



PUBLIC NOTICE

**U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT**

BUILDING STRONG®

APPLICATION FOR PERMIT

Public Notice/Application No.: SPL-2014-00600-MBT

Project: Rose Canyon Fisheries Sustainable Aquaculture Project

Comment Period: February 9, 2015 through March 12, 2015

Project Manager: Melanie Tymes; 760-602-4841; Melanie.B.Tymes@usace.army.mil

Applicant

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Contact

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Location

The proposed project location is approximately 7.2 kilometers (4.5 statute miles) west of Mission Bay in San Diego, California; the center of which is at Latitude 32°44.469'N, Longitude 117°19.931'W. See attached map.

Activity

Rose Canyon Fisheries, Inc. (RCF) is a partnership between Hubbs-SeaWorld Research Institute (HSWRI), a 501(c)(3) research organization, and Cuna del Mar (CdM), a private equity fund dedicated to developing sustainable aquaculture. RCF intends to create a commercially viable, economically and environmentally sustainable aquaculture facility off the San Diego, CA coast..

The proposed project will annually produce 5,000 metric tons (MT) of yellowtail jack, white seabass and striped bass in sea cages that will be located 4.5 miles (7.2 kilometers) from the San Diego shoreline. Yellowtail jack has been chosen as the initial species as cultured juveniles are readily available from HSWRI hatcheries. The site will also be permitted for other local species which will be interchangeable with yellowtail jack when the project has become operational and depending on availability of juveniles and permit conditions. Production will be phased, beginning at 1,000 to 1,500 MT in the first production cycle in order to achieve operational efficiency and ensure environmental compatibility. Based on these data, the project will gradually expand to 5,000 MT annual production, which is expected by year eight. Initially, recently developed submersible cages will be deployed, but the farm will have the capacity to test new containment systems as they are developed over time. (See attached drawings for site location and proposed project engineering). For more information see page 3 of this notice.

The Corps is requesting any information available to address potential impacts associated with the proposed project

Interested parties are hereby notified that an application has been received for a Department of the Army (DA) permit for the activity described herein and shown on the attached drawings. We invite you to review today's public notice and provide views on the proposed work. By providing substantive, site-specific comments to the U.S. Army Corps of Engineers (Corps), Regulatory Division, you provide information that supports the Corps' decision-making process. All comments received during the comment period become part of the record and will be considered in the decision. This permit will be issued, issued with special conditions, or denied under Section 10 of the Rivers and Harbors Act. The activity proposes to anchor the floating fish cages to the sea floor on the outer continental shelf. Accordingly, the Corps decision whether to issue a permit will be limited to an evaluation of the impact of the proposed work on navigation, national security, and general public interest. Because of the nature and location of this project, the Corps does not have Clean Water Act Section 404 regulatory authority over the proposed activity. Comments should be mailed to:

U.S. Army Corps of Engineers, Los Angeles District
Regulatory Division, South Coast Branch
Attention: SPL-2014-00600-MBT
5900 La Place Court, Suite 100
Carlsbad, California 92008

Alternatively, comments can be sent electronically to: Melanie.B.Tymes@usace.army.mil

The mission of the Corps Regulatory Program under Section 10 of the Rivers and Harbors Act is to protect navigation and to ensure that activities regulated under Section 10 of the Rivers and Harbors Act of 1899 are not contrary to the public interest. The Corps evaluates permit applications for essentially all construction activities that occur in the Nation's waters, including wetlands. The Regulatory Program in the Los Angeles District is executed to protect aquatic resources by developing and implementing short- and long-term initiatives to improve regulatory products, processes, program transparency, and customer feedback considering current staffing levels and historical funding trends.

During the permit process, the Corps considers the views of other Federal, state and local agencies, interest groups, and the general public. The results of this careful public interest review are fair and equitable decisions that allow reasonable use of private property, infrastructure development, and growth of the economy, while offsetting the authorized impacts to the navigation and waters of the U.S. The permit review process serves to first avoid and then minimize adverse effects of projects on aquatic resources to the maximum practicable extent. Any remaining unavoidable adverse impacts to the aquatic environment are offset by compensatory mitigation requirements, which may include restoration, enhancement, establishment, and/or preservation of aquatic ecosystem system functions and services.

Evaluation Factors

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof. Factors that will be considered include conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water

supply and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people.

The Corps is soliciting comments from the public; Federal, state, and local agencies and officials; Indian tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act (NEPA). Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Preliminary Review of Selected Factors

EIS Determination- This public notice is being issued to determine potential impacts of the proposed project and whether an EA or an EIS will be prepared in accordance with the National Environmental Policy Act (NEPA) process. The resulting NEPA document will assess the impacts of various alternatives as set forth below and further identified during the permitting process.

Water Quality- The applicant is required to obtain a permit, under Section 402 of the Clean Water Act, from the Environmental Protection Agency (EPA). EPA will determine the level of NEPA compliance necessary for their permit action.

Coastal Zone Management- For those projects in or affecting the coastal zone, the Federal Coastal Zone Management Act requires that prior to issuing the Corps authorization for the project, the applicant must obtain concurrence from the California Coastal Commission that the project is consistent with the State's Coastal Zone Management Plan. The applicant has provided project materials to the California Coastal Commission for consistency review.

Essential Fish Habitat- Preliminary determinations indicate that the proposed activity would not interfere with essential fish habitat. Bottom-profiling surveys of the area surrounding the RCF-SAP site suggest that much of the immediate area consists of soft-bottom substrate, and that the nearest hard substrate features are located more than 1,600 m from the project site. Benthic assemblages on the coastal shelf off San Diego, where the RCF-SAP site is located, typically vary with sediment particle size and/or along depth gradients. Grain size generally decreases with increasing distance from shore, changing from medium sands to silts and clays, which in turn provide different habitat advantages to the various benthic species that inhabit them.

Cultural Resources- The latest version of the National Register of Historic Places has been consulted and this site is not listed. This review constitutes the extent of cultural resources investigations by the District Engineer, and he is otherwise unaware of the presence of such resources.

Endangered Species- Preliminary determinations indicate that the proposed activity would not affect federally-listed endangered or threatened species, or their critical habitat. Therefore, formal consultation under Section 7 of the Endangered Species Act does not appear to be required at this time.

Marine Mammal Protection Act - The applicant shall abide by the regulations set forth in the U.S. Marine Mammal Protection Act as well as document and report any interactions with wildlife, to the appropriate state and federal agencies.

Public Hearing- Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearing shall state with particularity the reasons for holding a public hearing.

Proposed Activity for Which a Permit is Required

Project Purpose- The project purpose is to establish and operate a commercial-scale fish farm off the San Diego, CA coast. The proposed project will apply a scaled or phased approach to develop a fish farm in the US Exclusive Economic Zone (EEZ) offshore of southern California to produce a maximum of 5,000 metric tons (MT) per year of yellowtail jack, white seabass or striped bass to be sold in the United States. The fish will be produced in sea cages that will be located 4.5 miles (7.2 kilometers) from the San Diego shoreline. Yellowtail jack has been chosen as the initial species as cultured juveniles are readily available from HSWRI hatcheries. The site will also be permitted for white seabass and striped bass which will be interchangeable with yellowtail jack when the project has become operational and depending on availability of juveniles and permit conditions. The project is phased to scale up incrementally with a steady state of production from approximately eight years and beyond. Initially the farm will be stocked to produce up to 1,000 to 1,500 MT of product at peak harvestable biomass. The farm will operate in this capacity while all aspects of production are closely monitored and documented. Demonstrating the efficacy of the venture at the initial scale of production will ensure that all the proper safeguards are in place before scaling up further. Initially, recently developed submersible cages will be deployed, but the farm will have the capacity to test new containment systems as they are developed over time.

Additional Project Information

Proposed Mitigation and Proposed Special Conditions – The proposed mitigation and special conditions may change as a result of comments received in response to this public notice or the applicant's response to those comments. In consideration of the above, the applicant's proposed mitigation sequence (avoidance/minimization/compensation), is summarized below.

Marine Water and Sediment Quality

Impact No. 1. Organic particulates discharged during aquaculture activities may locally degrade marine water quality.

Mitigation Measure. Conduct a receiving-water monitoring program capable of delineating the extent of the discharge plume emanating from the net pens.

Impact No. 2. Deposition of excess feed, fecal matter, and fish excretions may adversely impact seafloor sediments.

Mitigation Measure. Conduct a benthic impact assessment capable of detecting project-related changes to seafloor chemistry and benthic infaunal communities. If significant adverse effects on benthic quality are observed (as defined below), abatement measures will be instituted to reduce impacts to benthic sediments and communities.

Mitigation Measure. Model the nutrient (both dissolved and particulate wastes) dispersion around the net pens.

Mitigation Measure. Identify and implement all practicable net pen management practices to reduce excess nutrient discharges to the marine environment.

Impact No. 3. Antibiotics and other therapeutic chemicals released into the marine environment may adversely affect water and sediment quality.

Mitigation Measure. Use of chemicals should be minimized by practicing preventive medicine, adopting biological controls, and adopting optimal/best aquaculture management practices.

Marine Biological Resources

Impact No. 1. Hard-bottom habitat, located within 1,600 m of project site and the fish pens, may potentially be impacted by the 3000kg anchors and associated anchor chains that will be used to moor the fish cage grids.

Mitigation Measure: Anchor contact with hard-bottom structures in the project area shall be avoided. If hard substrate is encountered, the mooring grids and anchors will be re-sited to avoid it. After initial installation of the fish pens, inspections shall be conducted on an annual basis and after major storms to verify that anchors have not migrated, or come into contact with hard-bottom structures. Anchors shall be repositioned if they contact or are in close proximity to hard-bottom features.

Impact No. 2. Wildlife may become entangled in the fish-pen nets.

Mitigation Measure: The applicant shall implement specific measures to minimize harmful interactions with wildlife (e.g., marine mammals, birds, fish and turtles). A specific goal is to avoid entanglement of marine birds, mammals, turtles, and predator fish species in the various nets that will be utilized at the RCF-SAP. As proposed by the applicant, the use of physical predator deterrence methods, such as anti-predator netting and locating the farm away from known seal and sea lion haul-out areas will be implemented. A description of the nets to be used and their placement are described in detail in section 2.3 of this report. The applicant shall consult further with the appropriate state and federal agencies regarding net mesh sizes that will be used for the fish pens, in order to minimize potential entanglement of marine wildlife. The applicant shall consider the recommendations for preventing harmful interactions with marine mammals issued by the Environmental Assessment Office, Government of Canada, as they apply to the current industry rules and regulations in the U.S. (e.g.-only physical deterrence methods, guarding, and proper storage of materials that may attract predators are allowed in the U.S. net pen aquaculture industry). The applicant shall abide by the regulations set forth in the U.S. Marine Mammal Protection Act as well as document and report any interactions with wildlife, to the appropriate state and federal agencies.

Impact No. 3. The deposition of uneaten fish food and fish feces on the seafloor may potentially alter the benthic community in the proposed project area.

Mitigation Measure: As required by the EPA as part of the NPDES permit process, a benthic monitoring program shall be initiated at the project site that is subject to review and approval by the EPA. The applicant has proposed a benthic monitoring program that includes monitoring of the health and community composition of benthic epi- and infaunal communities in addition to various physical and physiochemical measures. The proposed monitoring program incorporates adequate reference

sites and satisfies BACI criteria. Additional information regarding the design of the monitoring program is provided in Section 4.1, Marine Water Quality, Mitigation Measure No. 2.

Impact No. 4. Cultured fish may escape from containment, impacting the genetic integrity of wild populations.

Mitigation Measure: As part of the project's best management practices, the applicant will develop and implement a comprehensive loss-control plan. At minimum, the plan will include: equipment standards, equipment installation protocols, preventative maintenance plans, integrated predator deterrence plans, and a containment management system that includes documentation of management actions and external audits. Plans should allow for continuous improvement and revisions as more innovations in farming methods and technology become available.

Impact No. 5. The pathogens or diseases associated with the cultured species may be transferred to wild fish stocks or to the fish community residing in the project area.

Mitigation Measure: A comprehensive health management program consisting of the early detection of infectious agents, monitoring of environmental conditions, good husbandry practices, good nutrition, and disease control and eradication, as proposed by the applicant, shall be implemented (See Appendix III). Disease identification, control and reporting practices shall be conducted in accordance with applicable state or federal regulatory criteria (See Section 2.7). Under this plan, disease outbreaks will be minimized. When an outbreak does occur, it will be detected quickly and controlled as rapidly as possible.

Impact No. 6. Increased vessel traffic resulting from the proposed project may impact marine mammals and sea turtles.

Mitigation Measure: Vessel operators shall be trained to recognize and avoid marine mammals and turtles during their transits to and from the project site and during their operations at the project site. Once trained, vessel operators shall be re-trained on an annual basis. At a minimum, vessel operators shall implement the following procedures should marine mammals be encountered at sea.

- Support vessels shall make every effort to maintain a distance of >1,000 feet from sighted whales and other endangered or threatened marine mammals and sea turtles.
- Support vessels will not cross directly in front of migrating whales.
- When paralleling whales, support vessels will operate at a constant speed that is not faster than the whales' speed.
- Female whales will not be separated from their calves.
- Support vessels will not be used to herd or drive whales or other marine life.
- If a whale engages in evasive or defensive action, support vessels would drop back until the animal calms or moves out of the area.
- Collisions or with marine wildlife shall be reported promptly to the federal and State agencies listed below pursuant to each agency's reporting procedures.

National Marine Fisheries Service
Justin Viezbicke, Stranding Coordinator, Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213
Phone: (562) 980-3230
Justin.Viezbicke@noaa.gov

California Department of Fish and Wildlife
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201

California State Lands Commission
Environmental Planning and Management Division
100 Howe Avenue, Suite 100 South
Sacramento CA 95825-8202
(916) 574-1900

Commercial and Recreational Fishing

Impact No. 1. The proposed project would result in adverse impacts to commercial fishing operations in the San Diego area.

Mitigation Measure: To the maximum extent possible, the fish cages shall be placed in the smallest footprint possible without compromising water or sediment quality. This placement would minimize the area potentially lost to commercial fishing operations.

Mitigation Measure: The mitigation measure regarding Avoidance of hard-bottom structures, Marine Biological Resources, Section 4.1.2, also applies to this impact.

Impact No. 2. The proposed project would result in adverse impacts to recreational fishing activities in the San Diego area.

Mitigation Measure: The two mitigation measures for impacts to commercial fishing (above) would also apply to recreational fishing impacts. No additional mitigation measures are proposed.

Marine Traffic

Impact No. 1. Vessels that transit through or operate in the project area can accidentally run into the project fish pens.

Mitigation Measure: Vessel operators shall be notified of the project and its location. A project announcement should be posted in the Notice to Mariners (USCG publication). The U.S. Department of Commerce, NOAA, shall also be notified so navigational charts can be updated to show the location and extent of the fish pens. Additionally, the fish pens shall be marked with lights and radar reflectors mounted onto surface buoys in accordance with USCG regulations (72 COLREGS and all amendments), and as determined by the issuance of the USCG Aids to Navigation Permit.

Mitigation Measure: Notices that describe and illustrate the net pen locations and markings shall be posted at the Harbor Patrol or Harbor Masters offices at the two regional harbors (San Diego and Mission Bay).

Mitigation Measure: Monitors at the project site will contact vessels or boaters by marine radio if they approach too close to the net pens. Boaters should be notified by the monitors of potential conflicts and hazards.

Impact No. 2. The frequency of vessel collisions in the project area will increase due to the increase in traffic from the supply vessels that will be used to support the proposed project.

Mitigation Measure: The Mitigation Measures for Impact No. 1 apply.

Marine Cultural Resources

Impact No. 1. While the project anchors are not expected to extend to the location of any known seafloor feature, unknown seafloor features could still be encountered.

Mitigation Measure: During the installation of anchors, seafloor features shall be avoided by a minimum distance of 100 meters. At no time shall any seafloor feature be allowed to lie between an anchor and the cages where the anchor chain could damage a potentially significant cultural resource.

Mitigation Measure: Should a previously unknown shipwreck of potential cultural resource value be discovered within the project area, the proposed project anchoring scheme shall be modified to avoid the potential cultural resource.

For additional information please call Melanie Tymes of my staff at 760-602-4841 or via e-mail at Melanie.B.Tymes@usace.army.mil. This public notice is issued by the Chief, Regulatory Division.



Regulatory Program Goals:

- To provide strong protection of the nation's aquatic environment, including wetlands.
- To ensure the Corps provides the regulated public with fair and reasonable decisions.
- To enhance the efficiency of the Corps' administration of its regulatory program.

U.S. ARMY CORPS OF ENGINEERS

5900 La Place Court, Suite 100

Carlsbad, California 92008

WWW.SPL.USACE.ARMY.MIL

December 18, 2014

LIST OF ADDITIONAL INFORMATION TO SUPPLEMENT BLOCKS 17, 18 and 19 ON ACOE SECTION 10, RIVERS AND HARBORS ACT INDIVIDUAL PERMIT APPLICATION:

Additional Information for Block 17: DIRECTIONS TO THE SITE.

From *Rose Canyon Fisheries Sustainable Aquaculture Project Executive Summary*, Pages 8-10.

The proposed project location is approximately 4.5 miles (7.2 km) west of Mission Bay in San Diego, CA (see Figures 4 – 6), the center of which is at Latitude 32°44.469'N, Longitude 117°19.931'W. A variety of criteria were used in selecting the site, including depth, currents, temperature, bottom sediment type and habitat, proximity to shore based infrastructure, and avoidance of areas that would result in any potential user conflicts (other commercial and recreational activities). HSWRI consulted with representatives from a variety of stakeholder groups, and collected and analyzed sediment samples, and used a bottom and depth sounder across the entire site location to ensure that there was no hard bottom or other habitat in the proposed area. This and other site and species information will be used by NOS (National Ocean Service), Science Systems Applications, and CA Sea Grant for integration into an updated proprietary modeling program, AquaModel to simulate water and sediment quality effects of the proposed farm. HSWRI will also be redeploying their Acoustic Doppler Current Profiler (ADCP) to collect more current site information and for a longer duration. Further, the proposed site is being evaluated by the Bren School of Environmental Science and Management at the University of California Santa Barbara to analyze siting criteria for an aquaculture marine spatial planning project supported by the Sea Grant program.

In summary, the proposed location may be characterized as exposed, deepwater coastal shelf remote from sensitive habitats such as nearshore kelp beds, rocky, hard bottom substrates, seal or sea lion haul outs, or other aquatic resource areas. The area is also remote from islands, seamounts, hard bottom habitat, and any other abrupt changes in bottom bathymetry, as well as away from usual navigational lanes.

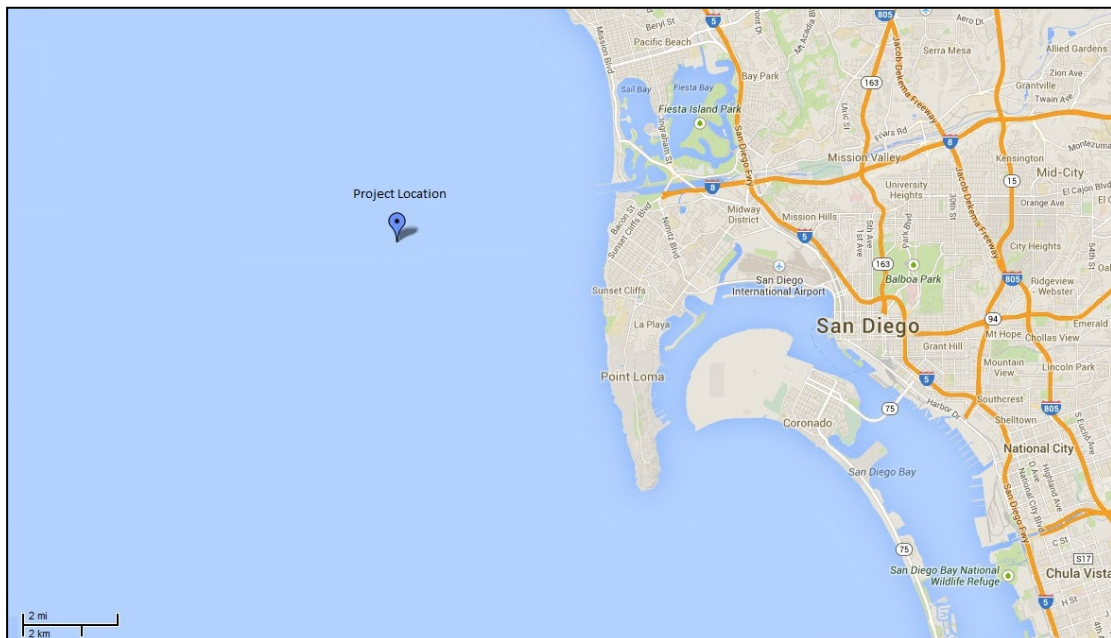


Figure 4. Map of project location.

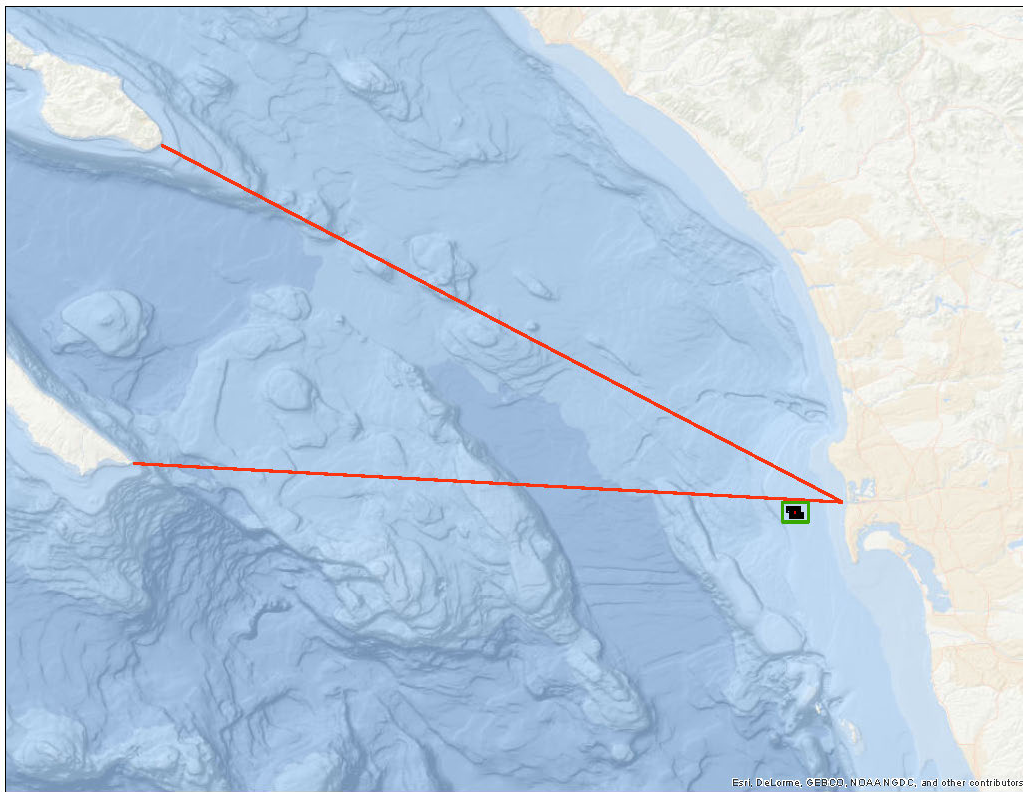


Figure 5. Vicinity map showing site location (green square with black center) and main navigational paths to San Clemente Island (south) and Santa Catalina Island (north).

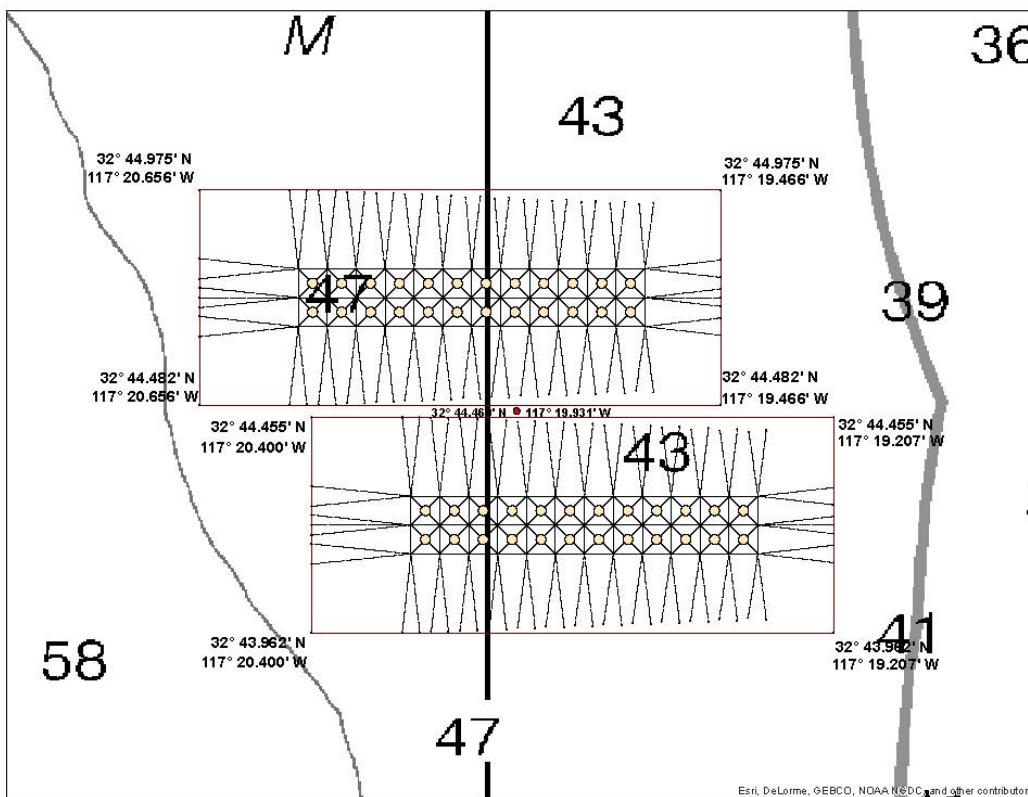


Figure 6. Close up of vicinity map with depths in fathoms.

Other Known Locations Around the Site:

Section 4.4 of the *Environmental Evaluation* prepared by Marine Research Specialists, pages 97-100 describes marine traffic around the proposed site. According to marine charts, there are no shipping lanes in close proximity to the site. The following is an excerpt from the *Environmental Evaluation*:

There are three broad categories of vessels that traverse the project area: 1) large commercial vessels that transit through the area, 2) local work boats (e.g., tour boats and fishing boats), and 3) recreational boaters.

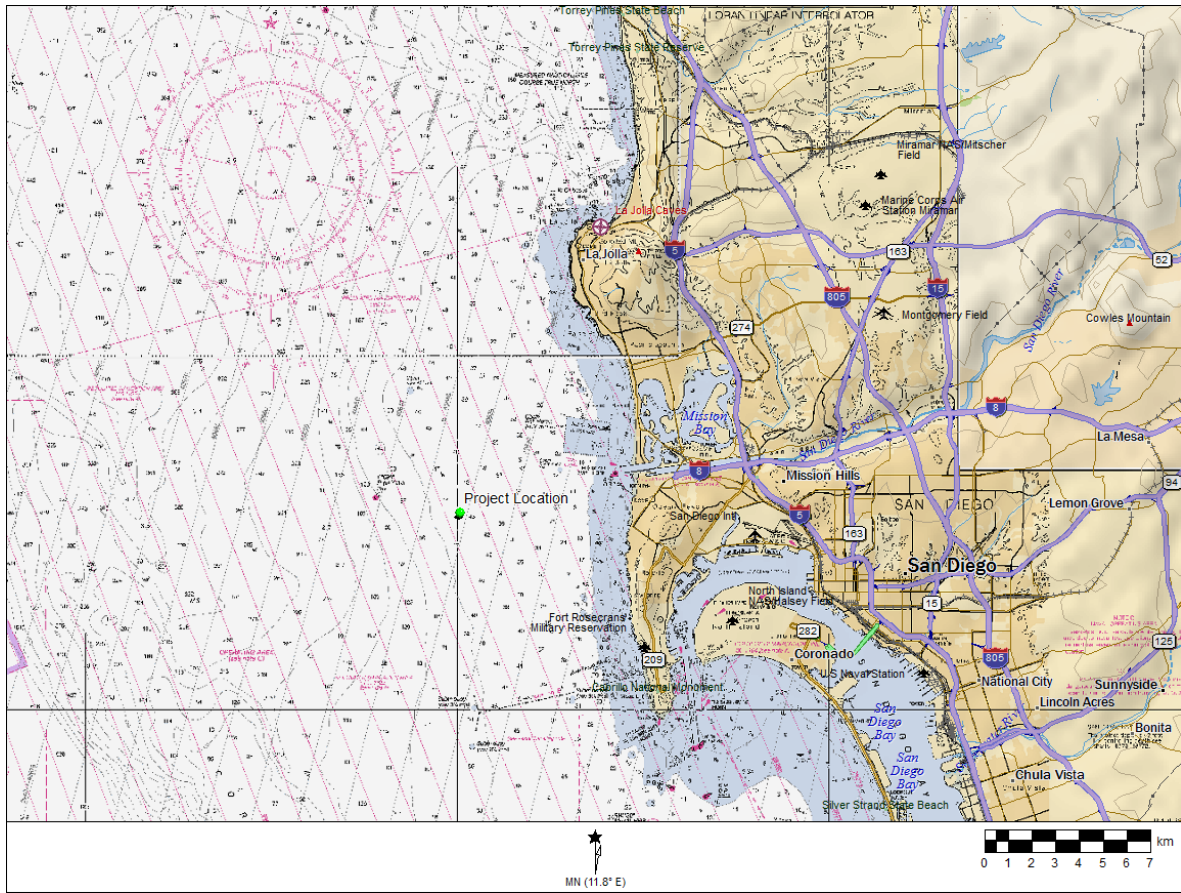
San Diego Bay is an active commercial harbor with two commercial wharves operated by the Port of San Diego, and numerous commercial fishing wharves as well. There is also heavy vessel traffic from the U.S. Navy. Approximately 82,413 vessel transits occurred in 2009 (San Diego Harbor Safety Committee, 2013). Of this total, approximately 78,094 were considered shallow draft vessels (draft of less than 18 feet), while the remaining deep draft vessels (4,319) would be generally categorized as having drafts in the 25-41 foot range.

There are four Port District maintained launch ramps throughout San Diego Bay, and an additional five in Mission Bay. These are located in:

- San Diego – Shelter Island;
- National City – Pepper Park, adjacent to the 24th Street Marine Terminal;
- Chula Vista – J Street Park;
- Coronado – Glorietta Bay; adjacent to the Municipal Pool
- Mission Bay – De Anza Cove;
- Mission Bay – Dana Launch Ramp;
- Mission Bay – South Shore Ramp;
- Mission Bay – Ski Beach Vacation Isle; and
- Mission Bay – Campland by the Bay.

The proposed project is not located in, or immediately adjacent to, any established vessel transportation corridors. The area surrounding the proposed project is considered a regulated navigation area as shown in Figure 4.4-1.

Figure 4.4-1. Marine Vessel Navigation



Additional Information for Block 18: NATURE OF THE ACTIVITY.

From *Rose Canyon Fisheries Sustainable Aquaculture Project Executive Summary*, Pages 2-3.

Background

Rose Canyon Fisheries, Inc. (RCF) is a partnership between Hubbs-SeaWorld Research Institute (HSWRI), a 501(c)(3) research organization, and Cuna del Mar (CdM), a private equity fund dedicated to developing sustainable aquaculture. RCF will permit, establish and operate a commercial-scale fish farm off the San Diego, CA coast. This will be the first operation of its kind in federal waters of the United States. By combining the scientific and environmental expertise of HSWRI with the mission focus and direct open ocean aquaculture experience of Cuna del Mar, RCF will help pioneer environmentally and economically sustainable methods for providing healthy seafood to meet our Nation’s growing demand for healthy seafood.

The proposed project will annually produce 5,000 metric tons (MT) of yellowtail jack, white seabass and striped bass in sea cages that will be located 4.5 miles (7.2 kilometers) from the San Diego shoreline. Yellowtail jack has been chosen as the initial species as cultured juveniles are readily available from HSWRI hatcheries. The site will also be permitted for other local species which will be interchangeable with yellowtail jack when the project has become operational and depending on availability of juveniles and permit conditions. Production will be phased, beginning at 1,000 to 1,500 MT in the first production cycle in order to achieve operational efficiency and ensure environmental compatibility. Based on these data, the project will gradually expand to 5,000 MT annual production, which is expected by year eight. Initially, recently developed submersible cages will be deployed, but the farm will have the capacity to test new containment systems as they are developed over time.

From *Rose Canyon Fisheries Sustainable Aquaculture Project Executive Summary*, Pages 11-13.

Culture Systems

Cage Types. Three types of cage systems may be used for this project: Double Rim SeaStation or traditional SeaStation, traditional gravity type surface cages, and Aquapod submersible fish cages.

Double Rim (DR) SeaStation and traditional SeaStation fish cages are designed for large-scale submerged or surface operations in medium-to-high energy open ocean sites (Figure 7 and 8). SeaStation’s patented, central spar design provides excellent sea-keeping abilities in open ocean conditions and through major storm events. Cages are constructed with a galvanized steel framework, surrounded with an option of different netting materials, depending on the operator’s preference. In other parts of the world these cages have been installed and are currently being operated at commercial production levels. RCF proposes using 11,000 m³ cages and increasing the number of cages being used incrementally to a maximum of 24 cages per mooring grid.

The Aquapod submersible fish cage is a unique containment system for marine aquaculture, suited for rough open ocean conditions and a diversity of species (Figure 9). The Aquapod is constructed of individual triangle net panels fastened together in a spheroid shape.

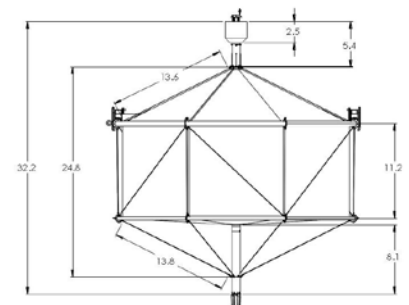


Figure 7. Illustration of a traditional SeaStation DR fish cage



Figure 8. Illustration of traditional SeaStation cage

Most Aquapod net panels are made of reinforced high density polyethylene with 80% recycled content and covered with coated galvanized steel wire mesh netting. Individual net panels or groups of panels are modified to accommodate other functions, such as access, feeding, fish transfer, grading, and harvesting. The Aquapod functions as a secure containment system for finfish while submerged or partially surfaced.

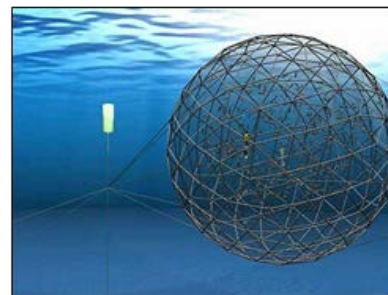


Figure 9. Illustration of Aquapod submersible fish cage

A traditional gravity cage consists of a single or double ring collar made of high-density polyethylene (HDPE) pipe (Figure 10). The pipe is filled with closed cell flotation with a net suspended from the collar. HDPE type or steel type stanchions are installed at intervals around the ring to reinforce the pipe structures as well as support net systems, handrails and walkways. All cage equipment, including navigational aids are supported directly by the flotation structure. Gravity cages come in a wide range of sizes and associated volumes. This project will initially use gravity cages of up to 11,000 m³ each and will incrementally be scaled to a maximum use of 24 cages per mooring grid, depending and in conjunction with the other cages.

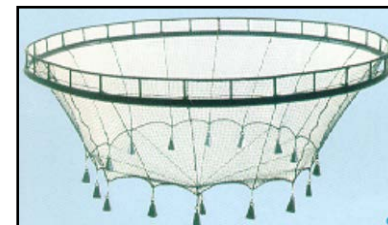


Figure 10. Illustration of a traditional gravity cage design.

Cage netting. Proposed nets and associated mesh sizes are standard in the industry, both in the U.S and throughout the world. For gravity type cages, each cage will have two types of nets; a primary net, which serves as the main containment net for the fish, and an anti-predator net, which acts as a barrier to the primary net and keeps predators at a safe distance (1 m) from the fish being cultured. All nets on gravity cages are weighted from the bottom. This keeps the nets taut so the desired culture volume is maintained and so animals do not become entangled. Primary containment nets will be suspended to a maximum depth of 12 m, with mesh sizes ranging from 0.95 to 2.85 cm square, depending on size of fish being cultured. Predator nets will be 8 cm square mesh and extend below the primary nets by a minimum of 1 m, and also above the cage collar by 2 m. Cover nets, or bird nets of 2.5-5 cm square mesh will also be stretched taut over the cage surface. These nets will be of high visibility color and supported with floating net rings to prevent birds from weighing down the net to the water surface.

Other types of cage netting may also be incorporated into the project, depending on the system used. These netting types can offer advantages over traditional netting in terms of strength and resistance to predators and biofouling.

Kikko Net mesh material is a Tetron plastic wire that can be molded into a variety of mesh sizes. Kikko Net is lightweight (1/6 the specific gravity of iron wire net); heavy strength to prevent continual tears because the structure is constructed using a special knitting method; anticorrosive; resistant to chemicals and sea water, highly resistant to acids. This makes Kikko Net ideal for usage in the sea. The strong material acts as its own predator exclusion mesh. The nets are environmentally friendly as no harmful materials are included in the raw material, and nonconductive to electricity. Additionally, because Kikko Net is non-fibrous, fouling does not grow into the material itself making it easier to clean than standard woven fish netting.

Copper mesh material is used frequently now on a variety of farming operations. Although heavier than traditional woven fish netting and Kikko Net (requiring a more buoyant cage support system), copper alloy's resistance to fouling and strength make it an attractive option. In addition, copper netting resists storm damage and lasts longer than traditional netting, reduces predator attacks and fish escapes, stays

naturally clean, reduces drag and maintains cage volume, decreases impact of pathogens and parasites, supports sustainable fish farming and is 100% recyclable and minimizes maintenance cost and efforts.

Mooring systems. One of two mooring grids capable of accommodating up to 24 cages each will be installed before installation of the first cages in order to optimize efficiency and cost. The primary portion of the mooring grid is submerged between 3 to 5 m below the surface and consists of professionally engineered anchors, chain, ropes, and assorted flotation structures. The grid and assembly is designed and installed using site-specific criteria such as depth, current, and bottom type. The final installation of the mooring grid will be perpendicular to the prevailing current direction in order to maximize flow of fresh seawater through the entire system. The cage equipment manufacturers as well as licensed maritime contractors will specify all mooring system configurations. Cage moorings will be inspected at regular intervals and after storm events. Plan and elevation view drawings of mooring configurations, as well as a site map are shown in Appendix II.

Other supporting information:

Cage Construction and Installation: Typically, sections of HDPE pipe are heat welded together in a straight line with the last weld bringing together the two ends of the straight section to form a circle. Other cage frames are bolted or connected together. This is accomplished at a shore side facility (open dock space or beach area). Typically, up to two weeks is needed to weld and completely construct as many as eight to ten cages. Cage frames are then towed out to the site and installed with mooring lines within the cage mooring grid. Nets are then hung on the cage collars.

Vessels with equipment large enough to lift and transport anchors of 3000 kg each as well as other mooring lines and floats will be needed. These same vessels can also be used to tow cage collars out to the mooring grid. Several types of commercial fishing boats in the Port of San Diego area are suitable for contracting for this work and will be guided by equipment manufacturers and other licensed marine contractors. Installing the mooring grid typically requires approximately 7-14 days to fully install. At full scale operation, the project will have two mooring grids capable of mooring 24 cages each. Only one grid will be installed at a time, the second of which likely in year 4 of the project. Therefore, total duration of cage and mooring grid construction and installation should be approximately 21-30 days, weather permitting for the offshore work. The plan is to install the systems approximately 2-3 months in advance of stocking fish and is currently driven by the issuance of all other required permits. Cage systems are checked daily as part of normal operations. Cage moorings are inspected at regular intervals, usually once per month and after storm events.

Cage and Mooring Grid Materials: Modified from *Rose Canyon Fisheries Sustainable Aquaculture Project Executive Summary*, Appendix II, page 25.

List of components for 1 cage grid of 24 cages. There will be two cage grids with these components in each when the project is fully built out.

Component	Quantity	Description
Anchors	66	3 tonne twin shank delta
Fish pens	24	~11,000 cubic meter volume
Anchor chain	132	Shot 2 in grade 3 stun link chain

Tensioning chain	66	10 m. 2 in grade 3 open link chain
Anchoring line shackles	264	2 in domestic safety anchor shackles
Ballast/float shackles	156	1-3/4 in domestic safety anchor shackles
Grid node plate	39	OceanSpar Grid Node Plate
Float chain	39	1.5 m. 1-1/2 in stud link chain
Node ballast weight	39	6.8 tonne (dry weight) concrete ballast weight with 1-1/2 in stud link chain tailer
Grid lines	62	100 m . 2 in diameter 12 plait dyneema fiber rope
Bridle penants	88	36 m. 1-1/2 in diameter dyneema fiber rope
Bridles	176	20m. 1-1/2 in diameter dyneema fiber rope
Flip swivels	12	OceanSpar bridle swivel connection
Bridle ballasts	12	1 tonne (dry weight) concrete block ballast
Bridle shackles	264	1-1/2 in domestic safety anchor shackles

Cage Grid Orientation, Surface and Benthic Footprint:

From *Rose Canyon Fisheries Sustainable Aquaculture Project Executive Summary*, Appendix II, page 23.

Cage grid orientation: perpendicular to the prevailing current direction, approximately NNE (0 to 22-25 degrees).

Surface cage footprint: 0.48 km²

Benthic anchoring system footprint: 3.25 km²

Total volume of water occupied by system: 48 cages max of 11,000m³ ea = 528,000 m³

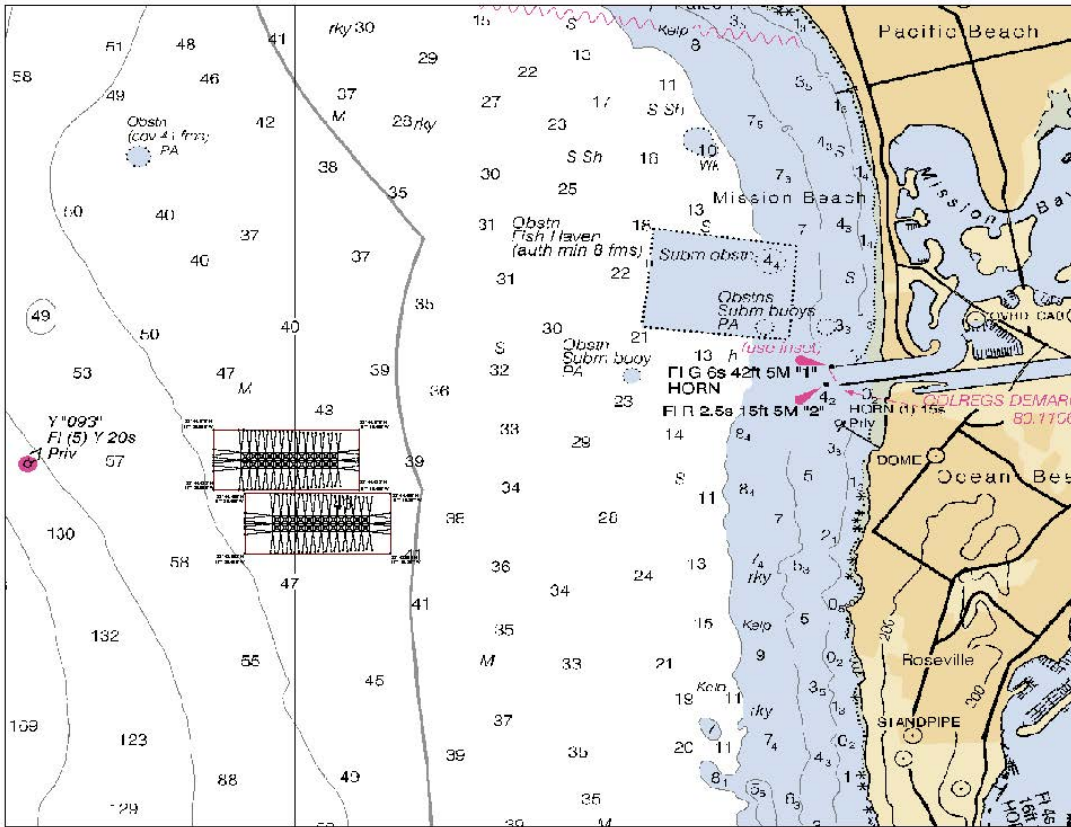
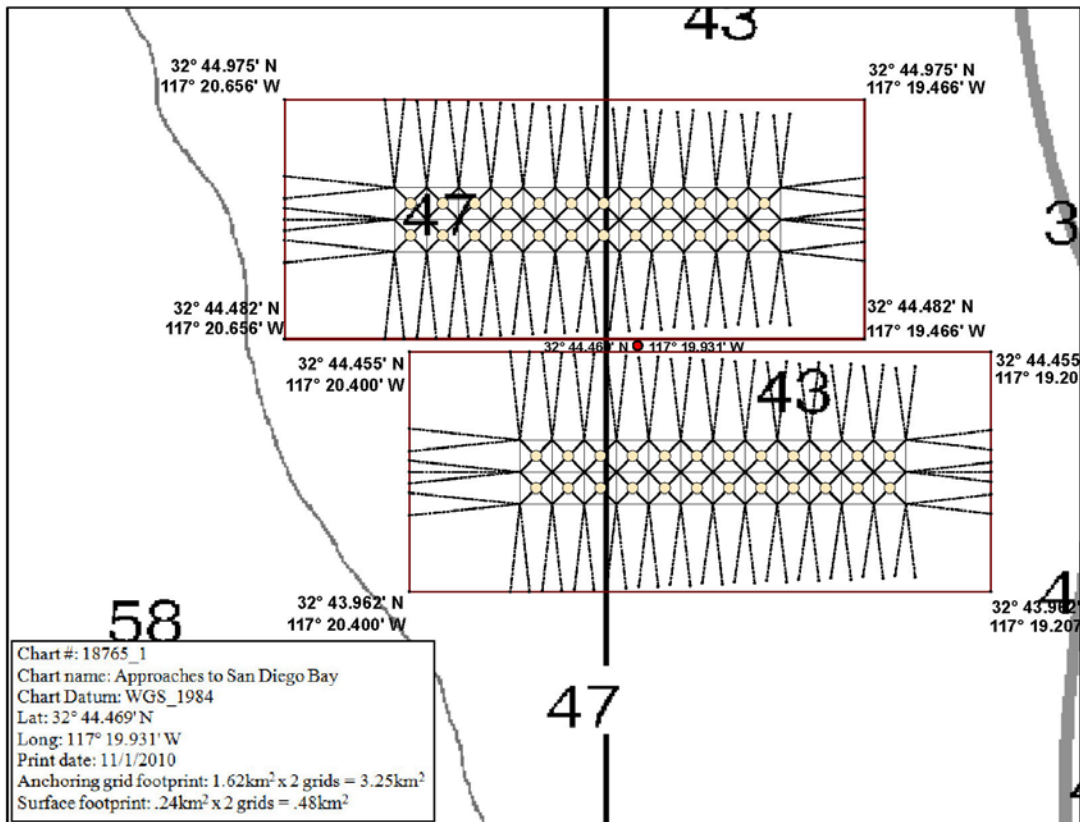


Figure 25. Project location: site detail with cage grid overlay



Additional Information for Block 19: PROPOSED PROJECT PURPOSE.

From *Rose Canyon Fisheries Sustainable Aquaculture Project Executive Summary*, Pages 2-3.

PURPOSE AND NEED:

Rose Canyon Fisheries, Inc. (RCF) is a partnership between Hubbs-SeaWorld Research Institute (HSWRI), a 501(c)(3) research organization, and Cuna del Mar (CdM), a private equity fund dedicated to developing sustainable aquaculture. RCF will permit, establish and operate a commercial-scale fish farm off the San Diego, CA coast. This will be the first operation of its kind in federal waters of the United States. By combining the scientific and environmental expertise of HSWRI with the mission focus and direct open ocean aquaculture experience of Cuna del Mar, RCF will help pioneer environmentally and economically sustainable methods for providing healthy seafood to meet our Nation's growing demand for healthy seafood.

This project is being driven by the growing global demand for healthful seafood and a lack of domestic production. Traditional harvest fisheries are fully exploited and cannot meet this increasing demand. The expanding market is fueled by an increasing world population and the growing per capita consumption of seafood. In the US, more than 91% of seafood is imported and half of that supply comes from aquaculture. This represents a \$10.4 billion contribution to the US trade deficit.

The proposed project will annually produce 5,000 metric tons (MT) of yellowtail jack, white seabass and striped bass in sea cages that will be located 4.5 miles (7.2 kilometers) from the San Diego shoreline. Yellowtail jack has been chosen as the initial species as cultured juveniles are readily available from HSWRI hatcheries. The site will also be permitted for other local species which will be interchangeable with yellowtail jack when the project has become operational and depending on availability of juveniles and permit conditions. Production will be phased, beginning at 1,000 to 1,500 MT in the first production cycle in order to achieve operational efficiency and ensure environmental compatibility. Based on these data, the project will gradually expand to 5,000 MT annual production, which is expected by year eight. Initially, recently developed submersible cages will be deployed, but the farm will have the capacity to test new containment systems as they are developed over time.

When fully built out, the proposed farm will produce approximately 5,000 metric tons annually with a landed value six to seven times the current total in San Diego. The enterprise will support approximately 200 regional seafood industry jobs. This will demonstrate how sustainably operated fish farms can help to rebuild the economic benefits to Southern California's coastal communities. Only 6.5% of our seafood is caught from domestic fisheries and only 2.3% of our supply comes from domestic aquaculture. Half of the seafood we consume is produced through aquaculture in other countries. Americans will benefit in many ways by scaling up domestic aquaculture production.

If successful, this project will serve as a model for the development of offshore aquaculture in California and the United States. It will create jobs, including new opportunities for commercial fishermen, and it will ensure that the existing infrastructure for fish processing and distribution has a viable future. The consumer will benefit from a year-round supply of high quality seafood that is safe and healthful. The environment will benefit as a high quality seafood source is produced significantly more efficiently than capture fisheries or land-based practices can achieve. In addition, the supplemental supply of high quality farmed fish will take pressure off wild fisheries.

Depending on various permit approvals, the project could begin as early as 2016, with the installation of the first 8-10 cages to support the first production cycle of harvestable fish (1000-1500 MT). First harvests from that production cycle would be available in 2018 (2 years duration for each production

cycle). Depending on environmental compatibility, scale up would occur incrementally until 5000 MT (a total of 48 cages) is reached, which would take 8 years to reach once the project becomes operational. The duration of the project will depend on permit conditions but would be intended to last well beyond the 8 years it takes to be fully operational.

From *Rose Canyon Fisheries Sustainable Aquaculture Project Executive Summary*, Appendix II Pages 24-25.

Scale, Plan, and Elevation View Drawings:

The following figures were developed by professional engineers and sea cage technology companies to provide scale and plan view drawings of the cages and mooring grids to be installed.

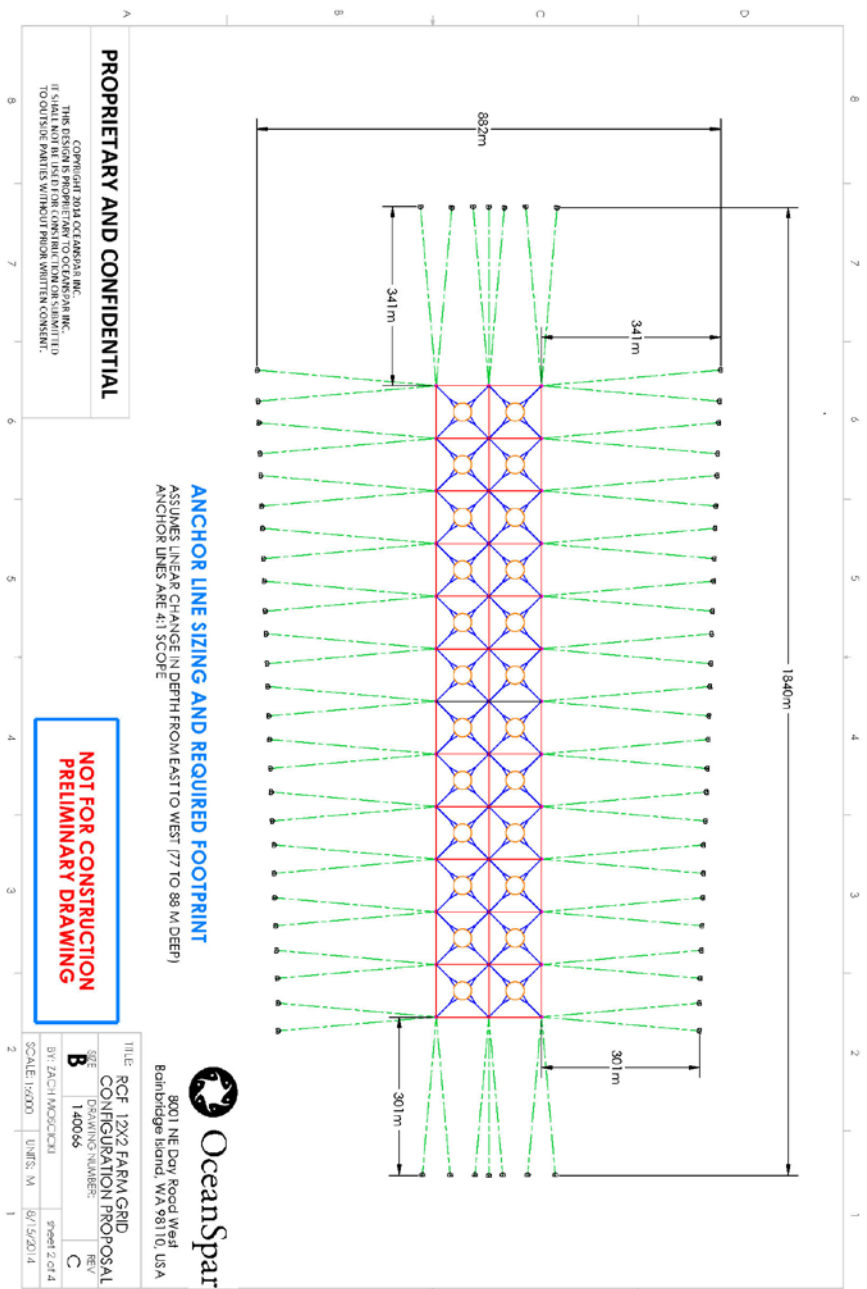


Figure 26. Mooring diagram of one cage grid.

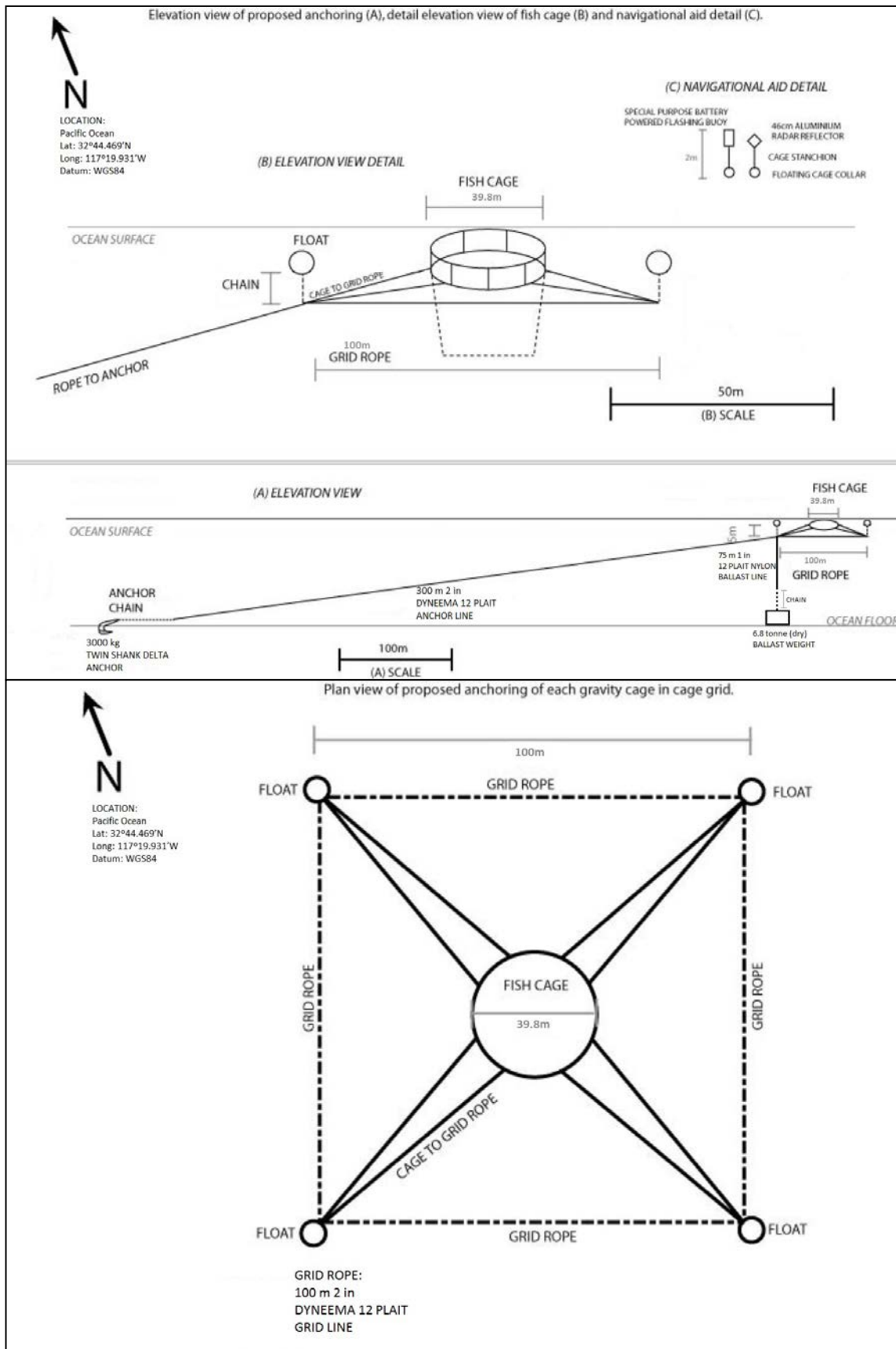


Figure 28. Additional cage drawings