



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BLVD. STE 930
LOS ANGELES, CALIFORNIA 90017

May 2, 2019

SUBJECT: Essential Fish Habitat (EFH) and Endangered Species Act (ESA) consultations for the Ventura Shellfish Enterprise Project (SPL-2017-00093-BLR)

National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service (NMFS)
ATTN: Bryant Chesney, Dan Lawson, and Monica DeAngelis
501 W. Ocean Blvd. Suite 4200
Long Beach, California 90802

Dear NMFS Resource Managers:

The Ventura Port District submitted an application (SPL-2017-00093-BLR) for Department of the Army authorization to install a commercial shellfish operation in the Southern California Bight of the Pacific Ocean, proximate to Ventura County, about three miles offshore in United States federal waters, centered at approximately 34.239647 latitude and -119.397064 longitude.

This letter includes initiation of consultation for Essential Fish Habitat (EFH), informal Section 7 Endangered Species Act (ESA) consultation of which some ESA species are also relevant to the Marine Mammal Protection Act (MMPA).

I. EFH Assessment:

I have determined the proposed work may adversely affect EFH. Therefore, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1996, as reauthorized (2007), this request initiates EFH consultation for the proposed project. Because the project would result in work involving permanent installation of twenty (20) one-hundred (100) acre plots with structures comprised of longlines, anchors, and buoys, I am seeking conservation recommendations for individual Expanded Consultation (50 CFR 600.920(i)). I am providing or otherwise identifying the below mandatory EFH assessment contents, and attached EFH Assessment Worksheet.

(i) Description of the action:

The proposed action is in federal waters of the Pacific Ocean. The Ventura Port District is seeking authorization for a project whereby they would seek Growers/Producers who would individually install structures and operate shellfish aquaculture within authorized plots. The project would occur off the coast of Ventura County outside the three mile state limit (approximately 3.53 miles from shore), in waters depths between 80 –114 feet below sea level, within the Santa Barbara Channel over sandy soft-bottom substrate. The project

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includes establishing twenty, 100-acre plot areas (2,000 acres) covering an area of approximately 1.8 miles by 1.8 miles, installing a total of 960 sand anchors (48 per plot) in the seafloor with 480 associated longlines (24 per plot) and 1,440 buoys (3 per each longline), all within waters of the United States, for the purpose of conducting a commercial aquaculture bivalve operation for non-native, but considered naturalized, Mediterranean mussel (*Mytilus galloprovincialis*) harvest. Each longline system would be approximately 1,100 feet long, comprised of a 600-foot long backbone line from which ‘grow ropes’ would be deployed, plus a 250 foot-long anchor line at each end. Each 100-acre Grower/Producer would have 24 individual longlines with 100-foot spacing between each longline. Lines were designed to be positioned roughly parallel to the prevailing winds and currents in the Channel.

Settled mussel spat on ropes would be purchased from farm sources, buoy sources, or land-based seed hatcheries. Cultivation of Mediterranean mussel is proposed because there exists a reliable source of spat from hatcheries certified by CDFW and there is a market for the species. No spat collector lines are proposed, in order to avoid potential marine mammal gear interactions. Cotton sock bags would be attached alongside the ropes until mussels naturally attach onto the socks. Maintenance and inspection of longlines are proposed to occur during daylight and/or night hours, monthly for at least the first two years. Mussels would feed on phytoplankton naturally occurring in the ocean environment; no feed, pesticides, or chemicals (such as antibiotics and hormones) are proposed. Harvesting would occur when mussels reach market size after about one year, with anticipated annual production of between 9,000 tons (20,000,000 pounds) to 11,000 tons (24,000,000 pounds) mussels. All harvesting, grading, and restocking of mussels on lines would occur on specialized vessels.

The project would result in installation of structures and work pursuant to Section 10 of the Rivers and Harbors Act of 1899 and its navigable waters, and does not include any proposed discharge of fill material that could be pursuant to Section 404 of the Clean Water Act.

(ii) Analysis of the potential adverse effects of the action on EFH and the managed species:

An adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Attached is a recent Biological Assessment Report (Dudek, dated September 2018) and EFH Assessment Report (Dudek, dated September 2018; supplement dated March 1, 2019), which describe biological resource effects in the project area and region. The proposed project is located over sandy soft-bottom substrate, and is not located over hard substrate (native or artificial), nor over submerged aquatic vegetation. Sandy soft-bottom supports various epibenthic and infaunal invertebrates that support EFH. Therefore, the project would result in no direct impact to any complex habitat resources which are known to provide high quality functions and services to EFH and their prey.

Habitat Areas of Particular Concern (HAPC) in Southern California include designated areas for the Pacific Groundfish FMP where there is seagrass, kelp canopy, estuaries, rocky reef, and discrete Areas of Interest such as the Channel Islands National Marine Sanctuary (CINMS) Marine Protected Area, Cowcod Conservation closure Area, and banks/seamounts/canyons, and sometimes deep sea corals or oil platforms. The project does not contain any of these HAPC, and therefore would result in no effect to HAPCs. The nearest proximate HAPC resources are located many miles away from the project site (see attached EFH Assessment).

Fishery Management Plan (FMP) EFH:

The project is located in EFH for three (3) FMPs, including the Pacific Groundfish FMP (53-82 species in southern California), Coastal Pelagic Species FMP (5 species), and Highly Migratory Species FMP (multiple groups), as described below.

- a. Pacific groundfish (many species) occur in the project area: As described in the EFH Assessment Report, EFH is present in the project area for over 79 species of groundfish. Because the project area lacks complex habitat, it reduces the potential for certain groundfish species like rockfish. However, the groundfish with the highest potential to utilize the habitat within the project area are those who utilize sandy soft-bottom habitat, including flatfish, flounders, and most notably the commercially important state-managed California halibut (*Paralichthys californicus*). The 2,000 acre project area does overlap with ocean bottom that is utilized by the California halibut trawl fishery but avoids areas of recorded high density use by the fishery (Figure A; northwest of the project site in red). Below is an overlay map (Figure B) of the project site approximately relative to recorded trawl fishing tracks. The approximately 2,000 acre site would occupy approximately 2.27% of the fisheries found within Block 0664 (21,363 acres) and 0665 (66,613 acres) (See attached EFH Assessment supplement, Table 1 *Groundfish EFH and Impacts in the Action Area*). Similarly effects to California halibut trawl grounds in fishing blocks are less than 0.5% (Table 2 *California halibut regional and trawl block landings in pounds*). Therefore the extent to which the project area would overlap with, and/or affect Pacific groundfish fishing grounds as a whole would be minimal.

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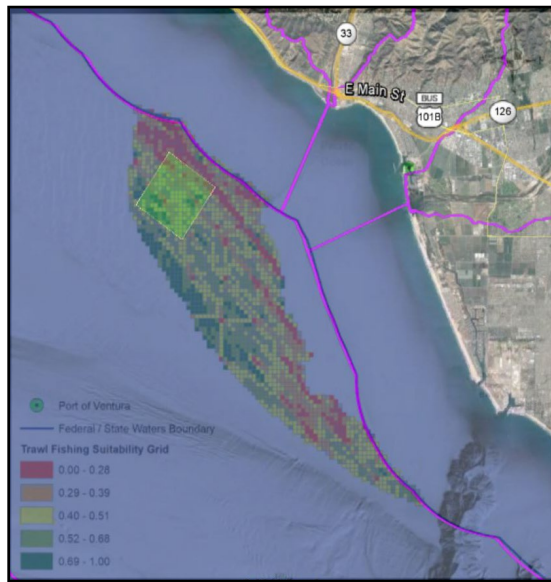


Figure A: The project area (square) is overlaid onto the trawl fishing tracks and is adjacent to areas of moderate to highest use. See Coastal Aquaculture Siting and Sustainability (CASS) Report for larger map.

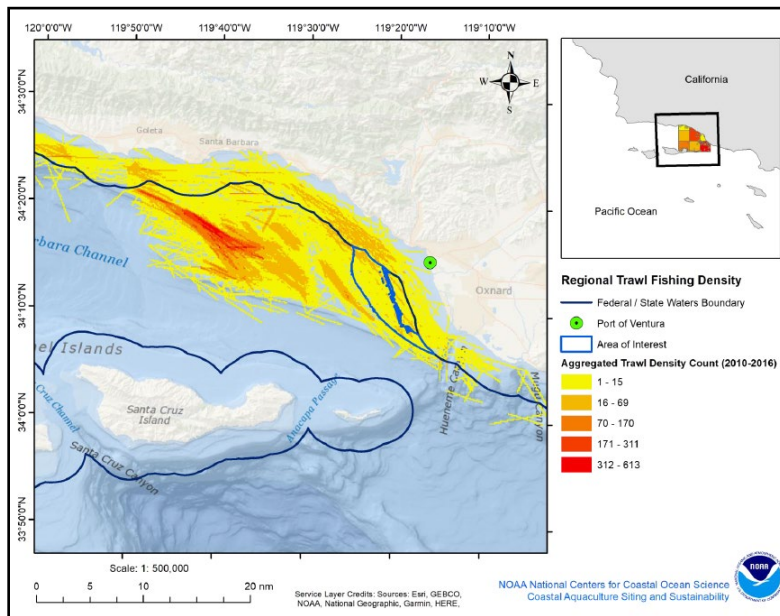


Figure B: The Area of Interest (blue) is within a high trawl fishing area, adjacent to moderate trawl density (orange), but is outside of the highest trawl density areas (red). See CASS Report for larger map.

- b. Coastal Pelagic Species (northern anchovy, Pacific sardine, Pacific mackerel, Jack mackerel, market squid) are found in the project area. The project area is located in an area with the lowest relative total recorded squid catch landings. The EFH Assessment report describes that suitable habitat for squid egg cases covers depths between 15–180 feet. Zeidberg et al. (2012) found that squid egg cases around the Channel Islands occurred in depths between 20 and 93 m (66 – 305 feet). The project area is in depths between 80 –114 feet and therefore is within the range whereby squid egg cases could be found subsequent to squid spawning. The project would result in excluding 2,000 acres of sandy soft-bottom habitat which could be utilized by squid for spawning, resulting in adverse impacts to the CPS fishery and therefore EFH. However, based on the total squid landing recorded, the impacts would occur within an area least utilized by the fishery. For example, areas farther south from the project site off Port Hueneme have much higher squid landings data recorded (Figure C). The recorded fish blocks outside the Area of Interest are not mapped. Of the CPS fisheries, the project would impact 0.53% of the northern anchovy fishery, which is less than 1% of the regional fishery, and 0% of the Pacific mackerel fishery (see EFH Assessment supplement, Table 3, *Coastal Pelagic Species in the Action Area*). The most significant species based upon economic impact, the market squid, would incur approximately 0.0015% relative percent impact regionally. Therefore, the extent to which the project area would overlap with, and/or affect CPS fishing grounds as a whole would be minimal.



Figure C: Map showing green areas least utilized by the squid fishery. The project area (square) is adjacent to two blocks of moderate use. See CASS Report for larger map.

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- c. Highly Migratory Species FMP (North Pacific albacore, yellowfin tuna, bigeye tuna, skipjack tuna, pacific bluefin tuna, common thresher shark, shortfin mako shark, blue shark, striped marlin and swordfish, and dorado) occur in the project area: Based on catch landings, EFH for thresher shark, shortfin mako shark, and dorado are caught in the project area and therefore the project would reduce the total available fishing area for the HMS fishery. Other HMS like swordfish which are caught in drift gill nets and by harpoon have a high likelihood of being in the project area and therefore the likelihood of being excluded or interacting with gear. Because the new structures could provide the effect of a fish aggregating device, potentially attracting HMS species to feed on prey at the project site, HMS movements and behaviors could be modified by the project. The extent area of existing primary HMS fishing grounds which would be affected was not mapped. Based on fishing block data, the relative percent impact to the yellowfin tuna fishery would be about 0.86%, while northern Pacific albacore, blue shark and Pacific Bluefin tuna would experience an approximate 0% impact as a result of the project (EFH Assessment supplement, Table 4 *Highly Migratory Species in the Action Area*). Therefore, the extent to which the project area would overlap with, and/or affect HMS fishing grounds as a whole would be minimal.

Potential adverse effects to EFH:

- a. Reduction in access to habitat and prey for: Pacific groundfish, CPS, and HMS.
The installation of a network of long-lines with mussel bags and buoys could physically reduce the area of use and natural movements by many species, temporarily during construction and permanently after construction.

Flatfish of the Pacific groundfish fisheries may be able to navigate the network freely along the seafloor to feed on benthic communities and seek shelter in the sand. The project would however exclude Pacific groundfish trawling activities, such that fisheries could have reduced access to groundfish as a result of them seeking refuge beneath the facility.

The project area would also restrict the CPS squid fishery from accessing the area. Because squid mating and spawning behavior occurs in aggregations with vertical movements in depths 10–50 m (30 – 150 feet), the longlines and buoys would likely restrict squid from successfully carrying out such behavior within the project area, thereby effectively excluding them from the area. The CPS fishery who also targets northern anchovy, pacific sardine, pacific mackerel, and jack mackerel, would be physically restricted from fishing in the project area. Sandy habitat within this depth range is large in the region, and the project area is not within the highest fished areas for CPS or Pacific groundfish.

HMS species like swordfish, opah, and shark who frequently reside or bask in warm surface waters could be at least somewhat restricted from the area. However, HMS

could be displaced to bask in the remaining open ocean environments, which are vast, leading to a minimal exclusion of HMS to open ocean habitat.

- b. Reduction in the quality of habitat for: Pacific groundfish, CPS, and HMS.
- The installation of a mussel aquaculture facility would result in modification to the water column and benthic substrate due to structures. The cultivation of mussels would result in removal of chlorophyll *a* phytoplankton nutrients from the water column by mussel filtering for food but is not expected to result in significant depletion due to high regeneration (see Biological Assessment Appendix C, *Phytoplankton Population Impact Analysis*). The cultivation of mussels could also result in biodeposition and bio-chemical modification of the sandy benthic environment, affecting habitat by depositing nutrients in concentration beyond what would naturally occur. However, due to the location of the project offshore in the open ocean, a high volume of biodeposition would be expected to dissipate away from the site by rapid moving currents, before reaching the seafloor (80 - 114 feet deep). However, recent observations from a local shellfish farm in similar depths of water further south have shown mussel shell deposition/mounds within a short period of time, due to unknown cause. While shell mounds have the potential to provide both beneficial and adverse effects, monitoring is needed to determine effects to the benthic environment, including composition and condition. New proposed frequent occupation by vessels could bring contaminants and pollutants to the project site water not previously present, resulting in minimal reduction in habitat condition and/or quality. Construction noise from the installation of sand anchors would result in minimal and temporary elevated noise, resulting in temporary reduction to habitat quality.

Further, anthropogenic hard surfaces and novel structures, commonly known to attract non-native and exotic/invasive fouling marine life, which can compete with native marine life, could result in community changes affecting habitat condition and/or quality. The project would include installation of mussel socks which are produced using methods to avoid introduction of non-native and exotic/invasive species. The installation of 1,440 buoys with manufactured surfaces would create a large surface area susceptible to harboring non-native and exotic/invasive species settlement if occurring or introduced to the project site. The installation of 480 longlines with mussels may have less likelihood of harboring non-native and exotic/invasive species because the lines would be dominated by mussels. Given that non-native and exotic/invasive species may be presently prevalent throughout the region on similar anthropogenic surfaces closer to the coastline, it is unknown if the facility structures in the open ocean would attract such species at levels of concern. It is also unknown if such species would then successfully populate the structures or not, or if such species could in turn adversely affect the benthic or water column habitats in the project area. Considerations for potential risk of non-native and exotic/invasive species include the proposed source of gear, the maintenance of gear, and proximity to sensitive marine resources nearby or marine life feeding on the

structures. Based on the project location in the open ocean with high water velocities, the above risks of harboring non-native and exotic/invasive species is likely to be lower than intertidal environments and embayments which have lower water exchange rates. However, due to the lack of data regarding how the proposed structure surfaces may affect environmental resources through settlement of non-native and exotic/invasive species, monitoring to detect any changes over time would be needed. How such non-native and exotic/invasive species populations could adversely affect regional-level conditions and/or ecosystems is outside the scope of this analysis. In summary, minor reduction in the quality of habitat could occur for Groundfish, CPS, and HMS, although monitoring is needed.

- c. Reduction in the quantity of prey for: Pacific Groundfish, CPS, and HMS.
The installation of a mussel aquaculture facility would reduce access across 2,000 acres, resulting in less availability to prey along the project's isobath for certain Groundfish, CPS, and HMS. However, prey fishes are also recorded as being attracted to mussel farms and therefore localized aggregations of fish prey may assist predators in quickly locating congregated prey. Overall it is unknown how reduced access and community displacement affects these groups or individual species within each group, or the potential interaction effects that may result across or within factors.
- d. Modification to the movement patterns for: Pacific Groundfish, CPS, and HMS.
See (a) above. In addition, the installation of a new 2,000 acre structure with a series of biological resources (mussel socks) stationed throughout it, would be expected to create an effective fish aggregating device, naturally attracting certain species of marine life, like shark and other HMS. For example, local structures like oil platforms, off Southern California support extremely high biodiversity and biomass of marine life, which subsequently attracts top predators. It is unknown if such structures serve as a new source of biomass for the region (added marine life), or a sink of existing biomass (displaced marine life). Therefore the new installation of a large-scale structure could modify the behavioral patterns of HMS, and possibly Pacific Groundfish and CPS.
- e. Cumulative effects for: Pacific Groundfish, CPS, and HMS. The large 2,000 acre project area is both large in scope and scale, and unprecedented in Southern California. The only other mussel farms in southern California are off Huntington Beach in federal waters and Santa Barbara in state waters, and both are each less than 100 acres, or each 5% of the proposed project area. Because only two mussel farms exist in Southern California, the project would result in no cumulative effect to EFH.

The above effects would result in individual minor adverse effects to EFH for three FMPs. Mitigative components and siting considered were incorporated into the project design to reduce and minimize adverse effects to EFH. In addition, the Corps would require incorporation of a monitoring plan in consultation with NMFS to collect data for comparing anticipated levels of adverse impacts to EFH, and ultimately determine

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whether or not more or less monitoring or mitigative measures may be needed to avoid and minimize effects to EFH.

(iii) The Federal agency's conclusions regarding the effects of the action on EFH:

Although the individual anticipated adverse effects would result in minor adverse effects to EFH, because adverse effects and threats to EFH cannot be alleviated through minor modification to the proposed large-scale action, and because specific effects of mussel farms in our region are unstudied, the Corps has determined these expected and unknown effects, over the proposed large scale area (2,000 acres) and time, would result in substantial adverse effects to EFH.

(iv) Proposed mitigation, if applicable:

The proposed project location was based on a detailed siting analysis in federal waters, designed to maximize avoidance of all conflicts with existing features and uses, and identify the locations with the highest likelihood for compatibility (NOAA CASS Technical Report). The study Area of Interest covered 20,000 acres along bathymetry comprised of target depths between 25–37 m (82 –121 feet). As a result of the analysis, the proposed project location avoids all hard substrate features, various other hazards and vessel traffic zones, all complex biological habitats, all HAPC special habitat areas (including Marine Protected Areas and special habitats), fishery blocks of highest catch, and predicted cetacean distribution.

The applicant has proposed to incorporate additional avoidance and minimization measures into their project design and mitigation measures (see attached EFH Assessment section on 'Proposed Best Management Practices to Mitigate Potential Adverse Project Impacts').

The applicant has not proposed to provide compensatory mitigation.

(v) Additional information.

Attached documents:

1. Biological Assessment Report (Dudek, Sep. 2018).
2. EFH Assessment Report (Dudek, Sep. 2018), and Supplement (Dudek, March 1, 2019)
3. CASS Technical Report (NOAA, Sep. 2018).

Reference:

Zeidberg et al. 2012. Estimation of spawning habitats of market squid (*Doryteuthis opalescens*) from field surveys of eggs off Central and Southern California. *Marine Ecology*. doi:10.1111/j.1439-0485.2011.00498.

II. Endangered Species Act, Section 7 consultation:

1. Description of the action considered: See above I(i).
2. Description of the specific areas that may be affected by the Action Area (scope of analysis):

The Action Area includes the entire proposed project site (2,000 acres) of open water habitat with sandy bottom, including a 500-foot buffer around the site to account for vessel operation during construction, potential slack lines or loose gear, and consideration of effects to adjacent habitat and marine life.

3. Description of any listed species or critical habitat that may be affected by the action and description of the manner in which the action may affect any listed species or critical habitat:

The NOAA Species Directory website was referenced for each species, inclusive of its referenced data (*accessed Feb 2019*): www.fisheries.noaa.gov/species-directory.

SEA TURTLES (NOAA/USFWS-managed):

May affect but is not likely to adversely affect (MANLAA):

- a. Threatened East Pacific green sea turtle (*Chelonia mydas*): High potential to occur. Forages in the open ocean when migrating. Known to occur in the Santa Barbara Channel and Ventura. Adults are herbivorous, but juveniles are omnivorous foraging on benthic organisms and could thus also forage on farm mussels. Movement patterns of adults however are variable whereby adults have been tracked moving away from the coast in the spring. Because sea turtles bask at the surface and juveniles are known to find food and shelter among aggregated floating objects, and sea turtles frequently become entangled in gear, there is a moderate potential for behavioral disruption and restricted access to sea turtle foraging habitat (pelagic and benthic), and potential adverse interactions with gear.
- b. Threatened/endangered olive Ridley sea turtle (*Lepidochelys olivacea*): Moderate potential to occur. Mexico coast populations are endangered and all others are threatened. Observed in Santa Barbara and Los Angeles. Carnivorous and forage in the open ocean when migrating. Primarily pelagic but also occupy coastal areas. Because sea turtles bask at the surface, and juveniles are known to find food and shelter among aggregated floating objects, and sea turtles frequently become entangled in gear, there is a moderate potential for behavioral disruption and restricted access to foraging habitat (pelagic and benthic) and potential adverse interactions with gear.
- c. Endangered loggerhead sea turtle (*Caretta caretta*): High potential to migrate through the action area. There are recent stranding data records on Ventura beaches. Feed on benthic invertebrates primary on/near hard substrate. Because sea turtles bask at the surface,

juveniles are known to find food and shelter among aggregated floating objects, and sea turtles frequently become entangled in gear, there is a moderate potential for disruption and restricted access to pelagic and foraging habitat (benthic) and potential adverse interactions with gear.

- d. Endangered Pacific leatherback sea turtle (*Dermochelys coriacea*): High potential to occur. Leatherbacks have been sited often along the entire coast of California (<http://www.californiaherps.com>). Leatherbacks feed only on soft-bodied pelagic ocean prey. Leatherbacks forage widely in temperate waters and exploit diverse open-ocean and coastal habitats characterized by oceanic processes that aggregate prey, such as convergence zones, coastal retention areas, or eddies. Because sea turtles bask at the surface, juveniles are known to find food and shelter among aggregated floating objects, and sea turtles frequently become entangled in gear, there is a moderate potential for disruption and restricted access to foraging habitat (pelagic) and potential adverse interactions with gear. Entanglement and mortality as a result of aquaculture gear has occurred.

Discussion (sea turtles):

There is no ESA designated critical habitat for any listed sea turtles in the project area, and therefore there would be no effect to critical habitat.

Sea turtles are known to move through the proposed project area and are attracted to warm waters and food resources in Southern California. Only Eastern Pacific green sea turtle have been observed permanently residing in southern California (Los Angeles and San Diego regions), but because they do not nest in southern California, individuals present are presumed to have immigrated to the area from offshore waters.

Migrating juveniles who are ending their one-year growth period at sea would be expected to depart towards a determined destination, while younger juveniles may stay in the open ocean off southern California to feed. Depending on their age and species, they may forage on pelagic prey in the project area. Juveniles and adults could be attracted to floating drift kelp/algae in the project area or any kelp/algae that aggregates around the proposed buoys and structures. Omnivorous sea turtles, like loggerhead, could be attracted to the proposed mussel farm structures to feed on its mussels or benthic invertebrate communities.

Because the proposed longlines would be stationary, and sea turtles are relatively small in size, turtles would be expected to navigate the structures and not readily become entangled in gear, due to the implemented mitigative measures (no line loops, wide line widths more visible to certain marine life). Although rare, sea turtles entangled in fixed gear in Southern California have been documented. Sea turtles must breach the water surface to breathe, so during ascent and descent, they could become entangled if any longlines or gear become loose or dislodged, which could then result in drowning followed by mortality. The applicant only proposes to minimally monitor the structures for loose gear and entangled animals one

time per month for at least the first two years, so operators are unlikely to become aware of any entangled sea turtles before mortality would occur.

While the presence and stranding data for Eastern Pacific green sea turtle, olive Ridley sea turtle, loggerhead sea turtle, and Pacific leatherback sea turtle occurs persistently in the Southern California Bight, the number of individuals occupying the offshore is expected to be low, reducing the likelihood for any frequent potential adverse interactions. However, the project size is large and situated in a location where northern cold waters converge with southern warm waters, likely attracting sea turtles to food resources in the project area. Because the project could influence migration routes, foraging habitat, and behavior of sea turtles, but has a presumed low occurrence and there is a low potential to cause behavioral disturbance, the project may affect but is not likely to adversely affect (MANLAA) all four (4) species of federally-listed sea turtle.

STEELHEAD TROUT:

No effect (for your awareness only):

- e. Endangered Southern California steelhead trout Evolutionary Significant Unit (ESU) (*Oncorhynchus mykiss*): Low potential to occur. The project area does not contain Pacific salmon FMP EFH habitat (Chinook and Coho). The project area is situated off the coast of two main rivers (Ventura River and Santa Clara River) outletting to the ocean, which contain occupied designated critical habitat for the endangered Southern California steelhead ESU. The critical habitat is located outside the project area and would not be affected. However, the Ventura River, located about 4.5 miles away, is known to be occupied by anadromous spawning steelhead which migrate between the river and the ocean. The Santa Clara River, located about 6 miles away, is known to support non-spawning steelhead. Salmon are not thought to distribute far from shore (CalFish.org), so given the project is over three miles from shore, and the population of steelhead is low and variable, there is a low probability endangered steelhead would occur within the project area. Even if steelhead were to occur within the project area, they would be expected to freely navigate the structures without adverse effects. Based on this information, the Corps has determined the project would result in no effect to endangered Southern California steelhead.

CETACEANS (whales):

May affect but is not likely to adversely affect (MANLAA):

- f. Endangered Central American Humpback whale DPS (*Megaptera novaeangliae*): Moderate to high potential to occur. Humpback prefer shallow waters for feeding targeting schooling fish close to shore and krill along upwelling and convergent zones. They are strongly associated with the 200 meter isobath (7 miles from the action area) but are prevalent nearshore in the Santa Barbara Channel and around Ventura. Threats in

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southern California include entanglement and habitat degradation. Entanglement and mortality as a result of aquaculture gear has been recorded.

- g. Endangered fin whale (*Balaenoptera physalus*): Low potential to occur. Feeds on krill, schooling fish, fish, copepods, and squid. Prefers deeper offshore waters and is strongly associated with the 200 meter isobaths (7 miles from action area) but is prevalent nearshore in the Santa Barbara Channel and region. Threats in southern California include entanglement and noise pollution. Entanglement and mortality as a result of aquaculture gear has been recorded.
- h. Endangered blue whale (*Balaenoptera musculus*): Known to occur in the Southern California Bight, but populations appear to be shifting north. Threats in southern California include entanglement and habitat degradation. There are no known records of entanglement or mortality as a result of aquaculture gear.
- i. Endangered Northern Pacific right whale (*Eubalaena japonica*): Very low potential to occur close to the southern California coast. Populations are extremely low, but migration and movement patterns are not well known. Threats in southern California include entanglement and habitat degradation. Entanglement and mortality as a result of aquaculture gear has been recorded.
- j. Endangered Sei whale (*Balaenoptera borealis*): The North Pacific population are very low, typically found farther from shore and project area, and their distributions are unpredictable and unknown. Threats include entanglement and habitat degradation. Threats in southern California include entanglement and habitat degradation. Entanglement and mortality as a result of aquaculture gear has been recorded.
- k. Endangered Southern resident killer whale DPS (*Orcinus orca*): Orcas have a highly diverse omnivorous diet and adapt to almost any environment. Their population is very small and has declined over the decades. Threats include habitat degradation and noise pollution. Threats in southern California include habitat degradation and noise pollution.
- l. Endangered sperm whale (*Physeter macrocephalus*): Sperm whales forage at very deep depths for long periods of time and target mostly squid, sharks, skates, and fishes. Migrations are not predictable. Threats in southern California include entanglement, habitat degradation, and noise pollution. Entanglement as a result of aquaculture gear has been recorded.

PINNIPED (seal):

No effect (for awareness only):

- m. Threatened Guadalupe fur seal (*Arctocephalus townsendi*): Guadalupe fur seals occur annually in California but are site specific to San Miguel Island, Isla Guadalupe, and

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Isla San Benito in the East Pacific. Because fur seals are agile in the water and small (5 – 7 feet long), they would be expected to navigate the network of longlines, and not become entangled in lines. Therefore the Corps has determined the project would result in no effect to threatened Guadalupe fur seal. The project area does not contain critical habitat for this species.

FISSIPED (otter):

No effect (for awareness only):

- n. Threatened Southern sea otter (*Enhydra lutris nereis*). Sea otter are managed by the U.S. Fish and Wildlife and NOAA. Their historical range includes the project area, but currently otters are only found north of Point Conception and south on San Nicolas Island. Due to predation risk, it is unlikely sea otter would venture from Point Conception of San Nicolas Island to the project area, due to the great distance. Even though sea otter could be attracted to mussel farms, they are very unlikely to travel or make it to the project site. In summary, the project would result in no effect to Southern sea otter. The project area does not contain critical habitat for this species.

Discussion (marine mammals):

Although recorded entanglement and adverse interactions by marine mammals with mussel farms worldwide have occurred, they are rare, the data is highly limited and unstudied. In southern California, threats to marine mammals include: entanglement especially injury and mortality from gillnets; habitat degradation; noise pollution; contamination especially from oil spills; vessel ship strikes; and shooting. Vessel ship strikes are a serious threat occurring often in the southern California Bight, but is outside the scope of this analysis. Except for the existing port barriers and coastal embayment, which can largely exclude marine mammals, habitat exclusion from aquaculture use is a new potential threat in southern California.

The applicant proposes to incorporate mitigative measures, recommended by NOAA from New Zealand practices (NOAA Technical Memo, 2017), to reduce effects to the above federally listed species (as described in Section 5.0 of the Biological Assessment Report).

Because large baleen whales lack the ability to detect structures using echolocation, they may be more likely to enter and/or become entangled within longlines due to their location within migratory routes and foraging zones, and the sheer high number of longlines that would be present. However, the above mitigative measures, would be expected to substantially reduce the potential for entanglement. Killer whale (orca) and sperm whale may have the ability to avoid the structure using echolocation detection. However, still, sperm whale have had adverse interactions with gear. Noise pollution in the ocean has the potential to affect many marine mammals who echolocate or communicate over great distances. However construction-related noise would be low and temporary and would not, near or, exceed

thresholds known to adversely affect marine mammals. Operational vessel noise is outside this scope of analysis.

Smaller sized marine mammals who are more agile and of lesser biomass, may be able to avoid and/or navigate the longlines if encountered, without experiencing entanglement issues. However, juvenile whales who are more inquisitive may also have a potential risk for entanglement from behaviorally seeking out novel objects.

The project area is sandy soft-bottom, a prevalent habitat type occurring along 400 miles of the coastline from Point Conception, California to Mexico. However, the project width, about 2 miles wide, would occupy a portion of the 20-mile wide channel between the coast and the Channel Islands, which is 10% of the migratory pathway of the channel. The placement of the facility would be expected to largely exclude many marine mammals and force them to seek alternative nearby habitat for migration and foraging.

The proposed project is square approximately 1.8 miles by 1.8 miles, with its center-point located approximately 1.3 miles from any corner of the square, and 0.9 miles from any side of the square. This configuration could make it difficult for marine mammals to depart the site after they have entered it, and could result in higher expenditure of energy. In hundreds of observations of dolphins near mussel farms, almost all selectively avoided entering the facility, however, some individuals were observed swimming and navigating the longlines (NOAA Technical Memo, 2017). Dolphins were observed selectively foraging more frequently near mussel farms, apparently due to an increase in fishes attracted to the mussel farm. A study in Australia found that bottlenose dolphins avoided shallow aquaculture mussel farms causing displacement and reduced fecundity (NOAA Technical Memo, 2017). Therefore, even if dolphins avoid the structure altogether, they could experience sublethal levels of mortality as a result, which would presumably take effect on a population level displaced over time. It is unknown if these types of behaviors are similar for whales.

To reduce adverse interactions with marine mammals for a mussel farm, best practices include avoiding siting in migratory routes, avoiding foraging habitats, reducing underwater noise, using thicker than typical spat lines, using rightly tensioned ropes and lines, breakaway links, continuous monitoring of presence/absence of marine mammals around facilities analyzed by experts, disposing of facility waste to prevent attracting animals, and regular maintenance. The above practices would be employed except the migratory routes and foraging habitats of marine mammals would not be fully avoided and continuous monitoring is not proposed. While these are the current best practices, there is a lack of data regarding specificity of interactions for each species (NOAA Technical Memo, 2017). For example, tensioned lines may cut animals who roll or panic, or damage baleen and body structures. In addition, other methods like acoustic deterrent devices, colored or lighted visual aids, or seasonal specifications could be considered to further minimize interactions, although can result in unintended attractive devices altering normal predator-prey interactions.

Based on **Table A** (below), large baleen whales may be of high risk for adverse effects, based on by previous adverse interactions with gear, and include Central American Humpback whale DPS, fin whale, blue whale, Northern Pacific right whale, and sei whale. These five baleen whales are federally-listed ESA species. Federally-listed blue whale may be similarly, or less, likely to interact at the project site because they have diminishing occurrence in the region and no prior records of adverse interactions. Federally-listed southern resident killer whale (orca) can echolocate and has no prior known record of adverse interaction, but could be at risk for entanglement, similar to echolocating sperm whales. All seven federally listed ESA whales also have MMPA depleted stocks (below optimum sustainable populations).

Although certain species like sei whales, Northern Pacific right whale, and sperm may occur less frequently in the region than other whales, limited stock assessment data restricts excluding them from potential presence and interactions. For regional data and fixed commercial gear interactions, also see NOAA Technical Memorandum NMFS, 2013. Further, populations of Northern Pacific right whale, sei whale, and killer whale (orca), in the East Pacific are extremely low, ranging from 26 to 519 animals, such that any losses could pose additional threat to populations. In summary, while overall entanglement risk is expected to be low with incorporation of mitigation design and monitoring measures, the project would reduce access to 2,000 acres of migration and foraging habitat for marine mammals feeding on benthic and pelagic prey in their habitats. Based on the above information, the Corps has determined the project may affect but is not likely to adversely affect (MANLAA) seven (7) species of federally-listed cetaceans.

	Species	ESA-listed	MMPA-protected	MMPA depleted	Size large	Cannot echolocate	Migration route/ occurrence	Stock-assessment*	Population trend	Past entanglement	Past farm mortality
a	Green ST	X	-	-	-	X	High	-	-	-	-
b	Olive ST	X	-	-	-	X	Moderate	-	-	-	-
c	Loggerhead ST	X	-	-	-	X	High	-	-	-	-
d	Leatherback ST	X	-	-	-	X	Moderate	-	-	-	X*
e	Steelhead	X	-	-	-	X	Lowest	-	-	-	-
f	Humpback	X	X	X	X	X	Low	1,876	Increases.	X*	X*
g	Fin	X	X	X	X	X	Low	9,029	Immigr.	X*	X*
h	Blue	X	X	X	X	X	Highest	1,600	Emigr.	-	-
i	N.P. right	X	X	X	X	X	Lowest	26	UNK	X*	X*
j	Sei	X	X	X	X	X	UNK/Low	519	UNK	X*	X*
k	S.R. killer/orca	X	X	X	X		UNK/High	83	Declin.		
l	Sperm	X	X	X	X		Lowest	1,997	Unchang.	X*	
m	G. fur seal	X	X	-	-	X	Low	15,830	-	-	-
n	S. sea otter	X	X	-	-	X	Lowest	3,272	-	-	-

*Stock assessment values are from the most recent surveys or population stock estimates for each species; NOAA Species Directory accessed January 2019 (<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#cetaceans---large-whales>).

Biological Assessment Report:

-A leatherback sea turtle suffered mortality in 2009, 2010, 2013 in a Canadian mussel farm.

-There are reports of two fatal marine mammal entanglements in mussel farms in Iceland (Young 2015), a harbor porpoise (*Phocoena phocoenain*) 1998 and a juvenile humpback whale in 2010. Single dropper spat collection lines were involved in both incidents. Between 1982–2010 Australia has recorded multiple humpback interactions with mussel farms and other gear.

-In February 2015, a young North Pacific right whale was entangled in ropes in mussel aquaculture gear off Korea (International Whaling Committee 2015) and released.

-A gray whale gear interaction was recorded in California.

4. Relevant reports:

- See attached as referenced above.
- See ESA Assessment supplement (dated March 1, 2019).
- NOAA Technical Memorandum NMFS, September 2013. Southwest Region Office. Saez Lauren, Dan Lawson, Monica DeAngelis, Elizabeth Petras, Sarah Wilkin, and Christina Fahy. Understanding the co-occurrence of large whales and commercial fixed gear fisheries off the west coast of the United States. NOAA_TN-NMFS-SWR-044.

Under MMPA, the applicant may need to individually pursue permission and/or commercial fishing take authorization from NOAA directly, separate from the Corps' action.

We anticipate EFH consultation will be initiated upon your receipt of this letter. We are seeking your conservation recommendations for EFH within 60 days. If we receive conservation recommendations from you, we will provide our written response within 30 days, and at least 10 days before a final action (50 CFR 600.920(k)(1)). If we deviate from any of the conservation recommendations, we will provide a written response and justification for your review. In addition, should we receive any substantial revisions on the action that could affect EFH, or if new information becomes available, we will contact you (50 CFR 600.920(1)). If you would like to receive additional information pursuant to 50 CFR 600.920(k)(2), which you believe would provide a better information base from which to conclude this process, please contact me.

We also anticipate informal ESA consultation will be initiated upon your receipt of this letter. If you wish to receive additional data pursuant to 50 CFR Part 402.14(f), which you believe would provide a better information base from which to conclude this process and formulate a response, please contact me.

Although the above statutory timelines are different, I respectfully request you provide one response, within 60 days, or let us know if separate responses would be provided. You may reach me at (213) 452-3372 or via e-mail at Bonnie.L.Rogers@usace.army.mil during the consultation period.

Sincerely,

Bonnie L. Rogers
Senior Project Manager / Ecologist
L.A. and San Bernardino Section
North Coast Branch
Regulatory Division

Ventura Shellfish Enterprise Project (SPL-2017-00093-blr)

Copy provided to:

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