



US Army Corps
of Engineers ®
Seattle District

**BIOLOGICAL EVALUATION
FOR INFORMAL ESA CONSULTATION**
For: _____ (Corps Reference Number)
Version: May 2012



**** This form is for projects that have insignificant or discountable impacts on listed species. It contains all the information required for a biological evaluation, but in abbreviated form and with minimal instructions on how to fill it out. For more detailed instructions, a format for development of a biological assessment or biological evaluation can be found on the Seattle District Corps website (www.nws.usace.army.mil – click on regulatory and then on endangered species, BA Template). You may also contact the Corps at 206-764-3495 for further information.**

Drawings and Photographs - Drawings and photographs must be submitted. Photographs must be submitted showing local area, shoreline conditions, existing overwater structures, and location of the proposed project. Drawings must include a vicinity map; plan, profile, and cross-section drawings of the proposed structures; and over- and in-water structures on adjacent properties. (For assistance with the preparation of the drawings, please refer to our *Drawing Checklist* located on our website at www.nws.usace.army.mil Select Regulatory – Regulatory/Permits – Forms.) Submit the information to: U.S. Army Corps of Engineers, Regulatory Branch, P.O. Box 3755, Seattle, Washington 98124-3755.

Date: _____

SECTION A - General Information			
1. Applicant name: SPARO Aquatics			
Mailing address: 14400 107 th Way SW			
Work phone: 206-491-0936	Home phone:	Email: Mike.spranger@outlook.com	Fax:
2. Joint-use applicant name (if applicable):			
Mailing address:			
Work phone:	Home phone:	Email:	Fax:
3. Authorized agent name:			
Mailing address:			
Work phone:	Home phone:	Email:	Fax:
4. Location where proposed work will occur			
Address (street address, city, county):			
Location of joint-use property (street address, city, county):			
Waterbody: Puget Sound/Colvos Passage			
¼ Section:	Section: 2	Township: 21N	Range: 02E
Latitude: NW 47 20 22 15 N		Longitude: 122 31 30 53 W	

5. Description of Work:

Include project drawings and site photographs.

Describe the proposed project in detail. Please describe any mitigation that is being proposed for impacts from your project. Attach a mitigation plan as an appendix, if appropriate.

The proposed project is an integrated and regenerative 10-acre (approximate) kelp and shellfish farm in the Puget Sound at the SW corner of Vashon Island, WA in Colvos Passage. The mariculture farm will grow sugar kelp (*Saccharina latissima*), clams (Manila – *Ruditapes philippinarum*), mussels (Blue Mussels/ *Mytilus trossulus* or *M. galloprovincialis*, oysters (Pacific/*Crassostrea gigas*), and possibly scallops at one location. All these species are either native or naturalized to the proposed area.

The site footprint, including the gear area and regulatory markers, will be approximately 1200' by 350', for a total of 9.6 acres.* The site will be entirely in open water between depths of 30' and 80' and will not access the shoreline or tidal lands. Required gear includes anchors, buoys, cages, and line. There will be no nets. It is approximately 300' off shore of the mean low tide. While the total farm site will be approximately 10 acres, due to the scope required for necessary anchorage the actual size of the area being farmed will be approximately 6-7 acres.

*Note: Precise location, size, depths will all be determined pending completion of farm site marine engineering work.

Kelp will be out planted in November and harvested in March/April. Shellfish will grow year-round. Growing kelp and shellfish together as a polyculture requires zero inputs (no fertilizer, pesticides, or freshwater)—making it the amongst the most sustainable form of food production on the planet—while sequestering carbon and rebuilding marine ecosystems.

Kelps are a macroscopic group of marine algae that have been shown to provide a variety of important ecosystem benefits to the surrounding marine environment. Native kelps are important nursing grounds for a variety of juvenile fish, including herring. They also improve water quality by taking up nutrients like nitrogen and phosphorus and sequester carbon acting as a carbon sink. This also locally ameliorates ocean acidification, which is a potential threat to local shellfish.

Shellfish aquaculture is among the most sustainable sources of animal protein currently available with the potential to be augmented when grown in tandem with kelp. Shellfish are filter feeders that clean the water and improve water clarity, increasing light attenuation through the water column and benefiting kelps, eelgrass, and other Submerged Aquatic Vegetation. Shellfish aquaculture also provides structural habitat for the colonization of small organisms, acting as a refuge against predators and allowing for safe foraging.

No negative habitat alterations are expected whereas the farm will likely provide benefits to the surrounding ecosystem by improving water quality and clarity, providing complex three-

dimensional habitat for small invertebrates and juvenile fishes, and partially mitigate habitat degradation due to human activities in the surrounding marine habitat and watersheds. Furthermore, scientific evidence suggests that this type of mariculture will have a positive effect on ocean acidification which will benefit many fisheries including the PS Chinook Salmon which are resident to the South Puget Sound.

For projects that include pile driving

If steel or concrete piles are being installed with an impact hammer pile driver, marbled murrelets may be adversely impacted. For installation of any type of pile with a vibratory pile driver, marine mammals may be adversely impacted. A monitoring plan may be required to ensure protection of these species.

No pile driving is expected or proposed for this project

Please fill out the following: (obtain information from contractor)	
5.1 Number of piles being replaced:	
5.2 Replacement pile type: (e.g.: ACZA-treated wood, steel, coating used on steel piles)	
5.3 Replacement pile size: (e.g. 12-inch)	
5.4 Installation method: (e.g.: vibratory, impact hammer)	Note: Vibratory or impact installation of wood, concrete, plastic, or other non-metal piles of any size is allowed. Impact installation of steel piles in marine waters is not covered under the programmatic and, in freshwater, is only covered programmatic for steel piles up to 10 inches.
5.5 Anticipated dates, number of minutes and number of days vibratory pile driving	_____ minutes per day _____ number of days Anticipated dates:
5.6 For vibratory installation, will proofing be required? If so, how many pile strikes per pile?	Yes _____ Number of pile strikes per pile _____ No _____
5.7 For impact hammer installation, estimate the number of pile strikes required per pile:	
5.8 For impact hammer installation or proofing, estimated number of pile strikes per day:	Minutes per day _____ Number of days _____ Anticipated dates:
5.9 For impact hammer pile driving or proofing, sound attenuation measures:	
5.10 Anticipated dates, number of minutes and number of days of impact hammer pile driving or proofing:	

Please fill out the following: (obtain information from contractor)	
5.11 Describe substrate into which piling will be driven:	

6. Construction Techniques:

Describe methods and timing of construction to be employed in building the project and any associated features. Identify actions that could affect listed / proposed species or designated / proposed critical habitat and describe in sufficient detail to allow an assessment of potential impacts. Consider actions such as vegetation removal, temporary or permanent elevations in noise level, channel modifications, hydrological or hydraulic alterations, access roads, power lines etc. Also discuss construction techniques associated with any interdependent or interrelated projects.

Address the following:

A. Construction sequencing and timing of each stage (duration and dates):

Stage	Date and Duration	Activity
1: Install farming system	<ul style="list-style-type: none"> • Fall 2022 • 1 week 	<ul style="list-style-type: none"> • Install anchor system (*see below for anchorage notes) • Install primary mooring buoys to bottom anchors via mooring chains/line. • Fasten main line between anchors via shackled holdfast • Attach secondary depth control lines with floats and weight at 6-8 feet
2: Seed lines with kelp and shellfish	<ul style="list-style-type: none"> • Nov 2022 • 1 week 	<ul style="list-style-type: none"> • Obtain seeding stock materials sourced in the Puget Sound and attach to mainlines. A thin line with small kelp growing on it will be attached to main line. • Obtain local shellfish stock and outplant in cages attached to long lines
3: Seasonal maintenance	<ul style="list-style-type: none"> • Weekly 	<ul style="list-style-type: none"> • Inspection of farming system via boat to measure growth and ensure continuing integrity • Perform Ad-hoc repairs and/or modifications as needed • Inspection of entire farm via ROV (remote operated vehicle) • Inspection of farm via SCUBA as needed
4: Kelp Harvest	<ul style="list-style-type: none"> • March/April 2023 	<ul style="list-style-type: none"> • Harvest kelp via boat by hand • Sort and consolidate product into insulated totes • Boat to Quartermaster Harbor or Dockton (Vashon Island) and trucked to processor (location TBD)
5: Continued Maintenance	<ul style="list-style-type: none"> • Year round 	<ul style="list-style-type: none"> • All anchors, mooring buoys, anchor lines, main kelp and shellfish lines, and secondary depth controlling lines (floats and weights) will checked and maintained weekly • Analyze project for performance and efficiency and adjust as necessary

6: Process repeated	<ul style="list-style-type: none"> Nov 2023- March/April 2024 	<ul style="list-style-type: none"> Repeat steps 2-5
7: Harvest shellfish	<ul style="list-style-type: none"> 2024 	<ul style="list-style-type: none"> Mussels, clams, and oysters typically take approximately 2 years to be harvestable. Harvesting will be done by hand via a small boat.

*Anchors – Helical anchors will be used throughout the farm (corners and perimeter) pending on site analysis of the substrate by an established helical anchor installer. Helical anchors are screwed into the seafloor and provides increased holding power over other types of anchors as well as less environmental impact.

If Helical anchors are not possible due to the substrate condition (cobble that is so large that exceeds the anchors' ability to screw into the seafloor) this will be documented by an expert in which case concrete blocks will be used.

The number, type, weight, and scope of anchoring system will be determined by a marine engineering firm.

B. Site preparation:

- Substrate will be inspected by an anchor installer to determine if helical anchors can be used.
- [Aquadopp Profiler](#) will be used to:
 - Measure water flow (current speed, direction)
 - Measure tidal currents
 - Measure combined waves and currents
- Substrate will be visually inspected to determine existing wild species.

C. Equipment to be used:

As noted above, equipment for the farm will be limited to anchors, anchor chain, stainless steel connectors, line, buoys, and shellfish cages and socks. No nets will be used.

If helical anchors can be used, they will be installed by a scuba diver using a hydraulic drill. If concrete anchors will be used, they will be moved into place using a tug, barge, and crane.

The only motor operated equipment that will be used are small skiffs. These outboard-powered vessels will be the primary source of transportation for the applicant workers and will be utilized throughout the project duration.

Harvesting will be done by hand. No mechanical harvesting will be done for seaweed or shellfish

D. Construction materials to be used:

See section C

E. Work corridor:

None

F. Staging areas and equipment wash outs:

Quartermaster Marina on Vashon Island will be used for boat(s) that are kept continually in the water. Trailered boats will use Dockton Park boat ramp on Vashon Island.

G. Stockpiling areas:

Stockpiling of spare equipment and assorted tools will be at the company owners' residence on Vashon Island. Small motor vessel(s) will be stored either at the owners' residence or docked at Quartermaster Marina. Stockpiling of harvested and finished product will be kept at a location to be determined.

H. Running of equipment during construction:

Setting anchors (Step 1 above) – If helical anchors are used this will be supported by a small boat (22') and Scuba divers.

If concrete blocks are used this will be supported by a local tugboat, barge, and crane. In either case, the boat/barge will anchor offshore during anchor placement and will be on site for no longer than 1 week.

Steps 2-5 above will be supported by a small boat.

I. Soil stabilization needs / techniques:

No soil stabilization will be needed

J. Clean-up and re-vegetation:

No clean-up or revegetation proposed

K. Storm water controls / management:

No controls proposed

L. Source location of any fill used:

No fill proposed

M. Location of any spoil disposal:

No soil dispersal proposed

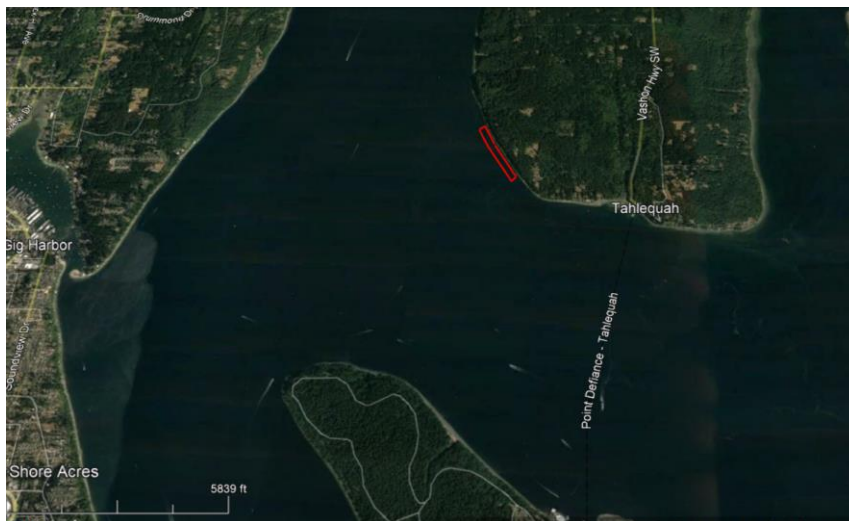
7. Action Area

Please describe the action area. The action area means all areas to be affected directly (e.g., earth moving, vegetation removal, construction noise, placement of fill, release of environmental contaminants) and indirectly by the proposed action. (Example: as a direct effect, the action area for pile driving would include the area out to where the noise from the pile driving falls below the level of harm or disturbance for listed species. For vibratory hammer pile driving impacts to killer whales, this level is 120 dB. Action area will include any area where the underwater noise level may exceed 120 dB).

The action area for this proposed project is in the South Puget Sound area on the SW corner of Vashon Island in Colvos Passage. This site was chosen for the following reasons:

- Proximity to Quartermaster Marine and Dockton Park for boat access
- Strong current and water flow to ensure high nutrient levels
- Clean water ([per Washington Dept of Health](#))
- No existing aquaculture permits (active or inactive) exist
- Support/Approval from Puyallup tribe who has U&A rights
- Limited shoreline residences
- Limited usage by recreational boaters, fishers, crabbers
- No existing/wild eel grass
- Per the DFW, not spawning area for any fish nor a herring holding area

The eastern edge of the farm is approximately 300' offshore at the MLLW extending another 350' westward thus the western edge is approximately 750' offshore at the MLLW. It extends approximately 2150' to the north for a total size of 9.6 acres.



Farm setup (step 1) is the only time when any “construction” would occur and with either anchor type this is expected to be minimal.

The only other under-water noise will be engine noise associated with a small vessel (less than 22' feet) with a 50hp outboard motor around the immediate farm area. Lifting of the long lines and shellfish cages will be done via a winch powered by an electric/battery motor.

Per the Endangered Species Act (ESA) Section 7 (a)(2) Biological Programmatic Opinion and Magnuson-Stevens Fishery Conservation and Management Act, NMFS Consultation Number WCR-2014-1502, US Army Corps of Engineers, Seattle District

In more developed areas in the SPSAA such as the cities of Olympia, Shelton, and Tacoma, nearshore areas with suitable habitat for native species is shrinking as shoreline development proceeds. Bulkheads, stormwater pollution, riparian removal, dredging, overwater structures, and other anthropogenic features have fragmented or removed habitat and altered natural sediment and organic nutrient regimes (Simenstad et al. 2011). The proposed aquaculture project will create suitable habitat for various species helping to offset the above trend.

Water quality is a primary factor affecting the health of marine and freshwater species in Western Washington (PSEMP 2013, PSEMP 2014). As Washington's population grows and urbanization of the action area continues, freshwater and marine ecosystems are under rising pressure from human activities that increase nutrient and pathogen pollution. Inputs of nutrients and pathogens affect ecosystem functions, the health and habitat of aquatic species, including economically important species (such as salmon and shellfish), and human health.

Increased nutrient loading can dramatically change the structure and function of freshwater and marine ecosystems by altering biogeochemical cycles and producing cascading effects throughout the ecosystem and food web, such as prolonged algae blooms, depressed oxygen levels, fish kills and losses of aquatic vegetation. Biomass of cultured and native shellfish has the potential to substantially reduce nutrient loading by providing a pathway for nitrogen to be sequestered and removed from sheltered coastal waters (Bricker et al. 2007, Saurel et al 2014)

Also, elevated levels of nitrogen have been studied as a stressor on eelgrass in certain places in Puget Sound (Short 2014)

Surf smelt and Pacific sand lance are key parts of the Puget Sound food web, providing food for many sea birds, marine mammals and fishes (Krueger et al in Shipman, 2010). Shoreline armoring is the greatest threat to surf smelt and sand lance spawning habitat, as armoring affects beach morphology and results in the direct loss of spawning habitat (Krueger et al in Shipman 2010). In addition to shoreline armoring, sea level rise is likely to cause widespread loss of -61- spawning habitat for these two species. Indirectly, the decline of forage fish habitat has likely led to a decline in forage for adult and sub-adult salmonids, as well other fish and wildlife species.

This farm will have a positive impact on the water quality. Kelp removes nitrogen and phosphorous from the water. Shellfish act as natural water filters. Both actions will help to improve water quality. The proposed farm will also increase forage fish habitat countering the effect of shoreline armoring.

Per Laura Arber, the WDFW has determined that you sugar kelp project doesn't require an HPA per WAC 220-660-040 (2) (1), <https://app.leg.wa.gov/WAC/default.aspx?cite=220-660-040>.

8. Species Information:

Identify each listed or proposed species, including terrestrial species, as well as designated or proposed critical habitat in the action area. Please include information on which listed species use are expected to be found in the action area and the potential for them to be there during project activities..

To determine what listed or proposed species may occur in the action area, contact NOAA Fisheries at the address listed below and obtain a county list of federally listed/ designated and proposed species and critical habitat from the:

U.S Fish and Wildlife Service at: http://westernwashington.fws.gov/se/SE_List/Endangered_Species.asp

National Marine Fisheries Service at:

510 Desmond Dr., SE # 103
 Lacey, WA 98503
 (360) 753-9530
<http://www.nwr.noaa.gov>

The following species are listed as of August 11, 2011:

USFWS SPECIES

BIRDS

Marbled murrelet
 Northern spotted owl
 Short-tailed albatross
 Western snowy plover

MAMMALS

Canada lynx
 Columbia white-tailed deer
 Gray wolf (western WA)
 Gray wolf (eastern WA)
 Grizzly bear
 Woodland caribou
 Pygmy rabbit (Columbia Basin DPS)

INSECTS

Oregon silverspot butterfly

PLANTS

Bradshaw's desert parsley
 Marsh sandwort
 Showy stickseed
 Wenatchee Mtns. Checker-mallow
 Golden paintbrush
 Kincaid's lupine
 Nelson's checker-mallow
 Water howellia
 Spalding's catchfly
 Ute ladies'-tresses

FISH

Bull trout, Columbia River
 Bull trout, coastal-Puget Sound
 Dolly varden, coastal-Puget Sound

NMFS SPECIES

FISH

Chum, Columbia River
 Chum, Hood Canal summer
 Chinook, lower Columbia River
 Chinook, upper Columbia River spring
 Chinook, Puget Sound
 Chinook, Snake River fall
 Chinook, Snake River spring-summer
 Chinook, upper Willamette River
 Coho, lower Columbia River
 Sockeye, Ozette Lake
 Sockeye, Snake River
 Steelhead, upper Columbia River
 Steelhead, middle Columbia River
 Steelhead, lower Columbia River
 Steelhead, Snake River
 Steelhead, upper Willamette River
 Steelhead, Puget Sound
 Sturgeon, Green (southern DPS)
 Eulachon, Pacific (southern DPS)
 Bocaccio (Georgia Basin DPS)
 Rockfish, canary (Georgia Basin DPS)
 Rockfish, yelloweye (Georgia Basin DPS)

MARINE MAMMALS

Humpback whale
 Blue whale
 Fin whale
 Sei whale
 Sperm whale
 Southern resident killer whale
 Steller sea lion

REPTILES-AMPHIBIANS

Leatherback sea turtle
 Loggerhead sea turtle
 Green sea turtle
 Olive Ridley sea turtle

USFWS Species

Marbled Murrelet (*Brachyramphus mamoratus*):

- **Listed Status:** Threatened, 1992 (57 Fed. Reg. 45328) done
- **Critical Habitat:** Critical areas are old growth forests near the coast. In Washington, these areas are primarily along the Olympic Peninsula and west Cascades. No overlap with action area
- **Take:** No take is expected or proposed.

Bull Trout (*Salvelinus confluentus*):

- **Listed Status:** Threatened, 1999 (64 Fed. Reg. 58909)

- **Critical Habitat:** Includes freshwater tributaries into all four major Puget Sound basins and proximal coastal marine waters.
- **Take:** Bull trout may occur in the action area during the construction activities and ongoing maintenance (Phase 2). **No take is expected or proposed.**

NMFS Species

Southern Resident Killer Whale (*Orcinus orca*):

- **Listed Status:** Endangered, 2005 (70 Fed. Reg. 69903)
- **Critical Habitat:** Virtually all waters within the Puget Sound, excepting Hood Canal, the United States portion of the Strait of Juan de Fuca, and waters surrounding the San Juan Islands are designated critical habitat (71 Fed. Reg. 69054). Additional inshore and offshore areas along the Washington and Oregon Coasts were proposed and are under review (84 Fed. Reg. 49214). The proposed project's action area overlaps with designated critical habitat Summer Core Area 1.
- **Take:** Orcas may occur in the action area while summer construction activities occur. **No take or harassment is expected or proposed.**

Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*):

- **Listed Status:** Threatened, 1999 (64 Fed. Reg. 14308)
- **Critical Habitat:** Includes nearshore and freshwater habitats along Puget Sound (70 Fed. Reg. 52629). The proposed action area overlaps with the designated nearshore critical habitat, as well as the Puyallup, White and Nisqually watershed
- **Take:** Chinook salmon may occur within the action area during construction activities. **No take is expected or proposed. No eelgrass exists in proposed farm area**

Puget Sound Steelhead (*Oncorhynchus mykiss*):

- **Listed Status:** Threatened, 2007 (72 Fed. Reg. 26722)
- **Critical Habitat:** Critical habitat was designated in 2016 (81 Fed. Reg. 9251). Proposed farm will be in the South Puget Sound. Inlets and mudflats laid down at stream confluences provide a variety of nearshore habitats. Slow and thorough tidal mixing consistent with the long, finger-like water bodies of Oyster Bay, Oakland Bay, Mud Bay, North Bay, Eld Inlet, Hammersley Inlet, Totten Inlet, Skookum Inlet, and upper Case Inlet provides nutrient rich waters at stream outlets. The proposed action does NOT overlap with critical habitat
- **Take:** **No take is expected or proposed.**

Puget Sound Bocaccio (*Sebastes paucispinis*):

- **Listed Status:** Endangered, 2010 (75 Fed. Reg. 22276)
- **Critical Habitat:** Their critical habitat is broken into nearshore and deepwater habitats and includes waters in Puget Sound east of the Victoria Sill and North to the terminus of the Strait of Georgia. While abundance of bocaccio is considered low in the NPSAA, the limited exchange of waters between the Straits and Puget Sound, including waters east of Whidbey Island, suggests extremely low abundance south and east of the Straits (Ebbesmeyer et al. 1988)
The proposed action area does not overlap with both nearshore and deepwater habitats in the area (79 Fed. Reg. 68041).
- **Take:** **No take is expected or proposed.**

Puget Sound Yelloweye Rockfish: (*Sebastes ruberrimus*):

- **Listed Status:** Endangered, 2010 (75 Fed. Reg. 22276)

- Critical Habitat: includes deepwaters in Puget Sound east of the Victoria Sill and North to the terminus of the Strait of Georgia (79 Fed. Reg. 68041). The proposed action area does not overlap with this critical habitat
- Take: **No take is expected or proposed.**

Puget Sound canary rockfish: (*Sebastes pinniger*):

- Listed Status: Endangered, 2010 (75 Fed. Reg. 22276)
- Critical Habitat: Of the four species of rockfish in the action area whose juveniles inhabit intertidal areas (Love et al. 2002), canary are the least abundant and therefore the least likely to overlap with shellfish culture activities. Few adult canary rockfish have been found recently in each of the four Puget Sound sub-basins, and the paucity of spawners, combined with natural barriers between sub-basins and Puget Sound, means that larvae and juveniles are quite rare in Puget Sound, i.e., south of Port Townsend (Green and Godersky 2012). None of the other three species are ESA-listed and one is quite common, the black rockfish (*S. melanops*)
- Take: **No take is expected or proposed.**

Southern DPS Green Sturgeon: (*Acipenser medirostris*)

- Listed Status: Endangered, 2010 (75 Fed. Reg. 22276)

Critical Habitat: Includes river basins in and near the South Puget Sound including the Green, Puyallup, White, and Nisqually. The proposed action area overlaps with nearshore and deep-water habitats in the area. However, Green sturgeon are rare within Puget Sound with only a few sightings (NMFS 2012) and none are expected to be within the action area. No effects are expected.

- Take: **No take is expected or proposed.**

Eulachon: (*Thaleichthys pacificus*)

- Listed Status: Threatened

Critical Habitat: Eulachon primarily spawn in the Columbia River system in Washington State, although occasional, sporadic spawning runs in Grays Harbor tributaries, including the Chehalis River, have been reported (WDFW (Washington Department of Fish and Wildlife) and ODFW (Oregon Department of Fish and Wildlife) 2001) and occasional spawning runs in Willapa tributaries, including the Bear River, Naselle River and one report of spawning in 1941 from Nemah River, have been reported (Gustafson 2010). Eulachon are present in Puget Sound and could occur in the action area, but are not common. They are semelparous fish that spawn in large streams before heading to deeper water offshore along the coast but there is currently no evidence of Eulachon spawning in Puget Sound (75 Fed. Reg. 13012, Comment 8). It is unlikely that they will regularly occur in the action area.

- Proposed action does not overlap with critical habitat
- Take: **No take is expected or proposed.**

Mexico Humpback Whale: (*Megaptera novaeangliae*):

- Listed Status: Threatened, 2016 (81 Fed. Reg. 62259)
- Critical Habitat: Within the Salish Sea proposed critical habitat includes the coastal waters at the opening of the Strait of Juan de Fuca and eastward, terminating at Angeles Point (84 Fed. Reg. 54354). Critical habitat does not overlap with the action area.
- Take: **No take is expected or proposed.**

Central America Humpback Whale: (*Megaptera novaeangliae*)

- Listed Status: Endangered, 2016 (81 Fed. Reg. 62259)
- Critical Habitat: Within the Salish Sea proposed critical habitat includes the coastal waters at the opening of the Strait of Juan de Fuca and eastward, terminating at Angeles Point (84 Fed. Reg. 54354). Critical habitat does not overlap with the action area.
- Take: **No take is expected or proposed.**

9. Existing Environmental Conditions:

Describe existing environmental conditions for the following:

A. Shoreline riparian vegetation and habitat features

Upland vegetation adjacent to the site was typical of that found on steep shoreline bluffs in the Puget Sound region. Visible macroflora was dominated by red alder (*Alnus rubra*), followed by vine maple (*Acer circinatum*), Douglas fir (*Pseudotsuga menziesii*), Pacific madrone (*Arbutus menziesii*), other maple species, Himalaya blackberries, and ferns of various kinds. Alders and vine maple clusters were the most common plants found on the bluff face, with some firs and madrones interspersed, but these last two species (along with alders to a lesser extent) were more prevalent on the crest of the bluff.

B. Aquatic substrate and vegetation (include information on the amount and type of eelgrass or macroalgae present at the site)

The substrate is small to medium size (golf ball to softball) cobble with occasional large (4-5') rocks. No eel grass was found nor was it expected considering the absence of any sandy/silty substrate. At depths less than -40 MLLW there was found to be areas of macroalgal cover of sugar kelp (*Saccharina latissima*) and various anchored red macroalgae (*Cryptopleura reprechiana*, *Sarcodiotheca gaudichaudii*, *Ulva* and *Ulvaria* spp., and *Delesseria decipiens*) but this decreased with increasing depth to eventually depths (70+') with little to no macroalgae present.

C. Surrounding land/water uses

Land use: There are 2 waterfront homes in the vicinity of the proposed farm. One is boat in access only and the other is walk in access only. Both have bulkheads. The farm site was intentionally chosen and placed such that is not directly in front of either home. There are 6-8 homes adjacent to the farm site on the high bank (approx. 100-150' high) set back several hundred feet from the bank. The closest road (SW Pohl Rd) is lightly used for local access only and is approximately 800'-1000' from the high bank. There are several private roads/driveways for homeowner access on the high

bank. There is no road/land vehicle access to the beach. The beach has limited public access and when used is for recreational purposes.

Water use: The proposed site is not used for commercial marine navigation or for commercial fishing/crabbing/shellfish. It is, however, used for recreational boaters (power, sail, kayak/canoe) and fishers. It is rarely used for recreational crabbing.

D. Level of development

Aside from the aforementioned homes and road there has been little to no shoreline armoring or development in the area (only 2 bulkheads currently exist)

E. Water quality

[Per the Washington Dept of Health](#), the water quality is classified as meeting the standards for aquaculture.

F. Describe use of the action area by listed salmonid fish species.

The project area is likely used by all life stages of Puget Sound Chinook salmon, including out-migrating juveniles, resident fish “blackmouth”, and returning adult fish.

The project area is NOT likely used by steelhead of the Puget Sound Distinct Population Segment.

G. Is the project located within designated / proposed bull trout or Pacific salmon critical habitat? If so, please address the proposed projects’ potential direct and indirect effect to primary constituent elements (Critical habitat templates can be found on the Corps website at: <http://www.nws.usace.army.mil/Missions/CivilWorks/Regulatory/PermitGuidebook/EndangeredSpecies.aspx>, select Forms, Tools and References; Forms and Templates; Critical Habitat Assessment Forms.

Bull trout are found within the action area and the *Assessment of Impacts to Critical Habitat for Columbia River Bull Trout or Coastal Puget Sound Bull Trout* form was used to examine the impacts to the 9 Primary Constituent Elements. We found no adverse impacts:

1. Groundwater and subsurface water: No expected effect
2. Migratory habitats: no expected effect
3. Food base: no expected effect
4. Fluvial, lacustrine, and shoreline habitats and processes: no expected effect
5. Water temperature: no expected effect
6. Substrate: no expected effect
7. Hydrology: no expected effect
8. Water quality: no expected effect
9. Non-native species additions: no expected effect

Puget Sound Chinook Salmon are found within the action area while Steelhead are NOT. The *Assessment of Impacts to Critical Habitat for ESUs of Pacific Salmon and Steelhead in Washington* form was used to examine the impacts to the 6 Primary Constituent Elements. We found no adverse effects and the potential to enhance nearshore foraging habitats adjacent to natal streams:

1. Spawning sites: no expected effect
2. Rearing sites: no expected effect
3. Migration corridors: no expected effect
4. Estuarine habitat: no expected effect
5. Nearshore marine areas: potential enhanced effect
 - **Existing Conditions:** the action area has no current obstructions to water quality, water quantity, foraging potential, or growth and development for Pacific Salmon and Steelhead.
 - **Effects to PCE:** this project may enhance the foraging habitat for juvenile salmon through increasing prey availability of both harpacticoid copepods and forage fish, while potentially decreasing the risk of predation associated with deeper water habitats (Shaffer et al. 2020).
6. Offshore marine areas: no expected effect

H. Describe use of the action area by other listed fish species (*green sturgeon, eulachon, bocaccio, canary rockfish and yelloweye rockfish*).

North American green sturgeon and Pacific eulachon critical habitats are not found in the action area (74 Fed. Reg. 52299 and 76 Fed. Reg. 65323). Green sturgeon southern DPS was listed as threatened in 2006 (71 Fed. Reg. 17757) with critical habitat designated in 2009 (74 Fed. Reg. 52300). Green sturgeon are rare within Puget Sound with only a few sightings (NMFS 2012) and none are expected to be within the action area. No effects are expected.

Eulachon are present in Puget Sound and could occur in the action area, but are not common. They are semelparous fish that spawn in large streams before heading to deeper water offshore along the coast but there is currently no evidence of Eulachon spawning in Puget Sound (75 Fed. Reg. 13012, Comment 8). It is unlikely that they will regularly occur in the action area.

Canary rockfish are no longer listed under the ESA (82 Fed. Reg. 7711). Bocaccio and yelloweye rockfish deepwater critical habitat overlap with the action area, but not the footprint of the proposed 10-acre farm. Yelloweye rockfish are unlikely to be found in the immediate project area as they occur deeper than bocaccio and other rockfish (Love et al. 1991). Kelp habitat has been shown to be critical for juvenile rockfish, particularly the young-of-the-year (YOY) who use it as an abundant foraging habitat with protection from predation (Matthews 1989, Love et al. 1991, 2002, Tonnes et al. 2016). In Puget Sound bocaccio settle in the late spring to early summer, and develop to benthic juveniles late summer through the end of the year (Tolimieri and Levin 2005). This project will provide seasonal kelp habitat during the larval/juvenile phase suspended in the water column. The juveniles of some rockfish species make use of floating mats of vegetation in open water (Buckley 1997), and the cultivated sugar kelp could replicate this habitat and may increase forage habitat and refuge from predators, though additional research would be necessary to better understand this potential effects of cultivated kelp on larval rockfish.

I. Is the project located within designated/proposed critical habitat for any of the species listed below? If so please address the proposed projects' potential direct and indirect effect to primary constituent

elements. Please see the NOAA-Fisheries and US Fish and Wildlife websites (www.nwr.noaa.gov and www.fws.gov/pacific respectively) for further information.

<i>Southern resident killer whale</i>	<i>Marbled murrelet</i>
<i>Northern spotted owl</i>	<i>Western snowy plover</i>
<i>Green sturgeon</i>	<i>Eulachon</i>

Southern resident killer whale (SRKW) critical habitat overlaps with the proposed project's action area. Specifically Area 1: Summer Corps area. There are currently three PCEs identified under the 2006 Designation of Critical Habitat for Southern Resident Killer Whale (71 Fed. Reg. 69054): (1) water quality, (2) prey; and (3) passage; however a fourth PCE, (4) sound, is suggested for the 2019 proposed revision to SRKW critical habitat.

1. Water quality: no expected effect
2. Prey: no expected direct effects, but a potential indirect enhanced effect through increased foraging of Chinook salmon and their prey species within the action area.
3. Passage: Orca's echolocation capabilities suggest that it is unlikely that lines will be an entanglement hazard. No cases have been reported in the Puget Sound of entanglement by any cetacean.
4. Sound: no expected effect. Construction and maintenance will be done using small vessels with outboard motors of. End of season activities will include harvesting kelp and shellfish by hand off of small fishing vessels and transporting raw product through Quartermaster Harbor.

- J. Describe use of action area by marbled murrelets. How far to the nearest marbled murrelet nest site or critical habitat? Some information is available on the Fish and Wildlife Service website: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?scode=B08C>.

The action area is not within Marbled Murrelet critical habitat. [Per DFWW](#), "...it is most abundant in northern Puget Sound and the Strait of Juan de Fuca, and least abundant along the coast of southwestern Washington. Surveys indicate highest nesting presence is on the Olympic Peninsula, the northern Cascades and in limited remaining habitat in southwest Washington."

- K. Describe use of action area by the spotted owl. How far to the nearest spotted owl nest site or critical habitat? Some information is available on the Fish and Wildlife Service website: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?scode=B08B>.

The action area is not within the Northern Spotted Owl critical habitat. Nearest designated critical habitat is at the Olympic Peninsula. No information on specific nesting sites around the action area was found.

- L. **For marine areas only:** Describe use of action area by Southern Resident killer whales. How often have they been seen in the area and during what months of the year? For information on noise impacts on killer whales and other marine mammals, please see the National Marine Fisheries website: <http://www.nwr.noaa.gov/Marine-Mammals/MM-consults.cfm>.

Per, the [NOAA 5 year SRKW](#) review,“..NMFS is engaged in many other habitat restoration and mitigation efforts that improve or offset impacts to the primary SRKW prey base, Chinook salmon.

The proposed kelp farm may enhance habitat functions by providing enhanced rearing and foraging opportunities to individual fish within the project and action area. These effects would be discountable or solely beneficial to Puget Sound Chinook and their designated critical habitat.

The installation of farm infrastructure (lines and buoys) would occur over a week or so at the beginning and end of the growing season, and the tools and methods are minimally intrusive. No noise related harassment or take is expected during that time. Regular maintenance activities throughout the growing season are likewise expected to be minimally intrusive because they entail a small vessel checking the grow lines and removing the kelp and shellfish will be done by hand.

M. **For marine areas and Columbia River:** How far is the nearest steller sea lion haulout site from the action area? Describe their use of the action area. See the National Marine Fisheries website: <http://www.nwr.noaa.gov/Marine-Mammals/MM-consults.cfm> for information on the steller sea lion and location of their haulout sites.

There are no steller sea lion haulout sites in the action area.

N. **For marine areas only: Forage Fish Habitat** – only complete this section if the project is in tidal waters.

Check box if Washington Department of Fish and Wildlife (WDFW) documented habitat is present. Go to the WDFW website for this information: <http://wdfw.wa.gov/fish/forage/forage.htm>, then search for each species under the link to Biology, then the link to Documented Spawning Grounds (if available, please attach a copy of the Hydraulic Project Approval from WDFW):

Surf Smelt: **Pacific Herring:** **Sand Lance:**

If no boxes are checked, please explain why site is not suitable as forage fish spawning habitat.

The proposed farm area is NOT in a documented spawning habitat area however it is close to it therefor it is worth further commentary.

Below is the DFW spawning map for the above fish with the proposed farm site noted in yellow.



Surf smelt are common, year-round residents in the nearshore areas of Puget Sound. They are a short-lived fish with most spawning populations comprised of 1- and 2-year old fish. Spawning occurs on mixed-sand and gravel substrates in the upper intertidal zone, generally higher than +7 ft MLLW (Penttila 2007, pp. 3, 8-10).

The WDFW has documented Pacific sand lance spawning habitat on approximately 130 lineal miles of shoreline; however, the surveys are incomplete (Bargmann 1998). Several spawnings may occur at any given site during the November to February spawning season. Pacific sand lance frequently use the same stretches of beach used by surf smelt, and sometimes at the same time of year (Bargmann 1998). Spawning is confined to the upper intertidal zone, generally higher than + 5 ft MLLW.

The entirety of the proposed farm will be subtidal and since sand lance and surf smelt spawn in the upper intertidal zone this project will not interfere with their spawning. However, it is being recognized as being near a recognized sand lance spawning area should the DFW maps not be complete or accurate.

The weight of available evidence suggests and leads the Service to conclude that permanent losses of marine forage fish spawning habitat and production will be uncommon, and not typical of most outcomes. The Service does not expect that permanent losses attributable to shellfish activities will be measurable at the scale of the five geographic sub-areas (Willapa Bay, Grays Harbor, Hood Canal, south and north Puget Sound), at the scale of any whole waterbody (e.g., Willapa Bay), or sub-basin (e.g., Totten Inlet, Samish Bay). We expect that these temporal losses will rarely, if ever, occur at a scale, or with a duration or severity, sufficient to measurably reduce the quality or availability of bull trout prey resources in any portion of the action area.

The DFW has determined that the proposed farm area is NOT a herring spawning or holding area.

Please describe the type of substrate and elevation and presence of aquatic vegetation at the project area. For example:

At +10 to +5 feet above MLLW, there is no aquatic vegetation, the substrate consists of large cobbles.

At +5 to +1 foot above MLLW, there is eelgrass and the substrate consists of fine sand.

The shoreline associated with the project area is unarmored except for bulkheads for two homes that are adjacent to the farm site. Driftwood and sparse vegetation exists. The shortline is small/medium cobble.

At 300-750ft from the shoreline the project area occurs from roughly -30ft MLLW to -80ft MLLW. Substrate is categorized as mixed coarse with gravel and pebbles overlaying sand, and cobble and shell added in certain areas. At depths less than -40 MLLW there was found to be macroalgal cover of sugar wrack kelp and various anchored red seaweeds, but this decreased with increasing depth. Most depths over -60 MLLW contained little to no macroalgae.

10. Effects Analysis

Describe the direct and indirect effects of the action on the proposed and listed species as well as designated and proposed critical habitat within the action area. Consider the impact to both individuals and the population. Discuss the short-term, construction-related, impacts as well as the long-term and permanent effects.

Direct Impacts:

The initial setup of the farming system is short (approx. 1 week). As mentioned above, helical anchors will be used if the substrate allows it. This anchoring system has minimal impact on the environment and is the preferred method. If it is not possible to use this style of anchor, concrete blocks will be used. These will be put in place by a crane that is supported by a barge and tug. Anchor chain will be suspended off the substrate with floatation. If concrete blocks are used, they will be permanent.

Small motor vessels associated with ongoing maintenance operations are likewise not expected to harm any previously mentioned listed species in the area. Anchorage will be installed carefully into the water to minimize turbidity. In the short term some very minor sediment disturbance could increase turbidity in the immediate area, but this impact is expected to be minor and short lived due to high currents and the absence of silt/sand in the area.

Harvest of the kelp and shellfish will occur by a small boat and by pulling the growing line onboard and removing the crop. When this occurs, it is possible that there will be some larval/juvenile ESA-listed rockfish, herring and juvenile Chinook in the vicinity, This minor disturbance may require the fish swimming to adjacent native habitats, but this is not anticipated to result in harm to individual fish.

While the area has not been identified as a spawning area for any ESA-listed fish, should spawning occur in the farm and eggs attach to the kelp or farm gear, the DFW will be contacted and no farm activities including harvesting of kelp/shellfish will take place.

Per the US Fish and Wildlife Service reference: 01EWF00-2016-F-0121,
Water quality/sequestration of carbon and nutrients

It is widely acknowledged that both naturally occurring and cultured shellfish provide significant water quality improvement functions (Forrest et al. 2009, p. 5; Straus et al. 2013, pp. 16, 17). “High densities of suspension feeding bivalves can dramatically impact water quality in myriad ways (Newell 2004). Numerous studies have shown that filter-feeding bivalves can locally decrease phytoplankton abundance in both natural (Asmus and Asmus 1991, Cressman et al. 2003, Grizzle et al. 2006) and cultured settings (Strohmeier et al. 2005, Grizzle et al. 2006) ... In addition to removing phytoplankton, bivalve filter feeding removes inorganic particles from the water column, reducing turbidity (Newell 2004). The reduced turbidity results in deeper light penetration, which can improve the condition for submerged aquatic vegetation, including seagrasses (Newell and Koch 2004, Straus et al. 2013, p. 16).” “Filter feeding also removes nitrogen and phosphorus from the water column, nutrients that may ultimately be removed from the ecosystem via the harvest of cultured bivalves ... Thanks to this nutrient-removal capacity, bivalve aquaculture can improve water quality. Several authors have suggested aquaculture ... to mitigate eutrophication pressure in coastal systems (Newell 2004, Lindahl et al. 2005, Zhou et al. 2006)” (Straus et al. 2013, p. 17).

Bivalves and other filter-feeding shellfish, whether occurring naturally or in farmed/cultured settings, do provide important benefits in the form of ecosystem services. The Service expects that shellfish activities will generally, and in the majority of cases, provide long-term benefits in the form of improved water quality and sequestration of carbon and nutrients. These ecosystem services may be important as a means to control and prevent the effects of excess nutrient additions occurring elsewhere in the contributing watersheds and may lessen or counteract the potential for climate-induced ocean acidification and hypoxia

In-Air and Underwater Sound

The Corps has described elevated sound levels that result temporarily from some typical shellfish activities and equipment (Corps 2015, pp. 86, 87). Small- and medium-sized work vessels and skiffs are used widely. These are generally powered with outboard motors, and produce in-air and underwater sound levels that are likely to exceed the ambient condition to a distance of a few hundred ft.,, all of these sources of measurable in-air and underwater sound are non-impulsive, and even the loudest and most intense sounds resulting from shellfish activities are unlikely to exceed the ambient condition to a distance of more than 500 hundred ft. We conclude that related exposures and effects to bull trout are insignificant

Marbled murrelets exposed to elevated underwater and in-air sound levels resulting from the operation of vessels, motors, and other shellfish equipment (e.g., gas-powered air compressors, hydraulically powered onboard equipment) will not experience $TS \geq 40$ dB, and non-injurious $TS > 40$ DB occurring in the marine environment would not generally have a measurable effect on marbled murrelet behaviors; the effect of ambient sound levels on signal perception would be greater than that of TS (SAIC 2012). The Service also concluded that a $TS < 40$ dB will not generally interfere with predator detection

The proposed farm will be supported by a small boat(s) with a small outboard (4 stroke) engine. An electric/battery powered winch will be used to lift long lines and shellfish cages. No other mechanical equipment will be used.

Related or Additional Considerations for Marine Birds and Shorebirds

“Shellfish aquaculture typically occurs in shallow, nearshore waters, which also tend to harbor the greatest densities and diversity of marine birds. However, only a relatively small number of studies have evaluated the effects of shellfish aquaculture on birds” (Zydelis et al. 2009, p. 2).

“When disturbance does occur, birds compensate by moving elsewhere or by feeding at a greater rate during undisturbed periods of the day ... birds move from adjacent bed ... to bed ... when large numbers of

people occur there” (Goss-Custard and Verboven 1993, p. 64). “They can ... habituate to people ... though this depends critically on the extent to which the people move about ... The effects on most birds might be insignificant because they can adapt their foraging behavior” (Goss-Custard and Verboven 1993, p. 65).

All shellfish will be grown subtidal in cages/bags/socks and therefore will not be available for bird predation. Surface activities will be limited to regular gear/crop inspection and harvesting.

Indirect Impacts:

The lines, buoys and growing kelp and shellfish will result in minor shading of benthic habitats. This shading could alter the growth of native macrofauna underneath the project area. However, these effects are expected to be insignificant given the small amount of shade from lines that are spaced 15 feet from each other, and the kelp will be harvested in the spring during the onset of most macrofaunal growth in the late spring/summer months.

Per the US Fish and Wildlife Service reference: 01EWF00-2016-F-0121,

Interactions between submerged aquatic vegetation, such as native eelgrass (Zostera marina) or rooted kelp (attached brown algae in the order Laminariales), and shellfish activities are complex and not easily characterized with simple generalizations. These interactions include competition for space, competition for light (or shading), and physical damage that results from some activities, practices, and techniques. However, not all of these interactions are detrimental to the health of native eelgrass and rooted kelp. For instance, shellfish culturing provides a source of nutrient enhancement, which supports plant growth and vigor, and frequently improves water quality.

We conclude that temporary physical disturbance resulting from shellfish activities causes insignificant effects to bull trout and marbled murrelets.

The BOD created by feces, pseudofeces, and other decomposing organic materials consumes oxygen in the sediments and water column. And, as with their potential to temporarily increase turbidity and nutrients in the water column, shellfish activities that turn over the surficial substrates and shallow subsurface (e.g., mechanical leveling, harrowing, and harvest) may also expose and hasten the aerobic decomposition of litter and wastes. At least conceptually, this has the potential to increase BOD and temporarily suppress DO.

As noted above, no frosting, leveling, harrowing, or mechanical harvesting will be done. Furthermore, all shellfish activity will be subtidal. Therefore, typical increases of turbidity and other negative effects of shellfish farming will be minimal.

Coen et al. (2007) and Forrest et al. (2009) both review published findings suggesting that bivalves create and enhance habitats for submerged aquatic vegetation, marine invertebrates, and finfish

“High shellfish culture density may ... impact the ecosystem through food competition with wild filter-feeders (Dame and Prins 1997) and cause shifts in the phytoplankton community (Prins et al. 1997) ... In general, [however] sediment organic enrichment due to shellfish farming is considered to be limited (Crawford et al. 2003; Forrest et al. 2009); farmers understand that stocking densities leading to these effects do not benefit production, due to high mortality and reduced growth rates” (Saurel et al. 2014, p. 256)

The proposed farm is relatively small (10 acres including anchorage with a maximum of 7 acres of seaweed/shellfish farming). Furthermore, there are no other commercial seaweed/shellfish farms within 10 nautical miles hence farmed shellfish density issues are moot.

Bull trout and designated critical habitat and Marbled Murrelet

It is the Service's Biological Opinion that the action, as proposed, will not appreciably reduce the likelihood of survival and recovery of the bull trout in the wild. The action, as proposed, is not likely to jeopardize the continued existence of the bull trout. It is the Service's Biological Opinion that the action, as proposed, will not destroy or adversely modify designated bull trout critical habitat. CONCLUSION (MARBLED MURRELET) The Service has reviewed the current rangewide status of the marbled murrelet, the environmental baseline for the action area, the direct and indirect effects of the proposed action, the effects of interrelated and interdependent actions, and the cumulative effects that are reasonably certain to occur in the action area. It is the Service's Biological Opinion that the action, as proposed, will not appreciably reduce the likelihood of survival and recovery of the marbled murrelet in the wild. The action, as proposed, is not likely to jeopardize the continued existence of the marbled murrelet

In the long-term, this project may enhance critical habitat of bocaccio and Chinook salmon in the immediate project area by providing juveniles of each species with foraging habitat with cover from predators.

11. Conservation measures:

- If Pacific herring spawn on the cultivated kelp project operators will contact the Area Habitat Biologist of WDFW, and not harvest the kelp until after hatching occurs.
- To protect local wild kelp genetics, a small amount of cultivated sugar kelp (less than 5#) will be originally sourced from local sugar kelp in accordance with WDNR harvest regulations. Sorus material will be collected on permitted waters and grown by SPARO aquatics to produce sugar kelp "seed"
- All harvesting will be done manually with no mechanical equipment except for an electric/battery powered winch to raise long lines and shellfish cages.
- No 1) mechanical dredge harvesting, 2) raking, 3) harrowing, 4) tilling, leveling or other bed preparation activities, 5) frosting or applying gravel or shell on beds, shall be done
- No eelgrass is present thus activity associated with the farm will NOT impact eelgrass
- No activity will occur above the MLLW tide line
- Proposed site does NOT overlap with herring holding/spawning area or DFW identified surf smelt or sand lance spawning areas
- All shellfish (and other) gear shall either be secured to longlines and/or anchors or will be removed from the area and kept in a storage area that is landward of MHHW.
- All shellfish bags and cages will be clearly, indelibly, and permanently marked.

- All buoys/floatation devices will be constructed of commercial grade marine material.
- Regular maintenance and surveillance of farm area, including adjacent beach, will be done to remove any project debris.
- No Intentional hazing of wildlife will occur
- No nets will be used (shellfish cages/socks will be used)
- No inputs (fertilizer, pesticides, fresh water, etc) will be used on the farm site
- All shellfish gear and the vast majority of seaweed gear (the exception being buoys and floating lines) will be subtidal minimizing bird entanglement
- Any fish or wildlife that becomes entangled in gear will be recorded and notice provided to WDFW.
- No land vehicles will be used in the farm area.
- Prior to installation of farming infrastructure, operators will survey for Southern Resident Killer Whales SRKW (and consult with ORCA-Network) and other marine mammals and avoid on-water activities if any are within, or anticipated to be, the action area. Similarly, operators will not conduct farm maintenance activities or harvest if SRKW are within or are anticipated to enter the action area.
- Vessels used in operations will be maintained to avoid release of any grease/gas and will carry absorbent pads in the unlikely event of a spill.
- Operators will maintain infrastructure to avoid release of any marine debris such as cultivation lines.

Conservation measures are measures that would reduce or eliminate adverse impacts of the proposed activity (examples: work done during the recommended work window (to avoid times when species are most likely to be in the area), silt curtain, erosion control best management practices, percent grating on a pier to reduce shading impacts).

Proposed work window:

Other conservation measures:

12. Determination of Effect:

Provide a summary of impacts concluding with statement(s) of effect, by species. Even projects that are intended to benefit the species might have short-term adverse impacts and those must be addressed. Only the following determinations are valid for listed species or designated critical habitat:

No effect. Literally no effect. No probability of any effect. The action is determined to have ‘no effect’ if there are no proposed or listed salmon and no proposed or designated critical habitat in the action area or downstream from it. This effects determination is the responsibility of the action agency to make and does not require NMFS review.

May Affect, Not Likely to Adversely Affect (NLAA) – Insignificant, discountable, or beneficial effects. The effect level is determined to be ‘may affect, not likely to adversely affect’ if the proposed action does not have the potential to hinder attainment of relevant properly functioning indicators and has a negligible (extremely low) probability of taking proposed or listed salmon or resulting in the destruction or adverse modification of their habitat. An insignificant effect relates to the size of the impact and should never reach the scale where take occurs. A ‘discountable effect’ is defined as being so extremely unlikely to occur that a reasonable person cannot detect, measure, or evaluate it. This level of effect requires informal consultation, which consists of NMFS and/or USFWS concurrence with the action agency’s determination.

May Affect, Likely to Adversely Affect (LAA) This form is not appropriate for use with a project that is LAA listed species. Please see the Biological Assessment (BA) template on the Corps website: http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage_ESA

- **No Effect:** The proposed project will have no effect on eulachon, green sturgeon, Steelhead marbled murrelet, Western Snowy Plover, northern spotted owl, or their designated critical habitat
- **Marbled Murrelet- No effect:** the proposed action will not affect marbled murrelet populations or their designated critical habitat.
- **Western Snowy Plovers - No effect:** the proposed action will not affect marbled murrelet populations or their designated critical habitat.
- **Northern spotted owl- No effect:** the proposed action will not affect northern spotted owl populations or their designated critical habitat.
- **Eulachon- No effect:** the proposed action will not affect eulachon or their designated critical habitat.
- **Green sturgeon- No effect:** the proposed action will not affect green sturgeon or their designated critical habitat.
- **Steelhead- No effect:** Juvenile PS steelhead enter the marine environment as older/bigger fish than Chinook and are less dependent on the nearshore areas during their migration. Upon entering the PS from tributary natal rivers, juvenile steelhead quickly move offshore, migrating through offshore areas of the Puget Sound (Goetz 2016). It is likely that steelhead would NOT occur in the project area or action area for a significant enough time to be affected by the proposed action. Therefore the proposed action will not affect steelhead or their designated critical habitat.
- **May Affect, Not Likely to Adversely Affect:** The direct and indirect effects of the project may affect but are not likely to adversely affect bull trout, Puget Sound Chinook, yelloweye rockfish, bocaccio, and SRKW. Based on previous research regarding the essential role kelp habitats play in survivorship of rockfish and potentially salmon, this project may enhance the habitat functions in the project area through the addition of farmed kelp. Humpback have been spotted infrequently in the area and the majority are thought to originate from the unlisted Hawaii DPS (Wade 2017).
- **Bull trout- May Affect, Not Likely to Adversely Affect:** The direct and indirect effects of the project may affect but are not likely to adversely affect bull trout. Based on previous research regarding the essential role kelp habitats play in Puget Sound (Calloway et al. 2020), this project may enhance the habitat functions in the project area through the addition of farmed kelp.
- **Puget Sound Chinook- May Affect, Not Likely to Adversely Affect:** the proposed action may have insignificant and discountable effects on individual Chinook in the immediate area as a result of a minor amount of sediment disturbance when the anchors are installed and would

provide a minor amount of shading of benthic habitats from the farm buoys, lines, kelp, and shellfish. This also includes possible noise disturbance when the anchors are installed and during regular activities involving small vessels with outboard motors around the site during the operations window. The project will include a minor amount of in-water disturbance during maintenance activities and harvest of the crop and will be managed to be protective of forage fish and native kelp. Harvest of the kelp and shellfish will occur by a small boat pulling the growing line onboard and removing the crop. When this occurs, it is possible that there will be some juvenile Chinook in the vicinity, and this minor disturbance will induce them swimming to adjacent native habitats, but this is not anticipated to result in harm to individual fish. The farmed kelp may enhance habitat functions by providing enhanced rearing and foraging opportunities to individual fish within the project and action area. These effects would be discountable or solely beneficial to Puget Sound Chinook and their designated critical habitat. Therefore, the proposed action is not likely to adversely affect Puget Sound Chinook salmon and their designated critical habitat.

- **Bocaccio- *May Affect, Not Likely to Adversely Affect*:** the proposed action may have insignificant and discountable effects on individual bocaccio in the immediate area as a result of a minor amount of sediment disturbance when the anchors are installed and would provide a minor amount of shading of benthic habitats from the farm buoys, lines, kelp and shellfish. This also includes noise disturbance when the anchors are installed and during regular activities involving small vessels with outboard motors around the site during the operations window. The project will include a minor amount of in-water disturbance during maintenance activities and harvest of the crop and will be managed to be protective of forage fish and native kelp. The proposed action may enhance habitat functions by providing enhanced rearing and foraging opportunities to individual fish within the project and action area. These effects would be discountable or solely beneficial to Puget Sound/Georgia Basin bocaccio and their designated critical habitat. Therefore, the proposed action is not likely to adversely affect bocaccio and their designated critical habitat.
- **Yelloweye rockfish- *May Affect, Not Likely to Adversely Affect*:** the proposed action may have insignificant and discountable effects on individual yelloweye rockfish in the immediate area as a result of a minor amount of sediment disturbance when the anchors are installed and would provide a minor amount of shading of benthic habitats from the farm buoys, lines, kelp and shellfish, and benthic juvenile yelloweye are unlikely to occupy these habitats. This also includes noise disturbance when the existing anchors are installed and during regular activities involving small vessels with outboard motors around the site during the operations window. The project will include a minor amount of in-water disturbance during maintenance activities and harvest of the crop, and will be managed to be protective of forage fish and native kelp. The proposed action may enhance habitat functions by providing enhanced rearing and foraging opportunities to individual (larval and pelagic juvenile) fish within the project and action area. These effects would be discountable or beneficial to Puget Sound/Georgia Basin yelloweye rockfish and their designated critical habitat. Therefore, the proposed action is not likely to adversely affect yelloweye rockfish and their designated critical habitat.
- **Southern resident killer whales- *May Affect, Not Likely to Adversely Affect*:** the proposed action may have insignificant and discountable effects, and therefore not likely to adversely affect southern resident killer whales in the immediate area because of a minor amount of noise disturbance when the anchors are installed and during regular activities involving small vessels

with outboard motors around the site during operations. Furthermore, while they do travel through Colvos Passage, resident orca whales are not common in this area. Therefore, the proposed action is not likely to adversely affect SRKW or their designated critical habitat.

- **Humpback whales (Central America and Mexican DPS)- *May Affect, Not Likely to Adversely Affect*:** the proposed action may have insignificant and discountable effects, and therefore not likely to adversely affect humpback whales in the immediate area as a result of vessel activities during farm operations. The probability of vessel interactions with individual whales is very low as humpbacks have been spotted in the much deeper commercial shipping lanes within the Salish Sea and very infrequently off the coast of Vashon. Recorded ship strikes have also generally involved much larger vessels traveling at faster speeds (Miller unpub.). The critical habitat for both listed DPSs is far from the action area, with the closest designated habitat terminating at Angeles Point in the Strait of Juan de Fuca. Therefore, the proposed action is not likely to adversely affect listed humpback whales or their critical habitat.

13. EFH Analysis

Essential Fish Habitat (EFH) is broadly defined by the Act (now called the Magnuson-Stevens Act or the Sustainable Fisheries Act) to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". This language is interpreted or described in the 1997 Interim Final Rule [62 Fed. Reg. 66551, Section 600.10 Definitions] -- Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include historic areas if appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

Additional guidance for EFH analyses can be found at the NOAA Fisheries web site under the Sustainable Fisheries Division.

A. Description of the Proposed Action (may refer to BA project description)

Please see the BE Project Description above.

B. Addresses EFH for Appropriate Fisheries Management Plans (FMP)

C. Effects of the Proposed Action

- i. Effects on EFH (groundfish, coastal pelagic, and salmon EFH should be discussed separately)
 - Coastal pelagic EFH is located within the action area described above. The project would have no effect upon the habitat functions of coastal pelagic EFH.
 - Groundfish EFH is located within the action area. The proposed action could result in a minor amount of sediment disturbance when the anchors are installed and could provide a minor amount of shading of benthic habitats from the farm buoys, lines, kelp and shellfish. The project will include a minor amount of in-water disturbance during maintenance activities and harvest of the crop, and will be managed to be protective of forage fish and native kelp. The farmed kelp may enhance habitat functions by providing enhanced rearing and foraging opportunities within the project and action area. Canopy forming kelp habitat is considered a Habitat Area of Particular Concern, but no such

habitat occurs in the project area near the farm, and no floating kelp habitats in the action area will be impacted by the potential short-term turbidity of setup or the long-term usage of the area. The proposed kelp farm may provide similar ecosystem services to natural kelp beds in the surrounding area and may enhance pre-existing habitat.

- Salmon EFH include the marine waters in the action area. Similarly to groundfish EFH, no detrimental impacts to salmon EFH is expected in the long-term or short-term. The proposed kelp farm may enhance salmon EFH by increasing total foraging and rearing habitat functions.

ii. Effects on Managed Species (unless effects to an individual species are unique, it is not necessary to discuss adverse effects on a species-by species basis)

Any negative effects to managed species and their EFH is expected to be discountable and negligible as in water construction activities occur in a short window using only small fishing vessels with outboard motors and SCUBA to install bottom anchors. Individuals in the immediate area may experience sediment and/or noise disturbance during this time and be displaced to adjacent habitats, but this is only expected in the short term. Long term effects may be of slight benefit to managed species through increasing protected foraging habitat important for some juvenile stages of managed species (e.g. rockfish).

iii. Effects on Associated Species, Including Prey Species

This project may beneficially impact associated prey species by providing complex 3-dimensional habitat to colonize on and shelter from would be predators, increasing water quality through filtration and absorption of nutrients, and support foodwebs through algal detritus inputs in various forms.

iv. Cumulative Effects

Given the short duration of construction, no long-term negative effects on EFH, managed species, or associated prey species are expected for this project. There may be a positive enhancement to EFH, managed species, and associated prey species in the long term, but this is an area of ongoing research.

D. Proposed Conservation Measures

- If Pacific herring spawn on the cultivated kelp, project operators will contact the Area Habitat Biologist of WDFW, and not harvest the kelp until after hatching occurs.
- To protect local wild kelp genetics, a small amount of kelp (less than 5#) will be originally sourced from local sugar kelp in accordance with WDNR harvest regulations. Nonetheless, cultivated kelp will be harvested before maturation and release of reproductive material, to protect adjacent wild kelp from any genetic influence from cultivated kelp over-time.
- Buoys and lines associated only with seaweed farming will be removed outside of the growing season to reduce shading of benthic habitats.
- Vessels used in operations will be maintained to avoid release of any grease/gas, and will carry absorbent pads in the unlikely event of a spill.

- Operators will maintain infrastructure to avoid release of any marine debris such as cultivation lines.
- The following best practice(s) shall be followed: Shellfish Aquaculture Programmatic Biological Opinion: *"At least once every three months, beaches in the project vicinity will be patrolled by crews who will retrieve debris (e.g., anti-predator nets, bags, stakes, disks, tubes) that escape from the project area. Within the project vicinity, locations will be identified where debris tends to accumulate due to wave, current, or wind action, and after weather events these locations shall be patrolled by crews who will remove and dispose of shellfish related debris appropriately. A record shall be maintained with the following information and the record will be made available upon request to the Corps, NMFS, and USFWS: date of patrol, location of areas patrolled, description of the type and amount of retrieved debris, other pertinent information.*
24. *When performing other activities on-site, the grower shall routinely inspect for and document any fish or wildlife found entangled in nets or other shellfish equipment. In the event that fish, bird, or mammal is found entangled, the grower shall: 1) provide immediate notice (within 24 hours) to WDFW (all species), Services (ESA listed species) or Marine Mammal Stranding Network (marine mammals), 2) attempt to release the individual(s) without harm, and 3) provide a written and photographic record of the event, including dates, species identification, number of individuals, and final disposition, to the Corps and Services. Contact the U.S. Fish and Wildlife Service Law Enforcement Office at (425) 883-8122 with any questions about the preservation of specimens"*

E. Conclusions by EFH (taking into account proposed conservation measures)

There will be no adverse effects to EFH of Pacific salmon, groundfish and coastal pelagic species as a result of this project.

14. References:

Include any studies or papers that support statements made in this form (example: reference the source for the listed species that are covered).

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- Shaffer, J. A., S. H. Munsch, and J. R. Cordell. 2020. Kelp Forest Zooplankton, Forage Fishes, and Juvenile Salmonids of the Northeast Pacific Nearshore. *Marine and Coastal Fisheries* 12:4–20.
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- Tonnes, D., M. Bhuthimethee, J. Sawchuk, N. Tolimieri, K. Andrews, and K. Nichols. 2016. 5-Year Review: Yelloweye Rockfish, Canary Rockfish, and Bocaccio of the Puget Sound/Georgia Basin.
- USFWS. 2006. U.S. Fish and Wildlife Service’s Biological and Conference Opinion for the Proposed Issuance of a Section 10(a)(1)(B) Incidental Take Permit (PRT-TE-X121202-0) to the State of Washington for the Forest Practices Habitat Conservation Plan.
- Wade, P. R. 2017. Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas revision of estimates in SC/66b/IA21.

15. Appendices:

As needed include mitigation, revegetation plans, monitoring plans, results of studies, water quality information, etc.