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Re: **Public Comment Opportunity for U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Seafood Processors in Federal Waters off the coast of Washington and Oregon (General Permit # WAG520000)**

Dear Ms. Gockel:
On June 19th, 2017 the EPA published a new draft for a National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Seafood Processors in Federal Waters off the coasts of Washington and Oregon (General Permit # WAG520000) and requested public comment. Specifically, EPA seeks

public comment on elements of the draft permit that were not included in the initial draft in 2015. Below, each agency provides general and specific comments.

We appreciate the coordination and effort the EPA has taken to revise this draft permit. As the first discharge permit provided for offshore seafood processors, as required under the Clean Water Act, a thoughtfully crafted permit that looks toward the future is critical. For a little over a decade, this region has been at the forefront of impacts related to ocean acidification and hypoxia (OAH). In response to this rapidly developing and potentially chronic phenomenon, state and federal entities in Oregon are leading policy development, scientific research, monitoring, and response-planning on OAH. The launch of several regional policy bodies and scientific bodies to address OAH (e.g., the International Alliance to Combat Ocean Acidification and the West Coast Ocean Acidification and Hypoxia Science Panel) is testimony to the urgency of averting ecosystem impairment. Scientists and policy specialists stress the need to implement protective measures to minimize risks of exacerbating OAH. Both ocean acidification and hypoxia are affected by nutrient-load in marine waters. Since seafood processing discharge contributes to overall nutrient load in the waters off of our coast, we provide information about the resources, coordination, and policy Oregon has dedicated, undertaken, and created to start addressing these pressing environmental issues. We hope this context will help underscore our concerns and recommendations herein.

Oregon was the first locale that documented impacts from ocean acidification in 2007; a now world-famous incident at the Whiskey Creek Shellfish Hatchery in Netarts Bay where oyster growers failed to grow young animals, and therefore failed to deliver spat (oyster larvae) to oyster growing operations up and down the West Coast. However, hypoxia impacts were recorded as early as 2002 and the Oregon Department of Fish and Wildlife, in collaboration with Oregon State University researchers, first documented a large hypoxic zone on the continental shelf in the early 2000's (see http://www.oregonocean.info/index.php/home/downloads/oah/1332-ocean-acidification-and-hypoxia-in-oregon/file). Those incidents were a catalyst for major effort in collaboration and coordination across state agencies, tribal governments, universities, and others to better understand Oregon's ocean chemistry and water quality. The West Coast Ocean Acidification and Hypoxia Science Panel was established and subsequently generated a report summarizing the known facts about OAH, and provided recommendations for further study and potential mitigation (Chan et.al 2016). The report includes a description of why the West Coast is vulnerable to OAH impacts, which describes the interaction of ocean currents and coastal upwelling that exposes naturally enriched deep ocean waters to the shelf, which can be exacerbated through natural respiration processes that break down sinking organic matter (http://live-westcoastoah.pantheonsite.io/wp-content/uploads/2016/02/OAH-Panel-Appendix-B-3.22.16.pdf).

The Oregon legislature and Governor have taken the threat to coastal resources, coastal economies, and the marine environment very seriously, first allocating funding for OAH research in 2013 and most recently by passing SB 1039 (2017) unanimously in the Senate and nearly so in the House. The bill declares state policy on OAH that acknowledges the urgency and severity of OAH for endangering the state's ocean resources, and calls for a coordinated response with federal agencies and other partners by establishing the Oregon Coordinating Council on Ocean Acidification and Hypoxia that will provide biennial reports and recommendations to the legislature.

Below, we provide input on EPA's draft permit, concerns, and recommendations nested within this important context as Oregon grapples with being an OAH 'hotspot' in the global arena. As such, consequences of acting at an insufficient scale could be negative for not only Oregon's natural

resources, but fisheries-dependent communities and industries, including the permitees of this NPDES General Permit.

Oregon Coastal Management Program

The Oregon Coastal Management Program (OCMP), created by the Coastal Zone Management Act (CZMA) of 1972, and housed within the Department of Land Conservation and Development, has a mission to work in partnership with coastal governments, state and federal agencies, and others to ensure that coastal and ocean resources are managed, conserved, and developed in alignment with Oregon's statewide planning goals. The statewide planning goals provide guidance to coastal communities to ensure coastal and ocean resources are managed sustainably to support a prosperous coastal resource-based economy that provides a thriving and vibrant quality of life.

Separate from the federal consistency review process, the OCMP engages community stakeholders, fisheries industries, natural resource agencies, watershed councils, and others to help gather information, organize data, and provide technical expertise where needed. Ocean acidification and hypoxia are an issue beyond the reach of small communities and yet they stand to bear the brunt of its effects. Not acting aggressively to limit nutrient inputs in a region identified as 'ground zero' for OAH issues may have large negative consequences for Oregon's coastal communities including loss of jobs and businesses that will have ripple effects throughout Oregon's tourism industry, global fisheries industry, and Oregon's health as a state.

Hypoxia, ocean acidification, and harmful algal blooms (HAB) damage the coastal economies of both states. Scientists are beginning to understand the coupled dynamics of ocean acidification and hypoxia, but less is understood about HAB's. What is known is that ocean chemistry is changing in response to climate change. In 2015, the largest HAB ever recorded (induced by a large, warm water mass) impacted the entire U.S. West Coast, resulting in toxic levels of a neurotoxin found in several species of marine mammals, birds, Dungeness crab and bivalves. HAB toxins affected the fishery again in 2016 and 2017. The fishery supports a 204 million dollar industry in Oregon (The Research Group 2016). Fisheries and support services generate thousands of coastal jobs in Oregon (The Research Group 2016).

The OCMP also reviews federal actions to make sure they are consistent with the enforceable policies of the program set forth by 50 CFR Section 930, of the CZMA of 1972, as amended. This process is known as 'federal consistency review'. We appreciate the dialogue and effort EPA has taken to understand Oregon's marine resources, the State's ocean policy, and the grave challenge we face with rapidly unfolding impacts of OAH.

Oregon has taken great steps to conserve coastal and ocean resources through implementation of Statewide Planning Goal 19: Ocean Resources. Goal 19 sets state policy that prioritizes preservation and conservation of marine organisms above other uses in order to sustain fisheries industries and the coastal communities that depend on them in perpetuity. The OCMP remains concerned that the conditions within the draft permit, although an improvement, are not in line with the state's policy on conservation of marine living organisms. Additionally, without sufficient evidence that discharge in federal waters will not reduce dissolved oxygen in state waters after transport, the OCMP would like to highlight the 'precautionary approach' found within Goal 19 and the Territorial Sea Plan, which suggests implementing measures to ensure water quality and the marine life dependent upon it can be sustained, is a prudent action.

The OCMP understands that this is the first seafood discharge NPDES permit in this region and that previously the industry has been operating without a permit. Oregon's coast and associated economies are dealing with the effects from ocean acidification, hypoxia, and harmful algal blooms. Although

additional scientific understanding is needed regarding ocean chemistry and seafood discharge quantities and transport, taking this opportunity to craft a permit using a conservative approach is reasonable in light of unknowns. NPDES permits are renewed every five years and new information can be incorporated as it becomes available during renewals. EPA has submitted a thorough and well-researched consistency determination to the OCMP and review is taking place now. Although the OCMP's federal consistency decision is outstanding, we have reviewed the draft permit for EPA's public comment period, and as a Program, we support the recommendations of the state's technical agencies included in this letter.

Oregon Department of Environmental Quality

DEQ made several points in our letter dated December 14th, 2016 of why the discharges allowed under the draft permit are not acceptable to Oregon. The draft re-proposed permit currently on Public Notice includes some changes by EPA from the August 2015 version. However, the environmental protection afforded by this permit is still of concern for Oregon waters.

State Water Quality Criteria for Marine Waters

The Oregon state water quality criteria for dissolved oxygen in marine waters is no decrease in dissolved oxygen. The criteria for dissolved oxygen in OAR 340-041-0016 states *"No wastes may be discharged and no activities may be conducted that either alone or in combination with other wastes or activities will cause violation of the following standards: (6) For ocean waters, no measurable reduction in dissolved oxygen concentration may be allowed."* However, the discharges allowed by the permit in its current version include three sources of oxygen demanding substances measured as biochemical oxygen demand (BOD5):

- high concentration of suspended and dissolved BOD5 in the wastewater,
- much higher concentration of BOD5 in stickwater plus
- ground solids which exert oxygen demand as they rot.

Based on data submitted to DEQ by Oregon's shore based seafood processors and using capacity data from an example vessel, DEQ calculated, (after adjusting for inaccuracies in our December 2016 letter), that a typical vessel, would likely discharge over 2.2 million gallons of wastewater, with BOD5 concentrations from 2000 to 50,000 mg/L which calculates to an estimated 272,400 pounds of BOD5 per vessel per trip (calculations in attached letter to DLCD dated August 2, 2017; based on wastewater and stickwater, but not accounting for the solids poundage). Therefore, the wastewater and solids mixture from these processes would be high volume and high concentration and must be considered a significant source of BOD5.

The discharges to federal waters would be transported by ocean currents to state waters. As reported in the draft EPA Fact Sheet accompanying the General Permit[1], the process called Ekman transport seasonally moves oxygenated surface waters offshore while deeper water is moved shoreward upwelling onto the continental shelf. That upwelling deep water is low in dissolved oxygen and contributes to seasonal hypoxia in state waters. The Fact Sheet reports documented incidences of hypoxia (*reduced* dissolved oxygen conditions) and anoxic conditions (*depleted* dissolved oxygen, [less than 0.5 mg/L; the USGS definition of anoxic conditions]) off Oregon and Washington coasts. These events have been accompanied by "mass die-offs of fish and invertebrates including Dungeness crab.[1]"

[1] Preliminary Draft EPA Offshore Seafood Fact Sheet, NPDES Permit WAG52000, draft 11-3-13; pp 4-13.

The vessel discharges allowed by the permit would carry a substantial loading of BOD5 into deep federal waters where currents could move the loading into state waters. The BOD5 load would then decrease dissolved oxygen into state waters. Thus, it appears these discharges would result in lowering dissolved oxygen in state waters which is contrary to Oregon water quality standards.

Recommendation: In order to ensure that discharges in federal waters do not impact state marine water quality, DEQ recommends minimizing BOD5 discharges and an adequate buffer be established between the activity and the boundary of the Territorial Sea. The proposed vessel discharges to federal waters should not be permissible shallower than 200 meters year round. DEQ concurs with the exclusion zone location, depth, and timing recommended by ODFW and presented later herein.

Wastewater Treatment

The re-proposed draft permit applies the federal effluent limitation guidelines that were developed for remote Alaskan waters (40 CFR Subpart T 408.202(b) and 205(b)). The correctness of applying these guideline limitations has not been satisfactorily established. The hydraulic nature of Oregon's waters is significantly different from that of remote Alaska. The currents in Oregon and Washington are upwelling and on-shore. The currents in Alaska include down-welling, high velocity and high exchange volume. Currents off Oregon will carry waterborne pollutants and ground solid material from the federal waters into State waters on the continental shelf. In state waters, the oxygen demanding materials will exert their influence lowering the dissolved oxygen. Ground materials that did not rot in the colder deeper federal waters will rot, consuming oxygen, in the shallower state water on the continental shelf. DEQ recommends:

- The cutting line wastewater discharges should be subject to higher levels of treatment capable to meet the limitations in 40CFR 408 Subparts U and V. These are based on model technologies including at a minimum 40 mesh screening which reduces BOD5 by 40% according to EPA data. If implemented, the suspended BOD generated by the cutting lines and carried shoreward into state waters by currents would be significantly reduced.
- The residuals processing lines should have a solubles plant to process the stickwater in accordance with 40 CFR 408 Subpart O.152 (a). By this action the suspended BOD from residuals processing carried shoreward into state waters would be significantly decreased.
- Scientific third party studies of discharges under this permit should be funded and required to inform the application of effluent limitations within this permit in the future

Ideally, no solids should be ground and discharged which is implicit in the technology of the named effluent limitation guidelines. That material should be minimized into usable products and when not useable, stored for disposal on shore by legally acceptable methods. Thus, none of the solid material would be carried into state waters to exert BOD or to bury and smother sensitive aquatic life. With the above requirements in place, the BOD loading will still exceed that of raw domestic sewage, presenting a challenge when carried into state waters. To minimize these effects, DEQ further recommends that the spatial, depth and temporal limitations on discharges as recommended by ODFW be incorporated.

Recommendation: EPA should apply the effluent limitation guidelines for bottomfish processing contained in 40 CFR Subparts U and V 408.210-227 and the fish meal/fish oil processing guidelines from Subpart O, with a solubles plant as in 40 CFR 408.152(a).

Monitoring Requirements

To evaluate the effect of the allowed discharges of ground solids, stickwater and seafood processing wastewater, on marine water quality, it is necessary to know where and when the discharges occur and the extent of the discharges. DEQ recommends monitoring and reporting that will document this information for use in scientific research on effects; such information will inform future permit discussions. It is important to note that wastewater carries a tremendous burden of BOD5 and to establish the likely effluent characteristics with actual data from vessel based operations. In the Biological Evaluation, EPA used 25 year old data from shore based Alaskan processors (BE Table 2.4). That data did not include whiting (not an Alaskan species), nor the parameter BOD5 for bottomfish and did not distinguish bottomfish hand filleted from mechanical processing, which the whiting fleet will likely use at times. More relevant and current data is needed. DEQ supports retaining the Monitoring Requirement #7 and expanded as follows:

Recommendation: The monitoring and reporting should include:

- ***start/stop times and locations of discharges,***
- ***speed during discharge,***
- ***tidal and general weather status during discharge,***
- ***weight of discharge (lbs) with a requirement to discharge evenly through the discharge run***
- ***gallons of wastewater discharged, whether simultaneously or separately from ground fish discharges.***

Recommendation: The monitoring and reporting of the wastewater discharges should include parameter monitoring sampling and analysis for parameters BOD, TSS, Oil and Grease and pH in accordance with 40 CFR 136 and should be required once per trip or no less than once per month if the same processes are ongoing and at least once per quarter for each different species/process.

The challenges in this monitoring can be addressed as follows:

- pH has a hold time of 15 minutes can be accurately performed on-site with relatively little training
- TSS samples have a 7-day holding time, which will allow sample collection within the last days of a trip and delivery by 7 days to a shore based laboratory
- Oil and Grease samples have a 28 day holding time, which will allow sample collection within a trip and delivery by 28 days to a shore based laboratory
- BOD5 is collected compositely for 24 hours and has a 48 hour hold time starting with the beginning of collection. DEQ recognizes that this protocol is unsuited to longer duration ship-board activities. However, 40 CFR 136.4 includes provisions for applying to use an alternate test method. An alternate test method that uses automated in-line analysis of COD as a surrogate parameter has been approved for another industrial use in Region 10 and may be suited to ship-board installation. EPA should consider, review and approve an alternate test procedure suitable for these ship board activities for a parameter as surrogate for BOD analysis.

Oregon Department of Fish & Wildlife

ODFW appreciates the opportunity to comment on EPA's Draft Re-Proposed NPDES General Permit for Offshore Seafood Processors Discharging in Federal Waters off the Washington and Oregon Coast. The NPDES permit is of particular interest to ODFW for its capacity to protect fishery resources important to the state and the marine environment on which our fisheries depend. In previous comment letters on October 8, 2015 and December 9, 2016, ODFW emphasized concerns for intensifying hypoxic conditions in waters off Oregon that impact fishery resources and the risk of inducing or exacerbating hypoxia with large-volume inputs of oxygen-demanding seafood processing waste. ODFW also stressed the need to protect rocky reefs from the effects of excessive nutrient load and smothering of reef organisms, as well as for vessel reporting requirements that are robust enough to ensure that the permit's protective provisions are adhered to. ODFW has reviewed the current draft NPDES permit and appreciates that EPA recognizes the serious threat of hypoxia to the marine ecosystem and proposes to prohibit seafood processing discharges in specific areas of recurring and persistent hypoxia (i.e., the Heceta-Stonewall Banks reef complex, and the mid-to-shallow shelf). While this is a significant step in reducing a major stressor on already compromised waters, it does not go far enough to fully protect marine waters, habitats and species susceptible to the adverse effects of seafood processing waste discharges. Benthic and pelagic habitats across the entire shelf provide essential functions for fish and invertebrate species that are of direct interest to the state of Oregon. Since Oregon has interest in conserving these species, state interest extends to ensuring that all habitats used by these species retain their ability to provide supportive functions to these species. Fish and wildlife management laws that are part of the state's coastal program include habitat protection provisions for the purpose of fish and wildlife conservation.

The threat of hypoxia to the marine ecosystem off Oregon and to Oregon's marine fisheries cannot be stressed enough and is a primary concern of this permit. In brief, oxygen-demanding organic matter increases respiration, a key driver of hypoxia (Siedlecki, et. al 2015). Seafood processing waste in all forms has high biochemical oxygen demand (BOD) and when discharged into the ocean in high volume, rapidly consumes dissolved oxygen which can induce or exacerbate hypoxia. Hypoxia compresses habitat for demersal fish and causes physiologic distress or mortality. Sessile and slow-moving organisms succumb to the lack of oxygen. Hypoxia has expanded across the continental shelf in severe years, resulting in mortality and spatial displacement of several species important to Oregon's commercial and recreational fisheries. Scientists expect hypoxia to increase in both frequency and severity in the future. Offshore fisheries are an integral part of Oregon's state and local economies with more than 140 species in approximately 33 commercial and recreational fisheries (Table 1). Seventeen fisheries overlap both state and federal waters, and most commercial fisheries occur across the entire shelf. Oregon's coastal communities and its thirteen coastal port economies depend heavily on these fisheries and, by extension, on healthy habitats that support the populations of harvested species. Seafood processing waste discharges may impact these habitats and the populations that depend on them.

The purpose of this NPDES General Permit is to protect water quality in the marine environment from degradation caused by seafood processing waste, and ultimately to protect the marine resources that inhabit these waters. The full implications of high-volume, high nutrient, oxygen-demanding organic

inputs of seafood processing waste on the marine environment are yet to be determined. Therefore, a precautionary approach is warranted, and is consistent with Oregon's Statewide Planning Goal, Goal 19.

Since fisheries and fish species that ODFW has the responsibility and authority to manage overlap across state and federal waters, impacts of seafood waste discharges in federal waters have a direct effect on the fish populations and fisheries under state authority, as well as on the Oregon coastal economy. These coastal resources (fish) and uses (fisheries) are managed by enforceable policies of the state's Coastal Zone Management Program. The comments below establish that the waste discharges governed under the proposed permit in federal waters have a reasonably foreseeable effect on the state's coastal resources and uses, and provide recommendations designed to minimize those effects.

Fisheries policies

The Magnuson-Stevens Fisheries Conservation and Management Act recognizes the interests of coastal states in management of ocean fishery resources in federal waters and provide for state participation in ocean resources management decisions. Likewise, Oregon state policy asserts Oregon's interest as a partner with federal agencies in the management of ocean resources within the Exclusive Economic Zone and on the continental shelf (Oregon Revised Statute [ORS] 196.420). And, it is Oregon policy to conserve the long-term values, benefits and natural resources of the ocean both within the state and beyond (ORS 196.420). Similar policy for all ODFW-managed species is provided in ORS 496.012. Oregon's Fisheries Conservation Zone policy (ORS 506.755) conveys the state's interest in marine resources and fisheries in the area from shore to 50 miles offshore. The Oregon Food Fish Management Policy (ORS 506.109) requires economic optimization and preservation of the commercial and recreational fisheries. This includes maintaining all species of food fish at optimum levels in all suitable waters of the state, to manage waters of this state to optimize utilization of food fish, and to preserve the economic contribution of the sport and commercial fishing industries consistent with sound food fish management practices. ODFW is responsible for the management of all fish and other marine life over which the State Fish and Wildlife Commission has regulatory jurisdiction (ORS 506.142). Furthermore, ODFW represents Oregon state interests on the Pacific Fishery Management Council (PFMC) for developing fishery regulations and management measures for West Coast fisheries that are implemented by the National Marine Fisheries Service (NMFS). In short, actions in federal waters that affect the fishery resources of the state or fishery resources that are of economic importance to the state, are directly relevant to ODFW's mandate.

Fishery Economic Resources

> Offshore fisheries are an integral component of both state and local economies (The Research Group 2014a). The contribution of the commercial fishing industry to the Oregon economy was $205 million in 2015 (The Research Group 2016) and $353 million in 2013 (The Research Group 2014b). The two most valuable commercial fisheries off Oregon are Dungeness crab and groundfish trawl fisheries (The Research Group 2014b). These and most other commercial fisheries occur in both state and federal waters, shelf-wide. Marine recreational fishing averages 1.5 million fishing trips per year and contributes, on average, $67 million annually to Oregon's

economy (The Research Group, 2015). As noted above, approximately 33 commercial (Table 1) and recreational (Table 2) fisheries occur off Oregon. Seventeen of these fisheries overlap state and federal waters. Oregon's coastal zone primarily consists of rural areas with small communities. Small port communities offer limited economic opportunities and fisheries dependence is high. Because of the high degree of the regional community dependence on fisheries, actions that affect the health of the marine ecosystem and harvested species can have a disproportionally large impact to the already-fragile Oregon coastal economy. (See http://www.dfw.state.or.us/agency/economic_impact.asp for full reports).

Ocean Acidification and Hypoxia, and Policy Guidance for Water Quality Protection

Ocean acidification in the California Current Large Marine Ecosystem (CCLME) is more intense than in many other coastal regions worldwide, and hypoxic events are occurring more widely and more often (Klinger T. et al, 2017). Oregon is at the epicenter of these climatological changes. In the CCLME, patterns of ocean acidification and hypoxia mirror upwelling currents that transport naturally carbon dioxide (CO_2)-rich and oxygen-poor waters across the shelf. Hypoxic conditions have been observed from the shelf break up to the inner shelf – approximately 40 m bottom depth (Grantham et al., 2004), while OA conditions commonly extend across the entire continental shelf (Chan 2017). Research has found that ocean acidification and hypoxia dynamics are closely coupled (Gobler & Baumann, 2016). The resulting interaction leads to both additive and synergistic impacts on marine biota and has led to the recommendation that ocean acidification and hypoxia be considered in conjunction with one another (WCOAHSP 2016; Gobler & Baumann, 2016).

Demersal fish and invertebrates have already experienced the adverse effects of hypoxia, ranging from increased mortality to physiological impairment, avoidance, habitat compression, alterations in predator–prey relationships and changes in foraging dynamics (Chan et al., 2008; Keller et al., 2010; Koslow et al., 2011; Seibel, 2011). During the severe hypoxic event of 2002 off Oregon, rockfish densities plummeted, and there was high mortality of invertebrates, including Dungeness crab (Grantham et al., 2004). Catch rates for several commercially and recreationally-important fish and benthic invertebrate species were significantly related to bottom oxygen concentration within the hypoxic region off Oregon in 2007 (Keller et al., 2010). Also in 2007, an Oregon oyster hatchery experienced unprecedented mortality of Pacific oyster larvae that was attributed to high CO_2 levels (or ocean acidification [OA]) in the seawater that affect the mineral formation of calciferous organisms (Barton et al., 2015). The effects of OA extend to other calciferous organisms, many of which are key prey species in the marine food web.

Based on what is known about the biological and ecological effects, OAH in the CCMLE has the potential to alter critical processes, such as nutrient cycling and food-web interactions that determine the biological productivity of coastal and marine ecosystems (Gaylord et al., 2015; Klinger T. et al, 2017; Siebel, 2011).

As EPA noted in its 2016 Fact Sheet, a major finding of the West Coast OAH Science Panel is that organic pollutants contribute to algal and bacterial blooms that trigger hypoxia and exacerbate ocean

acidification. The release of organic material, such as fish processing waste, into the marine environment is a well-documented driver of hypoxia in estuarine and nearshore systems (Diaz, R.J. et al. 2008). Fish processing waste is a demonstrated contributor to increased biochemical oxygen demand, a precursor to hypoxic conditions, in nearshore environments (Islam, M.S. et al. 2004). The predisposition of Oregon's coastal waters to seasonal hypoxia and the demonstrated ties between hypoxia and acidification indicate a sensitivity of Oregon's nearshore zone to environmental perturbation. Given the coupling and interaction of OAH and the resulting effects, any action that potentially contributes to either hypoxic or acidified conditions on the continental shelf is concerning for Oregon's coastal zone. The OAH Science Panel recommends the full enforcement of water quality laws and regulations to reduce intensification of OAH, as well as monitoring to assess OAH (Klinger T, et al. 2017).

Additionally, the Pacific Fishery Management Council, in both the Pacific Groundfish Fishery Management Plan and Pacific Coast Salmon Fishery Management Plan, identifies organic matter and specifically, fish processing wastewater as sources of potential adverse effects on essential fish habitat (EFH) for more than 90 Council-managed species. The EFH Appendices includes conservation measures that are directly applicable to seafood processing waste, including: 1) effluent limitations based on water-quality concerns for EFH, 2) limit the discharge of untreated solid and liquid waste [*such as solid fish waste*] and liquid waste [*such as seafood processing wastewater and stickwater*], 3) establish controls for stickwater, 4) find alternative uses for fish processing waste, 5) avoid waste discharges into fish rearing and nursery habitat, 6) monitor the affected environment and water quality discharges under NPDES requirements.

The recommendations and conservation measures from these important policy and science bodies reinforce the need for EPA to apply the highest water quality standards within its mandate by controlling nutrient pollution on the continental shelf to lessen the risk of inducing or exacerbating hypoxia and jeopardizing ecological functionality of the marine ecosystem.

Depth-based Exclusion Area

EPA's proposed Exclusion Area encompasses waters that have experienced hypoxia most consistently since first detected off Oregon in 2002. The proposed Exclusion Area, which extends from 3 miles to 100 m, and the Heceta-Stonewall Banks complex, encompasses 40% of the continental shelf. Further review of the available scientific information and modeling suggests that the deeper portion of the shelf is also at risk for hypoxia, particularly during years of severe hypoxia, and that extending the Exclusion Area out to the continental shelf break (approximated by the 200m depth contour) would ensure comprehensive protection of all marine habitats, including rocky reefs, for all fishery resources on the shelf (Figure 1).

A high-resolution regional oxygen model of the transport processes of hypoxic water on the continental shelf off Washington and northern Oregon demonstrates broad temporal and spatial oxygen decline in a seasonal progression across most of the shelf (Siedlecki, et. al 2015). A comparison of modeled and observed data for the Washington shelf demonstrates that low oxygen water beyond the shelf break (>200m) upwells onto the shelf and contributes to the development and expansion of hypoxia on the shelf. Once upwelling is initiated, respiration of organic matter is the primary driver of hypoxia through

the upwelling season (Siedlecki, et. al 2015). Survey data off central Oregon indicate hypoxia typically occupies waters on the mid to inner shelf (<100m depth); however, hypoxic waters were identified across the shelf, out to the shelf break (200 m) during the severe hypoxic events of 2002 and 2006 (Chan, et al., 2008). During severe hypoxic years, significant mortality of demersal fish and benthic fauna, including commercially harvested rockfish species and Dungeness crab occurred (Grantham et al., 2004; Chan, et al., 2008). The West Coast Ocean Acidification and Hypoxia Science Panel (Panel) expect hypoxia and ocean acidification to intensify with climate change (West Coast Panel, 2016). Given the uncertainty of the spatial and temporal distribution and severity of hypoxic conditions on the continental shelf, and the need for data in offshore waters, a precautionary approach that protects the entire shelf is warranted until further refinement of modelled data and additional survey data suggest otherwise. As stated previously, this is consistent with a stated management measure of Oregon's Statewide Planning Goal, Goal 19.

In addition to addressing regional hypoxia, a shelf-wide Exclusion Area would provide protection for all rocky reefs of the shelf, which are highly vulnerable to habitat impacts (further discussed below). A shelf-wide Exclusion Area would also protect eggs of bottom-spawning species that spawn in the deeper waters of the shelf where they are susceptible to smothering (e.g., sablefish and Pacific halibut).

Analysis of Impacts to the Fishery

In developing a recommendation for the proposed exclusion area, ODFW evaluated the potential spatial displacement of the whiting fishery at-sea sector (i.e., catcher-processors, motherships and their catcher boats). Catcher-processor vessels and motherships are required to carry federal observers at all times to collect fishery data. The data include information on the location and species catch for all catcher-processors and the mothership catcher vessels. ODFW obtained the NMFS At-Sea Hake Observer Program (A-SHOP) data for the at-sea sector. Spatial analysis provided the ability to visually and quantitatively assess haul locations in relation to potential Exclusion Areas. We mapped both the start and end locations of all hauls by all vessels[2] from 2008 to 2016. Presuming that motherships receive and begin to process the catcher boat's load at the end of the haul, it was important to consider the end locations of the hauls with respect to potential Exclusion Areas. From 2008 to 2016 the at-sea sector conducted 23,180 hauls. Only 259 of the haul start or end points were shoreward of the 200 m depth contour, or 1.1% of all hauls over this 10 year period (26 hauls per year, on average) (Table 3). For the three years prior to 2008, hauls shoreward of the 200 m contour accounted for 9% of the total, on average. This corroborates well with the vessel's electronic depth data recorded by the vessel captains while fishing and reported in the A-SHOP database. The spatial "footprint" of at-sea sector hauls (determined by a line density algorithm based on start and end locations) from 2008 to 2016 aligns tightly to the shelf edge, or 200 m contour. (Figure 2). This pattern is best explained by restrictions on overfished species catch that have motivated these vessels to voluntarily operate farther offshore to

[2] This analysis includes all fishing vessels (catcher-processors and mothership catcher vessels) in the at-sea sector of the whiting fishery and is not limited to only vessels intended to be covered under EPA's NPDES General Permit.

avoid catching species declared as overfished. However, the fleet could conceivably move in shoreward of 200 m if fishery conditions change in the future.

Mothership and catcher-processor operators have expressed concerns that Exclusion Areas could negatively impact their operations. At-sea processors explained that some fishing has occurred inside the 200 m depth contour and that they typically process whiting while transiting between fishing locations, searching for fish schools, taking on supplies or exchanging crew. An additional concern raised by at sea whiting industry representatives is the loss of flexibility in fishing location that discharge Exclusion Areas could present.

The A-SHOP data indicate that 99% of the start and stop locations of all hauls for the entire at-sea fleet occur deeper than the 200 m depth contour. Even if catcher vessels fish shallower than 200 m, they end most hauls deeper than 200 m, as the A-SHOP data indicate. At this point they likely transfer their catch to the motherships and processing begins. This suggests that imposing a minimum 200m depth Exclusion Area may have minimal interference with processing operations as this would occur outside the 200 m Exclusion Area. However, as processors expressed, there is potential to impede certain aspects of their operations. Although there may be some impacts to at-sea whiting operations, the benefits of an Exclusion Area encompassing the entire shelf (i.e., protecting life-sustaining dissolved oxygen, averting displacement of fish caused by oxygen depletion) ultimately supports the at-sea whiting fishery and all Oregon fisheries.

Recommendation: The Discharge Exclusion Area should encompass the entire continental shelf out to the shelf break, which is approximated by the 200 m depth contour (Figure 1).

Rocky Reefs

According to the Ocean Discharge Requirement, EPA must determine if the permit causes unreasonable degradation of the marine environment (40 CFR §125.122) and EPA must specifically consider "*special aquatic sites including, but not limited to marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas and coral reefs."*

Rocky reefs are '*special aquatic sites'* because they are a finite resource of only 10% of the continental shelf, yet they support high biodiversity and abundance. The topographic complexity of rocky reefs provides a diversity of habitat structure for critical ecological functions such as nesting, nursery sites, foraging, refuge from predators and shelter from ocean currents. Numerous reef-associated species are vital to west coast fisheries, as is evidenced by several spatial management designations signifying their relative ecological and economic value. Most notably, the designation of rocky reefs Essential Fish Habitat (EFH) for West Coast Groundfish under the Magnuson Stevens Act, and their distinct designation as Habitat Areas of Particular Concern emphasizes their superior ecological significance, sensitivity and limited availability. In addition, several rocky reefs are federally-regulated as EFH Conservation Areas to protect sensitive rocky habitats from physical damage by fishing gear.

Unlike smooth bottoms of sand or mud, the inherent topographic relief and complexity of rocky reefs could alter water movement and the retentive capacity of nutrients and detritus across the reef, similar

to coral reefs, where topography, orientation, wind and other factors divert currents and flow around reef structures and reduce velocity and flow across the reef surface up to a magnitude greater than sandy seafloors (Rogers, et al., 2013; Storlazzi, et al., 2013; Black et al., 1988; USGS, 2017). Although information about hydrodynamics on rocky reefs of the Pacific Northwest may be lacking, high-relief and rugose (i.e., surface roughness) structural formations in an otherwise homogenous and smooth sand or mud seafloor, likely affect water movement at the seafloor. Thus, rocky reefs may experience increased nutrient retention and accumulating detritus on the bottom as large amounts of sinking processing waste settle into crevices and burrows, between boulders, and adhere to pinnacles, ridges and attached invertebrates, including deep-sea corals.

The effects of increased organic load on deep-water rocky reefs is not well known, but studies report negative effects of sedimentation on deep-sea coral species and filter-feeding organisms which inhabit deep-water reefs (Allen, et al. 2006; Reed 2005). This suggests that smothering from accumulating debris is generally detrimental. Without proper flushing, sinking detritus could smother sessile and habitat-forming invertebrates. Smothering of benthic fish eggs and displacement of young-the-year rockfishes and other species from secure burrows is also plausible as protected micro- habitats and low-flow support larval settlement (Breitburg, et al. 2002). Furthermore, immobile organisms and eggs are directly susceptible to localized hypoxia as they cannot escape these conditions. Deep-sea corals are further susceptible to shifts in ocean chemistry and nutrients as they have evolved with relatively stable ocean chemistry conditions (Guinotte e al. 2006; Whitmire, 2007).

EPA's Ocean Discharge Criteria Evaluation (ODCE) (2015) stated that benthic communities are particularly vulnerable to disturbance and burial under a minimal amount of material, and that fish eggs may succumb when buried under as little as 0.4 inches of accumulating waste material. EPA's analysis predicts an accumulation of 0.5 cm (0.2 inches) of processing waste on the seafloor (ODCE, Section 3.2.1). This would create a safety margin of only 0.2 inches for vulnerable organisms. This analysis is quite concerning because: (1) fish eggs have a very narrow tolerance threshold for burial; (2) a safety margin of 0.2 inches is too narrow; and (3) EPA's analysis did not consider marine conditions and habitats that could increase retention or uneven accumulation as discussed above (e.g., rocky reef and biogenic habitat features that trap material, and localized currents or eddies that could result in greater amounts of accumulation concentrating in some areas). EPA's estimate of deposition may actually underestimate the retentive nature of rocky reefs that could result in increased build-up of organic matter than predicted in the analysis. Without in-situ or laboratory studies, the fate of the material and its implications on marine organisms and habitats are unknown. Rocky reef habitats and associated species would be subjected to an unknown and unpredictable level of physical and chemical degradation by seafood processing waste caused by increased nutrient load, oxygen-demanding organic matter, and smothering.

In our comments to EPA in December 2016, ODFW identified several prominent reefs for protection from processing discharges. EPA proposes prohibiting discharges on only one of these areas; the large rocky reef complex of the Heceta-Stonewall Banks. ODFW continues to recommend prohibiting discharges at six prominent rocky reefs (Figure 3). Three of these reefs are designated as Groundfish EFH Conservation Areas, and three are currently proposed for designation in the PFMC's Groundfish EFH

review process. ODFW shares management responsibility for species dependent on these specific habitat areas. Coastal economies could be impacted should these species suffer from impacts on their habitats. Therefore, protection of rocky reef habitats are of direct interest to the state of Oregon.

In developing our recommendation to prohibit discharges on rocky reefs, ODFW evaluated the potential spatial displacement of the at-sea sector using NMFS Observer Program A-SHOP data (2010-2016). Spatial impact is low at all reefs relative to the total number of hauls (23,180) during this time period, however some effort would be displaced (Table 3).

Recommendation: Rocky reefs are special aquatic sites of ecological and economic significance with high potential for water quality degradation and smothering of benthic organisms that require <u>year-round</u> protection from processing waste discharges. The large reef complex known as Heceta-Stonewall Banks, as proposed in the draft permit, should remain in the final permit. The following additional rocky reefs should be protected as <u>year-round</u> Exclusion Areas: Nehalem Bank, Garibaldi Reef, Daisy Bank, Arago Reef (federal waters), Coquille Bank, and Rogue Reef (Figure 3).

See Figure 4 for a composite map of all proposed Exclusion Areas.

<u>Seasonal vs. year-round closure</u>

EPA proposes a seasonal prohibition for the depth-based Exclusion Area from April 15 to October 15 to coincide with peak upwelling and hypoxia, however, there are other factors that support a year-round prohibition in the Exclusion Area: 1) Year-round low oxygen persists across the Washington shelf and Heceta Bank, Oregon and could expand spatially and temporally, particularly during severe hypoxia events, as occurred across the shelf off Oregon during 2002 and 2006; 2) A year-round prohibition protects rocky reefs in the Exclusion Area from smothering and excessive nutrient input; impacts that are independent of seasonality; 3) Current fishing regulations require that the at-sea sector delay fishing until April, however, regulations could change in the future.

If EPA imposes a seasonal closure instead of a year-round closure, the closed season should extend through October 31. EPA based its proposed dates on the upwelling period for a typical year (to coincide with the occurrence of hypoxia). However, the exact timing for the onset and end of upwelling is highly variable, and hypoxia can persist into late October, particularly in years of severe hypoxia. As upwelling subsides, the post-upwelling transition period of late October and November is characterized by the slowing of currents across the shelf as they reverse direction and flow northward and offshore. This period of current relaxation can allow hypoxia to linger until strong currents begin to transport low-oxygen water off the shelf. Furthermore, the at-sea sector is often highly productive in October, representing the highest or second highest monthly catch between 2008 and 2015, and up to 40% of the annual catch over that time period (NMFS A-SHOP data). Permitting processing waste discharges into high-risk hypoxic waters during this unstable time period, could further exacerbate or prolong hypoxic conditions. At a minimum, seafood processing discharged during the transition period in October should be prohibited in the Exclusion Areas.

Recommendation: Preferred: Institute a year-round prohibition of waste discharge for all Exclusion Areas. If EPA declines to institute a year-round prohibition for all exclusion areas, implement a seasonal prohibition for the depth-based Exclusion Area from April 15 - October 31, while maintaining a year-round prohibition for all rocky reefs.

Monitoring, Reporting and Compliance

EPA has determined that (40 CFR § 125.123(c)) is the applicable Ocean Discharge Criteria for this permit which states that: *"If the director has insufficient information to determine prior to permit issuance that there will be no unreasonable degradation of the marine environment pursuant to §125.122, there shall be no discharge of pollutants into the marine environment unless the director on the basis of available information, including that supplied by the applicant pursuant to §125.124 determines that:*

(1) Such discharge will not cause irreparable harm to the marine environment during the period in which monitoring is undertaken, and
(2) There are no reasonable alternatives to the on-site disposal of these materials, and
(3) The discharge will be **in compliance** with all permit conditions established pursuant to paragraph (d) of this section.

Included in paragraph (d): "*Specify a monitoring program* **sufficient to assess the impact** *of the discharge on water, sediment and biological quality, including, where appropriate, analysis of the bio-accumulative and/or persistent impact on aquatic life of the discharge,*" and *"Contain any other conditions, such as performance of liquid or suspended particulate phase bioaccumulation tests, seasonal restrictions on discharge, process modifications, dispersion of pollutants, or* **schedule of compliance for existing discharges, which are determined to be necessary because of local environmental conditions***."* (Bold type for emphasis)

Monitoring/Reporting: the EPA Fact Sheet explains the need for additional reporting requirements on processing amounts and discharges in order to assess bio-loading and potential impacts to water quality and dissolved oxygen (as specified in 40 CFR § 125.123(d)). However, the proposed monitoring requirements will not provide the quantitative information on processing and discharge amounts and discharge locations that are necessary to meet EPA's stated need or the Ocean Discharge Requirement for assessing impacts. In order to assess impacts on the environment (and ultimately minimize those impacts), we need to know what is discharged where, when and how much. This information would make it possible to conduct scientific studies with a robust approach to determine if there is measureable accumulation and transport. Furthermore, this information would be needed to modify or remove discharge restrictions in the future.

Recommendation: To meet this legal mandate, the reporting requirements for the annual report should include:

- ***Total amount (pounds or metric tons) of each raw product per month***
- ***Total amount of each type of finished product and byproduct (e.g., H&G, fillet, surimi, fish oil, fishmeal) per month***

- ***Known amount of each type of waste product (weight of fish solids, volume of stickwater, waste water, and offal, etc.) separately, per month. This is necessary for scientists to calculate BOD for each type of waste product since BOD concentrations vary greatly among byproduct type (i.e., BOD is much more concentrated in stickwater)***
- ***Representative samples of different types of liquid wastes (wastewater, stickwater, offal) to measure BOD5, TSS, O&G and pH.***

Compliance: the Ocean Discharge Requirement [40 CFR Part 125.123(d)] requires a "*schedule of compliance for existing discharges, which are determined to be necessary because of local environmental conditions*". The biochemical oxygen demand (BOD) of seafood processing wastewater at 1500-3000 mg/L is 50-100 times higher in BOD than treated sewage (DEQ, personal communication). Stickwater at 50,000 mg/L is 1700 times higher in BOD than treated sewage (DEQ, personal communication). Because seafood processing uses high volumes of water, it produces a waste stream that is high volume and high BOD. The precise risk that inducing or aggravating hypoxic conditions would cause '*unreasonable degradation'* has not been investigated, but is plausible, and considered by scientists to be a risk that must be avoided. In order to encourage and ensure vessel compliance with the spatial prohibitions designed to prevent '*unreasonable degradation'*, detailed reporting requirements are essential. The draft permit's proposed requirement of a once-daily location on a map of unspecified scale to be reported annually does not satisfy the Ocean Discharge Criteria requirement of "*compliance …determined to be necessary because of local environmental conditions*". Reporting should include authenticated vessel location information at a spatially and temporally- relevant interval.

In addition to the NMFS observer program data (A-SHOP) previously discussed, all vessels in the at-sea sector (motherships, catcher-processors, and catcher boats) are required to carry a vessel monitoring system (VMS) that reports their position to federal fisheries law enforcement via satellite. These two sources provide the most reliable and accurate accounting of vessel position. It is understood that catcher boats may fish in areas prohibited to processing; however, as previously discussed catcher boats transfer their catch to motherships at the end of the haul, so that the haul end points of the catcher boats would provide a reference point secondary to the VMS data for motherships. There are a few potential options to facilitate and simplify reporting of the A-SHOP and VMS data to EPA. Vessel captains could provide these data directly to EPA or possibly request their data be forwarded from the data center to EPA, or arrange a data-sharing agreement between EPA and NMFS or PSMFC.

Recommendation: Specific reporting requirements should include: 1) VMS vessel position at the required VMS interval [3 pings per hour], and 2) NMFS At-Sea Hake Observer Program (A-SHOP) location data for each haul start and stop location for catcher-processors and catcher boats (as proxy for motherships that track very closely to catcher boats.)

Optional Study to demonstrate that discharges will not contribute to hypoxia

It should be a stated requirement of the optional study that any proposed study design or analysis must be reviewed by subject-matter experts and meet scientific rigor.

Recommendation: Require an independent research/university partner in order to assure peer review, access to ocean chemistry expertise, and scientific rigor. Study results should be shared with the newly formed Oregon Coordinating Council on OAH to help contribute to scientific knowledge and solutions regarding this issue.

Table 1. Commercial fisheries occurring off of Oregon.

Fishery	Target Species	Depth Range (fathoms)	State Water Fishery	Federal Water Fishery	Value[a/] (millions of $)	Volume[a/] (millions of Lbs)
Crab	Dungeness crab	1-120	X	X	35.5	15.5
Shrimp	Pink shrimp	30-160	X	X	16.2	35.3
Highly Migratory Species	Albacore, minor tuna species	40-700+	X	X	13.5	9.9
Coastal Pelagic Species	sardine	15-700	X	X	5.7	52.5
Salmon	Chinook and coho salmon	1-200	X	X	5.8	2.2
Halibut	Pacific halibut	18-300	X	X	0.9	0.2
Fixed Gear (groundfish)	Sablefish, lingcod, Pacific halibut	25-650	X	X	8.7	3.0
Bottom Trawl (groundfish)	Sablefish, shelf/slope rockfish and shelf flatfish species	5-700	X	X	26.3	30.7
Midwater Trawl	Pacific whiting	25-300	X	X	9.3	90.6
Hagfish	Pacific hagfish	40-600	X	X	1.0	1.5
Squid	Market and Humboldt squid	< 40	X	X	b/	b/
Nearshore rockfish	Black and blue rockfish, cabezon, greenling, lingcod, nearshore rockfish complex	1-30	X	X	1.0	0.7
Prawn	Spot prawn	60-170	X	X	0.1	< 0.1
Urchin	Red Urchin		X		0.3	0.6
Razor Clams	Razor Clams	Shoreline	X		0.1	< 0.1
Ghost Shrimp		Estuaries	X		c/	c/
Mussels	California mussel	Shoreline	X		c/	c/
Dive Clams	Gaper clam, heart cockle, butter clam, littleneck clam	0-1	X		0.1	0.2
Herring	Pacific Herring (roe)	Estuaries	X		d/	d/
Coonstripe shrimp	Coonstripe shrimp	1-33	X		e/	e/

(Source: State of Oregon Geographic Location Description, 2015)

a/ Five year, annual average (2008-2012) of ex-vessel value, unless otherwise noted

b/ Squid is an ephemeral fishery and typically occurs on a decadal cycle. Peak years were 1983-85 (average = $0.2 million and 1.0 million pounds)

c/ No estimates available for these commercial fisheries and species

d/ Targeted roe herring fishery has not occurred since 2003.

e/ Targeted coonstripe shrimp fishery has not occurred since 2007.

Table 2. Recreational fisheries occurring off Oregon

Fishery	Target Species	Depth Range (fathoms)	State Water Fishery	Federal Water Fishery	Effort (# of Trips)[a/]	Volume (# of Fish)[a/]
Crab	Dungeness crab, minor crab species	1-30	X		115,531 b/	624,393 b/
Groundfish - from boats	Black and blue rockfish, lingcod, greenling, cabezon, quillback, minor rockfish species	1-100	X	X	73,000	1,638,406
Groundfish - from shore	same as above	estuaries and shoreline	X		80,000 c/	77,692 c/
Halibut	Pacific halibut	10-170	X	X	16,700	56,000
Salmon	Chinook and coho salmon	1-200	X	X	284,300	154,900
Highly Migratory Species	Albacore tuna, minor tuna species	>40	X	X	11,000	196,700
Razor Clams	Razor Clams	Shoreline	X		92,400	1,168,200
Ghost Shrimp		Estuaries	X		d/	d/
Mussels	California mussel	Shoreline	X		d/	d/
Bay clams	Gaper clam, heart cockle, butter clam, littleneck clam	Estuaries	X		44,152	699,281
Herring	Pacific herring	Estuaries	X		d/	69,836 c/
Surf Perch - from boats	Several surf perch species	1-30	X		39,158	48,400
Surf Perch - from shore	Several surf perch species	Estuaries and Shoreline	X		d/	150,068 c/

(Source: State of Oregon Geographic Location Description, 2015)
a/Five year, annual average (2008-2012), unless otherwise noted
b/Annual average for 2008-2011
c/Annual average for 2000-2004
d/ No estimates available for these recreational fisheries and species

Table 3. Whiting at-sea sector hauls within all ODFW proposed Exclusion Areas (EA) for the period 2010-2017.

Area Name	Haul Count	% Hauls	Area size (km^2)
200 m EA	199	1.08	13,722
Nehalem Reef	0	0	217.7
Garibaldi Reef	0	0	329
Daisy Bank	62	0.35	167
Heceta-Stonewall	353	1.9	4855
Arago Reef	0	0	336
Coquille Bank	156	0.84	197
Rogue Reef	6	0.03	92

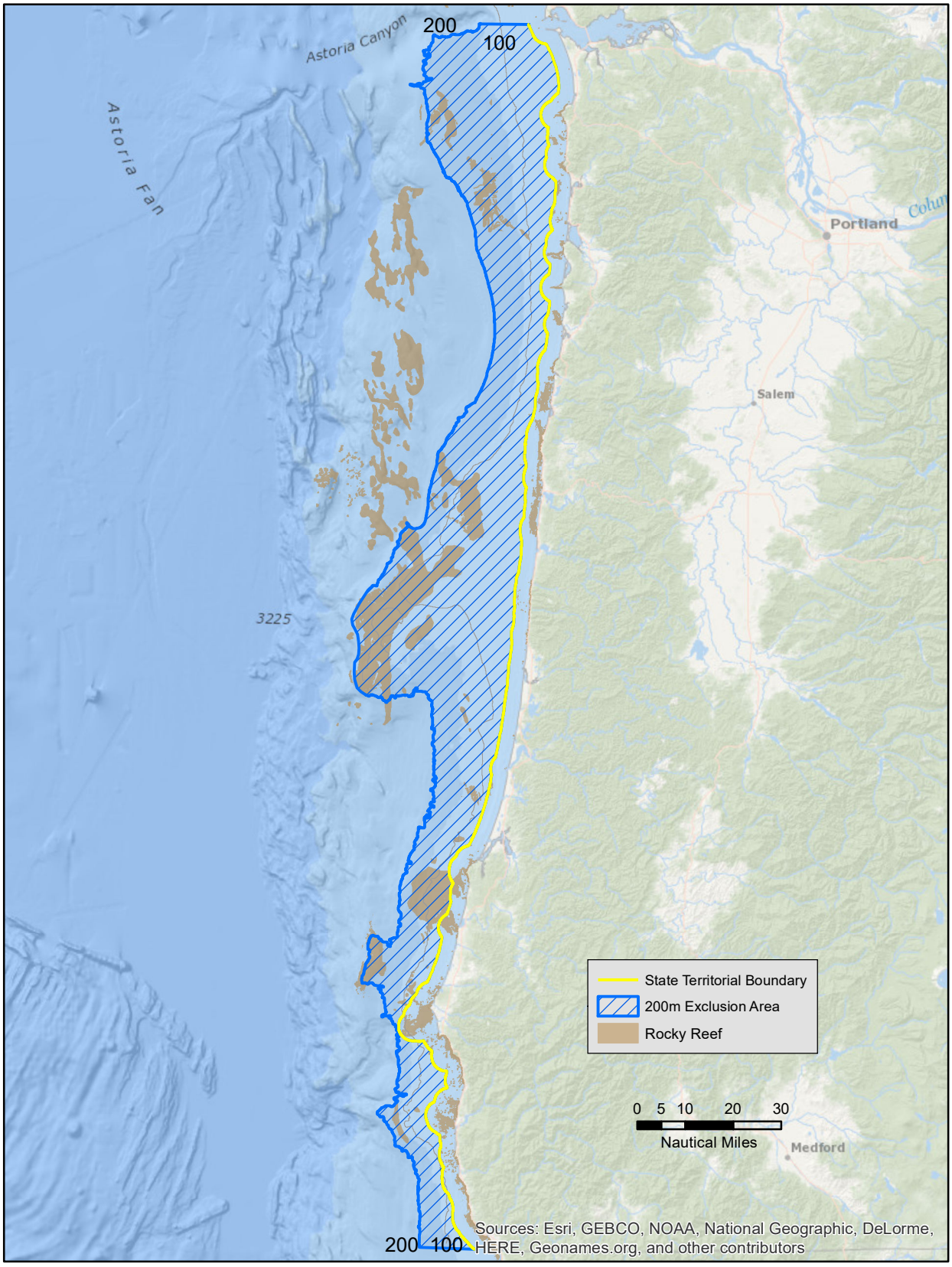

Figure 1. Proposed Year-Round 200-m Exclusion Areas.

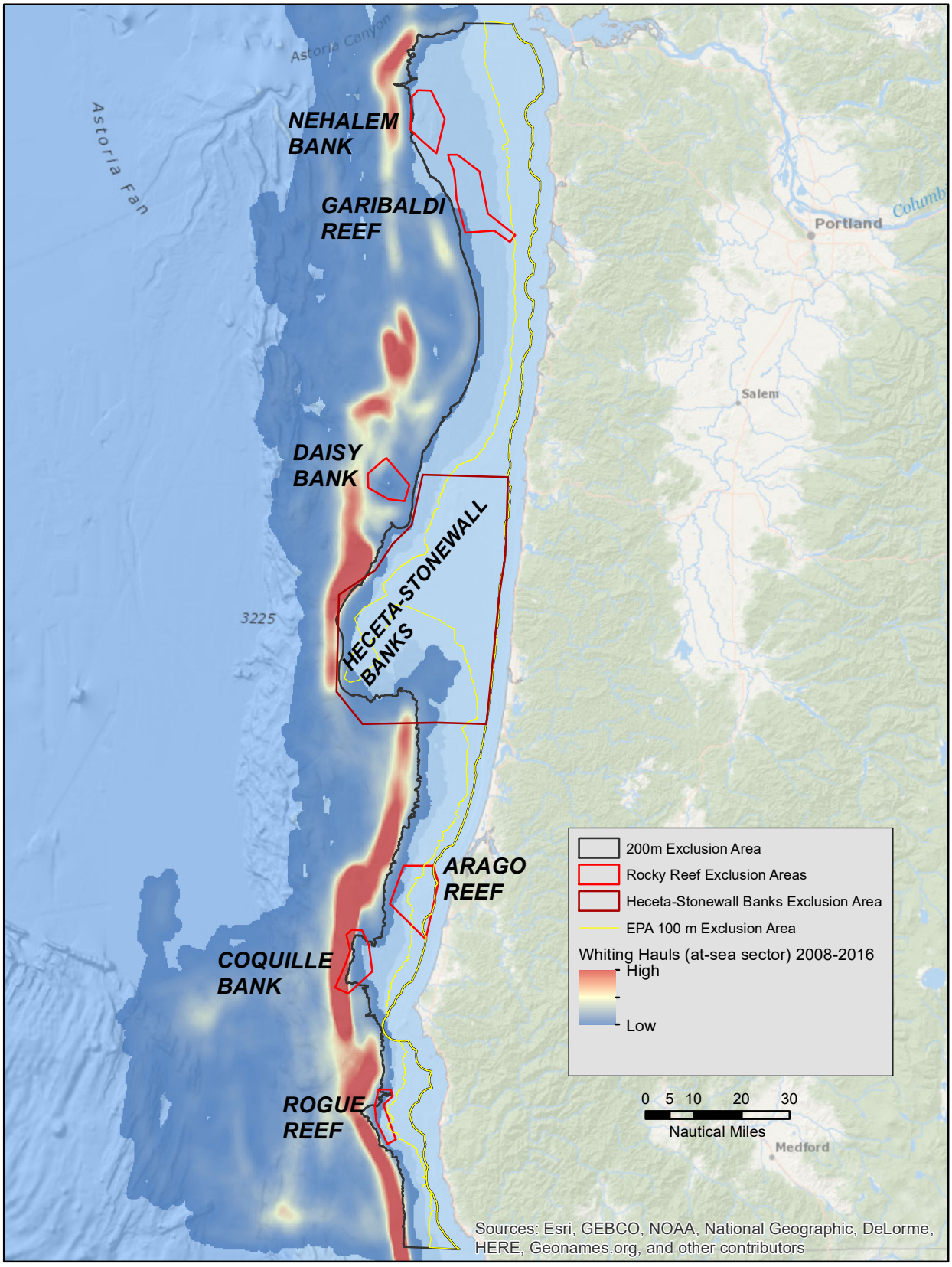

Figure 2. Density of haul locations for at-sea sector of the whiting fishery from 2010-2016 using the line density algorithm method in ArcGIS. This generalized density raster intentionally obscures individual fishing locations to protect proprietary information, as requred by law, and therefore is not meant to be an exact replication of fishing locations everywhere. Nevertheless, relative fishing intensity and the fishery's footprint is well represented.

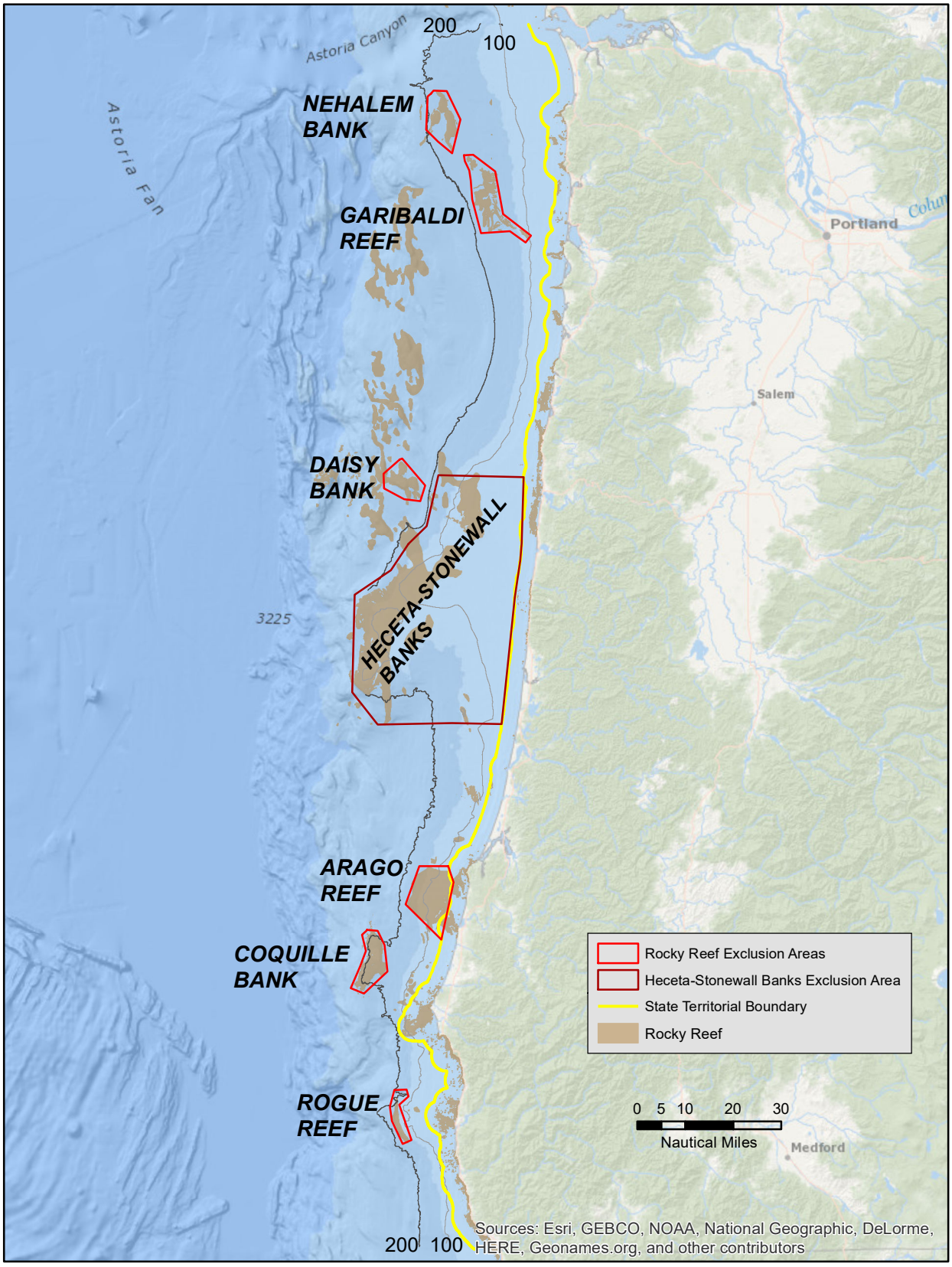

Figure 3. Proposed Year-Round Rocky Reef Exclusion Areas.

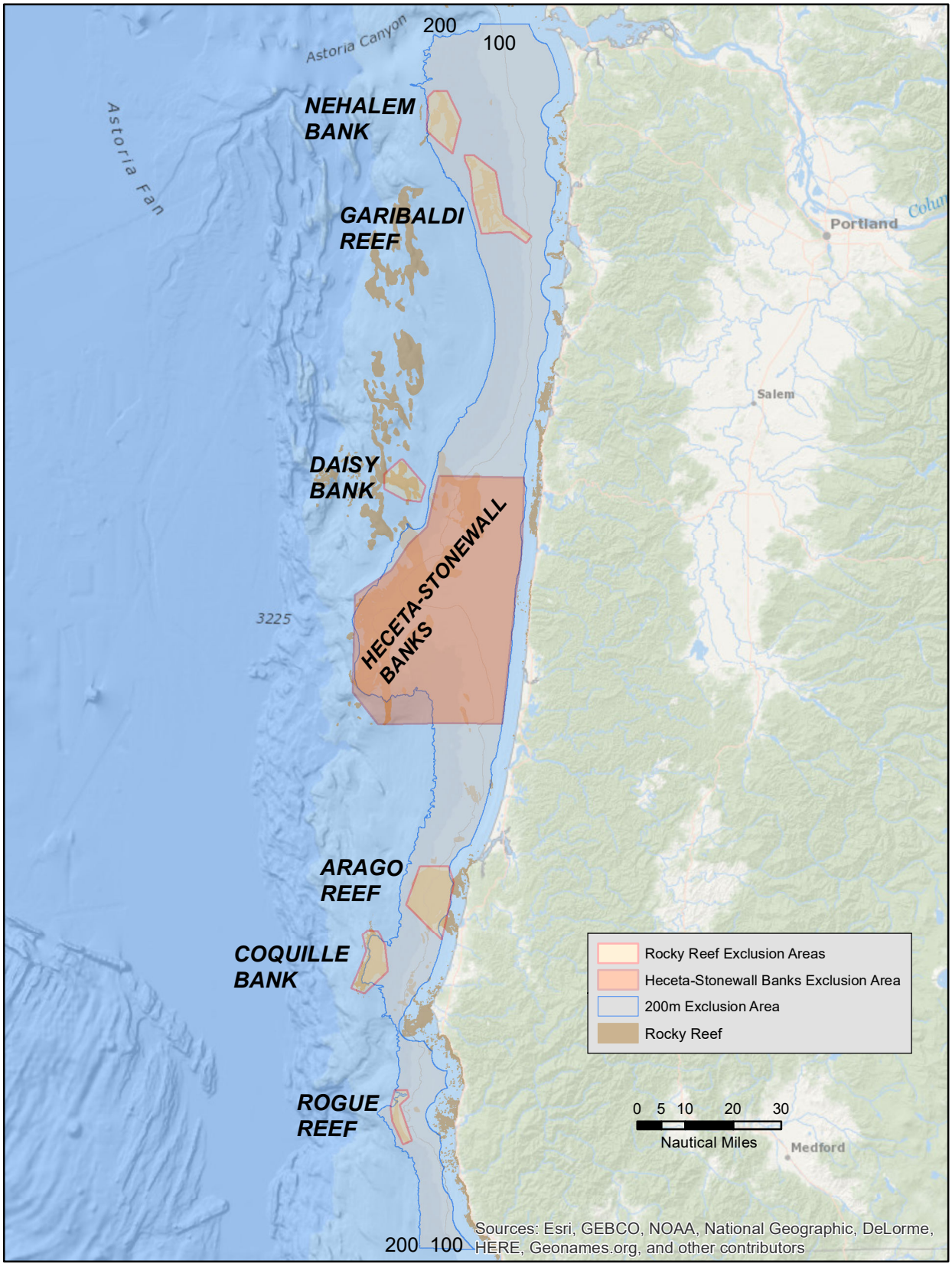

Figure 4. Map of all proposed Exclusion Areas.

Summary of Agency Recommendations

We acknowledge the time and energy the EPA has taken to consider state resources and the quickly developing issue of OAH and the role nutrient input has in contributing to the problem. We appreciate the year-round discharge exclusion area at Heceta-Stonewall Banks as well as the other permit conditions to reduce impacts to continental shelf resources of interest to the State, however, beyond the Heceta-Stonewall Banks discharge exclusion area, we do not believe the conditions in this seafood discharge draft NPDES general permit are adequate to conserve and sustain fisheries, other marine life, and water quality into the future. We recommend the additional conditions:

1. The Discharge Exclusion Area should encompass the entire continental shelf out to the shelf break, which is approximated by the 200 m depth contour.
2. Rocky reefs (Nehalem Bank, Garibaldi Reef, Daisy Bank, Arago Reef (federal waters), Coquille Bank, and Rogue Reef) should be protected by year-round Discharge Exclusion Areas.
3. The continental shelf Discharge Exclusion Area should be implement year round, which encompasses many of the rocky reefs and provides a clear, consistent, economically feasible, and biologically meaningful boundary for seafood waste discharge. If EPA does not implement a year-round continental shelf Discharge Exclusion Area, a seasonal prohibition from April 15 - October 31 for the depth-based shelf Exclusion Area and a year-round prohibition for all rocky reefs named above is critical.
4. EPA should apply the effluent limitation guidelines for bottomfish processing contained in 40 CFR Subparts U and V 408.210-227 and the fish meal/fish oil processing guidelines from Subpart O, with a solubles plant as in 40 CFR 408.152(a).
5. Reporting requirements for the annual report should include:
    a. Total amount (pounds or metric tons) of each raw product per month
    b. Total amount of each type of finished product and byproduct (e.g., H&G, fillet, surimi, fish oil, fishmeal) per month
    c. Known volume (if possible) or estimate of each type of waste product (fish solids, stickwater, waste water, offal, etc.) separately, per month. This is necessary for scientists to calculate BOD for each type of waste product since BOD levels vary greatly among byproduct type (i.e., stickwater BOD is 3-8 times higher than wastewater BOD)
    d. Ideally, these additional detailed reporting requirements could be required to fully understand the contribution of seafood processing waste on BOD:
        i. start/stop times and locations of each discharge event,
        ii. speed during each discharge event,
        iii. tidal and general weather status during discharge,
        iv. weight of each discharge (lbs) and whether discharged evenly throughout run
        v. gallons of wastewater discharged per discharge event, whether simultaneously or separately from ground fish discharges.
6. Compliance reporting requirements should include:
    a. VMS vessel position at the required VMS interval [3 pings per hour] for all vessels, and

b. NMFS At-Sea Hake Observer Program (A-SHOP) location data for each haul start and stop location for catcher-processors and catcher boats (as proxy for motherships that track very closely to catcher boats.)

7. If EPA retains Monitoring Requirement #7 (Optional Study) to allow permittees to determine whether seafood discharge contributes to hypoxia, EPA should require an independent research/university partner in order to assure peer review, access to ocean chemistry expertise, and scientific rigor. EPA should also require study results be shared with the newly formed Oregon Coordinating Council on OAH to help contribute to scientific knowledge and solutions regarding this issue. Gathering certain information would be particularly helpful to understand if seafood waste discharge contributes or does not contribute to OAH and are listed in Recommendation #5.

We appreciate the opportunity to comment and the earnest research the EPA undertook after receiving Oregon's initial concerns. Local, state, and global fisheries economies that Oregon depends upon must be protected through reasonable conditions within the NPDES draft permit to ensure that seafood and fisheries industries utilizing the same ocean resources can all continue to operate well into the future. If you have any questions please do not hesitate to contact us.

Sincerely,

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Tiffany Yelton-Bram
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Attachment 1

Oregon
Kate Brown, Governor

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August 2, 2017

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Re: DEQ comments on the draft Re-Proposed NPDES permit (WAG5200000) - Offshore Seafood Processors Discharging in Federal Water off the Coast of Washington and Oregon

Dear Liz,

The purpose of this letter is to convey DEQ comments regarding the EPA draft general permit for Offshore Seafood Processors to the Oregon Coastal Management Program for contribution to an Oregon interagency letter to EPA during the public comment period. A number of these comments, with particular regard to the federal consistency determination, were previously conveyed in my communication to you on July 28, 2017. In addition, we have some comments here specific to the public notice of the permit. These comments include recommendations for limitations, related treatment modes and monitoring requirements. Finally this letter presents DEQ concurrence with the recommendations from ODFW.

EXAMPLE CALCULATIONS OF THE DISCHARGES ALLOWABLE UNDER THIS PERMIT:
Our email of July 28 included an example of the scale of pollutants expected in discharges permissible under the proposed permit. The example was expanded and corrected from similar calculations in the DEQ letter of December 14, 2016.

In this example we used vessel data from the industry by selecting an example vessel from the mid range of one of the operating fleets including:

- Frozen cargo tonnage
- Fishmeal hold tonnage
- Fish Oil in Metric tons

We also used industry-submitted data from Oregon onshore seafood processors (This data is from land based Oregon processors, using 2 years of data, typically 2014-2015, reported monthly to DEQ on forms known as DMRs from seafood processors along the entire Oregon coast) including:

- Weights of raw materials and initial products from which we calculated:
    - The typical percentage of initial product to landed weight
    - The typical percentage of residuals after initial processing prior to further processing as fishmeal and fish oils

- Weights of residuals entered into further processing and resulting weight of fishmeal and fish oil products. The difference in weight from residuals to residual products is based on steam loss and the slurry of dissolved or suspended materials in the stickwater. (Stickwater is the name of the wastewater specifically from fish meal processing. It is much stronger in pollutants than the wastewater from typical hand and mechanical fish processing.)
- Gallons of wastewater generated per metric ton of landed weight processed
- Typical concentrations of biochemical oxygen demand (BOD5) in various types of seafood processing wastewater including hand and mechanical processing of finfish
- Typical concentrations of BOD5 in stickwater generated during fishmeal processing from residuals without a solubles plant

From these two data sources we were able to calculate:

- The landed weight processed that would fill the frozen cargo tonnage
- The weight of residuals left after initial product processing
- The weight of fish meal and fish oil such that the fishmeal hold and fish oil hold were full
- The weight of materials not contained in any of these products

This analysis resulted in an estimate of the weight of solid or suspended materials in the discharge. The material in the discharge would be pounds of solids ground for discharge or pounds of materials in the stickwater as thick slurry. We were also able to calculate:

- The total volume of wastewater discharged and
- The pounds of BOD5 Discharged

Weight Of Fish Waste Solids Discharged:

- The ratio of waste fish solids to raw product has been reported in Discharge Monitoring Reports (DMRs) as 40 to 50% from Bottom Fish Mechanical processing
- Or as 50 to 65% when hand fillet only occurs (Bottom Fish Conventional Processing)
- The smallest waste fraction 40% is used in calculations here as:
    - 40% of landed weight = weight of waste (initial residual %)
    - 60% of landed weight = weight of finished product
- "finished product" is the same as vessel frozen cargo tonnage
- The large offshore processing vessels, which stay at sea until full, reportedly have total capacities such as 1400 metric tons of finished product. (Specifications for American Seafoods' vessel Northern Jaeger, given at this link: http://americanseafoodscompany.com/vessels/northern-jaeger)
- This ship was used for example calculations. If Frozen cargo tonnage = 1400 MT(vessel data) and frozen product cargo averages 60% of landed weight then
- Landed weight = (1400/.60) = 2333 MT = 5.144 million pounds = 2572 US short tons
- Since the residual material is 40% of the landed weight: 40% of 2333 MT = 933 MT waste material per vessel per trip. This material may be further processed as fishmeal and fish oil or ground and discharged under this permit.
- Some but not all of these vessels have equipment to process residuals into usable by-products such as fish meal and fish oils. The vessel in this example does both.
- The vessels have stated capacities such as for 300 metric tons of the fish meal and 200 metric tons for fish oil. If all products are maximized such that product storage is full for each product type:
- 933 MT fish waste - 500 MT residuals products = at least 433 MT of waste for sea disposal per vessel per trip
- Therefore, the total solids discharged at sea as ground chunks or in slurry forms such as fishmeal "stickwater" would be:
    - 433 metric tons of solids discharged in wastewater per vessel per trip

- Where: 433 x 2204.62 lbs/ MT = 1.86 million pounds = 929 US short tons of solids discharged in wastewater per vessel per trip

Volume Of Wastewater Discharged:
These vessel production capacity numbers, reported in metric tons of fish products, are also associated with significant discharged volumes of wastewater. The volume of wastewater generated during land based processing (hand fillet and mechanical), has been 600-800 gallons per metric ton processed. Residuals processing (fishmeal) follows the hand and mechanical processing and adds an average 630 gals discharged/MT of fish waste entering the process for residuals recovery as reported by one fish meal processor.

- Average 700 gallons/ metric tons processed x 2333 MT = 1.633 million gallons per vessel per trip of wastewater from fish processing (BFM or BFC) Plus
- Average 630 gallons/ metric tons processed x 933 MT = 588,000 gallons per vessel per trip of wastewater from fish meal processing
- The example vessel would discharge from both of these practices 1.633 million gallons plus 0.588 million gallons = **2.22 million gallons of wastewater per vessel per trip**

Pounds Of BOD5 Discharged:
In addition to the ground solids, the wastewater from fish processing contains oxygen demanding substances (measured as BOD5) in dissolved, suspended and particulate components of the wastewater. Wastewater from typical shore based seafood processing, without any stickwater or ground solids and screened by 40 mesh screens, has been reported with averages over 1500 mg/L BOD5 and peaks as high as 8000 mg/L BOD5 (based on land based processors, using 2 years of DMRs). With the added material from grinding fish solids the BOD5 discharged by ship board processors will be significantly higher in concentration than those with no ground solids. Without advanced treatment, the wastewater discharged from fishmeal and other residuals processing has been reported with values averaging 50,000 mg/L and as high 90,000 mg/L BOD5.Conservatively calculating using concentration of 2000mg/L for the fish cutting lines and 50,000 mg/L for the residuals lines:

- 1.633 million gallons *8.34 pounds per gallon water * 2000 mg/L BOD5 = 27,200 pounds of BOD5 discharged from the fish cutting lines per vessel per trip Plus
- 0.588 million gallons *8.34 pounds per gallon water * 50,000 mg/L BOD5 = 245,200 pounds of BOD5 discharged from the residuals processing lines per vessel per trip
- The example vessel discharging from both of these practices would discharge 27,200 pounds of BOD5 plus 245,200 pounds of BOD5 = 272,400 pounds of BOD5 per vessel per trip

Thus, this example vessel will discharge over 2.2 million gallons of wastewater containing 272,400 pounds of BOD5 per vessel per trip. Therefore, the wastewater and solids mixture from the processes allowed by this permit would be high volume and high concentration and must be considered as significant sources of BOD5.

SUMMARY OF IMPACTS OF PERMIT DISCHARGES TO FEDERAL WATERS REACHING STATE WATERS

As reported in the draft EPA Fact Sheet accompanying the General Permit[1], the process called **Ekman transport seasonally moves oxygenated surface waters offshore while deeper waters**

[1,2] Preliminary Draft EPA Offshore Seafood Fact Sheet, NPDES Permit WAG52000, draft 11-3-13; pp 4-13.

(from more than 100 m depth) move shoreward upwelling onto the continental shelf. That upwelling deep water is low in dissolved oxygen and contributes to seasonal hypoxia in state waters. The Fact Sheet reports documented incidences of hypoxia (*reduced* dissolved oxygen conditions) and anoxic (*depleted* dissolved oxygen, [less than 0.5 mg/L; the USGS definition of anoxic conditions]) off Oregon and Washington coasts. These events have been accompanied by "mass die-offs of fish and invertebrates including Dungeness crab.[2]"

The effect of the vessel discharges allowed by the permit would be an increased BOD5 load that would reduce the dissolved oxygen in the deep water prior to transport into state waters and would continue to decrease the dissolved oxygen subsequent to the upwelling into state waters as the transported BOD exerted its influence. The currents may entrain some of the discharged solids which will decay further lowering dissolved oxygen. Thus, these discharges will result in lowering dissolved oxygen in state waters which is contrary to Oregon water quality standards. The Oregon water quality criteria for dissolved oxygen states (in OAR 340-041-0016) is *"No wastes may be discharged and no activities may be conducted that either alone or in combination with other wastes or activities will cause violation of the following standards: (6) For ocean waters, no measurable reduction in dissolved oxygen concentration may be allowed."* Since the criterion is no measurable reduction in dissolved oxygen, scientific research should be engaged to prove that the loadings from these discharges will not lower dissolved oxygen in state waters.

These proposed vessel discharges to federal waters should be minimized due to their potential impact on state waters, potentially in violation of the Oregon state water quality criteria for dissolved oxygen in ocean waters. The impact of these proposed vessel discharges should be scientifically studied and minimized.

DEQ COMMENTS ON EFFLUENT LIMITATIONS AND TREATMENT TECHNOLOGIES IN THE DRAFT PERMIT, AND APPLICABLE EFFLUENT LIMITATION GUIEDLINES

The re-proposed draft permit applies the federal effluent limitation guidelines that were developed for remote Alaskan waters. The correctness of applying these guideline limitations has not been satisfactorily established. The hydraulic nature of Oregon's waters is significantly different from that of remote Alaska. The currents in Oregon and Washington are upwelling and on-shore. The currents in Alaska include down-welling, high velocity and high exchange volume. Currents off Oregon will carry waterborne and ground solid material from the federal waters into State waters on the continental shelf. In state waters, the oxygen demanding materials will exert their influence lowering the dissolved oxygen. Ground materials which did not rot in the colder deeper federal waters will rot, consuming oxygen, in the shallower state water on the continental shelf. DEQ recommends:

- The cutting line wastewater discharges should be subject to higher levels of treatment capable to meet the limitations in 40CFR 408 Subparts U and V. These are based on model technologies including at a minimum 40 mesh screening which reduces BOD5 by 40% according to EPA data. If implemented, the suspended BOD generated by the cutting lines and carried shoreward into state waters by currents would be significantly reduced.
- The residuals processing lines should have a solubles plant to process the stickwater in accordance with 40 CFR 408 Subpart O.152(a). By this action the suspended BOD from residuals processing carried shoreward into state waters would be significantly decreased.

- No solids should be ground and discharged. That material should be minimized into usable products and when not useable, stored for disposal on shore by legally acceptable methods. Thus, none of this solid material will be carried into state waters to exert BOD or to bury and smother sensitive aquatic life.
- Scientific third party studies of discharges under this permit should be funded and required to inform the application of effluent limitations within this permit in the future

With these requirements in place, the BOD loading will still exceed that of raw domestic sewage presenting a challenge when carried into state waters. To minimize these effects DEQ further recommends that the spatial, depth and temporal limitations on discharges as recommended by ODFW, WA Ecology and OCMP be incorporated.

The effluent limitation guidelines applicable to remote Alaska 40 CFR Subpart T 408.202(b) and 205(b)are not reasonable guidelines for EPA to apply to the West Coast and Non-Alaskan fish processing industry which would properly be subject to 40 CFR Subparts U and V 408.210-227 and the fish meal/fish oil processing would properly be subject to Subpart O with a solubles plant as in 40 CFR 408.152(a).

DEQ COMMENTS ON THE DISCHARGE EXCLUSION AREA AND MONITORING REQUIREMENTS

Two of the major impacts on aquatic life in OR waters of the discharges to be allowed by this permit have been identified by ODFW and DEQ as smothering by deposition of materials and oxygen depletion. Both of these impacts can be limited by adopting the discharge exclusion area and discharge exclusion timing as detailed by ODFW.

- **DEQ supports the Discharge Exclusion Area across the continental shelf as approximated by the 200 m depth contour;**
- If the exclusion area does not encompass the entire continental shelf, DEQ supports that the exclusion area should be extended to the **rocky reefs** as named by ODFW.
- **DEQ supports the discharge exclusion area to be implemented year round**;
- If not implemented year round, DEQ supports the discharge exclusion area be implemented as **a seasonal prohibition from April 15 through October 31 for the continental shelf and year round for the rocky reefs as identified by ODFW**.
- DEQ supports **the Monitoring Requirement #7.** It should be retained and expanded as follows. To evaluate the effect of the allowed discharges of ground solids, stickwater and seafood processing wastewater, it is necessary to know where and when the discharges occur and the extent of the discharges. DEQ recommends monitoring and reporting that will document this information for use in scientific research on effects; such information will inform future permit discussions. The monitoring and reporting should include:
    - Start and stop times and locations of discharges
    - Speed during discharge
    - Tidal and general weather status during discharge
    - Poundage of discharge (with a requirement to discharge as evenly as possible through the discharge run)
    - Gallons of wastewater discharged, whether simultaneously or separately from the ground fish discharges
- With regard to Oxygen Depletion we note that the wastewater carries a tremendous burden of BOD5 and that the ground solids add an even higher level burden of oxygen

demanding substances. To establish the likely effluent characteristics, EPA used 25 year old data from shore based Alaskan processors (BE Table 2.4). That data did not include the parameter BOD for bottomfish and did not distinguish hand filleted bottomfish from mechanical processing -which the whiting fleet will likely use sometimes- and did not include whiting since that is not an Alaskan species. DEQ recommends that Monitoring and Reporting of the wastewater discharges includes parameter monitoring:

  - Sampling and Analysis for parameters BOD, TSS, Oil and Grease and pH in accordance with 40 CFR 136
  - pH which has a hold time of 15 minutes can be accurately performed on-site with relatively little training
  - TSS samples have a 7-day holding time which will allow sample collection within the last days of a trip and delivery by 7 days to a shore based laboratory
  - Oil and Grease samples have a 28 day holding time which will allow sample collection within a trip and delivery by 28 days to a shore based laboratory
  - BOD5 is collected compositely for 24 hours and has a 48 hour hold time starting with the beginning of collection. DEQ recognizes that this protocol is likely unsuited to ship-board activities. However, 40 CFR 136.4 includes provisions for applying to use an alternate test method. An alternate test method that uses automated in-line analysis of COD as a surrogate parameter has been approved for another industrial use in Region 10 and may be suited to ship-board installation.

- DEQ recommends parameter monitoring and reporting to develop data for use in the future issuance or renewal of this permit.
  - By trip or monthly if the same processes are ongoing.
  - By species/process type

Thank you for the opportunity to collaborate on interagency letter to EPA concerning the draft Re-Proposed NPDES permit (WAG5200000) - Offshore Seafood Processors Discharging in Federal Water off the Coast of Washington and Oregon.

Sincerely,

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