UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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JUN 19 2017

OFFICE OF
WATER AND WATERSHEDS

Ms. Carol Bernthal
Sanctuary Superintendent
Olympic Coast National Marine Sanctuary
115 East Railroad Avenue, Suite 301
Port Angeles, WA 98362-2925

Re: EPA Response to OCNMS 304(d) Consultation for the Issuance of a National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Seafood Processors Discharging in Federal Waters of the Washington and Oregon Coast (Permit No. WAG520000)

Dear Mr. Bernthal:

The National Marine Sanctuaries Act (NMSA) authorizes the Secretary of Commerce to designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities as national marine sanctuaries. The Olympic Coast National Marine Sanctuary (the Sanctuary) was designated under this authority in 1994. The EPA acknowledges that the Sanctuary encompasses a highly productive ocean and coastal environment that is important to the continued survival of numerous ecologically and commercially important species of fish, seabirds, and marine mammals, and diverse habitats supporting a great variety of biological communities.

Section 304(d) of the NMSA (16 U.S.C § 1434(d) requires federal agencies to consult with the Secretary of Commerce, through NOAA, regarding any federal action or proposed action, including activities authorized by federal license, lease, or permit, that is likely to destroy, cause the loss of, or injure any sanctuary resource. In a letter dated May 25, 2016, the Sanctuary recommended that the EPA establish permit conditions to mitigate against the stimulation of harmful algal blooms, to mitigate contributions to hypoxic conditions, and to require more detailed monitoring and reporting.

The EPA is re-proposing the General Permit in order to address issues highlighted during the public comment period and via the EPA's various consultations. The re-proposed draft General Permit and materials are available on the EPA's website at https://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/DraftPermitsORWA. The re-proposed General Permit and revised Fact Sheet are also enclosed as attachments to this letter.

The EPA's responses to the Sanctuary's recommended alternatives are provided below:

***OCNMS Recommended Alternative 1**: Establish permit conditions to mitigate against the stimulation of harmful algal blooms (HABs)...*

EPA Response 1: Algal blooms are common in aquatic environments. A subcategory of these blooms poses environmental or public health risk, and are therefore referred to as "harmful algal blooms," or HABs. Some HABs are deleterious because of their sheer biomass, whereas others are associated with algal blooms capable of producing toxins (e.g. the neurotoxin domoic acid). During a HAB event, algal toxins can bioaccumulate up the food web. Animals, including humans, can be exposed to HAB-related toxins when they eat contaminated fish or shellfish, have contact with contaminated water, or inhale contaminated aerosols (Backer and McGillicuddy, 2006).

Harmful algal blooms can cause a number of human health effects, including paralytic shellfish poisoning, neurotoxic shellfish poisoning, and respiratory irritation, diarrhetic shellfish, poisoning, amnesic shellfish poisoning, and cyanobacterial toxin illnesses (Backer and McGillicuddy, 2006). The neurotoxin domoic acid has impacted numerous species along the West Coast since 1991, including razor clams, Dungeness crabs, seabirds, and marine mammals (Trainer et al., 2002). Domoic acid can bioaccumulate via food web transfer from filter-feeding fish and shellfish to birds and mammals (Trainer, et al., 2002).

As noted in the Sanctuary's letter, the Juan de Fuca Eddy (which is located off the Northwest corner of Washington State, in federal waters to be covered by this General Permit) is thought to be an initiation site for toxic Pseudo-nitzschia blooms, which can impact the Washington coast (MacFadyen et al., 2008; Trainer, et al., 2002). The Juan de Fuca eddy region is characterized by high phytoplankton biomass (Trainer, et al., 2002). The eddy is seasonal and topographically defined, with typical near-surface eddy radii ranging from ~15 km in the early summer to ~30 km in September (MacFadyen et al., 2008). According to MacFadyen et al. (2008), "The presence of the eddy facilitates large inputs of dissolved inorganic nutrients to the area and thus has a major impact on regional nutrient distributions. Nutrients are supplied to the region through two primary mechanisms: direct upwelling of California Undercurrent water onto the shelf, and enhanced cross-shelf advection of Juan de Fuca Strait outflow. The penetration of Undercurrent source water to increasingly shallow depths throughout the season results in elevated nutrient concentrations over a large portion of the northern Washington shelf."

Algal blooms can be difficult to identify. HABS have been called "red tides" because many were comprised of red pigmented dinoflagellates, but blooms can also be yellow, green, or brown, depending on the type of algae present (Glibert, et al., 2005). But algal blooms are not always visible. According to Zingone and Enevoldsen (2000), the microalgal species that are potentially involved in HABs comprise approximately 80 toxic species and 200 noxious species out of about 4,000 total marine planktonic microalgae that had been described to date. Less than one percent of algal blooms actually produce toxins (NOAA, 2016) and only a handful of Pseudo-nitzschia produce domoic acid. At present, monitoring for the specific domoic acid-producing diatoms provides the only proactive method that permits some early warning that shellfish might become toxic. Unfortunately, *P. multiseries*, which produces the toxin and *P. pungens* (which does not produce significant amounts of the toxin) are virtually identical under the standard light microscope. Therefore, a current means to identify the toxic species from non-toxic is by the scanning electron microscope (SEM), a method that magnifies cells about 20,000 times (Northwest Fisheries Science Center, 2008). To further complicate matters, there are many places where HAB monitoring and surveillance programs do not exist.

Given the challenges associated with addressing harmful algal blooms, as part of this 304(d) consultation, the EPA sought the expertise of Dr. Vera Trainer, a NOAA scientist whose research is focused on West Coast harmful algal blooms. Since the EPA was also working with the National Marine Fisheries Service (NMFS) on a separate but concurrent consultation to address Essential Fish Habitat (EFH) concerns regarding algal blooms, the EPA requested that NOAA provide the EPA permit writer with concrete recommendations for implementation in the NPDES permit. On May 31, 2016, NOAA provided the EPA with a potential bounding box for the Juan De Fuca Eddy (Trainer, 2016, personal communication). See Figure 1. The EPA considered prohibiting discharge within the Juan de Fuca Eddy region, but decided against it, in part because of impacts to tribal treaty protected fisheries within a tribe's usual and accustomed area.

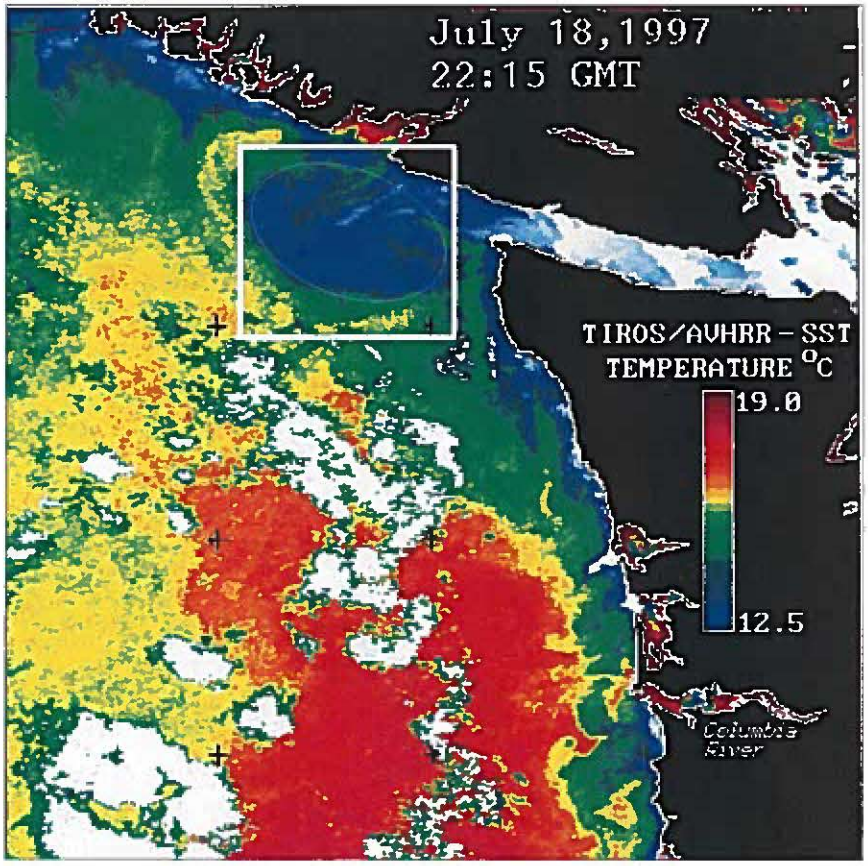

Figure 1. Satellite-derived sea surface temperature (SST), particulate domoic acid (µg/L) and total Pseudo-nitzschia cell numbers in surface seawater July 1997 (modified from Trainer et al., 2002). This image (including a potential bounding box for the Juan De Fuca Eddy) was provided to the EPA as part of the 304(d) consultation on May 31, 2016 (Trainer, 2016, personal communication).

On July 14, 2016, Dr. Trainer communicated the following to the EPA via email:

"...[T]he following are scientific facts regarding harmful algal blooms (HABs) in the area:

1. The seasonally retentive Juan de Fuca eddy is a hotspot for harmful algal bloom initiation off the Washington State coast.
2. The manifestation of the eddy varies considerably and basically disappears during the winter
3. Pseudo-nitzschia (one of the harmful algal species) abundance and toxin production are influenced by nutrient (pulses of nitrate, ammonium) inputs in the coastal environment. These cells bloom when pulses of nutrients are supplied, especially after periods of nutrient limitation.

These 3 facts are our basic truths that need to be connected with more scientific research. There currently is no evidence to suggest that nutrient inputs from fish processing will be sufficient to cause toxic algal blooms.

I suggest the following.

That this wish for proper permitting be based on strong science and scientific collaboration. For example, the current project on Monitoring and Event Response to HABs (MERHAB) project that proposes to collaborate with the Makah and makes available boat sampling in the Makah U&A, provides an opportunity to sample inside and outside the eddy region, both near and far to the fish processing vessels. I would recommend that phytoplankton net tows, whole water and nutrient samples be collected near the vessels before and after discharge. In fact, the fish processing vessels could be involved in the sample collection, as the work is very simple and straightforward.

I would imagine that similar samples could be collected to answer questions about hypoxia and perhaps also pH.

I would strongly advocate for a delay in issuance of the permit until the proper science is available to substantiate any decisions."

Since the NOAA scientist with whom the EPA was consulting for this Sanctuary recommendation believes that there is currently no evidence to suggest that nutrient inputs from fish processing will be sufficient to cause toxic algal blooms, it would not be reasonable for the EPA to prohibit seafood processing waste discharge within the bounding box in Figure 1.

With regard to monitoring for HABs, the EPA is supportive of additional scientific research on West Coast HABs, but believes that a requirement for permittees to participate in the Monitoring and Event Response to HABs (MERHAB) project is beyond the scope of this NPDES permit. Conducting phytoplankton net tows and sampling for whole water and nutrients before and after discharge are also beyond the scope of this permit, and/or infeasible because vessels are moving while discharging. If permittees are interested in collaborating with NOAA to further the scientific knowledge on HABs, the EPA encourages those permittees to contact NOAA directly.

NPDES permits are written for a 5-year time period; the EPA will consider any relevant new information when this permit is up for reissuance. No change is being made to the draft permit based on this recommended alternative.

OCNMS Recommended Alternative 2: *Establish conditions to mitigate contributions to hypoxic conditions... possibly by depth contour or by monitoring for near-bottom oxygen.*

EPA Response 2:

Hypoxia

The dynamics of seasonal hypoxia off the Washington and Oregon coast are well described by Peterson, et al. (2013): "In the northern section of the California Current (NCC), running along the west coast of the U.S.A., seasonal hypoxia events are driven by a combination of relatively low oxygen waters upwelling onto the shelf with further oxygen drawdown stemming from the decomposition of organic matter settling to the seafloor (Chan et al. 2008; Connolly et al. 2010). During the upwelling season (typically mid-April to mid-October), water from 100–150 m depth is transported up onto the shelf and replaces surface waters that move offshore via wind-driven Ekman transport. The upwelled waters are relatively old and tend to be low in oxygen due to extended exposure to water column respiration and isolation from the atmosphere."

Although high primary production [from nutrient inputs] produces oxygen at the surface, the system is driven toward hypoxia when the particulate organic carbon sinks and respires into water already low in oxygen (Siedlecki, et al., 2015). Seafood processing waste not consumed at the surface has high biochemical oxygen demand, and could contribute to near-bottom hypoxia off the coast, particularly in wide shelf areas that already experience high sediment oxygen demand. Even if dissolved oxygen has already reached hypoxic levels at the continental shelf break, respiration can further exacerbate hypoxic conditions as bottom water moves shoreward over the shelf, especially if surface organic carbon sources are sizable (Grantham, et al., 2004). Once nutrients sink to the bottom off the Washington and Oregon coast, they stay on the shelf until circulation patterns are strong enough to flush them away (Siedlecki, et al, 2015).

Oceanographers whom EPA interviewed while developing this draft permit recommended depth-based discharge exclusion zones in waters shallower than 100 or 200 meters in depth to prevent seafood waste discharges from triggering or exacerbating hypoxic conditions in retentive and/or wide continental shelf areas (Newton and Peterson, 2016, via separate personal communications).

The width of the shallow shelf is the critical factor that controls sediment oxygen demand, probably because proximity of the bottom to the surface allows organic matter to reach the bottom, and sediment oxygen demand is directly proportional to the flux of detritus that sinks to the seafloor (Siedlecki, et al., 2015). Observations of sediment oxygen demand in waters shallower than 70 meters are not available, but biomass is more concentrated near the coast, resulting in more large more large detrital particles (Siedlecki, et al., 2015). Seafloor oxygen modeling for waters off the Washington and Oregon coasts shows substantial depth dependence, with more sediment oxygen demand in the shallower depths. The larger detritus tends to sink faster, so it reaches the seafloor and respires faster. Generally, more detritus reaches the bed faster in shallower water columns, since there is less area for respiration to occur in the water column (Siedlecki et al., 2015).

In order to avoid triggering or exacerbating hypoxic conditions because of additional nutrient inputs from seafood processing waste, the EPA proposes to prohibit the discharge of seafood processing waste in waters shallower than 100 meters in depth during April 15 – October 15. Heceta Bank and the broad Washington shelf region (e.g. offshore of Grays Harbor at 46 N–47 N) are known ''hot spots'' of organic matter respiration (Siedlecki, et al., 2015). A depth-based

discharge exclusion zone will help to protect the wider shelf areas, where both detrital concentrations and sediment oxygen demand are high (Siedlecki, et al., 2015). The wide shelf areas off the Washington and Oregon coasts are already stressed by ocean acidification and hypoxia, both of which are projected to increase as the global climate continues to change.

This NPDES General Permit applies only to the discharge, and not to the act of harvesting seafood. Thus, the seasonal discharge prohibition would only apply to seafood processing waste discharged under this NPDES General Permit, and would not apply to the fishing action itself. Thus, vessels could still catch fish in waters shallower than 100 meters, but vessels would not be permitted to discharge seafood processing waste in waters less than 100 meters deep. Because hypoxia is a seasonal issue, the EPA is not proposing to prohibit discharge in shallower waters during the winter months. The seasonal discharge prohibition in waters shallower than 100 meters is shown in Figure 4, and has been added to the re-proposed General Permit Part III.B.4.

Although outside of the Sanctuary's boundaries, in light of the well-documented concern regarding hypoxic conditions in the Heceta/Stonewall Banks complex in particular, the EPA proposes to prohibit discharge year-round discharge above the Heceta/Stonewall Banks complex.

If a Permittee (or group of Permittees) is able to demonstrate that the discharge will not contribute to a measurable change in near-bottom oxygen levels, then that Permittee may be granted authorization to discharge in waters shallower than 100 meters during the summer upwelling season and/or in the Heceta/Stonewall Banks complex, subject to the Director's approval and in accordance with the requirements in Section V.B.7 of the re-proposed General Permit.

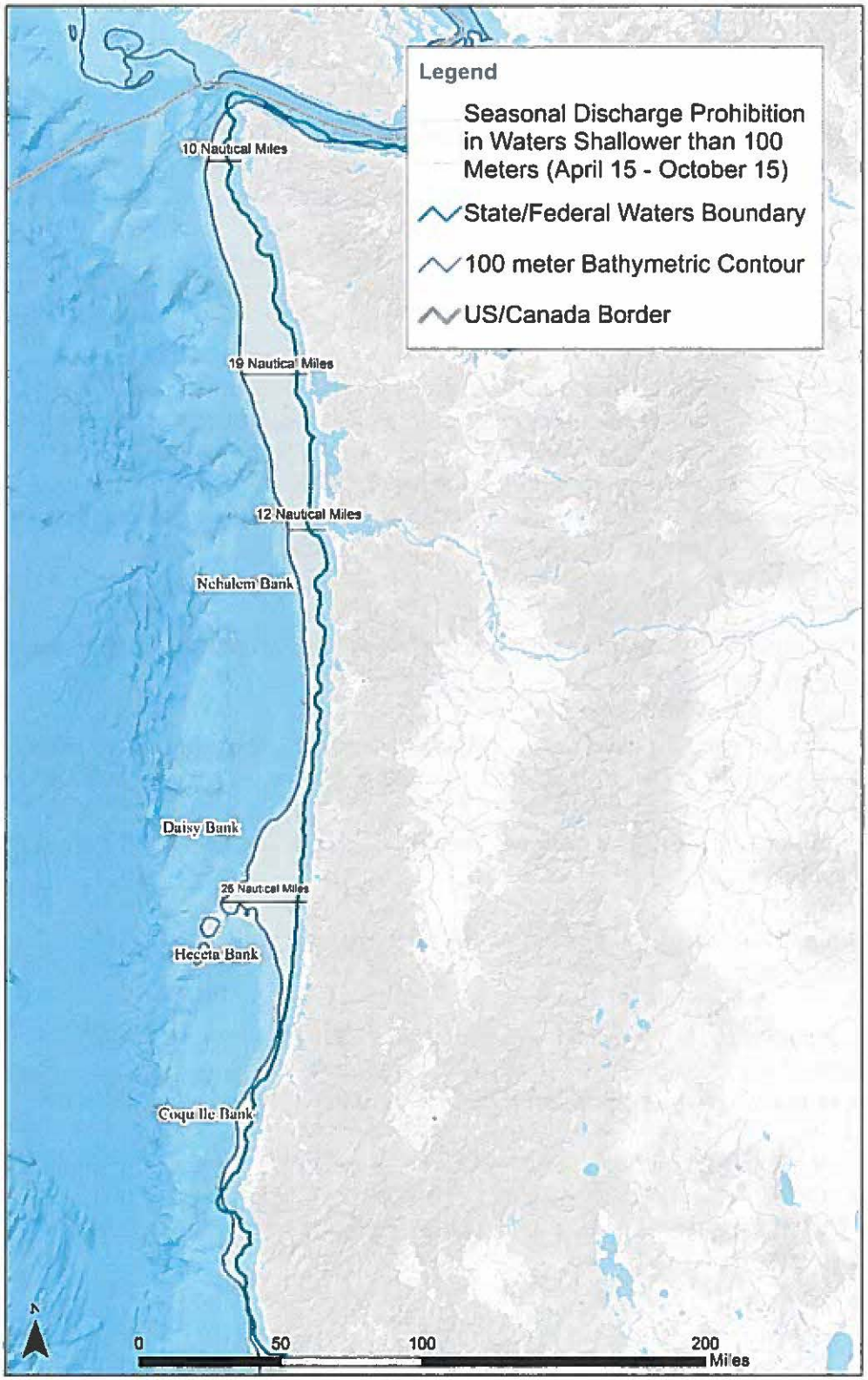

Figure 4. Proposed seasonal discharge prohibition in waters shallower than 100 meters in depth. The seasonal, depth-based discharge prohibition is one of the recommended alternatives provided in the Sanctuary's letter to the EPA.

OCNMS Recommended Alternative 3: *Require more detailed monitoring and reporting on discharges...*

EPA Response 3:
The EPA is proposing to require additional reporting on the quantity and nature of the discharge in order to better understand potential impacts to water quality and dissolved oxygen (see Appendix A of the re-proposed General Permit for the revised NOI and Appendix B for the revised Annual Report). Additional reporting requirements include: a table on which to report daily location of the vessel while discharging, minimum and average daily distances traveled, vessel speed, total stickwater discharged per month, maximum daily discharge amounts, and monthly average by-product recovery rates.

However, the EPA is not proposing to require additional monitoring to assess the discharge's contributions to hypoxic conditions, primarily because of logistical and cost considerations. One factor is that the holding time for BOD is only 48 hours, and it would be problematic for Permittees to deliver samples to a laboratory within that time frame. With regard to dissolved oxygen monitoring at the seafloor, it would be unreasonable for the EPA to require near-bottom dissolved oxygen monitoring as part of this General Permit (Peterson, 2016 personal communication):

- Deep-sea monitoring is difficult and expensive, and would likely require the employment of a specialized research vessel;
- Vessels are moving while discharging;
- Seafood processing waste will likely take weeks to mineralize, depending on temperature and other ocean conditions. Therefore, there will be an unknown time lag in the BOD of the discharge; and
- Ocean conditions are dynamic, and seasonal hypoxia is already occurring of the coast due to natural upwellings.

Thus, there are multiple factors that would confound the interpretation of the discharge's contribution to hypoxic conditions.

The EPA is seeking input on the proposed monitoring requirements during this public comment period, particularly from the seafood processing industry and from scientists/modelers, as well as from the Sanctuary and its Advisory Council.

In its May 25, 2016 letter, the Sanctuary requested that it be provided with copies of monitoring reports. Accordingly, the EPA is proposing to require that vessels provide copies of their Annual Reports to the Sanctuary if they discharged seafood processing waste within the Sanctuary's boundaries during that calendar year.

Conclusion

On September 23, 2016 and January 20, 2017, EPA staff attended/presented at the Sanctuary's Advisory Council meetings. The EPA enjoyed the opportunity to meet Sanctuary staff and associated stakeholders and scientists, discuss the draft permit and associated

issues/consultations, and to learn more about the Sanctuary, including the scientific advancements and environmental issues facing the Sanctuary (such as ocean acidification and state of the art ocean modeling).

The EPA appreciates the willingness of Sanctuary staff and associated scientists to engage with the EPA to resolve these issues. If you have any questions or comments about this response to the 304(d) consultation, please feel free to contact me directly, or contact Catherine Gockel of my staff at 206-553-0325 or by email at gockel.catherine@epa.gov.

Sincerely,

Christine Psyk, Acting Director
Office of Water and Watersheds

Enclosures

cc: George Galasso, OCNMS *(via electronic transmission)*
Bonnie Shorin, NMFS *(via electronic transmission)*
Vera Trainer, NOAA *(via electronic transmission)*

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