CALIFORNIA COASTAL COMMISSION
45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105- 2219
VOICE AND TDD (415) 904- 5200
FAX (415) 904- 5400

F11a

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STAFF REPORT: REGULAR CALENDAR

Application No.:	**E-12-012-A1**
Applicant:	**Santa Barbara Mariculture Company**
Location:	Offshore of Arroyo Burro Beach Park, Santa Barbara.
Project Description:	Request to amend permit to expand shellfish aquaculture facility from 26-acres to 72-acres and request for after-the-fact approval for previous relocation and expansion of facility from one-acre to 26-acres within area of leased state tidelands approximately 3/4 mile offshore of Hope Ranch, Santa Barbara County.
Staff Recommendation:	Approval with conditions.

SUMMARY

Santa Barbara Mariculture (owned and operated by Bernard Freidman) submitted to the Coastal Commission a request for after-the-fact authorization for the 26-acre existing shellfish cultivation facility it currently operates within the coastal waters approximately ¾ mile offshore of Arroyo Burro Beach Park in Santa Barbara. Santa Barbara Mariculture (SBM) also proposes to expand this operation to cover a total of 72-acres. The existing and proposed facility would be used to plant, grow, and harvest Mediterranean mussels and Pacific oysters using of a system of 700-foot long submerged "longlines" maintained in the water column at a depth of approximately 30-feet through a network of surface buoys and seafloor anchors. SBM currently operates 12 such longlines and proposes to add another 28 for a total of 40 longlines within its

72-acre lease of state submerged lands. Onto these longlines would be affixed shellfish cultivation structures – large diameter ropes for mussel cultivation and hanging plastic mesh nets for oysters. Approximately one- to three-years after planting, these cultivation structures would be recovered by a surface vessel and the mature shellfish harvested for commercial sale. SBM anticipates a total annual harvest of 400,000-pounds of Mediterranean mussels and 250,000 oysters from the facility.

Although Santa Barbara Mariculture (SBM) has been operating on this lease since 2005, it has been doing so without benefit of a coastal development permit. Through this application, SBM is seeking after-the-fact authorization for its existing facility and proposing to approximately triple the size of its operations.

As a result of SBM's failures to obtain the necessary authorizations prior to carrying out development activities, violations of the Coastal Act exist on the subject property. These include, but are not limited to, installation and use of shellfish aquaculture longlines and associated anchoring and floatation systems. In response to notification by Commission permitting and enforcement staff about these Coastal Act violations – as well as its desire to carry out additional proposed development - SBM prepared and submitted this CDP application. Approval of this application pursuant to the staff recommendation, issuance of the permit, and the applicant's subsequent compliance with all terms and conditions of the permit will result in resolution of the above described violations.

The key Coastal Act issues raised by this project are to marine resources - including benthic habitats and marine wildlife. Potential adverse impacts associated with the project include: (a) accidental release of marine debris; (b) entanglement of marine wildlife in the project structures; (c) disturbance or alteration of seafloor habitats due to the deposition of biological or artificial material from the shellfish cultivation facility; (d) spread of non-native marine species; and (e) loss of commercial and recreational fishing grounds.

To address these potential impacts and minimize their likelihood and magnitude, **Special Conditions 1 through 14** would require (a) a limited permit term; (b) annual reporting of maintenance inspections and benthic monitoring results; (c) the implementation of a benthic monitoring program to assess and respond to accumulations of aquaculture materials and debris on the seafloor; (d) limitations on the type of non-native oysters grown at the facility; (e) the use of a marine wildlife observer during construction; (f) use of marine wildlife entanglement minimization measures; (g) limitations on night lighting; (h) notification to mariners when construction is scheduled and updates to navigational charts when installation is completed; (i) the development and implementation of marine debris management and hazardous material spill prevention and response plans; and (j) the use of marine wildlife safety protocols during vessel transit to and from the project site.

Commission staff therefore recommends that the Commission **APPROVE** coastal development permit application E-12-012-A1, as conditioned.

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APPENDICES

EXHIBITS

I. MOTION AND RESOLUTION

Motion:

I move that the Commission approve Coastal Development Permit Amendment No. E-12-012-A1 subject to conditions set forth in the staff recommendation specified below.

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

Resolution:

The Commission hereby approves Coastal Development Permit Amendment No. E-12-012-A1 for the proposed project and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit amendment complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

II. STANDARD CONDITIONS

1. **Notice of Receipt and Acknowledgment**. The permit is not valid and development shall not commence until a copy of the permit, signed by Santa Barbara Mariculture Company or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. **Expiration**. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. **Interpretation**. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. **Assignment**. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

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

III. SPECIAL CONDITIONS

1. **Permit Term.** This permit shall expire on May 21, 2033. If the term of Santa Barbara Mariculture's lease (State Water Bottom Lease No. M-653-02) – currently also set to expire on May 21, 2033 – is amended or a new lease is issued by the California Fish and Game Commission, Santa Barbara Mariculture (SBM) may submit an application for a permit amendment requesting an extension of the permit term. SBM shall, no less than 60 days prior to permit expiration or the cessation of its operations on Lease No. M-653-02, submit a complete application to amend this permit to remove all anchors, longlines, cultivation equipment and associated materials and return the lease area to a natural condition.

2. **Other Agency Review and Approval.** PRIOR TO COMMENCEMENT OF CONSTRUCTION AND/OR INSTALLATION ACTIVITIES FOR NEW LONGLINES, SBM shall submit to the Executive Director written evidence that all necessary permits, permissions, approvals, and/or authorizations for the approved project have been granted, including those from the California Department of Fish and Wildlife, Regional Water Quality Control Board and U.S. Army Corps of Engineers. Any changes to the approved project required by these agencies shall be reported to the Executive Director. No changes to the approved project shall occur without an amendment to this permit unless the Executive Director determines that no amendment is legally necessary.

3. **Annual Report.** By December 31 of each year, SBM shall submit to the Executive Director an annual report with the results of the seafloor, anchor, and longline surveys carried out as described in **Special Conditions 5** and **8**.

4. **Discharge of Materials.** SBM shall not intentionally dispose of or release any equipment or waste, including lines, buoys, cultivation trays, and other equipment, or living or dead shellfish, shells, or 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.

5. **Benthic Monitoring.** WITHIN 60 DAYS OF PERMIT ISSUANCE, SBM shall submit for review and written approval by the Executive Director a Benthic Monitoring Plan. No construction or installation activities for new longlines shall commence until the Executive Director has approved, in writing, a Benthic Monitoring Plan that includes, at a minimum, the following:

   Visual benthic surveys of the quantity, type and distribution of materials from the shellfish cultivation facilities (such as shellfish, shell material, fouling organisms, and aquaculture equipment) accumulating on the seafloor shall be conducted at multiple sites beneath the shellfish facility and shall be carried out annually for the first two years and every three years in subsequent years. Surveys shall be carried out by an independent, third party

approved in writing by the Executive Director and shall include randomly selected locations beneath the long-line array as well as two control sites to be selected based on their similarity to the project area in terms of sediment character and water depth, but at least 100-meters distant. The Benthic Monitoring Plan shall describe the proposed survey technique (i.e. survey locations, lengths and widths of transects, location selection methods, etc.), equipment, and protocols to be used for data collection, archiving, and reporting.

If during monitoring, the visible accumulation of a significant amount of oyster or mussel shell material, fouling organisms, cultivation equipment, or other project-related debris is observed, SBM shall apply for an amendment to this permit proposing to adapt its operations and/or redesign the project to avoid recurrence of these changes, and to mitigate any additional impacts to marine resources that may have occurred. Such project changes shall include consideration of additional monitoring measures to determine whether significant changes to sediment chemistry and benthic ecology are occurring, the removal of accumulated materials and restoration of benthic habitat, and/or modifications to the management or deployment of project facilities. For the purposes of this condition, a "significant amount of oyster shell material, fouling organisms, or other project-related debris" shall comprise any accumulation in excess of a handful of scattered occurrences, such as the formation of piles or layers of debris.

6. **Oyster Cultivation.** All oysters planted and cultivated by SBM shall be triploid Pacific oysters (*Crassostrea gigas/Magallana gigas*).

7. **Construction Monitor.** A qualified marine wildlife observer approved in writing by the Executive Director shall be onboard the project construction vessel or support vessel during installation of all longlines and associated anchoring 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 activities have the potential to result in injury or entanglement of marine wildlife.

8. **Marine Wildlife Entanglement.** No less than once per month, SBM shall visually inspect all longlines 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 longlines, anchor lines, and buoy lines remain taught 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. Any maintenance issues identified during monthly surveys, including broken, worn, or especially fatigued materials, shall be remedied immediately. All equipment and materials accidentally released or found to be missing from the facility during monthly inspections, including buoys, floats, lines, ropes, chains, cultivation trays, wires, fasteners, and clasps, shall be searched for, collected, properly disposed of onshore, and documented in the annual inspection report described above in **Special Condition 3**.

In addition, no less than once per year, SBM shall carry out a maintenance inspection of all anchors and attached lines. These inspections shall be carried out by remote video

equipment and/or SCUBA and recorded video shall be provided along with the annual report described above in **Special Condition 3**. Any maintenance issues identified during annual surveys, including broken, worn, or especially fatigued materials, shall be remedied immediately.

All incidents of observed marine mammal entanglement shall be immediately documented and reported to the National Marine Fisheries Service's Regional Stranding Coordinator following the protocol described in mitigation measures MM BIO-1 of **Exhibit 4**. In addition, all incidents of actual or potential entanglement (including dislodged, broken, or missing ropes, equipment, or gear) shall be described (including the type of incident and date) and submitted to Commission staff as part of the annual report described above in **Special Condition 3**.

9. **Lighting and Operations at Night.** All operations shall be completed during daylight hours. No operations at night and no artificial lighting of the shellfish cultivation facility shall occur, except for that associated with the use of navigational safety buoys if required by the U.S. Coast Guard.

10. **Notice to Mariners.** No less than 15-days prior to the start of in-water activities associated with the installation phase of the project, SBM 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 from Santa Barbara to Oxnard (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, SBM 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.

11. **Update NOAA Charts**. WITHIN 60 DAYS OF INSTALLATION OF NEW LONGLINES, SBM shall submit evidence to the Executive Director that it has provided to the NOAA Office of Coast Survey: (a) the geographic coordinates of the expanded facility boundaries obtained using a differential geographic positioning unit or comparable navigational equipment; (b) as-built plans of the expanded shellfish facility and associated buoys and anchors; (c) SBM'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 shellfish farm on navigational charts.

12. **Spill Prevention and Control Plan.** WITHIN 60 DAYS OF PERMIT ISSUANCE, SBM shall submit for Executive Director review and written approval, a project specific Spill Prevention and Response Plan (SPRP) for work vessels that will be used during project construction and operational activities. SBM and its contractors shall be trained in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project installation and 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 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 boat 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.

13. **Marine Debris.** WITHIN 60 DAYS OF PERMIT ISSUANCE, SBM shall submit for Executive Director review and approval a Marine Debris Management Plan that includes (a) a plan for permanently marking all floating equipment (buoys, floats, etc.) 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 shellfish cultivation facility materials, equipment, and/or infrastructure occurs. No construction or longline installation activities shall commence until the Executive Director has approved, in writing, the Marine Debris Management Plan.

14. **Vessel Transit**. During transit to and from the project site, vessel operators shall remain watchful for the presence of marine mammals or sea turtles. In addition, SBM shall train all project vessel operators in and follow the following safety protocols: (1) if a vessel is travelling parallel to a whale, the vessel shall operate at a constant speed that is not faster than the whale; (2) vessel operators shall make every effort to ensure that female whales are not separated from their calves; (3) vessel operators shall not try to influence a whale's swim pattern; (4) if a whale engages in defensive action (rapid changes in direction, breaches or increased surface activity, movement towards the vessel), the vessel shall drop back until the animal moves out of the area; (5) vessel speeds shall be limited to 10 knots or less to minimize the likelihood and consequences of collisions with marine wildlife; (6) in the event that any project activities result in a collision or any take, as defined in the federal Endangered Species Act, of a marine mammal, SBM shall immediately notify the Executive Director, NMFS, CDFW and any other required regulatory agency.

IV. FINDINGS AND DECLARATIONS

A. BACKGROUND AND PROJECT DESCRIPTION

In July 1982, the Commission approved a CDP to Pacific Seafood Industries (CDP No. 4-82-391) for a one-acre oyster aquaculture operation on a lease of state water bottom (No. M-653-01) located slightly offshore of Santa Barbara Point. The Commission subsequently approved the relocation of this one-acre oyster operation to a new lease site (No. M-653-02) located roughly one-mile offshore of Arroyo Burro beach in Santa Barbara. Several years later, in 1986, this one-acre lease was authorized for expansion by the California Fish and Game Commission to 78 acres. In 1996, it was again modified and reconfigured to cover a total of 72 acres. Neither

expansion nor modification was reviewed or authorized by the Coastal Commission, U.S. Army Corps of Engineers or Regional Water Quality Control Board and Pacific Seafood Industries did not seek an amendment to its CDP to reflect these changes in its operations. During this time, Pacific Seafood Industries also shifted its practices to focus almost exclusively on the cultivation of Mediterranean mussels. This change was also carried out without the benefit of a coastal development permit or permit amendment.

In 2005, the California Fish and Game Commission approved the transfer of the state water bottom lease from Pacific Seafood Industries to the current leaseholder, Santa Barbara Mariculture Company (SBM). SBM has continued to operate the mussel cultivation facility since that time, and it currently covers approximately 26 acres of the 72-acre lease area.

Through this CDP application, Santa Barbara Mariculture Company is requesting after-the-fact authorization for the 26-acre existing shellfish cultivation facility it has operated for the past 13 years on a state water bottom lease (No. M-653-02) approximately ¾ mile offshore of Arroyo Burro Beach Park in Santa Barbara (as shown on the map provided in **Exhibit 1**). State Water Bottom Lease No. M-653-02 was recently renewed and reconfigured by the California Fish and Game Commission and the lease term now extends until May 21, 2033. **Special Condition 1** would establish a permit expiration date consistent with this lease term. If this lease term is subsequently extended, the permit could be amended to reflect a new expiration date.

In addition to seeking after-the-fact authorization, SBM also proposes to expand and partially reconfigure its aquaculture facility to cover the entire 72-acre lease area with longlines (as shown in **Exhibit 2**). The existing and proposed facility would be used to plant, grow, and harvest Mediterranean mussels (*Mytilus galloprovincialis*) and Pacific oysters (*Magallana gigas* /*Crassostrea gigas*)[1] using of a system of 700-foot long submerged "longlines" maintained in the water column at a depth of approximately 30-feet through a network of surface and submerged floats and seafloor anchors.

SBM currently operates 12 such longlines and proposes to add another 28 for a total of 40 longlines within its 72-acre lease area. Onto these longlines would be affixed shellfish cultivation structures – large diameter ropes for mussel cultivation and hanging plastic mesh bags, baskets and/or trays for growing oysters. A maximum of one mussel cultivation rope would be installed on each of the 40 proposed longlines. The mussel cultivation ropes are 2,000 –feet long each and would be hung from the longlines with short lengths of rope so they would extend downward in ten-foot long loops at roughly three-foot intervals. Each loop would be held in place and weighted with a small mesh bag of gravel rocks; 4,000 total gravel bags are proposed to be used throughout the facility. Mussels would be seeded onto and grow directly on these cultivation ropes. A figure showing the design of one of the longlines in this cultivation system is provided below along with photographs of mussels being cultivated and oysters being harvested at the facility. For oyster cultivation, SBM proposes to use approximately two-foot

[1] As a result of recent genetic analysis, the Pacific oyster has been re-classified under a new genus and is now referred to as *Magallana gigas* (Salvi et al. 2014 and Salvi and Mariottini 2017). However, because this change is so recent and was not done with consensus from the scientific community (for example, see Bayne et al. 2017), the formerly common scientific name for the species, *Crassostrea gigas,* is also used in this report.

wide by five-foot long plastic mesh nets that would hang from the longlines. A maximum of 550 such oyster nets would be used – 50 with narrow mesh for the initial planting of young oysters and 500 with wider mesh for the grow-out of larger oysters. Approximately one to three years after planting, these cultivation structures would be recovered by one of SBM's vessels and the mature shellfish would be brought ashore for commercial sale. SBM anticipates a total annual harvest of 250,000 individual oysters and 400,000-pounds of mussels from the facility.

The surface floats used for the facility would be either 16-inch wide round, hollow, high density plastic floats or 24-inch long by 14-inch wide hollow vinyl floats. A total of approximately 240 such floats would be installed across the 40 proposed longlines and held in place with 25-foot long, half-inch diameter ropes. In addition, approximately 1000 more 16-inch hollow plastic sub-surface floats would also be installed directly on the longlines and held submerged to help the longlines maintain position in the water column. The specific number and configuration of floats would change over time as a result of operational refinements and as the weight of cultivation equipment increases over time as shellfish grow. For marking purposes, SBM proposes to maintain "spar bouys" at each of the four lease corners and a six-foot long radio reflective buoy at the lease's south east corner. The spar buoys would be made up of a seven foot length of PVC pipe extending above the water line and the radio reflective buoy would be nine-inches in diameter and extend three-feet above the water.

To anchor the 12 existing longlines, SBM uses 24 total anchors (one at each end of each longline). Most of the anchors currently in use are one-ton concrete blocks but several longlines are held in place by 220-pound metal fluke anchors that are embedded into the seafloor. Each concrete block is approximately three-feet high, four-feet wide and two-feet long. For the 28 longlines that are proposed to be installed, SBM is proposing to use either metal fluke anchors or 12-foot long helical screw anchors that would be drilled into the seafloor. A total of 56 anchors of either type would be installed (one at each end of each proposed longline) for the new longlines along with as many as 20 more as replacements for the existing concrete block anchors.

Figure 1 – Mussel Longline Design

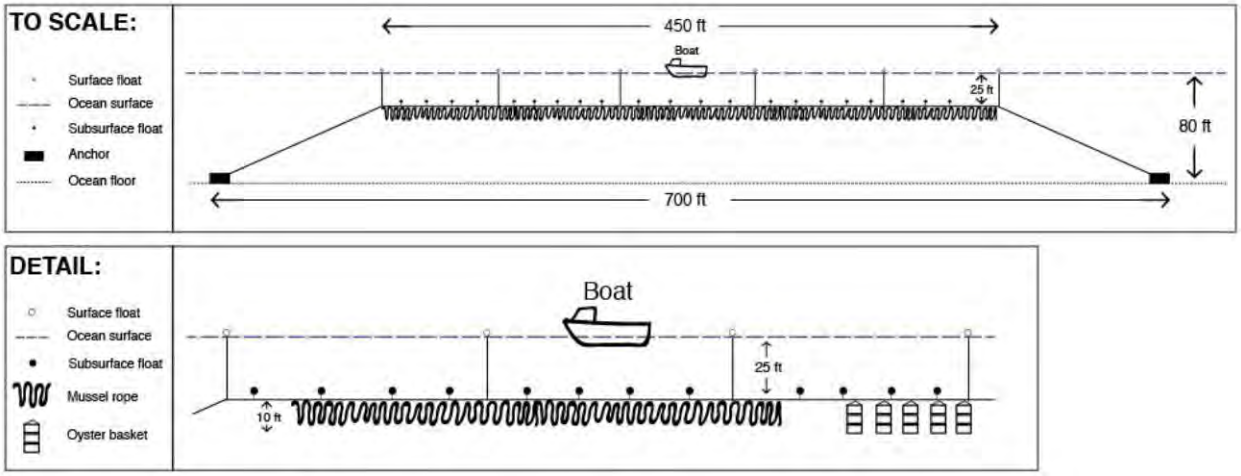

Figure 2 – Mussel Cultivation Ropes and Oyster Cultivation Bags

Figure 3 – Oyster Harvesting and Project Vessel

Longline Installation

To install the 28 proposed longlines and associated buoys and anchors, SBM proposes to primarily use its 35-foot work vessel. For installing lines secured by metal fluke anchors, the anchors, floats and lines would be loaded on the vessel at the Navy Pier in Santa Barbara Harbor and brought to the lease area. Once on-site, the installation location would be determined using the vessel's GPS and the anchor would be released off the side of the vessel with an anchor rode and temporary tether attached. Once on the seafloor, the anchor's tether would be secured on the vessel and it would be positioned and embedded into the sand. The longline would then be attached to the anchor rode and it would be spooled out with attached floats and buoys to the second anchoring site where the process of anchor deployment and positioning would be repeated.

For installing helical screw anchors, SBM would contract with a marine construction company that would make use of a construction vessel and hydraulic drill machine. This machine would be temporarily lowered to the seafloor from the construction vessel and used to rotate the screw anchor several feet into the seafloor. Once the anchor is installed, the machine would be lifted back to the vessel and repositioned at the next anchoring site.

Depending on the anchoring method used, installation of each individual longline is anticipated to take between two and eight hours.

Operations
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 mussel and oyster seed, and the offloading and transport of harvested shellfish to an existing processing facility located in Santa Barbara. Storage of purchased and imported shellfish seed (purchased from a CDFW-approved shellfish hatchery) would occur at SBM's onshore base of operations and the landing and offloading of harvested shellfish would occur at Santa Barbara Harbor.

To support its offshore operations, SBM would make use of two 35-foot long outboard motor powered vessels to transport personnel, equipment, and shellfish product between the offshore facility and Santa Barbara Harbor and to support planting and harvest activities. As shown in the image above, each of SBM's vessels are equipped with a hydraulic "arm" that can be used to raise and lower the submerged longlines so that the attached shellfish cultivation equipment can be added, inspected or removed. All vessel fueling would occur at the fuel dock in Santa Barbara Harbor.

In general, maintenance and operational activities at the offshore facility would require up to two boats visits five days per week year-round for approximately eight hours a day, including travel time to the lease. The vessels would journey from berths at Navy Pier in Santa Barbara Harbor, approximately 4.5 miles away.

Operations at the shellfish cultivation facility would include shellfish planting and harvest as well as equipment and gear inspections and maintenance. Maintenance and inspections on the longlines are proposed to be carried out on a monthly basis while the lines are lifted out of the water to allow additional buoys to be installed (as the size and weight of the cultivated shellfish increase, additional floats would be added to maintain the longline's position in the water column). Inspections of the anchor ropes, anchors, and connecting tackle are proposed to be carried out every five years with a light and video equipped remotely operated vehicle (ROV).

Planting and harvest activities for the oyster nets would begin when each of the 50 proposed small mesh nets are filled with small seed oysters and then re-attached to the longline ropes and placed in the ocean (as shown in **Exhibit 3** and Figures 1 and 2 above). These nets would then be recovered from the water every three months so that dead and especially slow growing oysters can be removed and the rest can be sorted by size and returned to the water until harvest. Oyster harvest activities would be carried out from 12 to 18 months after initial planting and are expected to yield a total of approximately 250,000 individual market-sized oysters per year.

Mussel cultivation would rely on a two-phase system using seed ropes and mussel grow-out ropes. To each of the 40 longlines would be attached up to ten 10-foot long by 2.5-inch diameter seed ropes. Attached to the hanging seed rope would be tens of thousands of small seed mussels. A cotton tube with narrow mesh would be rolled over the seed lines to help hold the mussels in place until they attach to the seed rope. The cotton mesh is expected to deteriorate after three weeks and leave the mussels behind in a symmetrical array along the rope surface. After three months of growth, the seed ropes would be hauled onto the work boat, stripped of mussels, and brought ashore for re-seeding. The mussels stripped from the seed rope would be collected and loaded into a socking machine on the work boat. This machine would place the mussels along a continuous two and a half-inch diameter by 2,000-foot long cultivation rope and wrap them in place with cotton mesh socking material. The continuous rope would then be draped under the longline in loop fashion as shown in **Exhibit 3** and Figures 1 and 2 above. Each loop would extend approximately 10-feet below the longline and would be attached to the longline with a small nylon line. After approximately eight months, the continuous mussel rope would be recovered by the work boat and all mussels on it would be removed and harvested for transport to shore and sale. In total, each of the 40 longlines would produce an estimated 10,000 pounds of mussels at harvest.

B. Other Agency Approvals and Consultations

California Fish and Game Commission

The California Fish and Game Commission (FGC) has a wide range of responsibilities, including authority for leasing state tidelands for shellfish cultivation. In 1984, FGC issued a one-acre lease (No. M-653-02) in the project vicinity to Mr. Jeffrey Young, owner of Pacific Seafood Industries.[2] In 1986, FGC approved the expansion of this lease to cover 78-acres and then later amended it again to cover 72-acres in a slightly different location. In 2005, FGC approved the transfer of this lease from Mr. Jeffrey Young to Bernard Friedman of Santa Barbara Mariculture Company, the current leaseholder of state water bottom lease no. M-653-02. In April of 2018, FGC approved the reconfiguration of this 72-acre lease and its renewal for approximately 15 years. FGC was the lead agency on the preparation of a Mitigated Negative Declaration for this action. Coastal Commission staff coordinated with FGC on the development of this document, reviewed drafts and provided several rounds of comments, most recently through a comment letter dated February 8, 2018.

California Department of Fish and Wildlife

In addition to providing staff support for FGC, the California Department of Fish and Wildlife (CDFW) is also responsible for ensuring that those cultivating shellfish within the state's marine waters have a valid aquaculture registration and adhere to the CDFW's biosecurity regulations to prevent the release or spread of parasites, diseases or invasive species associated with shellfish cultivation. Santa Barbara Mariculture Company (SBM) has maintained a valid aquaculture registration with CDFW since beginning its shellfish aquaculture operations.

[2] The Coastal Commission approved a CDP for this one-acre shellfish cultivation operation in 1984, CDP No. 4-84-222. No CDPs, CDP amendments, or transfers were applied for or issued for the subsequent expansion, modification, and transfer of the lease and shellfish cultivation operation.

U.S. Army Corps of Engineers
The U.S. Army Corps of Engineers (ACOE) has regulatory authority over the proposed project under Section 404 of the Clean Water Act of 1972 and Section 10 of the Rivers and Harbors Act of 1899 (*33 U.S.C. 1344*). SBM has been operating since it began in 2005 without a permit or other authorization from ACOE but is currently seeking such authorization to continue and expand its operations. **Special Condition 2** would require SBM to provide the Executive Director with evidence that this authorization has been granted prior to expanding its existing aquaculture facility.

Pursuant to Section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA) the Corps cannot issue an individual permit to SBM until the Commission either concurs or is conclusively presumed to concur in a federal consistency certification. Commission approval of this CDP application would constitute concurrence under the CZMA.

Regional Water Quality Control Board
Projects involving discharges of dredged or fill material to waters of the United States that require ACOE permits under Clean Water Act Section 404 are also required to obtain authorization from the Regional Water Quality Control Board under Clean Water Act Section 401. SBM has indicated to Commission staff that it is in the process of developing and submitting an application for a 401 certification to the Central Coast Regional Water Quality Control Board. **Special Condition 2** would require SBM to provide the Executive Director with evidence that this certification has been granted prior to expanding its existing aquaculture facility.

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. NMFS will be coordinating its review of the proposed project with the U.S. Army Corps of Engineers and providing recommendations.

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 80 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 is aquaculture (Section 30233(a)(7)). Because the proposed anchoring devices would support a shellfish 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 shellfish aquaculture facility – without the placement of at least some fill material in open coastal waters.

Commission staff therefore evaluated several alternative anchoring systems that would require differing amounts of fill. These anchoring systems included weighted mooring blocks, metal fluke anchors (such as Jeyco "Stingray" anchors), and helical screw anchors. These three systems represent a range of seafloor footprint areas – with concrete blocks taking up the most area (roughly eight-square feet each), helical screw anchors taking up the least (several square inches) and fluke anchors falling in between (two- or three-square feet once embedded).

However, installation of the helical screw anchor system can be significantly more expensive than other systems. It would involve the use of a specialized hydraulic-powered underwater drill machine, as well as a specially-equipped construction vessel to lower the drill to the seafloor and retrieve it. While SBM has proposed to use these anchors for the 28 new longlines and as replacements for the existing concrete block anchors, it has also stated that this would be dependent on cost, and that metal fluke anchors may be used for some or all of the new and replacement anchors if the installation cost of screw anchors is prohibitive. While screw anchors would result in less fill than fluke anchors, because both are proposed to be installed within the

same areas of soft substrate seafloor that are not known to support sensitive species or habitats, neither type of anchor is expected to have a significant adverse impact.

Therefore, 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. As discussed above, due to the small footprint of the proposed anchors, the absence of sensitive habitat within their installation sites, the ability of soft substrate benthic organisms to quickly recover from small disturbance events (such as anchor installation), and the regional abundance of soft substrate habitat similar to that at the installation sites, the fill associated with the proposed anchors would not result in significant adverse environmental effects. As such, mitigation for this fill is not necessary.

However, as discussed further in the following sections of this report, other aspects of the project – including equipment operation and installation activities associated with anchor placement – do have the potential to result in adverse environmental effects. Accordingly, 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 12** that SBM 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. In addition, **Special Condition 7** 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 associate with the proposed anchor installation activities. Further, **Special Conditions 8 and 13** would require the development and implementation of a Marine Debris Management Plan as well as annual maintenance inspections of the anchors and associated attachment lines, and require that any maintenance issues identified during annual surveys, including broken, worn, or especially fatigued materials, are remedied immediately. These requirements would help ensure that the anchors remain functional - thereby minimize 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 is 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 1** would require that at the termination of the permit term, SBM submits a CDP application for the 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.

The Commission finds that with the addition of **Special Conditions 1, 7, 8, 12 and 13**, feasible mitigation measures have been provided to minimize any adverse effects of fill, and, therefore, that the third and final test of Coastal Act Section 30233(a) has been met.

D. 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 shellfish aquaculture facility have 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; release of reproductive materials from non-native species; and collision of project vessels with marine mammals or sea turtles.

Non-Native Species
The proposed project has the potential to adversely affect native species, habitats and marine biological productivity through the introduction and spread of non-native marine species. These effects may come from two primary sources – (1) planting and cultivation of non-native Pacific oysters and Mediterranean mussels and (2) attraction and spread of non-native fouling organisms on the facility's submerged infrastructure and equipment.

Pacific oysters
At full build-out and maximum capacity, SBM anticipates growing an annual crop of approximately 250,000 adult Pacific oysters. These oysters would be grown in submerged mesh bags attached to the facility's longlines where ocean water would freely pass through them. The oysters would be grown from "seed" – tiny immature oysters attached to small fragments of ground shell – and after 12 to 24 months would be harvested as mature reproductively viable

adults. Pacific oysters are native to East Asia and have been translocated around the world for aquaculture. The species is included on the California Department of Fish and Wildlife (CDFW) and California Fish and Game Commission "List of Approved Plants and Animals That May be Propagated by Registered Aquaculturists" in the state.

As discussed extensively in the Commission's Adopted Findings for CDP No. 9-14-0489 (USC-Wrigley, Oyster Research), in addition to being one of California and the world's most popular shellfish species for aquaculture, the Pacific oyster is known to escape cultivation and develop wild populations outside of its native region that can significantly alter marine habitats and communities of native species. Contributing to its ability to escape cultivation are the Pacific oyster's abilities to change gender to optimize reproductive potential and to reproduce through "broadcast spawning" events in which each female oyster can release 50-200 million eggs into the water column where they trigger surrounding oysters to release their own reproductive material. Once fertilized, oyster eggs then drift on the currents for up to several weeks as they develop into free swimming larvae and then settle out on suitable hard surfaces.

Although incidents of Pacific oysters becoming established within new ecosystems have most extensively been documented outside of California - for example, the Pacific oyster has established permanent and self-sustaining wild populations on five continents (e.g., Ruesink et al. 2005; Carrasco and Barón 2010) – naturalized populations of Pacific oysters also now appear to be present at a number of locations within the state, particularly in southern California. Research and biological survey work carried out in recent years has shown that Pacific oysters can be found on Catalina Island and from Los Angeles Harbor south to the Tijuana River Estuary (Grosholz et al. 2012, 2015; Crooks et al. 2015; Merkel and Associates 2015). Other research indicates that prior to the past several years, this conspicuous species of shellfish had never before been recorded in such abundance in these locations (Carlton 1979, Cohen 2008, Crooks et al. 2015, Zacherl 2015, Novoa et al. 2016). As noted by Crooks et al. (2015), this is remarkable, in part, because there have been a number of historical attempts to intentionally introduce Pacific oysters to the region that have failed:

> *Even with this widespread import, persistent populations of Pacific oysters were not reported in California throughout the 19th and 20th centuries, although many oyster associates did successfully invade (Carlton 1979, Grosholz et al. 2012). Occasional instances of wild Pacific oysters were reported, including one specimen found in Mission Bay, San Diego (as Ostrea laperousi, noted as "introduced - large 4 to 5 inch specimen" [Wilson 1943]) and a small number in Newport Bay in the 1940s (Carlton 1979). Starting in the year 2000, new incidences of Pacific oysters in southern California began to be reported. Cohen et al. (2005) found Pacific oysters in Los Angeles Harbor in 2000, and LaGrange (2002) reported them from San Diego Bay soon thereafter. This was coupled with other reliable sightings from San Diego Bay and Mission Bay in the early 2000s (C. Gramlich, San Diego State University, personal communication, 2006).*
>
> *In 2005, we noted the presence of Pacific oysters within Mission Bay, the Tijuana River Estuary, and Oceanside Harbor (Figure 1). Since that time, we have found non-native Pacific oysters in virtually every suitable system in San Diego County, including Oceanside Harbor; Agua Hedionda, Batiquitos, San Elijo, San Dieguito, and Los Peñasquitos*

> *lagoons; Mission Bay; the San Diego River flood control channel; San Diego Bay; and the Tijuana River Estuary (Figure 1, Figure 2). Individuals range in size from recruits to specimens reaching 300 mm in length, with instances of multiple year classes present at a given time.*

This emerging trend has triggered discussions among the scientific and natural resource management communities about possible sources and contributing factors. Several of these factors are discussed by Cohen (2006) in his memo describing a similar recent appearance of Pacific oysters in San Francisco Bay and the resulting efforts to survey and remove them:

> *Although C. gigas has been grown commercially in central California since 1928, with many millions of oysters reared through maturity and apparently releasing spawn into the environment, there are records over that period of only a few dozen oysters settling as a result (Carlton 1979). However, we have now collected over 260 C. gigas (estimated to be a fraction of the population in the* [San Francisco] *Bay), indicating a rate of settlement that is orders of magnitude greater than observed in the region over the previous 78 years, and in a bay where the oyster has not been grown commercially in recent years. The reason for the enhanced settlement is not known. The oysters might be a genetically distinct strain from previously cultured C. gigas; or environmental conditions may have changed in a way that makes it easier for the oysters to settle (for example, higher phytoplankton concentrations have been reported in the South Bay in recent years— Cloern et al. 2006). In recent years there have also been reports or records of a few populations of settled C. gigas in other parts of California (southern California and Humboldt Bay), where settlement was previously unknown or extremely rare, so it's possible that the recent settlement in San Francisco Bay is part of a broader phenomenon.*

While the reasons continue to remain unknown for this recent trend of Pacific oysters establishing in California in numbers and locations not previously documented, if it is a lasting change due to a persistent shift in ocean or environmental conditions, it may have significant and lasting consequences. This is largely because the current pattern of Pacific oysters appearing in small numbers and low densities within southern California may shift to a pattern of increasing abundance and more widespread distribution – particularly because of the apparent abundance of suitable habitat. This possibility is described by the California Department of Fish and Wildlife in its California Non-native Estuarine and Marine Organisms (Cal-NEMO)[3] database, as it summarizes a typical pattern of spread of Pacific oyster into new locations:

> *In introduced locations, C. gigas often starts by being confined to culture areas, with only sporadic and limited reproduction, but later becomes a major biomass component and ecosystem engineer. This process, which has taken 3-10 decades, has occurred in British Columbia, Washington, the North Sea, the Atlantic coast of Patagonia, Hawaii, and Australia. In some cases, C. gigas poses risks to native oyster populations, including competition, hybridization, and introductions of associated organisms (e.g. parasites, fouling species and oyster predators).*

[3] Fofonoff, P.W., Ruiz, G.M., Steves, B, and Carlton, J.T. (2003). California Non-native Estuarine and Marine Organisms (Cal-NEMO) System. http://invasions.si.edu/nemesis/. Accessed on June 18, 2018. Hereafter referenced as "Cal-NEMO".

As it is unknown what is driving the trend of increasing Pacific oyster establishment seen in recent years, it is also unknown what may trigger the sharp increase in abundance that has been observed in other locations around the world with this species and when that event may be triggered. Based on available research and biological survey reports[4], however, the recently observed trend in southern California appears to be continuing and may be increasing. As such, intentional and continuous introduction and cultivation of Pacific oysters within southern California should be closely examined.

In southern California, adult Pacific oysters are currently being intentionally cultivated in only four locations – as part of the Santa Barbara Mariculture project described in this report, at the Carlsbad Aquafarm shellfish aquaculture facility that will be before the Commission later this year, as part of the KZO Seafarms operation in federal waters off of Long Beach (authorized by the Commission in 2014 through Consistency Certification No. CC-035-12), and as part of a small-scale, four-year research effort on oyster reproduction by the USC Wrigley Institute for Environmental Studies in Catalina Harbor (authorized by the Commission in 2015 through CDP No. 9-14-0489).

In approving the USC Wrigley Institute project several years ago, the Commission required USC to carry out annual monitoring efforts throughout the harbor to find and remove Pacific oysters and to ensure that new settlement and expansion of wild Pacific oyster populations does not occur. If the annual monitoring does document new oyster settlement, USC is required to apply for a CDP amendment within 30 days to address the issue or to suspend cultivation of mature Pacific oysters.

This approach was developed because the success of the USC research project relied on cultivation of reproductively viable Pacific oysters and because the small numbers of oysters it was proposing to cultivate and environmental conditions in Catalina Harbor were found unlikely to support successful spawning and settlement.

In contrast to this research effort, commercial oyster cultivation does not require reproductively viable oysters. In fact, many years of research has gone into developing oysters that are largely sterile in order to meet the needs of the oyster aquaculture industry. These are known as triploid oysters and they are bred to have faster growth rates, higher meat quality, and to allow year-round harvesting.

In concurring with the consistency certification for the KZO Seafarms project in 2014 (CC-035-12), the Commission memorialized KZO's commitment to cultivate only triploid Pacific oysters in order to minimize the project's potential contribution to the establishment of this species in southern California.

Although several studies have shown that not all triploid oysters are completely sterile, even under the carefully controlled and optimized laboratory settings used in these studies, only 2% to 13% of triploid oysters have been capable of spawning (Guo and Allen 1994, Gong et al 2004).

[4] Including observations by Commission staff in Alamitos Bay and Mission Bay as well as those described in Crooks et al. 2015, Merkel and Associates 2015, Anderson 2016, and California Academy of Sciences 2018.

In addition, even when these triploid oysters do successfully spawn and generate fertilized offspring, survivorship of that offspring is severely impaired – even under laboratory conditions it has been shown to be significantly less than 1% of the survivorship typical of normal, non-triploid oysters (Guo and Allen 1994). In the natural environment where predators are present and environmental conditions can change rapidly, both spawning potential and survivorship of offspring are expected to be even lower. This means that in most natural conditions, triploid oysters would be functionally sterile and not capable of escaping cultivation or creating self-sustaining populations.

Although there are limited reports of Pacific oysters growing in the wild along the Santa Barbara County coastline, many of the environmental conditions present in other areas of the state that have documented more widespread oyster establishment are also present in Santa Barbara County. In addition, a focused survey effort to determine if and where Pacific oysters are present has not been carried out in the area and to date, SBM's existing operation has focused almost exclusively on growing mussels rather than oysters. Because SBM's proposed project includes a significant expansion of oyster cultivation efforts and current research continues to demonstrate that Pacific oysters are capable of escaping cultivation and establishing self-sustaining wild populations in southern California, the Commission is requiring in **Special Condition 6** that oyster cultivation carried out by SBM be limited to triploid Pacific oysters. Cultivation of these types of oysters with a very limited ability to successfully reproduce and spread would minimize SBM's potential contribution to the further establishment and spread of Pacific oysters in southern California. As noted above, this approach is consistent with that taken by the Commission in its concurrence with the KZO Seafarms project, the only other commercial shellfish aquaculture operation the Commission has authorized in southern California.

Mediterranean mussels
The primary species of shellfish that SBM would grow is the Mediterranean mussel (*Mytilus galloprovincialis*). Similar to the Pacific oyster, this is another species that is not native to California that has been brought here and many other places throughout the world for aquaculture. In contrast to the Pacific oyster, however, in California, the Mediterranean mussel has already become well established and extremely abundant in the wild. Surveys by Suchanek et al. (1997) demonstrate that it is now among the most abundant mussel species between Marin County and San Diego, and research by Geller (1999) suggests that since the 1900s, the Mediterranean mussel may have completely replaced and/or hybridized with the native blue mussel (*Mytilus trossulus*) between Monterey Bay and San Diego.

Given the existing abundance of this species throughout both the project area and the wider southern California region, the existing and proposed cultivation efforts by SBM would have an insignificant contribution to the continued presence of the species in the area. The proposed location of the aquaculture facility in open coastal waters only a few miles from the nearest shoreline populations of Mediterranean mussels does not introduce a source of reproductive material to current systems and larval transport pathways that are not currently available to the species. In addition, it appears that large populations of Mediterranean mussels are already present on the caissons of the offshore oil production platforms in the Santa Barbara Channel. The water column at the project site is therefore likely to already contain Mediterranean mussel larvae from both shoreline populations and the oil platforms and the proposed project is therefore

unlikely to result in the release of reproductive material for this species in an area in which none currently exists.

Fouling organisms
Shellfish 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 includes 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).

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 tunicate 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.

As noted in the Mitigated Negative Declaration (MND) prepared for the project by the California Fish and Game Commission,

> *Certain invasive tunicates are of great concern in their potential to rapidly colonize and overwhelm surfaces and benthic organisms that include cultured shellfish, shellfish culture gear, and other natural and artificial hard-substrate habitat and the native colonizers of such habitat. The club tunicate (Styella clava), the transparent tunicate (Ciona savignyi), sea vase (Ciona intestinalis), and the colonial tunicate (Didemnum vexillum) represent some of the most important invasive tunicates of potential concern that could colonize the Proposed Project area.*
>
> *None of these species are currently known to be found in waters near the project site (Curran et al., 2013). Surveys of Didemnum species distribution throughout the US and South Canadian Pacific coast have furthermore not shown it to be present in the Santa Barbara Channel (Bullard et al., 2007) and that is confirmed by a lack of on-farm sitings by the operator (Bernard Friedman, pers. comm.). However, due to the smothering impacts that such invasive tunicates can have on both natural habitats and mariculture production, diligence is called for in both identifying and rapidly reporting new appearances, and the*

practical and effective removal of such organisms should they occur. Of note is the farm's practice of frequent inspections and maintenance, which may serve as a sentinel site for CDFW coordination of the rapid response to novel sightings in the area of invasive species of concern.

To address this issue, both the MND and aquaculture lease issued by the Fish and Game Commission include the following mitigation measure:

> ***Mitigation Measure (MM) BIO-2: Aquatic invasive species spread.*** *To reduce the potential spread of marine invasive species, such as certain tunicates known to be problematic, resulting from the Proposed Project, the following measures have been proposed. Implementation of MM BIO-2 will reduce this impact to Less Than Significant.*
>
> ***MM BIO-2: Aquatic invasive species spread.***
> *a.* ***Awareness and Training*** *– SBMC will coordinate with CDFW staff to generate and utilize invasive species identification guides and training materials on board its vessels and educate all farm personnel in the importance of identifying and taking of appropriate action if certain invasive species are encountered. SBMC will maintain updated materials corresponding with applicable CDFW priority invasive species local to the Proposed Project and the appropriate response actions.*
> *b.* ***Responses*** *– Upon identification of an invasive species of concern on SBMC aquaculture gear, farm personnel will carefully remove the organism for disposal on land. Care shall be taken to avoid fragmenting such tunicates to reduce their spread. This practice is consistent with management plans in other regions, including the Washington Department of Fish and Wildlife Tunicate Management Plan's effective management practice guidelines, where removal by hand was noted as one of the few proven effective control methods. (Washington Department of Fish and Wildlife, 2009).*
> *c.* ***Maintenance*** *– SBMC will continue its practice of frequent inspection, cleaning, and rotation of culture gear to reduce the opportunity for invasive species to colonize its gear.*

Although the development of the training materials and identification guides described above has yet to occur, CDFW staff have indicated that they anticipate these documents to be completed and put in use by SBM by the end of the year. In addition to this approach, **Special Condition 4** would prohibit the intentional release of non-native fouling organisms into the marine environment and help ensure that maintenance cleaning operations are carried out in a manner that limits uncontrolled discharges. This would reduce the possibility that the proposed project would contribute to the further spread of invasive species in the vicinity of the project.

Benthic Habitat

The existing and proposed shellfish cultivation facility would be installed less than a mile from the shoreline in Santa Barbara in waters between 70- and 100-feet deep. Based on surveys of the project area using remote sensing equipment and conformational ground-truthing by divers and video-equipped ROVs, the seafloor at the project site is composed of low-relief soft bottom habitat composed of sand and soft silt. Seafloor geology and benthic habitat surveys carried out in the region by the United States Geological Survey also indicate that the benthic habitat present at the project site is the dominant habitat type in the larger region, existing within the majority of

the area surveyed. During a field inspection of the project site by CDFW staff, species encountered were described as "typical of soft/sandy nearshore substrate in southern California, and include Kellet's whelk (*Kelletia kelletii*), sea pen (*Stylatula elongata*), tube-dwelling anemone (*Pachycerianthus finmbriatus*), California lizardfish (*Synodus lucioceps*) and various species of sea star (class *Asteroidea*)" (Weltz 2015).

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 (such as shellfish, shells, and fouling organisms that may become dislodged during cultivation, harvest, or maintenance activities).

Anchor Placement
Potential adverse impacts to marine resources associated with the proposed installation of anchoring devices on the seafloor are discussed in more detail in the previous section of this report focused on the placement of "fill" material within coastal waters. To summarize that discussion, all of the proposed anchor installation sites would be within areas of soft substrate and adverse impacts to epifauna and infauna in these habitat areas would be minimal. The proposed anchors would have a limited footprint – a combined total of roughly 400-square feet, including the large connecting tackle required for some of the anchors that often sinks and further disturbs adjacent seafloor habitat. While some adverse impacts to invertebrate species that were shown in ROV surveys of the project area 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 region. In addition, many soft substrate organisms are mobile and would re-colonize and recover quickly after the initial installation of the proposed anchoring units. As such, the installation and presence of the 80 proposed anchors would not adversely affect the marine biological productivity of the project area.

Some of the proposed project activities may also serve to enhance the seafloor habitat at the project when compared to existing conditions. Specifically, SBM proposes to remove the existing large concrete block anchors and replace them with either metal fluke or screw anchors with a footprint that would be half as big or less. This anchor replacement element of the proposed project would reduce to total anchoring footprint of the facility and make some areas of seafloor once again available as soft substrate habitat.

Accumulation of Biological Materials
Extensive research has shown that over time, the seafloor below shellfish aquaculture facilities can accumulate large amounts of biological material that becomes dislodged or discharged from the facility above and sink through the water column. Such material typically includes feces and pseudofeces[5] from the cultivated shellfish (collectively known as biodeposits); fouling organisms

[5] Filter feeding shellfish including mussels feed by pumping water through specially adapted gills that act as filters to trap particulate matter. Trapped particles are then wrapped in mucus and either ingested as food or ejected as pseudofeces. Typically many times larger than the particulate matter naturally found in the water column, this pseudofeces sinks to the bottom more readily.

such as algae, barnacles, sponges, and other species of shellfish that settle on the artificial hard substrate of the facility and become dislodged due to natural processes or operational activities; and cultivated shellfish or shells that also become dislodged from the cultivation structure during growth, storm events, predation from marine wildlife, cleaning, and harvest activities. The accumulation of this material on the substrate below mussel aquaculture facilities is the most commonly discussed environmental impact in the international scientific literature. Research on mussel aquaculture farms in Maine, Sweden, Scotland, and New Zealand, several of the areas with large existing mussel aquaculture industries, suggest that up to four inches per year of biodeposits and shell material can accumulate in areas below active mussel farms (Mattsson and Linden 1983, Wilding and Nickell 2013). 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.

As shown by Wilding and Nickell (2013), Wilding (2012), and a wide variety of prior research, direct effects of organic enrichment 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.

While the accumulation and subsequent decomposition of organic materials affects physical sediment characteristics such as grain size and composition, the largest impact on the physical structure of the seafloor sediment expected to occur beneath the proposed shellfish cultivation facility would be from the deposition of intact and broken shells (Tenore et al. 1982; Kaspar et al. 1985; Stenton-Dozey et al. 2005). As these shells are fed upon and deteriorate further they are broken into a matrix of calcium carbonate fragments known as shell hash. Studies of mussel farms have consistently shown that high levels of shell hash can accumulate in soft sediments; the estimates of Mattsson and Linden (1983) that between 2,000 and 4,000 shells per square meter can be deposited per year below an active mussel farm have often been corroborated (recently, in Wilding and Nickell 2013). As the proportion of shell hash in the substrate increases, it may influence the type and abundance of invertebrate species that live on and in it, thus altering the structure and productivity of the ecological community in the affected area.

Changes to sediment chemistry that have been observed to result from the organic enrichment of sediments with biological material from overlying mussel farms typically consists of an increase in sediment oxygen demand (as this biological material decomposes) and an upward shift in the zone in which sulfides are formed (Pearson and Rosenberg 1978). Because many species typically found in soft substrates are not particularly tolerant of sulfides, this chemical shift often results in the loss of larger, more complex sediment dwelling organisms, and a shift towards a lower diversity assemblage of sulfide specialist species (Weston 1990; Tenore et al. 1982).

At the most basic level, the deposition of organic material beneath a shellfish farm causes an influx of predatory and scavenging species that are able to exploit the organic material as a source of consistent food. Species such as polychaete worms and starfish have frequently been observed in particularly high density in these environments within a fairly short period ranging from weeks to months. As demonstrated in Wilding and Nickell (2013), the density of starfish below mussel farms off the Scottish coast was two to 27 times higher than at a distance of several hundred feet away. Fundamental ecological models of seafloor sediments subjected to

organic enrichment indicate that as organic materials increase, trophic community structure shifts (Weston 1990), the abundance of organisms increases and the biomass and number of species declines (Pearson and Rosenberg 1978). However, as noted above, the effect of organic enrichment on sediment chemistry can often reduce the abundance of organisms as well as selective pressures promote a more limited suite of species adapted to low oxygen, high sulfide sediments.

For the most part, the direct effects noted above are limited in extent to the area immediately beneath a cultivation facility and its adjacent vicinity. However, some research has shown that indirect effects can also occur which can impact a larger area. For example, Inglis and Gust (2003) describe how the elevated density of predatory invertebrates such as starfish that can accumulate on the seafloor below an aquaculture facility as a result of the consistent and robust food source it provides can serve to boost reproductive rates and lead to augmented populations of predatory invertebrates on a scale that extends beyond the benthic footprint of the facility.

While site specific physical characteristics such as depth and current velocity typically do not have a large effect on the amount of biological material released from an aquaculture facility – this is typically determined by operational factors such as cultivation practices and quantities – such site characteristics play a large role in determining how concentrated discharged and dislodged biological materials become and how far they disperse (in other words, the size and severity of the facility's "footprint" on benthic habitat). Based on Commission staff's review of available research, the great majority of shellfish aquaculture operations carried out worldwide appear to be located in shallower nearshore waters with more restricted water movement and lower current speeds than those at the proposed project site.

The applicability of evidence from these other operations to SBM's project regarding accumulation rates and dispersal distances for biological materials must therefore be considered carefully, with a close examination of physical site characteristics such as current speeds and depths, as well as operational practices and facility-specific factors such as stocking density and cultivation and harvest methods.

Because the SBM facility has been in place since 2005 and has been operated continuously since that time (albeit at only a third of the size proposed in this application), it provides a direct opportunity to understand what effects it may or may not be having on the benthic habitat below it and in the nearby vicinity. Unfortunately, however, little information is available about the condition of the seafloor below the existing facility. Most of what is available is from a field inspection carried out by CDFW staff in 2015 and a partially completed ROV survey carried out in 2013 (submitted in support of the CDP application). Although sparse, this information indicates that a limited amount of aquaculture debris is present below the facility, including discarded line and small accumulations of mussel shell. However, neither of these efforts appear to have been designed as comprehensive surveys of the seafloor below the facility or as efforts designed to gather sufficient data from a portion of the area to be representative of the areas that were not surveyed (for example, through the use of a sufficient number of transects or randomly selected survey points). Therefore, while this information is illustrative, it would not be appropriate to rely on to form definitive and defensible conclusions about the existing condition

of the area or the future condition that would result from the proposed expansion of the SBM operation.

To address this uncertainty and help ensure that an excessive accumulation of aquaculture debris and biological materials does not occur on the seafloor below the existing and expanded facility, **Special Condition 13** would require SBM to develop and implement a marine debris management plan, **Special Condition 4** would prohibit SBM from intentionally discharging waste, shell or fouling materials into the ocean, and **Special Condition 5** would require SBM to prepare and submit a benthic monitoring plan. This plan would include annual visual surveys of multiple locations below the facility for the first two years and subsequently at three year intervals. These surveys would be focused on determining if – and how much - shellfish, shell material, fouling organisms, and aquaculture equipment is accumulating on the seafloor. **Special Condition 5** would also require that if during monitoring, the visible accumulation of a significant amount of oyster or mussel shell material, fouling organisms, cultivation equipment, or other project-related debris is observed, SBM shall apply for a permit amendment to adapt its operations and/or redesign its project to avoid recurrence of these changes and to mitigate any additional impacts to marine resources that may have occurred.

Marine Wildlife

The proposed location of the 72-acre SBM facility in the coastal waters offshore of Santa Barbara is within an area known to be used on a year-round basis by a variety of small marine mammals (primarily dolphins and sea lions) and seasonally by large whales (primarily California gray whales during northward migrations when they travel with young calves and typically remain closest to shore). Other large whale species such as humpbacks, fin whales, and blue whales may also occasionally be present with the project area, but the location of the facilty in shallower waters closer to shore and away from known feeding grounds means these species are likely to be found at the project site more rarely. Two species of sea turtle, the green sea turtle and leatherback sea turtle, also have the potential to be found within the project site, but their low abundance also makes these species unlikely visitors. Several species of seabirds, in particular coastal species such as pelicans, cormorants, gulls and terns and diving sea ducks such as scoters, western grebes, and loons, are also known to pass through and forage at the project site. The larger Santa Barbara Channel supports many more seabird species, including several such as the brown pelican, Xantus' murrelet, California gull, and double-crested cormorant that have protected status.

The proposed project has the potential to adversely affect these marine mammals, 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 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 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 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 proposed project area. 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 line but the origin of the material was not conclusively determined.

While Commission staff is aware of no quantitative research that has been carried out in California on the entanglement risk to marine wildlife specifically associated with shellfish aquaculture infrastructure in open coastal waters – likely because of the general lack of aquaculture facilities in California's offshore waters - studies and evaluations from other locations can be examined for guidance. A variety of these studies suggest that nearshore and open ocean aquaculture 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 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 1999) notes that entanglement is a key concern with marine aquaculture facilities, especially shellfish facilities with designs similar to the proposed shellfish farm, due to their reliance on underwater lines, many of which may be small diameter, looped and prone to slack. This Technical Memorandum describes several evaluations of proposed offshore and nearshore shellfish culture facilities in New England that have been carried out by the National Marine Fisheries Service (NMFS). Although the scale of these proposals is typically several orders of magnitude *smaller* than the shellfish facilty proposed in this project, consideration of entanglement risks to marine mammals and sea turtles features prominently. Among these evaluations is a Biological Opinion for a scallop farm in which NMFS concludes that the proposed configuration of aquaculture gear, amount of gear, and amount of water column occupied by gear poses such a high risk of entanglement to right whales that it would jeopardize the species. It should be noted, however, that the extremely endangered status of the species of right whale considered in that review likely contributed to the level of caution in NMFS's conclusion. Several examples from overseas also suggest that aquaculture facilities that include lines and ropes held in the water column present an entanglement risk to marine mammals. These examples include the entanglement and death of two Bryde's whales in a mussel spat collection line (a buoyed line held in the water column to recruit naturally occurring mussel larvae) in New Zealand and the entanglement and subsequent rescue of a humpback whale calf in Western Australia that encountered a shellfish crop line (Keeley et al. 2009).

In contrast to these evaluations of the entanglement risk to marine wildlife from open ocean aquaculture facilities are a variety of anecdotal reports of actual mussel cultivation facilities with designs similar to that of the proposed project that have been installed and operated for many years with few if any observed incidents of entanglement. In New Zealand, for example, the entanglement of the Bryde's whales noted above appears to be the only recorded incident despite the fact that over 900 mussel farms are currently in operation along the coast and have been for many years (Lloyd 2003). It must be noted, however, that the applicability of this evidence from New Zealand to the proposed project is limited due to substantial differences in species assemblages and movement patterns, geographic factors, and the overall lack of mussel farms in New Zealand that are located in open ocean areas similar to the SBM site. The majority of mussel farms in New Zealand are located close to shore within protected bays and sounds, areas with densities and movement patterns of large whale species that are likely very different from those at the proposed site.

Considering the proposed site specifically – and the existing 26-acre facility that has been present for the past 12 years – suggests that the entanglement risk it presents to marine mammals may be low. Anecdotal reports by the operator of this facility suggest that although gray whales have several times been observed passing in close proximity to it, no recorded incidents of marine mammal entanglement have occurred. This may be due to a design or operational feature of the facility that reduces its entanglement potential, the ability of whales to recognize and avoid the facility, or a combination of those and other unknown factors.

However, the observed presence of large whales at the project site combined with the proposal to nearly triple the size of the facility and the potential adverse consequences of entanglement suggest that a cautious approach is warranted. As noted in the MND prepared for the project:

> *After twelve years of farm operation at this location with an approximate 25-acre footprint of longlines installed, no incidents of entanglement by marine mammals, turtles, or birds have been observed or known to have occurred. Nonetheless, in light of known migration and activity patterns of marine species in the area and the enlarged footprint of installed culture gear, the risk of future entanglement by marine species exists and measures should be taken out of precaution to mitigate such risks to a level less than significant.*
>
> *A large majority of reported entanglements have involved fixed or derelict fishing gear, such as various types of nets and the cables used to attach floats to lobster and crab traps and not the large diameter submerged shellstock longlines that are proposed for this Project. Some generalizations can be made regarding the characteristics of fishing gear with which entanglements have occurred. Lines that float at the surface, small diameter vertical lines such as endlines from a trawl of lobster traps, non-sinking line connecting individual traps in a trawl, and loose twine as found in gillnets, seines, and fish traps have all been associated with entanglements. Though similar to some fishing gear in the sense that it is fixed and remote, the submerged longline shellfish grow out gear differs from fishing gear in a number of ways. Line diameters are much larger and under tension, there are no loose or floating lines, no loose twine, and no bottom lines. (Langan, 1998).*

> *The longline mussel culture gear for the Proposed Project (and existing operation) is designed in such a way that proper tensioning of the backbone and anchorages, and positioning of buoys will minimize entanglements, and if they occur, can be identified quickly from the surface. Longline backbones are spaced 100 feet apart, and mussel grow line loops are also relatively short, leaving room for marine species to navigate beneath, above, and through the farm. If longlines were disturbed, abnormalities in the longline would be easily identified based on surface buoy and longline backbone positions. If there was an entanglement, the affected surface buoy would likely appear abnormally low in the water relative to the other surface buoys. This allows the farm operator to identify a problem upon visual inspection of the farm at the surface and through normal handling of the backbone. Regular maintenance, water and mussel sampling for public health requirements, and harvesting activities by the farm operator on a frequent basis (3 to 5 days per week) includes visual inspection of growout lines hung from the longline backbone, and adjustments to the longline system's tensioning and buoyancy if required*

This approach described in the MND of focusing on maintenance and operational practices at the facility to ensure that all of its lines, floats, and anchors remain in good working condition and that loose or slack lines (which have been shown to pose the greatest risk of entanglement) are avoided and quickly addressed when they occur, is consistent with the Commission's past practice in considering similar types of open ocean aquaculture projects at Catalina and offshore of Long Beach (CDP No. 9-14-0489 and CC-035-12, respectively).

To help ensure that these steps are followed, the MND and aquaculture lease include the following mitigation measure:

> ***Regular inspection and maintenance of gear for proper tensioning and evidence of wear or derelict gear or debris.*** *Mitigation proposed to reduce entanglement risk shall include regular inspections and properly maintained longline system tensioning and buoyancy. Loose or entangled derelict debris and lines will be removed and appropriately disposed of on land.*

Building on this measure, **Special Condition 8** would require SBM to carry out visual inspections of the facility's lines, ropes, anchors, and cultivation equipment on a monthly basis (or annually for anchors) and to remedy any observed maintenance issues or wear or fatigue of materials as soon as feasible. In addition, **Special Condition 8** also provides that all lines and equipment are 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 response. Further, **Special Condition 7** provides that SBM 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. Finally, **Special Condition 8** also requires SBM to provide Commission staff with documentation in the annual report established in **Special Condition 3** that the surveys and inspections have been carried out.

Indirect Entanglement
The presence of the shellfish 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 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 8** would require SBM to carry out visual inspections of its facility no less than once per month and to collect, remove and dispose of onshore any marine debris or derelict fishing equipment that has accumulated on the facility. Further, **Special Conditions 10 and 11** require SMB to work with NOAA's Office of Coast Survey to update navigational charts to reflect the final as-built location and configuration of the facility and to provide notification to mariners in the project area when construction and installation activities are scheduled. By ensuring that anglers and other ocean users are notified of the expanded facility and navigational charts are accurately updated with the project location, accidental interactions between other ocean users and the facility would be reduced and the facility would be less likely to snag fishing gear.

Disturbance from Operational Activities
Depending on the methods used to carry them out, several aspects of SBM'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 9** requires SBM to 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. 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. SBM does not propose to intentionally disturb or harass marine wildlife and would not use any such active deterrent methods.

Ship Strikes
Another potential impact to marine wildlife is collision with project vessels during construction and marine operations associated with the proposed project. SBM proposes to use two 35-foot vessels to carry out planting, harvest, and maintenance operations. Both vessels would operate out of Santa Barbara Harbor approximately 4 miles away from the project site and SBM estimates that each vessel would travel to the project site on average of once per day on weekdays. Assuming a total round-trip

daily travel distance of 16 miles (eight miles for each vessel), project vessels would therefore travel approximately 4,100 miles per year within nearshore coastal waters.

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 the small size and lower operational speeds of the project vessels significantly reduces the likelihood of collisions with marine mammals – most recorded instances of which have involved 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 (International Whaling Commission 2013).

To address this issue, **Special Condition 14** would require SBM to train all project vessel operators to observe the following protocols: (1) if a vessel is travelling parallel to a whale, the vessel shall operate at a constant speed that is not faster than the whale; (2) vessel operators shall make every effort to ensure that female whales are not separated from their calves; (3) vessel operators shall not try to influence a whale's swim pattern; (4) if a whale engages in defensive action, support vessels shall drop back until the animal moves out of the area; (5) vessel speeds shall be limited to 10 knots or less to minimize the likelihood and consequences of collisions with marine mammals and sea turtles; (6) in the event that any project activities result in a collision or any take of a marine mammal, SBM shall immediately notify the Executive Director, NMFS, CDFW and any other required regulatory agency.

Implementation of these protocols, in addition to the requirements in **Special Condition 7** that a qualified marine wildlife observer may halt operations if marine wildlife is potentially at risk during project construction, would minimize the potential occurrence of ship strikes during project operations and construction.

Conclusion
With the implementation of **Special Conditions 3-9 and 12-14** described above, the Commission finds that the proposed project is consistent with Coastal Act Sections 30230 and 30231.

E. COMMERCIAL AND RECREATIONAL FISHING

In addition to the commercial fishing protection afforded under Section 30230 of the Coastal Act (quoted above on page 16), Section 30234 and 30234.5 of the Coastal Act state:

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.*

SBM's existing and proposed shellfish aquaculture facility is within an area used by both commercial and recreational fisheries. The presence of the facility's anchors, floats, cultivation gear and submerged longline cables has the potential to limit or preclude some fisheries activities due to concerns about entanglement and gear loss. As a result, commercial and recreational fishing activities within the project site and its immediate vicinity may be limited by the proposed project.

In his CDP application, Bernard Friedman (SBM's owner) provides the following description of commercial and recreational fishing activities he has observed at and around the project site over the 10+ years he has been operating there:

> *Phil Freeman is the only commercial fisherman fishing in the vicinity of the* [shellfish] *farm. He is a rock crab fisherman, and since rock crab are very common, easy to catch, and have a large distribution in southern California, most crab fishermen set up territories amongst themselves to decrease conflict and increase catch productivity and efficiency. Mr. Freeman has been rock crab fishing in his de facto territory for over 20 years. He fishes 3 or 4 traps next to the* [aquaculture lease] *boundaries. We have a verbal agreement that allows him to fish close to the longlines, and he keeps an eye on the farm when I'm not around. If a trap becomes entangled in a longline, one of us will untangle it. The crab catch is considered good next to the farm.*
>
> *My own personal experience with commercial fishing for lobsters in the farm and between the longlines is mixed. Commercial lobster fishing can occur in tandem with mariculture but the catch for lobster does not seem to be worth the effort. Lobsters do frequent the area when large swells push them out of the kelp beds, but they do not seem to set up residence under the longlines.*
>
> *The recreational angler mistakenly visits the farm because they believe that the increased structure will increase the likelihood of catching fish. Occasionally, the hooks they fish snag the culture gear, and since the culture gear is too heavy to retrieve with a fishing rod, they cut the line. I have not seen any snagged hooks in years because people learned that the farm is not productive for fishing and an increased likelihood of snags, and so the farm is left largely alone now. People do recreationally fish for halibut in the area, and this is done by bouncing a hook on the bottom and drifting along the ocean. These anglers usually pass the farm on the inside towards the shore and no interaction with the farm takes place.*

These statements about limited commercial and recreational fishing occurring at the project site are supported by the analysis provided in the Initial Study and Mitigated Negative Declaration (MND) prepared for the project by staff of the California Fish and Game Commission. This analysis found that the facility's marker buoys would warn anglers of the presence of the

submerged longlines and that "the project area is small enough to allow anglers to fish near the area without affecting or altering their fishing experience." The MND therefore concluded that the proposed expansion of aquaculture operations and addition of submerged longlines throughout the 72-acre lease area would have a less than significant impact on recreational fishing.

During the recent Fish and Game Commission public hearing in Ventura (April 2018), when the leasing aspects of the proposed project were considered and approved, no comments or opposition from commercial or recreational fishing interests were provided. No such comments or opposition have been received by Coastal Commission staff during the course of its review as well.

However, the proposed three-times expansion (from 26-acres to 72-acres) of the SBM facility may not be anticipated or expected by those commercial and recreational users of the project area that are familiar with the facility at its current size. As such, conflicts may arise initially while these users adjust to the new size and configuration of the facility. To reduce the potential for this and for accidental loss or damage of fishing gear due to contact with the proposed facility, the Commission is providing in **Special Conditions 10 and 11** that SBM facilitate the update of NOAA nautical charts with the accurate location and configuration of the facility and provide advance notice of construction activities through a Notice to Mariners. In addition, **Special Condition 8** ensures that routine maintenance inspection and repair activities are carried out 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 7** requires 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.

Conclusion
With the implementation of **Special Conditions 7, 8, 10 and 11**, 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.

F. 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 two ocean vessels that could potentially increase the chance of a vessel collision and a 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 and drilling machines that could 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, SBM has incorporated into its project a number of measures that reduce the risk and consequences of an oil spill. To avoid the potential for a vessel collision, SBM has sited the proposed facility outside of all known major vessel transit routes to and from Santa Barbara Harbor and has proposed to mark the boundaries of its facility with both visual and radar reflective navigational aids. In addition, SBM would make use of vegetable-based hydraulic fluid in its onboard equipment. This would reduce the potential for adverse impacts to marine wildlife and habitats in the event of a hydraulic fluid spill. Further, SBM has prepared a Standard Operating Procedure Spill Prevention and Response Plan as part of its lease renewal and modification process with the California Fish and Game Commission. This plan is provided in **Exhibit 4** and includes a variety of measures that would reduce the likelihood of a spill, including commitments to operate only during daylight hours, use safe navigation and vessel handling practices, stow grease and oil in sealed compartments, and to maintain only the minimum quantity of hazardous materials on board.

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 12** would provide that SBM 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. This Spill Prevention and Response Plan would compliment the standard operating procedures and spill avoidance measures outlined in the plan included with SBM's aquaculture lease and would take the form of a more typical stand-alone Spill Prevention and Response Plan that would be made available on each vessel deck for reference in the event of an incident. Such a plan would include the requisite spill notification number (the State Warning Center number 1-800-852-7550) in an easy to find location on the front page along with the appropriate list of specific local contact names and numbers that will be called. Additionally, the more typical stand-alone plan required in **Special Condition 12** would also specify the total, worst-case volume of hazardous materials on the vessels and detail the type and quantity of response equipment that would be kept available on the vessel to address such a worst-case spill.

With implementation of the measures described above and in **Special Condition 12**, the Commission finds that SBM would be undertaking appropriate measures to prevent a spill from

occurring and effectively contain and respond to accidental spills that may occur. Therefore, the project is consistent with the second test of Coastal Act Section 30232.

G. ALLEGED VIOLATION

As noted above in the Summary, violations of the Coastal Act exist on the subject property, including, but not limited to, installation and use of submerged shellfish cultivation longlines, anchors, buoys, and associated equipment. In response to notification by Commission permitting and enforcement staff about these Coastal Act violations, as well as its desire to carry out additional proposed development, SBM submitted this CDP application. Approval of this application pursuant to the staff recommendation, issuance of the permit, and the applicant's subsequent compliance with all terms and conditions of the permit results in resolution of the above-described violations.

Although development has taken place prior to the submission of this Coastal Development Permit amendment application, consideration of this application by the Commission has been based solely upon the Chapter 3 policies of the Coastal Act. Commission review and action on this permit amendment does not constitute a waiver of any legal action with regard to the alleged violations, nor does it constitute an implied statement of the Commission's position regarding the legality of development, other than the development addressed herein, undertaken on the subject site without a coastal permit or permit amendment. In fact, approval of this permit amendment is possible only because of the conditions included herein and failure to comply with these conditions would also constitute a violation of this permit amendment and of the Coastal Act. Accordingly, the applicant remains subject to enforcement action just as it was prior to this permit amendment approval for engaging in unpermitted development, unless and until the conditions of approval included in this permit amendment are satisfied.

Failure to comply with the terms and conditions of this permit amendment may result in the institution of enforcement action under the provisions of Chapter 9 of the Coastal Act. Only as conditioned is the proposed development consistent with the Coastal Act.

H. CALIFORNIA ENVIRONMENTAL QUALITY ACT

Section 13096 of the California Code of Regulations requires that a specific finding be made in conjunction with coastal development permit applications showing the application to be consistent with any applicable requirements of 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 that the activity may have on the environment.

The California Fish and Game Commission, acting as lead CEQA agency, prepared a Mitigated Negative Declaration for the project and adopted it at a public hearing on February 8, 2018. The Coastal Commission's review and analysis of land use proposals has been certified by the Secretary of the Natural Resources Agency as being the functional equivalent of environmental review under CEQA. The preceding CDP determination findings discuss the relevant coastal resource issues with the proposal, and the CDP conditions identify appropriate modifications to avoid and/or lessen any potential for adverse impacts to said resources. All public comments

received to date have been addressed in the findings above, which are incorporated herein in their entirety by reference.

The Commission finds that as conditioned by this CDP amendment, there are no additional feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse environmental effects that approval of the project, as conditioned, would have on the environment within the meaning of CEQA. As so, the project will not result in any significant environmental effects for which feasible mitigation measures have not been employed consistent with CEQA Section 21080.5(d)(2)(A).

Appendix A
Substantive File Documents

Adopted Findings for Coastal Development Permit No. 9-14-0489 (University of Southern California – Wrigley Institute for Environmental Studies; oyster aquaculture research facility).

Adopted Findings for Consistency Certification No. CC-035-12 (KZO Seafarms/Catalina Sea Ranch; open-ocean commercial shellfish aquaculture facility).

Adopted Findings for Coastal Development Permit Amendment No. E-85-010-A3 (Freeport McMoRan Oil & Gas; marine pipeline repair).

Coastal development permit application and supplementary letters, reports, and materials included in file no. E-12-012-A1 (Santa Barbara Mariculture; open-ocean commercial shellfish aquaculture facility).

Initial Study and Mitigated Negative Declaration for Santa Barbara Mariculture Company Continued Shellfish Aquaculture Operations On State Water Bottom Lease Offshore Santa Barbara, California. Prepared By: California Fish and Game Commission Staff, January 2018.

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