ENVIRONMENTAL ASSESSMENT

PALOS VERDES REEF RESTORATION PROJECT

February 22, 2017

LEAD AGENCY: USDC National Oceanic and Atmospheric Administration

RESPONSIBLE
OFFICIAL:

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LOCATION: Los Angeles County, California

ABSTRACT: The National Oceanic and Atmospheric Administration (NOAA) proposes to implement an offshore rocky-reef habitat restoration project in the vicinity of the City of Rancho Palos Verdes, Los Angeles County, California. The restored reef would compensate for effects of past wastewater discharges of DDTs and PCBs on fish habitats on the Palos Verdes Shelf. The reef restoration project would involve the placement of 70,300 tons of quarry rock on 40 acres of sandy ocean bottom within a 69-acre site located 0.3 miles offshore of the City of Rancho Palos Verdes in the vicinity of Bunker Point.

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ENVIRONMENTAL ASSESSMENT

PALOS VERDES REEF RESTORATION PROJECT
LOS ANGELES COUNTY, CALIFORNIA

CHAPTER 1 PROPOSED ACTION AND PURPOSE OF AND NEED FOR ACTION

1.1 Proposed Action

The National Oceanic and Atmospheric Administration (NOAA) proposes to create 69 acres of rocky-reef habitat on submerged lands located offshore of the City of Rancho Palos Verdes, California (Figure 1-1). This proposed action is referred to as the Palos Verdes Reef Restoration Project. The submerged lands to be used by the project are owned by the State of California and administered by the California State Lands Commission. The rocky-reef habitat will be created through the placement of 70,300 tons of quarried rock on 40 acres of sandy ocean bottom within a 69-acre project site. The quarry rock will be transported to the site via tugboat and barge from existing quarries on Catalina Island, Los Angeles County, California.

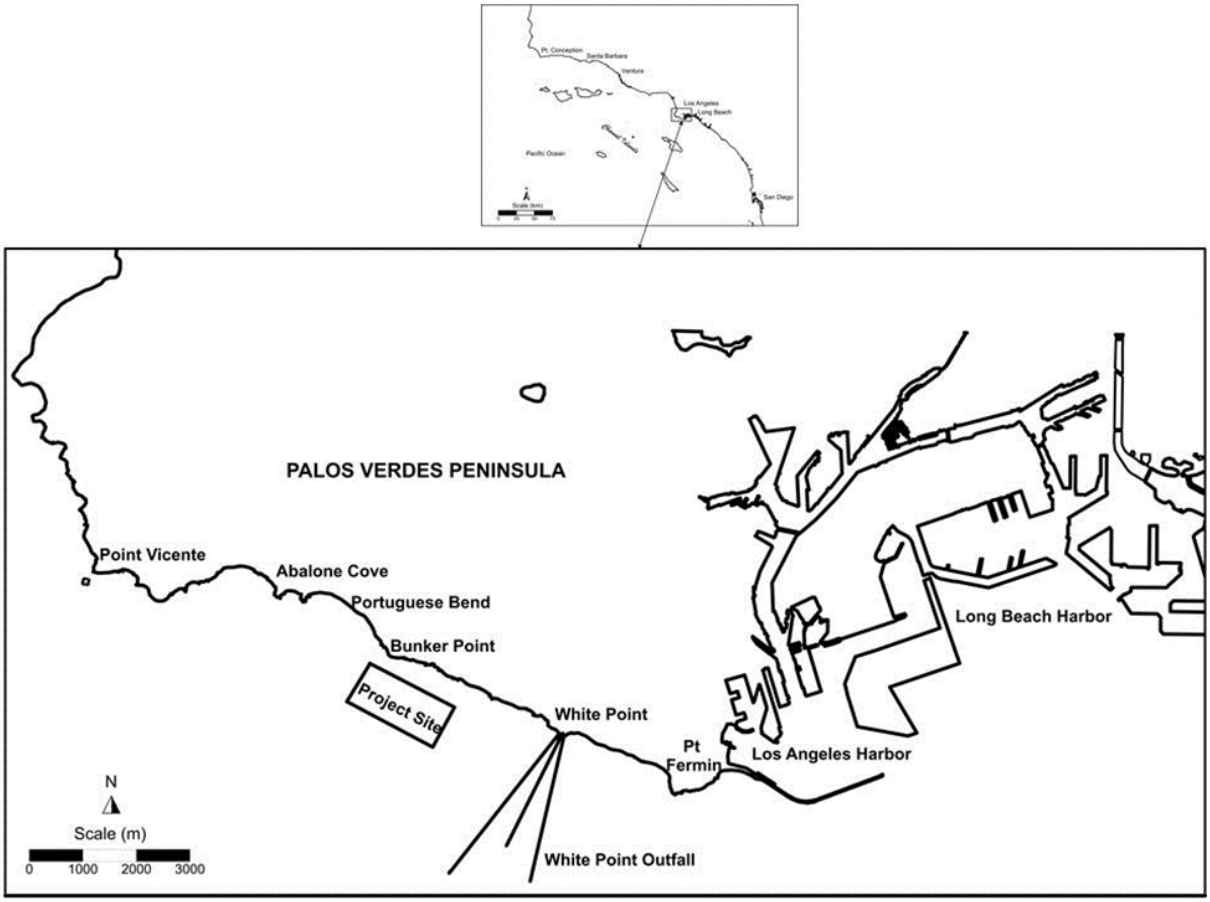

Figure 1-1. Location of proposed site for the Palos Verdes Reef Restoration Project, showing major landmarks in the area.

Two Catalina Island commercial quarries, Pebbly Beach Quarry and Empire Quarry, will supply the quarried rock. The individual rocks used for the project will range from approximately 0.25 to 3.0 tons each. The rock will be clean and free of contaminants per the California Department of Fish and Wildlife's (CDFW) material specification guidelines (Wilson et al., 1990), which include being durable in seawater and having a specific gravity greater than 2.2. Testing performed by an independent laboratory will assure the size, specific gravity, durability, purity, water absorption, and abrasion resistance of the quarry rock used for the project. Inspections of the quarried rock will be conducted to ensure conformance with the specification guidelines.

The two commercial quarries are located within 0.25 miles of Catalina Island loading docks and have direct marine access for the loading of quarried rock. Dump trucks will be used to carry the quarried rock from the excavation sites to the loading docks. The dump trucks will have an approximate capacity of 22 tons and therefore approximately 3,200 round-trips are expected between the excavation sites and the loading docks.

Cranes and front-end loaders will be used to load the quarry rock onto 2,000 ton capacity flat-deck supply barges. The supply barges will be towed by a tug boat, two at a time, approximately 30 miles to the project site. Since each trip will transport about 4,000 tons of quarry rock, a total of 18 trips from Catalina Island to the project site will be required to complete the project. The trip from Catalina Island to the project site is estimated to take approximately 3.5 hours, using an assumed average speed of 9.3 miles per hour.

Figure 1-2 shows a schematic of the construction method and equipment, including the derrick barge, the flat-deck supply barge, GPS markers, anchoring points, rock placement lines, and front-end track loader. A "push off" construction method using a front-end track loader will be used to place the quarry rock within the 69 acre project area. The front-end track loader will be lowered via crane from the derrick barge to the flat-deck supply barge so that boulders can be pushed over the side. The winch operator will maneuver the edge of the flat-deck supply barge to the required position (e.g., at the first line) by winching "in" or "out" on six anchor cables connected to their respective anchors. The derrick-barge winch operator will use a computer monitor displaying the triangulated data to assist in locating the edge of the supply barge at the exact line of deployment. Two differential GPS (DGPS) receivers will be mounted on the derrick barge to keep the barge accurately positioned as it moves along the lines. Positional accuracy of the DGPS system will be estimated at one to two feet, and the software acceptance limits will be set at six feet, meaning that the winch operator will hold position to within a tolerance of six feet. Appendix A contains the proposed anchoring plan.

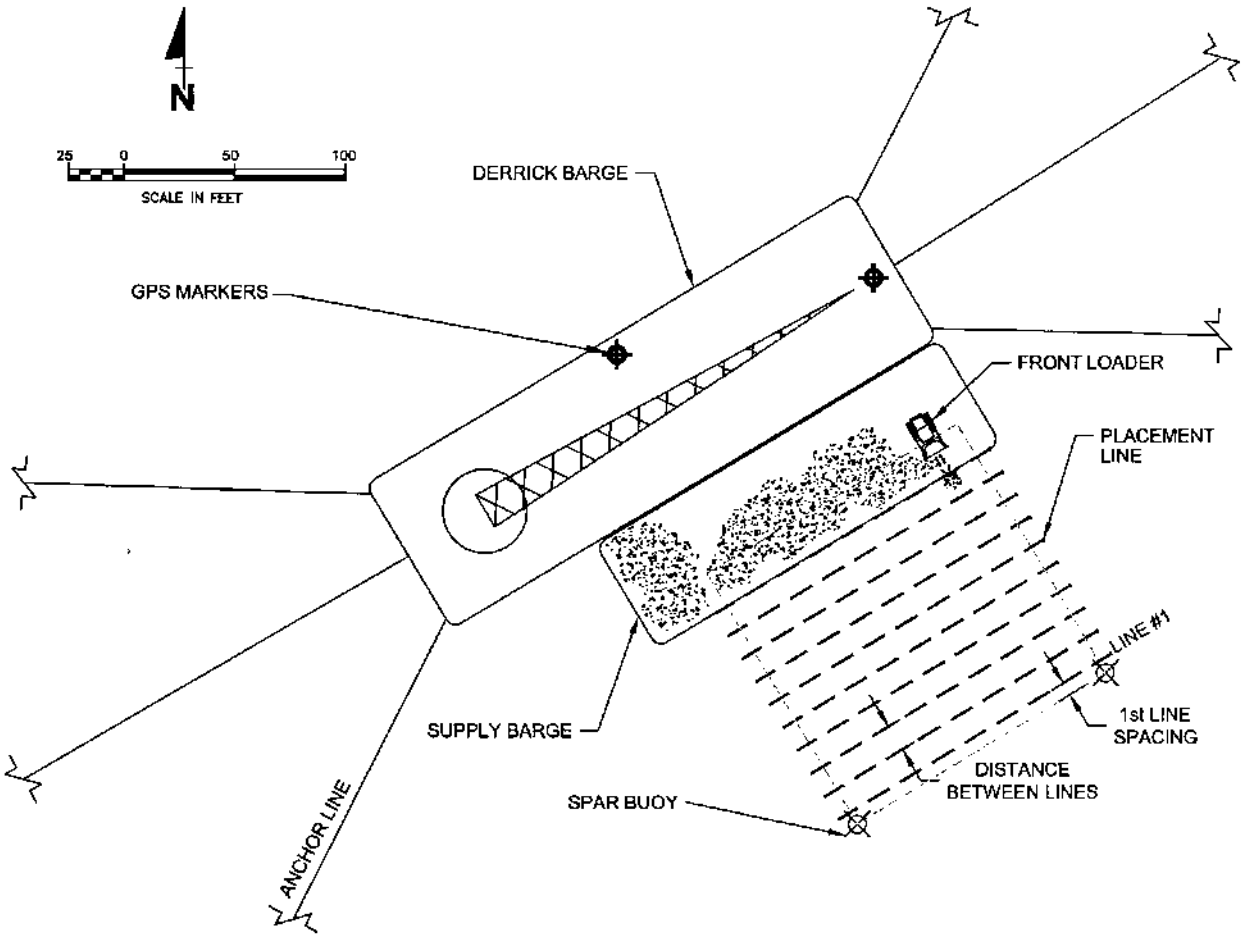

Figure 1-2. Construction method schematic showing derrick barge, supply barge, front-loader, rock placement lines, and six-anchor positioning.

The construction will be carried out by an eight person crew that includes a crane operator, foreman, crane oiler, deck engineer, barge-hand, loader operator, superintendent, and project manager. Appendix B contains the proposed oil spill contingency plan.

The construction activities are proposed to take place between May 1 and September 30 to avoid the lobster-fishing season and to utilize the calm weather conditions that are typical of this time of year in southern California. The pace of the construction is expected to be determined by the pace of quarrying, which is expected to produce about 1,725 tons of rock per day, and by the weather conditions at the project site. This calculates to a minimum of about 40 days of construction to place 70,300 tons of rock. In order to allow for delays caused by mechanical problems and adverse weather conditions, the construction period is estimated as a minimum of 40 days and a maximum of up to 60 days. The construction will be carried out during daylight hours six days a week (Monday through Saturday) except on holidays and during inclement weather (no construction will be performed if the wave height is larger than four feet). The onsite work will begin no earlier than 7:00 am and will be halted no later than 7:00 pm. The average

work day placing quarry rock at the project site is expected to be about ten hours. Eighteen tugboat and barge round trips to and from the quarry site and project site are expected and will include nighttime hours.

1.2 Purpose and Need

The purpose of the Palos Verdes Reef Restoration Project is to restore historic rocky reef habitat that was buried by sedimentation from nearby landslides, thereby providing essential fish habitat and substrate for kelp, other marine algae, and marine invertebrates, creating a productive rocky-reef ecosystem in an area with limited hard substrate. This reef restoration project will compensate for biological resource losses caused by contaminated sediments from the Palos Verdes Shelf Superfund Site as identified in the Montrose Settlements Restoration Program (MSRP) Phase 2 Restoration Plan. NOAA is the lead federal agency on the MSRP Trustee Council. The MSRP Trustee Council also includes the United States Fish and Wildlife Service (USFWS), National Park Service (NPS), California Department of Fish and Wildlife (CDFW), California State Parks (CSP) and California State Land Commission (CSLC).

CHAPTER 2 ALTERNATIVES TO THE PROPOSED ACTION

2.1 Introduction

The range of reasonable alternatives considered in this EA include four locations within the geographic area affected by White Point outfalls, four reef designs requiring different amounts of quarry rock and different construction periods, and the No Action Alternative. The geography of the area that would benefit from restoration is relatively confined and this was an important factor in identifying a range of reasonable alternatives. In fact, there were no reasonable alternatives identified by NOAA that were eliminated from further consideration in this EA. NOAA's preferred alternative is the placement of 70,300 tons of quarry rock on 40 acres of submerged lands in shallower depths within the West Area. The screening criteria used in selecting the agency's preferred alternative are described in the following.

2.2 Screening Criteria

The several alternatives were evaluated individually and screened in considering the Purpose and Need of the proposed action and the relative environmental benefits and adverse effects of each alternative. The limits on available funding and the geography of the area historically impacted by wastewater discharges and sedimentation were important factors in identifying the range of reasonable alternatives. The water depths suitable for kelp forest delineated a zone parallel to the coastline where ecosystem restoration could be considered. No alternative that could reasonably achieve the Purpose and Need was eliminated from consideration in this EA. The screening criteria used in this evaluation focused on achieving the greatest environmental benefits in terms of extent, numbers, and diversity of restored organisms, while minimizing the potential adverse effects on other environmental resources, as follows.

- Proximate to White Point outfalls
- Scale of construction consistent with available funding
- Degraded habitat that would benefit from restoration
- Suitable depths for kelp forest establishment
- Absent or minimal fine-grained bottom sediments
- Low turbidity to assure quarry rock resists burial
- Other conditions favoring diverse ecosystem restoration
- Low potential for adverse effects on range of environmental resources

2.3 Location Alternatives

2.3.1 Introduction

Four locations were considered for the proposed action, including areas referred to as the West and East Areas, and then two different depths within the West Area. The shallower location within the West Area was selected as the preferred location for the proposed action. Each alternate location is briefly described in the following.

2.3.2 West and East Areas

Two different general locations were considered for the proposed reef, one referred to as the West Area, which was selected as the location for the proposed action, and the other referred to as the East Area (Figure 2-1). These locations were considered reasonable alternatives because they are on opposite sides of the White Point Outfalls, sufficiently far away to not affect the integrity of the outfalls during construction, and both possess the general physical characteristics necessary for reef and reef-related resource restoration.

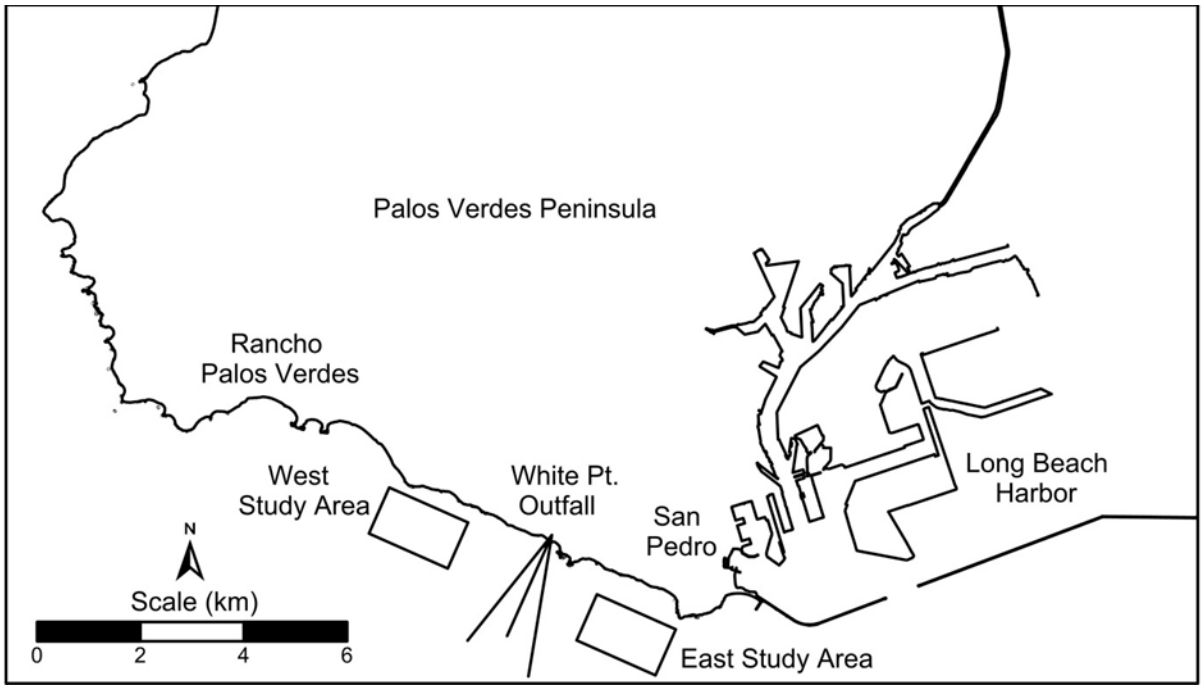

Figure 2-1. East and West location alternatives for the proposed Palos Verdes Reef Restoration Project.

The West Area and East Area are physically similar in terms of the potential for restoration. However, the West Area was selected for the proposed action because the fine-grained bottom sediments are thinner within the depths most suitable for reef construction. The relative absence of fine-grain sediments means the quarry rock would be less likely to sink into or otherwise be covered by sediments. The quarry rock needs to remain uncovered to allow kelp to become established and to survive over time.

There are minor differences between the West Area and East Area in considering the effects of the proposed action on environmental resources. The East Area project site is approximately one mile closer to the Port of Los Angeles and therefore somewhat more accessible in terms of crew and equipment travel time. The shorter travel distance would conserve a small amount of fuel and labor resources, and avoid a small amount of air emissions. The distance to/from the Catalina Island quarries would be the same for both project sites, and the related air emissions would take place within the South Coast Air Basin (SCAB) for either site. The East Area is located offshore of the City of San Pedro, the coastal zone which, like the City of Rancho Palos Verdes, is occupied by residences and open space recreation areas. The beaches and coastal zone adjacent to both sites are used for recreation by residents and visitors, with the beaches being somewhat more accessible in the City of San Pedro. For this reason, concerns over visual and noise effects on residents and visitors are slightly less in the West Area.

These differences in effects between the West Area and East Area are considered minor and offsetting. The East Area's small fuel/labor/emissions advantage in access to the Port of Los Angeles are considered offset by a somewhat more accessible beach area and potential exposure of greater numbers of people to construction-related visual and noise effects. In assessing the minor trade-offs, the greater likelihood of restoration success and of satisfying the purpose of and need for the proposed action are considered compelling reasons to select the West Area for project implementation.

2.3.3 West Area Depth Alternatives

Two locations within the West Area were considered for the proposed action, on either side of a linear outcrop of hard substrate that approximately parallels the shoreline. Both alternatives would involve placing quarry rock on 40 acres within a 69-acre project site. Both alternatives would be built out as 40 acres total of low relief (about 3.2 feet or 1 m) rocky-reef habitat and high relief rocky-reef habitat with heights varying between 2m and 4m (about 6 to 12 ft). Each depth alternative is briefly discussed in the following.

2.3.3.1 Shallower Location – 49 to 68 feet deep (15 – 21 m)

The 69-acre restoration project site in this location would have an elongated footprint about 600 feet (183 m) wide and extending about 1.2 miles (1.9 km) approximately parallel to the shoreline (Figure 2-2). The reef would be constructed in relatively shallow water depths (49 to 68 feet or 15 to 21 m) shoreward of an existing linear outcrop of hard substrate that approximately parallels the shoreline, and adjacent to existing nearshore kelp beds. This 69-acre area includes a patchwork of hard substrate between the more extensive sandy-bottom areas where the quarry

rock would be placed. The sediment depths in the sandy-bottom areas are relatively shallow, 80 percent of the area surveyed has sediment depths less than 3.2 feet (1 m) thick.

This location was selected for the proposed action for several reasons. Higher densities of important fish species are found at these depths on comparable natural reefs. Kelp recruitment in the constructed rocky-reef habitat would be facilitated by the proximity of the existing kelp beds. The constructed reef would also effectively expand the footprint of the existing kelp beds instead of creating a reef island, and thereby have synergistic benefits. In addition, the shallower sediment depths in this area (less than 3.2 feet or 1 m) favor rocky-reef habitat creation because the quarry rock will be less likely to sink into and be buried by sediment. The presence of a patchwork of existing hard substrate would facilitate kelp recruitment over the entire 69-acre site. For these reasons, this location is considered to have the highest potential for restoration benefits and success.

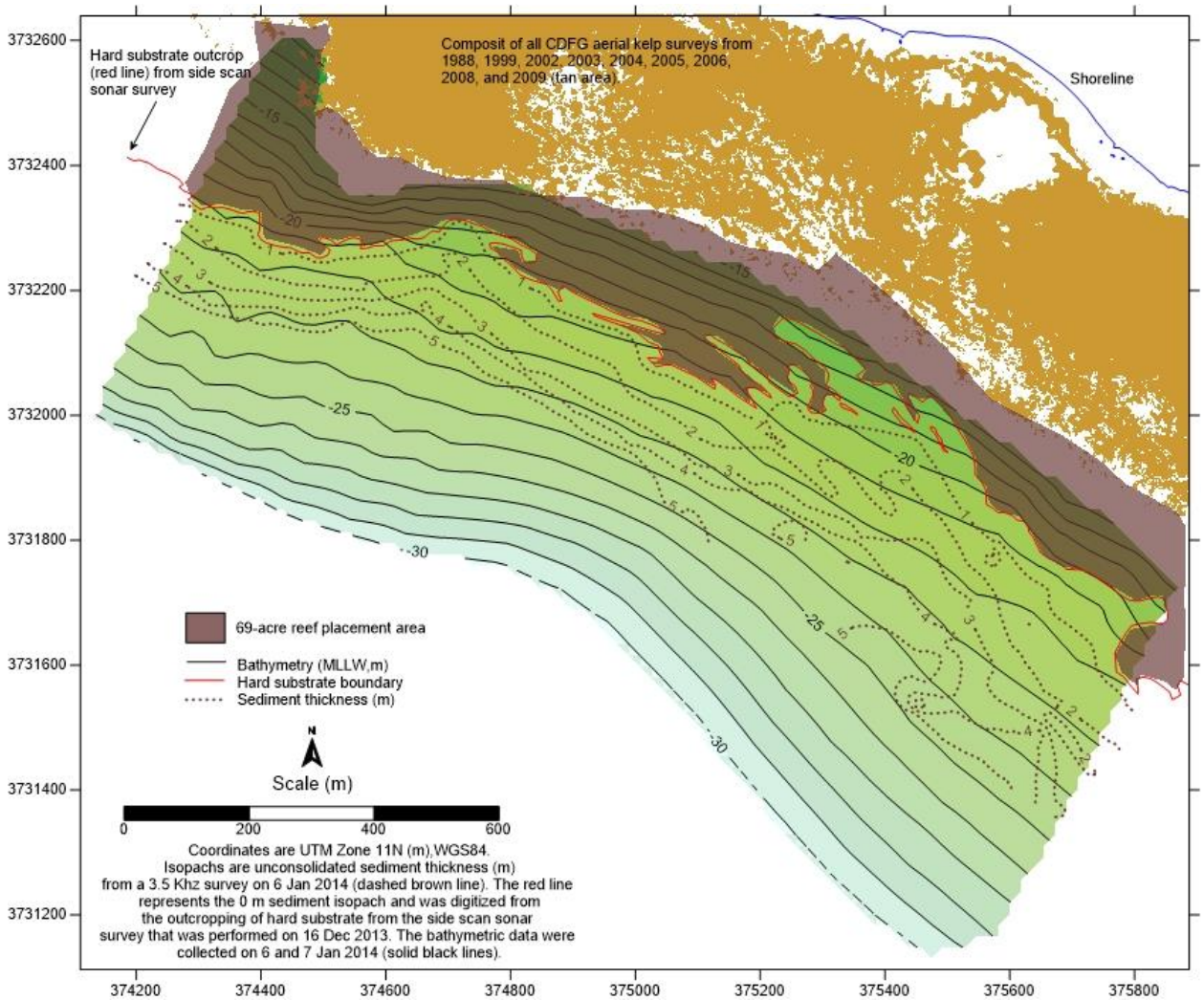

Figure 2-2. Relatively shallow area between the line of hard substrate (red line) and the kelp canopy at the West Area selected for reef construction.

2.3.3.2 Deeper Location – 65 to 82 feet deep (20 - 25 m)

A 69-acre restoration project site in this location would have an elongated footprint about 600 feet (183 m) wide and extending about 1.2 miles (1.9 km) approximately parallel to the shoreline. The reef would be constructed in relatively deep water depths (65 to 82 feet or 20 to 25 m) seaward of an existing linear outcrop of hard substrate that approximately parallels the shoreline. The restoration area would be located about 0.5 to 0.6 miles (0.8 to 1.0 km) offshore. This 69-acre area is almost exclusively sandy-bottom habitat, with a relatively thick cover of sediments, 3.2 to 17 feet (1 to 5 m) thick.

This alternative site is considered to have less potential for restoration benefits and success than the shallower water location described above. Kelp recruitment would be less likely because of the reduced light conditions in deeper water and distance from the existing nearshore kelp beds. The quarry rock would also be more likely to sink into and be covered by the existing, thicker bottom sediments. Furthermore, greater turbidity in this area due to the proximity of the Port of Los Angeles and the Los Angeles River might also inhibit the establishment of kelp. The resulting rocky-reef habitat in this location would function as a reef island and have fewer synergistic benefits than would occur in the shallower alternate location. Under this alternative, the productivity of the reef may be greatly reduced.

These two locations would have minor differences with respect to environmental effects. There would be virtually identical fuel/labor/emissions effects in the two locations. The shallower location would be slightly closer to the shoreline and therefore expose residents and visitors to slightly more proximate construction-related visual effects and noise. The shallower water location contains more hard-bottom habitat, and therefore, there is the potential for greater effects upon existing bottom-dwelling organisms than in the deeper water location. On the other hand, the proposed action includes measures to avoid or minimize effects to hard-bottom habitat. Furthermore, the hard-bottom habitat is relatively degraded and restoring ecological diversity in this habitat by creating adjacent rocky-reef habitat is a purpose of and need for the proposed action. Given the thinner bottom sediments and more favorable lighting conditions for kelp, the likelihood of restoration success is much higher in the shallower location. Therefore, in assessing the minor trade-offs, the greater likelihood of restoration success and of satisfying the purpose of and need for the proposed action are considered compelling reasons to select the shallower location for project implementation.

2.4 Design Alternatives

Four design alternatives were considered in developing the proposed action, which varied in the amount of quarry rock to be placed in the project site from 64,200 to 70,300 tons. The highest amount of quarry rock, 70,300 tons, was selected for the proposed action because it is believed this density of quarry rock placement would result in optimum resource enhancement and thereby best achieve the project purpose and need. The smaller footprint alternatives, 69,300, 69,200 and 64,200 tons, would proportionately reduce the environmental effects of the proposed action. These design alternatives, which vary by up to 6,100 tons of quarry rock, are scaled to a critical mass level that helps assure restoration will be successful and substantial. The variability

in the amount of rock to be used reflects four different configurations, including variations in vertical relief to promote the restoration of different species mixes and abundances. The selected amount, 70,300 tons, would be used to create a rocky-reef habitat structure that would be the most abundant and ecologically diverse.

In assessing the environmental effects, these design alternatives affect the total numbers of round trips between the quarries on Catalina Island and also the duration of the construction period. The reductions from 70,300 tons to either 69,300 or 69,200 tons would amount to small reductions in construction time of 1.4 and 1.6 percent respectively, or perhaps one day or less. The number of round trips to/from Catalina Island would likely not be affected because the reduction would be less than 2,000 tons. Under the assumed construction parameters, the last trip to the project site would be a half load of 1,000 tons, and about one half day of construction would be avoided.

The reduction from 70,300 tons to 64,200 tons would amount to a 6,100 ton or 8.7 percent reduction in the amount of rock to be transported to and placed within the project site. This would reduce the numbers of round trips to/from Catalina Island by about three, from 18 to 15 trips. Using the assumed construction parameters, this would reduce the required construction time from 60 days to 55 days, a reduction of five days. Therefore, this alternative would reduce emissions, fuel consumption, labor expenditures, visual effects, and noise effects by about 8.7 percent.

Selecting the smaller footprint alternatives would mean that fewer resources would be committed including quarry rock, fuel, and labor. There would be less air emissions, the time required for construction would be reduced and minor effects relating to biological resources, air quality, visual aesthetics, and noise would be slightly reduced. However, the result of implementing a smaller footprint design would be a less abundant and less ecologically diverse biological community. For this reason, the 70,300 ton design alternative is considered to best meet the purpose of the proposed action and to best satisfy the need for the project. In addition, as discussed further in this EA, several measures are available and being considered that would help reduce the identified minor effects associated with the 70,300 ton design alternative.

2.5 No Action Alternative

Under the No Action Alternative, NOAA would not implement the Palos Verdes Reef Restoration Project. Quarry rock would not be transported to the proposed project site and would not be placed on the project site in order to enhance environmental resources and compensate for the negative effects of past discharges of DDTs and PCBs. There would be savings of quarry rock, construction-related fuel would be conserved, air emissions would not occur, and no project-related construction equipment would be visible during the period May 1 to September 30. Minor effects on biological resources, air quality, visual aesthetics, and noise would be avoided. At the same time, however, the resource enhancement objectives of the proposed action would not be achieved. As such, the No Action Alternative would not address the purpose of and need for the proposed action.

CHAPTER 3 NEPA REQUIREMENTS, SCOPE OF ANALYSIS, AND PUBLIC INVOLVEMENT

This National Environmental Policy Act (NEPA) Environmental Assessment (EA) evaluates the environmental effects of restoring rocky-reef habitat through the placement of 70,300 tons of quarry rock on 69 acres of submerged lands offshore of the City of Rancho Palos Verdes, Los Angeles County, California. In developing the proposed action and this EA, NOAA consulted with a number of agencies and interested parties in the vicinity of the project area, as follows.

- U.S. Army Corps of Engineers
- California Coastal Commission
- California Department of Fish and Wildlife
- California State Lands Commission
- City of Rancho Palos Verdes
- Regional Water Quality Control Board – Los Angeles Region
- South Coast Air Quality Management District
- The Bay Foundation
- Santa Monica Bay Restoration Commission
- Los Angeles County Sanitation District

NOAA has prepared this EA to assist in determining whether the direct, indirect, and cumulative impacts of the proposed rocky-reef habitat restoration project are likely to result in significant impacts to the human environment. The EA also contains information and analyses designed to help assure compliance with the California Environmental Quality Act (CEQA), pursuant to Section 15221 of the CEQA Guidelines.

NOAA understands that the State of California has several discretionary decisions to make in connection with the proposed action, and that CEQA compliance is required for this decision-making. The California State Lands Commission (CSLC) will be making a discretionary decision on whether to approve a lease for the 69 acres of submerged lands to be used for the project, and is the Lead Agency for CEQA. NOAA consulted with the CSLC in preparing this EA and has included the additional information and analyses identified in Guidelines Section 15221 as necessary for CEQA compliance. Appendix C contains the Initial Study and Environmental Checklist prepared by CSLC for this proposed project.

NOAA Administrative Order 216-6 (NAO 216-6) established agency procedures for complying with NEPA and the implementing regulations issued by the President's Council on Environmental Quality (CEQ). Consistent with the intent of NEPA and the direction in NAO 216-6 to involve the public in NEPA decision-making, NOAA is circulating this EA and requesting public and agency comments on the contents of this EA. Comments received will be considered by NOAA in making a final determination on this proposed action.

CHAPTER 4 APPLICABLE LAWS, FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

4.1 Introduction

Other federal agencies that have environmental review or permitting responsibility for this project include:

- U.S. Army Corps of Engineers (USACE)
- U.S. Environmental Protection Agency (EPA)
- U.S. Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- National Ocean Service (NOS)
- U.S. Coast Guard (USCG)

The jurisdictional authority and other applicable requirements and policies for the placement of artificial reefs are as follows.

- National Environmental Policy Act
- Rivers and Harbors Act
- Clean Water Act
- Coastal Zone Management Act
- Endangered Species Act
- Marine Mammal Protection Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Fish and Wildlife Coordination Act

4.2 National Environmental Policy Act

NEPA's Environmental Impact Statement (EIS) requirement is applicable to all "major" federal actions with the potential to significantly affect the quality of the human environment. Major federal actions include activities that are fully or partially funded, regulated, conducted, or approved by a federal agency. NOAA prepared this EA to assist in determining whether an EIS is necessary for the proposed action.

4.3 Rivers and Harbors Act

Under Section 10 of the Rivers and Harbors Act, any construction affecting navigable waters, including filling, requires a permit from the US Army Corps of Engineers.

4.4 Clean Water Act

The purpose of the Clean Water Act (CWA) is to "Restore and maintain the chemical, physical, and biological integrity of the nation's waters through prevention and elimination of pollution." This act is applicable to any discharge of a pollutant into waters of the United States. Under Section 404 of the Clean Water Act, a permit is required by the US Army Corps of Engineers to regulate the discharge of dredged or fill material into waters of the United States. This project will require CWA authorization.

4.5 Coastal Zone Management Act

The purpose of the Coastal Zone Management Act is to" Preserve, protect, develop, and where possible, restore and enhance resources of the coastal zone." This act is applicable for all federal development activities and development requiring federal permits or funding affecting land or water areas or resources within the coastal zone. Section 307 of the act (16 U.S.C. § 1456), requires that federal agencies proposing activities, including artificial reefs, conduct activities in a manner consistent to the policies of a state's federally approved coastal management program. The Trustee's consistency determination and Coastal Development Permit Application have been submitted to the California Coastal Commission.

4.6 Endangered Species Act

Under the Endangered Species Act (16 U.S.C. §1531-1543), the conservation of endangered and threatened species and the ecosystems they depend upon are mandated. Section 7 of the Act requires federal agencies to insure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or their critical habitats. Potential adverse impacts from this project to federally-listed species are not anticipated (see Sections 5.3.4, 6.1.3 and 6.1.4), but the lead federal action agency will still need to confirm this. If the lead federal action agency determines its proposed action may have an adverse impact on federally-listed species, a biological assessment will be prepared and a Section 7 consultation must be completed. A consultation's effects analysis would consider project materials, possible exposure to contaminants, or physical/mechanical characteristics that may affect listed species.

4.7 Marine Mammal Protection Act

Under the Marine Mammal Protection Act (16 U.S.C. §1361-1421h), the federal responsibility to conserve marine mammals is established. This Act allows for incidental harassment authorizations of marine mammals as long as there is no mortality or serious injuries to marine mammals under the utilization of mitigation measures. The lead federal action agency has determined that the proposed action will have no impact on marine mammals. This is discussed in section 6.1.3.1.

4.8 Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act, National Marine Fisheries Service (NMFS) has the responsibility to rebuild, restore, and maintain fishery resources in exclusive economic zones (EEZ). Under this act, NMFS must develop guidelines on essential fish habitat. Artificial reefs may be designated as essential fish habitat. Ongoing consultation with NMFS combined with established best management practice (Section 6.1.2) will minimize adverse impacts to designated Essential Fish Habitat (EFH). The project area contains EFH for for a variety of fish species that are managed under Coastal Pelagic Species (CPS), Groundfish, and Highly Mighly Migratory Species management plans (see Section 5.3), including two Habitats Areas of Particular Concern (HAPC), rocky reef and canopy kelp. Potential adverse impacts may be associated with the anchors and anchoring systems (Section 6.1.2), which would be ameliorated by predeterming anchoring sites on sandy areas in the mapped reef habitat, and only allowing operation under acceptable swell and wind conditions. Adhering to this will minimize this potential impact as much as possible, and we do not expect any adverse impacts to the site.

4.9 Fish and Wildlife Coordination Act

Under the Fish and Wildlife Coordination Act (16 U.S.C. §§661-666c), fish must receive equal consideration with respect to other aspects of water resource development. This is achieved by consulting with the USFWS, NMFS, and appropriate state agencies, whenever a body of water is proposed to be modified in a way that a federal permit or license is required. These agencies determine: 1) the possible harm to fish and wildlife resources; 2) the measures needed to both prevent the damage to and loss of these resources; and 3) the measures needed to develop and improve the resources, in connection with water resource development. This project is anticipated to improve resources for fish and we do not anticipate detectable or significant impacts during construction. Ongoing consultation with USFWS and NMFS will insure no adverse impacts occur to fish during this project.

CHAPTER 5 AFFECTED ENVIRONMENT

5.1 Introduction

The scope of this EA is based on field data collection and analysis, research of the environmental records of similar southern California reef restoration projects, consultation with affected agencies and known interested parties, a review of the Council on Environmental Quality (CEQ) Guidelines and State of California Environmental Quality Act (CEQA) Guidelines, and coordination with the CSLC in their preparation of a CEQA Initial Study (IS) and Environmental Checklist (Appendix C). Effects on biological resources, air quality, land use, recreation, aesthetics, and noise were determined to be areas of potential concern and will be discussed at some length. Several other potential effects were considered, addressed, and then eliminated from further detailed analysis. A general description of the physical environment of the project site is provided first, followed by individual descriptions of the several components of the affected environment.

5.2 Physical Environment of the Project Site

5.2.1 Geophysical Survey

A geophysical survey was undertaken in order to provide data to assess the suitability of reef construction within the West and East Areas, the two location alternatives. This survey included acquisition of bathymetry, shallow sub-bottom profiling, and side-scan sonar data. These data sets allowed for the definition of suitable areas for reef placement based on appropriate depths of 39 to 98 feet (12-30 m), preferred shallow sediment thickness of less than 3.2 feet (1 m), and the distribution of outcroppings of hard substrate. Surveys were performed from the seaward edge of the existing nearshore kelp beds out to the 98 foot (30 m) isobaths. The side-scan survey was used to map the distribution and roughness of various seafloor substrate types. Sub-bottom profiling was performed to determine the thickness of areas covered by unconsolidated sediments. Bathymetric surveys were performed to determine the water depths and bathymetrical features within the surveyed areas (Figures 5-1 and 5-2).

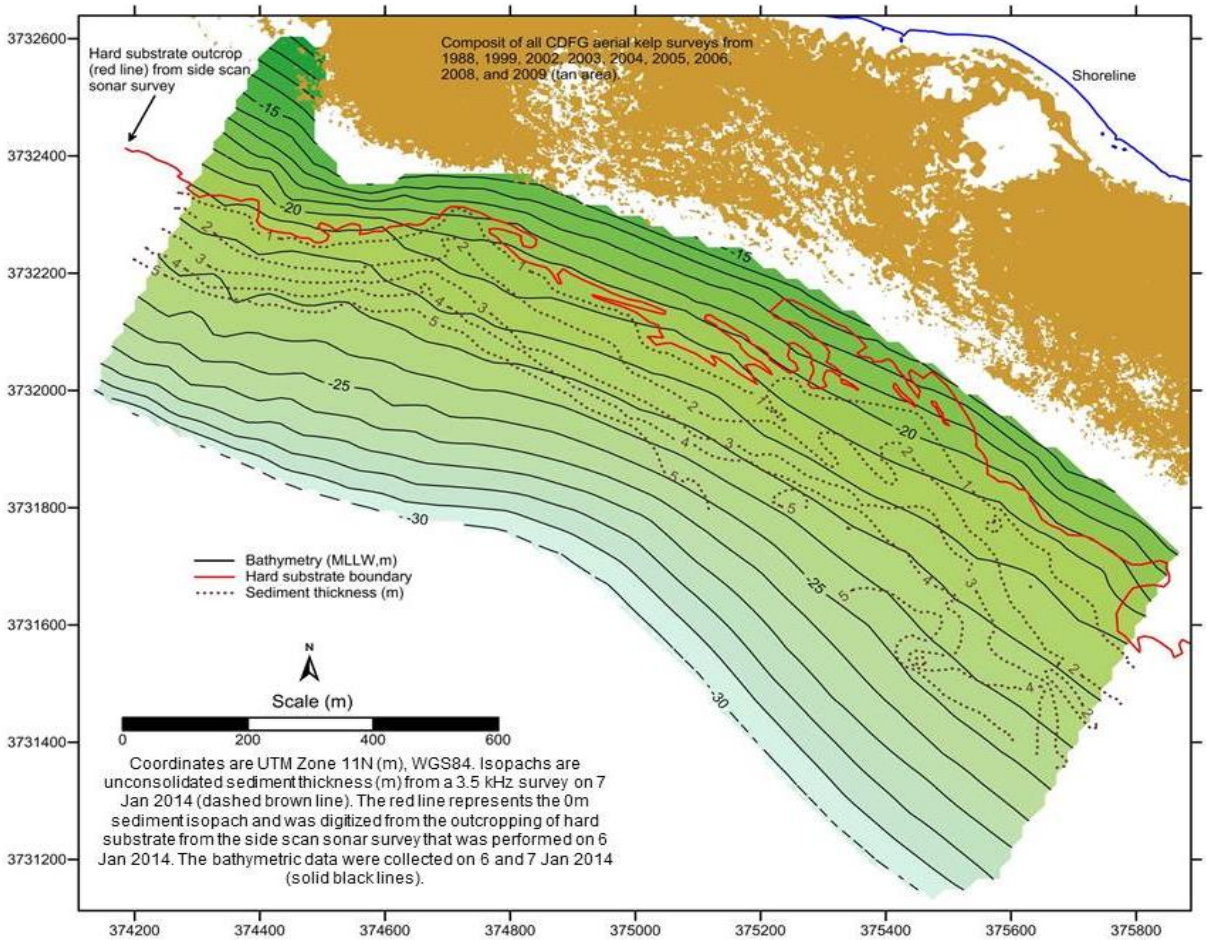

Figure 5-1. Composite of the West Area isobaths, showing the offshore boundary of hard substrate, isopach of sediment thickness, and kelp canopy distribution.

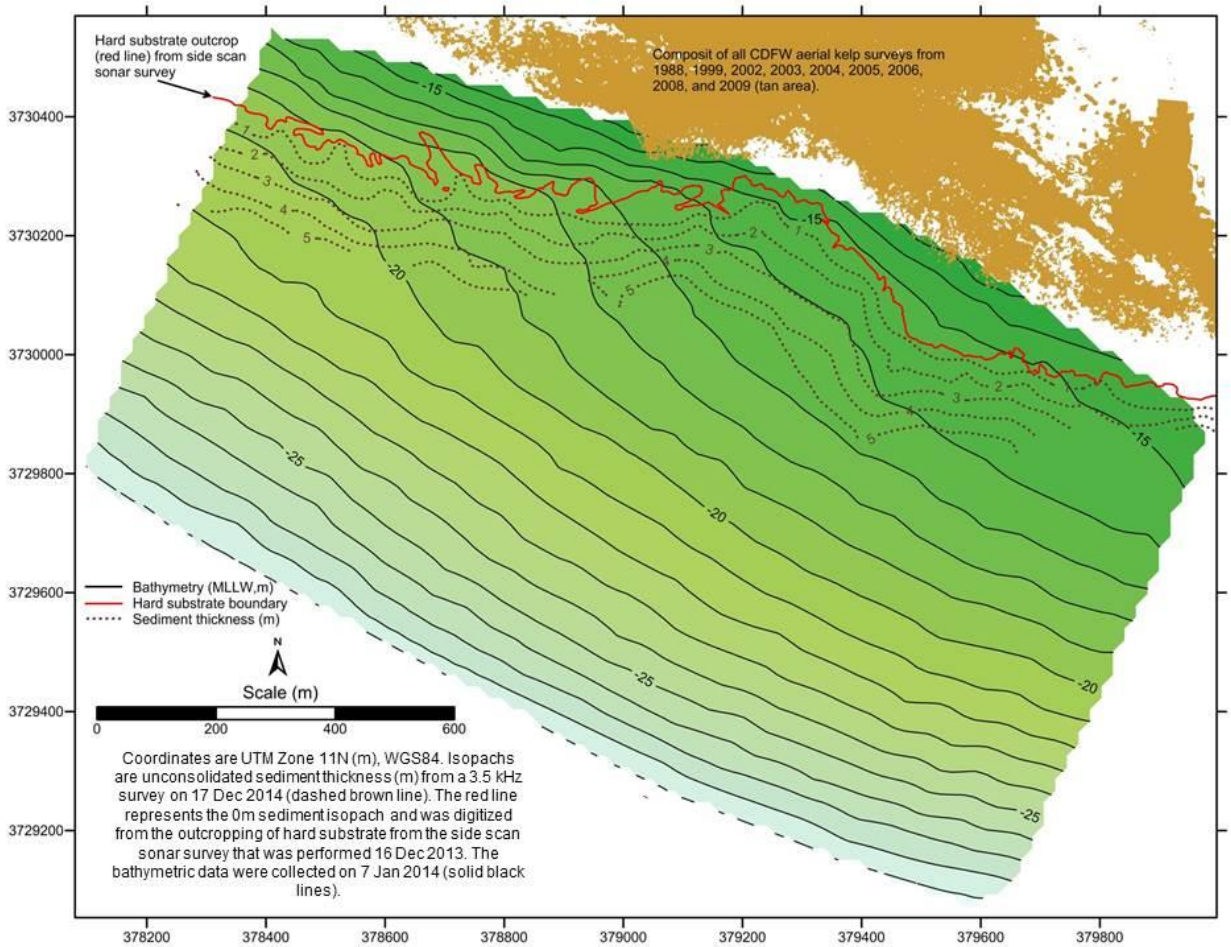

Figure 5-2. Composite of the East Area isobaths, showing the offshore boundary of hard substrate, isopach of sediment thickness, and kelp canopy distribution.

5.2.2 Diver-Based Inspections

Diver-based ground-truthing was performed in March-April 2014 by the Vantuna Research Group in the East and West Areas between the line of hard substrate and the kelp canopy in an effort to determine the suitability of this region for reef placement. Sixteen 650-foot long transects were evaluated in all, eight at each site. The collected data included: 1) video documentation; 2) sediment cores; 3) sediment depth readings via jet probes; and 4) estimations of percent hard substrate at transect points. Video documentation taken during this survey showed that this region contains a mixture of mostly sandy-bottom and some low-relief hard substrate. Sediment confirmed the predominance of sandsized sediments. Jet probes showed that sand cover thickness is somewhat less in the West Area than in the East Area. In the West Area, 80 percent of the sand areas were determined to have sediment depths less than 3.2 feet (1 m), versus 71 percent in the East Area.

5.2.3 Light Attenuation

Light attenuation studies performed by the Los Angeles County Sanitation District (LACSD) along the Palos Verdes Shelf have shown average ranges of 82-88 percent light transmittance in the 3.2 to 328 feet (1-100 m) depth range (EPA, 2007). At the Bunker Point station (near the West Area), the percent of surface light reaching the bottom, up to 65 foot (20 m) depths, ranged from two to 66 percent (Pondella et al., 2012a). According to Luning (1981), the lower depth limit of light irradiance for giant kelp is one percent that of the water's surface (*In:* Foster and Schiel, 1985). This indicates that the Bunker Point area has sufficient light up to 65 foot (20 m) depths to support the growth of giant kelp. Additionally, the CDFG (2009) has stated that the LACSD studies showed that the euphotic zone in this area reached up to 59 feet (18 m), which indicates that sufficient light is reaching depths that can sustain kelp growth.

5.3 Biological Resources

5.3.1 Introduction

The proposed action would involve the placement of quarry rock in a 69-acre area that consists of about 60 acres (87 percent) of subtidal sandy, soft-bottom habitat, and about 9 acres (13 percent) subtidal rocky, hard substrate habitat. Each of these habitats is described in the following.

5.3.2 Soft-Bottom Habitat

Soft bottom habitats consist of sand or sand interspersed between boulders, rocks, and cobbles. The most common type of marine species found in the subtidal sand-bottom habitat are bottom-feeding (benthic) fish and infaunal and epifaunal invertebrates (EPA, 2003; Allen et al., 2011). This habitat also contains plankton suspended in the water column as well as some algal species.

Because of their low productivity, subtidal sand-bottom communities are often considered to be less important than more productive rocky reef environments, which promote increased species richness and biological productivity. Subtidal sand-bottom environments provide habitat for sanddollars (*Dendraster* spp.), sand stars (*Astropecten* spp. & *Luidia* spp.), sea pens (*Stylatula* spp.), as well as many species of polychaetes, crustaceans, gastropods, rays, and flat fishes. Subtidal sand-bottom environments are also economically important to nearshore fisheries, which trawl for white croaker, and various flatfish.

5.3.3 Hard-Bottom Habitat

About 13 percent of the project site (about nine acres) consists of hard substrate and is characterized by a degraded hard-bottom community. Video documentation taken in March and April 2014 at the project site showed that giant kelp was absent in the area between the line of hard substrate and the existing kelp canopy. Gorgonians, algae, and sea urchins were seen in the areas with hard substrate. The surveys determined that marginally suitable habitat exists for a federally Endangered species, white abalone (*Haliotis sorenseni*) and two NMFS Species of Concern, pink abalone (*Haliotis corrugata)*, and pinto abalone (*Haliotis kamtschatkana)*, but none occurs within the project site.

5.3.4 Rare, Threatened, or Endangered Species

Information on the biological resources within the proposed project site was collected by Cooperative Research and Assessment of Nearshore Ecosystems program (CRANE), a statewide research program that provides a long-term collaborative research study of the nearshore rocky reefs in Santa Monica Bay and the Southern California Bight. A list of species identified and their abundance are presented in Tables 5-1 to 5-3. These data were analyzed to determine the potential occurrence of rare, threatened, or endangered species of plants and animals at the project site and within a one-mile radius of the project site.

A review of the State of California state and federally endangered and threatened animals and plant database (http://www.dfg.ca.gov/wildlife/nongame/t_e_spp/) did not indicate that any animals or plants observed during the CRANE surveys were listed as State or federally endangered species. No plants were observed at all. The special status species that could potentially occur in the region of the project site are provided in Table 5.4, which lists each species and its status. After intensive surveys we have determined that none of these species occur in the study site. In addition, *Caulerpa* sp., a known problematic invasive algae also is not present in the study site.

Table 5-1. Algal densities in the inner, middle, and outer reef in the vicinity of the project site based on CRANE surveys.

Species	**Inner Reef[1]**	**Middle Reef[2]**	**Outer Reef[3]**
	Density/100m^2	Density/100m^2	Density/100m^2
Cystoseira osmundacea	35.3	33.8	12.5
Egregia menziesii	32.3	0.0	0.2
Laminaria farlowii	0.3	9.3	26.7
Macrocystis pyrifera	26.2	15.0	12.8
Pterygophora californica	32.2	111.5	46.0
Sargassum spp.	1.3	0.0	0.0

[1] Inner reef = 5m
[2] Middle reef = 10m
[3] Outer reef = 15m

Table 5-2. Fish abundances in the inner, middle, and outer reef in the vicinity of the project site based on the CRANE surveys.

Species	Inner Reef[1]	Middle Reef[2]	Outer Reef[3]
	Abundance Mean/100m^2	Abundance Mean/100m^2	Abundance Mean/100m^2
Anisotremus davidsonii	5.0	45.0	70.0
Atherinops affinis	0.0	0.0	30.0
Atherinopsis californiensis	0.0	535.0	0.0
Atractoscion nobilis	10.0	0.0	0.0
Brachyistius frenatus	205.0	425.0	0.0
Chromis punctipinnis	300.0	1,110.0	480.0
Damalichthys vacca	25.0	10.0	5.0
Embiotoca jacksoni	220.0	275.0	60.0
Girella nigricans	25.0	430.0	320.0
Halichoeres semicinctus	25.0	110.0	30.0
Hermosilla azurea	0.0	5.0	0.0
Heterostichus rostratus	15.0	0.0	0.0
Hypsurus caryi	230.0	125.0	20.0
Hypsypops rubicundus	80.0	465.0	55.0
Medialuna californiensis	0.0	15.0	20.0
Micrometrus minimus	5.0	0.0	0.0
Oxyjulis californica	420.0	4,020.0	1,115.0
Oxylebius pictus	0.0	15.0	15.0
Paralabrax clathratus	115.0	295.0	390.0
Paralabrax nebulifer	0.0	25.0	80.0
Phanerodon furcatus	0.0	0.0	5.0
Rhacochilus toxotes	0.0	15.0	65.0
Rhinogobiops nicholsii	5.0	5.0	80.0
Sebastes atrovirens	0.0	30.0	0.0
Sebastes mystinus	0.0	10.0	5.0
Semicossyphus pulcher	35.0	360.0	230.0
Trachurus symmetricus	0.0	0.0	2,400.0

[1] Inner reef = 5m
[2] Middle reef = 10m
[3] Outer reef = 15m

Table 5-3. Invertebrate densities in the inner, middle, and outer reef in the vicinity of the project site based on the CRANE surveys.

Species	Inner Reef[1]	Middle Reef[2]	Outer Reef[3]
	Density/100m^2	Density/100m^2	Density/100m^2
Anthopleura Artemisia	0.0	1.7	0.2
Anthopleura elegantissima	6.5	2.7	0.0
Anthopleura sola	3.2	24.5	0.2
Centrostephanus coronatus	0.0	0.0	0.3
Craniella arb	0.0	0.0	0.3
Crassedoma giganteum	0.2	0.0	0.0
Flabellina iodine	0.5	0.7	0.2
Kelletia kelletii	1.8	5.3	4.2
Leptogorgia chilensis	0.0	0.2	0.0
Megastraea undosa	0.7	0.5	0.0
Megathura crenulata	3.0	1.0	0.2
Muricea californica	0.0	10.3	54.0
Muricea fruticose	0.0	0.2	1.7
Octopus bimaculoides	0.0	0.3	0.0
Ophioplocus esmarki	0.0	0.2	0.0
Pachycerianthus fimbriatus	0.0	0.3	4.7
Panulirus interruptus	1.0	0.3	0.0
Parastichopus parvimensis	1.8	6.7	6.7
Patiria miniata	0.2	3.2	11.3
Pisaster brevispinus	0.0	0.3	0.0
Pisaster giganteus	9.2	10.5	5.2
Pisaster ochraceus	2.3	0.2	0.8
Pycnopodia helianthoides	0.0	0.0	0.2
Strongylocentrotus franciscanus	20.2	58.7	23.8
Strongylocentrotus purpuratus	228.3	24.7	4.0
Styela montereyensis	0.0	0.7	2.8
Tethya californiana	0.0	0.2	4.8
Urticina lofotensis	0.0	0.7	0.0

[1] Inner reef = 5m
[2] Middle reef = 10m
[3] Outer reef = 15m

Table 5-4. Federal and state listed endangered, threatened, and species of concern that could potentially occur near or at the project site.

Common Name	Scientific Name	Status
Invertebrates		
Pink abalone	*Haliotis corrugata*	NMFS SC
Pinto abalone	*Haliotis kamtchatkana*	NMFS SC
White abalone	*Haliotis sorenseni*	FE
Reptiles		
Green sea turtle	*Chelonia mydas*	FT
Leatherback sea turtle	*Dermochelys coriacea*	FE
Loggerhead sea turtle	*Caretta caretta*	FT
Olive ridley sea turtle	*Lepidochelys olivacea*	FT
Pacific Hawksbill Sea Turtle	*Eretmochelys imbricata*	FE
Birds		
Black Storm Petrel	*Oceanodroma melania*	CSC
California Gull	*Larus californicus*	CSC
California Least Tern	*Sterna antillarum browni*	SE,FE
Common Loon	*Gavia immer*	CSC
Double-crested Cormorant	*Phalacrocorax auritus*	CSC
Elegant Tern	*Thalasseus elegans*	CSC/FSC
Western Snowy Plover	*Charadrius lexandrines nivosus*	CSC/FT
Mammals		
Sei whale	*Balaenoptera borealis*	FE
Blue whale	*Balaenoptera musculus*	FE
Fin whale	*Balaenoptera physalus*	FE
Humpback whale	*Megaptera novaeangliae*	FE
Right whale	*Eubalaena japonica*	FE

FE – Federally Endangered FSC – Federal Species of Concern SE – State Endangered
FT – Federally Threatened CSC – California Species of Concern
NMFS SC – National Marine Fisheries Service Species of Concern

5.4 Air Quality

5.4.1 Air Pollutants

Air quality is measured as the relative degradation of ambient air quality standards (AAQS), which are set by state and federal agencies. An air quality standard defines the maximum amount of a pollutant that can be present in outdoor air without harm to the public's health. The national ambient air quality standards (NAAQS) represent the maximum acceptable concentrations that may not be exceeded more than once per year, with the exception of the annual standards, which may never be exceeded. The California ambient air quality standards (CAAQS) represent the

maximum acceptable pollutant concentrations that may not be equaled or exceeded, as established by the California Air Resources Board (CARB).

Criteria air pollutants are defined as those for which a state or federal ambient air quality standard has been established to protect public health (Table 5-5). These include:

- Nitrogen oxides (NO_x)
- Sulfur dioxide (SO2)
- Carbon monoxide (CO)
- Ozone (O3)
- Volatile organic compounds/reactive organic compounds (VOCs/ROCs)
- Particulate matter less than or equal to 10 microns (µm) in diameter (PM10)

Nitrogen oxides and VOCs/ROCs interact in the presence of solar radiation to form secondary pollutants such as ozone.

5.4.2 Primary Pollutants

Air pollutants are broken down into primary and secondary sources. Primary pollutants are those that are derived directly from a point source into the atmosphere. Secondary pollutants are derived from primary pollutants and are produced through chemical reactions and phase transformations that occur in the atmosphere. The primary pollutants associated with the proposed action are as follows:

- Sulfur dioxide (SO2), derived from the burning of fossil fuels that contain sulfur compounds;
- Fine particulate matter (PM) composed of either natural or artificial solid particles or aerosols present in the atmosphere; and
- Toxic air contaminants (TACs). These airborne chemicals are present in marine diesel and are known or suspected to cause cancer and other serious ailments.

5.4.3 Secondary Pollutants

Secondary air pollutants result from the chemical and photochemical reactions of primary pollutants within the earth's atmosphere. Those pertinent to the proposed action are as follows:

- Nitrogen dioxide (NO2) is derived from Nitrogen oxide (NO), which is produced during the combustion of fossil fuels in motor vehicles and industrial equipment. NO2 is one of the main precursors to ozone and can be a source of fine particulate matter.
- Sulfates (SO4) are compounds in particulate aerosol derived from sulfur dioxide that can create pulmonary and respiratory problems, reduce visibility, and cause damage to vegetation.
- Ozone (O3) is derived from two main precursors, NO_x and reactive organic compounds (ROCs), which form ozone when exposed to ultraviolet radiation.

Table 5-5. State and federal Ambient Air Quality Standards (AAQS) and averaging times.

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)[8]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[8]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[9]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[10]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[11,12]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[13]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[11]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

5.4.4 Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere are called greenhouse gases (GHGs). GHGs are emitted by natural processes as well as by human activities. Examples of GHGs that are produced by both natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Examples of GHGs that are created and emitted primarily as the result of human activity include fluorinated gases (hydrofluorocarbons [HFCs] and perfluorocarbons [PFCs]) and sulfur hexafluoride (SF6).

Each GHG has a varying global warming potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. By convention, CO_2 is assigned a GWP of 1. By comparison, CH_4 has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. N_2O has a GWP of 310, which means that it has a global warming effect 310 times greater than CO_2 on an equal-mass basis. To account for their GWPs, GHG emissions are often reported as a CO_2 equivalent (CO2e). The CO2e is calculated by multiplying the emission of each GHG by its GWP, and adding the results together to produce a single, combined emission rate representing all GHGs (portoflosangeles.org). The SCAQMD posts a significance threshold of 10,000 MT/yr of CO2e emissions per year for industrial projects, 3,000 MT/yr for commercial projects, and 1,100 MT/yr for mixed projects where the SCAQMD is the lead agency (www.aqmd.gov).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without these natural GHGs, the earth's surface would be approximately 61 degrees (°) Fahrenheit (F) cooler (AEP, 2007). GHGs differ from criteria pollutants in that GHG emissions do not cause direct, adverse human health effects. Rather, the direct environmental effect of GHG emissions is an increase in global temperatures, which in turn has numerous indirect effects on the environment and humans (POLA, 2008).

5.4.5 Regulatory Setting

The proposed action would take place within the South Coast Air Basin (SCAB), which is one of 15 jurisdictional air basins within California. The SCAB is affected by temperature inversions and stagnant wind conditions, which prevent the breakdown of inversion layers and limit the movement of air pollutants. While air quality has improved in recent years in the SCAB, this basin exceeds standards for one or more air pollutants. State law requires air basins to be designated as in attainment, nonattainment, or as unclassified for each State standard. If the hourly parts per million (ppm) levels for individual criteria pollutants exceed State or federal standards, it is considered to be in nonattainment. The attainment status of criteria pollutants in the SCAB is presented in Table 5-6.

Table 5-6. Attainment status of criteria pollutants in the South Coast Air Basin.

Pollutant	State	Federal
O_3 – 1-hour	Extreme Nonattainment	No Federal Standard
O_3 – 8-hour	Extreme Nonattainment	Severe-Nonattainment
PM_{10}	Serious Nonattainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO_2	Nonattainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Pb	Nonattainment (LA County only)	Nonattainment (LA County only)
All others	Attainment/Unclassified	Attainment/Unclassified

Source: California Air Resources Board (CARB) 2013.

The South Coast Air Quality Management District (SCAQMD) regulates air emissions within the SCAB from stationary emissions sources, including boats and other equipment used for the construction of the proposed rocky-habitat reef. This includes idling tugboats and the equipment used during the loading and unloading of the barges. It does not include the trucks used to haul the quarry rock nor the tugboats while underway to and from the project site. NOAA consulted with SCAQMD staff in evaluating the emissions and assuring compliance with the relevant permitting processes and requirements. No permits are required for the proposed action. Nevertheless, this EA includes an evaluation of the emissions from both stationary and mobile sources, along with measures to reduce the emissions (See Chapter 10).

5.5 Land Use, Recreation, Aesthetics, and Noise

5.5.1 Introduction

The potential effects on land use, recreation, aesthetics, and noise are considered together because they all involve the effects of the proposed action upon people who either live along the coast adjacent to the project site and/or use the coastal waters, nearby beaches and other coastal areas for recreation. The scoping process identified several issues that required further detailed evaluation. The potential issue for land use involves a determination of the consistency of the proposed action with existing local and regional plans for the utilization of the project site. The use of tugboats, a crane, barges, an off-loading bulldozer, and other boats and equipment 0.3 miles offshore has the potential to negatively affect coastal residents and visitors in terms of visual aesthetics and noise. This has the potential to interfere with recreational opportunities and uses. An additional issue for recreation involves determining whether the proposed rocky-reef habitat might affect surfing opportunities and use along the shoreline.

5.5.2 Land Use

The project site is located 0.3 miles offshore from the City of Rancho Palos Verdes and 1.3 miles from the City of San Pedro coastline. More than three-fourths of the immediate City of Rancho Palos Verdes coastline is open space or vacant and about one-fourth is devoted to single-family residential land use. Directly inshore of the project site is the Trump National Golf Course and the Ocean Trails Reserve. To the northwest of the project site is a large open space, occupied by

the Abalone Cove Preserve and the City of Rancho Palos Verdes' Abalone Cove Shoreline Park. The City of San Pedro coastal zone is also devoted to residential and open space uses. Open space areas in the City of San Pedro include the White Point Nature Preserve and the Point Fermin Park.

Because of its natural character and location near a large metropolitan complex, the City of Rancho Palos Verdes coastal area is a popular area for recreation. The open space areas contain trails and roads, and some allow access to the beaches through trails that lead down the coastal bluffs. Abalone Cove Reserve, Ocean Trails Reserve, White Point Nature Reserve, and Point Fermin Park all feature parking areas and hiking trails that enable recreational users to access the beaches. These access points allow for multiple recreational purposes, including surfing, diving, and fishing.

The closest residential communities to the project site are located approximately 0.4 miles and 0.9 miles to the northeast in the City of Rancho Palos Verdes. Many of the homes in these residential areas as well as the beaches and open space recreational areas have views of the project site and the surrounding waters.

5.5.3 Recreation

Many of the recreational activities near the project site are aquatic-based and include activities such as surfing, diving, fishing, and boating. Popular activities on or near the beach include tide pool viewing, hiking the bluffs, and wildlife viewing, as described in the following.

5.5.3.1 Surfing

The Rancho Palos Verdes coastline is a highly regarded area for surfing. There are many attractive surfing locations (breaks) in the area due to rock points and the Redondo Submarine Canyon, which funnels the swells toward the coastline. There are three recognized surfing breaks in the vicinity of the project site, as follows.

Japan Cove, the closest surfing break to the project site, is located just northeast of the site. It can be accessed from the Royal Palms/White's Point County Beach parking area or from a trail originating at the Ocean Trails Reserve. This surfing break has the best waves when the swell direction is from the south/southeast.

TC's is located west of Royal Palms/White's Point Preserve and can be accessed from the Royal Palms/White's Point County Beach parking area. It is the second-most-popular right-handed surfing break on the Palos Verdes Peninsula. This surfing break has the best waves when the swell direction is from the west-northwest.

Pickle's is located just south of White's Point Nature Preserve and can be accessed from a path down the cliffs from Paseo Del Mar. The waves at this surfing break are best when the swell is less than four feet. For surfing, this means the ride will be short and the surfer will be carried over shallow, jagged rocks covered in sea urchins.

5.5.3.2 Diving

The rocky coastline and coastal bluffs of Rancho Palos Verdes provide an attractive area underwater setting for divers. There are several areas near the project site that are suitable and used for free diving and scuba diving. The coastal trails along the open-space areas provide access points for divers. The recognized dive sites in the area are generally rated as more advanced, not because of the technical difficulty of the dive itself, but because of difficult access, including the length of the trail leading to the beach (Pacific Wilderness, Inc., 2007).

Divers are likely to see rock formations due to intense tectonic activity in the region, as well as sand and kelp forests. The region is particularly attractive for the occurrence of invertebrates, including brightly colored Spanish shawl nudibranchs, sea stars, chestnut cowries, sand bass, bat rays, calico bass, white sea bass, tree fish, cabezon, giant kelpfish, blackeye goby, California halibut, California sheephead, senorita, white seaperch, opaleye, horn shark, giant crabs, small reef fish, and an abundance of octopus (Pacific Wilderness, Inc., 2007).

Divers can also access dive spots in the general project vicinity by boat. Many charter boats travel from nearby harbors, such as the Port of Los Angeles, the Port of Long Beach, and Marina Del Rey, to destinations along the Rancho Palos Verdes coastline (Pacific Wilderness, Inc., 2007).

5.5.3.3 Fishing

Because the Rancho Palos Verdes coastline has a predominantly rocky shoreline, access to the beach for fishing is limited (California's Best Beaches, 2014). Therefore, much of the fishing in this area is done from boats. Recreational boaters and commercial passenger fishing vessels originate primarily from King Harbor and Marina del Rey, which are located approximately 12 and 20 miles, respectively, northwest of the project site. A smaller number of fishing vessels originate from the Ports of Long Beach and Los Angeles, approximately four miles south of the project site. The most heavily fished area is from Malaga to Rocky Point, along the northwestern section of the Palos Verdes Peninsula. This is due to the high number of boats departing from King Harbor and the abundant reef and kelp habitat in the area. Rocky Point is the largest reef, and it has the most persistent kelp in the region, making it a very popular fishing destination (Pondella, 2009). Other popular nearshore areas for fishing from vessels include Rocky Point, Point Fermin Reef, Long Point, and Point Vicente Cliffs (Davey's Locker, 2014).

Fishing from the shoreline is also popular, particularly near the public open-space preserve access points or at the Cabrillo Beach Fishing Pier. Some of the species of fish typically caught here are sand bass, calico bass, white sea bass, giant kelpfish, California halibut, senorita leopard sharks, horn sharks, lobsters, and giant crab (California's Best Beaches, 2014).

5.5.3.4 Boating

Boating is a popular activity in the Rancho Palos Verdes coastal area for several reasons: 1) the availability of protected harbors and related facilities; 2) proximity to Santa Catalina Island; and 3) mild weather (San Pedro Peninsula Chamber of Commerce, 2008). In Los Angeles County, approximately 65,000 recreational vessels were registered in 2014 (County of Los Angeles, 2014b). Boating activities include motor boating, sailing, kayaking, and jet skiing.

5.5.3.5 Beach Activities

Recreation visitors participate in a variety of activities along the rocky shoreline and on the coastal cliffs of Rancho Palos Verdes and San Pedro via the numerous city parks, county parks, and open-space reserves. Hiking the coastal trails is popular, along with sunbathing, beach-combing, walking, tide pool viewing, and swimming (California's Best Beaches, 2014).

5.5.4 Land Use Plans and Policies

Several land use plans were reviewed and considered to determine whether the proposed action might be consistent with existing plans and policies. These included the City of Rancho Palos Verdes General Plan the City of San Pedro Specific Plan, and the County of Los Angeles General Plan - Land Use Element, along with several potentially applicable State plans and policies.

5.5.4.1 California Coastal Act

Although the project site is proximate to the City of Rancho Palos Verdes and within the County of Los Angeles, the California State Lands Commission (CSLC) has exclusive jurisdiction over the submerged lands that make up the project site. The CSLC jurisdiction includes submerged lands adjacent to the coast and offshore islands from the mean high tide line to three nautical miles offshore, as set forth in the California Coastal Act of 1976. Since the California Coastal Act was passed, local and regional agency planning has focused on onshore land uses and policies and largely deferred to State and federal agencies for coastal zone management. However, the City of Rancho Palos Verdes Coastal Specific Plan (1978) includes a discussion of the loss of kelp forests along the City's coastline and a City policy to "Protect, enhance and encourage restoration of marine resources of the City through marine resource management and cooperation with other public agencies and private organizations."

Several sections of the California Coastal Act are relevant to the proposed action. Section 30001.5(a) outlines the basic goals for the coastal zone as follows: "protect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environments and its natural and artificial resources." Section 30230 states: "Marine resources shall be maintained, enhanced and, where feasible, restored." Section 30231 states the biological productivity and quality of ocean waters should be maintained so that optimum populations of marine organisms vital the protection of human health shall be maintained.

5.5.4.2 California Fish and Game Code

The California Fish and Game Code includes several relevant plans and policies. Policies relating to fish planting and propagation (Chapter 5) promote the placement of artificial reefs in State waters, and include design criteria and requirements for reef siting and placement. Policies relating to the conservation of aquatic resources (Chapter 7) include the following:

"It is hereby declared to be the policy of the state to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the state for the benefit of all the citizens of the state and to promote the development of local fisheries and distant water fisheries based in California in harmony with international law respecting fishing and the conservation of the living resources of the oceans and other waters under the jurisdiction and influence of the state."

5.5.4.3 California Ocean Resources Management Act

The California Ocean Resources Management Act (CORMA), Public Resources Code Section 36002(1), includes the State's policy to: "Assess the long-term values and benefits of the conservation and development of ocean resources and uses with the objective of restoring or maintaining the health of the ocean ecosystem and ensuring the proper management of renewable and nonrenewable resources."

5.5.4.4 California Ocean Plan

The Water Quality Control Plan for Ocean Waters of California (California Ocean Plan) also includes State policies that are relevant to the proposed action. Under the Beneficial Uses section of the California Ocean Plan, marine habitats are identified as a beneficial uses of the ocean:

"The beneficial uses of the ocean waters of the State that shall be protected include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting."

5.5.5 Noise

Noise is generally defined as an unwanted or objectionable sound. Noise can cause annoyance, interference with communication, sleep disturbance, or in severe cases, hearing impairment. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale scales the actual sound power levels in order to be consistent with that of human hearing response, since the human ear is not equally sensitive to sound at all frequencies. Table 5-7 outlines common noise terms and their definitions.

Table 5-7. Common noise terms and definitions.

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound, equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time-varying signal over a given time period. The L_{eq} is the value that expresses the time- averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening (7:00 PM to 10:00 PM) and +10 dBA for the nighttime (10:00 PM to 7:00 AM).
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) in order to develop criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The Ldn is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.

Source: Harris, 1979.

The sound pressure level is measured on a logarithmic scale with the zero dB level based on the lowest detectable sound pressure level that people can perceive. Based on the logarithmic scale, a doubling of sound intensity is equivalent to an increase in 3 dB, and a sound that is 10 dB less than the ambient sound level has no effect on the ambient noise. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud. Everyday day sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud).

According to the US Environmental Protection Agency, impairment to the human ear begins at about 70 dBA. Noise levels above 35-45 dBA will disturb a sleeping person, noise between 50-60 dBA can make it difficult to carry on a quiet conversation, and stress reactions can occur with noise levels above 85 dBA (City of Rancho Palos Verdes, 2010). Table 5-8 outlines the sound levels of common noise sources.

Table 5-8. Sound levels of typical noise sources.

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet fly-over at 300 m (1,000 ft)	100	
Gas lawn mower at 1 m (3 ft)	90	
Diesel truck at 15 m (50 ft) at 80 km/hr (50 mph)	80	Food blender at 1 m (3 ft) Garbage disposal at 1 m (3 ft)
Noisy urban area, daytime Gas lawn mower, 30 m (100 ft)	70	Vacuum cleaner at 3 m (10 ft)
Commercial area Heavy traffic at 90 m (300 ft)	60	Normal Speech at 1 m (3 ft)
Quiet urban daytime	50	Large business office Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night, concert hall (background)
	10	Broadcasting/recording studio
	0	Lowest threshold of human hearing

Source: Caltrans, 1988.

The completed rocky-reef habitat will be a passive, submerged feature that will not generate noise. However, the tugboats, crane, off-loading bulldozer, small boats, and other equipment used for construction would create noise during the up to 60 days of construction. The construction would be limited to six days per week, Monday through Saturday, and to daylight hours to help reduce the potential for noise effects on people. There are several plans, policies, and regulations pertaining to limiting the noise created during the construction phase of the proposed action, as follows.

5.5.5.1 Federal Guidelines

There are no federal noise standards that directly regulate noise related to construction. The Occupational Safety and Health Administration (OSHA) has regulations under 29CFR1910.120 to protect the hearing of workers from excessive noise levels in the workplace. Permissible noise exposures and duration covered under OSHA are in Table 5-9.

Table 5-9. Occupational Safety and Health Administration (OSHA) permissible noise exposures.

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

Source: United States Department of Labor.

5.5.5.2 State of California Guidelines

Noise levels in California are regulated through State, county and municipal standards and regulations. California has required each local government to perform noise studies to implement a noise element as part of their general plan. California Administrative Code, Title 4, has guidelines for evaluating compatibility of various land uses as a function of community noise exposure.

5.5.5.3 California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of their comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable," "conditionally acceptable" and "clearly unacceptable" noise levels for various land use types.

5.5.5.4 California Department of Public Health Services, Office of Noise Control

This State agency provides guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. These guidelines for land use and noise exposure compatibility are shown in Table 5-10 (same data as City of Los Angeles standards). Based on these standards, an exterior CNEL between 50-75 dBA is considered normally acceptable for most land uses, including single family, multi-family, duplexes, and mobile homes without special noise insulation requirements. Noise levels exceeding 70-80 dBA are considered unacceptable levels of noise for most land use structures.

Table 5-10. Los Angeles County noise ordinance construction standards (dBA) for mobile and stationary equipment sources for Residential Structures.

a. Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

	Single-family Residential	Multi-family Residential	Semi-residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75dBA	80dBA	85dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60dBA	64dBA	70dBA

b. Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:

	Single-family Residential	Multi-family Residential	Semi-residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60dBA	65dBA	70dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50dBA	55dBA	60dBA

Source: County of Los Angeles, County Code Section 12.08.440.

5.5.5.5 County of Los Angeles

The Los Angeles County General Plan Noise Element (1974) addresses various noises and sources throughout the County, specifically focusing on noise sources such as traffic, railroad, and aircraft. The guidelines used by the County are based on the community noise compatibility guidelines established by the State of California Department of Health Services. Regulations that implement these guidelines are set forth in the Los Angeles County Code.

Section 12.08.440 of the County of Los Angeles Noise Ordinance prohibits construction during weekday evening and nighttime hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real-property line. The ordinance sets specific limits for allowable construction noise affecting existing structures during daytime the hours of 7:00 a.m. to 8:00 p.m., varying by the day and type of structure (Table 5-10).

5.5.5.6 City of Rancho Palos Verde

Table 5-11 outlines the noise regulations for the City of Rancho Palos Verdes, as outlined in the City of Rancho Palos Verdes General Plan Noise Element (2010). In general, the City limits mechanical equipment noise in residential areas to no more than 65 dBA on Sunday and during nighttime hours (7:00 pm to 7:00 am) Monday through Saturday, as measured at the affected

residential property lines. The City Noise Element allows higher level construction-related noise during 7:00 am to 7:00 pm Monday through Saturday.

Table 5-11. City of Rancho Palos Verdes existing noise regulations.

Code Section	Topic
8.20.120	Noise controls applicable to solid waste collection
10.04.040	Limitation on off-road vehicle operation that disturbs the peace
17.12.030 F.	Limitation on commercial uses regarding deliveries, trash pick-up, parking lot trash sweepers, operation of machinery or mechanical equipment, can exceed sixty-five (65) dBA, as measured from the closest property line, shall only be allowed on commercial properties which abut a residential district between the hours of 7 a.m. and 7 p.m., Monday through Saturday.
17.48.030 E.3. b	65 dB limitation on mechanical equipment at closest property line
17.56.020	Restricts the hours of operation for construction equipment to between the hours of 7 a.m. and 7 p.m. Monday through Saturday. No work is allowed on Sunday. A Special Construction Permit could be obtained to allow work on federal holidays and Sundays during the permitted hours stated above.
17.60.050	Conditional Use Permit standards and conditions to protect against noise impacts
17.62.060	Special Use Permit standards and conditions to protect against noise impacts
17.60.040 G. 4.	Grading Permits and conditions of approval to address noise impacts of grading activities

Source: Rancho Palos Verdes Municipal Code.

According to the Noise Element, ambient noise levels within the City of Rancho Palos Verdes range from 42 to 75 dBA. The sound produced by the ocean surf contributes to the measured noise levels of the coastal zone. The sound of the ocean surf can vary depending on the tides and weather conditions. At a point 50 feet from the surf line, gentle lapping waves could produce about 20 dBA, while large waves and surf could produce about 55 dBA. The nominal value under normal conditions is around 40 dBA. The coastal zone is also affected by community noise, which can include such noise sources as construction activities, heavy trucks, airplanes, and barking dogs. Traffic noise from area roadways is a major source of noise in the City, including along the coastline. Noise from traffic on Palos Verde Drive, which runs along the coastline adjacent to the project site, is considered to be moderate at 70 dBA, with adjacent open space and residential areas experiencing ambient noise levels in the 60 to 65 dBA range.

CHAPTER 6 ENVIRONMENTAL CONSEQUENCES

6.1 Biological Resources

6.1.1 Introduction

The scale and nature of the proposed action are important to understanding the potential effects on biological resources, and are the reasons why several kinds of potential effects were considered but then eliminated from further detailed analysis. While the construction will involve placing quarry rock on 40 acres within a 69-acre project site, the construction activities at any one time will be confined to a much smaller footprint as the barges are moved in by tugs, slowly positioned by anchors for the rock to be off-loaded. The construction will also be of relatively short duration, no more than sixty days. The expected response to the proposed construction activities by fish, birds, turtles, and marine mammals is avoidance and the use of adjacent areas for predation, foraging, and migration. The nature of the proposed action is such that unavoidable effects on the existing bottom habitat and less mobile biological species are expected to be more than offset by the increased biological resources and diversity associated with the created rocky-reef habitat and kelp forest.

6.1.2 Effects on Bottom Species and Habitat

The activities associated with the proposed action that could adversely affect species and habitat at the project site include derrick barge anchoring and the placement of 70,300 tons of quarry rock on the sea floor, as discussed in the following.

Derrick barge anchoring has the potential to affect biological resources at the project site by tearing up and/or crushing bottom community organisms and habitat. Seven-ton anchors and 15-ton concrete blocks will be used to position the barges. The placement of 70,300 tons of quarry rock on project site bottom habitat will crush and bury existing invertebrates and other less mobile and stationary biological resources over a 40-acre area. About 60 acres of the 69-acre project site consists of degraded sandy-bottom habitat with low biological diversity. This is where the quarry rock will be placed. The remaining nine acres is hard substrate bottom. The hard substrate bottom habitat is also degraded and low in biological diversity, but is includes marginal potential habitat for the federally endangered white abalone (*Haliotis sorenseni*), and for two National Marine Fisheries Service (NMFS) Species of Concern, pink abalone (*Haliotis corrugata)*, and pinto abalone (*Haliotis kamtschatkana)*. The quarry rock will be placed to avoid this habitat type.

Forty acres of degraded biological communities within the 69-acre project site will be replaced by rocky-reef habitat and subsequently by kelp forest and a substantially larger, more diverse marine ecosystem. The objective of the proposed action is to replace sandy-bottom habitat with rocky-reef habitat and to avoid coverage of existing hard substrate. For this reason, the proposed action includes positioning the derrick barge to off-load quarry rock on sandy-bottom habitat and to avoid existing hard substrate. In addition, the potential effects of construction will be reduced by implementing a proactive anchoring plan (Appendix A), summarized in the following.

- Avoid anchoring in areas of hard substrate
- Postpone operations during inclement weather to minimize anchor drag
- Minimize anchor drag by system design, monitoring, and timely corrective action

The placement of quarry rock at the project site also has the potential to affect existing biological resources by causing localized and short-term turbidity and sedimentation as the quarry rock impacts the sandy bottom sediments. The resulting effects on marine plants and animals can be both adverse and beneficial. Increased turbidity reduces light penetration, which may reduce primary production and the predation rates of visual predators. High levels of suspended sediments can clog the feeding structures of planktonic and benthic suspension feeders, and the gills of fish and many invertebrates (Sherk et al. 1974; Velagic 1995). Fish eggs and larvae are particularly sensitive to smothering by suspended sediments. The potential benefits of increased turbidity and suspended sediments include higher primary productivity in areas where nutrients are limiting, if the suspended materials contain and release the limiting nutrients (Odum and Wilson 1962). Disturbance of the sediments may also benefit infaunal invertebrates by increasing the availability of detrital food material (VanBlaricom 1982). Reduced light levels help prey species, including early life stages of fish and macroinvertebrates, escape notice by predators.

With respect to the proposed action, neither the adverse nor the beneficial effects are considered major due to the relatively small area affected by construction at any one time and the relatively coarse sediments that would be suspended as a result of the impacts by quarry rock. Coarse sediments stay in suspension a short time and settle out close to their source.

6.1.3 Marine Mammals, Fish, and Birds

The potential effects of the proposed construction activities on marine mammals, fish, and birds were considered and then eliminated from further detailed evaluation because of the small scale of the construction, the capacity of these animals for avoidance, and the availability of extensive suitable habitat adjacent to the project site, as discussed in the following.

6.1.3.1 Marine Mammals

The marine mammals most likely to occur in the vicinity of the project site during the construction period are California sea lions, Pacific harbor seals and bottlenose dolphins (Logomarsino 1997). There are four ways in which these and any other marine mammals present could be affected:

- Collision with water craft
- Direct injury from falling quarry rock
- Injury related to turbidity
- Interference with foraging

Each is discussed in the following.

Tug boats with barges would transport the materials moving at a rate of approximately 9 miles per hour. At this rate, marine mammals within the shipping route would avoid potential collision by moving out of the way of the oncoming barge. The crew vessel that would transport the crew between the derrick barge and the Cabrillo Marina would travel at greater speeds, but the risk of collision with marine mammals would still be extremely low. Marine mammals are highly mobile and can avoid boat traffic. Marine mammals in the lease area could also be expected to be habituated to boat traffic, since boating is common in the area.

The mobility of marine mammals is also important in addressing concern over direct injury from falling quarry rock, and injuries from turbidity. The construction associated with the Palos Verdes Reef Restoration Project will be localized and limited in extent at any one time. The initiation of construction activities would likely result in a startled response from marine mammals presence in the lease area, and they would be expected to avoid the immediate vicinity of the construction. California sea lions and bottle nose dolphins, however, are generally known to be curious and may investigate the activities, but are likely to keep their distance from falling rocks. Pacific harbor seals are more wary in nature and would likely stay well away from the construction site.

The potential for interference with foraging is considered low because the construction is localized and of short duration and because the degraded sandy-bottom habitat that prevails in the area is a poor source of prey for mammals. More productive areas for foraging will be readily available adjacent to and outside of the construction area.

6.1.3.2 Special-Status Marine Birds

The special-status marine birds most likely to occur in the vicinity of the project site include black storm-petrel, brown pelicans, double-crested cormorants, California gulls, elegant terns and, occasionally, California least terns and common loons. All of these species feed on fish and may occasionally utilize the project site for foraging. No breeding colonies for any of the above listed species exist near the project site. Several of the avian species may be discouraged from foraging in the immediate vicinity of the construction because of noise and human activity. In addition, construction activities may scare prey species away from the project site, reducing feeding success. However, the construction activities will be small scale, localized, and of short duration. Many adjacent, higher quality foraging areas will be readily available to marine birds during the construction period.

6.1.3.3 Migratory Species

Migratory species that may be in the project area include migratory birds, migratory fish species, or migratory marine mammal species. The project site falls within the boundaries of the Pacific Flyway, which is a major north-south migratory fly-way that extends from Alaska to Patagonia. Along their migrations, these birds stop at important rest stops to feed and regain their strength before continuing their migration. Rest areas for migrating birds generally include protected areas with food. Common rest areas include wetlands, agricultural areas, or coastal forested areas. Considering the project site is located over open water, it is most likely not an important rest area for migrating birds. Additionally, since there are ample parks and open spaces inshore

of the project site, it would be expected that these areas would be more attractive to migratory birds passing through the area during project construction.

Migratory fish species in California include coastal pelagic (open ocean) species and highly migratory species. Coastal pelagic species include Pacific sardines, Pacific mackerel, market squid, northern anchovy, jack mackerel, and krill. Highly migratory species include tunas, billfish, and sharks (CDFW, 2015). Most of these species are pelagic, and are thus found farther offshore than the boundaries of this project. The only pelagic species observed near the project site was the jack mackerel (*Trachurus symmetricus*), which was noted just inshore of the project site. These species are adept at avoidance.

During the time frame of construction (May-September), there are three species of migratory whales that may be found in the project area. These include: 1) blue whales; 2) fin whales; and 3) humpback whales. However, these whales are generally found farther from shore than where project construction will occur and are adept at avoidance.

6.1.4 Restoration Effects

The creation of 40 acres of rocky-reef habitat, and the subsequent development of a 69-acre kelp forest, will have beneficial effects upon marine organisms including native and resident migratory fish and wildlife species. Kelp forest communities provides structural diversity, which promotes increased prey availability and variety for avian species. Several specific potential effects were considered as follows:

- Waves and Currents
- Kelp Entanglement
- Food Resources
- Predation
- Marine Mammal Utilization
- Marine Bird Utilization

6.1.4.1 Waves and Currents

The kelp forest that will be produced by the proposed action has the potential to affect waves and currents and thereby affect littoral zone sedimentation processes and beach habitat. The littoral zone extends from the beach to a water depth of less than 32 feet (10 m). It is in this zone where wave energy causes transport of coastal sediments. If waves and currents were altered to such a degree that the project resulted in a substantial changes in beach width or sediment volume in the littoral zone, then the project would be considered to have an impact on the beach community. Elwany et al. (1998) reviewed the potential for offshore reefs to affect littoral zone sedimentation processes and beach habitat and concluded that there would be no substantial effects.

6.1.4.2 Kelp Entanglement

An important factor in the destruction of kelp during storms is the entanglement of broken and detached pieces of kelp with kelp plants that are still attached to the bottom. These entangled

masses increase the drag forces and result in further tearing and detachment of kelp plants from bottom substrate. Detached kelp could entangle kelp in the surrounding area, aggravating adverse effects of storm waves on these kelp forests. However any loss of kelp from the surrounding area due to entanglement would be offset by the increased kelp production of the restored reef.

6.1.4.3 Food Resources

The majority of the project site contains sandy bottom habitat and areas of buried reef. Biological surveys conducted at the project site only noted the presence of small amounts of giant kelp. In these sandy bottom communities, which lack a major plant community, much of the detrital food material is exported from other communities by currents. The restoration of hard substrate at the project site is expected to create a habitat conducive to plant communities, specifically giant kelp. This would increase the supply of detrital food material available to the remaining sandy bottom community at the project site, thereby increasing production in this community.

Besides the sandy bottom community, the rocky reef community will also be positively affected by the restoration project. The addition of hard substrate in the project area will provide a substrate for giant kelp, other algae, and invertebrates to become attached. These in turn, will create food items for larger prey species. In addition, the cover created by the algae and invertebrates will create hiding areas for other numerous rocky reef species.

6.1.4.4 Predation

The abundance of predators at the project site following restoration would be expected to be much higher than in the existing sandy bottom community. Fish and invertebrate predators associated with reefs prey to a varying degree on animals living in the surrounding sandy bottom community. However, the sandy bottom organisms that may be affected by increased predation are widely distributed in the SCB.

6.1.4.5 Marine Mammal Utilization

The proposed action has the potential to create 69 acres of kelp forest habitat. Several of the marine mammals that may occur in the project vicinity utilize kelp forest habitat. Pacific harbor seals in particular are known to use kelp forests for foraging and cover. California sea lions and bottlenose dolphins have been observed near kelp forests, although both species tend to prefer pelagic prey. The kelp forest development may increase habitat for some of the prey that dolphins and sea lions would take. Gray whales generally do not forage during their migration, but they have been observed skimming kelp beds for food and utilizing kelp forest for escape cover (Dailey et al. 1993; Foster and Schiel 1985). These areas are believed to be particularly important to cow-calf pairs in the northern migration during late winter and spring. Accordingly, the presence of a kelp reef would have a beneficial effect upon marine mammals.

6.1.4.6 Marine Bird Utilization

The development of a kelp forest associated with the proposed action would provide additional foraging and resting habitat for a number of marine birds. Several special-status species likely to

be present in the vicinity of the project site are known to depend on the different sub-habitats that a persistent kelp forest can provide. The kelp forest would increase foraging and resting habitat for brown pelicans, double-crested cormorants, common loons, California least terns and elegant terns. Additionally, the kelp forest community provides structural diversity, which promotes increased prey availability and variety for avian species. The kelp wrack that washes up on the beaches near kelp forests provides habitat for many of the prey species preferred by shore birds.

6.1.5 Post-Construction Monitoring

The post-construction monitoring activities associated with the proposed action would entail the use of a small vessel (less than 40 feet) to conduct side-scan sonar surveys to confirm the location of rock material and diver surveys to assess the biological community and progress of habitat on the reef.

The post-construction survey operations, including the use of a side-scan sonar system, would operate under the California State Land Commissions Offshore Geophysical Survey Permit Program (OGPP). Through the OGPP, there are several required measures designed to protect marine life. These include:

- Collection of marine mammal and sea turtle presence information from NOAA and local whale watching operations prior to survey operations
- Having marine wildlife monitors onboard the survey vessel during survey operations. If sensitive marine wildlife is observed within the safety zone radius specified in the permit, survey operations must cease until the animal(s) is gone.
- Limits on nighttime survey operations
- Implementation of a soft-start technique
- Strict adherence to equipment manufacturers' guidelines
- Avoidance of pinniped haul-out sites and marine protected areas
- Marine mammal collision reporting requirements
- Implementation of a marine wildlife contingency plan

The diver surveys would be conducted to monitor the biological health of the reef and to confirm the placement of rock material. These surveys would be limited to a small dive survey team using a skiff to access the project site. Surveys will be conducted by two divers following pre-determined transect lines that run in an inshore to offshore orientation. The determined coordinates will be entered into a differential Global Positioning System (DGPS) to be used during the survey aboard the boat A temporary buoy will be placed at each of these coordinates in the field marking the starting point of each transect. One diver will record the presence of substrate types while the second diver will record the number of selected target species along and within a set distance of about six feet (2 m) on either side of the transect line. Impacts from the diver surveys may include the boat anchor for the skiff as well as temporary disturbances to the mobile biological community during diver observations. The boat will be anchored just offshore of the project site, in sandy bottom areas, thus, no rocky reef habitat will be affected. The temporary buoys will be held in place by weights, therefore no anchors will be placed at the project site. Divers will not be collecting any species. Therefore, the effects to the biological community will be limited to temporary avoidance.

6.2 Air Quality

6.2.1 Introduction

The air emissions resulting from the construction of this reef can be traced to the individual construction-related steps involved in the quarrying, the transportation of the quarry rock to the project site, and the placement of the rock on the ocean floor. The quarry business is operated by Connolly-Pacific Co. under existing current permits, and for this reason, was not a part of this air emissions evaluation. The following describes the emissions associated with the proposed action and explains why these emissions are not considered to be major effects.

6.2.2 Daily and Quarterly Emissions

The proposed action includes the placement of 70,300 tons of quarry rock within a 69-acre area. It is estimated that construction will take up to 60 days. It will take 18 round trips (36 one-way trips total) by tugboat to transport all the reef material to the site. Quarterly emissions are estimated by multiplying daily emissions by 36 days for the rock transport and by 60 days for the remainder of the construction components. Since the project will be constructed within a single quarter, the quarterly emissions are the same as the total emissions.

The proposed action will produce the daily and quarterly emissions of CO, ROC, NO_x, SO_x, PM_{10}, and $PM_{2.5}$ shown in Table 6-1. The total daily and quarterly emissions for CO, ROC, SO_x, PM_{10}, and $PM_{2.5}$ are well below the SCAQMD thresholds of significance (Table 6.1). The daily and quarterly emissions for NO_x are near but still below the threshold of significance, at 95 lbs/day and 4,628 lbs/quarter (threshold of significance is 100 lbs/day and 5,000 lbs/quarter). Because the SCAQMD thresholds are not exceeded, the effects on the human environment are considered minor and mitigation measures are not required.

Table 6-1. Total daily and quarterly emissions for criteria air pollutants.

Pollutant	Daily Emissions[1] (lbs/day)	Quarterly Emissions[2] (lbs/qtr)
CO	63.66	2.984.88
ROC/VOC	10.28	495.44
NO_x	95.19	4,628.29
SO_x	3.94	146.69
PM_{10}	3.11	152.89
$PM_{2.5}$[3]	2.92	144.724

[1] Daily emissions include barge loading, workers commuting, tugboat/barge shipping, and material off-loading at project site during one day.

[2] Total of 60 days of construction of reef restoration, all in one quarter, with some components of construction occurring over 36 days. Quarterly numbers were computed by adding quarterly emissions estimates for individual components.

[3] $PM_{2.5}$ estimates were calculated by using updated CEIDARS Table with PM2.5 Fractions.

6.2.3 Daily and Quarterly Greenhouse Gas Emissions (GHG)

Climate change, as it relates to human-made greenhouse gas (GHG) emissions, is by nature a global impact. The cumulative GHG (CO2 and CH4) emissions and computed CO2e values associated with the proposed action are presented in Table 6-2. Total CH4 emissions are 0.047 MT (103.3 lbs) and total CO2 emissions are 347.8 MT (766,843 lbs) (Table 6-3). Thus, the construction of this project would not exceed the SCAQMD threshold of 10,000 MT/yr for industrial projects, 3,000 MT/yr for commercial projects, or 1,100 MT/yr for mixed projects. Because the SCAQMD threshold is not exceeded, the GHG effects are considered to be minor and mitigation measures are not required.

Table 6-2. Total annual Greenhouse Gas (GHG) emissions.

GHG	Annual Emissions[1] (lbs)	Annual Emissions[2] (MT)
CO_2	766,843.8	347.84
CH_4	103.31	0.047
CO_2e[3]		348.8

Source: CE Reference No. 14-27, Air Quality Technical Report

[1] Summation of all construction components
[2] GHG significance determined by MT/yr (2204.62 lbs in a 1 metric ton)
[3] CO_2e calculated by summing $CO_2 + 21*(CH_4)$

6.2.4 Consistency with Applicable Plans and Policies

Consistency with the following air quality plans and policies was reviewed: 1) the Federal Clean Air Act; 2) State CEQA Guidelines; and 3) SCAQMD significance criteria. Under Section 182(e) of the federal Clean Air Act, the significance level for any proposed project in an area of extreme nonattainment is identified at 10 tons/year (20,000 lbs/yr) of volatile organic gas emissions or 10 tons/year (20,000 lbs/yr) of nitrogen dioxide emissions. For this project, total volatile organic gas emissions were 495 lbs, while nitrogen dioxide emissions were 4,628 lbs. Since California has more stringent standards for certain criteria pollutants, the SCAQMD standards were utilized to determine consistency with plans and policies. None of the construction-related emissions were above the daily or quarterly emission thresholds established by the SCAQMD. For this reason, the proposed action is considered consistent with the applicable plans and policies.

6.3 Land Use Plan Consistency

The proposed action would restore kelp and other marine biological resources in an area where such resources have been diminished over time by the effects of wastewater disposal. The rocky-reef habitat created by the placement of quarry rock would not change the current use of the site, but enhance its biological productivity. The restoration and enhancement of coastal marine

biological resources is consistent with the California Coastal Act, the California Fish and Game Code, the California Ocean Resources Management Act, Coastal Zone Management Act, the California Ocean Plan, and the City of Rancho Palos Verdes Coastal Specific Plan. There are no conflicts with General or Specific Plans or policies adopted by the City of Rancho Palos Verdes, the City of San Pedro, or the County of Los Angeles.

6.4 Visual Aesthetics and Noise

The construction of the rocky-habitat reef would require the use of tugboats, a crane, barges, an off-loading bulldozer, and other boats and equipment 0.3 miles (1,600 feet) offshore for up to 60 days, Monday through Saturday, during daylight hours. These construction boats, equipment, and activities would be visible during the day from residential areas beaches, open space recreation areas, roads, and from boats. At night, navigation lights would be visible. The use of the equipment during the day would produce noise estimated to range from 51 to 60 dBA as measured 1,600 feet away from the project site (Table 6-3). Once the construction has been completed, all of the equipment would be removed. The constructed rocky-reef habitat would be submerged, unobtrusive, and would not produce noise. A small boat with a crew of divers would periodically visit the project site after construction to inspect and monitor the progress of the restoration.

The construction-related effects on visual aesthetics and the noise of the boats, equipment, and activity are unavoidable for this proposed action. However, these effects are not considered to be significant because coastal residents and others who use the beaches and coastal zone for recreation are used to and expect the occasional and temporary offshore presence of tugboats, barges, cranes, boats, and other equipment. Coastal protection projects, dredging, repair and maintenance of discharge and intake facilities, and offshore terminals are ongoing along the southern California coastline. In addition, the noise to be produced by the construction activity is limited to the daylight hours and will be at levels not highly distinguishable from ambient noise levels along the beaches and coastal roads. A planned public outreach program will explain the purpose of the project and the timing and limited duration of construction. This will inform the public that the purpose of the proposed action is ecological restoration and that no permanent structures are being constructed.

Table 6-3. Estimated sound levels (dBA) at various distances, originating from the construction phase of this project.

Operation	Equipment	Hours of Operation	Quantity	Sound Levels at Maximum Engine Power With Mufflers at Indicated Distances (dBA)				
				100 Feet	200 Feet	400 Feet	800 Feet	1600 Feet
Towing barge/ Anchor positioning/ Standby	Tugboats	8	2	84	78	72	66	60
Positioning system	Diesel engine	9	1	81	75	66	60	54
Power-up during operation hours	Generator	9	1	75	69	63	57	51
Scoop and drop rock from barge	Tracked loader	8	1	79	73	67	61	55
Hoist track loader onto rock barge	Derrick cranes	1.5	1	82	76	70	64	58
Maneuver items on derrick barge platform	Bulldozer	1	1	82	76	69	63	57

Sources: Bolt, Beranek, and Newman (1971), the US Army Environmental Hygiene Agency (1991), the Port of Los Angeles (2007), and the United States Department of Transportation, Federal Highway Administration (2009).

6.5 Recreational Opportunities and Uses

The construction boats, equipment, and activity would be visible during the day to people using the nearby beaches and open space recreation areas and by people using the general project area for diving, fishing, or boating. Navigation lights would be visible at night. The construction would take place up to 60 days, during daylight hours, on Monday through Saturday. Noise from the construction would not be highly distinguishable from ambient levels on the beaches or in open space areas, but could be a disruptive factor for boating, fishing, or diving in areas closer to the boats and equipment. These effects are unavoidable, but not considered significant because tugboats, barges, and small-scale construction equipment and activities are common along the southern California coastline. People who are boating, fishing, or diving in the area are used to avoiding moored barges, ships, offshore construction activities, and have access to many nearby alternative locations with similar recreational attributes and opportunities.

An additional issue for recreation involves concern that the proposed rocky-reef habitat and resulting kelp forest might affect surfing opportunities and use along the shoreline by influencing the size, shape, and direction of surfing locations or breaks. These concerns were addressed in a relevant study conducted by Elwany et al. (1998) that concluded that reefs and the associated

kelp forests would not change the measurable attenuation of height or energy of long-period swell waves, nor would they affect the propagation or direction of swell waves. The study also concluded that the construction of a reef would not substantially affect the distribution and transport of sediment in the littoral zone, nor the width of the beach. The study also determined that kelp forests dampen the effects of high-frequency sea waves, which are generated by local onshore winds and result in surface chop or roughness. These rough, choppy conditions are generally not favorable for surfing. The presence of a kelp forest would therefore be expected to reduce these conditions, help foster a smooth, glassy sea surface, and thereby have a beneficial effect on surfing.

6.6 Potential Effects Considered and Eliminated from Further Detailed Analysis

6.6.1 Cultural Resources

The potential effects on cultural resources were considered but eliminated from further detailed consideration for the following reasons. The 69 acre site is located in water depths where the sediment movement is dynamic and the sediment cover is thin. This is not an environment in which cultural materials would be expected to remain in place. Both side-scan radar surveys and visual inspection by divers failed to detect the presence of manmade materials. Furthermore, the construction of the reef does not involve excavation, which might have the potential to disturb any existing resources. Rather, the construction involves the placement of quarry rock covering material, which is protective of buried resources.

6.6.2 Transportation

The potential for transportation-related effects was considered but eliminated from further detailed consideration because the project site is located outside of designated shipping lanes, the numbers of boats and barges to be used is small. Existing navigation lights, aids, and rules are considered sufficient to protect lives and property.

6.6.3 Water Quality

The potential for water quality-related impacts from the placement of quarry rock in the ocean was considered but eliminated from further detailed consideration because the proposed action includes a commitment that the materials will conform to the California Department of Fish and Wildlife's Material Specification Guidelines, as follows.

- The materials shall be clean and free of any contaminants, especially those that could dissolve in seawater (e.g., asphalt, paint, oil, or oil stains).
- All rocks used for the project must be accepted by state and federal agencies in the following respects:
  - Purity: The materials shall be free of contamination and foreign materials.
  - Specific gravity: Shall be greater than 2.2.
  - Durability: Rocks used must remain unchanged after 30 years of submersion in seawater.

Furthermore, the potential for quarry rock to cause turbidity and release of harmful substances upon impact with the ocean bottom was considered but eliminated from further detailed consideration, for two reasons. First, the project site is located in a dynamic environment in which sand and fine sediment are naturally periodically suspended, transported, and deposited. Second, because of the dynamic environment, the project site is known to be free of the contamination from historic White Point Outfalls releases that occurs offshore in much deeper water.

6.6.4 Socioeconomics, Public Services, and Utilities

The proposed action would involve the placement of rock on submerged land in order to restore biological resources. The construction will require a small crew and a small number of tugboats, barges, boats, and other readily available for-hire construction equipment. The occurrence of additional sea habitat, sea life, and 60 days of small-scale construction, would not cause changes in human population numbers, population or housing growth, or the demand for new public services. For these reasons, the effects of the proposed action on socioeconomics, public services, and utilities were considered but eliminated from further detailed analysis.

6.6.5 Geology

The proposed action would involve the acquisition of rock from existing commercial quarries and the placement of the quarry rock on low relief, submerged land 0.3 miles offshore of the City of Rancho Palos Verdes. The objective is to create a hard, rocky substrate upon which kelp will become established. There are no issues in terms of effects on human populations or of exacerbating the risk of landslides, earthquakes, or tsunamis. Furthermore, the project site is not an area of special geologic interest. For these reasons, the effects on geology were considered but eliminated from further detailed analysis.

6.6.6 Energy Use

The proposed action includes the use of diesel fuel powered trucks, tug boats, small service boats, a crane, and an off-loader during 60 days of construction. Up to an estimated 72,000 gallons of diesel fuel is expected to be utilized during this period. There are no standards or thresholds established for fuel use apart from avoiding the wasteful use of energy resources. In fact, the economic feasibility of the proposed action dictates the efficient use of diesel fuel powered equipment and human resources, and energy conserving strategies are included in the proposed action for these reasons. Considering the above, the potential effect on energy use was considered but eliminated from further detailed analysis.

6.6.7 Mineral Resources

The proposed action would involve placing quarry rock on 40 acres of submerged land 0.3 miles offshore to create hard, rocky substrate upon which kelp will become established within a 69-acre project site. Sand is mined offshore in southern California for use as beach replenishment, but the project site was selected because of the relative absence of sand, since sand can cover hard substrate and inhibit the growth of kelp. There has historically been interest in mining

nodular phosphorite along the southern California coast to be used to produce fertilizer, but with no resulting commercial extraction. Offshore oil and gas extraction is also a potential use for the project site. However, the 69-acre project site is not currently being mined for minerals nor used for oil or gas extraction, and there are no known plans for mining or oil or gas extraction on the site. For these reasons, the effect of the proposed action on mineral resources was eliminated from further detailed analysis.

6.6.8 Growth Inducement

An important issue in California is whether a proposed action may directly or indirectly foster population growth and the consequent growth in demand for services and utilities, or may remove an obstacle that clears the path for the implementation of a separate development project. In this case, the proposed action is the restoration of pre-existing offshore biological resources. The type or nature of the proposed action is such that population growth would not be an expected direct or indirect result. The proposed restoration is not associated with a housing development project of any kind or with any project that would provide new services or utilities to facilitate the development of new housing. In addition, the proposed restoration is not an action that will be used as an offset or compensation measure for another proposed action. For these reasons, the potential for growth inducement was considered, but eliminated from further detailed analysis.

CHAPTER 7 UNAVOIDABLE ENVIRONMENTAL EFFECTS

The proposed action includes burial of existing biological habitat and resources within a 40-acre area offshore of the southern California coast in order to create rocky-reef habitat conditions. These rocky-reef habitat conditions are expected to improve and restore the existing biological conditions within a 69-acre project site, resulting in a much larger and more diverse biological community. The loss of the existing resources is an unavoidable effect of the proposed action.

The construction phase of the proposed action will consume fuel and irreversibly commit labor and capital resources. It will also produce emissions that will adversely affect air quality. And, the presence and operation of construction equipment 0.3 miles offshore from the City of Rancho Palos Verdes will cause adverse visual effects and noise. The post-construction phase will involve periodic monitoring using ships and divers. This monitoring will also consume fuel and irreversibly commit labor and capital resources.

All of these effects are unavoidable consequences of the proposed action. The effects, however, are considered minor because of the small scale of the project and the fact that no permanent structures will be visible after the construction 60 day construction period and that no noise will be generated by the rocky-reef habitat.

CHAPTER 8 MITIGATION MEASURES AND MEASURES TO REDUCE ENVIRONMENTAL EFFECTS

8.1 Introduction

All of the environmental effects of the proposed action are considered minor and therefore no required mitigation measures are necessary. There are, however, several measures that could be implemented to further reduce the minor environmental effects, as follows:

8.2 Biological Resources

A preconstruction survey would be carried out within 30 days of the start of construction for white, pink, and pinto abalone. If a white abalone were to be discovered, NOAA would contact the University of California at Davis, which holds permit for collection of white abalone to enhance captive broodstock. The survey would assure the white abalone meets the collection requirement that no other white abalone occurs within a ten-meter radius, and then the white abalone would be collected and transferred to Davis. If a pink or pinto abalone were discovered, or a white abalone that does not meet the collection requirement, NOAA would consult with the State Department of Fish and Wildlife and upon receiving authorization, relocate the animals to suitable habitat on the western side of Palos Verdes Peninsula, outside of the project area.

The post-construction monitoring/survey operations, including the use of a side-scan sonar system, would operate under the California State Land Commissions Offshore Geophysical Survey Permit Program (OGPP). The OGPP includes measures designed to protect marine life.

8.3 Public Outreach

A planned public outreach program will explain the purpose of the project and the timing and limited duration of construction. This will inform the public that the purpose of the proposed action is ecological restoration and that no permanent structures are being constructed. This will include notifying the media and local residents about both the type and duration of construction activities a month prior to beginning construction. Notices will also be placed at parks and nearby viewing stations.

- The Harbor Patrol will be notified two weeks prior to the start of construction activities for the Palos Verdes Reef Restoration Project.
- Local lifeguards will be notified of construction activities so they can help inform the public.
- A Local Notice to Mariners will be submitted to the U.S. Coast Guard Waterways Branch. The notice will include information about the purpose of the project and the location and timing of the construction activities.
- Construction notices targeting divers will be posted at dive forums, local dive shops, and nearby city, county, and open-space recreational areas where divers access dive spots near the project site.

- Construction notices targeting fishing and boating will be posted at the Long Beach and Los Angeles Harbors, the nearest Harbor Patrol office, the Cabrillo boat ramp, and the Cabrillo Pier.
- Recreational fishing and commercial fishing businesses that conduct operations in the project area will be notified of the project-related activities two weeks prior to the onset of construction. Notification will include a map of the project site, hours and duration of operation, and the predicted path of barge travel into and out of the construction site.

8.4 Air Emission Reduction Strategies

- Water sprays will be applied to the quarry rock piles/graveled areas and conveyor belts in the Catalina Island loading area at least twice daily. The frequency of watering will be increased when wind speeds exceed 15 miles per hour.
- The injection timing on diesel engines will be retarded to two degrees Before Top Center (estimated ten percent reduction in NO_x emissions).
- High-pressure injectors will be used on diesel engines to reduce NO_x emissions by approximately 40 percent (not applicable to tugboats).
- A live boating method will be used to off-load material at the reef site to eliminate the use of the crane and derrick barge. As such, the quarry rock will be pushed off the towing barges with a track loader. This will reduce daily and quarterly NO_x emissions.

8.5 Energy Conservation

- Reformulated diesel fuel No. 2 will be used by all of the heavy equipment. Additionally, Tier 2 and Tier 3 diesel-equipped engines, which reduce emissions of nitrogen oxides and particulate matter, will be utilized.
- Contractors will organize the construction activities to make the most efficient use of time, equipment, and materials, which will in turn result in the most efficient use of energy resources. Construction methods, such as towing two barges loaded with quarry rock from the Catalina rock quarry to the project site instead of only one barge, will reduce overall emissions.

8.6 Protecting Water Quality

- The quarry rock will be regularly inspected by an independent laboratory to ensure the materials placed on the project site conform to the California Department of Fish and Wildlife's Material Specification Guidelines and are protective of water quality.

CHAPTER 9 CUMULATIVE EFFECTS

9.1 Introduction

Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR§1508.7). Cumulative impacts may occur when there is a relationship between a proposed action and other actions expected to occur in a similar location or during a similar time period, or when past or future actions may result in impacts that would additively or synergistically affect a resource of concern. These relationships may or may not be obvious. Actions overlapping within close proximity to the proposed action can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide temporally will tend to offer a higher potential for cumulative effects.

In considering the proposed action, the restoration of offshore biological resources adjacent to the City of Rancho Palos Verdes, biological resources and air quality would be shared resources of potential concern. In addition, projects or activities in the general vicinity that exacerbate the visual aesthetic and noise effects of the proposed action on residents and people using the adjacent waters and coastal area for recreation would be of potential concern for cumulative impacts.

9.2 Biological Resources

As a principle for cumulative effects, actions that might permanently remove a biological resource would be expected to have a potential to act additively or synergistically if they affected the same population, even if the effects were separated geographically or temporally. In the case of this proposed action, the creation of rocky-reef habitat, biological resources would initially be lost to burial, but would later be replaced by an enhanced and more diverse biological community. For this reason, the potential cumulative effects of the proposed action would be beneficial in the context of ongoing impacts to biological resources from the many existing coastal industrial facilities, including electric power generation, petroleum products and refining, proposed construction projects such as improvements within the Ports of Los Angeles and Long Beach, and several proposed water desalinization projects. Many of these existing and proposed projects are subject to biological resources protection and mitigation requirements, some of which are subject to requirements for biological resources enhancement or restoration. The proposed action, the creation of rocky-reef habitat, would be beneficial and synergistic with the biological protection, mitigation, enhancement, and restoration efforts associated with these projects.

The proposed action would also be synergistic with other efforts to protect, enhance, and restore biological resources along the southern California coast. This includes the several elements of the Montrose Settlements Restoration Program, which seeks to achieve long-term net improvements in fish and wildlife habitat, the restoration of ecological balance in areas where contamination and other human-caused disturbances have led to adverse impacts on sensitive

native species, and improvement in the human use and non-use services provided by fish and wildlife in the region. The proposed action would also be synergistic with: 1) the California Marine Life Protection Act Initiative, which is involved in designing and managing a network of marine protected areas to protect marine life, habitats, and ecosystems. And, 2) the Montrose Settlements Restoration Program (MSRP) Phase 2 Restoration Plan. NOAA is the lead federal agency on the MSRP Trustee Council.

9.3 Air Quality

Along with the biological resources benefits of the proposed action, there are also emission-related effects on air quality from the construction of the rocky-reef habitat. These effects are minor and unavoidable if the proposed action is implemented. The evaluation of cumulative effects focuses on whether the effects should be considered major or significant when combined with other existing and future emissions in the area. The potential concern for cumulative effects for this particular proposed action is alleviated due to the small scale and timing of the project and has been addressed in considering the SCAQMD emissions permitting thresholds. Specifically, the proposed action requires the operation of two tugboats, barges, a crane, an off-loading bulldozer, several other small boats and pieces of equipment. The emissions released from operating these boats and pieces of equipment for up to 60 days are infinitesimally small when compared with the total emissions generated within the SCAB during this period and would not reasonably cause basin wide emissions thresholds to be exceeded. The emissions from the proposed action fall below the permitting thresholds established by the SCAQMD.

9.4 Visual Aesthetics and Noise

The construction of the proposed rocky-reef habitat would require the presence and operation of boats, barges, a crane, other small boats and equipment for up to 60 days in a location 0.3 miles offshore of the City of Rancho Palos Verdes. The construction would be visible to coastal residents and people using the beaches and other recreation facilities in nearby waters and along the adjacent coastline. The sound of the construction activities would typically blend in with the ambient noise along the coast, but might momentarily be distinguishable from other sources of noise, particularly on the water close to the construction site. Similar construction activities occur frequently along the southern California coastline and 60 days of construction 0.3 miles offshore from the City of Rancho Palos Verdes is be considered a minor effect both because of the small scale of the activity and the fact that no permanent structures will be visible following the end of the construction period.

Cumulative effects would occur if there were one or more other construction projects planned in the immediate project area during the 60 days of construction, and/or planned to occur soon before or after the proposed action. However, no such projects were identified during the site selection process for the proposed action or during consultation with the California State Lands Commission, the State agency with permitting jurisdiction over submerged lands in the vicinity of the project site.

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APPENDIX A

ANCHORING PLAN

PALOS VERDES REEF RESTORATION PROJECT

APPENDIX A

ANCHORING PLAN

An anchoring plan is necessary to assure the quarry rock is placed as precisely as possible in the design locations, to avoid placing rock on hard substrate areas, and to avoid anchor drag that might damage hard substrate. Figures A-1 and A-2 show the derrick barge and offloading operations. Figure A-3 is a schematic showing the operations including the placement of anchors.

The derrick barge will be moored by six anchor cables attached to winches on the barge. During rock placement, the barge will be located at the required position by winching on the six cables connected to the respective anchors. The anchors are designed to minimize possible drag on the bottom. This will be achieved by connecting each offshore anchor to a ten-ton concrete block located on the ocean floor and by connecting the cable from the barge to each concrete block via a foam-filled can (surge-can), as shown in Figure A-3. Anchors will be placed on sandy-bottom areas or on areas with less than 30 percent coverage of hard substrate.

Each anchorage location will allow a maximum coverage of 2,000 ft by 800 ft. The anchors will be located based on (a) the ocean bottom topography; (b) the existing potential for environmental harm to existing habitat as a result of the placement of anchors, chains, buoys, and/or cables; (c) and the weather conditions.

Figure A-1. Derrick barge.

Figure A-2. Rock placement method; front-end loader/flat supply-barge "push off" method.

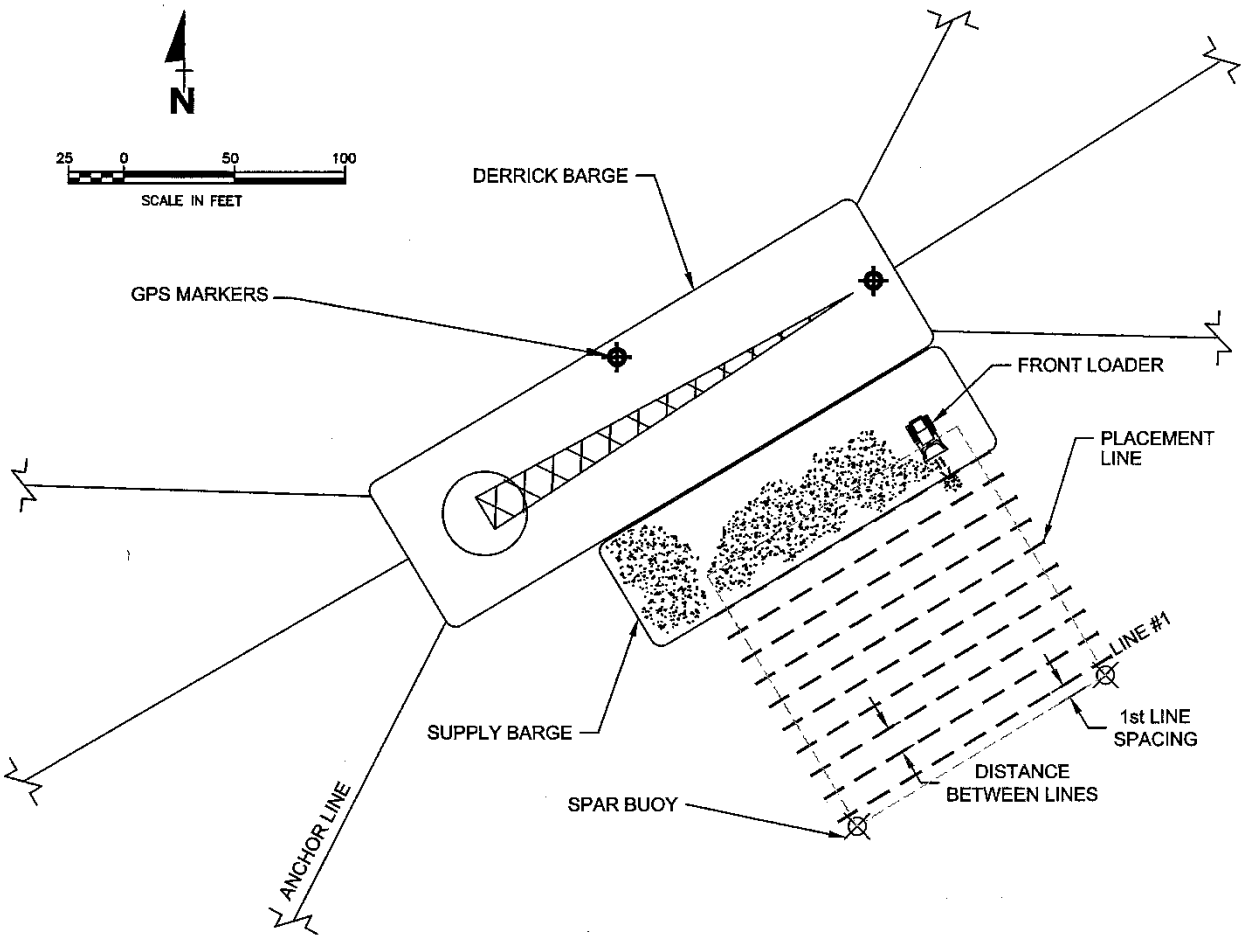

Figure A-3. Construction-method schematic showing derrick barge, supply barge, front-loader, rock placement lines, and six-anchor positioning.

APPENDIX B

OIL SPILL CONTINGENCY PLAN

PALOS VERDES REEF RESTORATION PROJECT

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OIL SPILL CONTINGENCY PLAN

PALOS VERDES REEF RESTORATION PROJECT

1.0 INTRODUCTION

At the initiation of each project or project phase, a spill management review will be conducted by the vessels captain who is in all cases the responsible authority. It should be pointed out that any oil spill in United States (U.S.) marine waters shall be reported immediately (on the same day). Reporting information is stated in Section 7.0.

2.0 OPERATIONAL SPILLS

Operational spills might involve one or more of the following substances carried on board the vessel: (i) diesel fuel; (ii) lube oil; (iii) hydraulic oil; or (iv) waste oil.

(i) Diesel fuel:

A spill kit shall be available for use in the event of a spill. If the fuel is spilled on the deck, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel foreman shall notify the Coast Guard and port facility.

(ii) Lube oil:

A spill kit shall be available for use in the event of a spill. If the oil is spilled on deck or in the machinery space, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel foreman shall notify the Coast Guard and port facility.

(iii) Hydraulic oil:

A spill kit shall be available for use in the event of a spill. If the oil is spilled on deck or in the machinery space, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel foreman shall notify the Coast Guard and port facility.

(iv) Pipe leakage:

The vessel foreman shall check the piping and rubber hose daily for leakage. Where leakage is found, it shall be repaired immediately. In the event of leakage, the vessel deck engineer shall secure valve(s) at the appropriate tank before repairing the leak. Spilled fuel on the vessel shall be

immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel foreman shall notify the Coast Guard and port facility.

3.0 SPILLS RESULTING FROM CASUALTIES AND VESSEL PROBLEMS

In the event of a casualty, the vessel foreman's first priority is to ensure the safety of the vessel's personnel and to initiate actions that may prevent escalation of the incident and marine pollution.

(i) Grounding:

The likelihood of grounding, although remote, could occur when the vessel is working near shore. Should an unforeseeable grounding event occur that causes a spill, the vessel foreman shall immediately report the accident to the Coast Guard and port facility. It is mandatory that the survey company immediately report the incident to the California Office of Emergency Services ("OES").

(ii) Fire or explosion:

If a fire or explosion occurs, the Coast Guard and port facility will be notified immediately by the vessel foreman. While awaiting a response from the USCG or local fireboat agencies, all crewmen shall report to the foreman for a head count. In the event that one or more crewmen are missing, the vessel foreman shall so notify the site safety officer and direct a search for the missing crew where practical. If one or more crewmen are injured, the foreman shall render first aid with the assistance of available crewmen. The foreman shall also notify the site safety officer of any injuries sustained as a result of the fire or explosion.

The crew will fight the fire with portable fire extinguishers if this can be done safely. The foreman shall determine if the fire or explosion warrants abandoning the vessel. If it is determined that the vessel is to be abandoned, the crew shall don life vests and safely enter the water or available life raft.

If there is a spill as a result of the fire or explosion, the vessel foreman shall immediately report the incident to the Coast Guard and port facility. It is mandatory that the survey company immediately report the incident to the OES.

(iii) Collision:

A collision is unlikely to cause a spill unless the vessel sinks or the fuel tank is "holed." If it is determined that the vessel is to be abandoned, the crew shall don life vests and safely enter the water or available life raft.

If the collision causes a spill from the fuel tank, the foreman shall immediately report the incident to the site safety officer, Coast Guard, and port facility. It is mandatory that the survey company immediately report the incident to the OES.

(iv) Vessel submerged/foundered:

If the vessel is submerged or foundered to the extent that it, or parts of it, is submerged, all measures shall be taken to evacuate all persons on board. Avoid contact with any spilled oil. Alert other vessels/vessels and/or the nearest coastal state for assistance in rescuing lives and the vessel as far as possible.

4.0 PRIORITY ACTIONS TO ENSURE PERSONNEL AND VESSEL SAFETY

Safety of vessel personnel and the vessel are paramount. In the event that a crewman's injuries require outside emergency assistance, the site safety officer shall be contacted immediately and emergency personnel contacted. While awaiting emergency assistance, the survey company's vessel personnel will render first aid and/or CPR.

5.0 MITIGATING ACTIVITIES

If safety of both the vessel and the personnel has been addressed, the vessel foreman shall care for the following issues:

- Assessment of the situation and monitoring of all activities as documented evidence.
- Care for further protection of the personnel, use of protective gear, assessment of further risk to health and safety.
- Containment of the spilled material by absorption and safe disposal within leakproof containers of all used material onboard until proper delivery ashore, with due consideration to possible fire risk.
- Decontamination of personnel after finishing the cleanup process.

All personnel shall refer to the MSDS's on board for additional information.

6.0 MEASURES TO BE TAKEN IN THE EVENT OF CASUALTY

(i) Response to collision

The vessel foreman and crew shall ensure that the following actions are taken.

- When there is no immediate danger to their own vessel and crew, rescue crew of the other vessel.
- Investigate the damaged area of the vessel and the ingress of water and take emergency measures to prevent the damage from becoming worse.
- When ingress of water is found as a result of damage investigation, take necessary measures to prevent water from coming in, or pump out the water already taken in, according to the position and amount of water taken in. Such measures include the

closing of water-tight doors, inserting wooden plugs, use of collision mats, cement box, strengthening of bulkhead, and use of water discharge pumps.

- When water penetration is severe even after countermeasures are taken and there is a danger of the vessel sinking, consider intended grounding on an appropriate shore.

(ii) Response to grounding

If the vessel runs aground, the vessel foreman and crew shall muster and the following steps should be taken immediately.

(1) Eliminate all avoidable sources of ignition and ban all smoking on board.

Further actions:

(1) Carry out a visual inspection of the vessel to determine the severity of the situation.
(2) Take soundings around the vessel to determine the nature and gradient of the seabed.
(3) Check difference in the tidal ranges at the grounding site.
(4) Evaluate tidal current in the grounding area.

Having assessed the damage that the vessel has sustained, and taking into account the effects of hull stress and stability, the foreman should decide whether any action can be taken to avoid further spillage, such as:

(1) Transfer of cargo and bunkers internally. If the damage is limited—for example, to one or two tanks—consideration should be given to transfer of liquid from damaged to intact tanks.
(2) Review existing and forecasted weather conditions to see if they will adversely affect the vessel.
(3) Evaluate the possibility of transferring cargo to barges or other vessels, and request such assistance accordingly.
(4) Trim or lighten the vessel sufficiently to avoid damage to intact tanks, thereby avoiding additional pollution from spillage of oil or noxious liquid substance.

The foreman should obtain information about the situation, including the following.

(1) Tides and currents
(2) Weather, including wind, state of sea and swell.
(3) Any weather forecast changes.
(4) Nature of the bottom.
(5) Depth of water around the vessel, the calculated buoyancy needed to refloat, draught, and trim after refloating.
(6) Condition of the vessel, including stresses on the hull.

Strict safety precautions should be taken before entering any empty space, in order to avoid any risks from toxic fumes or oxygen deficiency.

Soundings should be taken around the vessel to determine the extent of the grounding/stranding as accurately as possible. If the sea is too rough for accurate sounding, it may be possible to measure the distance from the seabed to the main deck. By marking this on a longitudinal section from the general arrangement drawings, the extent of grounding can be determined.

If the vessel is structurally intact, an immediate attempt may be made to refloat her with or without assistance. In deciding whether to make an immediate attempt to refloat, the foreman should consider the use of the tugs and ground tackle as well as the possible damage that might be caused to the vessel.

Immediate refloating may be the best course to adopt even if the vessel has sustained bottom damage. However, if there are signs of excessive hogging, sagging or of undulations in the sides of the hull, more careful consideration is required before attempting to refloat the vessel. In these circumstances, lightening of the vessel may reduce the risk of further damage and pollution.

(iii) Response to submerged/foundered

The vessel foreman and crew shall muster and ensure that the following actions are taken immediately.

- If the vessel is wrecked to the extent that it or parts of it are submerged, take all measures to evacuate all persons on board.
- Avoid contact with any spilled oil.
- Alert other vessels and/or the nearest coastal state for assistance in rescuing lives.
- All openings in hull and superstructures are to be checked for watertight integrity. Ensure that all water doors, sewage and other relevant damage control valves are closed.
- Fill bottom tanks with ballast low side first.
- Should the situation appear to be deteriorating, urgency or distress messages should be dispatched as appropriate.

7.0 REPORTING AN OIL SPILL TO STATE AND FEDERAL AGENCIES

Any oil spill in U.S. marine waters shall be reported immediately (on the same day) to the state and federal phone numbers below:

West Coast Oil Spill hot-line	800-OILS-911, *or*
Department of Fish and Game CalTIP	888-CFG-CALTip
(Californians Turn In Poachers & Polluters)	(888-334-2258). *and*
U.S. Coast Guard National Response Center	800-424-8802
California Office of Emergency Services (OES)	800-OILS-911 or 800-852-7550.

During the phone call, the following information will be given over the phone.

a. Name and telephone number of caller.
b. Where did you see the spill?
c. What do you think was spilled (oil, gas, diesel, etc.)?
d. Can you estimate the size of the spill?
e. The date & time you saw this spill? (PLEASE report on the same day).
f. Did you see any oiled or threatened wildlife?
g. Do you have any information or thoughts about who spilled the material?
h. What, if any, activity did you observe at the spill site?

After taking the necessary actions, the spill will be reported in writing to the Governor's Office of Emergency Services on their forms.

8.0 DIVER CHECKLIST

Prerequisites:

1. Copy of dive manual shall be at work site.
2. Site safety has reviewed work plan.
3. A written pre-job brief has been approved by the manager or designee.
4. All prerequisites required in the dive manual have been met.
5. Verify that a rescue plan is in place.
6. All procedures, drawings, and work documents are available.
7. All video and communication equipment is operable.
8. All diver qualifications are active.
9. Any known hazards have been identified.
10. Verify that all hazard barriers are in place.
11. Verify that waves and tidal conditions will not impact diving operations.
12. A diving supervisor shall be present at all times while the diver is in the water.

Diver Equipment Checkout:

1. Ensure that there are two sources of breathing air available.
2. Ensure that air compressor fuel tank and oil levels are full prior to diving.
3. Ensure that breathing air compressors are not located in an area where the induction of harmful gases is possible.
4. Ensure that the Dive Supervisor inspects the diver's equipment per their daily equipment checklist.
5. Ensure that diver communication equipment checkout is performed.

Placing a Diver in the Water:

1. Notify the control room prior to commencing dive activities. Also:
   a. Verify method of communication to be used with the control room.
   b. Notify control room at conclusion of daily dive activities.
2. Verify that standby divers are in the immediate area and in a state of preparedness to enter the water within two minutes.
3. If SCUBA equipment is used, two divers shall be in the water.
4. Remove the diver from the water if any operational changes are encountered.