

**CALIFORNIA COASTAL COMMISSION**

ENERGY, OCEAN RESOURCES AND FEDERAL CONSISTENCY  
455 MARKET STREET, SUITE 300  
SAN FRANCISCO, CA 94105-2421  
VOICE (415) 904-5200  
FAX (415) 904-5400



# F12a

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## STAFF REPORT: REGULAR CALENDAR

**Consistency Certification:** CC-0003-21

**Applicant:** Ocean Rainforest, Inc.

**Location:** Federal waters offshore of Santa Barbara

**Project Description:** Install and operate for two years a submerged aquaculture facility within an 86-acre site for the cultivation of giant kelp (*M. pyrifera*) approximately 4.4 miles offshore of Santa Barbara, Santa Barbara Co.

**Staff Recommendation:** Conditional Concurrence

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## SUMMARY OF STAFF RECOMMENDATION

Ocean Rainforest, Inc. (ORI) voluntarily submitted to the Coastal Commission (Commission) a consistency certification request to temporarily install and operate a demonstration seaweed aquaculture facility on an 86-acre site in federal waters approximately 4.4 nautical miles offshore of Santa Barbara. The facility would be comprised of a variety of ropes, lines, buoys, and cultivation equipment that would be anchored to the seafloor and held submerged at a depth of between 33 and 49 ft below the ocean surface. The depth at the proposed site is between 246 and 262 ft. The facility itself would occupy 16 acres and would be used to grow native giant kelp (*Macrosystis Pyrifera*) on an array of 32 cultivation lines. ORI would maintain the facility

in place for two years and expects to harvest kelp every 3 to 4 months over the lifespan of the project. At the end of two years, ORI would fully remove the aquaculture facility and all associated anchors, buoys, cultivation lines and kelp.

Key Coastal Act issues raised by this project involve marine resources - including benthic habitats and marine wildlife – and commercial and recreational fishing. ORI evaluated a variety of project alternatives to avoid and minimize potential adverse impacts to these coastal resources, including different project sizes and locations. In the process of determining a proposed site for its project, ORI modified its initially proposed site location to minimize potential conflicts with existing commercial fishing activities and designed the structure with the best available scientific guidance to minimize potential adverse impacts to marine resources. These design measures include the use of large diameter lines under tension with minimum breaking strengths. These mechanisms would potentially reduce the likelihood and magnitude of adverse impacts to marine resources and commercial fishing by limiting interaction with fisheries as well as minimizing entanglement risk to protected marine wildlife such as whales.

Despite these measures, the project would pose certain risks to coastal resources, including: (a) entanglement of marine wildlife in the project structure or associated lines and cables; (b) disturbance or alteration of seafloor habitats due to the deposition of biological material or marine debris from the cultivation facility; (d) collisions of project vessels with marine wildlife; (e) loss of commercial and recreational fishing grounds; and (f) loss/damage to fishing gear due to accidental contact with the project facility.

To help address these potential adverse impacts and minimize their likelihood and magnitude, Special Conditions 1 through 16 would require, among other things: (a) the development and implementation of a robust independent monitoring program; (b) the implementation of marine wildlife entanglement minimization measures; (c) the development and implementation of a marine debris management program; (d) the development and implementation of a plan for the timely and complete removal of the facility upon project termination; (e) the establishment of a financial surety device to ensure that such removal is carried out; and (f) the development and implementation of a compensation plan to address the potential loss/damage of fishing gear that may accidentally come into contact with the facility and be lost or damaged.

With implementation of these mitigation measures and conditions, the project would be carried out consistent with the enforceable policies of California's Coastal Management Program. The Commission staff recommends the Commission **conditionally concur** with consistency certification CC-0003-21.

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**APPENDICES**

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**EXHIBITS**

- Exhibit 1 – Proposed Project Location
- Exhibit 2 – Schematic Diagrams of Proposed Facility
- Exhibit 3 – CRFS and CPFV density
- Exhibit 4 – Letter of Support from Commercial Fishermen of Santa Barbara
- Exhibit 5 – ORI Proposed Mitigation Measures

## I. MOTION AND RESOLUTION

### A. CONSISTENCY CERTIFICATION

**Motion:**

*I move that the Commission **concur** with consistency certification CC-0003-21 that the project described therein is consistent with the enforceable policies of the California Coastal Management Program.*

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in concurrence in the certification and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

**Resolution:**

*The Commission hereby **concurs** with the consistency certification by Ocean Rainforest, Inc. on the grounds that the project described herein is consistent with the enforceable policies of the California Coastal Management Program.*

## II. Special Conditions

1. **Expiration.** This consistency certification shall expire at the conclusion of Ocean Rainforest, Inc.'s two-year kelp aquaculture research project and not later than October 15, 2024.
2. **Monitoring Plan.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, Ocean Rainforest, Inc. (ORI) shall submit for review and approval by the Executive Director a Monitoring Plan that will provide baseline data from the pre-construction survey ([Special Condition 16](#)), a program for assessing the status of benthic habitat over the duration of the proposed project, and a process to evaluate the effects of the seaweed farm on the project site. No construction shall commence until the Executive Director has approved the Monitoring Plan, which shall provide, at a minimum:
  - (a) that monitoring activities be carried out by independent, third party entities that are approved by and reported annually to the Executive Director;
  - (b) that all monitoring activities be carried out for the life of the project, starting no later than the beginning of facility operations;
  - (c) the frequency, duration, location, and methodology to be used for all sampling and monitoring activities;
  - (d) the methodology to be used for all analysis and reporting of results;
  - (e) that monitoring activities be designed and carried out in a manner that supports robust statistical analysis of results and includes thorough sampling and evaluation of appropriate reference sites and pre-project baseline conditions;

- (f) that monitoring includes an evaluation of the quantity, type, and distribution of biological materials, marine debris or other waste from the seaweed facility that accumulate on the seafloor below and in the vicinity of the facility as compared to baseline conditions;
- (g) that monitoring includes an evaluation of the response of marine mammals (eg; sightings or interactions) in the project area to the presence of the facility's infrastructure, biofouling organisms, and cultivated seaweed;
- (h) that monitoring includes an evaluation of water current speed and direction at and around the facility;
- (i) that monitoring includes an evaluation of the type and amount of commercial and recreational fishing activity that occurs at and around the facility as well as compilation of all reports of lost or damaged fishing gear or catch that occurs as a result of contact with the facility.

Compliance with the Monitoring Plan shall include annual reporting to the Executive Director. The first annual report shall be submitted 12 months after completion of construction or initial seaweed planting activities, whichever date is first. These annual reports shall include:

- the data from all sampling and monitoring activities;
- a narrative summary of sampling and monitoring activities that were carried out and the techniques, methodologies, and equipment used to support them;
- an analysis of sampling and monitoring results; and
- a discussion of preliminary or final results and conclusions, including any proposed adaptive management techniques.

### **3. Aquaculture Gear Monitoring, Escapement, and Entanglement Plan.**

Following completion of construction, ORI or an appropriately qualified, independent, third-party approved by the Executive Director shall conduct monitoring once per week for the first four weeks and twice per month for the remaining project term. Monitoring results shall be reported directly to the Executive Director no more than 14 days after their collection. The independent, third-party monitor shall complete no less than every other monitoring event. Monitoring events shall include visual inspections of all ropes, cables, and equipment to help determine if any entanglement of marine wildlife has occurred, to document the as-built condition of the facility, and to ensure that: (a) no lines have been broken, lost or unintentionally removed; (b) all longlines, anchor lines, and buoy lines remain taut and in good working condition; and (c) any derelict fishing gear or marine debris that collects on the facility is removed and disposed of at an appropriate onshore facility.

Visual inspections shall also include video monitoring of anchors for the first two monitoring events and attached mooring lines thereafter as well as SCUBA/ROV video monitoring of longlines and seaweed cultivation lines and equipment. Any wear or fatigue of materials that might compromise structural integrity or lead to failure of the materials shall be remedied immediately and any lines or anchors not installed or remaining consistent with the approved facility design shall be

immediately corrected. All incidents of observed or suspected marine wildlife entanglement shall be immediately reported to Commission staff and to:

- NOAA Fisheries (entangled whale, dolphin, sea, sea lion and sea turtle)
- Santa Barbara Wildlife Care Network (Seabirds)
- West Coast Region Stranding Hotline (injured/stranded/dead whale, dolphin, sea, sea lion and sea turtle)
- Channel Islands Cetacean Research Unit (whales and dolphins only)
- CA Lost Gear Recovery Program (Derelict fishing Gear or lost cultivation gear)

All incidents of potential entanglement (including dislodged, broken, or missing ropes, equipment, or gear) shall be detailed in a written letter and submitted to Commission staff within two days of their occurrence.

Survey videos shall be submitted to Commission staff on annual basis along with a written report that includes:

- a summary of the monthly monitoring results;
- a summary of the any derelict gear removal efforts;
- a summary of any wildlife entanglement;
- a summary of biannual beach cleanup efforts;
- any issues or concerns identified during the year regarding implementation of the plan; and
- any requested changes to the plan to be implemented the following year by ORI; the Executive Director may approve such changes if they will not lessen the effect of the conditions and will not cause any effects on coastal resources different than anticipated in this consistency certification

- 4. Lighting and Operations at Night.** All operations shall be conducted during daylight hours. No operations at night and no artificial lighting of the seaweed cultivation facility shall occur, except for that associated with the use of navigational safety buoys required by the U.S. Coast Guard or short-term, emergency work necessary to protect life or property.
- 5. Construction Monitor.** A qualified marine wildlife observer approved by the Executive Director shall be onboard the project construction vessel during the installation of the longlines and anchoring system. That observer shall monitor and record the presence of marine wildlife (mammals and reptiles) and shall have the authority to halt operations if marine wildlife is observed or anticipated to be near a work area during installation activities that have the potential to result in injury or entanglement of marine wildlife.
- 6. Notice to Mariners.** No less than 15 days prior to the start of in-water activities associated with the installation phase of the project, ORI shall submit to (a) the Executive Director; (b) the U.S. Coast Guard (for publication in a Notice to Mariners); and (c) the harbor masters and/or marina managers from Port San Luis to Port Hueneme (for posting in their offices or public noticeboards), notices

containing the anticipated start date of installation, the anticipated installation schedule, and the coordinates of the installation sites.

- 7. Spill Prevention and Response Plan.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, ORI shall submit for Executive Director review and approval a revised version of its May 13, 2021, project specific Spill Prevention and Response Plan (SPRP). This plan shall apply to all work barges and vessels that would be used during project construction and operations. ORI and its contractors shall be educated in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project operations. The revised SPRP shall provide for emergency response and spill control procedures to be taken to stop or control the source of the spill and to contain and clean-up the spill. The revised SPRP shall include, at a minimum: (a) identification of potential spill sources and quantity estimates of a project-specific reasonable worst-case spill; (b) identification of prevention and response equipment and measures/procedures that would be taken to prevent potential spills and to protect marine and shoreline resources in the event of a spill. Spill prevention and response equipment shall be kept onboard project vessels at all times; (c) assurances that all hydraulic fluid to be used for installation, maintenance, planting, and harvesting activities shall be vegetable-based; (d) the use of at least one dedicated support person during facility construction/installation activities to direct other non-project vessels in the project area away from the installation site; (e) a prohibition on at-sea vessel or equipment fueling/refueling activities; and (f) emergency response and notification procedures, including a list of contacts to call in the event of a spill.
- 8. Lost/Damaged Fishing Gear Compensation Plan.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, ORI shall submit for Executive Director review and approval, a Lost/Damaged Fishing Gear Compensation Plan that outlines the steps that would be taken by ORI to address any adverse impacts to commercial or recreational fishing operations that may result from the loss and/or damage of fishing gear or catch due to contact or entanglement with the cultivation facility or associated infrastructure. The Plan shall include, at a minimum: 1) a method to notify area fishing operations of the Plan; 2) a process for gear owners to apply for funds to compensate for lost or damaged gear; 3) a commitment to fully compensate owners for gear lost or damaged due to the project or to make use of third party mediators if ORI concludes that the claim is invalid and/or disputed. No construction shall commence until the Executive Director has approved the Lost/Damaged Fishing Gear Compensation Plan.
- 9. Update NOAA Charts.** WITHIN 30 DAYS OF FACILITY INSTALLATION, ORI shall submit evidence to the Executive Director that it has submitted to the NOAA Office of Coast Survey: (a) the geographic coordinates of the facility boundaries obtained using a differential geographic positioning unit or comparable navigational equipment; (b) as-built plans of the seaweed farm and associated buoys and anchors; (c) ORI's point of contact and telephone number; and (d) any other information requested by the NOAA Office of Coast Survey to accurately

portray the location of the seaweed farm on navigational charts.

**10. Letter of Credit.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, ORI shall provide evidence that a letter of credit or other surety device acceptable to the Executive Director has been established in the amount of \$119,000 naming the Coastal Commission as the beneficiary/assured, to help guarantee the faithful observance and performance by ORI of [Special Condition 11](#) and to fund any and all facility removal activities not completed by ORI. The letter of credit or other surety device shall be maintained in full force and effect at all times until the successful removal of the facility (seaweed, grow-out structures, anchoring devices, equipment, debris, and associated materials) has been completed. Failure of ORI to meet the requirements of [Special Condition 11](#) shall cause the Coastal Commission to use the funds from the Letter of Credit or other surety device to effectuate the complete removal of the cultivation facility and all associated debris.

**11. Facility Removal.** NO LESS THAN 90 DAYS PRIOR TO THE EXPIRATION OF THIS CERTIFICATION, ORI shall submit a plan for (a) the timely removal of all seaweed, grow-out structures, anchoring devices, equipment, debris, and materials associated with the cultivation facility, and (b) the conduct of a thorough inspection of the facility site by a qualified independent third party to verify the completion of removal activities. Upon approval by the Executive Director of the plan, ORI shall implement the removal and inspection plan in accordance with the schedule specified therein and shall completely remove the seaweed cultivation facility, including all lines, ropes, buoys, anchors, and associated equipment, materials, debris and infrastructure.

Alternatively, ORI shall comply with the conditions above, including to submit the plan for removal of the facility, within 60 days of a written request by the Executive Director if the Executive Director determines that there is a significant lapse in planting, harvest, maintenance, monitoring or condition compliance activities that causes the facility to either no longer be maintained in its approved condition or become a danger to mariners or wildlife or cause a risk of spreading marine debris.

**12. Discharge Prohibition.** ORI shall not intentionally dispose of any equipment or waste, such as non-native fouling organisms, into the marine environment. All maintenance cleaning operations of the cultivation facility, including its buoys, ropes, lines, cables, and anchors, shall be carried out onshore or in a contained manner sufficient to capture all dislodged biological materials. All non-native fouling organisms and biological materials from non-native organisms removed during these cleaning operations shall be collected and disposed at an appropriate upland facility. No discharge of untreated wash water or non-native fouling materials shall occur during maintenance cleaning operations.

**13. Marine Debris.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, ORI shall submit for Executive Director review and approval a Marine Debris Management



Plan that includes (a) a plan for permanently marking all lines, ropes, buoys, and other facility infrastructure with the name and contact information of the facility operator; (b) a description of the extent and frequency of maintenance operations necessary to minimize the loss of materials and equipment to the marine environment resulting from breakages and structural failures; (c) a description of the search and cleanup measures that would be implemented if loss of seaweed cultivation facility materials, equipment, and/or infrastructure occurs; (d) a plan for annual submittal to the Executive Director of the results of biannual ORI beach cleanup events. No construction shall commence until the Executive Director has approved the Marine Debris Management Plan.

- 14. Invasive Species.** WITHIN 90 DAYS OF TERMINATION OF OPERATIONS, ORI shall provide to the Executive Director an inventory of invasive species that were found on in water materials including all cultivation and grow-lines as well as anchors, anchor chains, and buoys.
- 15. Speed Limit.** All project vessels shall operate at speeds at or below 10 kts during all project-related construction, transit and operations. Limited exceptions to this speed limit shall be allowed if vessel captains determine that speeds greater than 10 kts are necessary for crew or navigational safety.
- 16. Pre-construction Survey.** PRIOR TO COMMENCEMENT OF CONSTRUCTION ORI shall provide results of a pre-construction visual site survey to the Executive Director that documents the seafloor conditions and benthic habitat present at and immediately around each of the proposed anchor installation sites prior to anchor installation. This survey should verify proposed anchor placement in soft substrate.

### III. FINDINGS AND DECLARATIONS

#### A. PROJECT DESCRIPTION

ORI is requesting authorization to install and operate a seaweed aquaculture demonstration facility for two years within an 86-acre site in federal waters approximately 4.4 nautical miles off the coast of Santa Barbara County (as shown in [Exhibit 1](#)). The proposed facility would be comprised of a network of horizontal long-lines arranged in a rectangle between 33 and 49 ft below the surface of the ocean and held in place underwater by 28 plough anchors that would be secured to the seafloor and marked by a large buoy at the surface of the water ([Exhibit 2](#)). This grid of lines would be planted with young giant kelp (*Macrocystis pyrifera*) grown from seed in an onshore nursery and cultivated on the offshore facility until it achieves sufficient size for harvest.

In total, ORI proposes to install and operate an array of 32 “cultivation lines” attached to two thick “backbone lines” that would be kept in place with 28 drag-embedment anchors and supported by large perimeter buoys. Smaller “grow lines” would extend from the cultivation lines. These lines would be kept taut with small floats attached to the end of each line (as shown in [Exhibit 2](#)). In total, the proposed farm would include

approximately 28,000 ft of grow lines and just over 10,000 ft of cultivation lines. The backbone lines that would be used would be thick rope (>1.5 inch diameter) tensioned to a minimum of 2,000 lb. Additionally, the cultivation lines would also be thick (.94 inch diameter rope) and tensioned to more than 1,000 lbs. The grow lines would be .25-.4 inch in diameter and maintain a breaking strength of less than 1,700 lbs, which have been shown to significantly reduce the risk of life-threatening marine mammal entanglements (Knowlton et al, 2018).

As the seaweeds develop, the grow lines would be densely covered by stipes, increasing the diameter of the rope to approximately 20 inches. In total, the structure would form a 2,165 ft by 328 ft rectangle that would support 10,496 ft of cultivation lines and roughly 28,000 ft of grow lines. The grow lines would be attached to the backbone line with 4.9 and 8.2 ft between each grow line. The total sea floor area used for anchors and anchor chain is estimated to be 9,128 ft<sup>2</sup>. The cultivation facility would be installed on approximately 16-acres of the total 86-acre site.

To accurately evaluate the growth process from propagation to harvest, ORI plans to conduct several experiments at the site. While some may last for up to 10 months and involve the harvest of all cultivated kelp, other experiments would evaluate the feasibility of multiple harvest and involve repeated partial removal of kelp from individual plants that would remain attached to the lines for up to 20 months. The canopy of the kelp remaining on the structure as part of these more extended trials would be partially harvested every three or four months. By the end of the project period, all plants would be removed from the cultivation system, weighed and measured to evaluate yield.

Once the facility is installed, the majority of maintenance and operational activities carried out on it would be vessel-based. Onshore operations would be limited to administrative work based out of existing office facilities, the loading of kelp seed, and the offloading and transport of harvested kelp to an existing onshore abalone aquaculture facility in Goleta (the Cultured Abalone Farm) for use as feedstock for the abalone. To support its offshore operations, ORI would have one principal vessel (less than 50 ft in length) docked in Santa Barbara harbor and used to transport personnel, equipment, and product between the offshore facility and the Santa Barbara area. Maintenance, monitoring, and operational activities are anticipated to require vessel trips to and from the facility every two weeks. Harvests are expected to occur every 3 to 4 months.

Ongoing operations at the seaweed cultivation facility would include equipment and materials inspections and maintenance as well as planting and harvest. Maintenance and inspections on the longlines are proposed to be carried out on a twice monthly basis using a remote operated vehicle (ROV), certified SCUBA divers, and/or fish/depth finding equipment to detect any derelict gear. Inspection of all ropes, cables and cultivation equipment would be carried out no less than twice per month to determine if any entanglement of marine wildlife has occurred and to ensure that: (a) no lines or cultivation equipment have been broken, lost or removed; (b) all anchor and buoy lines remain taut and in good working condition; and (c) any derelict fishing gear

or marine debris that collects on the facility is removed and disposed of at an appropriate onshore facility. ORI also proposes to check cultivation gear after significant swell events when wave heights reach greater than 8.0 ft at the Station 46053 (LLNR 196) - East Santa Barbara, located approximately 8.5 mi southwest from the project site.

ORI proposes to remove the entire facility from the site following completion of the two-year pilot demonstration.

## B. PROJECT ALTERNATIVES

As part of the design of this project, ORI worked with NOAA to thoroughly evaluate and facilitate its siting using the Coastal Aquaculture Siting and Sustainability (CASS) program. Potential sites in both state and federal waters were considered. The components of the siting analysis, and selection of ORI's preferred site are discussed below.

### Alternative Project Sizes

ORI worked with marine engineers as well as aquaculture specialists at NOAA on the design and siting of its project.

ORI had initially considered a farm footprint size of 133 acres; however, the footprint was reduced to 86 acres as it more accurately represents the actual size of the proposed facility's footprint. The structure itself is estimated to encompass 16 acres at the surface ([Exhibit 2](#)) but a larger area is necessary to account for movement and the extended footprint of the anchoring system on the seafloor. For comparison, other aquaculture projects in the region are 71.7 acres (Santa Barbara Mariculture) and 100 acres (the former KZO Sea Farms/Catalina Sea Ranch).

### Alternative Sites

As part of the NOAA CASS analysis and US Coast Guard's Navigational Safety Risk Assessment, ORI and the respective federal agencies analyzed a variety of data to determine the most suitable location for the project. The analysis began with ORI's identification of preferred parameters (home port, distance to port, cultivated species) and constraints (water depth, temperature, etc.):

**Table 1. Ocean Rainforest, Inc. farming requirements.**

Requirement	
Preferred port	Santa Barbara
Federal/State waters	Federal or State Waters
Selected culture species	Giant Kelp ( <i>Macrocystis pyrifera</i> )
Farm Footprint Size	133 acres (~54 ha)*
Maximum distance from port	≤ 8 nm
Gear depth requirements	≥ 30 and ≤ 150 m
Seawater temperature	< 20 °C
Current Velocity	< 1.02 m/s
Significant wave height	< 4 m

\*ORI have reduced the farm footprint to less than 100 acres; 86 acres (~35 ha) was used for this analysis, as it is more representative of the farm footprint.

The first step in the CASS<sup>1</sup> process was for the ORI to identify an area of interest (AOI) in state and federal waters using the operational parameters and constraints noted above. This generated an area of interest based on distance from port and depth parameters:

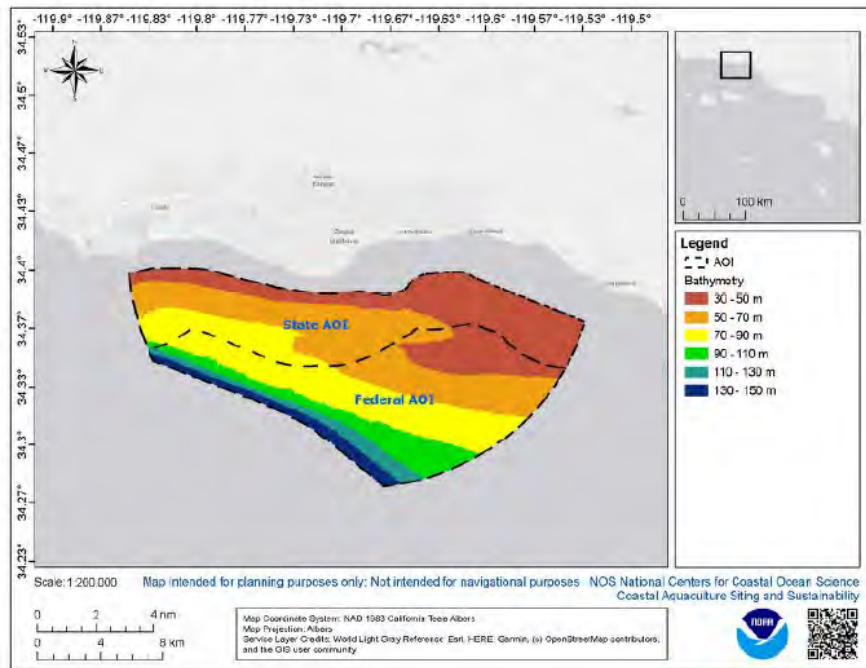


Figure 1: Area of Interest. Photo: NOAA CASS report.

Next, a data inventory of more than 260 layers was used to help identify potential siting locations for the proposed farm. These data layers included:

- Vessel Traffic (including ferry routes, VMS, data from CA Recreational fishing surveys, and AIS data)
- Commercial fishing (including halibut trawls and market squid landings)
- Recreational fishing
- Bathymetric slope data
- Locations of features such as reefs, marine mammal Biologically Important Areas, important seabird areas, existing aquaculture leases, eelgrass habitat, dive sites, military training routes and sea ranges, ferry routes, kelp habitat, and Essential Fish Habitat
- Offshore leases, platforms, wells, and pipelines
- Shipwrecks and other obstructions
- Submarine cables,
- Habitat areas of particular concern
- Deep Sea Corals
- Danger and restricted areas
- Unexploded ordinance sites

<sup>1</sup> Methods used in the CASS analysis for this project are consistent with those that have been incorporated into the forthcoming AOA for the Southern California Bight.

- Wastewater treatment discharge sites
- Wave heights
- Seawater temps
- Current Velocities

After combining the spatial data and applying a three-tiered ranking scheme to identify areas of incompatibility (ie: high levels of existing use and conflict), a total of 18 alternative locations were identified (nine in state waters, and nine in federal waters). All locations had depths of between 98 and 492 ft within eight nautical miles of Santa Barbara and included at least 86-acres. The figure below identifies these sites in green and sites with a high potential of conflict or incompatibility in red.

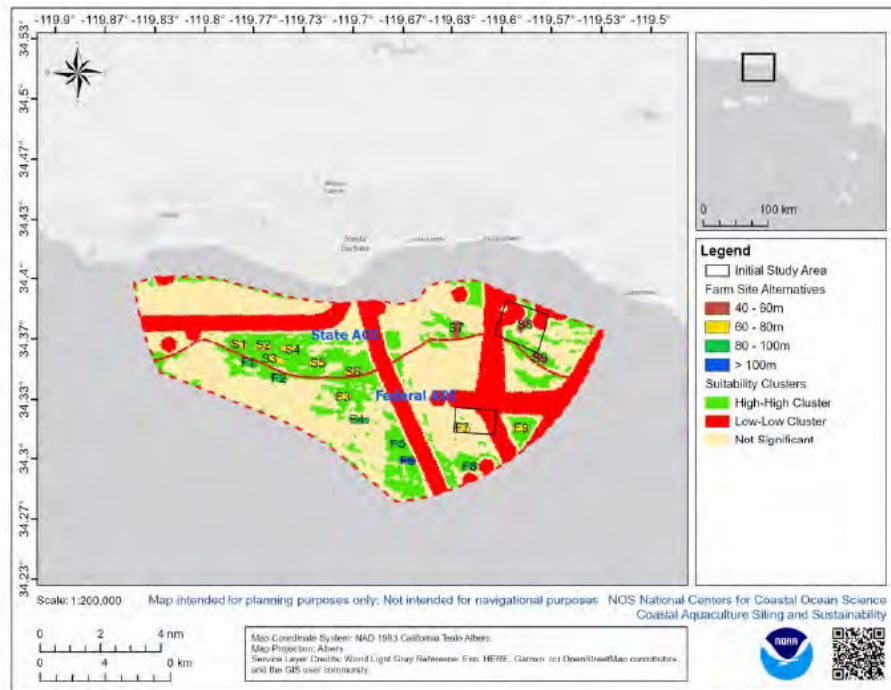


Figure 2: Site Locations. Photo: NOAA CASS report.

Next, the CASS analysis considered the following specific information at each site:

- Benthic characterization
- Oceanographic conditions
- Habitat
- Commercial and Recreational fishing effort
- Vessel traffic (including passenger, pleasure, sailing, and fishing)

ORI took these alternative site locations and determined that each one met the environmental and oceanographic conditions they required, and all posed minimum navigation risk given that the vessel traffic is primarily limited to passenger, pleasure/sailing, and other small craft. ORI noted that all state water alternatives fell within the area designated by CDFW as halibut trawl ground, as did four of the federal waters sites (F5 to F8). Ultimately, given that deeper water sites would be more costly

in terms of structure installation equipment and monitoring, ORI selected site F3 as its preferred project site.

Prior to stakeholder engagement, ORI had also identified the area around F7 as a suitable project area. However, ORI received input from the fishing industry during its siting process that indicated the site would conflict with the gillnet fishery. ORI therefore reconsidered the site in favor of F3 to help minimize adverse impacts and conflicts with surrounding fishing operations.

ORI further evaluated its preferred site during the Navigational Safety Risk Assessment process with the US Coast Guard (USCG). This safety risk assessment process involves a review by USCG staff focused on factors associated with the construction, operation and deconstruction of the demonstration project – including sea-state (a.k.a. environment), vessel traffic, shared uses, etc. – that might contribute to increased safety risks in navigable waters. The assessment was approved by USCG in June 2021 and demonstrates that the modest size, short duration and location of the project poses relatively insignificant navigational or safety risk to the area surrounding the proposed project location. Components of this assessment are discussed in subsequent sections of this report.

### **C. FEDERAL CONSISTENCY**

On December 14, 2020, the Commission received notice of ORI's application for a permit from the U.S. Army Corps of Engineers under Section 10 of the Rivers and Harbors Act of 1899 (as discussed below). While such permits are "listed" in the California Coastal Management Program (CCMP), for activities located fully outside the coastal zone, the Commission needs permission from NOAA's Office of Coastal Management before it can review the activity. In these cases, the standard for receiving this permission is the activity's potential to result in any reasonably foreseeable effect on any coastal use or resource. Alternatively, project proponents can also voluntarily prepare and submit a consistency certification to the Commission, thus bypassing the need for the Commission to receive permission from the Office of Coastal Management and significantly expediting the federal consistency review process. On March 17, 2021, ORI voluntarily submitted a consistency certification to the Commission for the installation and operation for two years of the proposed open ocean kelp cultivation facility described above. Commission staff initiated a review of the application and filed it complete on June 4, 2021.

### **D. OTHER AGENCY APPROVALS AND CONSULTATIONS**

#### **U.S. Army Corps of Engineers**

The U.S. Army Corps of Engineers (ACOE) has regulatory authority over the proposed project under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Section 10 of the Rivers and Harbors Act regulates structures and work in or affecting navigable waters of the U.S.

For the subject project, DA Number SPL-2020-00585-LP, ACOE is currently in the

process of reviewing ORI's request for a standard individual permit under Section 10 of the Rivers and Harbors Act (with a review deadline of December 2021). If the ACOE authorizes this activity, this permit is likely to include a variety of general and specific permit conditions. Based on past ACOE permits for similar activities, such conditions are likely to include requirements for a sediment and water quality monitoring plan, aquaculture gear monitoring, entanglement and escapement plan, biosecurity protocols and decommissioning plan.

### **National Marine Fisheries Service**

The National Marine Fisheries Service (NMFS) has responsibilities over the proposed project under the Marine Mammal Protection Act (MMPA), the Magnuson-Stevens Fisheries Conservation and Management Act (MSA), the Endangered Species Act (ESA), and the Fish and Wildlife Coordination Act. An ESA and EFH consultation was initiated between NMFS and ACOE in May 2021, and was completed on September 21, 2021. The agency determined that the proposed project would adversely impact EFH or protected marine mammal species with implementation of the applicant's proposed mitigation measures.

### **California Department of Fish and Wildlife**

Fish and Game Code Sections 1002, 1002.5 and 1003, authorize the California Department of Fish and Wildlife (CDFW) to issue permits for the take or possession of wildlife. For the proposed project, Scientific Collection Permit (Amendment) S-200500001-20050-001-01 was granted to ORI on April 6, 2021 and expires on August 6, 2023. This permit authorizes ORI to use kelp grown from native gametophytes at the Cultured Abalone Farm on the site of their proposed cultivation facility. Commission staff also reached out to CDFW staff for input during its review of the consistency certification. Email correspondence received on September 23, 2021, from CDFW staff raised concerns regarding condition compliance and invasive bio-fouling as well as potential project related effects to fisheries and benthic habitat. Commission staff considered this input as part of its analysis and recommendation of Special Conditions 2, 8, 9, 11, 12 and 14.

### **Tribal Outreach**

During the review of this project, Commission staff reached out to representatives from the following Native American Tribes understood to have current and historic connections to the project area: Barbareno/Ventureno Band of Mission Indians, Northern Chumash Tribal Council, Santa Ynez Band of Chumash Indians, Barbareno Band of Chumash Indians, Chumash Council of Bakersfield, San Luis Obispo County Chumash Council, and Coastal Band of the Chumash Nation. Contact information for these Tribal Representatives was provided by the Native American Heritage Commission. At the time of publication of this report, a tribal representative from the Northern Chumash Tribal Council responded in support of the proposed project. Any concerns raised subsequent to the publication of this report will be included in an addendum to this staff report.

## E. PLACEMENT OF FILL IN MARINE WATERS

Section 30233(a) of the Coastal Act states in part:

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 Conditions 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.
- ....
- (7) Nature study, aquaculture, or similar resource dependent activities.

The proposed installation of 28 anchoring devices on the seafloor constitutes the placement of fill in open coastal waters. Coastal Act Section 30233(a) restricts the Commission from authorizing a project that includes fill of open coastal waters unless it meets three tests. The first test requires that the proposed activity must fit into one of seven categories of uses enumerated in Coastal Act Section 30233(a). The second test requires that there be no feasible less environmentally damaging alternative. The third test mandates that feasible mitigations measures be provided to minimize the project's adverse environmental effects.

### **Allowable Use Test**

One of the seven allowable uses of fill under 30233(a) is aquaculture. Because the proposed anchoring devices would support a seaweed aquaculture facility, the Commission finds that the proposed project meets the allowable use test of Coastal Act Section 30233(a).

### **Alternatives**

The Commission must further find that there is no feasible less environmentally damaging alternative to the proposed placement of fill in open coastal waters. No known project alternatives would meet the objective of the proposed project – to install and operate an open ocean seaweed aquaculture facility – without the placement of at least some fill material in open coastal waters. Other cultivation projects approved by the Commission have previously considered options that would not include fill (such as using existing oil platforms as moorings for the longlines), however Commission staff determined that USCG regulations<sup>2</sup> establishing a 1,640 ft vessel preclusion zone around platforms would make such alternatives infeasible.

ORI selected drag embedment anchors as compared to other anchoring systems that would require differing amounts of fill. These anchors are used worldwide for seaweed aquaculture structures and have a proven record of successful staying power in open ocean environments. Additionally, drag embedment (more commonly referred to as

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<sup>2</sup> 33 CFR 147.1104, 33 CFR 147.1108, 33 CFR 147.1111



danforth) anchors are a preferred anchoring method for temporary projects, such as this demonstration. While other anchoring systems such as helical screws can provide a more robust and stable anchoring point that occupies and disturbs significantly less seafloor habitat (both due to the small area of the anchor point and lack of associated anchor chain), these are more permanent fixtures on the seafloor, require specialized hydraulic drivers for installation and cannot be easily removed. As such, helical anchors are not considered appropriate for a limited duration project such as the two year kelp cultivation operation proposed by ORI. For long term installations over suitable seafloor substrates, the Commission has found helical anchors to be the least environmentally damaging alternative.

However, for shorter term facilities such as the proposed project, use of danforth anchors that do not require hydraulic installation methods and can be quickly placed and recovered would be less environmentally damaging because the risk of spill or release of hydraulic fluids or other oils during installation would be eliminated. While danforth anchors do require the placement of anchor chain on the seafloor, the chain (1.5 to 2 inch open link) that would be used for the ORI anchoring system would make up only a small amount of the overall line at just over 2,519 ft in total length. Each anchor would have a footprint of less than 33 ft<sup>2</sup>. 132 concrete cultivation line weights (1.64 x 1.64 ft) would have a total seafloor footprint of 108 ft<sup>2</sup>. The total sea floor footprint for the complete proposed facility is estimated at 9,128 ft<sup>2</sup>. ORI has proposed to monitor the structural components of the seaweed farm twice a month for the duration of the project to help ensure that the integrity of the structure and anchoring system would be maintained.

As described above, ORI also considered a variety of alternative sites for the project but found that this site is the preferable one from the standpoint of minimizing impacts to fishing operations, promoting navigational safety, and other factors.

The commission finds that the second test of Coastal Act Section 30233(a) has been met and that for this project, no less environmentally damaging feasible alternative exists.

### **Mitigation**

The final requirement of Coastal Act Section 30233(a) is that filling of coastal waters may be permitted if feasible mitigation measures have been provided to minimize any adverse environmental effects associated with that fill. In subsequent sections of this report, the Commission has identified Special Conditions that would help minimize the adverse environmental effects associated with the placement of fill. As discussed, due to the small footprint of the proposed anchors, anticipated absence of sensitive habitat within their installation sites, the ability of soft substrate benthic organisms to quickly recover from small disturbance events (such as installation of anchors), and the regional abundance of soft substrate habitat similar to that expected to be found at the installation sites, the fill associated with the proposed anchors would not result in significant adverse environmental effects. [Special Condition 16](#) ensures that a pre-construction survey accurately describes the bottom type, and subsequent monitoring in [Special Condition 2](#) will describe the status of benthic habitat over the duration of

the proposed project.

However, as discussed further in the following sections of this report, other aspects of the project such as equipment operation and installation activities do have the potential to result in adverse environmental effects. As such, the Commission has identified feasible mitigation measures that will minimize those adverse environmental effects associated with the placement of fill. For example, the section below on Oil Spills includes a discussion of adverse impacts associated with the potential release of hazardous materials from hydraulically powered equipment such as that proposed to be used to install the anchoring systems and describes measures to minimize that risk. These include the requirement in [Special Condition 7](#) that ORI revise their existing Spill Prevention and Response Plan to ensure that adequate spill prevention measures are taken, and response capability is provided during activities that may result in a spill. In addition, [Special Condition 5](#) would require the use of a qualified marine wildlife observer during anchor installation that has the authority to halt operations if marine wildlife is observed or anticipated to be near a work area and installation activities have the potential to result in injury or entanglement of marine wildlife. This requirement would minimize the risk to marine wildlife associated with the proposed anchor installation activities.

Further, [Special Conditions 3](#) and [13](#) would require the development and implementation of an Aquaculture Gear Monitoring and Escapement Plan and Marine Debris Management Plan. The former would ensure that visual inspections of the facility's lines and anchors are occurring and that no species or fishing gear have become entangled. The latter would help to account for any potential lost or damaged gear due to breakage or structural failure. These requirements would help ensure that the structure remain functional - thereby minimizing the potential release of marine debris from a structural collapse or degradation of the aquaculture facility – and that any fishing equipment or other debris that accumulates on the facility would be properly removed and disposed of on land. These measures would further minimize the facility's potential to entangle or injure marine wildlife.

Finally, [Special Condition 11](#) would require that prior to the expiration of this certification, ORI submit a plan for timely recovery and full removal of all project structures, anchors, and materials. This would also minimize potential adverse environmental effects associated with the proposed anchors by helping ensure that eventually they are carefully and completely removed and do not become obstacles capable of snagging and accumulating fishing equipment and other gear that would pose a risk to marine life.

With the incorporation of these conditions, the Commission finds that the third test of Coastal Act Section 30233(a) has been met and that the proposed project is therefore consistent with Coastal Act Section 30233(a).

## **F. MARINE RESOURCES**

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.*

Placement and operation of the proposed seaweed aquaculture facility has the potential to affect marine species, habitats, and biological productivity through disturbance, loss, and alteration of benthic habitat; deposition of organic materials; disturbance and entanglement of marine wildlife; release of marine debris; attraction and growth of invasive fouling organisms; alteration of water column habitat; and collision of project vessels with marine mammals or sea turtles.

### **Benthic Habitat**

The proposed seaweed cultivation facility would be installed offshore of Santa Barbara in approximately 246 to 262 ft of water. Although site specific visual surveys have not been carried out, available regional seafloor habitat mapping data indicates that the benthic habitat in this area is expected to be soft bottom and typical of the larger region. A variety of infaunal and epifaunal species (such as mysids, amphipods, and polychaete tube worms) rely on this habitat and may be affected by the placement of the facility's anchoring system.

Several aspects of the proposed project have the potential to affect benthic habitat below the aquaculture facility and in surrounding areas. These include the placement of the proposed anchoring devices for buoys and longlines and the accumulation on the seafloor of biological material from the facility.

#### *Anchor Placement*

Placement of anchoring devices on the seafloor would result in loss and disturbance of seafloor habitat and displacement of epifaunal and infaunal organisms from within the footprint of each anchor. ORI proposes to use 29 plough anchors to affix each of the proposed longlines to the seafloor. The footprint of each of these anchors is approximately 25 ft<sup>2</sup>. In total, this equates to a ~ 700 ft<sup>2</sup> area of effect on the seafloor.

Including the potential for drag from the anchor chains (sweep area) would increase this area of effect to approximately 9,128 ft<sup>2</sup> within the perimeter of the proposed 86-acre site.

Although confirmatory site-specific visual surveys have not been carried out, all 28 of the proposed anchor installation sites are believed to be in soft substrate where adverse impacts to epifaunal and infaunal organisms are anticipated to be minimal. To confirm that no sensitive or hard substrate seafloor habitat is present within any of the proposed anchoring sites, [Special Condition 16](#) would require the results of a pre-installation of each anchoring site to be provided to the Executive Director for review. The presence of any sensitive benthic habitat within a proposed anchoring site would necessitate the re-location of that anchor to an area of soft substrate.

The proposed anchors, weights, and chains (including sweep area) would have a limited footprint, approximately 9,128 ft<sup>2</sup>, and would not require the use of large connecting tackle that could sink and further disturb adjacent seafloor habitat. Adverse impacts to some invertebrate species would occur if these organisms are present within an anchoring footprint at the time of installation. However, the total soft-bottom habitat area to be disturbed by the proposed project would be small and regionally insignificant when compared to the geographical extent of this habitat type within the Santa Barbara Channel. In addition, many soft substrate organisms are mobile and would re-colonize and likely recover quickly after the initial installation of the proposed anchoring units.

#### *Accumulation of Biological Materials*

As described in ORI's consistency certification and supporting materials for this project, some research has shown that over time, the seafloor below aquaculture facilities can accumulate large amounts of biological material that becomes dislodged or discharged from the facility above and sinks through the water column. Potential effects to the environment and specifically to sediment chemistry and biology are known to be associated with the release of organic matter in this way from cultivation structures. As shown by Wilding and Nickell (2013), Wilding (2012), and a wide variety of prior research, direct effects of organic enrichment can include alteration of the physical structure and composition of seafloor sediment, alteration of the chemical makeup of sediments, and changes to the community structure of benthic organisms. Overall, the total amount of organic enrichment of the substrate below an active aquaculture facility can be substantial and can lead to a variety of direct and indirect effects.

ORI's consistency certification (supporting materials) considered the potential accumulation of cultivated kelp on the seafloor within the project area and provides the following discussion:

The project actions have a minimal potential to alter the seafloor habitat through the dislodgement and sinking of kelp blades accumulating on the seafloor beneath the aquaculture structures. Based on previous kelp research projects in Chile, we believe that the possibility of deposition is neglectable. Preliminary environmental studies at a 52-acre (21-ha) pilot-farm of *M. pyrifera* installed in

southern Chile (42° 29'27"S; 73° 18'28"W) indicated that no benthic modifications were found, even after three years of cultivation. Few algal fronds were found on the bottom under the kelp farm. The organic matter under the culture site also did not show a significant trend of increase over time -- always under 2%. In addition, seasonally repeated measurements over a 2-year period have shown that nitrogen was not affected, and slight increases of oxygen levels could be measured at the outflow of the farm during summer. As this pilot-farm for kelp was installed at a depth of 98 to 131 ft (30 to 40 m), light attenuation was considered a non-issue (Buschmann et al. 2014).

Another seaweed cultivation environmental impact study was made for *Saccharina latissima* in Sweden (2020). Results showed that the seaweed farm had a significant positive effect on benthic infauna ( $p < 0.05$ ) and was found to attract 17 mobile faunal and 7 other seaweed species, indicating that the farmed crop may provide habitat to mobile faunal species. No changes were observed in benthic oxygen flux, dissolved nutrient concentrations, and benthic mobile fauna between farm and control sites. These results showed that seaweed aquaculture has limited environmental effects, especially compared to other forms of aquaculture - such as fish and bivalve farming (Visch et al. 2020).

Given the site characteristics of depth and currents, and considering the project configuration whereby the cultivation ropes and the seaweed would be approximately 70 to 80 meters from the ocean floor, the accumulation of materials is expected to be minimal.... Findings in a study by Hartstein and Rowden (2004) indicates that aquaculture farms with high hydrodynamic energy (i.e., open ocean or offshore) results in bio deposits being transported and dispersed over a much greater distance from the point of origin before arriving on the seabed. The study concluded that no organic enrichment of the sediment and subsequent alteration of the macroinvertebrate assemblage took place in comparison to aquaculture farms with low hydrodynamic energy (i.e., bays, harbors, or inshore) (Hartstein and Rowden 2004).<sup>3</sup>

However, it is important to recognize that despite these previous studies, it is still not known how the proposed ORI kelp facility would interact with the conditions of the Santa Barbara channel, which are different than the referenced study sites in Chile and Sweden. To account for this, [Special Condition 16](#) would require a pre-construction survey of the site to accurately describe the pre-facility conditions, and [Special Condition 2](#) would require ORI to develop and implement a Monitoring Plan that would include an evaluation of the effects of the seaweed farm on the project site. To do so, this program would include a study of the seafloor below the aquaculture facility to determine the quantity and composition of materials that accumulate as well as what, if any, effects this accumulation has on the benthic habitat and biological communities at the project site. The Monitoring Program would also include reporting and adaptive

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<sup>3</sup> Harstein and Rowden (2004) studied differences in macroinvertebrate assemblage composition inside and outside of mussel farm sites. Significant differences in macroinvertebrate assemblage were observed at low energy sites.

management components to ensure that the Commission remains informed as data and results are gathered and that opportunities for appropriate corrective actions are presented if adverse impacts are observed.

In addition, to reduce the quantity of organic material that may accumulate on the seafloor below the facility, [Special Condition 12](#) would require that ORI refrain from intentionally discharging any biological materials into the ocean. [Special Condition 13](#) would further limit discharges through implementation of a Debris Management Plan, reviewed and approved by the Executive Director, that includes a detailed description of the maintenance measures that would be taken to ensure that all structures and equipment are kept in working order, thus limiting the accidental breakage or release of cultivation gear and product.

### **Marine Wildlife**

The proposed location of the seaweed farm in the open coastal waters of the Santa Barbara Channel is within an area known to be used on a year-round and/or seasonal basis by a variety of species of marine mammals, sea birds, and sea turtles. Marine mammal species that have a moderate to high potential of being present in the project area include the California gray whale, humpback whale, fin whale, common minke whale, California sea lion, Pacific harbor seal, Pacific white-sided dolphin, common bottlenose dolphin, long-beaked common dolphin, short-beaked common dolphin, harbor seal, and California sea lion. All of these species are also known to spend significant periods of time within California state waters. Three species of sea turtle, the loggerhead, green and olive ridley sea turtle, also have the potential to be found within the project site, along with numerous species of seabirds<sup>4</sup> known to occupy coastal and/or offshore aquatic habitats in the Southern California Bight.

The proposed project has the potential to adversely affect these whales, sea turtles, and seabirds in the project area in several ways, including through entanglement with the facility, collision with project vessels, and disturbance from operational activities.

#### **Entanglement**

Entanglement with ropes, fishing gear and other lines in the ocean is acknowledged as a significant source of injury and mortality for some marine mammal populations (Kemper and Gibbs 2001; Wursig and Gailey 2002; Kemper et al. 2003; PCCS 2012). Reid et al. (2006) estimate that entanglement in fishing gear results in the death of some 300,000 marine mammals per year and research carried out by the Provincetown Center for Coastal Studies suggests that at least 72% of the right whales in the North Atlantic have encountered entangling ropes in the ocean, as determined through photographic studies of their scars and entangled gear. Most entangled ropes and lines observed on whales have small diameters – typically less than two inches. Gray whales off the coast of California are also frequently observed entangled in long lines, ropes, and other gear. In fact, gray whales have the highest reported number of

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<sup>4</sup> The Biological Assessment for this project identified three listed avian species that have a low potential to interact with the proposed project: Marbled murrelet, Short-tailed Albatross, and California Least tern. These species have low potential for interaction due to a lack of nesting and preferred foraging habitat.

entanglements and ship strikes of any large whale species along the west coast of the U.S. (DeAngelis et al. 2012). As an example, during the course of several weeks in the spring of 2012, two gray whales were observed to be entangled in long lines near the site of a failed open ocean shellfish aquaculture operation off the coast of Long Beach. One of these whales was freed from a tangled mass of lines and buoys offshore of Redondo Beach in Los Angeles County on March 30, 2012, and another was found dead offshore of Long Beach several days after similar rescue attempts failed. The gear recovered in both cases was small diameter long line material (also extensively used for marker buoys on lobster and crab traps), but the origin of the material was not conclusively determined.

Thus, the proposed seaweed farm may result in marine mammal entanglement. Aquaculture uses various ropes in the water column that may pose an entanglement risk to cetaceans and sea turtles. In contrast to fishing gear, however, there are far fewer documented entanglement cases in seaweed aquaculture gear. The volume of gear is significantly different, however. Open ocean cultivation of seaweed is practiced in only a small number of locations around the world whereas the global fishing industry has existed for centuries and involves hundreds of millions of participants. Regardless, interactions and entanglements with longline aquaculture gear worldwide are rare, and close approaches by protected species have seldom been documented (Price et al. 2016). NOAA Fisheries reports that west coast entanglement summaries from 2013 to 2019 include no entanglements from the small number of existing open ocean aquaculture farms (only two offshore of California) (NOAA Fisheries 2019). There have also been no reported marine mammal entanglements associated with Santa Barbara Mariculture, which has operated a 25-acre mussel aquaculture farm in the nearshore waters of the Santa Barbara Channel, using a similar structure, for over a decade (CFGC 2018).

As described in the Biological Assessment for this consistency certification, “the majority of reported marine mammal entanglements involve gear from the crab, gillnet, and spiny lobster fisheries. Fixed gear (e.g., pot and trap gear) from these fisheries has been the most commonly recognized and reported gear type causing entanglements since 2000.” Project’s Biological Assessment also includes an excerpt from a 2020 report by Dudek:

Documented entangled animals and disentanglement efforts in the Pacific Northwest have mostly involved gray whales and humpback whales and have involved both gill nets and crab gear. While not as common, both fin and blue whales are sometimes entangled in gill nets and crab gear based on a few stranded animals and scarring on live animals (NOAA Fisheries 2014). More recently, from 2014 to 2017, the majority of the whale entanglements involved humpback whales and most of the entanglements were from commercial Californian and Washington Dungeness crab traps, and gillnet fisheries (NOAA Fisheries 2019a). Large whale species appear to be more vulnerable to entanglement than smaller cetacean species, such as dolphins and porpoises, which are more prone to be caught as bycatch in nets due to their smaller size (Benjamins et al. 2014). Furthermore, it is thought that juveniles are more likely

to be entangled due to their inquisitive nature and inexperience. Seaweed aquaculture techniques have some significant differences in comparison to crab and fishing gear that may reduce the potential for marine mammal entanglement....In contrast to fishery gear, seaweed aquaculture gear is stationary, the lines are larger, and the gear is not designed to catch or ensnare fish. Further, as described below, the lines would be highly tensioned, which reduces the risk of marine mammals being caught in slack lines. Therefore, the project design is expected to pose a much smaller risk to marine mammal entanglement compared to longline fishing methods.

Entanglement risk is highest when using thin ropes, such as those used in mussel farms that employ mussel spat collecting ropes, as these ropes are more flexible making them more conducive to entanglement (Keeley et al. 2009). However, with the seaweed farm, only thicker backbone and cultivation lines would be used. These ropes are tensioned, and not looping ropes commonly seen in other forms of aquaculture (Lindell 2014; Moore & Wieting 1999; Price et al. 2017). These lines would likely be under sufficient tension to prevent loose lines from becoming entangled and forming loops or knots within the system.

ORI has designed and proposed project design specifications to minimize protected marine mammal and sea turtle entanglement ([Exhibit 2](#)). The backbone lines that they proposed to use would be a thick (1.42 inch/36mm -diameter) tensioned (to a minimum of 2,000 pounds) rope that are considered less conducive to wrapping around or entangling protected species. To further minimize potential entanglement risks, ORI proposes that all backbone and mooring lines would be tensioned to greater than 2,000 pounds at all times. Similarly, the cultivation lines are a thick (.95 in/24 mm) rope that is also thought not to be conducive to wrapping around large marine wildlife. ORI proposes that it would be tensioned to greater than 1,000 pounds at all times. The grow lines proposed to be used for the duration of the demonstration project would be between .24-.4 in (6 and 10 mm) in diameter and maintain a breaking strength of less than 1,700 pounds. Ropes with a breaking strength less than 1,700 pounds have been theorized to reduce the risk of life-threatening marine mammal entanglements by 72% (Knowlton et al. 2016, Lysiak et al. 2018). Barring unforeseen circumstances,<sup>5</sup> it is not anticipated that the structure would become slack to allow entanglement, given the pre-tension supplied by the heavy chains and partially submerged floats. Frequent and thorough maintenance inspections and surveys would reduce the potential for structural failures and other unforeseen factors that may contribute to lines becoming slack.

While the limited number and relevance of these examples from existing farms, as well as the overall lack of documented incidents of marine mammal entanglements in seaweed cultivation facilities, is insufficient to support a conclusion that the ORI facility

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<sup>5</sup> ORI's draft monitoring plan incorporates a measure to inspect the facility after significant storm events to ensure structural integrity. These and regular inspections required in **Special Condition 3** seek to reduce the risk of structure failure causing adverse interactions with marine wildlife.



does not pose a risk of entanglement, these examples and risk reduction measures proposed to be implemented by ORI do suggest that the level of concern indicated by the growing number of observed marine mammal entanglement events in general may lead to an overestimation of that risk. Accordingly, an accurate assessment of the entanglement risk posed by this project must include an assessment of the size and design of the facility and marine mammal use patterns in the project area.

Lines with slack, open loops, small diameter lines, lines in areas of elevated marine mammal density, and lines that pass through large areas of the ocean surface or water column pose the greatest entanglement risk to marine wildlife. Through a use of anchors, weights and buoys, the project proposes to keep lines under tension as mentioned in the project description above.

Based on data collected by the National Marine Fisheries Service, the proposed project site would be located within Biologically Important Areas (BIAs) designated by the National Marine Fisheries Service for California gray whale migration and humpback whale feeding. BIAs are established to identify areas of consistently high density for particular whale species. Approximately 20,000 gray whales migrate through California waters each year between the Gulf of Alaska and breeding lagoons in Baja California. Along much of the west coast, the majority of southbound (November to January) gray whales migrate within two nautical miles of shore, while the northbound migration occurs much closer to shore, with mother and calves reported within kelp beds and sometimes only yards from the shoreline. Within the Southern California Bight (the area from Point Conception to San Diego), however, whales diverge into one of several routes, either remaining close to shore or traveling further offshore between and along the Channel Islands and Catalina. Additionally, the proposed project location overlaps with critical habitat for the endangered Central America and threatened Mexico distinct population segments of humpback whale. The NMFS consultation for this project concluded that effects on the humpback whale's critical habitat were discountable given the size of the habitat in comparison to the project size and duration, as it would not significantly impact the whale's ability to forage in the area.



Source: NOAA Cetacean sound mapping

*Figure 2: Cetacean Biologically Important Areas. Note: the gray whale BIA extends through the Blue Whale and humpback whale feeding areas.*

Installation of the proposed aquaculture facility and its many associated lines, ropes, and cables within gray and humpback whale BIAs would significantly increase the risk of entanglement to these and other whale species because the BIAs denote areas with the highest density and frequency of sightings and thus indicate the presence of environmental conditions that would contribute to future presence and abundance. However, the specific magnitude of this risk and the number of species most likely to be affected is difficult to precisely determine given the variability of ocean conditions and a lack of recorded marine mammal entanglements that definitively involve aquaculture gear.

Despite that uncertainty, several measures are available to help further reduce the risk of whale entanglement. Based on available research and entanglement records of marine mammals with fishing gear and lines, any loose, hanging, slack, and disconnected lines on the facility would pose a particular risk. As such, ORI's structural design has the facility keeping all backbone, cultivation and grow lines under tension. Additionally, available research notes that entanglement risk is higher with smaller diameter lines. As proposed, ORI's facility primarily includes larger diameter lines (described in the project description) to minimize entanglement risk with these species. Additionally, [Special Condition 3](#) would require visual inspections of the facility's lines, ropes, anchors, and cultivation equipment to be carried out on a bi-monthly basis and that any observed maintenance issues or wear or fatigue of materials is remedied as soon as feasible. In addition, [Special Condition 3](#) would also require all lines and equipment to be maintained taut and in good working condition and that all observed or suspected entanglement events are recorded and reported to appropriate resource management agency staff for review and consideration. Further, [Special Condition 5](#) provides that ORI include a qualified marine mammal observer on the project construction/installation vessel and that this observer be authorized to halt operations if marine wildlife is observed or anticipated to be near a work area and installation

activities have the potential to result in injury or entanglement.

Minimization of entanglement risk would also be provided through implementation of [Special Conditions 12](#) and [13](#), which prohibit the intentional discharge or release of materials or equipment from the facility, including ropes and lines, and provides for the development and implementation of a Marine Debris Management Plan that includes a description of the extent and frequency of maintenance operations, a description of search and clean-up protocols to be taken in the event of the loss or discharge of materials, and the marking of all project lines and materials with ORI's contact information to facilitate recovery and reporting. As an additional protective measure, [Special Condition 2](#) would require that ORI include in its Monitoring Plan an evaluation of the response of marine mammal populations in the project area to the presence of the facility's infrastructure, biofouling organisms, and cultivated seaweed. This evaluation and the annual reporting of results for the lifetime of facility operation would allow for adaptive management measures to be implemented based on the performance of the facility so that any unanticipated issues that arise with regard to marine wildlife entanglement may be appropriately addressed.

#### *Indirect Entanglement*

The presence of the seaweed cultivation facility in the project area may also cause indirect entanglement to occur if derelict fishing gear, ropes, lines, or other marine debris accumulates on the facility infrastructure. Both natural and artificial structures in the marine environment accumulate drifting marine debris over time and this material can pose a substantial threat to marine life if it is retained in the environment in such a way as to pose an entanglement risk. For example, abandoned fishing nets have been observed to snag on seafloor features and to remain in place, "fishing" for years afterwards. To address this additional potential source of entanglement, [Special Condition 3](#) requires that ORI perform visual inspections of the facility at least twice per month and that any derelict fishing gear or marine debris that collects on the facility be removed and disposed of at an appropriate onshore facility. Further, [Special Condition 9](#) requires that ORI work with NOAA's Office of Coast Survey to update navigational charts to reflect the final as-built location and configuration of the facility. By ensuring that navigational charts are accurately updated with the project location, accidental interactions between fishermen and the facility would be less likely and the facility would be less likely to snag fishing gear, resulting in damage and abandonment. Finally, [Special Condition 13](#) would require ORI to implement a marine debris management plan that ensures all gear is labeled with the ORI's name and contact information, lost gear is searched for and recovered (if possible), and ORI carries out its proposed mitigation measure of biannual beach cleanups to account for any unrecovered and unintentionally lost gear.

#### *Disturbance from Operational Activities*

Depending on the methods used to carry them out, several aspects of ORI's planting, maintenance, and harvest operations have the potential to result in disturbance to marine wildlife. For example, operations requiring the use of artificial night lighting may result in adverse impacts to marine wildlife such as seabirds. Several species of night foraging seabirds are particularly susceptible to attraction by artificial lights, especially

in open ocean environments, and may suffer a variety of adverse impacts due to their attraction to and entrapment in the area of artificial illumination. These effects can include exhaustion, separation of parents and young, disorientation and collision with structures, and increased predation due to a loss of concealing darkness. To address this potential source of operational disturbance to marine wildlife and resulting reductions in marine biological productivity that may result, [Special Condition 4](#) provides that ORI restrict operations to daylight hours and refrain from night operations and the use of artificial lighting.

Another potential source of disturbance to marine wildlife is the use of active deterrent devices to exclude or displace predatory species that may be attracted to the cultivated shellfish.<sup>6</sup> For example, in many locations mussel farming operators have taken measures to control or eliminate predation by sea ducks, including the use of acoustic harassment devices, water cannons, and other hazing methods. ORI does not propose to intentionally disturb or harass marine wildlife and would not use any such active deterrent methods.

#### *Ship Strikes*

Another potential adverse impact to marine wildlife would be collision with project vessels during construction and marine operations associated with the proposed project. ORI proposes to use one >50ft vessel to carry out planting, harvest, and maintenance operations. The vessel would be docked in Santa Barbara Harbor, and travel distance from vessel berth to the facility site is approximately 4.4 miles. With the proposed construction and removal periods of 10 days each and two trips to the facility for maintenance activities every month, project activities would result in a total of approximately 600 miles of vessel travel each year through the waters of the Santa Barbara Channel that support high densities of marine wildlife.

Vessel strikes are known to be a hazard to a number of marine species, particularly whales. Some marine mammal species that have been observed in high numbers in the project area, such as the California gray whale, blue whale, and fin whale, have been shown in recent years to be particularly susceptible to injury and mortality due to collision with marine vessels. Although several of the more recent recorded mortality incidents involving these species and vessel collisions are known or suspected to have been caused by several hundred-foot-long container ships, smaller vessels similar in size to the project vessels (such as recreational craft, ferries, and whale watching vessels) are also known to have struck and killed or injured marine mammals.

As described in ORI's consistency certification, the proposed project anticipates a small boat travelling to the site an average of two times per month and would likely only contribute a slight increase in boat traffic in the area during regular operations:

Between 1988 and 2012, there were 100 documented large whale ship strikes along the California coast. Large whale species are vulnerable to collisions with all vessel types, classes and sizes (NOAA Office of National Marine Sanctuaries

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<sup>6</sup> No shellfish propagation has been proposed, but aggregation may occur on structural components of the facility.

2017); however, most collisions are associated with large container and freight ships due to their mass and the speed at which they transit the shipping lanes (Silber et al. 2010). When large vessels such as container ships are involved, the crew may be unaware a strike has occurred. As such, the number of ship strikes to whales is likely under reported. Most cases where whales were known to be severely hurt or killed occurred at vessel speeds of 14 knots or more and were caused by large ships of 262 ft or more in length (Laist et al. 2001).

However, collisions with smaller boats, such as those that are proposed to be used for the seaweed cultivation facility, do have the potential to injure or kill marine wildlife, especially when travelling at high speeds (Ritter 2012). To address this concern, ORI proposes to use continuous education for its staff regarding how to properly interact with marine mammals if encountered during operations and to include vessel management and avoidance measures if vessels observe marine mammals in close proximity. In addition, [Special Condition 15](#) would establish a 10 knot maximum speed for construction and operational vessels to adhere to, which would minimize potential ship strikes and harm to marine wildlife. Existing research shows that at speeds of 10 knots or below, the likelihood of ship strikes declines significantly along with the risk of fatality to affected whales.

Implementation of these protocols, in addition to the provision in [Special Condition 5](#) that a qualified marine wildlife observer may halt operations if marine wildlife is potentially at risk, would minimize the potential occurrence of ship strikes during project operations and construction.

#### *Water Column Habitat*

ORI's consistency certification describes that the facility, which is comprised of lines, ropes, buoys, and cultivation equipment held at the ocean surface and within the upper third of the water column throughout the 86-acre project site, could function as a mid-water artificial reef or aggregation device. Artificial structures in the water column have been shown to provide foraging habitat, food sources, refuge from predators, and breeding habitat, thus altering the composition and abundance of wild fish assemblages and affecting fish aggregation behavior (Dealteris et al. 2004). Whether the proposed seaweed farm is likely to actually contribute to the production of fish populations or simply aggregate fish in the same manner as fish attraction devices (Buckley et al. 1989; Relini et al. 2000; Dempster and Kingsford 2003) is difficult to determine in advance due to the lack of directly comparable facilities within the same region that can be used for reference.

Because available research is ambiguous regarding the effect that the proposed project is likely to have on fish and macroinvertebrate populations and communities and there are no comparable projects in the area to use for reference, [Special Condition 2](#) would require development and implementation of a Monitoring Plan that includes an evaluation of the fishing activity and presence of marine mammal activity around the site, which may provide an indirect proxy for measuring presence of fish aggregation in the project area.

### **Non-native Species**

The proposed seaweed aquaculture farm would not intentionally produce non-native species and would instead focus on testing the viability of open ocean cultivation of native giant kelp. Once a sufficient amount of gametophytes (kelp “seed”) have been generated in an onshore lab, ORI would coat them onto grow lines and deploy them on the ocean structure. Giant kelp would remain attached to the lines for 20 months. The canopy of the kelp remaining on the structure as part of these extended trials would be partially harvested every 3 or 4 months. All harvested unused kelp generated would be brought to the Cultured Abalone Farm for use as feedstock until fully removed at the termination of the 2-year pilot project.

### *Invasive Biofouling Species*

Aquaculture farms and other artificial structures in marine environments provide a three-dimensional habitat for colonization by fouling organisms and associated biota (McKindsey et al. 2006; Costa-Pierce and Bridger 2002). Compared to rocky or soft-substrate benthic habitats, these structures can provide a much larger surface area available for the attachment of biofouling organisms (Keeley et al. 2009). A variety of studies indicate that the dominant organisms on submerged artificial structures include algae and attached filter-feeding invertebrates such as sea squirts, bryozoans and mussels (Hughes et al. 2005; Braithwaite et al. 2007). These assemblages typically have a range of other non-sessile animals associated with them, such as polychaete worms and various small crustaceans. Based on overseas research, the assemblages that develop on artificial structures can be quite different from those in adjacent rocky areas (Glasby 1999; Connell 2000). Fouling organisms can overgrow native species such as tunicates, sponges, macroalgae, hydroids, and anemones and may result in loss of prey resources for groundfish species. Of particular concern are species such as the carpet sea squirt, which reproduces quickly, covering the siphons of infaunal bivalves and creating a barrier between groundfish and their prey. However, the nearest known occurrences of these species are Monterey Bay and Mission Bay in San Diego.

Based on surveys carried out on the submerged structures of the oil platforms located near the project site, a wide variety of invasive marine species are present at these sites, including numerous species known to present significant economic and ecological risk to marine areas along the west coast. Many of these species are known to be “fouling organisms,” species of invertebrates and algae that are known to seek out and colonize artificial hard substrate in the marine environment. Maintenance activities for in-water structures and vessels that involve periodic removal of fouling organisms without proper collection and disposal protocols may result in increased dispersal and propagation opportunities for these species. Such opportunities for dispersion and spread pose a particular risk with some algal species and colonial species such as didemnum that may break apart into many pieces when disturbed, each of which may be capable of surviving, growing, and reproducing on its own.

Given that the proposed project has approximately 38,000 ft of line, 2,519 ft of anchor chain, and numerous buoys to potentially attach to, it is not infeasible that non-native fouling organisms could occur at the project site, brought in by vessel traffic or simply

dispersed from other nearby sites.

ORI proposes to conduct periodic maintenance and monitoring of the site and to receive training on proper identification and disposal of non-native species. To further address any potential risk of spreading non-native species discovered at the site, [Special Condition 12](#) would require that ORI not intentionally dispose of any equipment or waste, including living or dead shellfish, shells, or non-native fouling organisms into the marine environment. Further, [Special Condition 12](#) also provides that all maintenance cleaning operations of the cultivation facility, including its buoys, ropes, lines, cables, and anchors, be carried out onshore or in a contained manner sufficient to capture all dislodged biological materials. In addition, [Special Condition 12](#) provides that all non-native fouling organisms and biological materials from non-native organisms removed during cleaning operations be collected and disposed at an appropriate upland facility and that no discharge of untreated wash water or non-native fouling materials occur during maintenance cleaning operations.

In addition, [Special Condition 14](#) requires that ORI quantify the number of invasive species attached to gear following the removal of the facility after two years<sup>7</sup> and help determine an appropriate level of monitoring for future aquaculture projects.

## Conclusion

With the implementation of [Special Conditions 2 through 5, 9, and 12 through 15](#) described above, the Commission finds that the proposed project is consistent with Coastal Act Sections 30230 and 30231 pertaining to protection of marine resources and water quality.

## G. COMMERCIAL AND RECREATIONAL FISHING

In addition to the commercial fishing protection afforded under Section 30230 of the Coastal Act, Section 30234 of the Coastal Act states:

*Facilities serving the commercial fishing and recreational boating industries shall be protected and, where feasible, upgraded. Existing commercial fishing and recreational boating harbor space shall not be reduced unless the demand for those facilities no longer exists or adequate substitute space has been provided. Proposed recreational boating facilities shall, where feasible, be designed and located in such a fashion as not to interfere with the needs of the commercial fishing industry.*

Section 30234.5 of the Coastal Act states:

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<sup>7</sup> The project is proposed to take place over a period of two years. To account for any potential delays in issuance of other permits, construction delays due to weather, etc., this consistency certification incorporates a buffer period reflected in [Special Conditions 1 and 11](#). The short duration of this project is a key component of mitigating many of the potential adverse impacts that could arise from the proposed project, and thus the intent is not to extend the duration of the project but to allow the applicant to adapt to other systemic delays unassociated with the nature of the in-water activities.

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

The design and configuration of the proposed project, especially its location at a depth of between 33-49 ft, means that some limited commercial and recreational fishing could be carried out at the project site - namely, fishing which makes use of gear capable of remaining near the surface or that would be unlikely to contact or entangle with project lines and ropes. However, based on input from the fisheries community, Commission staff anticipates that most fishermen would avoid fishing within the 86 - acre project site. It is plausible that kelp growth could come much closer to the surface than the facility depth, which could present an in-water obstruction to boaters (fishing or otherwise). Initially, ORI had planned to install its facility in close proximity to another proposed aquaculture operation that was to be located offshore of Oxnard (the subsequently abandoned Ventura Shellfish Enterprise effort). However, ORI later chose to perform an expanded siting analysis (described previously) in state and federal waters in response to feedback from representatives of the commercial fishing community. Primary concerns raised by fishing industry representatives have been ensuring the facility site was clearly visible and located away from existing trawling grounds. In a letter to the Army Corps of Engineers, the Commercial Fishermen of Santa Barbara endorsed the site selection of the proposed farm, acknowledging that it avoided halibut trawl areas, and would have a very low impact on local fisheries. The organization expressed that the site may overlap with an area used for sea cucumber trawling, but largely avoids fishing activities, and thus did not oppose the project ([Exhibit 4](#)). Potential adverse impacts from the project to commercial and recreational fishing are discussed below and include the displacement of fishing activity from fishing grounds and the loss/damage of fishing gear due to accidental contact with the facility.

### **Displacement from Fishing Grounds**

The California Department of Fish and Wildlife has developed a numbered block system to aid in managing fisheries. California's offshore waters are divided into roughly 800 individual 100-square mile blocks used to report where fishing catch and effort occurs. The proposed project site overlaps two blocks: 0653 and 0667. Primarily, state regulated California Halibut were landed from these areas. Because the surface and submerged gear associated with the proposed project would interfere with fishing activity, Commission staff expects commercial and recreational fishing activity to be displaced from the project site. The following analysis includes an examination of the amount and likely impact of this displacement on the economic, commercial, and recreational importance of fishing activities.

### *Commercial Fisheries*

Commercial fisheries landings in California have declined dramatically since the 1970s (Hahn and Layne-Farrar 2003), with metric tonnage (mt) falling from 552,559 mt in 1975 to 142,946 mt in 2008 (NOAA Annual Commercial Landing Statistics). Trends in landings in southern California have followed a similar pattern of decline. In addition, in recent years, area closures, marine protection initiatives, and increased interest in offshore aquaculture and marine renewable energy development (e.g., offshore wind



farms, wave energy projects) have heightened the potential for competition for access to commercial fishing grounds. In this context, many commercial fisheries sectors consider any loss or displacement from productive fishing grounds to be a significant adverse impact. The project area overlaps with Groundfish Essential Fish Habitat (which covers more than 90 species and spans the entirety of the west coast). However, based on information from the Pacific Fisheries Management Council’s groundfish mapper spatial analysis tool, there are no habitat areas of particular concern noted for these species within the proposed project area. A close examination of the data shows that several species of flatfish have been harvested from the CDFW blocks that the project area overlap, and thus these species can be assumed to have some potential to occur in the project area. These species include Pacific sanddab, CA halibut as well as a variety of right-eye flounders. Note that of the groundfish species caught in abundance from these blocks, only the CA halibut is known to prefer soft bottom habitats for foraging. Others, such as vermilion rockfish prefer hard substrate and kelp, which are not believed present in the project area. [Special Condition 16](#) requires a pre-construction site survey that will accurately document the bottom habitat as described in the supporting documentation.

Approximately 59,425 lbs of CA halibut were landed in the Santa Barbara area in 2019, making it one of the most important fisheries in that region. In the years 2015 through 2019, a total of 48,618 lbs or 2.73% of total halibut landings were from the CDFW fishing blocks that the proposed project site would overlap. However, for the Santa Barbara area specifically, halibut caught in Blocks 0653 and 0667 represent approximately 1.82% and 5.41% of halibut landed. The project area does not overlap with any known commercial halibut trawling grounds, but recognizing the transient nature of fisheries, and the presence of suitable habitat, the potential for conflict does exist, even though historical data shows that it would be unlikely.

**Table 2. California Halibut Regional and Trawl Block Landings in Pounds**

Year	Santa Barbara Area <sup>1</sup>	Blocks 0653 and 0667 <sup>2</sup>	Percentage of Regional Landings
2015	99,977	9,709	9.71%
2016	125,684	19,201	15.28%
2017	148,763	10,142	6.82%
2018	132,922	3,296	2.48%
2019	165,269	6,270	3.79%

**Notes:**

- <sup>1</sup> Santa Barbara Area includes ports located in San Luis Obispo, Santa Barbara, and Ventura Counties (CDFW 2019).
- <sup>2</sup> California halibut caught in Blocks 0653 and 0667 are primarily landed in Santa Barbara Area, but may be landed in ports outside of the Santa Barbara Area (CDFW 2020b).

While Catch Blocks 0653 and 0667 support several dozen different commercial fisheries, these blocks appear to be of particular importance to the market squid fishery.

Market squid remains one of California's largest and most lucrative fisheries.<sup>8</sup> In the Santa Barbara area from 2015-2019, approximately 905,830 lbs were landed from blocks 0653 and 0667, with a value of more than \$1,183,433, according to CDFW data. Generally, market squid fishing grounds are located south of the proposed project area, which is supported by an examination of CDFW historic logbook data.<sup>9</sup> Unlike other coastal pelagic species, California market squid are unique in that the females lay their egg masses on sandy bottom habitat, at depths of about 15-180 ft. They are a short-lived species (approximately 6-9 months lifespan) and die shortly after they reproduce, which is when they are typically targeted by fishermen. The nearest known squid spawning grounds are in at Ventura flats, near Ventura harbor. Unfortunately, market squid population abundance is largely unknown, and impacts of aquaculture farms on the species is also unknown. However, given the large distribution of the species (from Baja, CA to Alaska), the temporary nature and relatively small footprint of the proposed farm, it is likely that adverse impacts would be limited.

However, fishing is an activity defined by a high degree of variability - the location in which catch occurs in one year may not be as productive in subsequent years and vice versa. While it is not possible to accurately predict the precise areas that will yield the most productive fisheries in future years, a spatial examination of fisheries activities averaged over several recent years can provide a general indication of the relative likelihood that a particular area will be important in the future. This approach is typically most accurate on a regional scale and using it here suggests that Catch Blocks 0653 and 0667 will continue to be a smaller contributor to the squid fishery in the Santa Barbara region.

The project area also overlaps with Essential Fish Habitat for highly migratory species. Specifically, thresher shark, shortfin mako, and dorado Essential Fish Habitat overlap the area. However, landings of these species were relatively small in comparison to halibut and market squid. Most Highly Migratory Species, though possibly present in the project area, spawn in tropical waters and migrate seasonally to the southern California bight. Therefore, the proposed project would not be expected to adversely affect the fisheries focused on their capture.

#### *Recreational Fisheries*

The smaller, lighter, cheaper, and more targeted gear typically used in the recreational fishery, such as hook and line gear, is likely to result in some recreational fishermen continuing to fish at or near the project site despite the potential risks to their catch and equipment. In its consistency certification, Ocean Rainforest acknowledges that a fatal navigational accident occurred in the Southern California Bight involving a recreational fishing boat entanglement with a detached long line from the KZO Seafarms/Catalina Sea Ranch aquaculture farm located on the San Pedro shelf (Consistency Certification No. CC-035-12). The tragic accident resulted in the death of a 71-year-old recreational fisherman. ORI's consistency certification recognizes that offshore cultivation

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<sup>8</sup> [California Commercial Market Squid Landing Receipt Data](#)

<sup>9</sup> [California Commercial Market Squid Logbook Data](#)

structures can often act as fish aggregation sites, and that many species of fish rely on kelp canopy for protection, feeding, or growth. Thus, it is possible that recreational fishing may increase in the area around the proposed kelp farm. ORI would not preclude or limit this activity from occurring and to help ensure that it does not adversely affect coastal resources, [Special Conditions 3](#) and [13](#) would ensure that the structure is regularly monitored and maintained and that any gear or debris is promptly removed from the water. Further, [Special Conditions 1](#) and [11](#) limit the time of operations and ensures the full removal of the facility at the conclusion of the certification term.

Overall, Commission staff's review of available information regarding recreational fishing in the proposed project area and analysis of project impacts to this fishery suggest that such impacts would be unlikely to occur and/or be limited in nature. However, recognizing the limitations of existing data sources and the spatial variability of recreational fishing, ORI will implement the actions described in [Special Condition 2](#) which provides that ORI, as part of its Monitoring Plan, carry out an evaluation of fisheries activities at and around the project site for the life of operation to determine the amount of fisheries activity that may be displaced due to the presence of the aquaculture farm and to address any impacts that may occur beyond those anticipated by ORI and discussed in its consistency certification.

#### **Loss/Damage to Gear**

Potential adverse impacts to commercial and recreational fishing could also occur due to entanglement of fishing gear with the proposed aquaculture facility. Comprised of ropes, lines, buoys, and cultivation equipment throughout the upper one-third of the water column within the 86-acre project site, the proposed aquaculture facility could snag, catch, damage, or entangle a variety of types of fishing gear, including hook and line gear, trawl gear, nets, and traps. Such gear could come into contact with the facility through intentional deployment, by drifting from surrounding areas, or getting towed or dragged (either from a boat or targeted animal) onto the site during fishing activity. Depending on the nature and duration of this contact, the fishing gear could be lost or recovered in a damaged condition. These gear losses or damages would result in potentially substantial financial losses to the affected fishing operation and potentially lead to the release of marine debris – the unrecovered fishing gear and/or lines or ropes from the facility.

To reduce the potential for accidental loss or damage of fishing gear due to contact with the proposed facility, [Special Condition 9](#) would require that ORI facilitate the update of NOAA nautical charts with the accurate location and configuration of the facility. In addition, [Special Condition 3](#) would help ensure that ORI carries out routine maintenance inspection and repair activities to minimize the number of loose cables, ropes, or materials on the facility that could pose an increased entanglement or snagging risk. Further, [Special Condition 5](#) provides for the use of a dedicated monitor during construction and installation activities to minimize the potential occurrence of fishing gear and marine mammal entanglement during installation. [Special Condition 13](#) would ensure that a marine debris management and response plan is developed and implemented, thus reducing the potential for project equipment

and materials to be released and abandoned into the marine environment where they could adversely impact fishing gear and activities. [Special Condition 11](#) also provides for the establishment of a removal plan to be implemented at the conclusion of operations so that it does not become abandoned and derelict, thus posing a continuing hazard or entanglement risk for fishing activities and gear. [Special Condition 10](#) further provides for the creation of a financial instrument to help guarantee that proper site abandonment is carried out<sup>10</sup>. Finally, [Special Condition 8](#) provides for the development and implementation of a lost/damaged fishing gear compensation program that would allow fishermen to recover costs for any gear damage or loss that occurs. Additionally, ORI has established an agreement with the Lost Gear Recovery Program (UC Davis) to recover any gear than may become entangled with the facility. Finally, ORI has proposed to implement a bi-annual beach clean-up event to also address marine debris accumulation in the project region.

### **Conclusion**

With the implementation of the measures described in [Special Conditions 1, 2, 3, 5, 6, 8 through 12](#) above, the Commission finds that the proposed project minimizes adverse effects on commercial and recreational fishing and is consistent with Coastal Act Sections 30230, 30234, and 30234.5.

### **H. OIL SPILLS**

Section 30232 of the Coastal Act 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.*

The proposed project includes the operation of at least one ocean vessel. This use could potentially increase the chance of a vessel collision or failure that could result in the release of fuel oil into marine waters during project construction/installation and operational activities. In addition, installation and operational activities also require the use of equipment such as hydraulically powered winches that could leak or fail and discharge oils and hydraulic fluids into marine waters.

The first test of Coastal Act Section 30232 requires an applicant to “protect against the spillage of crude oil, gas, petroleum products, or hazardous substances...” In this case, ORI has incorporated into its project a number of measures that reduce the risk of an oil spill. To avoid the potential for a vessel collision, ORI has sited the proposed facility outside of known vessel transit routes to and from the port of Santa Barbara and has established a vessel route for its operational vessels between the facility and its home port that avoids other known vessel transit lanes and routes. In addition, [Special Condition 7](#) provides that ORI submit, for Executive Director review and approval, a

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<sup>10</sup> The value of the Letter of Credit referenced in Special Condition 10 was determined based on input from experts in marine salvage and the estimated removal cost of the proposed aquaculture facility.

Spill Prevention and Response Plan that includes measures to minimize the likelihood of a hazardous material spill. Such measures may include the use of vegetable based hydraulic fluid in project equipment in place of more hazardous fluids; the use a dedicated support person during facility installation/construction activities to help direct non-project vessels away from areas of active construction; training of construction crew and ORI employees on the Spill Prevention and Response Plan and a prohibition on at-sea vessel or equipment fueling/refueling activities.

With the implementation of [Special Condition 7](#), the Commission finds that ORI would be undertaking appropriate measures to prevent a spill from occurring and therefore the project is consistent with the first test of Coastal Act Section 30232.

Notwithstanding implementation of the above-described prevention measures, accidental spills can and do occur. The second test of Section 30232 requires that effective containment and cleanup facilities and procedures be provided for accidental spills that do occur. To meet this test the Commission typically requires an applicant to submit an oil spill contingency plan that demonstrates that the applicant has sufficient oil spill response equipment and trained personnel to contain and recover a reasonable worst case oil spill, and to restore the coastal and marine resources at risk from a potential oil spill.

Because neither of these requirements have been met, [Special Condition 7](#) would also require that ORI submit, for Executive Director review and approval, a Spill Prevention and Response Plan that includes identification of potential spill sources and quantity estimates of a project specific reasonable worst case spill; identification of prevention and response equipment and measures/procedures that will be taken to prevent potential spills and to protect marine and shoreline resources in the event of a spill; the provision of spill prevention and response equipment onboard project vessels at all times; and emergency response and notification procedures, including a list of contacts to call in the event of a spill.

With implementation of [Special Condition 7](#), the Commission finds that ORI would be undertaking appropriate measures to effectively contain and respond to accidental spills that may occur and therefore the project is consistent with the second test of Coastal Act Section 30232.

## Appendix A Substantive File Documents

Consistency Certification and supplementary letters, reports, and materials submitted by ORI, included in file no. CC-0003-21.

Letter of Commitment from ORI to Coastal Commission regarding financial surety, dated August 22, 2021.

ESA Section 7(a)(2) Concurrence Letter and MSFCMA EFH response for the Ocean Rainforest Seaweed Cultivation Demonstration Project, received September 21, 2021, from the National Marine Fisheries Service to the U.S. Army Corps of Engineers.

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