 ft MLLW depth of water. A rocky reef to be created near (west of) Belmont Pier would be smaller.[7]

Reef crest elevations, or submerged depths below MLLW elevation, will vary from -3 to -10 ft MLLW. The stone pile height (or reef relief) would be roughly 2 ft to 17 ft in vertical height above the seabed.

Eelgrass beds. About 30 acres of eelgrass beds would be established at six locations in the nearshore zone of the project area, co-located with the nearshore rocky reefs described above. It is expected that the presence of the created nearshore rocky reefs would provide the calm water conditions eelgrass requires by stabilizing the bathymetry of the adjacent nearshore environment. Beach compatible sediment would also be placed leeward of the created rocky reefs to improve conditions and depth for eelgrass growth.

Open Water Rocky Reefs. The project would include placement of rock to create areas of rocky reef along Island Chaffee (the easternmost artificial oil production island; see Figure 2, including "TSP Features"), in deeper waters in the project area than the nearshore rocky reef measures described above. This placement of rock would augment existing artificially created rocky reef areas that were incidentally created as part of construction of Island Chafee. Open water reefs would be made up of individual rock groupings, roughly 100 ft in diameter, spaced apart within a circular area. The individual patches would make up a single reef complex and cover about 15 acres. Each individual rock grouping would vary in height between 3 ft to 12 ft above the seabed. The highest crest elevation will be set no more than -15 ft. MLLW. Quarry run stone with a medium stone weight of 10 tons would be utilized.

The construction of the nearshore rocky reefs would be accomplished by a barge and crane with appropriate support vessels. The nearshore rocky reef shoals would be created by first depositing

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[6] MLLW is Mean Lower Low Water - the lowest of the two low tides per day (or the one low tide) averaged over a 19-year period.

[7] "For the Recommended Plan prior to the release of the Final [Integrated Feasibility Report], the team will also consider adjusted locations for this particular rocky reef shoal to reduce potential impacts to existing eelgrass beds west of Belmont Pier based on updated existing eelgrass information." Quote from the November 2019 feasibility study, page xvii (Corps 2019).

134,000 tons of quarry run stone[8] with individual stones no larger than 1 ton at the site, then finely placing 231,000 tons of filter and armor stone with individual stones ranging from 1 to 10 tons to obtain sufficient interlocking and depth profiles.

About 30 acres of eelgrass habitat would be established at five locations in the nearshore zone, co-located with the nearshore reefs described above. For these eelgrass beds, up to 100,000 cubic yards of dredged sand material obtained from the project Surfside/Sunset Borrow Area (see "TSP Features" in Figure 2) would be dumped on the leeward side of the five created nearshore rocky reefs with the use of a split-haul scow. The Corps would utilize a clamshell dredge for all dredging associated with the project. Dredging is expected to occur on a 24-hour per day basis. The Corps would attempt to sequence dredging activities during winter months (November–March). However, due to the exposure of the work area to open ocean wave conditions, adverse wave and inclement weather may preclude safe working conditions during winter months, necessitating that dredging activities may extend into the non-winter months.

Some structural maintenance work may be required to maintain the design condition for the nearshore rocky reefs after completion of project construction. Typically, maintenance activities would be conducted every 10 years or after a strong storm event that has displaced enough stones to justify the cost of mobilization.

As detailed in letter to the Corps from the National Oceanographic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) on the project (NOAA 2020c), the Corps will implement following agreed-upon measures to avoid or minimize impacts to the green sea turtles (*Chelonia mydas*; GST) and eelgrass habitats. These commitments will be included in the final feasibility study report for the project (NOAA 2020c):

When dredging and nearshore placement operations occur, a qualified biologist with experience monitoring GSTs will be on site to monitor for the presence of GSTs. The GST monitor will have the authority to cease or alter operations to avoid impacts to GSTs.

- *Adequate lighting will be provided during night time operations to allow the monitor to observe the surrounding area effectively.*
- *During dredging and placement operations, the Corps will designate 30-meter monitoring zones around both the dredge site and nearshore placement sites.*
- *All vessels associated with the project will not exceed eight (8) knots inside the breakwater.*
- *Daily visual monitoring within the designated 30-meter monitoring zones will commence prior to the start of in-water construction activities and after each construction work break of more than 30 minutes.*

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[8] Quarry run stone is building stone as it is supplied from the quarry. It is larger stone used to stabilize slopes, protect shorelines, and control erosion around bridges and culverts.

- *If a GST is observed within the vicinity of the project site during project operations, all appropriate precautions shall be implemented to avoid or minimize unintended impacts. These precautions include, but are not limited to:*
    - *Cessation of operation of any moving equipment that is observed within 30 meters of a GST.*
    - *Immediate cessation of operation of any mechanical dredging equipment if a GST is observed within 30 meters of the equipment.*
    - *Operations may not resume until the GST has departed the monitoring zone by its own accord or has not been observed for a 15-minute period of time.*
- *Biological monitors will maintain a written log of all GST observations during project operations. This observation log will be provided to the Corps and NMFS as an attachment to the post-construction report for the project. Each observation log will contain the following information:*
    - *Observer name and title;*
    - *Type of construction activity (maintenance dredging, etc.);*
    - *Date and time animal first observed (for each observation);*
    - *Date and time observation ended (for each observation). A GST observation will terminate if (1) an animal is observed exiting the monitoring zone or (2) after a 15-minute period of no observation (assumption is that animal has exited, but was not observed to do so);*
    - *Location of monitor (latitude/longitude), direction of GST in relation to the monitor, and estimated distance (in meters) of GST to the monitor;*
    - *Nature and duration of equipment shutdown.*
- *Any observations involving the potential "take" of GSTs will be reported to the Corps within 10 minutes of the incident and to the NMFS stranding coordinator immediately.*
- *The Corps and its contractors will inform all personnel associated with the construction work of the potential presence of GSTs and the requirement to monitor a 30 meter designated monitoring zone around all in-water equipment and vessels to avoid interactions with, or "take" of GSTs. Prior to the commencement of on-site construction work, **all** contractor personnel (including sub-contractor personnel) will be trained by a Corps biologist (or qualified biologist approved by the Corps) on GST identification and observation protocols to be followed in the event that a GST is sighted. **All** construction personnel are responsible for observing and reporting the presence of GSTs during all water-related construction activities.*

- *The contractor will implement an Environmental Protection Plan that will include a GST Monitoring and Avoidance Plan and an employee training program on GST observation protocols, avoidance, and minimization measures.*

- *A pre-construction survey would be performed to document eelgrass extent in the areas of nearshore reef and sediment placement. If eelgrass is present, the location of rocky reef and sand placement would be adjusted to avoid impacts to all existing eelgrass habitat.*

Description of the Project Region, Project Footprint, and Project Area

The project region is located in San Pedro Bay, from the Palos Verdes/Point Fermin area to the north, to Seal Beach Naval Weapons Station in Orange County to the south. The project region is substantially larger than and includes the project area and project footprint (see Figures 1 and 2).

The project footprint delineates areas that would potentially be directly involved in proposed project activities; this involves all of the project area and proposed borrow areas and transit zones. The project footprint includes nearshore zones in East San Pedro Bay, zones offshore of Surfside/Sunset Beach, and associated vessel routes between the proposed Surfside/Sunset Borrow Area and the project's (non-borrow) construction areas (see Figure 2). The offshore Surfside/Sunset Borrow Area is outside of the Corps' delineated project area.

The project area (as identified by the Corps) specifically includes the East San Pedro Bay from the Port of Long Beach, extending south to Seal Beach (see Figure 1). The project area is south of downtown Long Beach and about 25 miles south of downtown Los Angeles. This 18-square-mile area includes the Long Beach shoreline, the Los Angeles River estuary, the Middle Breakwater, the Long Beach Breakwater, Alamitos Bay jetties, and open water between these features. The proposed project construction activities, outside of borrow area related activities, would all occur within the project area. The bathymetry of the project area can be seen in Figure 7.

The vast majority of sediments naturally deposited in the project area are carried by the Los Angeles River, San Gabriel River, Dominguez Channel, and several smaller local creek/storm drains (LA/LBHSC 2016). Due to the region's Mediterranean climate, these channels carry significant quantities of storm water during large storm events during the winter, and most of the associated silt settles out near the inlet mouths (LA/LBHSC 2016).

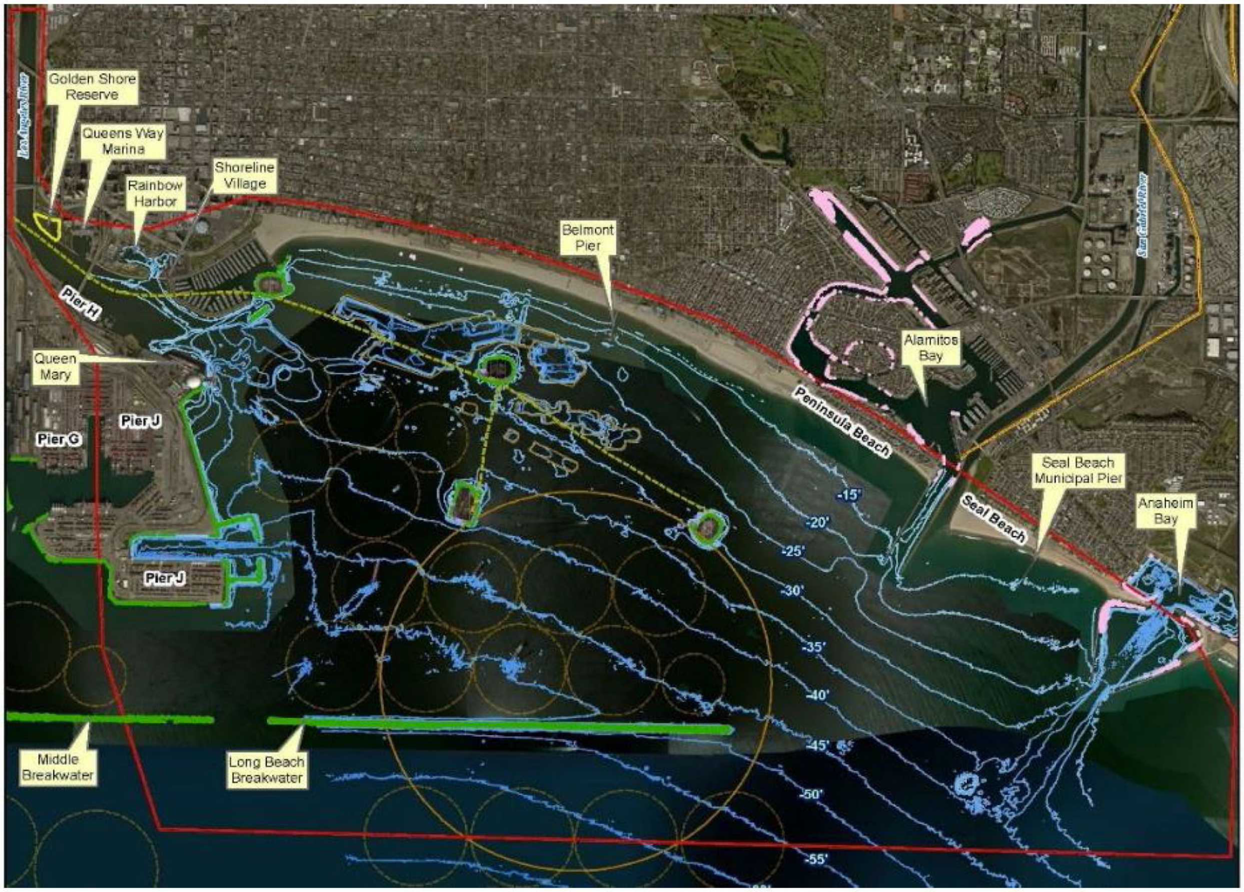

Figure 7. Bathymetry of East San Pedro Bay (Corps 2019).

Air Quality

Long Beach reportedly has some of the worst air pollution in the entire United States (Walsh 2013). Most of the city is in proximity to the ports of Los Angeles and Long Beach, and the prevailing westerly-to-west-south-westerly winds bring a large portion of the ports' air pollution directly into the Long Beach project area before dispersing it northward then eastward (City of Long Beach 2011). Heavy pollution sources at the ports include the ships themselves, many of which typically burn high-sulfur, high-soot-producing bunker fuel to maintain internal electrical power while docked, as well as heavy diesel pollution from drayage trucks at the ports, and short-haul tractor-trailer trucks ferrying cargo from the ports to inland warehousing, rail yards, and shipping centers (South Coast Air Quality Management District 2011). While overall regional pollution in the Los Angeles metropolitan area has declined in the last decade-plus, pollution levels remain high in much of Long Beach due to the port pollution, with exhaust from ships, trains, and trucks as the largest sources (Wilson 2008). Additionally, the Long Beach area is directly downwind of several of the South Bay oil refineries. Refinery processes that result in the atmospheric release of refinery by-products (commonly sulfur dioxide) reportedly impact air in the Long Beach coastal area due to the west-south-westerly prevailing wind (City of Long Beach 2011; South Coast Air Quality Management District 2011). It is undetermined how such air pollution likely affects the ecosystems of the project area.

Since 2008, EPA has awarded nearly $17 million in grants and has leveraged about $16 million from private and public partners through its programs to help reduce emissions from diesel vehicles, vessels, and equipment at the ports of Long Beach and Los Angeles (EPA 2016). The California Air Resources Board (CARB) has implemented regulations that apply to U.S. and foreign flagged ocean-going vessels; these regulations require that these vessels use low sulfur cleaner fuels within 24 nautical miles of the California coastline.

Water Quality

The first substantial ecological studies of the project region began in the 1950s; these studies revealed the marine environment was severely polluted (Reish 1959). Dissolved oxygen (DO) was, at one time, essentially depleted from the harbor waters of the project region, and its absence resulted in the elimination of the macrofauna[9] (Service 1989). The benthic[10] fauna has substantially passively restored since 1970, when national and State regulations were implemented to restore biological diversity and water quality.

The water quality in the east San Pedro Bay commonly ranks among the poorest on the entire West Coast during rainy periods. Many of Long Beach beaches average a “D” or “F” grade on beach water quality during wet periods in the Beach Report Card published by Heal the Bay (Heal the Bay 2011). However, during dry periods the water often attains “A” ratings in the same reports. The Los Angeles River discharges into eastern San Pedro Bay and conveys a large portion of the urban runoff from the entire Los Angeles metropolitan area into the waters of the project area. This runoff contains much of the debris and pollutants that are washed into storm drains in upstream cities, particularly whenever substantial rains occur. According to the State of California’s Consumption Advisories for San Pedro Bay within the area breakwaters (CDFW 2018): “…certain fish caught within this location contain high levels of the contaminants DDT and PCB. To reduce exposure to these chemicals, White Croaker should NEVER be consumed when caught from this location. In addition, the following fish should be consumed no more than two times per month: Rockfish, Surf Perch, Kelp Bass (Calico Bass), Sculpin (Scorpionfish), Black Croaker, Queenfish, and Corbina.”

Surface water temperatures within the project area typically range from approximately 59.9°F/15.5°C (all three seasons) to 70.0°F/21.1°C (summer high temperature). Reported dissolved oxygen (DO) in the ports of Los Angeles and Long Beach in 2013-2014 at the water surface exceeded 6 milligrams per liter (mg/l) (the regulatory threshold for water quality is 5 mg/L) (MBC 2016). In spring, DO concentrations below 5 mg/l were measured near water bottom at several monitoring stations in the port complex portion of the project region (MBC 2016). Overall the monitoring in 2013-2014 suggested continued improvement in water quality in the port complex since 2000 (MBC 2016). The spatial and temporal patterns of temperature, salinity, and DO recorded during the 2013-2014 study were consistent with those measured in

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[9] Macrofauna are estuarine and marine organisms visible to the naked eye that are commonly buried in sediment or attached to a fixed substrate (rocks, reefs, etc.).

[10] Benthic organisms are associated with seafloor sediments. Animals that live within soft sediments, primarily invertebrate species, are referred to as “infauna,” and animals living on the sediment surface are referred to as “epifauna.”

previous harbor-wide surveys and were reportedly indicative of conditions that would support healthy marine biological communities (MBC 2016).

Results from studies in 2000, 2008, and 2013-2014 indicate a continued trend of water quality improvement since the 1970s (MEC 2002; SAIC 2010; MBC 2016). Water clarity (transmissivity) decreased with increasing depth and was relatively lower in bottom waters at stations with fine sediments and/or in the vicinity of dredging and/or disposal (MEC 2002). Polluted and "semi-healthy" areas still exist in the ports and adjacent to the project area; however, the spatial extent of these areas of relatively poorer ecological/habitats function is not as widespread today.

Mobilized contaminants in storm run-off remains a challenge in the project area, per its effects water quality off the coast of Long Beach, particularly with the Los Angeles and San Gabriel rivers flowing into Long Beach waters. The City of Long Beach works with upstream cities, State and Federal regulatory agencies to address impacts from storm water runoff (City of Long Beach 2018). The City has used infrastructure improvements, grant funding, regional partnerships, and technology to improve the water quality in Long Beach (City of Long Beach 2018).

Physical Characteristics

The simplified general geology of the upland portion of project region is alluvium[11] in the project area and sedimentary rocks in the Palos Verdes/Point Fermin area, on the western edge of the project region (Hapke *et al*. 2006). Sediments of East San Pedro Bay are mostly detrital sands along the shore line, silty sands on the shelf, and silts and silty sands on the slope off the edge of the shelf (Bandy *et al*. 1964). This relates to the natural lack of rocky reef and kelp beds within the project area. Sediment grain size is important for two reasons: first, sediments consisting of finer particles usually contain higher concentrations of contaminants (e.g., metals and pesticides) due to the greater available surface area; and second, because infaunal communities are strongly influenced by the characteristics of the sediments in which they live. Sediment grain size affects aspects such as ease of burrowing, availability of suitable particles for constructing burrows and tubes, and the amount of organic food material. Surface sediments in the project area are primarily sand, with sandy silt and silt in the harbor areas.

Waves

Waves and currents are the primary forces that move sediment in the littoral zone[12] and annual wave height variations are responsible for natural seasonal beach erosion and sand accretion patterns (Hapke *et al*. 2006). Given the variety of local and seasonal variations in wave climate, the predominant direction of nearshore littoral sediment transport along the California coast is from north-to-south (Hearon and Willis 2002), driven by the north Pacific swell and northwest wind waves (Hapke *et al*. 2006). Wave energy in much of the project area is greatly reduced by breakwaters.

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[11] Alluvium is a deposit of clay, silt, sand, or gravel left by a flowing stream in a river valley or delta.
[12] In coastal environments the littoral zone is the area close to shore and includes land up to the high water mark.

Physical Feature Associations/Habitats

Riprap-Associated Organisms

A total of 334 species of invertebrates were identified from three tidal zones within the riprap areas in the project region (SAIC 2010). Distinct tidal zonation was observed with increasing numbers of species with increasing depth. Mean total abundance was highest in the lower intertidal, lowest in the upper intertidal, and intermediate in the subtidal zone (SAIC 2010). Across all tidal zones, crustaceans were numerically dominant, followed by polychaetes, and echinoderms.

Rock, Kelp, and Macroalgae[13]

Within the project region, the majority of kelp and macroalgae surface canopy in the water is closely associated with the imported rock making up the outer breakwaters and riprap structures (SAIC 2010). Algal diversity in the project region is considered relatively low (SAIC 2010). Dominant macroalgal communities in the project region include the genera *Sargassum*, *Ulva*, *Colpomenia*, *Chondracanthus*, and *Halymenia* (SAIC 2010). Occurrences of invasive exotic algae within the project region include the brown algae *Sargassum muticum* and *Undaria pinnatifida* (NOAA 2018). While *Sargassum* has become a commonly observed component of the algal flora in southern California, including the project region, *Undaria* was first reported in the United States in spring 2000 during studies of the project region (MEC 2002).

Rocky reefs and kelp beds are highly important fish habitats of the project region (e.g., the Palos Verdes Shelf) that have been reduced in most of southern California. Rocky reefs and kelp bed communities provide shelter and food for dozens of fish and hundreds of invertebrate species (NOAA 2020c). Kelp bed forests and rocky reef habitats are also an important component of commercial and recreational fisheries and support a thriving recreational industry in the project region including activities such as kayaking, snorkeling, and scuba diving. Kelp forests off of California provide habitats and food for over 700 species of algae, invertebrates, and fish (SeaTrees 2020).

In 2008, kelp beds reportedly encompassed about 80 acres within the outer harbor of the ports of Long Beach and Los Angeles (involving a portion of the project region). Within this same area in 2014, kelps bed expanded to approximately 132 acres, potentially associated with water quality improvements in the area.

The project area (e.g., the artificial structures of the local harbors and coastal development) provides a large amount of hard substrate in the form of riprap, breakwaters, and jetties, but that substrate is present in steep, linear configurations, which limits the associated kelp coverage to artificially narrow bands. That same substrate represents favorable habitats for a variety of other macroalgal species characteristic of southern California rocky shorelines. In particular, the breakwaters and south-facing outer harbor rock dikes are exposed to waves and currents typical of open coastal sites. The protected channels and basins within the harbors of the Project area

[13] Macroalgae is a collective term used for benthic marine algae that are generally visible to the naked eye.

are otherwise favorable habitats for algal species that cannot withstand vigorous wave and current action.

Giant kelp (*Macrocystis pyrifera*) is the dominant kelp of the project region, with a small contribution to total canopy coverage by feather boa kelp (*Egregia menziesii*). Kelp grows in the project area along the inside and outside of the outer breakwaters, on riprap along the piers and wharves of the outer harbor areas, on riprap along some of the piers and wharves not directly exposed to the harbor entrances, and on submerged rock dikes. Giant kelp plants in the region can grow about 2 ft per day (SeaTrees 2020).

Kelp forest habitats have made a slow recovery in southern California, including the project region (e.g., Palos Verdes) (NOAA 2020a). Nevertheless, kelp forest recovery remains limited in some portions of southern California that formerly supported kelp forests through the continued formation/existence of "urchin barrens" (NOAA 2020b). The high numbers of urchins within urchin barrens remove kelp vegetation before it has a chance to grow into mature plants. Major predators that normally consume urchins such as sea otters (*Enhydra* sp.), large sheepshead (*Semicossyphus* sp.), and large lobsters (*Panulirus* sp.); these species would otherwise be naturally present in the project region in considerable numbers, but are either now effectively rare in the region and/or reportedly rarely feed in urchin barrens because there is little kelp canopy that would provide cover for them. Notably, sea otters are one of the keystone species for kelp (e.g., see Estes *et al*. 1998); experiments in Alaska showed a rapid and extensive modification of algal species composition and a dramatic increase in kelp biomass followed the return of sea otters, through control of sea urchins (Duggins 1980). Artificial removal of sea urchins by divers has been implemented to help enhance kelp forests to some areas north of the project area along Palos Verdes Peninsula (SeaTrees 2020; NOAA 2020b).

Soft Bottom

Benthic organisms are an important component of the food web and are often indicators of environmental quality. Since the 1950s, improvements in water quality in the project region have aided the establishment of diverse assemblages of the benthic community in areas that were once largely devoid of marine life (MEC 2002; SAIC 2010).

Soft bottom zones are the most common habitat types within the project area and located throughout. Sediment composition of soft bottom habitats within the project area are composed of various combinations of silt and sand.

Eelgrass

Several locations in the San Pedro Bay project region support eelgrass. Eelgrass (*Zostera marina* and *Z. pacifica*) is a rooted aquatic plant found in shallow soft bottom habitats in quiet waters of bays and estuaries, as well as sheltered coastal areas (Corps 2019). Eelgrass beds function as habitats, including nursery areas, for many commercially and recreationally important open ocean marine fish and invertebrates, and they provide critical structural environments for resident bay and estuarine species, including abundant fish and invertebrates (Corps 2019).

About 55 acres of eelgrass occur at the west end of the San Pedro breakwater (Allen *et al*. 1983; Gregorio 1999). About 41 acres of eelgrass occur in the shallow water at Pier 300 and 9 acres at Seaplane Harbor in the central part of the Port of Los Angeles (Gregorio 1999). Eelgrass beds of an undetermined amount occur in the project area along a narrow band of shallow water offshore of the beachfront in Long Beach, with the highest densities in the central portion of Long Beach on either side of the Belmont Pier. Eelgrass beds are also found at the mouth of Anaheim Bay adjacent to the bay breakwaters.

Eelgrass is a natural community that is continuously changing in density, biomass, and distribution (Washington DNR 2020). Typical nearshore water movement can alter eelgrass beds as it tears leaves, shifts sediment, exposes rhizomes, buries plant parts, and changes the amount of light in the water column (Washington DNR 2020). As such, eelgrass is a dynamic resource with highly variable spatial distribution over time (NOAA 2020c). Washington State Department of Natural Resources typically requires an 8 meter (25 ft) buffer for nearby human activities to accommodate this natural spatial variation (outside of potential indirect effects) (Washington DNR 2020). Many in-water activities require an additional un-vegetated buffer around existing eelgrass beds for reduction of potential indirect effects (Corps 2018).

Estuaries

An estuary is a "small semi-enclosed coastal body of water with a free connection with the open sea within which seawater is measurably diluted by freshwater from land drainage" (Josselyn *et al*. 1993). This dilution of seawater must occur for at least 1 month of the year for the water body to be "estuarine" (Josselyn *et al*. 1993). These ecosystems are among the world's most biologically diverse and productive. Estuaries providing important or essential habitat for 80 percent of the world's fish and shellfish species. Forty-five percent of endangered and threatened species in the United States live in estuaries.

In San Pedro Bay, estuarine conditions occur at the mouth of the Los Angeles River and near the salt marsh at Cabrillo Beach (located at the foot of the San Pedro Breakwater). A small remnant estuary exists at the mouth of the San Gabriel River. Most of the formerly estuarine portions of the project area are no longer true estuaries because the significant freshwater input (i.e., from the Los Angeles and San Gabriel rivers) is now extremely spatially confined, and as a result the marine flora and fauna are not distributed along expansive salinity gradients as in most estuarine systems. Historically, in the project area, estuarine areas were much more extensive than today (see Figures 3–5), particularly associated with the large mouths of the Los Angeles and San Gabriel rivers, with different natural communities possessing a varying degree of hydrological connectivity to estuarine waters. The timing, frequency, and magnitude of freshwater/estuarine connection events normally directly influence both the abiotic and biotic components of these communities (Ragan and Wozniak 2019). Today, the watershed-sourced contaminant and trash contributions of the Los Angeles and San Gabriel rivers to the project area remain problematic and of high importance, and the freshwater inputs of these rivers continue to be essential to the estuarine ecosystem remnants in the project area. Marine litter is a substantial problem in the project area.

Subtidal

The natural seafloor habitats within the project region are largely sedimentary, predominantly sand and silty sand areas. Rocky substrates, where they occur within the deeper water areas of the project area (typically artificially produced), support some of the same species usually observed on inshore rocky features [i.e., solitary corals (e.g., *Paracyathus stearnsi*) and sea cucumbers (*Parastichopus* spp.)]. However, other species of solitary corals (C*aryophillia* spp.), crinoids (*Florometra* spp.), basket stars (*Gorgonocephalus* spp.), and sponges (*Staurocalyptus* spp.) become more abundant with depth, particularly on the rock features that are not subjected to sedimentation. Rockfish (*Sebastes* spp.), including copper rockfish (*S. caurinus*), greenspotted rockfish (*S. chlorostictus*), and starry rockfish (*S. constellatus*), are also more common in these deeper water depths around rock features.

Intertidal

The intertidal zone is a dynamic marine environment characterized in part by daily tidal fluctuations (leading to periods of sunlight, aerial exposure and submersion) and wave forces. Organisms residing within the intertidal zone are typified by hardy species that are capable of withstanding stresses associated with waves and daily tidal fluxes. Intertidal zones are found within the project area along shorelines and breakwaters, and predominately sand and silty sand.

San Pedro Bay naturally consist of quite limited areas of natural rocky intertidal habitats, notably occurring around Palos Verdes and Point Fermin. Placement of anthropogenic material (e.g., breakwaters and piers) and artificial structures have substantially type-converted many areas of generally sandy areas to rocky communities in San Pedro Bay.

Beaches

Beaches are ubiquitous features of the California coast and are important for a number of reasons: (1) they act as a natural buffer that protects coastal land during storms; (2) they are a valuable recreational and economic resource; and (3) they sometimes provide habitats such as nesting and wintering sites for the snowy plover, least tern, and haul-outs for protected marine mammals. Beach types found in California include pocket beaches, long expanses of linear to gently curved beaches, and barrier spit beaches at stream mouths. Because of the relatively high wave energy and a steeper and narrower continental shelf along the California coast, pronounced river deltas do not form. Instead, barrier spits and ebb and tidal bars develop where streams reach the sea. Beaches that form at the mouths of stream valleys and embayments are typically a mixture of both fluvial- and littoral-derived sediment (mostly sand). The barriers are typically barren to sparsely vegetated, indicating an unstable substrate prone to occasional marine overwash and breaching. In winter, periods of high waves and heavy rainfall cause overwash and channel formation on barrier spits, reducing their overall size. During the summer months, when the waves are smaller and the precipitation is limited, the barrier spits may completely block stream mouths due to reduced stream flow and beach accretion.

Much of the project region formerly included substantial barrier beaches and spits, such as Rattlesnake Island (see Figure 5). The spits and barrier beaches were likely formerly heavily used by least terns and snowy plovers for nesting due to their relative isolation from nest predators and lack of vegetation. Many crustaceans inhabit sandy beaches of the project area, particularly mole crabs (*Emerita* spp.) and sand dollars (*Dendraster excentricus*).

Description of Biological Resources

The fish and wildlife resources of the San Pedro Bay are reported in detail in a 2016 report entitled: 2013-2014 Biological Surveys of Long Beach and Los Angeles Harbors (MBC 2016). Please refer to this resource. A brief summary of the available ecological information is provided herein, based largely on this baseline report.

Although a substantial lack of natural hard bottom habitats exists within the project area, the project region does include a substantial amount of existing artificial hard bottom habitats including the Long Beach breakwater, Alamitos and Anaheim Bay jetties, and the protective hard structure built around artificial oil islands built in the region. Additionally, the northern portion of San Pedro Bay is dominated by the ports of Los Angeles and Long Beach. These ports are large harbor complexes typified by extensive areas of hardened shoreline (riprap and quay wall) and dredge-maintained channels (SAIC 2010). The benthic hard substrates in the port areas are mostly artificial breakwaters and barriers of riprap, and constructed (i.e., in-water hard structures such as walls and pilings) shallow water areas in the ports (LA/LBHSC 2016).

The physical habitat of the bottom of San Pedro Bay, with the exception of the artificial structures, is almost all soft bottom (Allen 1985; Anchor Environmental 2001). Commensurately, soft bottom substrates comprise the vast majority of acreage of the project area. Maximum water depths in the bay typically do not exceed 53 ft (Robbins 2006).

Within the project area, eelgrass beds occur in limited areas (SAIC 2010). Eelgrass notably serves as an important food source, protection, and nursery sites for many fish species (Allen *et al*. 1983; Allen 1999), and is very likely important for GSTs that use the project area (NOAA 2020c). The influence of eelgrass on the local environment can extend up to 33 ft from individual eelgrass patches (NOAA 2014).[14]Kelp beds are also limited in the project area, and grow on hard bottom substrates at depths ranging from 26 to 59 ft (Allen 1985).

Terrestrial vegetation in the project area is very limited and is primarily landscape plantings and weedy exotic species. Wildlife of the non-beach uplands areas of the project area is generally restricted to feral cats, rats and mice, and birds associated with developed areas such as various gull species (*Larus* spp.), American crow (*Corvus brachyrhynchos*), rock pigeon (*Columba livia*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), Brewer's blackbird (*Euphagus cyanocephalus*), and swallows (*Hirundo* spp. and *Stelgidopteryx serripennis*) (MEC 2002; SAIC 2010).

[14] Eelgrass has a relatively wide area of functional ecological influence, where the natural community/habitat functions provided by the vegetated cover extends out into adjacent unvegetated areas. Those functions include detrital enrichment, energy dampening and sediment trapping, primary productivity, alteration of current or wave patterns, and fish and invertebrate use, among other functions (NOAA 2014).

A 2013-2014 survey (MBC 2016) of much of the project region and the western portion of the project region found:

- Nearly 750,000 pelagic (open water) fish belonging to 35 different species were collected and released during the survey. Approximately 90 percent of these fish were anchovies (*Engraulis* sp.).

- Nearly 20,000 bottom-dwelling fish representing 58 species were collected.

- More than 76,000 birds belonging to 96 species were observed in the project region port areas.

- California sea lions (*Zalophus californianus*) were the predominant marine mammal in the project region.

- Less than 10 percent of all species catalogued were non-native, or introduced species.

Fish

Fish populations of San Pedro Bay are diverse and relatively abundant (SAIC 2010; MBC 2016). Surveys of the port areas of the project region in 2008 identified a total of 59 species of fish (SAIC 2010). Generally, schooling fishes were the most abundant species recorded.

Northern anchovy (*Engraulis mordax*) and white croaker (*Genyonemus lineatus*) were the most abundant species collected in the 2000, 2008, and 2013-2014 surveys in the project region; white croaker was top ranked in terms of biomass (MEC 2002). From 2008 surveys in the project region, pelagic fish from lampara[15] net collections were dominated by four species: northern anchovy, topsmelt (*Atherinops affinis*), California grunion (*Leuresthes tenuis*), and Pacific sardine (*Sardinops sagax*). These species accounted for 98 percent of the total lampara net catch in 2008.

Other relatively abundant species in area of the ports included shiner surfperch (*Cymatogaster aggregata*), salema (*Xenistius californiensis*), and jacksmelt (*Atherinopsis californiensis*). Less numerous but ecologically and/or recreationally important species recorded were California barracuda (*Sphyraena argentea*), California halibut (*Paralichthys californicus*), barred sand bass (*Paralabrax nebulifer*), California corbina (*Menticirrhus undulatus*), white seabass (*Atractoscion nobilis*), and several species of sharks and rays.

More species of fish were collected in the shallow waters of the project area, than at deepwater survey stations in open water, channel, basin, and slip habitats (MEC 2002). The greater diversity is likely partially explained by the greater heterogeneity associated with the shallow water habitats of the project region, which are adjacent to rock riprap and/or vegetated areas (e.g., eelgrass beds, kelp beds); this likely results in higher fish nursery function, greater production, and generally higher abundance of fish in shallow waters. Studies conducted in the

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[15] A lampara net is a type of fishing net used for capturing certain pelagic fish, those swimming near the water's surface.

shallow areas of the project region have shown that these areas have both higher diversity and greater abundance of fish and invertebrates than the deeper soft bottom areas (MEC 2002). A greater abundance of juvenile fish are also present in these shallow areas; they appear to enter these areas relatively soon after hatching/birth. Long Beach fishing experts often fish adjacent to the four manmade oil production islands located within the project area due to the abundance of recreational fish found there; the abundance of recreational fish in these areas is reportedly due to the shallow water combined with high relief from the riprap placed around the created islands (Ballanti 2007), similar to some of the rocky reef measures in the proposed project.

Benthic Invertebrates

Over 400 species of benthic infauna and larger macroinvertebrates were collected during the Year 2000 Baseline Study in the project region; over 250 species of benthic infauna and larger macroinvertebrates were collected during the Year 2008 Baseline Study (MEC 2002; SAIC 2010). Small infaunal organisms (which tend to be less motile than larger macroinvertebrates) and larger macroinvertebrates both exhibited spatial variability in species composition that appeared to be tied to a combination of factors including water depth, years since dredging/disposal in the region, and ecological/habitats functions (MEC 2002).

Birds

Southern California's coastal areas, including its shorelines, estuaries, bays, and developed harbors, currently provide a variety of natural and artificial communities for large numbers of waterfowl, shorebirds, wading birds, and piscivorous (fish-eating) birds. The predominately open water and hardscape/landscape habitats of the project region provide some opportunities for nesting, foraging, and resting by a moderate diversity of bird species, including two species listed as endangered or threatened under the ESA: the least tern and snowy plover.

Birds that occur in and near project area are primarily water-associated species; that is, they are dominated by seabirds, shorebirds, and waterfowl that depend on the marine communities for food and other essentials. Migratory birds use San Pedro Bay during annual migrations and for overwintering. Some are also year-round residents. As a result of the high numbers of small fish in the shallow water areas of the project area, substantial numbers of piscivorous birds are found foraging in these areas.

Feeding and roosting are two principal bird activities in the project vicinity. Birds using sheltered waters within the project area for feeding and resting include loons (*Gavia pacifica* and *G. immer*), grebes (*Podilymbus* podiceps, *Podiceps* spp., and *Aechmophorus* spp.), surf scoters (*Melanitta perspicillata*), and lesser scaup (*Aythya affinis*). These waters offer mollusks and fish that are preyed upon by these species. Riprap shoreline is utilized by spotted sandpipers (*Actitis macularius*), surfbirds (*Aphriza virgata*), willets (*Tringa semipalmata*), and pelagic cormorants (*Phalacrocorax pelagicus*). The small intertidal mudflat at Shoreline Aquatic Park (within the project area, adjacent to the Los Angeles River estuary) is important foraging habitat for western sandpipers (*Calidris mauri*), semipalmated plovers (*Charadrius semipalmatus*), and marbled godwits (*Limosa fedoa*). This area is also used extensively by mew (*Larus canus*), ring-billed (*L. delawarensis*), and

California gulls (*L. californicus*) as a resting area. Buoys and pilings in the project area are primary roosting sites for double-crested cormorants (*Phalacrocorax auritus*), gulls, and brown pelicans (*Pelecanus occidentalis*).

A total of 96 species representing 30 families of birds were observed within the project region during a 2008 study (SAIC 2010). Of these species, 69 are considered to be dependent on marine habitats. Gulls comprised 44.5 percent of the birds observed in the project region in 2008 (SAIC 2010). The most abundant birds included several gull species [e.g., Western (*Larus occidentalis*), Heermann's (*L. heermanni*), and California], brown pelican, elegant tern (*Thalasseus elegans*), western grebe (*Aechmophorus occidentalis*), Brandt's cormorant (*Phalacrocorax penicillatus*), double-crested cormorant, surf scoter, and rock pigeon.

The brown pelican, formerly federally listed as endangered, is found in large numbers in San Pedro Bay (MEC 2002). This bird breeds on the Channel Islands and forages widely along the southern California coast on small fishes. Brown pelicans make heavy use of the outer breakwaters of the project area for roosting. The peregrine falcon (*Falco peregrinus*), also formerly federally listed as endangered, nests on bridges within the project region (SAIC 2010).

Two birds highlighted below likely formerly made significant use of the project area, but are now severely limited in available functional habitats (particularly nesting and roosting habitats) in East San Pedro Bay due to human uses.

California Least Tern

The State and Federal endangered California least tern is a piscivorous seabird that makes significant breeding use of San Pedro Bay (KBC 2005). The least tern has a relatively long history of nesting on Terminal Island in the Port of Los Angeles. This least tern nesting site is typical of those used by the species in highly developed coastal California; the site is a relatively flat, open, barren sandy area near the ocean where the least terns lay and incubate their eggs, and chicks fledge. The least tern nesting period extends from April through August; along the California coast, least terns typically begin to arrive in the southern-most colony breeding sites (e.g., San Diego) in early April and they continue to arrive through the later part of May. The chicks fledge and migrate with the adult birds by August. During the remainder of the year, the birds are gone from the project area.

Least terns nest on sparsely vegetated substrates, including sandy beaches, salt flats, and dredge spoil, in colonies of a few to several hundred nesting pairs, in areas near their fish prey (Service 2006). This species relies on sight for foraging and usually requires relatively clear water to locate its preferred baitfish food sources, predominantly northern anchovy, topsmelt, and jacksmelt (LSA 2009). Although some field evidence suggests that least terns will forage in turbid waters to which fish are attracted, the majority of foraging occurs in clearer waters (LSA 2009). A 15.7-acre fenced nesting site used by least terns is located at the southern tip of Pier 400 on Terminal Island in the project region (see Figure 1).

Least terns have nested within the project region since the late 1800s and have been observed within the port areas almost every year since annual monitoring studies began in the ports in 1973 (SAIC 2010). Since 1973, the least tern has utilized nesting locations in the project region on Terminal Island (LAHD 2015). The principal foraging areas for least tern in the project region vary somewhat from year to year, but during the chick rearing period, the shallow water areas are used heavily, probably due to the relatively greater abundances of appropriate prey fish (size and species) found there (MEC 1988; MEC 1999). Least terns also forage along the outer breakwater and open-water areas of the project region, as well as basin and channel areas (SAIC 2010). Least terns foraged most frequently just off the Pier 400 nesting site, off Pier 300, and near Cabrillo Beach (SAIC 2010). Measures to protect the least tern during construction projects have proven successful (Service 1992); those measures have included nesting area and predator management, shallow water area conservation/creation, and protection of water quality in the shallow water areas during breeding season.

Western Snowy Plover

The Pacific coast population of the western snowy plover was listed as federally threatened in 1993 (Service 1993), and it is considered to be a "species of special concern" by the State of California. Within the project region, wintering snowy plovers were detected in Seal Beach in 2018 and 2019, Seal Naval Weapons Station in 2016, and Surfside in 2017 and 2018. Snowy plovers are occasionally observed during migration at the least tern nesting site on Pier 400 within the Port of Los Angeles (SAIC 2010). Snowy plovers were observed at Cabrillo Beach in 2016 and 2019 (Service 2020).

Prior to 1945, the snowy plover nested on beaches throughout Los Angeles County (LAC) (Grinnell and Miller 1944). Sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries (as formerly occurred within the project region) are the main coastal habitats for nesting snowy plovers (Service 2007). However, increased human use of sandy beaches brought with it disturbance from beachgoers, lifeguards, maintenance staff, introduced predators, and sand grooming; these reduced the ability of snowy plovers to nest on Los Angeles County beaches. In 1949, the last active nest of a snowy plover on Los Angeles County beaches was reported at Manhattan Beach (Ryan *et al*. 2014). Despite the reported lack of documented nesting since 1949, snowy plovers have continued to overwinter on Los Angeles County beaches.

For the Pacific coast population of the snowy plover, the nesting season extends from February through late September. In the California portion of its range, breeding tends to occur a few weeks earlier, with nests usually appearing by the third week of March (Page *et al*. 2009). Primary nesting habitats include sand spits, dune-backed beaches, beaches at creek and river mouths, and saltpans at lagoons and estuaries (Stenzel *et al*. 1981). Nests generally consist of a shallow scrape lined with beach debris and typically occur in flat, open, sandy areas with little vegetation (Widrig 1980; Stenzel *et al*. 1981). Multiple pre-nest scrapes may be dug, with one selected as the nest; these typically begin to appear in late January-early February. Driftwood, kelp, and dune plants provide cover for chicks and harbor invertebrates, an important food source (Page *et al*. 2009). Nests are usually found within 330 ft of water, whether ocean, lagoon, or river mouth (Page *et al*. 2009). In addition to nest scrapes, snowy plovers build roost scrapes throughout the year; these are typically shallower, with no materials placed inside and are often made from scraped-out footprints in the sand.

While several factors contribute to the degradation of winter roosting habitat and the disappearance of nesting snowy plovers in Los Angeles County, the main problems are likely direct habitat loss, beach grooming, development of upper beach habitats, heavy recreational use, vehicular traffic, domestic animals, and predators attracted to human refuse. Daily beach grooming removes or degrades many of the favorable nesting habitats described above, harms food resources, and likely destroys nest scrapes and eggs of snowy plovers (Page *et al*. 2009). Because grooming also removes naturally occurring beached kelp, it has been shown to drastically reduce the invertebrate populations that break down kelp, including prey items favored by snowy plovers (Dugan 2003; Page *et al*. 2009). The development of upper beach habitats has removed important snowy plover cover and foraging resources. Vehicular traffic in beach areas is known to cause mortality, crush foraging resources (vegetation and beached kelp/wrack), and regularly flushes resting snowy plovers from their roosts. Over 50 million visitors utilize Los Angeles County beaches annually (County of Los Angeles 2009); these visitor activities include sunbathing, swimming, dog walking, and sports. Support services at these beaches include police and lifeguard patrols, erosion control, and trash pick-up; most of which also involve vehicle use on the beach. Furthermore, human activity and local residences attract important snowy plover predators such as cats, dogs, and American crows.

Mammals

In the U.S. most marine mammals are under the jurisdiction of the NMFS, including all those potentially occurring in the project region. All marine mammals are protected under the Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 *et seq*.), and some are also protected by the ESA. Marine mammals that are known to occur (at least) sporadically in waters of the project region include pinnipeds [California sea lion and harbor seal (*Phoca vitulina*)] and cetaceans (SAIC 2010). Cetaceans that have been repeatedly observed in outer harbor locations in the project region include the gray whale (*Eschrichtius robustus*), Pacific bottlenose dolphin (*Tursiops truncatus*), short-beaked common dolphin (*Delphinus delphis*), and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) (SAIC 2010). The gray whales likely utilize San Pedro Bay predominately as part of annual migrations north and south along the eastern Pacific Coast, probably with some minor foraging occurring in the project region. None of these species are known to breed in the project area (SAIC 2010).

Pacific Green Sea Turtles

Pacific green sea turtles have been reported from the project area since at least 2008, most frequently from the mouth of the San Gabriel River. The river and its associated wetland/estuarine areas comprise the northernmost known year-round habitats for the Pacific GST (Aquarium of the Pacific 2019). The GSTs using the project area and environs are Federally-listed as threatened. Green sea turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. Green sea turtles are attracted to lagoons and shoals with an abundance of marine grass and algae. Nesting of GSTs is not considered likely in the project region with the high level of human disturbance on almost all beaches. The GSTs observed in the project region over the last decade are reportedly all of the teenage age class, with no occurrence reports of breeding-age adults or small juveniles in the area (Goldman 2016).

The small population of GSTs of the project region mainly persists in and around the San Gabriel River mouth and within Anaheim Bay and the Seal Beach National Wildlife Refuge (SBNWR) estuarine complex (Crear *et al*. 2016). The available information suggests that while GSTs are present in the estuarine reach of the San Gabriel River year round, their presence may be more seasonal (summer and fall) in other locations in the area when water temperatures are warmer, including: Anaheim Bay, the SBNWR, Sunset/Huntington Harbor, and Alamitos Bay. Crear *et al*. (2016) showed that tagged juvenile GSTs left SBNWR/Anaheim Bay and moved into the San Gabriel River during winter months, when temperatures dropped below 59°F/15°C. Conversely, GSTs moved through Anaheim Bay to get to the 7th Street Basin in the SBNWR during summer and fall months to forage on eelgrass beds. In the project region, the bay and estuarine habitat areas in which green sea turtles appear to most frequently occur are primarily adjacent and inshore of the project area (NOAA 2020c). While the specific importance of eelgrass in the project region to sea turtles has not been characterized, eelgrass is likely an important habitat feature for GSTs within the project area (NOAA 2020c).

Potential Impacts of the Proposed Project on Biological Resources

The proposed project would involve several types of marine-related ecological enhancement measures. Most or all of these measures are proposed within soft bottom areas within East San Pedro Bay. Marine soft bottom habitats are naturally common within the project area. Hard bottom/substrate habitats were naturally uncommon in the project area historically. Hard substrates in the waters of the project area have been greatly increased over the last century through installation of bulkheads, riprap for shoreline breakwaters, and pier pilings. Rocky reefs and kelp beds are naturally rare in the project area and project region (though these ecological communities were formerly naturally somewhat locally common in the Point Fermin/Palos Verdes area of the project region to the north of the project area, as these areas naturally have substantially more submerged rock than the project area). Eelgrass areas were likely naturally more common in the project area in the past than presently. The project would likely result in short term increases in turbidity and noise, long-term mechanical impacts to benthic soft bottom habitats, and habitat conversions. In general, the habitat conversions associated with proposed project activities are expected to provide a net positive impact on habitats of many fish species due to the conversion from soft bottom via the establishment of eelgrass, rocky reef, and kelp habitats.

The direct footprint of the proposed project enhancement measures is expected to occur in areas that are currently unvegetated soft bottom habitat, likely of existing moderate biological productivity. The losses associated with these conversions are likely offset by establishment of equivalent acreage of higher-function habitats (rocky reef, kelp, and eelgrass) that would benefit numerous native marine taxa, and adverse impacts to adjacent soft bottom habitat from indirect effects would be short-term.

Direct impacts to approximately 200 acres of soft bottom areas would involve essentially permanent trade-offs associated with specific type-conversion to other ecological community/habitat types (e.g., soft bottom to rocky reefs, kelp beds, and eelgrass), as proposed. This is expected to cause losses in numbers to some species and gains to others. For example, the type-conversion of soft bottom areas within the project footprint would have long-term impacts on the benthic invertebrate fauna and demersal fish communities currently found in these areas. The resultant ecological communities (rocky reefs, kelp beds, eelgrass) would be of different character and are expected to have substantially higher native biological diversity, higher biomass, and greater productivity, albeit with different species combinations adapted to these created substrates (rock versus sand or silty sand) and vegetation types (eelgrass and kelp versus unvegetated) areas.

The placement of rock and sediment materials (as proposed for creation of rocky reefs and eelgrass beds) would create temporary turbidity impacts and potential sedimentation effects to surrounding areas. Temporary reduction and degradation of the habitats (likely soft bottom) in the areas surrounding the direct footprint of the project is expected, due to turbidity and burying by sediments that would be generated by proposed rock and sediment placement. In particular, for the proposed eelgrass bed creation measure, up to 100,000 cubic yards of dredged sand material (obtained from the Surfside/Sunset Borrow Area) would be dumped adjacent to the proposed nearshore rocky reefs.

As proposed, existing eelgrass areas may occur within the identified project footprint construction activity zones. If project activities did occur (e.g., placement of rock or sediments) within existing eelgrass areas, long-term loss of eelgrass habitats would likely result in the area affected. The current locations of eelgrass within the project area are not fully determined.

Placement/disposal of sediments near existing eelgrass beds can have considerable indirect impacts on eelgrass communities (Erftemeijer and Lewis 2006; NOAA 2021), including indirect destruction of eelgrass habitats (NOAA 2014). Dredging and placement/disposal of dredged material near eelgrass can also lead to a temporary decrease in water transparency, increased concentrations of suspended matter, and increased rates of sedimentation within eelgrass (Erftemeijer and Lewis 2006). Sediment loading can lead to burial or fragmentation of eelgrass beds (Washington DNR 2015). In the case of contaminated sediment or sediments with relatively high contents of organic matter, dredging and sediment resuspension may also lead to effects on water quality by the release of contaminants (e.g., Filho *et al*. 2004), an increase in nutrient concentrations, and/or reduced dissolved oxygen in the water column (Erftemeijer and Lewis 2006). It is expected that most of the sediments to be dredged and placed as part of the project would be predominantly coarse-grained. Distance separation or a buffer zone between sensitive resources and dredge disposal project activities is often suggested/noted in guidance literature, to the extent appropriate, per the ecological resources and potential effects involved (e.g., NOAA 2014; Corps 2015, 2018; BOEM 2018).

As proposed within the feasibility study, refinements to nearshore reef locations to be created may be made during the planning and design process for the project (Corps 2019). For example, the western-most rocky reef/eelgrass feature proposed (west of Belmont Pier) may be adjusted by the Corps to a location fronting Peninsula Beach (Corps 2019). Pursuant to consultation with NMFS in 2020 on the project, the Corps has concluded that construction activities would not result in the direct loss of existing eelgrass habitat, and it has made environmental commitments to ensure any direct losses would be avoided (NOAA 2020c). Specifically (as noted above), the commitments of the feasibility study have been changed to require that a pre-construction survey would be performed by the Corps to document eelgrass extent in the areas of nearshore rock and sediment placement. As part of these commitments, if eelgrass is present, the location of rocky reef and sediment placement would be adjusted to avoid impacts to all existing eelgrass habitat (NOAA 2020c).

Another project concern is the potential project-related spread of the invasive algae of the genus *Caulerpa*, which have been introduced to the California coastline. Evidence of harm that can ensue as a result of the spread of these algae has already been seen in the Mediterranean Sea where *C. taxifolia* has heavily damaged some local ecosystems and adversely affected commercial fishing, coastal navigation, and recreational opportunities (NOAA 2019). A similar species, *C. prolifera*, was recently discovered in Newport Bay. If this invasive alga is present within the project area, the proposed dredging-disposal activities could adversely affect local marine ecosystems by promoting its spread and increasing negative ecosystem impacts. As noted below, the Corps will amend the proposed monitoring for the project to specifically include monitoring of non-native/invasive species of algae, including *Caulerpa* sp. (Corps 2021).

Disturbance of borrow areas of the project footprint associated with proposed dredging activities is expected. Repeated dredging of the same area by various projects likely has long-term impacts with little recovery. The proposed borrow site is approximately 1,700 acres in size and reportedly much of it has been dredged repeatedly since approximately 1964 (Corps 2019). The Surfside/Sunset Borrow Area consists of soft bottom habitats; however, this site has frequently been used for sand material dredging and, as such, the soft bottom habitats of the area are reportedly regularly disturbed. As proposed, approximately 12.5 acres of the borrow site would be dredged for the 100,000 cubic yards of sand material needed for the project.

After completion of project construction, maintenance work may be periodically (e.g., every 10 years) required to maintain the structural conditions of the proposed nearshore rocky reefs. This would mainly involve replacing project stones and/or sediment displaced by storm events, with similar localized impacts (within a subset the same project footprint) as the initial construction. Such work would not likely have long-term negative impacts to biological resources of the project area.

The project would likely have a positive net impact on the marine ecological conditions of the project area, due to the creation/establishment of eelgrass, rocky reef, and kelp habitats as a trade-off/replacement of what likely consists of existing sandy-bottom habitats. Proposed creation of approximately 30 acres of eelgrass bed features would likely result in long-term beneficial impacts to GSTs and the many other species that make use of eelgrass in the project area for foraging and/or cover. Proposed creation of approximately 120 acres of new kelp features would likely result in long-term beneficial impacts to a wide variety of species that make use of kelp in the project area. Proposed creation of about 49 acres of new rocky reef nearshore and open water habitats is expected to result in long-term beneficial impacts to species that make use of rocky reefs in the project area.

Recommendations

The Fish and Wildlife Coordination Act states that "...wildlife conservation shall receive equal consideration and be coordinated with other features of water-resource development projects through the effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation...." (16 U.S.C. 661). The proposed project (Tentatively Selected Plan) contains a number of best management practices, standard operating procedures, conservation measures, and mitigation measures to reduce the effects of the project on biological resources. Except where noted in our recommendations below, the Service assumes that the noted (feasibility study) project mitigation and conservation measures are integral components of the proposed project action and expects that all proposed activities will be completed consistent with those measures. Consistent with Fish and Wildlife Coordination Act, should the project be implemented, we suggest incorporation of the following recommendations in order to improve project planning and avoid, minimize, and compensate potential impacts to fish and wildlife resources; as well, we suggest the incorporation of the project design elements outlined below that would improve or enhance fish and wildlife resources beyond the enhancements achieved by the proposed project alone:

1. As part of the proposed project, the Corps should create a least tern/snowy plover nesting island in the project region, potentially with rock and dredge materials. This island should be at least 9 acres in size and relatively flat with the main interior surface of the island constructed of typical least tern nesting soil matrix materials. To accommodate snowy plovers and the haul-out of some pinniped marine mammals, a portion of the island should have a zone of low gradient shoreline sloped down to the water within a protected cove. Other features, such as subaquatic reefs constructed of rock, are also suggested around the island, to provide shallow rocky reef habitats and to help prevent erosion of the island cove shoreline surface materials through dissipation of wave energy. The slope surface of the island cove shore should be constructed of surface boulders, cobble, rounded gravel, and sand (grouted/cemented in place for erosion control) or other compatible materials for snowy plover chick foraging; the configuration (e.g., shore slope angle) should be such that the cove areas remain open to tide-borne deposition of natural beach wrack and would otherwise support snowy plover chick and adult foraging. The remainder of the island would likely need to be edged by riprap or similar materials to avoid erosion of the island by wave and wind energy; this would be similar to the four artificial THUMS islands[16] currently found off Long Beach within the project region. It is preferred that the surface/shore of this island not be utilized for human recreation and be protected from unauthorized entry.[17]

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[16] The THUMS Islands (named for the consortium of oil companies that built them) are a set of four artificial islands in San Pedro Bay built in 1965 to tap into the East Wilmington Oil Field. The outside rim of the islands are made of 640,000 tons of boulders from a quarry on Catalina Island, and the islands are filled with 3.2 mcy of dredged material from the bay (Sidel 1994).

[17] In a letter to the Service dated May 7, 2021, the Corps (2021) indicated that "The USACE has determined in the Draft IFR (Section 5.7.2, page 5-87) that the proposed project would not affect either California least tern or western snowy plover (USACE, 2019). In addition, there is no feasible location for such an island. There are no safe areas within the project area where such a habitat could be safely constructed that would not obstruct shipping or would not erode away, possibly leading to sedimentation of the federal navigation channels and increased maintenance

2. The Corps should consider opportunities to beneficially reuse dredged material from navigation and similar projects in the project region, if appropriate, in order to avoid and/or minimize the effects of dredging at the Surfside/Sunset Borrow Area for the proposed project.[18]

3. The Corps should avoid construction of nearshore reef and eelgrass habitats in areas that previously supported eelgrass habitats but may not currently (e.g., Merkel and Associates 2014).[19] Eelgrass has a naturally variable spatial distribution over time (NOAA 2020c; Washington DNR 2020). Similarly, we recommend that rock and sediment placement project activities utilize an appropriate buffer (e.g., at least 100 ft) from existing eelgrass beds and areas that previously supported eelgrass beds to reduce potential indirect effects. Providing appropriate distance between in-water construction activities and eelgrass beds should be implemented to reduce potential inadvertent direct damage, as well as reduce potential construction-related sedimentation, siltation, and/or temporary disturbance and turbidity, within any nearby eelgrass beds (e.g., see NOAA 2014; Corps 2015; NOAA 2021). Alternatively, a minimum 25-foot buffer could be utilized, when combined with a silt curtain installed within the 25-foot buffer between the construction site footprint and existing eelgrass beds prior to placement of the proposed rock/sediment/dredge material (e.g., see California Coastal Commission 2013; NOAA 2021). Meaningful criteria to limit the movement of sediment during placement and/or its potential effects requires site-specific evaluations (e.g., see Erftemeijer and Lewis 2006; Corps 2018).[20] As such, considering the large potential

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dredging requirements" (Corps 2021). We note that the subject project is intended as an ecological restoration project, and its potential effects on least terns or snowy plovers should not drive relevant FWCA recommendations. The FWCA directs the Service to make appropriate recommendations to action agencies such as the Corps that include measures beyond mitigation or project offsets and provides associated authorizations to implement those measures. Past development of the ports of Los Angeles and Long Beach, as well as urban and commercial development of the surrounding coastal communities, has eliminated the great majority least tern and snowy plover nesting habitats that formerly occurred in the project region. This recommendation is directed at partially replacing those historical losses in the same region, consistent with the mandates of the FWCA and the important ecological restoration needs of the region for listed species. Other similar sized artificial islands have been constructed in the project region that have remained intact for decades and are compatible with shipping.

[18] In a letter to the Service on May 7, 2021, the Corps wrote: "The USACE (and the Local Sponsor, the City of Long Beach) are committed to beneficially reusing dredge material to the maximum extent practicable. While we currently project using the Surfside Sunset borrow site, the possibility of utilizing dredged material from other navigation projects (e.g., the Port of Long Beach Deep Draft Navigation Project) will be evaluated during the pre-construction engineering and design (PED) phase and a decision made based on sediment quality and the timing of construction for any such projects" (Corps 2021). We appreciate this commitment to beneficial reuse.

[19] In a letter to the Service on May 7, 2021, the Corps wrote: "Based on data obtained from the planned pre-construction survey, areas mapped as previously having eelgrass by Merkel and Associates in 2016, and the suitable areas for nearshore reef placement indicated in Figure 5-2 of the IFR/EIS/EIR, the USACE has determined that it is reasonably practicable to shift the locations of nearshore reef and sediment placement during the PED phase for the East San Pedro Ecosystem Restoration Project to avoid areas known to have previously supported eelgrass as indicated by the 2016 survey by Merkel and Associates, in addition to areas with existing eelgrass. The Final IFR/EIS/EIR will include this environmental commitment" (Corps 2021). We appreciate this commitment.

[20] "Some in-water activities require an un-vegetated buffer around existing eelgrass beds …In these cases, the appropriate buffer should be included in maps/drawings….Once the bed edge is identified…, an un-vegetated buffer zone around the edge of each bed should be included on plan views or maps…The width of the un-vegetated buffer may vary by project type." (Taken from Corps 2018).

project area and limited extent of existing and previously-identified eelgrass beds, we suggest that the final restoration design and measures for the project chosen by the Corps be informed by previous and current eelgrass mapping efforts such that project activities and all associated impacts would occur outside extant eelgrass beds and areas known to have supported eelgrass in the past.

4. Consistent with the NOAA's National Artificial Reef Plan (NOAA 2007), the Corps should establish a performance monitoring program for the project that, among other things, can detect whether the created reefs from the project are having any unexpected negative consequences, such as facilitating the spread of non-native species (Lambert and Lambert 1998; Wasson *et al*. 2005; Airoldi *et al*. 2015; NOAA 2020c).[21] Post-project monitoring of any eelgrass beds nearby to construction areas should occur, if substantial potential for indirect impacts from the project exists (NOAA 2014). The results of the program should be provided to the relevant natural resource agencies.

If you have any questions regarding this letter, please contact Jon Avery,[22] Federal Projects Coordinator, at 760-431-9440, extension 309.

Sincerely,

SCOTT SOBIECH

Digitally signed by SCOTT SOBIECH
Date: 2021.06.21 12:57:20 -07'00'

Scott A. Sobiech
Field Supervisor

cc:
Bryant Chesney, NOAA National Marine Fisheries Service

[21] In a letter to the Service on May 7, 2021, the Corps wrote: "As described in the [National Artificial Reef Plan], the USACE will use project monitoring data to evaluate the performance of restored habitats (i.e., to assess if restored reefs are accomplishing their designed purpose) and in support of identifying appropriate actions if performance measures are not met or for selecting adaptive management actions. As written, performance measures described within the MAMP of the draft IFR/EIS/EIR are consistent with or similar to currently published performance measures for restored marine ecosystem projects....Within the Draft IFR/EIS/EIR, language was provided...pertaining to monitoring of nonnative and/or invasive (e.g., nuisance) species abundance and distribution to inform decisions about whether the restoration is performing as intended (e.g., native cover measure) and, if not, what adaptive management measures...can be taken to rectify the issue...the removal of nuisance species is described as possible adaptive management tasks to achieve performance criteria for restored habitats. However, predicted nuisance species currently existing within the project area and the Southern California Bight were not identified for each of the restored habitats. To remedy this, the USACE will amend the monitoring outlined in the MAMP to specifically include monitoring of non-native/invasive species of algae (e.g., *Caulerpa taxifolia*, *Sargassum horneri*, etc.) and sessile invertebrates including bryozoans (e.g., *Bugula neritina*), mussels (e.g., *Arcuatula senhousia*), Pacific oyster (*Crassostrea gigas*), and tunicates (e.g., *Botrylloides* spp., *Ciona* spp., etc.). The USACE will commit to incorporating additional language detailing the monitoring and adaptive management of such species into the MAMP in the final IFR/EIS/EIR and agrees with the USFWS that results of this monitoring will be shared with all relevant natural resource agencies" (Corps 2021). In light of recent findings in Newport Bay, we request that *Caulerpa prolifera* be added to that list.
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USACE responses to recommendations provided by the U.S. Fish and Wildlife Service's Final Coordination Action Report (CAR) for the East San Pedro Bay (ESPB) Ecosystem Restoration Feasibility Study

USFWS Recommendation 1

1) As part of the proposed project, the Corps should create a least tern/snowy plover nesting island in the project region, potentially with rock and dredge materials. This island should be at least 9 acres in size and relatively flat with the main interior surface of the island constructed of typical least tern nesting soil matrix materials. To accommodate snowy plovers and the haul-out of some pinniped marine mammals, a portion of the island should have a zone of low gradient shoreline sloped down to the water within a protected cove. Other features, such as subaquatic reefs constructed of rock, are also suggested around the island, to provide shallow rocky reef habitats and to help prevent erosion of the island cove shoreline surface materials through dissipation of wave energy. The slope surface of the island cove shore should be constructed of surface boulders, cobble, rounded gravel, and sand (grouted/cemented in place for erosion control) or other compatible materials for snowy plover chick foraging; the configuration (*e.g.*, shore slope angle) should be such that the cove areas remain open to tide-borne deposition of natural beach wrack and would otherwise support snowy plover chick and adult foraging. The remainder of the island would likely need to be edged by riprap or similar materials to avoid erosion of the island by wave and wind energy; this would be similar to the four artificial THUMS islands currently found off Long Beach within the project region. It is preferred that the surface/shore of this island not be utilized for human recreation and be protected from unauthorized entry.

USACE Response

1) Disagree: Recommendation 1 (create a California Least Tern/Western Snowy Plover nesting island in the project region with rock and dredge materials) is not feasible. The USACE determined in the Final IFR (Section 5.7.2) that the proposed project would not affect either California Least Tern or Western Snowy Plover (USACE, 2019). In addition, there is no feasible location for such an island. There are no areas within the project area where such a habitat could be safely constructed that would not obstruct shipping or would not erode away, possibly leading to sedimentation of the federal navigation channels and increased maintenance dredging requirements. Although armoring as described by the USFWS could feasibly protect the island for a period of time, constant exposure to currents, particularly in any unprotected low areas, waves, and storm waves (as exemplified by the four days of 10- to15-foot waves generated by Hurricane Marie off the west coast of Mexico battered the stronger Los Angeles-Long Beach Breakwater, culminating in substantial damages on or about August 26, 2014) would be expected to erode and damage the armoring and the fill beneath resulting in the structural failure of the island and the requirement to perform potentially substantial and costly repairs. The area shoreward of the middle breakwater is a frequent location of local boating traffic, as well as mooring locations for the Port of Long Beach. The area shoreward of the Long Beach breakwater is a frequently used mooring location for the nearby Naval Weapon Station Seal Beach. Additionally, there are concerns that the purpose of the island, California Least Tern/Western Snowy Plover nesting, would be compromised due to marine mammal haul out and visitation by the public that would be expected to disturb the nesting of least tern and

western snowy plover. Additionally, man-made nesting islands have a mixed history of use by the target species whose success is considered unlikely given the proposed location. Alternative placement sites for sandy island measures within the project area were considered by the USACE Project Delivery Team (please see Alternative 8 in the Final IFR). Based on the inefficiency of the measure (Annual Average Costs/Annual Average Habitat Units being many times higher than features included in Alternatives 2 and 4A), reduced suitability scores from the Habitat Evaluation Model for alternative placement sites, exorbitant Operations and Maintenance costs and safety issues predicted for the measure, the measure was not carried forward or included in the Recommended Plan.

USFWS Recommendation 2

2) The Corps should consider opportunities to beneficially reuse dredged material from navigation and similar projects in the project region, if appropriate, in order to avoid and/or minimize the effects of dredging at the Surfside/Sunset Borrow Area for the proposed project.

USACE Response

2) Agree: The USACE (and the Local Sponsor, the City of Long Beach) are committed to beneficially reusing dredge material to the maximum extent practicable. While we currently project using the Surfside Sunset borrow site, the possibility of utilizing dredged material from other navigation projects (*e.g.*, the Port of Long Beach Deep Draft Navigation Project) will be evaluated during the pre-construction engineering and design (PED) phase and a decision made based on sediment quality and the timing of construction for any such projects. The Port of Long Beach Deep Draft Navigation Project concluded that this is a potentially feasible beneficial reuse of dredged materials and has included this as an option in the Feasibility Study should timing of funding and construction permit this use. No specific projects have been identified that match construction timing and include results from sediment analyses that show compatibility of dredged sediments to ESPB requirements. If beneficial use sites become available, the Corps would consider a supplemental analysis. This environmental commitment is included as GEO-2 in Section 5.2 of the Final IFR/EIS/EIR.

USFWS Recommendation 3

3) The Corps should avoid construction of nearshore reef and eelgrass habitats in areas that previously supported eelgrass habitats but may not currently (*e.g.*, Merkel and Associates 2014). Eelgrass has a naturally variable spatial distribution over time (NOAA 2020c; Washington DNR 2020). Similarly, we recommend that rock and sediment placement project activities utilize an appropriate buffer (*e.g.*, at least 100 ft) from existing eelgrass beds and areas that previously supported eelgrass beds to reduce potential indirect effects. Providing appropriate distance between in-water construction activities and eelgrass beds should be implemented to reduce potential inadvertent direct damage, as well as reduce potential construction-related sedimentation, siltation, and/or temporary disturbance and turbidity, within any nearby eelgrass beds (*e.g.*, see NOAA 2014; Corps 2015; NOAA 2021). Alternatively, a minimum 25-foot buffer could be utilized, when combined with a silt curtain installed within the 25-foot buffer between the construction site footprint and existing eelgrass beds prior to placement of the proposed

rock/sediment/dredge material (*e.g.*, see California Coastal Commission 2013; NOAA 2021). Meaningful criteria to limit the movement of sediment during placement and/or its potential effects requires site-specific evaluations (*e.g.*, see Erftemeijer and Lewis 2006; Corps 2018). As such, considering the large potential project area and limited extent of existing and previously identified eelgrass beds, we suggest that the final restoration design and measures for the project chosen by the Corps be informed by previous and current eelgrass mapping efforts such that project activities and all associated impacts would occur outside extant eelgrass beds and areas known to have supported eelgrass in the past.

USACE Response

3) Partial Agreement: Based on data obtained from the planned pre-construction survey, areas mapped as previously having eelgrass by Merkel and Associates in 2016, and the suitable areas for nearshore reef placement indicated in Figure 5-2 of the IFR/EIS/EIR, the USACE has determined that it is reasonably practicable to shift the locations of nearshore reef and sediment placement and incorporate a rock and sediment placement buffer at a minimum of 50 ft (instead of the recommended 100 ft) from existing eelgrass beds and areas that previously supported eelgrass beds during the PED phase. This distance is greater than the eelgrass buffer zone of 5 meters (approximately 16 ft) that is described in the California Eelgrass Mitigation Plan (NOAA, 2014). Additionally, the nearshore project area is relatively protected and composed of sandy substrate. As a result, sediment is not likely to be significantly suspended or moved by hydrodynamic forces within the nearshore construction area, is expected to settle fairly quickly, and impacts to existing eelgrass beds are not expected based on a buffer zone of 50 ft. The Final IFR/EIS/EIR includes this environmental commitment within MH-1.

USFWS Recommendation 4

4) Consistent with the NOAA's National Artificial Reef Plan (NOAA 2007), the Corps should establish a performance monitoring program for the project that, among other things, can detect whether the created reefs from the project are having any unexpected negative consequences, such as facilitating the spread of non-native species (Lambert and Lambert 1998; Wasson et al. 2005; Airoldi et al. 2015; NOAA 2020c). Post-project monitoring of any eelgrass beds nearby to construction areas should occur, if substantial potential for indirect impacts from the project exists (NOAA 2014). The results of the program should be provided to the relevant natural resource agencies.

USACE Response

4) Partial Agreement: As described in the National Artificial Reef Plan (NOAA, 2007), the USACE will use project monitoring data to evaluate the performance of restored habitats (*i.e.*, to assess if restored reefs are accomplishing their designed purpose) and in support of identifying appropriate actions if performance measures are not met or for selecting adaptive management actions. Performance measures described within the MAMP of the Final IFR/EIS/EIR (Appendix F) are consistent with or similar to currently published performance measures for restored marine ecosystem projects (*e.g.*, NMFS, 2014 and Reed *et al.*, 2006, 2017, and 2019). As such, the USACE considers these performance measures satisfactory to evaluate project performance and to determine whether adaptive management measures are needed. Within the Final IFR/EIS/EIR, language is provided in sections 2.2 and 3.5 of the MAMP pertaining to

monitoring of non-native and/or invasive (*e.g.*, nuisance) species abundance and distribution to inform decisions about whether the restoration is performing as intended (*e.g.*, native cover measure) and, if not, what adaptive management measures can be taken to rectify the issue. In addition, within the Final MAMP in section 3.5 the removal of nuisance species is described as a possible adaptive management task to achieve performance criteria for restored habitats.

However, nuisance species currently or potentially existing within the project area and the Southern California Bight were not identified for each of the restored habitats in the Draft IFR/EIS/EIR. The USACE has amended the monitoring outlined in the MAMP of the Final IFR/EIS/EIR to specifically include monitoring of non-native/invasive species of algae (*e.g.*, *Caulerpa spp.*, *Sargassum horneri*, etc.) and sessile invertebrates including bryozoans (*e.g.*, *Bugula neritina*), mussels (*e.g.*, *Arcuatula senhousia*), Pacific oyster (*Crassostrea gigas*), and tunicates (*e.g.*, *Botrylloides* spp., *Ciona* spp., etc.). The USACE has incorporated additional language detailing the monitoring and adaptive management of such species into the MAMP in the final IFR/EIS/EIR and agrees with the USFWS that results of this monitoring will be shared with all relevant natural resource agencies.

The USACE disagrees with the recommendation that post-project monitoring of eelgrass beds (*i.e.*, after construction and after the monitoring and adaptive management period) should occur. Within the Final MAMP in section 2.2 the monitoring of a reference population of established eelgrass within the nearshore zone of the study area is described. This reference population will be surveyed for nuisance species abundance and distribution throughout the monitoring and adaptive management period. As the monitoring and adaptive management period will span a period of five (5) to ten (10) years, assuming success criteria are not met prior to this period, sufficient time is expected to occur in which to obtain monitoring data for the reference eelgrass population. Results of this monitoring will be shared with all relevant natural resource agencies.

Literature Cited

National Marine Fisheries Service (NMFS). 2014. California Eelgrass Mitigation Policy and Implementing Guidelines. NOAA Fisheries, West Coast Region. 48pp

National Oceanic and Atmospheric Administration (NOAA). 2007. National Artificial Reef Plan (as amended): Guidelines for siting, construction, development, and assessment of artificial reefs. 60pp

Reed, D. C., Schroeter, S. C., and Huang, D. 2006. An experimental investigation of the use of artificial reefs to mitigate the loss of giant kelp forest habitat. San Diego, CA: University of California. 145pp

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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

November 22, 2019

Mr. Bryant Chesney
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4221

Dear Mr. Chesney:

The U.S. Army Corps of Engineers (Corps) has completed a Draft Integrated Feasibility Report (IFR) which includes an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the East San Pedro Bay Ecosystem Restoration Feasibility Study. The Proposed Project Area is in the eastern portion of San Pedro Bay, offshore from the City of Long Beach, California. This 18 square mile area includes the Long Beach shoreline, the Los Angeles River estuary, the Middle Breakwater, the Long Beach Breakwater, Alamitos Bay Jetties, and open water between these features. The Corps' Los Angeles District is the lead Federal Agency and the City of Long Beach is the lead Local Agency for this study. The Draft IFR presents the plan formulation undertaken to develop feasible alternatives and also assesses the potential environmental impacts associated with implementation of the proposed project alternatives.

The purpose of the study is to restore and improve aquatic ecosystem structure and function and to provide for increased habitat biodiversity and ecosystem value. The planning objective is to restore and support the sustained functioning of imperiled habitats such as kelp, rocky reef, eelgrass, and other types historically present in San Pedro Bay in order to support diverse resident and migratory species. The Tentatively Selected Plan (TSP) with the proposed measures are presented in full in Chapter 6 of the Draft IFR. Refer to Chapter 4 of the Draft IFR for descriptions of the measures and alternatives considered during the plan formulation process. Environmental impacts and benefits of the TSP and alternatives are evaluated in Chapter 5 of the Draft IFR.

The Draft IFR is available for public review from November 29, 2019 through January 27, 2020 and may be downloaded as PDF document from the following location:

https://www.spl.usace.army.mil/Missions/Civil-Works/Projects-Studies/East-San-Pedro-Bay-Ecosystem-Restoration-Study/

This letter requests your review and written comments for this project, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, as amended.

This letter also initiates informal consultation on green sea turtles (*Chelonia mydas*) and requests your review and concurrence with a "may Affect, Not Likely to Adversely Affect" determination.

Two identical public meetings will be held on Monday, December 9, 2019, at the Aquarium of the Pacific located at 100 Aquarium Way, Long Beach, California 90802, in the Ocean Theatre.

The first meeting will be from 3 p.m. – 5 p.m. The second meeting will be from 6 p.m. – 8 p.m. A map and directions to the Aquarium of the Pacific are enclosed. Parking validation will be available to meeting attendees.

Please review and submit your comments no later than January 27, 2020. Correspondence may be sent either by email to ESPB@usace.army.mil or to

Mr. Eduardo T. De Mesa
Chief, Planning Division
U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Boulevard, Suite 930
ATTN: Mr. Naeem A. Siddiqui
Los Angeles, California 90017-3489

If you have any questions regarding the project, please contact Mr. Naeem A. Siddiqui, Project Environmental Coordinator, at (213) 452-3852 and EMAIL: ESPB@usace.army.mil.

Thank you for your attention to this document.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

From:	Solek, Christopher W (Chris) CIV USARMY CESPL (USA)
To:	Chabot, Christopher L CIV USARMY CESPL (USA)
Subject:	FW: [Non-DoD Source] Re: ANNOUNCING: Release of Draft Report for East San Pedro Bay Ecosystem Restoration Study Report EIS/EIR by USACE & City of Long Beach (UNCLASSIFIED)
Date:	Tuesday, January 18, 2022 5:48:37 PM

Christopher W. Solek
Chief, Regional Planning Section
Environmental Resources Branch, Planning Division
U.S. Army Corps of Engineers
Los Angeles District
christopher.w.solek@usace.army.mil

Office: 213-452-3867
Cell: 213-395-8464

From: Bryant Chesney - NOAA Federal <bryant.chesney@noaa.gov>
Sent: Thursday, January 16, 2020 11:41 AM
To: Siddiqui, Naeem A CIV CESPL CESPD (US) <Naeem.A.Siddiqui@usace.army.mil>
Cc: Solek, Christopher W CIV USARMY CESPL (USA) <Christopher.W.Solek@usace.army.mil>
Subject: Re: [Non-DoD Source] Re: ANNOUNCING: Release of Draft Report for East San Pedro Bay Ecosystem Restoration Study Report EIS/EIR by USACE & City of Long Beach (UNCLASSIFIED)

This letter was not received, though I can confirm I received it now.
There have been several projects over the past couple years in which a letter was supposedly sent, but we never received it. In the future, I'd suggest the USACE send initiation requests by hard copy and via electronic email requesting confirmation of receipt so we can avoid this problem moving forward.
On the surface, this does not appear to be the appropriate mechanism for initiating ESA7 consultation.
I'll discuss internally on how to resolve this, but I doubt that you'll be receiving a LOC by 1/27.
I'll follow up tomorrow or Tuesday about timeline.
Thanks,
Bryant

On Thu, Jan 16, 2020 at 11:32 AM Siddiqui, Naeem A CIV CESPL CESPD (US) <Naeem.A.Siddiqui@usace.army.mil> wrote:

> Sorry Bryant for the late reply, I was on A/L just came back this week. But to answer your question we initiated ESA consultation at the beginning of the public comments period with this letter sent to you with the Draft IFR/EIS/EIR on GST. Please let us if you have not received this letter in the mail. This was our official notification to initiate ESA Section 7 informal consultation.

From: Bryant Chesney - NOAA Federal [mailto:bryant.chesney@noaa.gov]
Sent: Thursday, January 30, 2020 1:35 PM
To: Solek, Christopher W CIV USARMY CESPL (USA) <Christopher.W.Solek@usace.army.mil>
Cc: Siddiqui, Naeem A CIV CESPL CESPD (US) <Naeem.A.Siddiqui@usace.army.mil>; Lovan, Hayley J CIV (USA) <Hayley.J.Lovan@usace.army.mil>
Subject: [Non-DoD Source] Re: ESPB NMFS Consultation

Good afternoon,
Thank you for the productive call yesterday. As discussed, I'm providing a summary of issues that should be addressed in order to move forward with informal ESA consultation for green sea turtles.

The IFR does not contain sufficient information to initiate ESA consultation (50 CFR 402.14), and thus precludes our ability to concur with your may affect, not likely to adversely affect determination. Below are some summary points for which I would appreciate a response to initiate the informal consultation.

There is incomplete/incorrect information regarding green sea turtles in the project area. For example, on page 5-84, the IFR indicates that 'Sporadic sightings of live sea turtles have been reported in Los Angeles-Long Beach Harbor in the past; however, none had been observed during the past 20 years (see Table 5-17); however, a dead leatherback sea turtle was collected recently in the area.' This is not consistent with the information I have verbally relayed and by email (e.g., 8/16/19 and 8/30/19). It is not critical that you provide additional information and/or revisions on green sea turtle presence to complete our ESA consultation process as we can help with that information need, but please plan to make appropriate changes in your final IFR/EIS. I presume our ESA consultation will be complete before issuance of the final IFR, so our response will include more detailed information that you may use.

I have some basic project clarification requests and am summarizing below in bullet form:
- Please estimate when construction would begin and end. I see that the Chief's report milestone is in August 2021. I understand there may be some uncertainty regarding project timing given the need for future authorization, but we need to at least be able to estimate the timing of the overall action in relation to other project activities that are affecting the environmental baseline.
- Does your defined project area include the Surfside/Sunset borrow site? I can't find a figure clearly delineating the borrow site location in your figures. Please provide a figure of the borrow site in relation to study area and restoration components.

In order for us to concur with a not likely to adversely affect determination, effects need to be discountable, insignificant, or completely beneficial. The USACE makes a number of conclusions without providing supporting information and/or analytical justification. I am summarizing the conclusions and our requests for clarification/information below:
'Construction activities would not result in the direct loss of habitat for sea turtles that may occur in the project area.'
Eelgrass is important foraging habitat for green sea turtles. The project has the potential to impact eelgrass habitat (0.5 acres), so some direct loss may occur. Adverse effects to eelgrass could potentially be a form of harassment. The associated environmental commitment and narrative to avoid/minimize impacts to eelgrass is ambiguous.
- Please clarify how you are defining eelgrass habitat (e.g., CEMP definition or something else)
- Please clarify if you are committing to avoid the areas mapped as eelgrass habitat by Merkel (2017) (i.e. the comprehensive eelgrass survey in East San Pedro Bay), and any future pre-construction surveys performed for this project.

- The draft environmental commitment appears to indicate avoidance, if feasible. Given the project purpose (e.g., creation/restoration), please explain why avoidance of direct impacts would not be feasible. Please consider avoidance of direct impacts based on CEMP definition utilizing all available data, and remove 'if feasible' language if the USACE believes such avoidance is feasible.

'Construction activities, including dredging, would not likely result in direct mortality of green sea turtles.'
Hydraulic dredging is known to have resulted in direct turtle mortality in the Southeast, and we've at least one incident in southern California of such a turtle mortality associated with a dredge interaction (verified by expert turtle pathologist) that occurred coincident in time with similar offshore dredging for sand placement in northern San Diego County. We also have observed a number of turtle strandings in the ESPB project area associated with vessel encounters, and potentially dredge interactions (i.e., cracks in both the top and bottom of the shell).
- Please clarify the duration and seasonal timing of the dredging
- Please describe in greater detail the potential dredging equipment and how it would be carried out.
- Please describe any operational measures and/or environmental commitments that would be implemented to avoid/minimize mortality. For example, a common BMP used with hydraulic dredging on the East Coast is to disengage dredge pumps until the dragheads are firmly on the bottom.
- The IFR indicates that dredging can occur 24 hours per day, 7 days per week, but one of the environmental commitments indicates that work would occur only during daylight hours when visual monitoring of marine mammals and sea turtles can be conducted. Please clarify whether dredging would occur 24/7 or during the daylight hours only.

'Construction activities may result in indirect impacts from noise, turbidity, and barge/equipment travel to and from construction sites within the bay, causing turtles to temporarily avoid activity areas'
The IFR indicates that Alternative 4A is anticipated to take approximately 37 months to construct. Given our understanding of turtle presence, movements, and foraging behavior, turtles may normally be using some of the nearshore areas along E. San Pedro Bay. Thus, the project may preclude the use of these areas for over three years. Combined with the environmental baseline (e.g., Navy Seal Beach Ammunition Pier and Turning Basin), this could potentially cause harassment.
- Please describe the duration and timing of individual nearshore restoration components to better understand the effects and exposure of these actions to turtles? How long will the nearshore reef placement and sediment placement occur and what time of year will the work be done?

I appreciate the inclusion of an environmental protection plan that includes a green sea turtle monitoring and avoidance plan. However, the methods and procedures for monitoring/avoidance are not provided in the IFR, so the benefits of the plan are uncertain.
- Please describe methods/procedures in greater detail so that we better understand how it would avoid/minimize effects to turtles and/or validate assumptions made in your effects analysis.

As examples that may facilitate your understanding of ESA green turtle effects analysis and appropriate mitigation measures, I'm attaching an EFH/ESA Programmatic Consultation we are implementing with the Navy in San Diego. In addition, I'm attaching an EFH/ESA LOC for a Navy action in San Diego Bay, which is similar to the nearshore reef/eelgrass restoration components and may have similar effects. Some of their commitments and design criteria (e.g., monitoring and associated operational adjustments) may be useful for your proposed project. I would also recommend reaching out to your colleagues in Vicksburg. I believe they have a lot of experience with managing dredge/sea turtle interactions, and are working on various mitigation measures (e.g., Blockedhttps://www.usace.army.mil/Media/News-Archive/Story-Article-View/Article/925977/erdc-demonstrates-new-equipment-approach/). I understand the example I provided may not be feasible to commit to at this stage given contractual limitations, but I'm providing it as an example of the experience they've developed over time and because I believe they'd probably be a very good resource for you. Lastly, I'm providing a link to a technical document developed in the Southeast for sea turtle dredge interactions: Blockedhttps://espis.boem.gov/final%20reports/5652.pdf. Please know that the risk and exposure is much higher in the Southeast for a variety of reasons, so I'm not implying that all the mitigation approaches used out there would be applicable/appropriate for your project. However, I believe you should consider some of the basic BMPs, as we discussed on our call.

Once we receive a sufficient response to our information needs, I will do my best to expedite our integrated ESA/EFH response so that it does not adversely affect your project timeline. The revised regulations allow for 60 days upon receipt of a complete initiation package, but our internal WCR guidance is to complete within 30 days. That said, I aim to complete even sooner.

Please let me know if you have any questions about our information needs and if you'd like assistance with developing more refined environmental commitments.

Cheers,
Bryant

From: Chabot, Christopher L CIV (USA)
To: Bryant Chesney - NOAA Federal
Subject: Updated: ESPB GST Monitoring and Avoidance Plan
Date: Thursday, April 2, 2020 2:13:00 PM
Attachments: ESPB_GST_Monitoring_Avoidance_Plan_4220.docx

Bryant,

Per your request for additional information and commitments to support a not likely to adversely affect determination for green sea turtles, these commitments were developed or revised in coordination with NMFS and will be included in the Final IFR.

If you require any further clarification or revisions please don't hesitate to contact me.

Chris

Chris L. Chabot, Ph.D.
Biologist
Regional Planning Section, Planning Division, Environmental Resources Branch
Los Angeles District, U.S. Army Corps of Engineers
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Office: 213-452-3861
Government Cell: 213-663-2092

From: Bryant Chesney - NOAA Federal
To: Chabot, Christopher L CIV (USA)
Subject: [Non-DoD Source] Re: Updated: ESPB GST Monitoring and Avoidance Plan
Date: Friday, April 3, 2020 1:38:33 PM

Hi Chris,
Thank you for providing the additional information and clarity regarding the project and related green sea turtle mitigation measures and environmental commitments. I believe this is responsive to my previous request for additional information, and that you have provided sufficient information to initiate the informal ESA7 consultation. I will do my best to expedite our integrated ESA/EFH response so that it does not adversely affect your project timeline.
Take care and be well,
Bryant

On Thu, Apr 2, 2020 at 2:16 PM Chabot, Christopher L CIV (USA) <Christopher.L.Chabot@usace.army.mil> wrote:

> Bryant,
>
> Per your request for additional information and commitments to support a not likely to adversely affect determination for green sea turtles, these commitments were developed or revised in coordination with NMFS and will be included in the Final IFR.
>
> If you require any further clarification or revisions please don't hesitate to contact me.
>
> Chris
>
> Chris L. Chabot, Ph.D.
> Biologist
> Regional Planning Section, Planning Division, Environmental Resources Branch
> Los Angeles District, U.S. Army Corps of Engineers
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>
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Bryant Chesney
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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

May 1, 2020 Refer to NMFS No.: WCRO-2020-00072

Mr. Eduardo T. De Mesa
Chief, Planning Division
U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017-3489

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter, Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response, and Fish and Wildlife Coordination Act Recommendations for the East San Pedro Bay Ecosystem Restoration Study

Dear Mr. De Mesa:

On January 16, 2020, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the U.S. Army Corps of Engineers (USACE) East San Pedro Bay Ecosystem Restoration Study's (Study) Tentatively Selected Plan (TSP) is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the Endangered Species Act (ESA). The Study was funded by the Energy and Water Development and Related Agencies Appropriations Act for Fiscal Year 2010. This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency template for preparation of letters of concurrence.

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination you made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency template for use of the ESA consultation process to complete EFH consultation.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at NMFS' Environmental Consultation Organizer (ECO) [https://www.fisheries.noaa.gov/resource/tool-app/environmental-consultation-organizer-eco]. A complete record of this consultation is on file at NMFS's West Coast Region Long Beach office.

Consultation History

On November 27, 2019, the USACE provided their Draft Integrated Feasibility Report (IFR), which included an Environmental Impact Statement/Environmental Impact Report, for the Study.

In addition, NMFS received the USACE's request for informal ESA consultation on January 16, 2020. NMFS indicated by email correspondence on January 30, 2020, that the IFR did not contain sufficient information to initiate ESA consultation, and requested additional information and project clarification. The USACE provided clarifying information via email on February 19 and 20, 2020, and a revised green sea turtle monitoring and avoidance plan on April 2, 2020. NMFS staff subsequently emailed the USACE on April 3, 2020, that the USACE had provided sufficient information to initiate informal ESA consultation.

Proposed Action and Action Area

The USACE identified Alternative 4A (Reef Restoration Plan) as the National Ecosystem Restoration (NER) Plan and the TSP. Restoration features include 24 rocky reefs intended to support kelp beds (121 acres) along the breakwater and in open water, two open water rocky reefs (29 acres) by Island Chaffee, and six nearshore rocky reef shoals (20 acres) coupled with six eelgrass beds (30 acres). In total, this alternative intends to restore over 200 acres of rocky reef, eelgrass, and kelp habitat. It is anticipated to take approximately 37 months to construct the proposed project.

Each kelp reef will be roughly circular in shape, spanning approximately 500' in diameter, with approximately 20% total bottom coverage of substrate with only one layer of stone thickness. To construct these kelp reefs, approximately 132,000 tons of quarry stone would be transported from either the Catalina Quarry (a.k.a. Pebbly Beach Quarry; primary quarry site) or from a secondary quarry site, 3M Quarry, located in Corona, Riverside County, California. A representative size of each stone is roughly 2' x 1.5' x 1', with a median weight of approximately 500 pounds. Establishment of giant kelp on the stones would occur through passive colonization of propagules over time. Kelp reef construction would employ the "push off" construction method. In this method, a derrick barge, held in place by six anchor locations, is tethered to a flat-deck barge. Each anchor weighs approximately 7 tons and is accompanied by either a 15-ton concrete block (three seaward anchor locations) or by a second anchor (three shoreward anchor locations) to hold the derrick barge and accompanying flat-deck barge in place. Construction activities would be performed during daylight hours six days a week (Monday – Saturday) during a regular 8-hour day.

The open water rocky reefs will be comprised of individual rock groupings, roughly 100' in diameter, spaced apart within a circular area. Each individual rock grouping will vary in height between 3 feet to 12 feet above the seabed. Approximately 440,000 tons of armor stone quarry material will be needed to construct both of the offshore reef complexes. Construction of the offshore reefs will utilize similar equipment as the kelp reefs, but will require more complex placement techniques than those used for the kelp reefs. For this measure, stone must be specially placed in order to obtain the required void spaces.

The nearshore reef shoals will be placed in relatively shallow waters. Each reef footprint is conceptually designed as a rectangle with crest limits roughly 1,000' long by 175' wide, running parallel to the shoreline in about -20' MLLW depth of water. The reef by Belmont Pier is smaller. Reef crest elevations, or submerged depths below MLLW elevation, will vary from -3 to -10 feet MLLW. The stone pile height (or reef relief) would be roughly 2' to 17' in vertical height above the seabed. Refinements to nearshore reef locations will be made during the planning and design process. For example, the western-most rocky reef/eelgrass feature from west of Belmont Pier may be adjusted to a location fronting Peninsula Beach. This could reduce potential impacts to existing eelgrass west of the pier, and potentially provide additional shoreline erosion benefits along Peninsula Beach. The construction of the nearshore rocky reefs will be accomplished by a barge and crane with appropriate support vessels. The nearshore shoals would be created by first depositing 134,000 tons of quarry run with individual stones no larger than 1 ton at the site, then finely placing 231,000 tons of filter and armor stone with individual stones ranging from 1 to 10 tons to obtain sufficient interlocking and depth profiles. Lastly, 30 acres of eelgrass habitat would be established at five locations in the nearshore zone, co-located with the nearshore reefs described above. The nearshore reefs are intended, among other things, to provide suitable habitat conditions for eelgrass by reducing wave energy and increasing sediment stabilization. Some structural work may be required to maintain the design condition for the nearshore rocky reefs. Typically, maintenance activities would be conducted every 10 years or after a strong storm event that has displaced enough stones to justify the cost of mobilization.

For the eelgrass beds, up to 100,000 cubic yards of dredged sand material obtained from the Surfside/Sunset borrow area would be dumped on the leeward side of the five nearshore rocky reefs with the use of a split-haul scow. The USACE will utilize a clamshell dredge for all dredging associated with the East San Pedro Bay Ecosystem Restoration Project (Project) because this type of equipment has been determined to be well suited based on the quantity and the location of the work. Dredging is expected to occur on a 24-hour per day basis. The USACE will attempt to sequence dredging activities during winter months (November – March 31). However, due to the exposure of the work area to open ocean wave conditions, adverse wave and inclement weather may preclude safe working conditions during winter months, necessitating that dredging activities may extend into the non-winter months.

We considered whether or not the proposed action would cause any other activities and determined that it would not.

The action area includes nearshore habitat in East San Pedro Bay, along the Long Beach Breakwater, offshore Surfside/Sunset Beach, and associated vessel routes between the Surfside/Sunset borrow site and East San Pedro Bay. Figure 1 depicts a map provided by the USACE, which shows the locations of the major project features within the action area.

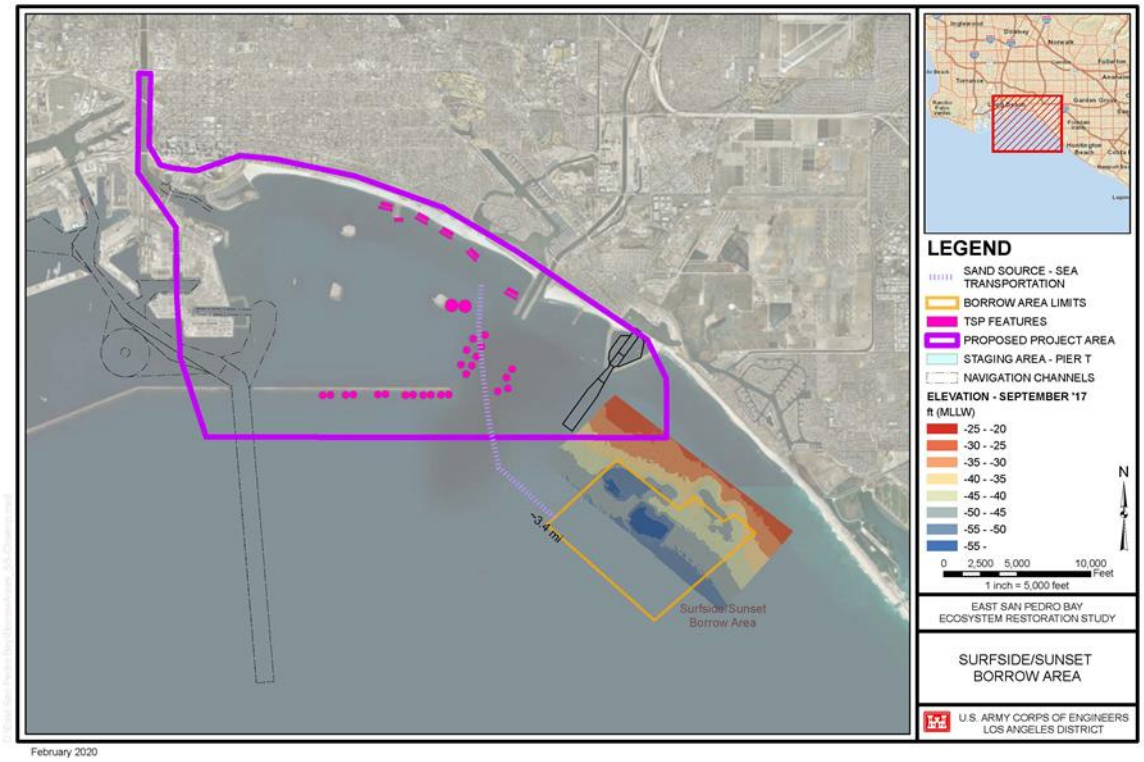

Figure 1: Action area and major project features

As detailed in the IFR and as described in further detail during communications between NMFS and the staff of the USACE Planning Division's Environmental Resources Branch, the following measures will be implemented to avoid or minimize impacts to the federally-listed threatened East Pacific distinct population segment (DPS) of GSTs. These commitments will be included in the Final IFR.

- When dredging and nearshore placement operations occur, a qualified biologist with experience monitoring GSTs will be on site to monitor for the presence of GSTs. The GST monitor will have the authority to cease or alter operations to avoid impacts to GSTs.
- Adequate lighting will be provided during night time operations to allow the monitor to observe the surrounding area effectively.
- During dredging and placement operations, the Corps will designate 30-meter monitoring zones around both the dredge site and nearshore placement sites.
- All vessels associated with the project will not exceed eight (8) knots inside the breakwater.
- Daily visual monitoring within the designated 30-meter monitoring zones will commence prior to the start of in-water construction activities and after each construction work break of more than 30 minutes.

- If a GST is observed within the vicinity of the project site during project operations, all appropriate precautions shall be implemented to avoid or minimize unintended impacts. These precautions include, but are not limited to:
  - Cessation of operation of any moving equipment that is observed within 30 meters of a GST.
  - Immediate cessation of operation of any mechanical dredging equipment if a GST is observed within 30 meters of the equipment.
  - Operations may not resume until the GST has departed the monitoring zone by its own accord or has not been observed for a 15-minute period of time.

- Biological monitors will maintain a written log of all GST observations during project operations. This observation log will be provided to the Corps and NMFS as an attachment to the post-construction report for the project. Each observation log will contain the following information:

  1. Observer name and title;
  2. Type of construction activity (maintenance dredging, etc.);
  3. Date and time animal first observed (for each observation);
  4. Date and time observation ended (for each observation). A GST observation will terminate if (1) an animal is observed exiting the monitoring zone or (2) after a 15-minute period of no observation (assumption is that animal has exited, but was not observed to do so);
  5. Location of monitor (latitude/longitude), direction of GST in relation to the monitor, and estimated distance (in meters) of GST to the monitor;
  6. Nature and duration of equipment shutdown.

- Any observations involving the potential "take" of GSTs will be reported to the Corps within 10 minutes of the incident and to the NMFS stranding coordinator immediately.

- The Corps and its contractors will inform all personnel associated with the construction work of the potential presence of GSTs and the requirement to monitor a 30 meter designated monitoring zone around all in-water equipment and vessels to avoid interactions with, or "take" of GSTs. Prior to the commencement of on-site construction work, **all** contractor personnel (including sub-contractor personnel) will be trained by a Corps biologist (or qualified biologist approved by the Corps) on GST identification and observation protocols to be followed in the event that a GST is sighted. **All** construction personnel are responsible for observing and reporting the presence of GSTs during all water-related construction activities.

- The contractor will implement an Environmental Protection Plan that will include a GST Monitoring and Avoidance Plan and an employee training program on GST observation protocols, avoidance, and minimization measures.

- A pre-construction survey would be performed to document eelgrass extent in the areas of nearshore reef and sediment placement. If eelgrass is present, the location of rocky reef and sand placement would be adjusted to avoid impacts to all existing eelgrass habitat.

Background and Action Agency's Effects Determination

A small population of green sea turtles persists in the San Gabriel River, and within Anaheim Bay and the Seal Beach National Wildlife Refuge (SBNWR) estuarine complex (Crear *et al.* 2016). The available information suggests that while green turtles are present in the San Gabriel River year round, their presence may be more seasonal in other locations during the summer and fall when water temperatures are warmer, including: Anaheim Bay, the SBNWR, Sunset/Huntington Harbor, and Alamitos Bay. Crear *et al.* (2016) showed that acoustically tagged juvenile sea turtles left SBNWR/Anaheim Bay and moved into the San Gabriel River during winter months, when temperatures dropped below 15° Celsius (C). Conversely, turtles moved through Anaheim Bay to get to the 7th Street Basin in the SBNWR during summer and fall months to forage on eelgrass beds. The bay and estuarine habitat areas in which green sea turtles appear to most frequently occur are primarily adjacent and inshore of the action area.

NMFS's Southwest Fisheries Science Center (SWFSC) has been monitoring green turtles throughout southern California, including Anaheim Bay and the SBNWR, to characterize population structure, foraging ecology, and movement patterns. For example, NMFS has been studying a local population of green sea turtles in San Diego Bay. These turtles are known to be attracted to the high concentrations of eelgrass and the presence of this important food item and habitat for other preferred prey species likely influences their activity patterns within San Diego Bay (Lemmons *et al.* 2011). While the specific importance of eelgrass in East San Pedro Bay has not been characterized, we conclude eelgrass is likely a similarly important habitat feature for green sea turtles that may be found within the project area. In addition to eelgrass, other important prey species identified in San Diego Bay included mobile and sessile invertebrates, as well as red and green algae to a lesser degree (Lemmons *et al.* 2011), which may also be found in shallow nearshore parts of the action area.

In addition, the Navy, in collaboration with NMFS, has been implementing a green sea turtle satellite tagging study to help monitor and better understand impacts of the Navy actions on green sea turtles within the Anaheim Bay estuarine complex. Preliminary results from this effort indicate that habitat utilization is highest within the SBNWR, but a limited number of forays have occurred in the adjacent nearshore within the action area (Bredvik *et al.* 2019). For example, tagging study results indicate limited use of shallow nearshore habitat in East San Pedro Bay, which harbors eelgrass habitat in various locations. In addition, preliminary tagging study results also indicate limited movements within and adjacent to the Surfside/Sunset borrow site.

The USACE concluded that the TSP may affect, but is not likely to adversely affect the federally threatened East Pacific (*Chelonia mydas*) DPS of green sea turtles. In summary, the USACE concluded that construction activities would not likely cause direct mortality, would not result in the direct loss of habitat for green sea turtles, and would only temporarily increase turbidity and noise in the action area. Proposed habitat restoration features would result in long-term beneficial impacts to green sea turtles by creation of 30 acres of new eelgrass habitat, which may increase foraging opportunities. In addition, the USACE committed to a number of conservation measures that would avoid and/or minimize impacts to green sea turtles. No critical habitat has been designated for the East Pacific DPS, therefore, no impacts to critical habitat would occur.

The USACE also determined that the TSP would adversely affect essential fish habitat for various federally managed species within the Coastal Pelagic Species, Highly Migratory Species, and Pacific Coast Groundfish Fishery Management Plans (FMP) due to short term increases in turbidity and noise, mechanical impacts to benthic habitat, and habitat conversions. However, the USACE concluded that the project would have a net, positive impact on EFH, due to the restoration and/or establishment of eelgrass, rocky reef, and kelp habitat, which are all habitat areas of particular concern (HAPC) for various federally managed species within the Pacific Coast Groundfish FMP.

ENDANGERED SPECIES ACT

Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b). When evaluating whether the proposed action is not likely to adversely affect listed species or critical habitat, NMFS considers whether the effects are expected to be completely beneficial, insignificant, or discountable. Completely beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

The potential effects of the proposed action include risks of injury, general disturbance, loss/avoidance of habitat, and/or mortality to sea turtles as a result of project activities through the use of vessels, cranes, dredges, or any other equipment needed to complete project activities. Any turtles present in the project area may be subjected to significant injuries if struck by a vessel or dredging equipment being used, or by falling rocks as a result of reef construction activities. Turtles may also be affected through collisions with vessels that are transporting dredged materials to the nearshore disposal sites. Additionally, habitats in the vicinity of the project area that may be utilized by sea turtles, such as eelgrass and shallow nearshore habitat, have the potential to be impacted via disturbance or degradation. In their consultation request, the USACE committed to a number of avoidance and minimization measures described above in the project description. These measures are expected to minimize the risk of potential adverse effects to green sea turtles caused by the proposed activities in the unlikely event that a turtle is encountered during the project.

Direct Contact Injury

Dredging equipment poses a direct contact threat to green sea turtles. The use of a clamshell dredge comes with the possibility of striking or trapping an unseen turtle, which may lead to serious injury or mortality. However, the clamshell dredging method involves relatively slow-moving machinery that impacts small areas of substrate at a time. In order for a turtle to be entrapped by a clamshell, it would have to avoid detection and remain in the same location, despite the presence of the moving dredging equipment. Considering the lack of foraging habitat near the Surfside/Sunset borrow pit and the expectation of turtles to avoid the project area due to noise generation disturbance, NMFS does not expect there to be a significant presence of turtles in the project area during dredging operations. Furthermore, clamshell dredging has been shown to be less harmful to turtles when compared to other dredging methods, primarily in comparison to hopper dredging (NMFS and USFWS 1991) or other dredging methods that utilize suction or hydraulic intakes.

In general, the risks of direct contact injury for sea turtles as a result of dredging are low as green sea turtles do not commonly occur near the Surfside/Sunset borrow pit, based on the information previously described. However, because there is a possibility of green sea turtles being present, the proposed project includes measures that are designed to minimize the risk of sea turtles coming into direct contact with any vessels, equipment, or debris. For example, the project area will be monitored for green sea turtles. If a turtle is observed within a 30 meter perimeter around activities, operations will cease for at least 15 minutes or until the animal is observed outside of the 30 meter zone, ensuring that any turtles have vacated the project area. If any turtles are in the project areas but avoid detection, we expect that those turtles will detect the commencement of project activities as dredging equipment and/or vessels begin to ramp up operations in the turtle's immediate vicinity, and will have an opportunity to move away, especially during the initial stages of mobilizing equipment and vessels for work.

The severity of injuries resulting from a collision between a GST and a project vessel typically depends on the size and speed of the vessel (Knowlton and Kraus 2001, Laist *et al*. 2001, Vanderlaan and Taggart 2007). For example, research has shown that lethality, defined as mortality or serious injury, increases with vessel speed. As described above in the proposed avoidance and minimization measures, vessels will be moving at relatively slow speeds while conducting project-related movements. While vessel collisions are the primary identified cause of green sea turtle strandings along the west coast of the United States (LeRoux 2015, NMFS unpublished stranding data), the likelihood of collisions between sea turtles and project vessels moving at such slow speeds is remote, as we expect alert vessel operators, biological monitors, and turtles to be able to avoid collisions.

NMFS expects that the implementation of the proposed avoidance and minimization measures will be effective at reducing the risks of direct contact between sea turtles and vessels and/or dredging equipment. Given the low likelihood that sea turtles will commonly be in the project areas, and the additional impact minimization measures that can be triggered as a result of monitoring and avoidance measures, NMFS concludes that the likelihood of direct contact with vessels and/or dredging equipment resulting in severe injury or mortality as a result of the proposed dredging project is discountable.

General Disturbance

In general, all in-water construction projects present some degree or risk of disturbance to any green sea turtles that may be present within the project area. Dredging and other vessel-based operations that may involve the generation of underwater or surface sounds or the increase of turbidity in the water column have the potential to create some level of disturbance for any green sea turtles that are nearby. However, clamshell dredging typically generates low frequency sound pressure levels, from 100 to 12 dB re 1 micro-Pascal (Dickerson *et al*. 2001). These levels are below the 160 dB re 1 micro-Pascal criteria for marine mammal harassment, which NMFS also uses as a general guideline for sea turtles, in the absence of species-specific information. Little data exists on the behavior of sea turtles in response to noise generate by dredging activities, but we expect the reaction to any disturbance that may be created by the proposed action will be avoidance of the immediate project area.

Given the lack of important foraging habitat features near the Surfside/Sunset borrow pit, we do not expect turtles to spend a significant time near the dredging operations. Similarly, we do not expect turtles to frequently utilize the areas proposed for rock placement at the kelp and rocky reef restoration sites given the lack of important foraging habitat features currently present. Therefore, avoidance of these areas is not likely to significantly impact or disrupt the regular movements or behaviors of turtles. Within East San Pedro Bay, green sea turtles may spend relatively more time in the areas proposed for nearshore reef and sediment placement given that these areas contain some important foraging habitat features, such as eelgrass vegetation and associated shallow subtidal habitat. However, there have been only limited observations of green sea turtles in these areas. The majority of construction work will occur in the winter months when green sea turtles are expected to occur most frequently in enclosed bays and estuarine areas outside the action area, thereby minimizing exposure to general disturbances associated with construction activities. Temporary avoidance of a small portion of available foraging habitats is not likely to limit foraging abilities or have any detectable effect on the health of sea turtles, as they are not expected to rely specifically or exclusively on the project areas for forage, rest, or refuge, especially given the quantity and quality of foraging habitat further south. Therefore, NMFS expects that any effects or disturbance resulting from exposure to project activities will be insignificant, given the low probability that turtles will be in the project area for extended periods of time and the lack of any expected impact on health and fitness that avoidance of these areas would have on green sea turtles.

Impacts to foraging habitat

The project is expected to provide a long term increase in the amount of foraging habitat in East San Pedro Bay, which NMFS expects will have a beneficial impact to green sea turtles. The USACE has concluded that construction activities would not result in the direct loss of existing eelgrass habitat, and has made environmental commitments to ensure any losses would be avoided. Specifically, a pre-construction survey would be performed to document eelgrass extent in the areas of nearshore reef and sediment placement. If eelgrass is present, the location of rocky reef and sand placement would be adjusted to avoid impacts to all existing eelgrass habitat. Therefore, NMFS concludes that the potential risks of impacts to the quantity, quality, or availability of sea turtle foraging habitat as a result of the proposed project are expected to be insignificant.

Conclusion

Based on this analysis, NMFS concurs with the USACE that the proposed action is not likely to adversely affect the federally threatened green sea turtle. Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by USACE or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) the proposed action causes take; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the written concurrence; or (4) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Under the MSA, this consultation is intended to promote the protection, conservation and enhancement of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, chemical, and biological properties that are used by fish (50 CFR 600.10), and "adverse effect" means any impact which reduces either the quality or quantity of EFH (50 CFR 600.910(a)). Adverse effects may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

The effects of dredging on EFH may include 1) direct removal/burial of organisms; 2) turbidity/siltation effects, including light attenuation from turbidity; 3) contaminant release and uptake, including nutrients, metals, and organics; 4) release of oxygen consuming substances; 5) entrainment; 6) noise disturbances; and 7) alteration to hydrodynamic regimes and physical habitat. The disposal of dredge material can adversely affect EFH by 1) impacting or destroying benthic communities, 2) affecting adjacent habitats, 3) creating turbidity plumes and introducing contaminants and/or nutrients. Adverse impacts to EFH from the introduction of fill material include 1) loss of habitat function and 2) changes in hydrologic patterns.

NMFS generally concurs with the USACE's determination that the TSP would adversely affect EFH for various federally managed species within the Coastal Pelagic Species, Highly Migratory Species, and Pacific Coast Groundfish Fishery Management Plans (FMP) due to short term increases in turbidity and noise, mechanical impacts to benthic habitat, and habitat conversions. In general, the habitat conversions associated with project activities are expected to provide a net, positive impact on EFH, due to the restoration and/or establishment of eelgrass, rocky reef, and kelp habitat, which are all habitat areas of particular concern (HAPC) for various federally managed species within the Pacific Coast Groundfish FMP. However, NMFS has some concerns regarding potential adverse impacts to eelgrass habitat and the effects of artificial reefs in embayment habitats. In addition, NMFS believes the USACE should consider opportunities to beneficially reuse dredged material from other navigation projects to avoid and/or minimize the effects of dredging at the Surfside/Sunset borrow pit.

According to the IFR, nearshore rocky reef construction would potentially result in the direct loss of approximately 0.5 acre of existing eelgrass habitat from direct rock/sediment placement o based on the feasibility-level design. Pre-construction eelgrass presence surveys would be conducted to determine presence of eelgrass within areas proposed for sand and rocky reef placement. Rocky reef and eelgrass sand placement would be adjusted as much as feasible during the detailed design phase as well as during construction to avoid impacts to all existing eelgrass habitat. For example, the western-most rocky reef/eelgrass feature from west of Belmont Pier may be adjusted to a location fronting Peninsula Beach. This could reduce potential impacts to existing eelgrass west of the pier. NMFS supports conducting additional pre-construction eelgrass surveys to inform final site design to avoid adverse impacts to eelgrass habitat. In addition, NMFS believes that the USACE should avoid nearshore reef and sediment placement in areas that previously supported eelgrass habitat (e.g., Merkel and Associates, 2014). Given the project purpose to restore and/or enhance the habitat quality of East San Pedro Bay, it is reasonable to avoid disruptions to areas that previously supported eelgrass vegetation. Eelgrass is a dynamic resource with highly variable spatial distribution. Therefore, the final restoration design should also be informed by previous eelgrass mapping efforts.

The project would convert or modify approximately 200 acres of unvegetated soft bottom habitat. In general, NMFS concurs with the IFR that these conversions are offset by establishment of equivalent acreage of higher-value habitats and adverse impacts to adjacent soft bottom habitat would be short-term. NMFS believes a carefully planned artificial reef constructed from quarry rock in appropriate seascape contexts can provide valuable marine resources comparable to those provided by natural reefs. However, NMFS generally has concerns regarding the cumulative effects associated with artificial hardening of embayment and estuary HAPC shoreline and associated shallow water habitat.

Although construction of the rocky reef components is expected to create beneficial reef habitat for numerous native marine taxa, it may also facilitate colonization by non-native species that may be better equipped to exploit such habitats compared to native species (Wasson et al. 2005; Airoldi et al. 2015). Given the relative lack of natural hard bottom habitat in estuaries, the addition of artificial hard structures within this type of habitat may provide an invasion opportunity for non-indigenous hard substratum species (Glasby et al. 2007, Wasson et al. 2005, Tyrell and Byers, 2007). Several studies have demonstrated greater abundance of non-native organisms on artificial structures in bays and harbors relative to native species (Lambert and Lambert 1998; Glasby et al. 2007; Tyrrell and Byers 2007; Obaza and Williams 2018). There also exists the potential for non-natives to expand into nearby eelgrass habitat (Worcester 1994; Carman and Grunden 2010). Quantifying non-native communities on such structures provides valuable information for resource managers where, currently, data and management strategies are limited (Obaza and Williams 2018).

Hydrodynamic forces and seascape context are likely important factors influencing community structure of artificial reef environments. Pondella *et al*. 2006 indicated that artificial reefs placed near the mouth of San Diego Bay yielded fisheries benefits. In addition, Davis et al (2002) found that intertidal sites closest to the mouth of San Diego Bay were most similar to exposed coast intertidal sites compared to more protected sites further from the bay mouth. The majority of rocky reef establishment activities associated with the TSP occur near the mouth of the breakwater enclosed East San Pedro Bay, which suggests that these reefs may yield fisheries benefits more similar to open coast reefs, as found in San Diego Bay (Pondella *et al*. 2006). However, some of the reef components may be sufficiently protected within the bay to yield a community structure different than open-coast natural reefs, and may be more prone to harboring non-native species. Consistent with the National Artificial Reef Plan (NOAA 2007), the USACE should establish a performance monitoring program that, among other things, can detect whether the reefs are having any unexpected negative consequences, such as facilitating the spread of non-native species. Therefore, NMFS believes that the USACE should include non-native species abundance and distribution as a performance measure in the monitoring and adaptive management program.

Lastly, the USACE should consider opportunities to beneficially reuse dredged material from other navigation projects to avoid and/or minimize the effects of dredging at the Surfside/Sunset borrow pit. For example, the USACE's Port of Long Beach (POLB) Deep Draft Navigation Project assumes that 2.5 million cubic yards of sediment may be placed at the Surfside/Sunset borrow site. In order to reduce dredging related habitat disturbances at the borrow site, the USACE should commit to beneficially re-using dredge and fill material from nearby navigation projects to the fullest extent practicable.

EFH Conservation Recommendations

The TSP contains a number of best management practices, standard operating procedures, conservation measures, and mitigation measures to reduce the effects of the project on EFH. Except where noted in our conservation recommendations, NMFS believes the mitigation and conservation measures are integral components of the proposed action, and expects that all proposed activities will be completed consistent with those measures. Any deviation from these measures will be beyond the scope of this consultation and may require supplemental consultation in order to determine what effects, if any, the modified action is likely to have on EFH.

Based upon the above effects analysis, NMFS has determined that the proposed project would adversely affect EFH for various federally managed fish species under the Coastal Pelagic Species, Pacific Coast Groundfish Species, and Highly Migratory Species FMPs. Therefore, pursuant to section 305(b)(4)(A) of the MSA, NMFS offers the following EFH conservation recommendations to avoid, minimize, mitigate, or otherwise offset the adverse effects to EFH.

1. In addition to avoiding vegetated eelgrass habitat observed in the planned pre-construction survey, the USACE should avoid nearshore reef and sediment placement in areas previously mapped as eelgrass habitat (Merkel and Associates, 2014).
2. The USACE should incorporate non-native species abundance and distribution as a performance measure in the monitoring and adaptive management program. Specifically, the USACE should include monitoring of non-native and/or invasive algae (e.g., *Caulerpa taxifolia, Sargassum horneri, S. muticum, Undaria pinnatifida*), and non-native sessile invertebrates, such as conspicuous space-occupying, bryozoans (e.g., *Bugula neritina, Watersipora subtorquata, Zoobotryon verticillatum*), mussels (*Arcuatula senhousia, Mytilus galloprovincialis*), Pacific oyster (*Crassostrea gigas*), and tunicates (e.g., *Botrylloides* spp., *Ciona* spp., *Diplosoma listerianum, Microcosmus squamiger, Styela* spp.).
3. The USACE should evaluate the feasibility of beneficially re-using suitable dredged material for ecosystem restoration purposes within East San Pedro Bay. Specifically, the USACE should evaluate the feasibility of utilizing dredged material from the USACE's POLB Deep Draft Navigation Project to support restoration measures identified in the TSP.

Within 30 days after receiving these recommendations, you must provide NMFS with a detailed written response (50 CFR 600.920(k)(1)). The number of conservation recommendations accepted should be clearly identified in that response. If your response is inconsistent with the EFH conservation recommendations, you must explain why the recommendations will not be followed, including the scientific justification for any disagreements over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects.

The USACE must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600. 920(l)). This concludes the MSA portion of this consultation.

Please direct questions regarding this letter to Bryant Chesney in our Long Beach, California office at 562-980-4037 and/or Bryant.Chesney@noaa.gov.

Sincerely,

Penny Ruvelas for

Chris Yates
Assistant Regional Administrator
for Protected Resources Division

cc: Administrative File: 151422WCR2020PR00032

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June 19, 2020

Mr. Chris Yates
Assistant Regional Administrator for Protected Resources
National Oceanic and Atmospheric Administration
National Marine Fisheries Service, West Coast Region
501 West Ocean Boulevard, Suite 4200
Attention: Mr. Bryant Chesney
Long Beach, California 90802-4213

Dear Mr. Yates:

On May 1, 2020, the U.S. Army Corps of Engineers, Los Angeles District (Corps) received a National Marine Fisheries Service's (NMFS) Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) Essential Fish Habitat response for the East San Pedro Bay Ecosystem Restoration Feasibility Study, Los Angeles County, California (National Marine Fisheries Service reference no. 151422WCRO202000072, dated May 1, 2020), and a discussion was held with NMFS staff on May 26, 2020 to discuss the recommendations.

This letter provides the Corps' response to the conservation recommendations contained in the above referenced document in accordance with section 305(b)(4)(B) of the MSFCMA.

As part of the proposed action, the Corps would be implementing environmental commitments to avoid and minimize impacts to Essential Fish Habitat. Your office has reviewed the project and provided three (3) conservation recommendations to avoid, minimize, mitigate, or otherwise offset the adverse effects of the proposed action on Essential Fish Habitat, as well as an analysis for how the conservation recommendations were determined.

In the attached Enclosure, the Corps has provided a response to each Essential Fish Habitat conservation recommendation provided by NMFS. The Corps believes that it has met the intent of the law, and considers this consultation with your office pursuant to the MSFCMA complete. We appreciate the time and careful consideration of NMFS staff in evaluating the proposed project and for providing Essential Fish Habitat conservation recommendations. We look forward to a continued productive partnership with NMFS in ensuring the restoration of marine aquatic habitat in southern California.

Should you have any questions about our response, please contact Dr. Chris L. Chabot, Project Biologist, at (213) 452-3861 or via email at christopher.l.chabot@usace.army.mil.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure

ENCLOSURE: USACE Response to National Marine Fisheries Service's (NMFS) Essential Fish Habitat (EFH) Conservation Recommendations for East San Pedro Bay Ecosystem Restoration Feasibility Study

NMFS EFH Conservation Recommendation 1.

In addition to avoiding vegetated eelgrass habitat observed in the planned pre-construction survey, the USACE should avoid nearshore reef and sediment placement in areas previously mapped as eelgrass habitat (Merkel and Associates, 2014). By email dated May 26, 2020, the NMFS noted that this conservation recommendation incorrectly cited the Merkel and Associates, 2014 eelgrass report, and should have cited to Merkel and Associates, Inc. 2017. 2016 Southern California Bight Regional Eelgrass Surveys. Report prepared for National Marine Fisheries Service.

USACE Response to EFH Conservation Recommendation 1.

Based on data obtained from the planned pre-construction survey, areas mapped as previously having eelgrass by Merkel and Associates in 2016, and the suitable areas for nearshore reef placement indicated in Figure 5-2 of the IFR/EIS/EIR, the USACE has determined that it is reasonably practicable to shift the locations of nearshore reef and sediment placement during the pre-construction engineering and design (PED) phase for the East San Pedro Ecosystem Restoration Project to avoid areas known to have previously supported eelgrass as indicated by the 2016 survey by Merkel and Associates, in addition to areas with existing eelgrass. The Final IFR/EIS/EIR will include this environmental commitment.

NMFS EFH Conservation Recommendation 2.

The USACE should incorporate non-native species abundance and distribution as a performance measure in the monitoring and adaptive management program. Specifically, the USACE should include monitoring of non-native and/or invasive algae (*e.g.*, *Caulerpa taxifolia*, *Sargassum horneri*, *S. muticum*, *Undaria pinnatifida*), and non-native sessile invertebrates, such as conspicuous space-occupying, bryozoans (*e.g.*, *Bugula neritina*, *Watersipora subtorquata*, *Zoobotryon verticillatum*), mussels (*Arcuatula senhousia*, *Mytilus galloprovincialis*), Pacific oyster (*Crassostrea gigas*), and tunicates (*e.g.*, *Botrylloides* spp., *Ciona* spp., *Diplosoma listerianum*, *Microcosmus squamiger*, *Styela* spp.).

USACE Response to EFH Conservation Recommendation 2.

The USACE disagrees with the recommendation to establish non-native species abundance and distribution as a performance measure in the Monitoring and Adaptive Management Plan (MAMP) for the East San Pedro Ecosystem Restoration Project; however, the USACE will use monitoring data in support of identifying appropriate actions if performance measures are not met or for selecting adaptive management actions. As written, performance measures described within the MAMP of the draft IFR/EIS/EIR are consistent with or similar to currently published performance measures for restored marine ecosystem projects (*e.g.*, NMFS, 2014 and Reed *et al.*, 2006 & 2017). As such, the USACE considers these performance measures satisfactory to evaluate project performance and to determine whether adaptive management measures are needed. Within the Draft IFR/EIS/EIR, language was provided on page 2-7 of the MAMP pertaining to monitoring of non-native and/or invasive (*e.g.*, nuisance) species abundance and distribution to inform decisions about whether the restoration is performing as intended (*e.g.*, native cover measure) and, if not, what adaptive management measures (as briefly described on pages 3-2 and 3-3 for each of the restored habitats) can be taken to rectify the issue. However, predicted nuisance species currently existing within the project area and the Southern California Bight were not identified for each of the restored habitats. In regard to the non-native and/or invasive (*i.e.*, nuisance) species NMFS specifically identifies for monitoring, the USACE agrees to amend the monitoring outlined in the MAMP to specifically include monitoring of non-native/invasive species of algae (*e.g.*, *Caulerpa taxifolia*, *Sargassum horneri*, etc.) and sessile invertebrates including bryozoans (*e.g.*, *Bugula neritina*), mussels (*e.g.*, *Arcuatula senhousia*), Pacific oyster (*Crassostrea gigas*), and tunicates (*e.g.*, *Botrylloides* spp., *Ciona* spp., etc.). The USACE will commit to incorporating additional language detailing the monitoring and adaptive management of such species into the MAMP in the final IFR/EIS/EIR.

NMFS EFH Conservation Recommendation 3.

The USACE should evaluate the feasibility of beneficially re-using suitable dredged material for ecosystem restoration purposes within East San Pedro Bay. Specifically, the USACE should evaluate the feasibility of utilizing dredged material from the USACE's POLB Deep Draft Navigation Project to support restoration measures identified in the TSP.

USACE Response to EFH Conservation Recommendation 3.

The USACE (and the Local Sponsor, the City of Long Beach) are committed to beneficially reusing dredge material to the maximum extent practicable. While we currently project using the Surfside Sunset borrow site, the possibility of utilizing dredged material from the Port of Long Beach Deep Draft Navigation Project will be evaluated during PED and a decision made based on sediment quality and the timing of construction for both projects. No specific projects have been identified that match construction timing and results from sediment analyses are necessary and will be conducted during PED. If beneficial use sites become available, the Corps would consider a supplemental analysis.

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