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# Th10b

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## STAFF REPORT: COASTAL DEVELOPMENT PERMIT

**Application No.:** 9-18-0629

**Applicant:** Southern California Marine Institute

**Location:** State waters approximately 0.3 miles offshore of the City of Rancho Palos Verdes, Los Angeles County (see [Exhibit 1](#)).

**Project Description:** Construction of nine acres of rocky reef comprised of 24 individual reef modules of approx. 16,000 square feet each within a 69 acre area of sandy seafloor in state waters 0.3 miles offshore of Bunker Point on the Palos Verdes Peninsula.

**Staff Recommendation:** Approval with conditions

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### SUMMARY OF STAFF RECOMMENDATION

The Southern California Marine Institute (SCMI) proposes to construct a total of approximately nine acres of low-relief (about three feet high) and high-relief (about 6 to 12 feet high) rocky reef in state waters offshore of Bunker Point, the Trump National Golf Club and the City of Rancho Palos Verdes. The proposed reef would be constructed as 24 individual modules or rectangular piles of rock – each about 16,000 square feet - separated by sand channels and configured in eight groups of three reef modules each ([Exhibits 2 and 3](#)). In total, approximately 70,300 tons of rock would be used to construct the reef modules. The rock would be purchased from two commercial quarries on Catalina Island and transported the approximately 30 miles to the project site using two 2,000 ton capacity supply barges pulled by a tug. An estimated 18 round trips would be needed to transport the rock to the project site, and once each supply barge is accurately positioned, the rock would be placed at the reef module locations by using a front-end loader to push the rock off of the supply barge (as shown in [Exhibit 4](#)).

The reef modules would be installed within an approximately 69 acre project area (600 feet wide by 6,300 feet long) in water depths of between 49 and 68 feet. The seafloor in this area is primarily comprised of a thin layer of soft substrate (less than three feet) overlying a historic rocky reef that has been buried over time. The reef modules would be installed within an approximately 40 to 60 day project window between May and October in order to avoid affecting the area's commercial lobster fishing season.

As stated by SCMI, the purpose of the proposed reef 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.” The motivation and funding to restore this reef habitat comes from the Montrose Settlements Restoration Program, which is managed by six state and federal agencies that serve as the program's Natural Resources Trustees (NOAA, U.S. Fish and Wildlife Service, National Park Service, CDFW, California Department of Parks and Recreation, and California State Lands Commission). Consistent with the Montrose Settlements Restoration Program's 2012 Final Phase 2 Restoration Plan, the proposed reef restoration project is intended to help compensate for losses to marine biological resources in the Palos Verdes area and throughout southern California caused by contaminated sediments from the Palos Verdes Shelf Superfund Site. This site surrounds the White Point Outfalls and includes areas that were heavily contaminated with DDT and PCB discharged into the Los Angeles County sanitation system by the Montrose Chemical Corporation (the nation's largest manufacturer of DDT) and others between the 1950s and 1970s.

Although intended as a restoration project, construction of the reef could also result in adverse impacts to coastal resources. The key Coastal Act issue raised by this project is the potential for adverse impacts to marine resources. The proposed project has the potential to harm marine resources by damaging rare, sensitive or ecologically important species and habitats and degrading water quality. To minimize impacts, Commission staff recommends several conditions designed to protect marine habitats, sensitive species and water quality. These include **Special Condition 3** requiring SCMI to submit a Marine Wildlife Monitoring Plan (MWMP), **Special Condition 4** requiring an Anchoring Plan, **Special Conditions 10** and **5** requiring an audit of reef polygon construction and a final post-construction as-built survey and report, **Special Condition 9** requiring completion of a pre-installation biological survey, and **Special Conditions 6- 8** requiring the development of plans to protect ocean water quality. As conditioned, the Commission staff recommends the Commission find the proposed project is consistent with Sections 30230, 30231 and 30232 of the Coastal Act.

For the reasons summarized above, and with implementation of the Special Conditions, the Commission staff recommends that the Commission **approve** CDP application 9-18-0629, as conditioned. The standard of review is Chapter 3 of the Coastal Act. The motion to approve with conditions is on page 4.

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## APPENDICES

[Appendix A – Substantive File Documents](#)

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## EXHIBITS

[Exhibit 1 – Project Location](#)

[Exhibit 2 – Proposed Reef Configuration](#)

[Exhibit 3 – Proposed Configuration of Reef Modules](#)

[Exhibit 4 – Photos and Figure of Proposed Installation Method](#)

[Exhibit 5 – California State Land Lease No. PRC 9448.9 – Special Provisions](#)

[Exhibit 6 – Department of the Army Permit Special Conditions](#)

[Exhibit 7 - Surfing Opportunities and the Bunker Point Reef Restoration Project](#)

## I. MOTION AND RESOLUTION

### Motion:

*I move that the Commission **approve** Coastal Development Permit No. 9-18-0629 pursuant to the staff recommendation.*

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in conditional approval of the permit and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

### Resolution:

*The Commission hereby approves Coastal Development Permit 9-18-0629 and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.*

## I. STANDARD CONDITIONS

This permit amendment is granted subject to the following standard conditions:

1. **Notice of Receipt and Acknowledgment.** The permit is not valid and development shall not commence until a copy of the permit, signed by the Permittees or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
2. **Expiration.** If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
3. **Interpretation.** Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.
4. **Assignment.** The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
5. **Terms and Conditions Run with the Land.** These terms and conditions shall be perpetual, and it is the intention of the Commission and the Permittees to bind all future owners and possessors of the subject property to the terms and conditions.

### III. SPECIAL CONDITIONS

1. **Other Permits and Approvals:** PRIOR TO THE START OF CONSTRUCTION, the Permittee shall provide to the Executive Director copies of all other local, state, and federal permits and authorizations required to perform project-related work, including final authorization from the U.S. Army Corps of Engineers and Regional Water Quality Control Board.
2. **Assumption of Risk, Waiver of Liability and Indemnity.** By acceptance of this permit, the Permittee acknowledges and agrees (i) that the site may be subject to hazards, including but not limited to public use of navigable waters around and over the project site, as well as waves, storms, and other ocean hazards, which may worsen with future sea level rise; (ii) to assume the risks to the Permittee and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.
3. **Marine Wildlife Monitoring Plan (MWMP).** AT LEAST 60 DAYS PRIOR TO THE COMMENCEMENT OF OFFSHORE ACTIVITIES, the Permittee shall prepare a MWMP for review and approval by the Executive Director. The Permittee shall implement the MWMP during all marine operations (e.g., rock placement, anchoring and movement of barges). The MWMP shall include the following elements:
  - a. Prior to the start of offshore activities, the Permittee shall provide awareness training to all project-related personnel and vessel crew, including viewing of an applicable wildlife and fisheries training video, on the most common types of marine wildlife likely to be encountered in the project area and the types of activities that have the most potential for affecting the animals.
  - b. A minimum of two National Marine Fisheries Service (NMFS)-qualified marine wildlife observers (MWOs) shall be located on the main project vessel to conduct observations, with two observers on duty during reef construction activities. A minimum of one qualified MWO shall be present on the supply barges during transit to and from the project site. The MWMP shall identify any scenarios that require an additional observer on the barges or other project vessels and, in these cases, make recommendations as to where they should be placed to ensure complete coverage of the surrounding marine environment.
  - c. Shipboard MWOs shall maintain a daily sighting log that shall be of sufficient detail to determine whether observable effects to marine mammals are occurring.
  - d. Determination of the exclusion zone for eliminating the risk of crushing as a result of rockfall.
  - e. Procedures for monitoring marine mammals and sea turtles and specifications for MWOs within the rockfall exclusion zone.
  - f. Methods for communicating with contractors to stop work if there is a risk that any marine mammals or sea turtles active in the area may move closer to the construction site and inside a designated exclusion zone.

- g. Procedures for MWO monitoring of barge transport.
  - h. Methods for communicating with the ship's captain if there is a risk of collision with a marine mammal or sea turtle.
  - i. Limitations that work occur only during daylight hours when visual monitoring of marine mammals and sea turtles can be conducted.
  - j. The MWOs shall have the authority to stop any activity that could result in harm to a marine mammal or sea turtle. For monitoring purposes, the MWOs shall establish a 1,640 foot (500 meter) radius avoidance zone around the project vessels for the protection of large marine mammals (i.e., whales) and a 500-foot (152-meter) radius avoidance zone around the project vessels for the protection of smaller marine mammals (i.e., dolphins, sea lions, seals, etc.) or sea turtles.
  - k. In the event that any take involving harassment or harm to a marine mammal occurs, the MWO shall immediately notify the Executive Director, NMFS and any other required regulatory agency.
  - l. A final report summarizing the results of monitoring activities shall be submitted to the Executive Director and other appropriate agencies no more than 90 days following completion of reef construction activities. The report shall include: (a) an evaluation of the effectiveness of monitoring protocols and (b) reporting of (i) marine mammal, sea turtle, and other wildlife sightings (species and numbers); (ii) any wildlife behavioral changes; and (iii) any project delays or cessation of operations due to the presence in the project area of marine wildlife species subject to protection.
- 4. Anchoring Plan.** AT LEAST 30 DAYS PRIOR TO THE COMMENCEMENT OF OFFSHORE ACTIVITIES, the Permittee shall prepare and submit an Anchoring Plan to the Executive Director for review and approval that describes how the Permittee will avoid placing anchors on sensitive ocean floor habitats. In addition to the elements required under Special Provision 2(e) of Lease No. PRC 9448.9 ([Exhibit 5](#)), the Plan shall include at least the following information:
- a. A list of all vessels that will anchor during the project and the number and size of anchors to be set;
  - b. Detailed maps showing proposed anchoring sites that are located at least 40 feet (12 meters) from all areas of known rocky habitat;
  - c. A description of the navigation equipment that would be used to ensure anchors are accurately set; and
  - d. Anchor handling procedures that would be followed to prevent or minimize anchor dragging, such as placing and removing all anchors vertically.
- 5. Final Post-Construction Sonar Survey and Report.** Within 30 working days following construction of the reef, the Permittee shall submit a final post-construction survey report to the Executive Director. The report shall include maps and GIS layers demonstrating:
- a. The installed position, perimeter and area of each reef module;
  - b. The average topographic relief and average percentage of the seafloor covered with quarry rock within each reef module;
  - c. An estimate of the uniformity of rock coverage within the perimeter of each reef module as well as rock overlap; and
  - d. The location, perimeter, area, average relief and average percent cover of any reef module that is significantly different from the specifications set forth in the CDP Application.

If the Executive Director determines that the deviation(s) exceed the scope of the activity authorized in this permit, the Permittee shall immediately prepare a Construction Remediation Plan that will include alterations or additions necessary to correct the deviation(s). Within 90 days of the Executive Director's determination, the Permittee shall submit the Construction Remediation Plan for Commission approval as an amendment to this permit and shall implement the Construction Remediation Plan as soon as is practicable following the Commission's approval.

- 6. Spill Prevention and Response Plan.** PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the Applicant shall submit a Project-specific Spill Prevention and Response Plan to the Executive Director for review and approval. In addition to the elements required under Special Provision 2(b) of Lease No. PRC 9448.9 ([Exhibit 5](#)), the Plan shall identify the worst-case spill scenario and demonstrate that adequate spill response equipment will be available. The Plan shall also include preventative measures the Applicant will implement to avoid spills and clearly identify responsibilities of onshore and offshore contractors and the Applicant personnel and shall list and identify the location of oil spill response equipment (including booms), appropriate protocols and response times for deployment. Petroleum-fueled equipment on the main deck of all vessels shall have drip pans or other means of collecting dripped petroleum, which shall be collected and treated with onboard equipment. Response drills shall be in accordance with Federal and State requirements. Contracts with off-site spill response companies shall be in-place and shall provide additional containment and clean-up resources as needed.
- 7. Critical Operations and Curtailment Plan (COCP).** PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the Applicant shall submit a COCP to the Executive Director for approval. In addition to the elements required under Special Provision 2(d) of Lease No. PRC 9448.9 ([Exhibit 5](#)), the COCP shall define the limiting conditions of sea state, wind, or any other weather conditions that exceed the safe operation of offshore vessels, equipment, or divers in the water; that hinder potential spill cleanup; or in any way pose a threat to personnel or the safety of the environment. The COCP shall provide for a minimum ongoing 5-day advance favorable weather forecast during offshore operations. The plan shall also identify the onsite person with authority to determine critical conditions and suspend work operations when needed.
- 8. Marine Discharge.** There shall be no marine discharge of sewage or bilge/ballast water from vessels working on the project. A zero-discharge policy shall be adopted for all project vessels.
- 9. Pre-Installation Site Survey.** No more than six months prior to the initiation of construction activities, the Permittee shall submit to the Executive Director for review and approval the results of diver-based ecological surveys carried out throughout the entire footprint (defined as the installation site and an adjoining six foot wide band) of each of the 24 reef modules. If the Executive Director determines, based on a review of the survey results, that sensitive marine habitat or species are present within the footprint of one or more reef modules, the Permittee shall, within 60 days of such a determination, submit a complete application to amend its permit to avoid placement of rock within the identified sensitive marine habitat.
- 10. Initial Construction Audit.** The Permittee shall submit to the Executive Director for approval the inspection findings of the quality control survey carried out on the first

installed reef module. These findings shall include an evaluation of the installed size, configuration, height, shape and location of the reef module compared to the proposed design described in the CDP Application. The Executive Director shall complete review of the inspections findings within two business days of receiving them. The Permittee shall correct or ameliorate non-conformance with any construction and/or material specifications set forth in the CDP Application prior to proceeding with installation of additional reef modules.

- 11. Liability for Costs and Attorneys' Fees.** By acceptance of this permit, the Applicant/Permittee agrees to reimburse the Coastal Commission in full for all Coastal Commission costs and attorneys' fees -- including (1) those charged by the Office of the Attorney General, and (2) any court costs and attorneys' fees that the Coastal Commission may be required by a court to pay -- that the Coastal Commission incurs in connection with the defense of any action brought by a party other than the Applicant/Permittee against the Coastal Commission, its officers, employees, agents, successors and assigns challenging the approval or issuance of this permit. The Coastal Commission retains complete authority to conduct and direct the defense of any such action against the Coastal Commission. **WITHIN 45 DAYS OF COMMISSION ACTION**, the Permittee shall enter into a separate written agreement with the Executive Director agreeing to reimburse the Coastal Commission for all court costs and attorney's fees, consistent with the requirements of this condition.

## **IV FINDINGS AND DECLARATIONS**

### **A. BACKGROUND AND PROJECT DESCRIPTION**

In its February 27, 2018 report and recommendation to the California State Lands Commission (CSLC), CSLC staff provide the following information on the development and background of the proposed project:

*From the late 1940s to the early 1970s, millions of pounds of DDTs and PCBs were discharged into ocean waters off the southern California coast. Most of these contaminants originated from the Montrose Chemical Corporation manufacturing plant located in Torrance, California. The Montrose Chemical Corporation discharged contaminants onto the Palos Verdes Shelf through an ocean outfall offshore from White Point, harming fish, birds, and other wildlife in the area.*

*In 2001, the Commission, NOAA, and other federal and state agencies reached a settlement with the parties responsible for the contamination and established the Montrose Settlements Restoration Program (MSRP). The MSRP's goal is to restore, replace, rehabilitate, or otherwise compensate for the natural resources destroyed by the DDT and PCB contamination in the region. The MSRP is overseen by a Trustee Council which includes NOAA; the U.S. Fish and Wildlife Service; the National Park Service; the California State Lands Commission; the California Department of Fish and Wildlife; and California Department of Parks and Recreation.*

*In 2005, the Trustee Council approved MSRP Phase 1 Restoration Plan, which included fishing, fish habitat, and bird restoration projects. In 2012, the Trustee Council released the MSRP Phase 2 Restoration Plan, which allocated the roughly \$15 million remaining in the settlement fund for additional projects. The Trustee*

*Council approved the proposed project, which is expected to cost \$6.49 million, as part of MSRP's Final Phase 2 Restoration Plan.*

*In the MSRP Final Phase 2 Restoration Plan, the Trustee Council determined that the project would effectively provide long-term benefits to fish on the Palos Verdes Shelf by restoring reef habitat buried by landslides.*

*While not associated with DDT and PCB contamination, landslides caused by human activity destroyed large amounts of fish habitat in the Palos Verdes Shelf. Road construction on Palos Verdes Drive triggered the Portuguese Bend Landslide in 1956, burying extensive areas of natural rocky reef in the vicinity. The landslide continued to release sediment through the 1990s, but by 1999 had slowed significantly as a result of efforts to stabilize the area. However, the Portuguese Bend Landslide continues to release sediment due to wave action.*

*Additionally, on June 2, 1999, a landslide occurred from the 18th hole of what is now the Trump National Golf Club, which sits above Bunker Point. While this landslide was stabilized relatively quickly, there was a large release of sediments into the ocean which buried additional reef habitat.*

*The Trustee Council determined that the project, by restoring reef habitat buried by these landslides, would help compensate for the harm caused by DDT and PCB contamination in the Palos Verdes Shelf.*

The proposed project would be managed by the Southern California Marine Institute (SCMI), an alliance of 23 major universities, colleges, agencies and foundations in southern California, including the National Marine Fisheries Service, nine universities from the California State University system, USC, UCLA, Occidental College, and The Bay Foundation. SCMI's mission is to foster marine research and education, focusing on urban impacts of the greater Los Angeles region on the coastal ocean. SCMI seeks to improve scientific understanding and the development of solutions that will enable coastal waters and watersheds to thrive, adapt and become resilient to ongoing environmental stressors.

SCMI would accomplish the proposed reef restoration through the placement of approximately 70,300 tons of quarried rock across 24 individual "reef module" sites within a roughly 69 acre area (as shown in [Exhibits 1 and 2](#)). Each proposed reef module would have a footprint of approximately 0.37 acres (16,000 square feet) and the total combined footprint of all 24 would be roughly nine acres. The reef would be installed as eight groupings of three modules each (as shown in [Exhibits 2 and 3](#)). The three reef modules within each grouping would be separated by 30 to 60 feet of unaltered seafloor and the groupings would be separated by at least 150 feet from each other (as shown in [Exhibit 3](#)). Each reef module would include a combination of six piles of approximately one-ton rock boulders with the total height of each pile ranging from between three and 13 feet. The photograph below provides an indication of what a single 13 foot high pile of one-ton rock would look like. A single reef module would be comprised of six such piles with different heights installed directly adjacent to one another (as shown in [Exhibit 3](#)).

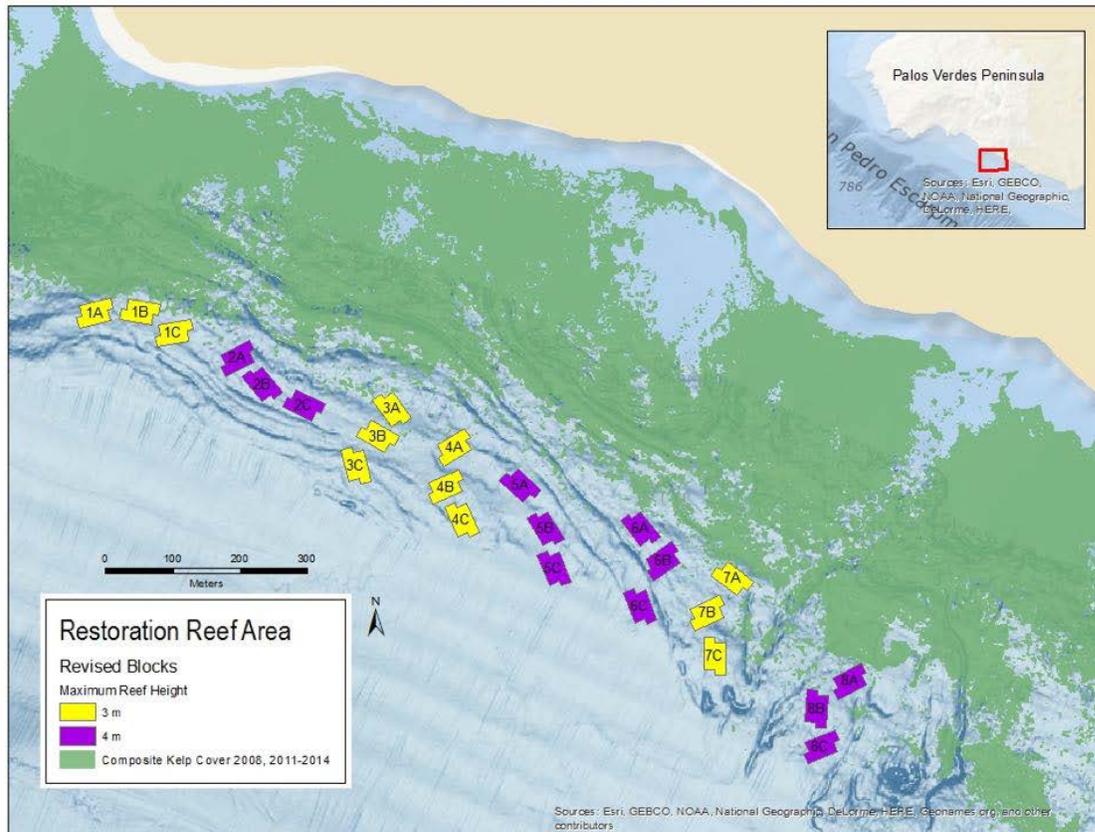


The rock proposed to be used for the project would be purchased from two commercial quarries on Catalina Island and transported the approximately 30 miles to the project site using two 2,000 ton capacity supply barges pulled by a tug. An estimated 18 round trips would be needed to transport all the rock to the project site. Once the supply barges arrive at the project site, they would be anchored to a derrick barge (an approximately 19,000 square foot, flat surface barge equipped with a crane) that would be maintained at the project site for the duration of reef installation. The derrick barge would provide logistical support, a work platform and staging area during construction of the reef. The derrick barge would also be used to store a front-end loader that would be moved onto each supply barge via crane once it is positioned in place at the reef block installation sites. Once the barge is accurately positioned using GPS, the front-end loader would be used to push the quarried rock off of the supply barge into the ocean (as shown in [Exhibit 4](#)). The rock boulders would then sink through the water column and accumulate on the seafloor in piles. Once these piles reach the appropriate dimensions, the barge would be repositioned over the next reef module site and the process would be repeated. This construction method is the same as that recently approved by the Commission for use by Southern California Edison on the San Onofre Nuclear Generating Station (SONGS) mitigation reef offshore of San Clemente (CDP No. 9-19-0025).

All 24 of the reef modules would be installed within an approximately 69 acre project area (600 feet wide by 6,300 feet long) in water depths of between 49 and 68 feet. The seafloor in this area is mostly flat and primarily comprised of a thin layer of soft substrate (less than three feet) overlying a historic rocky reef that has been buried. The reef modules would be installed within an approximately 40 to 60 day project window between May and October.

The project area was selected based on the results of historic investigations as well as bathymetric and dive surveys which were used to delineate an area of relatively shallow

water depths (49 to 68 feet) made up of a thinly buried section of hard substrate that approximately parallels the shoreline and is adjacent to existing nearshore kelp beds (as shown in the figure below and [Exhibit 2](#)).



The project area includes a patchwork of hard substrate between the more extensive sandy-bottom areas where the quarry rock would be placed. The sediment thicknesses in the sandy-bottom areas are relatively shallow - 80 percent of the area surveyed has sediment depths of less than about three feet thick.

Based on surveys and historical investigations carried out by the applicant (on behalf of the MSRP), these areas of sandy seafloor previously supported rocky reef and kelp forest habitat. The reefs appear to have been present through the 1990s and likely became buried by the sediment discharged into the ocean by nearby landslides, including the 16 acre landslide that occurred during construction of a golf course in 1999 at the top of the bluffs adjacent to the project site. As such, the site represents a unique opportunity to restore rocky reef to an area from which it has been lost.

The configuration of the proposed reef was guided by the following design criteria developed by the Occidental College's Vantuna Research Group to enhance the stability, ecological function, and long-term persistence of the reef. These criteria – and the figures they reference - are further discussed in the report titled *Bunker Point Reef Restoration Project: Criteria, Design, and Monitoring* (available as **Appendix B**).

- *Blocks do not overlap with persistent kelp canopy. Persistent kelp canopy is an indication of stable rocky reef below that has not been covered by sediment (Figure 25).*

- *Blocks are placed at 15-20 m seafloor depth (Figure 25). The highest biomass areas of the reefs we studied tended to be in this depth zone (Figure 22). Placing blocks in these somewhat deeper depths would also limit wave action, scouring and seasonal excavation/deposition of sediments.*
- *Vary the orientation of each block and each module (Figure 24). This would again increase heterogeneity in reef characteristics, with respect to their relative orientation to the shoreline and to prevailing currents and wave action. This should increase the likelihood of high relief blocks causing creating a mosaic of small-scale flow features, effectively facilitating microhabitat creation/diversification across the module/block/reef.*
- *Mimic natural features (reef width and orientation to natural features).*
- *Blocks placed in a maximum of 1m sediment to limit long-term burial/sinking.*
- *10-20 m sand channels between modules within a block (Figures 23-25). Permits space for sediments moving with longshore current and wave action to move around/through modules. Modules are still close enough to provide connectivity (fishes can move over sand between them).*
- *Maintain connectivity with existing natural reefs. This was done by positioning the ends of at least one module within a block less than 30 m from existing nearshore natural exposed reef (kelp line) or existing (non-buried) rocky reefs so the blocks are not “isolated islands” in the sand (Figure 24-25).*
- *Maximize distance between blocks (>50 m) to increase independence of each block (Figure 24). Mimics natural reef ridges, these are typically oriented perpendicular to shore with large sandy areas between them.*

Several of these design criteria have been specifically established to help ensure that the proposed restoration reef does not sink or become buried and suffer the same fate as the historic reef that was once present at the project site.

To minimize the risk of the installed rock and/or reef modules sinking into the seafloor, the installation sites were carefully selected to include areas in which a thin layer (less than three feet on average) of soft substrate overlies natural bedrock. Accordingly, even if the new installed rock sinks into the soft sediment, it would quickly make contact with the underlying bedrock which would hold it in place and prevent further sinking. Because the proposed reef modules would extend ten to 13 feet above the seafloor, even if they sank through the entire layer of soft sediment present at the installation sites, the majority of installed rock would continue to remain exposed above the seafloor.

SCMI also considered the risk that the proposed reef modules would be subjected to burial from existing soft sediment in the area or future soft sediment released from the Portuguese Bend landslide. To minimize this risk, the proposed reef modules were designed to mimic or replicate reef areas in the project vicinity that have been able to persist over time without becoming buried. One such example is referred to as KOU Rock and is located slightly downcoast of the project site. This rock reef feature has resisted burial over time and was therefore carefully evaluated by SCMI and the Vantuna Research Group. Among the characteristics of KOU Rock that were determined to protect it from burial are its height and higher relief features. The proposed reef modules were therefore designed to also include such characteristics and features.

Once the 24 proposed reef modules are installed, SCMI would carry out post-construction surveys to document the final “as-built” condition of the reef and begin an extensive

monitoring program to evaluate its colonization by marine life and effects on the physical and biological conditions on the surrounding area. As discussed in NOAA's Environmental Assessment:

*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 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 predetermined 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.*

Additionally, SCMI would also carry out a diver survey of the first installed reef module upon its completion. This survey would be focused on confirming that the size, configuration, shape, and height of the installed reef module are consistent with the design parameters.

## **B. OTHER AGENCY APPROVALS**

### **California State Lands Commission (CSLC)**

The CSLC is the lead agency under the California Environmental Quality Act (CEQA) for the proposed project. In February 2017, the CSLC prepared an Initial Study and Environmental Checklist for the project and on February 27, 2018, the CSLC determined that the project will not have a significant effect on the environment and prepared a Negative Declaration for the project pursuant to the provisions of CEQA. The CSLC also approved issuance of a lease to the SCMI for the area in which the proposed reef would be located. This lease includes 13 special provisions to help the project avoid or minimize potential adverse impacts to fisheries, water quality, marine habitats and wildlife, and other public trust resources. These special provisions are included in [Exhibit 5](#).

### **U.S. Army Corps of Engineers (USACE)**

On February 22, 2019 SCMI submitted an application to the USACE for a Department of the Army Permit to discharge fill into waters of the U.S. and to place structures in and under navigable waters of the U.S. On April 5, 2019, the USACE issued a provisional permit to SCMI for the proposed project. Issuance of the final Department of the Army Permit is dependent on issuance of a Clean Water Act Section 401 Water Quality Certification by the Regional Water Quality Control Board and a coastal development permit. The provisional Department of the Army Permit includes 15 special conditions, included as [Exhibit 6](#).

### **Regional Water Quality Control Board (RWQCB)**

Placement of the proposed reef blocks requires authorization from the Regional Water Quality Control Board in the form of a Clean Water Act Section 401 Water Quality Certification. SCMI

submitted an application for this certification to the Los Angeles Regional Water Quality Control Board in May 2017 and it is currently under review.

### **C. MARINE RESOURCES AND WATER QUALITY**

Section 30230 of the Coastal Act states:

*Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231 of the Coastal Act states:

*The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Coastal Act Section 30232 states:

*Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*

As described in the Initial Study prepared for the proposed project by the California State Lands Commission:

*The Project site is located 0.3 mile offshore, between Bunker Point and White Point on the Palos Verdes Peninsula in Los Angeles County. The Project site is in the region called the Southern California Bight (SCB), which includes the coastal area of southern California from Point Conception to the United States/Mexico border and offshore to the Channel Islands.*

*The SCB contains many unique biological and physical characteristics. Biologically, this area is the transition zone between northern marine populations to more temperate marine species, with 87 percent of California fish species found in this region. Physically, water temperatures are generally warmer and more consistent than in areas north and south of the SCB and wind speeds in the area are much lower than on other parts of the California coast (Gelpi and Norris 2008). This is a region of highly productive and valuable biological environments, particularly in the nearshore region; however, many of the biological environments in this area have been negatively affected by sedimentation and turbidity from nonpoint source pollution, reef burial from landslides, decimation of*

*kelp beds from sea urchins, sediment contamination from sewage effluent from the nearby Joint Water Pollution Control Plant's White Point Outfall, and other impacts.*

...

*Within the boundaries of the Project site (15 to 20 m depth range), much of the reef has been impacted by sedimentation, mostly due to landslides (Pondella et al. 2012). A review of side-scan sonar data collected by EcoSystems Management Associates (2014) within the boundaries of the Project site identified approximately 9 acres of substantial hard substrate that could be considered biologically important habitat. The remaining area (approximately 60 acres) contains predominantly buried-reef habitat covered by a thin veneer of sand less than 1 m thick. A diver ground-truthing survey conducted at the Project site in April 2014 indicated the presence of gorgonians, algae, and sea urchins in the areas with hard substrate. Giant kelp (*Macrocystis pyrifera*) was largely absent (Coastal Environments 2014b).*

Although the project site (the approximately 69 acre area in which the 24 individual reef modules are proposed to be installed) supports little hard substrate or kelp habitat, extensive areas of rocky reef and canopy-forming kelp beds are present directly shoreward (as shown in [Exhibit 2](#)) and along the Palos Verdes Peninsula to the north and south. Additionally, the complex of state designated marine protected areas that includes the Abalone Cove State Marine Conservation Area and Point Vicente State Marine Reserve begins approximately 1.5 miles to the northwest of the project site, on the other side of the Portuguese Bend landslide. Located in an area that is typically “up-current” of the Portuguese Bend and golf course landslides and the White Point Outfalls, these marine protected areas support a range of hard substrate reefs and sandy seafloor areas that have been less severely damaged than the habitats at the project site.

In order to evaluate the health of habitats at the project site and help identify viable locations for reef restoration, a series of biological surveys were carried out, including the most recent one between January and February 2015. This survey focused on documenting the invertebrate, algal, and fish species present at the project site. The results of this survey are discussed in the State Lands Commission's Initial Study:

*Common members of the invertebrate community associated with the kelp beds include three species of sea urchins that graze on kelp: (1) the purple urchin (*Strongylocentrotus purpuratus*), (2) the red urchin (*Strongylocentrotus franciscanus*), and (3) the white urchin (*Lytechinus anamesus*). Other species in the invertebrate community include various polychaetes, bivalves, sea stars, sea cucumbers, brittle stars, cnidarians (e.g., anemones and sea fans), and crustaceans. At the Project site, 33 species of macroinvertebrates were observed during the 2015 biological survey. Of these 33 species, the predominant macroinvertebrate, making up almost 60 percent of the total number of invertebrates, was the gorgonian, *Muricea californica*. Although *Muricea* spp. is native, it is often considered invasive on shallow reefs in southern California. This is because it can occur in high densities and exclude kelp, understory algae, and other sessile invertebrates. The next most abundant macroinvertebrate was the orange puffball sponge (*Tethya californiana*), representing 13 percent of the total number of invertebrates.*

*While hard substrate areas are the least abundant habitat type in the region, they are one of the most important for fish habitat, supporting about 30 percent of the species and 40 percent of the families of fish. Approximately 76 percent of transects completed across the project site were devoid of biota. Approximately 24 percent of transects had hard*

*substrate with biota; however, on these transects, gorgonians accounted for approximately 80 percent of the coverage. At the Project site, 27 percent of transects had 0 to 10 percent biotic coverage; 12 percent had 10 to 20 percent biotic coverage; 23 percent had 20 to percent biotic coverage; and 38 percent had greater than 30 percent biotic coverage. Areas with high biotic coverage (greater than 20 percent) were generally found closer to the existing kelp bed at Bunker Reef, while areas of low biotic coverage (less than 20 percent) were generally found farther offshore, closer to the line of historic hard substrate.*

Sections 30230 and 30231 of the Coastal Act mandate that marine resources and coastal water quality be maintained and where feasible restored, that protection be given to areas and species of special significance, and that uses of the marine environment are carried out in a manner that will sustain biological productivity of coastal waters. The overall purpose of the proposed project is to restore rocky reef habitat that is expected to support a wide variety of marine species, potentially including rare and special-status species. However, the proposed project could also result in adverse impacts to marine biological resources and the quality of coastal waters by damaging rare, sensitive or ecologically important species populations as a result of (1) damaging existing biota during construction; or (2) adversely affecting water quality through introduction of foreign materials and during construction.

### **Construction-related Effects on Marine Life**

Project-related construction activities could result in adverse impacts to existing marine species and habitats through: (1) the introduction of non-native species; (2) disturbance or injury to marine mammals and sea turtles; (3) damage to existing rocky substrate habitat and species from ship anchors and rock placement.

#### *Non-Native Species*

During construction, barge trips to and from ports and harbors in Los Angeles and Catalina would increase slightly. Non-native species attached to these vessels could be introduced to marine waters in the vicinity of the project site and the surrounding natural reefs. Depending on the species, impacts to the native reef community could be significant. To address issues associated with vessel-borne introductions of non-native species, harbors have adopted strict controls on ballast water discharge and recharge, reducing the potential for ballast water to be a source of contamination. In addition, vessels associated with the proposed project are not likely to remain in port long enough to allow for non-native species to become established on them. To further minimize the likelihood of transferring non-native species through project-related vessels, **Special Condition 8** requires that all vessels comply with a zero-discharge policy for the duration of the project. With this condition in place, the biological productivity and the quality of coastal waters would be protected by minimizing the risk of introducing non-native species to offshore waters in the project vicinity.

#### *Marine Mammals and Sea Turtles*

Sea turtles and marine mammals, including harbor seals, California sea lions, bottlenose dolphins and whales such as blue whales, humpback whales and gray whales are known to be present in and transit through the project area. The proposed reef construction activities have the potential to result in disturbance or injury to these species in several ways. Specifically, the project could result in: (1) injury or death to marine mammals or sea turtles from falling rocks during reef construction; (2) ship strikes from project vessels; and (3) disturbance related to noise from construction activities.

Several marine mammal species would be expected to avoid the project area during construction or would not typically be present during the proposed construction period (May through September). However, other species such as blue whales can be seasonally abundant during this time of year and could pass through the project site, putting them at risk of injury or entanglement due to interactions with project equipment or materials. Similarly, pinnipeds and sea turtles could also be at risk for injury from materials such as rocks discharged from the project barge due to their curiosity in construction activities or use of seafloor habitats, respectively.

Ship strikes from barges and their towing vessels are also a concern. The proposed project would involve the use of three different vessels and three barges. These would include a 76 foot wide by 255 foot long derrick barge that would be towed to the project site and moored there for the duration of the project; two 60 foot wide by 240 foot long barges that would be loaded with rock and towed to the project site; a 35 foot long crewboat used to transport project staff between the project site and the Port of Long Beach; and two 78 foot long tugboats that would be used to transport rock barges or maintained onsite to support the derrick barge. Of these vessels, the tugboat used to transport rock barges between the project site and Catalina Island (approximately 26 miles) would be the one involved in the most significant movement through open coastal waters known to support large populations of whales that may be susceptible to ship strikes. Although the maneuverability of the tug and its ability to avoid colliding with wildlife that may surface in its path will be limited by its payload, the low speed that the tug would travel would significantly reduce the likelihood and consequences of such collisions. The tug is proposed to maintain a maximum speed of under nine nautical miles per hour (knots). This speed is below the ten knots speed limit recommended by the National Marine Fisheries Service based on existing research to protect large whales from lethal ship strikes.

Underwater noise associated with construction activities could also result in behavioral changes and disturbance to marine mammals. However, according to a recent Environmental Impact Report developed for the Southern California Edison reef project (which would use a similar reef installation method), construction activities are not likely to produce noise levels that would result in marine mammal disturbance beyond a 164 foot zone around the construction site.

To further ensure that marine mammals and sea turtles are protected from harm during project activities, **Special Condition 3** requires SCMI to develop and submit a Marine Wildlife Monitoring Plan that includes:

- Determination of the exclusion zone for eliminating the risk of crushing as a result of rockfall.
- Procedures for monitoring marine mammals and sea turtles and specifications for Marine Wildlife Observers (MWO) within the rockfall exclusion zone.
- Methods for communicating with contractors to stop work.
- Procedures for MWO monitoring of barge transport, if necessary.
- Methods for communicating with the ship's captain if there is a risk of collision with a marine mammal or sea turtle.
- Limitations that work occur only during daylight hours when visual monitoring of marine mammals and sea turtles can be conducted.
- Awareness training to all project-related personnel and vessel crew.
- A minimum of two MWOs during rock placement activities and barge transit;
- Notification to the Executive Director if any effects to marine wildlife are observed; and

- A final report summarizing daily sightings and any other monitoring results.

With these conditions in place, impacts to marine mammals and sea turtles would be minimized.

#### *Special Status Marine Species*

Among the marine species that may be present within the proposed project area and potentially susceptible to injury or disturbance are several reef dwelling species of abalone that are extremely rare and federally recognized with protective designations, the federally endangered white abalone (*Haliotis sorenseni*), and the pink abalone (*Haliotis corrugata*), and pinto abalone (*Haliotis kamtschatkana*), both identified as Species of Concern by the National Marine Fisheries Service.

Although these species have not been observed in the project area during the numerous biological surveys carried out there over the past decade, their rarity and cryptic nature may have allowed them to avoid detection. If any of these species are present within the proposed reef module installation footprint, the placement of quarry rock could crush, damage, or fatally injure them.

In order to minimize the potential for this to occur, SCMI is relying on two primary project elements – (1) the siting of the reef module installation sites away from existing rocky reef areas that may provide habitat for abalone; and (2) a pre-construction biological survey that would be carried out within the footprint of each reef module. In its CDP application, SCMI provides the following details about these two project elements:

*The plan is for all of the installation to be carried out away from abalone habitat. However, diver-based ecological surveys will be conducted by [Occidental College's Vantuna Research Group] in all of the footprint areas prior to installation, and one of the objectives of these surveys is to find, identify, and enumerate macroinvertebrates including abalone. The likelihood of finding any abalone, especially white abalone, in the restoration site is very low, as we have not found any abalone within the site in our 10 years of surveys, which have been focused on the perennially exposed areas of reef where abalone might survive. In the event that a white abalone is found during these surveys, we would notify the NOAA Fisheries Abalone Recovery Coordinator immediately and would await guidance. Often when new individuals of white abalone are found, NOAA will collect them to be used as brood stock for the captive breeding program, so we would wait for them to complete any additional surveys or collections before proceeding.*

**Special Condition 9** would memorialize this commitment to carry out a thorough biological survey of the reef module sites and require the survey results to be provided to the Executive Director for review and approval. If the Executive Director determines, based on a review of those survey results, that sensitive marine habitat or species are present within the footprint of one or more reef modules, SCMI would be required to submit a complete application to amend its permit to avoid placement of rock within the identified sensitive marine habitat or areas with sensitive species such as white, pink or pinto abalone.

#### *Existing Reef and Hard Substrate*

Hard substrate and its associated biota provide valuable nursery grounds, food sources and shelter for a diverse assemblage of fish, invertebrates and other species. The primary purpose of the proposed project is to restore hard substrate in order to provide additional reef habitat areas to support marine species. However, construction activities could result in adverse impacts to

existing rocky habitat. Potentially significant impacts to hard substrate and biota could occur if rock or anchors are placed directly on or in areas of existing hard bottom. Impacts from anchors would be temporary, and would be removed as soon as the vessel has completed its work. However, studies have shown that hard bottom ecosystems are slow to recover from direct impacts, indicating the likelihood that areas impacted by project anchors could take many years to recover. Thus, to further reduce the potential for impacts to hard substrate from project anchors, **Special Condition 4** requires SCMI to develop and submit an anchoring plan demonstrating that hard substrate areas are avoided and listing equipment and procedures to be used to ensure anchors are accurately placed.

Potential impacts could also occur from placement of rock on existing hard substrate areas. As shown in [Exhibit 2](#), the proposed reef modules would be constructed near, and in some cases immediately adjacent to, areas of existing kelp beds and rocky reef. In addition, the approximately 69 acre project site is known to include roughly nine acres of rocky reef.

When designing the proposed reef restoration project, SCMI used data collected over several years from a variety of sonar and diver surveys to specifically site the proposed reef modules in areas devoid of hard substrate. However, many of these surveys were carried out from 2009 to 2015 and several years have since elapsed. Given the shallow layer of sand observed to be covering some reef areas during past surveys and the dynamic conditions that define the marine environment, some historic reef habitat in the project site may have become exposed or unburied since the last surveys were completed. Such areas may have been subsequently recolonized by reef species and could now be providing productive reef habitat. Although the data from repeated surveys of this area suggest that this would be unlikely and that material from past landslides in the area continues to bury or scour away marine life from the historic reef, the current conditions are not known with certainty.

Additionally, in some cases specific reef module footprints were not comprehensively assessed visually by diver surveys and were instead evaluated through remote sensing methods (sidescan or multi-beam sonar) or through diver surveys of adjacent areas. Although these methods provide a strong indication of the type of habitat and physical and biological conditions that are likely to be present within the individual reef module sites, some uncertainty remains.

To address this uncertainty and confirm the current conditions at each proposed reef installation site prior to installation, SCMI has proposed to carry out a variety of follow-up surveys once all the permits and authorizations for the project have been approved. These pre-installation surveys would include diver-based ecological surveys at each of the reef module sites as well as sidescan sonar/bathymetry surveys. These surveys would be focused on confirming that the reef module sites remain devoid of hard substrate areas or only include hard substrate areas that do not support diverse assemblages of algae and invertebrate species as a result of frequent sediment burial and scour. **Special Condition 9** would require SCMI to provide the results of these surveys to the Executive Director for review and approval and additionally require SCMI to avoid placement of rock within any area shown in the survey results to support sensitive marine habitat. Such habitat would include exposed rocky reef that supports kelp plants, high relief reef areas, and areas of hard substrate that support a low percentage of bare rock and sand cover and diverse assemblages of marine algae and invertebrate species.

To help provide additional protection for areas of existing reef and hard substrate habitat within and adjacent to the project site, SCMI also proposes to carry out a diver-based construction audit upon complete installation of the first reef module. This audit would be focused on confirming

that the reef module was installed consistent with the proposed design (size, configuration, and height) and that it was placed within the target site. The intention of this audit is to help ensure that construction or installation related issues are identified early in the project timeline and addressed before they result in significant deviations between the designed and installed condition of the reef modules.

**Special Condition 10** requires SCMI to submit the results of the audit for the first reef module to the Executive Director for review and approval. The Executive Director would review the results of the audit within two business days and SCMI would be required to address any issues identified in the audit prior to moving forward with additional reef installation operations.

To further ensure that the reef is constructed as designed, **Special Condition 8** requires SCMI to conduct a post-construction sonar survey to verify the as-built condition of the reef and submit a final post-construction report that documents the as-built condition of the proposed reef, and includes a map and GIS data layers showing the position and perimeter of each reef module and verified estimates of relief and rock coverage.

Even with these protections in place, it is possible that a small amount existing rocky substrate could be crushed or covered with new rock during the construction of the proposed reef. However, this area would be small and the affected habitat would be replaced with similar rocky habitat that, in time, would develop the same or similar biotic communities. In addition, the proposed project will add a significant acreage of low- and high-relief hard substrate to the immediate vicinity, resulting in a significant expansion of rocky habitat available to marine life in the region. Thus, even if impacts to existing hard bottom areas do occur as the result of construction-related impacts, these impacts would be temporary, minor, and offset by the amount of restored reef that would be generated by the project.

### **Water Quality**

Potential adverse impacts on marine water quality due to the proposed project include those associated with increased turbidity during construction and the accidental release of fuel, hazardous material, sewage or bilge/ballast water from project vessels. Increases in turbidity can degrade water quality by reducing light penetration, discoloring the ocean surface, or interfering with filter-feeding benthic organisms sensitive to increased turbidity.

Turbidity levels in waters surrounding the reef installation site could increase during the deposition of rocks to create the reef modules. This placement of rocks could result in significant seabed disturbance because the rock material used to construct the reef would likely contain some fine materials which would become suspended in the water column when the rocks are pushed off the barge. Additionally, the impact of the rock boulders on the seafloor could result in the suspension of clouds of fine sediments. These increases in turbidity could affect organisms living in the closest natural kelp reefs to the project area.

This issue was extensively evaluated during the CEQA review and construction of the Southern California Edison mitigation reef offshore of San Clemente – a reef that was constructed using the same methodology and type of rock proposed for the Palos Verdes restoration reef. The evaluation concluded that impacts to existing kelp reef and other marine habitats associated with increased turbidity from construction of new reef areas would be less than significant because increases would be minor and localized and would last less than a day. This conclusion was supported by monitoring results collected subsequent to construction activities that did not find indicators of long-term effects of increased turbidity on any of the reefs in the surrounding areas.

The information available from the proposed reef site offshore of Palos Verdes indicates that a similar outcome would be likely there as well. In fact, some information suggests that the proposed project site may generate even less resuspension of sediment and turbidity than the Southern California Edison reef site. This is due to the significant difference in sediment depths between the two sites - at the proposed project site, there is only a shallow layer of sediment in place atop buried underlying rock reef, resulting in less available sediment that could be released into the water column.

Thus, because the construction methods for the proposed project are similar to those employed for other reef installation efforts for which adverse impacts from turbidity have not occurred and the amount of sediment available for resuspension is small, effects associated with turbidity would be similarly short-lived, minor and localized.

The proposed project requires the use of several different marine vessels and equipment to support reef construction. It is possible that these marine vessels could discharge fuel or other hazardous fluids, sewage water, bilge water, debris, or ballast water into the marine environment. Depending on the size and contents of the release, impacts to marine organisms could be significant. Although the likelihood of a spill occurring is low, **Special Condition 6** requires SCMI to submit a project-specific Spill Prevention and Response Plan to the Executive Director for review and approval. This plan must identify the worst-case spill scenario and demonstrate that adequate spill response equipment is available. In addition, the plan must clearly identify responsibilities, list and identify the location of oil spill response equipment, and include a plan for conducting training and response drills. Further, **Special Condition 7** requires SCMI to implement an Executive Director-approved Critical Operations and Curtailment Plan (COCP). The COCP defines the limiting conditions of sea state, wind, or any other weather conditions that would hinder safe operation of vessels and equipment or a potential spill cleanup. Finally, consistent with previous marine projects approved by the Commission, **Special Condition 8** requires implementation of a zero discharge policy for all project vessels.

### **Contaminated Sediments**

The proposed project site is approximately 1.5 miles from the White Point outfalls, discharge pipelines operated by the Los Angeles County Sanitary District as part of its treatment plant in the city of Carson. From the 1950s to the early 1970s, the Montrose Chemical Corporation discharged wastewater containing DDT into the local municipal sewer system. This DDT laden wastewater then passed through the treatment plant in Carson and was discharged into the ocean through the White Point outfalls. Until they were banned in 1976, PCBs from local industries also formed part of the wastewater stream from the Carson treatment plant and were similarly discharged through the outfalls. Over the decades, these contaminated discharges accumulated in the sediments and environment surrounding the outfalls, eventually resulting in the inclusion of this area on the U.S. Environmental Protection Agency's list of "Superfund" sites.

Due to the proximity of the White Point outfalls and Superfund site to the proposed reef installation sites, the applicant funded a sediment sampling and chemical analysis effort in 2016. The stated objective of this effort, carried out by a consulting firm called Coastal Environments, was to "ensure that the project area is clear from contaminants, or if they are present, that their concentration levels are low and do not impact marine resources or human health." The sampling effort included the collection of sediment from within eight of the 24 proposed reef modules - one sample from each of the eight groupings of three reef modules. In addition to DDT, DDE, PCBs, and hydrocarbons, the samples were also tested for concentrations of heavy metals.

In its February 10, 2016 report, Coastal Environments summarizes its findings as follows:

*The results of the analysis show that the samples taken from the proposed project site consist of silty sand with minor clay and shell fragments. Results of the sediment chemical analysis for these eight samples showed that the metal concentrations detected were well below ERL limits, except for arsenic, cadmium, and nickel. For these three chemicals, the concentrations were well below the ERM values, indicating that adverse biological effects are unlikely.*

*DDT was only observed in sample #1 with a low concentration of 10.5 ppb (parts per billion). Other samples contained low concentrations of DDE (5.78 to 30.54 ppb). Seven of the eight samples did not contain any concentrations of DDT, indicating that most of the DDT present has deteriorated to DDE. Therefore, it is likely that the area is recovering from the presence of DDT and there have been no additional inputs of DDT in the project area. PCBs and TPHs [hydrocarbons] were not detected in any of the eight samples collected.*

For reference, the Coastal Environments report also identified EPA's designated cleanup level for DDT in surface sediments as 23 parts per billion – over twice the concentration of DDT found in the single sample from the project area in which DDT was detected.

Additionally, it should be noted that the concentration of DDT within this sample from the project area is consistent with the concentration of DDT found in samples collected throughout the Southern California Bight (not including the area near the Superfund site), based on data collected as part of the multi-agency Southern California Bight 2013 Regional Monitoring Program. In other words, available data indicates that levels of DDT in sediments at the project site are similar to those found in marine sediments found throughout southern California.

Further, the most recent sampling data and modeling efforts carried out by EPA and the Los Angeles County Sanitary District within and surrounding the Superfund site indicate considerable decreases and consistent downward trends in concentrations of both DDT and PCB in sediments and fish tissues throughout the Palos Verdes shelf area. These declines have persisted across the three most recently available sets of data collected by these agencies (2002/2004, 2009, and 2013). While these datasets only include sampling results from depths outside those at the proposed reef site, as noted by SCMI in its application materials, “the general consensus from LACSD and EPA sampling is that sediment in the area and depth where the reef is to be sited is either unaffected by DDT or is mostly hard substrate (or lightly buried hard substrate), thus there is no need to sample in those locations.”

Despite this information about the absence of contaminated sediments at the project site, several interested parties raised concerns during the California State Lands Commission's lease review about the potential for the project to disturb or release buried sediments with high levels of DDT. To help address these concerns, SCMI provided the following response:

*[T]he layer of sediment covering the natural reef where the quarry rock is to be placed is relatively thin – generally less than 10 cm. Therefore there is no deeper sediment to test for DDTs and only a small amount of sediment to suspend as a product of construction. Additionally, the levels of DDTs in that shallow sediment at the reef site are low, and less than that of sediment in the surrounding area that might be exposed to this resuspended*

*sediment. This is also the reason we do not expect to have issues of scouring, sinking, and burial of the reef like we have seen throughout Santa Monica Bay – beneath this layer of sediment is still the original natural reef, so the quarry rock could sink no further than the original depth of the reef and would still be 1-4m in height. Whether the reefs will cause scour of sediment immediately surrounding it (or the opposite – buildup of sediment against the base of the reef) is up for debate and likely variable over time, but we would not expect to see scouring beyond a few centimeters of the reef edge. We again have a good model for this in [the nearby reef feature] KOU Rock, where the bedrock is sticking up to 7m above the reef and seemingly unaffected by the surrounding sedimentation. Regardless, whatever sediment is resuspended through construction or scour will likely only travel a short distance and is among the least contaminated sediments in the area.*

Therefore, despite the proximity of the proposed project site to the White Point outfalls and areas known to contain contaminated sediments, the project site appears to be relatively free of such contaminants and installation of the proposed reef would not increase risks there or in surrounding areas.

### **Conclusion**

For the reasons discussed above, the Commission finds that the proposed project, as conditioned by **Special Conditions 3-10**, would be carried out in a manner that maintains marine resources and sustains the biological productivity and quality of coastal waters and protects against the spillage of hazardous substances into the marine environment and is therefore consistent with Coastal Act Sections 30230, 30231 and 30232.

### **D. PLACEMENT OF FILL IN MARINE WATERS**

Coastal Act Section 30233(a) states:

*The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*

- (1) *New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*
- (2) *Maintaining existing, or restoring previously dredged depths on existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*
- (3) *In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.*
- (4) *Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.*

- (5) *Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.*
- (6) *Restoration purposes.*
- (7) *Nature study, aquaculture, or similar resource dependent activities.*

As discussed in Section B above, the proposed project involves the placement of fill (approximately 70,300 tons of clean quarry rock) within coastal waters to form a nine acre reef. Coastal Act Section 30233(a) imposes three tests on a project that includes dredging and/or fill of open coastal waters. The first test requires that the proposed activity must fit into one of the seven categories of enumerated uses. The second test requires that there be no feasible less environmentally damaging alternative. The third test requires that feasible mitigation measures be provided to minimize the project's adverse environmental effects.

### **Allowable Use Test**

The first test set forth above is that any proposed filling, diking, or dredging in open coastal waters must be for an allowable purpose as specified under Section 30233 of the Coastal Act. Coastal Act section 30233(a)(6) allows fill in open coastal waters for restoration purposes. The proposed artificial reef project consists of the deposition of clean quarry rock on existing sandy seafloor areas that historically supported a rocky reef. This historic rocky reef appears to have been buried by sediment over the past several decades, including that released from a 16 acre landslide that occurred during the construction of a golf course near the edge of the adjacent bluff. The proposed reef is intended to restore this historic reef and enhance both the production of living marine resources and recreational fishing potential of the project site. Therefore, the Commission finds that the proposed reef project is for restoration purposes and is in conformance with Coastal Act section 30233(a)(6).

### **Alternatives**

The second test set forth under Section 30233 of the Coastal Act is that there is no feasible less environmentally damaging alternative to the proposed placement of fill. As part of the CEQA and NEPA review processes, several alternatives were identified and evaluated for environmental impacts. These alternatives include: (1) a "no project" alternative; and (2) smaller reef alternatives.

#### *"No-Project" Alternative*

As discussed in the Environmental Assessment developed in February 2017 by NOAA,

*Under this alternative, the Palos Verdes reef restoration project would not be implemented, quarry rock would not be transported to the proposed project site and would not be used to enhance marine biological resources and compensate for the negative effects of past discharges of DDTs and PCBs into surrounding areas. 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.*

In other words, while the anticipated minor adverse impacts associated with construction of the new reef would not occur, the benefits expected from the restored kelp reef ecosystem would also not occur. Because the project's primary outcome would be the restoration and enhancement of marine habitat and biological resources, its anticipated benefits would greatly exceed its adverse impacts. For these reasons, this alternative is not a feasible, less environmentally damaging alternative to the proposed project.

*Smaller reef alternative*

In its 2017 Environmental Assessment, NOAA also evaluated several different size alternatives for the proposed reef, ranging from those requiring between 64,200 tons and 70,300 tons of quarry rock. As noted by NOAA in its evaluation,

*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 would proportionally 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.*

...

*Selecting 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 alternative.*

Whereas the various size alternatives would all provide some level of restoration and enhancement of marine biological resources, the largest size – the proposed project – is expected to provide the most significant benefits and highest likelihood for success. In addition, because the smaller size projects would all make use of similar construction methods and activities, they would all result in similar potential adverse impacts. Selection of a smaller size reef alternative would involve a similar type and magnitude of adverse impacts but may significantly reduce the anticipated project benefits. As such, the smaller sized reef alternatives would not be feasible, less damaging alternatives to the proposed project.

Accordingly, for the reasons described above, the Commission finds that the proposed project is the least environmentally damaging feasible alternative and therefore meets the second test of Coastal Act Section 30233(a).

### **Mitigation**

The final test set forth by the above-cited policies is whether feasible mitigation measures have been provided to minimize adverse environmental effects. The proposed project incorporates a number of mitigation measures to minimize adverse environmental effects including locating the reef in water 49 to 61 feet in depth over an area of historic rocky reef; placement of quarry rock on soft substrate seafloor areas that do not support exposed reef or sensitive biological resources; and limiting construction to avoid the commercial lobster fishing season. Furthermore, **Special Conditions 3-10** ensure the protection and enhancement of marine resources (see Section D for additional details). With these conditions incorporated, the proposed project provides feasible mitigation for impacts related to fill of coastal waters, and thus, the Commission finds that the third test of Coastal Act section 30233(a) has been met.

For the reasons described above, the Commission finds the project, as conditioned, consistent with Coastal Act Section 30233(a).

### **E. PUBLIC ACCESS AND RECREATION**

Section 30210 of the Coastal Act states:

*In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Section 30220 of the Coastal Act states:

*Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.*

The proposed project is located offshore from several areas known to support locally important recreational resources, including several pocket beaches and surf breaks. Although these areas would not be directly affected by the proposed project, a concern raised during the State Lands Commission's lease review was the potential for adverse impacts to surfing conditions due to the construction of the proposed reef. During the State Lands Commission review, SCMI prepared the following analysis and response to these concerns:

*The nearest surf breaks to the project site are The Shack, K & G Point, Bee Aye Point, and Japan Cove. The Shack is most rideable with west swell that will not pass over the restoration reefs. K & G, Bee Aye, and Japan Cove surf breaks are all best with swells from the south or south-southeast (SSE). These swells will not pass over the restoration reef prior to reaching Japan Cove. South and SSE swells will pass over the restoration reef before reaching K & G and Bee Aye; however, the water depth between the top of the restoration reef and the water's surface is at least 40 feet. Typical surfable waves on our coast will not break until a bottom depth of < 20 feet is reached. Wave conditions along the Rancho Palos Verdes coastline are controlled by shallow natural reefs that lie inshore of the project site in water depths of approximately 13 to 20 feet. Additionally, since the reef modules are comprised of narrow sets of individual rock piles rather than a single large obstacle set parallel to shore, most of the wave energy will pass well over the*

*top of the reef and through the channels between reef modules. The naturally existing reef that these restoration reef modules are modeled after lies directly in the path of the Japan Cove surf break and clearly does not cause any harm to surfing conditions.*

In addition, the Occidental College's Vantuna Research Group also prepared a report and analysis of these issues as a component of its CDP application. The following is a summary of the findings of that report and the full report is provided as [Exhibit 7](#).

- *High vertical relief is a critical requirement for restoring sediment-impacted rocky-reef habitat while avoiding further sedimentation impacts.*
- *Wave conditions along the Rancho Palos Verdes coastline are controlled by shallow, high relief natural reefs inshore of the project site.*
- *The restoration reef will not affect wave conditions at adjacent surf spots, even during 100-year-wave events.*
- *The restoration reef will not affect sediment transport and deposition patterns that could affect wave conditions.*

As part of its CDP application, SCMI also provided an additional response focused on requests for a more quantitative evaluation of the project's potential to affect surf breaks near the proposed reef site:

*There have been several requests to model the potential for wave refraction as a product of placing this reef, each making it clear that any change in how surf arrives at the surf break will be unacceptable. Each of these requests notes that there are bathymetric surveys of the area (as seen in the NOAA EA) and without modelling there is no way to determine impacts on surf breaks... We, of course, had a coastal engineer (Hany Elwany) put together reports related to this particular area as well as other areas that have had artificial reefs built, and it was determined there would be no significant impact on surfing opportunities... While the proposed reef site does have extensive bathymetric surveys (and will continue to be surveyed annually to determine sedimentation impacts), and we have access to LIDAR data that gives very high resolution data inside the surf zone, all areas between the surf zone and the outside of the kelp line are very low resolution due to the existence of the kelp itself. This is not something that can be surveyed at a higher resolution using current technology unless all the kelp is removed (Saarman 2015). We believe that at this time the surveys do not go inshore enough at a high enough resolution to appropriately model wave action at the surf breaks. Additionally, the recommended modelling software is upwards of three decades old and provides poor cell size resolution (on the order of 100-300m<sup>2</sup>), is typically used on sandy shorelines with little rugosity, and the CDIP data itself only models to 100 m<sup>2</sup> resolution and does not model in to the depths of the surf break nor the proposed reef. Using these models either completely ignores the proposed reefs (as they are too small for the cell size) or treats them as orders of magnitude larger, and also completely ignores the existing, rugose rocky reef inshore of the proposed artificial reef (4-7 m depth) – these are the reefs that control wave conditions along this coastline.*

*There is some promise in a relatively new modelling program created by the USC Viterbi School of Engineering, but again the existing bathymetric data would only allow us to produce accurate models up to the kelp line. Creating a model that simply tests wave diffraction of this reef at this depth in a generalized manner can theoretically be done, but then once again completely ignores the inshore reefs that actually control wave*

*conditions and completely ignores the damping effect kelp has on the waves. We also want to reiterate that this reef may have some kelp growing on it, but the natural reef it is modeled after (KOU Rock) is directly adjacent to the project site, has very little kelp growing on it, and the artificial reef is not designed for extensive kelp growth. This reef will look nothing like the Wheeler North reefs (above or below the surface), nor function as they do (again, above or below the surface), therefore kelp growth is not a consideration in interactions with water flow and we do not foresee any valid scrutiny in that regard.*

To summarize, the proposed location of the reef in deeper waters (49 to 68 feet) beyond the outer edge of the nearshore reef and kelp beds adjacent to the project area, the limited height of the 24 individual reef modules and their dispersed configuration across the 69 acre project area, are expected to eliminate any potential for the restoration reef to dampen or divert wave energy from existing surf breaks in the area.

While existing bathymetric data for the project area and deeper adjacent areas is available and more would be collected as part of the post-installation monitoring effort, physical and technological constraints limit the ability for similar information to be collected from adjacent inshore areas. Because of their proximity to the surf breaks in question and shallower depths, these inshore areas are likely to have a much more significant influence on wave action at the surf breaks than the existing and proposed features in the project area. As such, additional quantitative modeling of the project's potential to affect these surf breaks is not feasible.

Based on the best available existing information, construction of the proposed restoration reef is not expected to have an effect on surfing in the project vicinity.

Therefore, for the reasons described above, the proposed project will not have a substantial negative effect on the public's ability to access and enjoy the coast, and the project is consistent with the public access and recreation policies of the Coastal Act.

## **F. COMMERCIAL AND RECREATIONAL FISHING**

Coastal Act section 30234.5 states:

*The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.*

Currently the subtidal sand bottom community at the project site is characterized by low densities of common invertebrates and bottom dwelling fish. The proposed project will alter or replace the sand-bottom community over a 69 acre area. The net effect of the project would be to replace a low-diversity, low-density community of sand-bottom organisms, which are common throughout the region, with a high diversity, much less common, rocky reef community that would support numerous recreationally and commercially valuable invertebrate and fish species.

The proposed project could result in impacts to commercial and recreational fishing through the loss of fishing ground or habitat and construction-related impacts. With respect to the loss of fishing grounds, the Initial Study prepared by the California State Lands Commission states:

*Although Project construction would take place over a 40- to 60-day period, the daily Project footprint (1 acre) would be small and localized. Even though fishing would be*

*excluded from this 1-acre construction site, the rest of the Project area and the extensive adjacent coastal fishing waters would remain available during this period. Additionally, Project construction would be complete prior to the start of the lobster season, which begins on October 1<sup>st</sup>. Once the rocky reef is complete, the entire Project area would be available for fishing. Therefore, this impact would be less than significant.*

Thus, as described above, the proposed project will not result in the loss of fishing ground for commercial or recreational fisherman. Similarly, significant loss of Essential Fish Habitat is not anticipated due to the proposed project. Furthermore, the restoration of rocky reef habitat to the project area would provide additional habitat for several important commercial and recreational species including kelp bass, spiny lobster, Pacific mackerel, sandbass, and bonito, thus resulting in an improvement to several fisheries.

The proposed project could, however, have a negative impact on fishing activities during the construction period. Specifically, construction-related adverse impacts could result from: (1) causing fish and motile invertebrates to avoid the project area in response to noise and physical disturbance; (2) excluding fishermen from the construction area; and (3) damaging fishing gear, such as traps. Each of these impacts is discussed in more detail below.

#### *Behavioral Avoidance*

During placement of reef materials, it is likely that fish and perhaps crabs and lobsters would avoid the area of physical disturbance. However, this disturbance will take place for only a few days in any given area. Most fishes are highly mobile and would simply avoid the construction areas. Lobster and sea urchins would be little affected in any event since their rocky habitat would not be directly affected. These temporary changes in movement and local abundance would not cause a significant adverse impact to commercial or recreational fishing.

#### *Excluding Fisherman from the Construction Area*

Installation of the proposed reef is estimated to require between one to two months of on-water construction activities (roughly 40 to 60 days). Reef construction would be limited to the period between May 1 to September 30 to avoid conflicts with the lobster fishing season. During construction the quarry rock barge would be moved from place to place to construct the 24 proposed reef modules. Therefore, within any given construction area, fishing would be restricted for up to several days. This may affect fisheries such as the commercial red urchin fishery which operate year-round. However, given the small share of the fishery at the project site and the likelihood that additional fishing opportunities exist nearby, a temporary closure of this small area would not have a substantial negative effect.

Furthermore, to ensure that impacts to recreational and commercial fisherman would be minimized, SCMI – as a condition of its Department of the Army permit – is required to submit a Local Notice to Mariners for publication with the U.S. Coast Guard to ensure that vessels in the area are advised of the locations of project vessels and the approximate dates and duration of project construction. Notice would also be posted in several locations within nearby harbors and marinas. This would allow fishermen and other mariners that conduct operations in the area to select alternative fishing or recreation sites during construction activities. The temporary loss of anchorages and fishing operations would not significantly impact commercial or recreational fishing.

### *Lost or Damaged Fishing Gear*

During construction activities, fishing equipment on the ocean floor could be damaged or destroyed. As a condition of its Department of the Army permit, SCMI is required to provide notification of project-related activities to fishermen and other mariners that conduct operations in the area when they notify the U.S. Coast Guard of construction activities at least two weeks ahead of the start date. This would allow the fishermen to select alternative fishing sites and to remove any fishing equipment from the project area prior to construction.

### *Contaminated Fish*

Among the fishing related concerns raised during the State Lands Commission's lease review for the project was the potential for it to negatively affect human health because it may promote additional fishing and capture of fish that carry contaminants and are therefore unsafe to consume. While the proposed reef modules would be expected to attract fish and fishing would not be prohibited on them, the species of fish expected to colonize the new reef habitat are known to contain lower levels of contaminants than the species of fish attracted to the type of habitat currently found within the project area.

Specifically, soft substrate associated fish species such as croaker and sand bass are among those most susceptible to accumulation of harmful contaminants such as DDTs and PCBs due to their close association with soft sediments and consumption of prey species that inhabit them. For this reason, the California Office of Environmental Health and Hazard Assessment advises against any consumption of these species caught within the area between the Santa Monica and Seal Beach piers. In contrast, hard substrate and rocky reef associated fish species are much less likely to accumulate harmful levels of DDTs and PCBs due to their presence in areas with less sediments that may be contaminated with these chemicals and their consumption of prey items that are associated with kelp forests and reefs rather than soft sediments. These are the species that would be expected to colonize the reef modules once they are installed.

In fact, one of the primary objectives of the project is to provide expanded opportunities for fishing away from habitats that are known to attract those fish species most likely to be contaminated, as discussed in the CDP application materials provided by SCMI:

*Construction of a rocky reef is designed to alter the fish communities in the study area. The highly contaminated soft-bottom associated fishes typically do not inhabit rocky-reef habitats (Allen 1999), therefore a primary benefit of placing rocky reefs even in contaminated soft-bottom habitats would be to displace soft-bottom associated species with midwater and rocky-reef associated species that do not typically feed on benthic organisms from contaminated sediment (MSRP 2005). Not only will this increase production of fishes whose tissues typically have lower concentrations of DDT (Dixon and Schroeter 1998), but organisms that prey on fishes in the study area will also be exposed to reduced levels of DDT, including recreational anglers (MSRP 2005).*

While it is important to note that some reef associated fish species may also be unsafe to consume in large amounts or frequencies, this is a widespread issue throughout southern California and other marine areas in close proximity to highly urbanized environments and not one that is specific to or related to the proposed project.

### **Conclusion**

With implementation of the above measures, the Commission finds the project consistent with section 30234.5 of the Coastal Act.

## **G. CALIFORNIA ENVIRONMENTAL QUALITY ACT**

Section 13096 of the Commission's administrative regulations requires Commission approval of coastal development permit applications to be supported by a finding showing the application, as modified by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits approval of a proposed development if there are feasible alternatives or feasible mitigation measures available that would substantially lessen any significant impacts that the activity may have on the environment.

The California State Lands Commission, acting as lead CEQA agency, determined that the project will not have a significant effect on the environment and prepared a Negative Declaration pursuant to the provisions of CEQA on February 27, 2018.

The proposed development has been conditioned to be found consistent with the Chapter 3 policies of the Coastal Act. Mitigation measures, including conditions addressing marine resources and water quality will ensure that the project does not result in any unmitigated significant adverse environmental impacts. As conditioned, there are no feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment. Therefore, the Commission finds that the proposed project is the least environmentally-damaging feasible alternative and is consistent with the requirements of the Coastal Act to conform to CEQA.

**Appendix A**  
**Substantive File Documents**

Coastal development permit application and supplementary letters, reports, and materials included in file no. 9-18-0629 (Southern California Marine Institute; nine acre restoration reef).

Adopted Findings for Coastal Development Permit No. 9-19-0025 (Southern California Edison; SONGS mitigation reef).

Initial Study and Environmental Checklist for the Palos Verdes Reef Restoration Project. California State Lands Commission, February 2017.

Environmental Assessment - Palos Verdes Reef Restoration Project. National Oceanic and Atmospheric Administration, February 22, 2017.