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RE: Corps of Engineers, Nationwide Permit Reissuance: Docket No. COE-2020-0002

Dear Directorate and District Engineers:

The Pacific Fishery Management Council (Council) submits the following comments on the Corps of Engineers (Corps) proposal to authorize mariculture activities under two new Nationwide Permits (NWPs). The NWPs would authorize structures and work in navigable state and Federal

waters for seaweed mariculture activities (NWP A) and finfish mariculture activities (NWP B), and potentially for multi-trophic mariculture activities. We also include comments on Regional Conditions for the proposed mariculture activities as requested under separate public notices published by Corps District Engineers for Washington, Oregon, and California.

The Council's comments are intended to help ensure that seaweed and finfish mariculture activities authorized by the Corps will meet the Corps' statutory requirement of "no more than minimal individual or cumulative adverse environmental effects" (33 CFR 330.1(b)), including effects on essential fish habitat (EFH) for Council-managed species. Likewise, mariculture activities should not displace or reduce fishing activities and opportunities. The Council shares many of the same concerns for a nationwide authorization approach to mariculture development as do the states of Washington, Oregon, and California.

To put our comments into context, the Council is one of eight Regional Fishery Management Councils established by the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA) and is charged with the sustainable management of West Coast fisheries. The Council is required to achieve optimum yield for public trust marine fishery resources. Optimizing the yield of our nation's fisheries requires safeguarding these resources, their habitats, and the fishing communities that depend upon them. The MSA also includes provisions to identify, conserve, and enhance EFH for species managed under a Council fishery management plan (FMP). The MSA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Council is authorized under MSA to comment on any Federal or state action that may affect the habitat, including EFH, of a fishery resource under its authority, and is required to comment on actions that may significantly affect the habitat of an anadromous fishery resource under its authority.

West Coast Marine Environment

The expansion of the mariculture industry (particularly finfish mariculture) on the West Coast must be carefully considered, given that the industry is likely to release a high volume of organic matter into the system, mainly from finfish mariculture activities.

The Northern California Current Marine Ecosystem off Washington, Oregon, and northern California is at the forefront of the global climate change crisis. For over a decade, this region has been dealing with the impacts of ocean acidification and hypoxia (OAH). In addition, harmful marine algal blooms and marine heatwaves are becoming common. These climate-driven processes are having a direct effect on marine species in the region and the fisheries that depend on them.

State and Federal agencies are leading policy development, scientific research, monitoring, and response-planning to respond to this rapidly developing and potentially chronic OAH phenomenon. The launch of several regional policy and scientific bodies to address OAH (e.g., International Alliance to Combat Ocean Acidification, and West Coast Ocean Acidification and Hypoxia Science Panel) is testimony to this urgent effort to avert impairment of the ecosystem. Scientists and policy bodies stress the need to minimize the risk of exacerbating OAH. For example, the Environmental Protection Agency (EPA) now prohibits discharges of offshore seafood processing waste in roughly 3,770 square miles of the continental shelf off Washington

and Oregon because of the potential for organic effluent to exacerbate hypoxia in this region (EPA NPDES Permit No. WAG520000).

Corps proposal to authorize mariculture activities under nationwide permits

NWP A and NWP B would authorize activities for an industry that does not currently exist in any ocean waters on the West Coast and occurs in limited capacity in two West Coast estuaries. The effects of mariculture on West Coast marine/estuarine resources are unknown.

The Council is concerned that authorizing seaweed and finfish mariculture activities under nationwide permits will not allow the detailed review, scrutiny, and permit conditioning that is necessary to ensure "no more than minimal individual or cumulative adverse environmental effects," as required under 33 CFR 330.1(b). Our concerns are amplified by the simultaneous Corps proposal to minimize regional conditions across all NWPs, further increasing the likelihood of individual or cumulative adverse environmental effects.

Considering the known and anticipated risk of mariculture activities on marine/estuarine resources elsewhere in the U.S. and globally, and the lack of testing and risk assessment on the West Coast, the Council believes that the appropriate pathway for authorizing mariculture activities for West Coast regions is by **individual permit** with ample coordination between the District Engineer, the affected state(s) and tribes, the Council, and the affected public.

The Corps should also impose **robust regional conditions and project-specific conditions** to ensure these activities will have no more than minimal individual or cumulative adverse environmental effects on EFH for Council-managed species and Council fisheries. Regional and project-specific conditions require a detailed and informative Pre-Construction Notification (PCN). Our recommendations for PCN Requirements and Regional Conditions are provided below. These recommendations apply whether mariculture activities are authorized under nationwide permits or individual permits for West Coast regions (as recommended).

Comments on NWP A: Seaweed Mariculture Activities

The adverse effects of seaweed mariculture have not been evaluated on the West Coast, but may include (and are not limited to):

- Adverse effects on seafloor habitats and benthic organisms through disturbance from anchoring systems causing shading, smothering, and/or scouring
- Effects of cultivation and introduction of nonindigenous species on wild, native species and habitats
- Escape of cultured (native and non-native) gametes into the estuary and ocean, colonizing and affecting natural seaweeds. Recent collapse in wild kelp abundance along the entire West Coast suggests wild kelp populations are a vulnerable resource and would be further threatened by genetic mixing and competition for space and light from cultured species.
- Chemical contamination from algaecides, pesticides, and/or antifoulants

- The risk of damage to rocky reefs, and creation of navigational hazards, by anchored mooring systems breaking during our frequent and severe storms
- Entanglement of marine species (mammals, turtles, seabirds) in floating and hanging lines and other installations. Attraction to operations may increase risk of vessel strikes.
- Effects of marine debris (nets, lines, etc.) on fishery-constraining species, habitats, fishing gear, and navigational safety
- Changes in hydrodynamics caused by facility infrastructure (e.g., reduced current velocity, altered circulation patterns)
- Spatial conflicts with fishing, fishery research cruises, and long-term ocean monitoring stations that occupy much of state and Federal waters. Conflicts include gear entanglement, displacement from traditional fishing areas, navigational safety, and income loss.

Along with these potential adverse effects, there is no precedent for commercial-scale seaweed mariculture in state or Federal ocean waters on the West Coast. Therefore, close scrutiny of seaweed mariculture activities is needed. The Council believes a nationwide permit for seaweed mariculture is not appropriate on the West Coast. Seaweed mariculture activities should be authorized by **individual permit**, issued by the District Engineer using discretionary authority to review project-specific effects and impose project-specific conditions. Furthermore, mariculture activities should be limited to small-scale demonstration projects where they do not presently exist. A spatial siting analysis should be conducted by the Corps well in advance of authorizing any mariculture activities. The District Engineer should coordinate its review with state natural resource agencies, the Council, and the affected public.

Comments on NWP B: Finfish Mariculture Activities

There are numerous potential adverse effects from finfish mariculture that have not been evaluated on the West Coast, including but not limited to:

- Physical effects on seafloor habitats and benthic organisms by placement of structures, anchoring, and scouring
- Physiological effects on benthic organisms due to increases in organic nutrient loads and eutrophication from excess feed, feces, etc.
- Changes in benthic community composition
- Chemical contamination from therapeutants, antimicrobials, antifoulants, etc.
- Changes in water chemistry from feed and feces, such as increasing phosphorus, nitrogen, turbidity, and reducing dissolved oxygen
- Spread of antimicrobials to wild fish stocks
- Transmission of disease to wild stocks
- Effects of cultivation and introduction of nonindigenous species on wild native species and habitats
- Escape of cultured (native and non-native) adults, progeny, and gametes, which may prey upon, colonize, or otherwise effect wild fish stocks (for example, interbreeding with wild fish, decreasing genetic diversity and resilience, and competing for habitat and food resources)
- Attracting and concentrating predators of wild fish stocks (sharks, mammals, seabirds)

- Attracting marine mammals to the site, increasing the risk of vessel strikes
- Attracting wild fish to the site, possibly reducing fishing access to those fish. Conversely, attraction and crowding can affect reproduction, movement, and migration, resulting in increased capture rate.
- Anchored mooring systems are at risk for breakage during frequent and severe regional storms, potentially damaging rocky reefs and creating navigation hazards
- Entanglement of fishery-constraining species (marine mammals, turtles, seabirds) in floating and hanging lines and other installations
- Effects of marine debris (nets, lines, cages, etc.) on fishery-constraining species, habitats, fishing gear, and navigational safety
- Changes in hydrodynamics caused by facility infrastructure (e.g., reduced current velocity, altered circulation patterns)
- Spatial conflicts with fishing, fishery research cruises, and long-term ocean monitoring stations which occupy much of state and Federal waters. Conflicts may include gear entanglement, displacement from traditional fishing areas, navigational safety, and income loss.

Along with these potential adverse effects, other factors indicate the need for close scrutiny of finfish mariculture activities, including but not limited to the facts that (1) there is no precedent for finfish mariculture in state ocean waters or Federal waters on the West Coast, and finfish mariculture occurs at only three sites in Puget Sound; (2) finfish mariculture projects must be held to the same regional water quality standard as offshore seafood processors (i.e., prohibiting finfish mariculture in hypoxia-prone waters without scientific evidence that mariculture activities will not contribute to hypoxia); (3) massive storms in the Pacific Northwest make the region unsuitable for year-round installations and create a high risk of escapement (as occurred in Puget Sound in 2018) with potentially serious consequences for wild stocks (such as genetic hybridization, predation, and pathogens).

Accordingly, the Council believes that the nationwide permit is not appropriate for finfish mariculture activities on the West Coast. Finfish mariculture activities should be authorized by **individual permit**, issued by the District Engineer using discretionary authority to review project-specific effects and impose project-specific conditions. Furthermore, finfish mariculture activities on the West Coast should be limited to small-scale demonstration projects where they do not presently exist, until they have been well studied and their impacts thoroughly understood and addressed. A spatial siting analysis should be conducted by the Corps well in advance of authorizing any finfish mariculture activities. The District Engineer should coordinate its review with state natural resource agencies, the Council, and the affected public.

Multi-trophic mariculture activities as a component of NWP A and NWP B or separate NWP

The Corps has proposed to authorize bivalve shellfish and/or seaweed as part of a multi-trophic mariculture system. Proponents of these systems suggest that organic waste and nutrients produced by finfish mariculture would be consumed and filtered by lower trophic organisms, thus reducing organic waste and nutrient load. This depends on several factors (aquaculture systems, species, growth conditions, operation size, site hydrography) that have yet to be standardized. Most multi-trophic techniques are experimental and unproven at commercial scales. Nationwide permits are appropriate only for activities with much more predictable outcomes and impacts and are not suitable for the earliest stages of experimental, multitrophic mariculture industries.

For this reason, the Corps should not authorize multi-trophic activities under a nationwide permit, nor develop a separate multi-trophic NWP, until industry standards are established and potential impacts are understood. Multi-trophic mariculture activities should be authorized under **individual** (rather than nationwide) permits by the District Engineer, tailoring appropriate permit review to potential environmental impacts at the project location. Additionally, the District Engineer should coordinate with state natural resource agencies to identify regional and site-specific concerns, needed analyses, and project-specific conditions. To support the Corps' review and coordination with the state, the Corps should require a descriptive and detailed PCN.

Recommended requirements for Pre-construction Notification (PCN) for NWP A: Seaweed Mariculture Activities and NWP B: Finfish Mariculture Activities, or Individual Permits

The PCNs for seaweed and finfish mariculture activities must contain highly descriptive and detailed information for the Corps to determine compliance with Regional Conditions and project-specific conditions, and to ensure that activities will result in no more than minimal individual and cumulative adverse environmental effects. The Council recommends the following PCN requirements:

- Provide a detailed description of all aspects of the proposed project: species, project configuration, structures, anchoring, techniques, anticipated production quantities, densities and spacing, containment system, etc.
- Provide source and description of broodstock
- Provide detailed map(s) that include the site location and ecologically important marine/estuarine areas, including those identified in each District's Regional Conditions, state and Federal marine protected areas, EFH Conservation Areas, EFH habitat areas of particular concern (HAPCs), marine mammal haulouts, whale migration corridors, seabird rookeries, and other important marine/estuarine resources delineated by state and Federal agencies
- Provide estimates of expected harvest biomass and any non-harvested biomass for seaweeds that may remain on site. Estimate biomass (if any) expected to be lost from the site (e.g. advection of broken kelp fronds)

- Describe measures to minimize physical effects of structures on habitat, marine life, and fishing gear, including structural design and spacing, wildlife deterrents, and locating projects away from sensitive resources and important fishing grounds
- Quantify and describe measures to minimize effects of chemicals, antifoulants, feed, and waste on water quality, habitat, and marine life
- Describe measures to minimize attraction and entanglement of sharks, mammals, seabirds, and attraction of wild fish
- Describe measures to minimize impacts on fishing and fishery research activities (conducting a siting analysis; considering the configuration and spacing of structures; considering placement of lines and cages; avoiding potential fishing displacement from high-value fishing areas, as well as fishing gear entanglement; and ensuring safe navigation)
- Provide prevention, monitoring, and response plans that address escapement of cultured adults, progeny, and gametes; release of antimicrobials; disease transmission to wild stocks; release of nutrients; chemical pollution; structural failures; entanglement of fishing gear and marine species; small vessel strikes; and marine debris
- Provide a decommissioning plan.

Recommendations for Regional Conditions for NWP A: Seaweed Mariculture Activities and NWP B: Finfish Mariculture Activities, or Individual Permits

The Council submits the following comments to the Corps District Engineers in Seattle, Portland, San Francisco, and Ventura, which have jurisdiction in the navigable waters of Washington, Oregon, and California. Our recommendations for Regional Conditions also apply to individual permits, should the Corps authorize mariculture activities by individual permits for West Coast regions. Additionally, the Corps should coordinate with state natural resource agencies and the Council during the District's review of any proposed mariculture project seeking authorization. In consideration of regional differences between the four Districts, the Council limits its recommendations to those that apply coastwide.

The Council recommends the following Regional Conditions:

1. Require the applicant to conduct a regional spatial analysis to determine locations of least impact to the environment, ecological areas, EFH, and fisheries.
2. Limit mariculture activities to small-scale demonstration projects in waters where they do not presently exist to demonstrate proof-of-concept at location, including the ability to contain cultured species, quantify and monitor nutrient outputs and associated environmental effects, and monitor structural integrity. If monitoring associated with a demonstration project shows no measurable environmental effects, then the project could scale up with continued monitoring, provided that individual and cumulative effects remain minimal.
3. Designate the following as sensitive ecological areas in District Regional Conditions: EFH HAPCs and EFH Conservation Areas.
4. Require measures to prevent escapement of adults and progeny.
5. Require measures to minimize physical effects of structures on habitat, marine life, and fishing gear, including appropriate structural components, design and spacing, wildlife

deterrents, and locating projects away from sensitive resources as noted above, and important fishing grounds.

6. Require measures to minimize effects on water quality and marine life from release of chemicals, antifoulants, therapeutics, feed, waste, etc.
7. Require prevention, monitoring, notification, and response plans addressing potential unintended events such as structure and anchoring failure, entanglement, adverse wildlife interactions, escape, disease, and spills.
8. Require a decommissioning plan.
9. Within the Regional Conditions, require the Council's Groundfish Fishery Management Plan's *Potential Conservation Measures for Aquaculture* (PFMC 2019) (Enclosure 1).
10. Do not authorize mariculture activities in hypoxic-prone Federal waters as prohibited in EPA NPDES Permit No. WAG520000. The prohibited area is located in Federal waters shallower than 100 m depth coastwide, plus the area encompassing both Heceta Bank and Stonewall Bank. Permittees seeking to operate in these waters should provide peer-reviewed scientific evidence that project activities will not contribute to hypoxia in those waters, consistent with WAG520000.
11. Do not authorize mariculture activities in ecologically important marine/estuarine areas identified in each District's Regional Conditions, state and Federal marine protected areas, EFH HAPCs (specifically, canopy kelp, seagrasses, and rocky reefs), EFH Conservation Areas, marine mammal haulouts, whale migration corridors, seabird rookeries, and other resources delineated by state and Federal agencies, including resources newly designated as regional conditions under this NWP Reissuance Notice. The Corps should establish buffers around these areas to minimize direct and indirect effects.
12. Do not authorize cultivation of nonindigenous species unless the species has been previously cultivated in the waterbody.
13. Do not authorize the use of genetically modified species at sites where there is any risk of escape.

Summary

As our comments indicate, seaweed and finfish mariculture activities can have profound consequences on West Coast marine/estuarine environments, EFH, fishery resources, and fisheries. Close scrutiny of mariculture projects is necessary. By requiring individual permits (first as demonstration projects), coordinating with affected entities, and imposing effective regional conditions, the Corps can minimize the risks associated with mariculture activities and enable this industry to co-exist with West Coast fisheries.

Sincerely,

Marc Gorelnik
PFMC Chair

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Enclosure 1: PFMC Groundfish FMP Appendix D

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Enclosure 1

Groundfish FMP Appendix D: PFMC-Recommended EFH Conservation Measures for Aquaculture

General guidelines

Use modern production technologies, proper siting protocols, standardized operating procedures, and BMPs to reduce the risk of environmental damage and degradation that can be caused by aquaculture development and activities (Shumway 2011, Price and Morris 2013, Rust et al. 2014).

Escapes and releases

- Use only native or naturalized species unless best available science demonstrates use of non-native or other species would not cause undue harm to wild species, habitats, or ecosystems in the event of an escape.

- Ensure that monitoring and maintenance plans and protocols employ BMPs designed to reduce aquaculture escapes. Plans should provide protocols (e.g., recapture, mitigation) for situations where an escape occurs.

Use risk assessment tools and empirical models (ICF 2012; RIST 2009) to identify and evaluate risks of farmed escapes on wild populations (Waples et al. 2012). The Offshore Mariculture Escapes Genetics Assessment model (OMEGA) is one such tool developed for this purpose and is available from the NOAA Aquaculture web site (http://www.nmfs.noaa.gov/aquaculture/science/omega_model_homepage.html)

Introduction of pathogens

- Prevent introduction of pathogens at aquaculture facilities (LaPatra 2003).
- An accredited aquatic organism health professional should regularly inspect crops and perform detailed diagnostic procedures to determine if disease presents a risk.
- Biosecurity plans to prevent or control the spread of pathogens within a farm site, between aquaculture operations, or to wild populations should be developed by veterinarians with expertise in fish culture, or qualified aquatic animal health experts.
- Document all stocking and transplanting activities to improve tracking ability if an outbreak occurs.
- Ensure compliance with Federal and state health control legislation. Import and export certifications and testing for certain types of diseases falls under the jurisdiction of the USDA Animal and Plant and Health Inspection Service (APHIS). States in the WCR all have specific protocols that must be followed when transplanting cultured species into wild environments to minimize the incidence of disease transfer.

Release of contaminants

- Employ BMPs and use vaccines to reduce the need for antibiotics (Forster 2010; Rico et al. 2012, Rust et al. 2014).
- Employ preventative husbandry practices and proper stocking densities to reduce the need for chemical treatments.
- If needed, use only prescribed antibiotics, parasiticides, and other medicines. Use sparingly and in accordance with approved protocols to minimize environmental contamination.

Water quality impacts

- Site finfish operations appropriately in well-flushed, non-depositional areas (Price and Morris 2013). For example, site cages in water at least twice as deep as the cage, in areas with minimum flows of 7cm/second, or use models (i.e. Aquamodel or depomod) to determine adequacy of site to avoid impacts to water quality.
- Use BMPs, including siting aquaculture operations outside of nutrient sensitive habitats, responsible cleaning practices, integration of feed management strategies, use of optimally formulated diets, and other management measures to minimize nutrient discharge.
- Construct wetlands at or near facilities to filter and help remove solids, phosphorous, and nitrogen compounds from aquaculture effluent (Michael 2003).

Benthic impacts

- Site aquaculture facilities in well-flushed waters. Belle and Nash (2008) recommend the siting of cages in water at least twice as deep as the cage with minimum flows of 7 cm/second.
- Use fallowing to reduce benthic impacts. Fallowing is the temporary relocation or suspension of aquaculture operations to allow sediments and the benthic community to recover from excessive nutrient loading (Brooks et al. 2003, Brooks et al. 2004, Tucker and Hargreaves 2008).
- Optimize feeding practices and use low-phosphorous feed (MacMillan et al. 2003).
- Actions that could reduce benthic impacts of feed include:
    - Reducing the use of solids by using highly digestible feed with high nutritional value
    - Reducing dissolved nitrogen by using feed that contains proper protein and energy content (Amirkolaie 2011)
    - Setting rations to reduce excessive feed and feces
- Implement benthic monitoring plans to detect nutrient enrichment and effects on benthic community structure. Establish treatment (facility) and control (non-facility) sites to evaluate aquaculture effects versus natural and seasonal variability.
- Do not site new aquaculture operations in or above sensitive benthic communities such as eelgrass or other SAV, near fish spawning habitat. If forage fish spawn is detected on aquaculture gear, cease aquaculture activities in the area until such time as the eggs have hatched and spawn is no longer present.