

CALIFORNIA COASTAL COMMISSION

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Staff: C. Teufel-SF
Date: April 21, 2017

ADMINISTRATIVE PERMIT

Application No.: 9-16-1153

Applicant: Marine BioEnergy

Location: Up to five sites between 0.6 miles and two miles offshore of Catalina Island, northwest of Catalina Harbor.

Project Description: Installation and operation for three years of up to five offshore experimental kelp cultivation systems.

I. EXECUTIVE DIRECTOR'S DETERMINATION

The findings for this determination and any special conditions appear on subsequent pages.

Note: Public Resources Code Section 30624 provides that this permit shall not become effective until it is reported to the Commission at its next meeting. If one-third or more of the appointed membership of the Commission so request, the application will be removed from the administrative calendar and set for public hearing at a subsequent Commission meeting. Our office will notify you if such removal occurs.

This permit will be reported to the Coastal Commission at the following time and place:

Wednesday, May 10, 2017 – 8:30 a.m.

San Diego County

Board of Supervisors Chambers

1600 Pacific Highway

San Diego, CA 92101

IMPORTANT: Before you may proceed with development, the following must occur:

Pursuant to Title 14, California Administrative Code Sections 13150(b) and 13158, **you must sign the enclosed duplicate copy acknowledging the permit's receipt and accepting its contents, including all conditions, and return it to our office.** Following the Commission's meeting, and once we have received the signed acknowledgement and evidence of compliance with all special conditions, we will send you a Notice of Administrative Permit Effectiveness.

BEFORE YOU CAN OBTAIN ANY LOCAL PERMITS AND PROCEED WITH DEVELOPMENT, YOU MUST HAVE RECEIVED BOTH YOUR ADMINISTRATIVE PERMIT AND THE NOTICE OF PERMIT EFFECTIVENESS FROM THIS OFFICE.

The Executive Director hereby determines that the proposed development is a category of development which, pursuant to PRC Section 30624, qualifies for approval by the Executive Director through the issuance of an administrative permit. Subject to Standard and Special Conditions as attached, said development is in conformity with the policies of Chapter 3 of the California Coastal Act, including those policies regarding public access and coastal recreation opportunities, and will not have any significant adverse impacts on the environment within the meaning of the California Environmental Quality Act. If located between the nearest public road and the sea, this development is in conformity with the public access and public recreation policies of Chapter 3.

John Ainsworth
Executive Director

By: MARK DELAPLAINE
Manager

II. STANDARD CONDITIONS

This permit is granted subject to the following standard conditions:

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

5. **Terms and Conditions Run with the Land.** These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

III. SPECIAL CONDITIONS

This permit is granted subject to the following special conditions:

1. **Permit Term.** This permit shall expire upon expiration of the permittee's State Lands General Lease on April 20, 2020.
2. **Marine Wildlife Entanglement.** No less than once per month, the permittee shall visually inspect all ropes, cables, and cultivation equipment 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. Inspections shall include SCUBA or video monitoring of each line and all cultivation equipment as well as an assessment of the stability of each anchor (which may be carried out by using GPS to determine if the buoys and cultivation structures remain within the expected swing radius of the initially installed anchor positions). Any wear or fatigue of materials shall be remedied immediately. All incidents of observed marine mammal entanglement shall be immediately reported to the National Marine Fisheries Service's Regional Stranding Coordinator. All incidents of observed marine wildlife entanglement (including sharks, sea turtles, seabirds or marine mammals) shall be immediately reported to Commission staff. 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 discovery of their occurrence. Survey videos or checklists from SCUBA inspections shall be submitted along with the anchor stability assessments to Commission staff on a quarterly basis.
3. **Lighting and Operations at Night.** Other than the automated raising and lowering of the kelp cultivation apparatus, all operations at each mooring shall be completed during daylight hours. No operations at night and no artificial lighting of the kelp cultivation facilities shall occur, except for that associated with the use of navigational safety lighting or buoys required by the U.S. Coast Guard.
4. **Construction Monitor.** A qualified marine wildlife observer approved by the Executive Director shall be onboard the project construction vessel during the installation and removal of the moorings, buoys and kelp cultivation systems. 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 and installation or removal activities have the potential to result in injury or entanglement of marine wildlife. Within 60 days of completion of installation activities, the marine wildlife observer shall submit to the Executive Director a report documenting the number, type, and behavior of marine wildlife observed during project installation.
5. **Notice to Mariners.** No less than 15-days prior to the start of in-water activities associated with the installation phase of the project, the permittee shall submit to (a) the

Executive Director; (b) the U.S. Coast Guard (for publication in a Notice to Mariners); and (c) the harbormasters and/or marina managers on Catalina Island and from Marina del Rey to Newport (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. During installation, the permittee shall also make radio broadcast announcements on the local fishers' emergency radio frequency that provide the current installation location and a phone number that can be called for additional information.

6. **Spill Prevention and Control Plan.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE PERMITTEE shall submit for Executive Director review and approval, a project specific Spill Prevention and Response Plan (SPRP) for work barges and vessels that will be used during project construction and operations. The permittee and its contractors shall be familiar with, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project operations. The 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 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 will 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 vessels and equipment used during installation, maintenance, and removal activities shall be in good working condition, have no visible leaks, up-to-date maintenance, and shall be used within safe and normal operating specifications; and (d) emergency response and notification procedures, including a list of contacts to call in the event of a spill.
7. **Update NOAA Charts.** WITHIN 60 DAYS OF FACILITY INSTALLATION, THE PERMITTEE 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 installation sites obtained using a GPS unit or comparable navigational equipment; (b) as-built renderings of the kelp cultivation systems and associated buoys and anchors showing the actual deployment locations; (c) the permittee'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 kelp cultivation systems on navigational charts.
8. **Letter of Credit.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE PERMITTEE shall provide a letter of credit or other surety device acceptable to the Executive Director for \$30,000, and naming the Coastal Commission as the beneficiary/assured, to guarantee the faithful observance and performance by the permittee of **Special Condition 9**. The letter of credit or other surety device shall be maintained in full force and effect at all times until **Special Condition 9** has been met. Failure of the permittee to meet the requirements of **Special Condition 9** shall cause the Coastal Commission to use the funds to effectuate the successful removal of the kelp cultivation facility.
9. **Facility Removal.** PRIOR TO PERMIT EXPIRATION, THE PERMITTEE shall completely remove the cultivation facility, including all lines, ropes, buoys, anchors,

moorings, and associated equipment and infrastructure. No less than 90 days after the expiration of this permit, the permittee shall submit a report to the Executive Director verifying the completion of removal activities.

10. **Marine Debris Reduction and Management.** The permittee shall carry out operations consistent with the following marine debris reduction and management practices:
 - A. **Storm Damage and Debris.** As soon as safely possible following storm or severe wind or weather events, the permittee shall inspect all cultivation facilities for missing or damaged equipment. If the facility or its equipment is lost or missing, the permittee shall carry out a reasonable search of the surrounding waters and coastline to locate and recover it. Any equipment that cannot be repaired and placed back into service shall be properly recycled or disposed of at an appropriate onshore facility.
 - B. **Gear Marking.** The permittee shall mark cultivation equipment and associated buoys, lines, and in-water equipment in an easily identifiable manner with its company name and phone number. Markings shall be securely attached and robust enough to remain attached and legible after an extended period in the marine environment (e.g. made with heat transfer, hot stamp, etching, etc.). In the event that kelp cultivation equipment or associated gear gets loose or becomes dislodged, it shall be the permittee's responsibility to retrieve the material from the water, shoreline, or submerged bottom with minimal damage to the resources affected. Such material shall be removed and properly disposed of, recycled, or returned to use.

IV. FINDINGS FOR EXECUTIVE DIRECTOR'S DETERMINATION

A. PROJECT DESCRIPTION & BACKGROUND

In partnership with the University of Southern California's Wrigley Institute for Environmental Studies, Marine BioEnergy, Inc. proposes to carry out an up-to three year test of its experimental system for cultivating kelp in the open ocean. Through this project, Marine BioEnergy seeks to demonstrate that kelp farming in deep ocean waters far from shore could be commercially viable using its cultivation technique. Marine BioEnergy and the project's fiscal sponsor, the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) Division, is interested in kelp as a potential source of material to produce bio-diesel or biofuel. As a feedstock for biofuel, kelp has the potential to provide an alternative to other biofuel feed stocks and fossil fuels that does not compete with food production on land, and does not require fresh water, pesticides, or artificial fertilizers.

The project would involve the use of up to four offshore test sites near the west end of Catalina Island and within several miles of Catalina Harbor ([Exhibit 1](#)). The experimental cultivation systems would be installed in two phases. Phase One would include installation of two separate systems (an active system and static control) at a shallow water site (referred to as "Shallow Site" or "SS" on [Exhibit 1](#)) approximately 0.6 mile offshore from Howland's Landing in Catalina. Phase Two would include installation of either one system at a deep water site located approximately one mile offshore of Howland's Landing (referred to as "Deep Site A" or "DS-A" on [Exhibit 1](#)), or two systems (an active system and static control)

at different deep water sites (referred to as “Deep Site B” or “DS-B” on [Exhibit 1](#)) approximately two miles offshore of Parson’s Landing. The decision to place cultivation systems at either Deep Site A or Deep Site B would depend on the results of water quality testing carried out at these sites during Phase One. The Shallow Site and Deep Site A would be in roughly 260-feet of water and Deep Site B would be in roughly 900-feet of water.

At each site, a mooring would be installed to hold the cultivation equipment in place for the duration of the test period. Each mooring would be comprised of an approximately 700-pound cast-iron anchor connected with a weighted anchor chain and taut, nylon or high-density plastic wrapped steel line to a seven-foot diameter, seven-foot high surface buoy. For the active experimental systems, the surface buoy would be equipped with an automated winch system that would be used to raise and lower a kelp cultivation apparatus along the line connecting the buoy to the anchor. During the day, the apparatus would be maintained in the well-lit surface waters at a depth of approximately 16-feet and at night it would be lowered to a depth of approximately 130-feet where nutrient concentrations are presumed to be higher. For the control systems, the cultivation apparatus would be held in a static position near the surface and would not be raised and lowered in the water column.

Each cultivation apparatus would be comprised of a series of fiberglass rods fitted together into a rigid tetrahedron frame ([Exhibit 2](#)). Within this frame, an approximately 50-foot long horizontal fiberglass rod would be “seeded” with small kelp plants harvested from nearby kelp beds. The kelp harvesting would be carried out under the authorization of a Scientific Collecting Permit issued by the California Department of Fish and Wildlife. Approximately 30 individual kelp plants would be harvested and attached to the cultivation structure where they would be monitored and evaluated for a roughly 30 day cycle. At the end of the evaluation cycle, the kelp would be harvested and taken to a nearby onshore lab for evaluation. New kelp would then be planted on the cultivation structure. Kelp species proposed to be cultivated include giant kelp (*Macrocystis pyrifera*), feather boa kelp (*Egregia menziesii*), elk kelp (*Pelagophycus porra*), and *Laminaria farlowii*. This process of planting, cultivation, and harvest would continue at up to five separate sites – each with one anchor and buoy supported cultivation structure – for up to three years. At the conclusion of the three year period, the surface buoys, anchors, anchor chains, cultivation structures and associated lines would be collected and removed from the seafloor and ocean.

B. OTHER AGENCY APPROVALS

California State Lands Commission

On April 20, 2017, the California State Lands Commission determined that the proposed project was categorically exempt under the California Environmental Quality Act and issued a lease of state submerged lands to Marine BioEnergy. This lease is valid from April 20, 2017 until April 20, 2020.

U.S. Army Corps of Engineers

Marine BioEnergy has submitted an application to the U.S. Army Corps of Engineers for authorization under Section 10 of the Rivers and Harbors Act. A decision on this application is pending.

California Department of Fish and Wildlife (CDFW)

Marine BioEnergy obtained from CDFW a Scientific Collecting Permit. This permit authorizes, by hand and hand tools, the collection of marine aquatic plants for research purposes and limits the collection amount to less than 10 pounds total wet weight.

U.S. Department of Energy

Marine BioEnergy was awarded funding for the proposed project through the Advanced Research Projects Agency-Energy (ARPA-E) division of the U.S. Department of Energy. As described in its publications, ARPA-E advances high-potential energy technologies that are too early for private-sector investment. ARPA-E awardees are unique because they are developing entirely new ways to generate, store, and use energy.

C. 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 mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

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

The proposed installation of up to four 700-pound anchoring devices on the seafloor constitutes the placement of fill in open coastal waters. Coastal Act Section 30233(a) restricts the Coastal 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 mitigation 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 aquaculture – installation and use of kelp cultivation equipment - 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 open ocean kelp cultivation equipment – without the placement of at least some fill material in coastal waters to maintain the equipment in place.

Marine BioEnergy evaluated several alternative anchoring systems that would require differing amounts of fill. These anchoring systems included weighted mooring blocks (including the proposed 700-pound “Dor-Mor” anchors) and other types of traditional anchors as well as self-burying “torpedo” anchors. Torpedo anchors are narrow, weighted cylinders which are released near the surface and allowed to sink to the seafloor, gaining sufficient speed to penetrate the seabed and become embedded. If sufficiently embedded, the anchors can provide significant holding strength.

Of the anchoring systems that were considered, the torpedo anchoring system would have the smallest footprint and would have resulted in the least amount of fill material on the seafloor. In fact, this anchoring system would have a footprint on the seafloor that would be several times smaller than the other types of anchor considered by Marine BioEnergy, in part because torpedo anchors do not make use of the weighted anchor chain and connecting tackle that traditional systems require. However, the torpedo-style anchors considered by Marine BioEnergy are largely untested – at least with the size and scale that would be most appropriate for the kelp cultivation moorings. Additionally, in order to function properly, these types of anchors need to be deeply embedded in the seafloor and are therefore only effective when soft muddy or silty substrates extend from the surface of the seafloor to depths of at least several dozen feet. While the seafloor mapping results provided by Marine BioEnergy with its application indicate that all five of the proposed anchoring sites have soft substrate, the density and depth of this material is not known. The effectiveness and appropriateness of using torpedo-style anchors at these sites is therefore uncertain. Finally, if a torpedo anchor becomes deeply embedded, it can be very difficult to remove and may need to be abandoned in place once it is no longer in use.

Given the untested status of the torpedo anchor systems considered by Marine BioEnergy, the potential need for them to be abandoned in place, and their uncertain effectiveness, their use would raise a variety of questions with regard to adverse environmental impacts. For

example, if the anchoring system were to fail, the mooring, buoy, and cultivation equipment could break free and drift, potentially putting at risk marine wildlife, habitat, fisheries, and boating activities. This anchoring system would therefore not be a feasible less damaging alternative to the use of a more traditional anchoring system that would operate with more certainty. Among traditional anchoring systems, several alternatives were considered, including Danforth anchors that dig into the seafloor and large weighted concrete moorings that have a substantial footprint due to the relatively low density of concrete (compared to other materials such as solid iron). The proposed “Dor-Mor” anchoring system – a version of traditional weighted moorings that makes use of a 700-pound solid cast-iron pyramid-shaped weight with a footprint of roughly three square feet – was selected as the preferred option because it uses a high density material with a small footprint and would rest on the seafloor rather than becoming embedded. This means that seafloor disturbance during installation and removal would be minimized compared to other systems such as Danforth anchors. The proposed Dor-Mor anchors would therefore be the least environmentally damaging feasible alternative.

The Commission finds that the second test of Coastal Act Section 30233(a) has been met.

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 other sections of this report, the Commission has identified feasible mitigation measures that will minimize the adverse environmental effects associated with the placement of fill. For example, the section on marine biological resources below includes a discussion of potential adverse impacts associated with anchor installation and removal activities such as entanglement or injury to marine wildlife or the release of hazardous materials from installation and removal vessels and equipment. Also included in that discussion is a description of measures to minimize those risks, including the provision in **Special Condition 4** that qualified marine wildlife observers are present during installation and removal activities and authorized to enforce a safety zone around the project area, as well as the provision in **Special Condition 6** that requires Marine BioEnergy develop and submit for review and approval a Spill Prevention and Response Plan that ensures that adequate spill prevention measures are taken and response capability is provided during activities that may result in a spill. With implementation of **Special Conditions 1-10**, 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).

D. MARINE BIOLOGICAL 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.

Installation and maintenance of the proposed kelp cultivation systems and associated anchoring and mooring systems has the potential to result in adverse impacts to marine resources through the disturbance of marine wildlife and habitats, the entanglement of marine wildlife, and the release of contaminated material or debris into the marine environment.

Habitat Disturbance

Each of the four proposed anchoring structures would have a footprint of approximately three-square feet. In addition, the lower anchoring chains and cables associated with these anchors are designed to periodically rest on and drag across the seafloor surrounding each anchor. The total area of seafloor that would be occupied and disturbed by each anchoring system (anchor and chain) would be determined in part by the installation depth and surrounding ocean conditions (areas with more variable current speeds and directions would likely have a greater amount of anchor chain contact with the seafloor over a wider area). The approximate maximum footprint of all four anchors and associated chains combined would be over 500-square feet (12-square feet for the four anchors and up to 500-square feet for the four anchor chains). Seafloor habitat within this area would be disturbed and degraded as a result of burial and scour caused by the anchors and anchor chains, and slow-moving or immobile invertebrates that occupy it may be crushed or injured.

Based on the results of site specific seafloor surveys carried out in 2017 by Marine BioEnergy and existing seafloor habitat data collected in recent years by the U.S. Geological Survey and as part of the Marine Life Protection Act Initiative process, the proposed kelp cultivation facilities would be installed on soft-bottom habitat. Specifically, the proposed project sites are within the underwater shelf and slope surrounding the west end of Catalina Island in depths of between 260- and 900-feet of water. While areas of high-relief rocky reef are also present in this area, the nearest known areas of this sensitive hard substrate habitat would be approximately 1,300-feet away from the nearest proposed installation site.

While some adverse impacts to invertebrate species such as the sea pens, sand stars, and urchins at and around the anchoring sites would occur if these organisms are present within an anchoring footprint at the time of anchor installation, 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 larger project area. In addition, many

soft substrate organisms are mobile and would re-colonize and recover quickly after the initial installation of the proposed anchoring units. In their post-installation survey and review of a submarine cable, Kogan et al. (2006) found little variation in the abundance or diversity of soft substrate organisms between cable sites disturbed during installation activities and non-disturbed reference sites. Such research suggests that the proposed placement and presence of the anchoring units and associated chain and tackle on up to 500 square feet of seafloor would not result in substantial adverse impacts to soft bottom habitats or organisms. Furthermore, these types of habitats and the organisms that inhabit them are often adapted to periodic natural disturbance and would therefore be expected to recover quickly once the anchors and anchor chains are removed at the completion of the three year project period. In order to ensure that this removal occurs in a complete and timely manner and no permanent loss of seafloor habitat occurs as a result of the proposed project, the Commission requires in **Special Conditions 8 and 9** that Marine BioEnergy remove all project anchors, chains, and equipment prior to permit expiration and that adequate funding be reserved for this purpose through a letter of credit. The letter of credit would be established for \$30,000, a conservative estimate of the amount that a marine salvage operator would charge to carry out the removal of all five cultivation facilities and anchoring systems.

Marine Debris

Man-made material released into the marine environment, especially ropes, lines and plastics, pose a significant threat to both marine wildlife and habitats. This debris may cause injury and death to marine life by entanglement or ingestion and can negatively affect habitats through spatial displacement and mechanical disturbance. Because the kelp cultivation structures and associated equipment proposed to be used by Marine BioEnergy are comprised of plastics, lines, and cables, their presence and use in the ocean brings with them a risk that material may become loose, disperse, and end up as marine debris. To address this risk and ensure that gear loss is prevented and responded to and complete clean-up and removal of this material is accomplished, the Commission is requiring in **Special Conditions 2 and 10** that maintenance surveys of all of the cultivation facilities are carried out no less than once per month and as soon as safely possible following storm or severe weather events. These conditions also require cultivation equipment and buoys to be marked with the name and contact phone number of the permittee to help ensure that any escaped material is recovered and properly disposed of by Marine BioEnergy. The Commission is further requiring in **Special Conditions 8 and 9** that the facility and all associated anchors, lines and cables are completely removed prior to expiration of the coastal development permit at the end of the three year project term and that adequate funding is available for this work to be carried out.

Marine Wildlife

The proposed locations of the kelp cultivation facilities in the open coastal waters offshore of Catalina Island are within areas 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 likely to be present at the project sites include the California gray whale, blue whale, humpback whale, fin whale, minke whale, California sea lion, harbor seal, Dall's porpoise, Risso's dolphin, Pacific white-sided dolphin, common dolphin, northern right whale dolphin, bottlenose dolphin, harbor seal, and California sea lion. Two species of sea turtle, the green sea turtle and leatherback sea turtle, also have the potential to be found within the project

sites, along with 195 species of birds 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 facilities, collision with project vessels, and disturbance from operational activities.

Entanglement

Entanglement with ropes, fishing gear and other lines in the ocean is increasingly 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. The majority of entangling 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 entanglements and ship strikes of any large whale species along the west coast of the U.S. (DeAngelis et al. 2012). As a recent example, during the course of several weeks in the early spring of 2017, three gray whales were observed to be entangled in lines, nets, and other gear in the coastal waters of southern California. This follows a 2016 total of 66 separate cases of whales entangled in fishing nets or lines that were reported off the coast of California. Reporting indicates that this is the highest annual total since the National Marine Fisheries Service started keeping records of whale entanglement in 1982.

Studies and evaluations of aquaculture facilities worldwide suggest that nearshore and open ocean facilities – especially those containing large numbers of ropes and lines – can present a risk to marine wildlife due to entanglement. For example, based on recorded marine mammal entanglement in aquaculture gear, the *Stellwagen Bank National Marine Sanctuary Marine Mammal Entanglement Working Group Action Plan*, approved in October of 2004, calls for a complete prohibition on aquaculture activities within the Sanctuary. In addition, NOAA Technical Memorandum NMFS-OPR-16 (produced from the Marine Aquaculture, Marine Mammals, and Marine Turtles Interactions Workshop held by NOAA in January of 1999) notes that entanglement is a key concern with marine aquaculture facilities. These reports, along with many others from countries such as New Zealand and Australia that have a more established marine aquaculture industry indicate that the greatest risk to marine wildlife is from 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.

Because the proposed kelp cultivation facilities would use a unique design that relies on a rigid-framed growing apparatus and would only use a limited number of taut cables and lines (as part of the floatation and anchoring system and to extend and retract the growing apparatus), they lack most of the primary risk factors for entanglement that have been identified on other types of facilities. Additionally, the four proposed installation sites near

the west end of Catalina Island are outside of the primary migratory routes for gray whales and the areas known to support high densities of humpback, blue, and fin whales in the Southern California Bight. Further, the proposed facilities would be in place for a limited amount of time – the proposed duration of the experimental investigation is three years and **Special Condition 1** limits the permit term to this amount of time – and would be frequently monitored using remote-sensing equipment and visits from Marine BioEnergy’s project partners located at the nearby Wrigley Institute for Environmental Studies. To further ensure that entanglement risks are minimized, **Special Condition 2** requires monthly maintenance inspections of the facilities so that any gear, lines, or ropes that become loose can be addressed in a timely manner and so that any evidence of wildlife entanglement is recorded and submitted to the National Marine Fisheries Service’s Regional Stranding Coordinator. Finally, **Special Condition 4** provides that Marine BioEnergy include a qualified marine wildlife observer on the project installation and removal vessels and that this observer be authorized to halt operations if marine wildlife is observed or anticipated to be near a work area and activities have the potential to result in injury or entanglement.

Indirect Entanglement

The presence of the kelp cultivation facilities may also cause indirect entanglement to occur if derelict fishing gear, ropes, lines, or other marine debris accumulates on the facilities’ 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, continuing to capture marine life and “fish” for years afterwards. To address this additional potential source of entanglement, the Commission requires in **Special Condition 2** that Marine BioEnergy perform visual inspections of the facility at least once 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 7** requires that Marine BioEnergy work with NOAA’s Office of Coast Survey to update navigational charts to reflect the final as-built location and configuration of the cultivation facilities. By ensuring that navigational charts are accurately updated with the project location, accidental interactions between fishermen and the facility will be less likely and the facility will be less likely to snag fishing gear, resulting in its damage and abandonment.

Disturbance from Operational Activities

Depending on the methods used to carry them out, several aspects of Marine BioEnergy’s planting, maintenance, and harvest operations would 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, the Commission requires in **Special Condition 3** that Marine

BioEnergy restrict operations to daylight hours and refrain from night operations and the use of artificial lighting (other than navigational safety lighting that may be required by the U.S. Coast Guard).

Ship Strikes

Another potential impact to marine wildlife is collision with project vessels during construction and marine operations associated with the proposed project.

Portions of the Southern California Bight are known to support high density aggregations of large marine mammals during portions of the year and vessel passage in and around these areas have resulted in collisions and marine mammal injuries and mortality. These events have most notably involved large oceangoing ships such as several hundred foot long container ships or other similar maritime vessels. While smaller vessels similar in size to the proposed project vessels are also known to have struck and killed or injured marine mammals (International Whaling Commission 2013), these types of incidents have occurred less frequently in the Southern California Bight.

Marine BioEnergy proposes to use one or more of the small research vessels owned and operated by the Wrigley Institute for Environmental Studies to carry out weekly planting, harvest, research, and maintenance operations. These vessels are berthed at the Wrigley Institute for Environmental Studies facility in Catalina Harbor, and Marine BioEnergy estimates that each vessel would travel from there to the project site at least once per week on average. Round-trip travel distance from vessel berth to all four facility sites could be approximately 20 miles or less, which means that monthly vessel trips could require as much as 100 miles of ocean travel. Although no incidents have been reported involving Wrigley Institute for Environmental Studies vessels in the past, this proposed level of additional use would raise the potential risk. However, all Wrigley Institute vessels used for the proposed project would be operated by personnel trained to observe the following marine mammal protection protocols: (a) maximum vessel speed of nine knots; (b) maintenance of a 150 yard separation distance and a prohibition on approaching marine mammals; (c) use of a designated observer to help spot marine mammals that may be in the vessel route; (d) reduction in vessel speed to five knots and change in course away from any marine mammal observed within a one-mile distance of the vessel; and (e) full stop if a marine mammal is sighted within 0.5 mile until a greater separation distance is observed.

Implementation of these protocols would minimize the potential occurrence of ship strikes during project operations and construction. This risk would be further minimized by the provision in **Special Condition 4** that requires a qualified marine wildlife observer be present during installation and removal operations and that this observer may halt operations if marine wildlife is potentially at risk.

Therefore, the Executive Director finds that the project, as conditioned, will be carried out in a manner in which marine resources are maintained, species of special biological significance are given special protection, the biological productivity of coastal waters is sustained, and healthy populations of all species of marine organisms will be maintained. In addition, the Executive Director finds the project, as conditioned, will maintain the biological productivity

of coastal waters and estuarine habitats appropriate to maintain optimum populations of marine organisms. The Executive Director therefore concludes that the proposed project, as conditioned, is consistent with Sections 30230 and 30231 of the Coastal Act.

H. COMMERCIAL AND RECREATIONAL FISHING

In addition to the commercial fishing protection afforded under Section 30230 of the Coastal Act (quoted above on page 9), Section 30234 and 30234.5 of the Coastal Act also address commercial and recreational fishing resources.

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:

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

While some limited commercial and recreational fishing could be carried out at and around the proposed project sites - namely, fishing which makes use of gear capable of remaining near the surface or that would be unlikely to contact or entangle with the cultivation apparatus or its associated lines and ropes - some fishermen using set gear or nets would likely avoid fishing near the project sites to avoid possible gear entanglement and loss. However, during the design of its project, Marine BioEnergy reached out to the primary commercial and recreational fishing groups that operate in the project area and worked with these groups to site its proposed facilities in locations with limited existing fishing activity. Specifically, Marine BioEnergy incorporated feedback from members of the spot prawn fishery and has selected proposed sites that are outside of the target depth range of this fishery. Marine BioEnergy also intentionally selected an installation site that is outside of but near the border of the Blue Cavern State Marine Protected Area, an area in which fishing activity is expected to be limited due to the risk of accidentally drifting into or entering the fishing restricted MPA. Placement of the cultivation systems in the proposed areas would therefore not significantly displace or conflict with fisheries activities.

The Executive Director therefore concludes that the proposed project, as conditioned, is consistent with Sections 30234 and 30234.5 of the Coastal Act.

E. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Section 13096 of the Commission's administrative regulations requires Commission approval of Coastal Development Permit applications to be supported by a finding showing the application, as modified by any conditions of approval, to be consistent with any applicable

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requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment.

The Executive Director incorporates his findings on conformity with the Chapter 3 policies of the Coastal Act at this point as if set forth in full. As discussed above, the development has been conditioned to be found consistent with the policies of the Coastal Act. Mitigation measures, which will minimize all adverse environmental impacts, so that no significant adverse environmental effects are anticipated to be caused by this project, have been required as permit special conditions. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity may have on the environment. Therefore, the Executive Director finds that the development as conditioned to mitigate the identified impacts can be found to be consistent with the requirements of the Coastal Act to conform to CEQA.

EXHIBITS

1. [Project Location](#)
2. [Cultivation System Design](#)

APPENDICES

A. Substantive File Documents

ACKNOWLEDGEMENT OF PERMIT RECEIPT/ACCEPTANCE OF CONTENTS:

I/We acknowledge that I/we have received a copy of this permit and have accepted its contents including all conditions.

Permittee's Signature

Date of Signing

Appendix A: Substantive File Documents

Coastal Development Permits and Application Materials:

Staff Report for Consistency Certification No. CC-035-12

Application and Application File for Coastal Development Permit No. 9-16-1153

Published Articles and Reports:

Kemper CM, Gibbs SE 2001. Dolphin interactions with tuna feedlots at Port Lincoln, South Australia and recommendations for minimizing entanglements. *Journal of Cetacean Research and Management* 3: 283-292.

Kemper CM, Pemberton D, Cawthorn M, Heinrich S, Mann J, Wursig B, Shaughnessy P, Gales R 2003. Aquaculture and marine mammals: co-existence or conflict? In: Gales N, Hindell M, Kirkwood R eds. *Marine Mammals: Fisheries, Tourism and Management Issues*, CSIRO Publishing. Pp 208-224.

Reid, A. J., P. Drinker, and S. Northridge. 2006. Bycatch of marine mammals in U.S. and global fisheries. *Conservation Biology*. 20:163-169

DeAngelis, M., L. Saez, J. MacNeil, B. Mate, T. Moore, D. Weller, W. Perryman. 2011. Spatio-temporal Modeling of the Eastern Pacific Gray Whale's (*Eschrichtius robustus*) Migration Through California, Oregon, and Washington. Poster presented to the national conference of the Society of Marine Mammalogy.

Lloyd, B.D. 2003. Potential effects of mussel farming on New Zealand's marine mammals and seabirds. A discussion paper. Department of Conservation, Wellington, New Zealand.

Langan, R. 1998. Biological Assessment of the Shellfish Component of the UNH Open Ocean Aquaculture Demonstration Project. Prepared for the U.S. Army Corps of Engineers, November 24, 1998.

National Research Council, 2009. *Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California*. National Academies of Science, 139 pp.

International Whaling Commission 2013. Website: <http://iwc.int/ship-strikes>

Branch, G.M. and Steffani, C.N. 2004. Can we predict the effects of alien species? A case-history of the invasion of South Africa by *Mytilus galloprovincialis* (Lamarck). *Journal of Experimental Marine Biology and Ecology*. 300: 189-215.