SEATTLE AQUARIUM

1483 Alaskan Way, Pier 59
Seattle, Washington 98101-2015

(206) 386-4300
SeattleAquarium.org

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Eleanor Ott, P.E.
Washington State Department of Ecology
PO Box 47696
Olympia, WA 98504-7696

Submitted through online comment form

Re: Draft of the Puget Sound Nutrient General Permit

Dear Eleanor Ott,

Thank you for the opportunity to comment on the Puget Sound Nutrient General Permit, which would apply to the 58 publicly owned domestic wastewater treatment plants (WWTPs) discharging to Washington's marine and estuarine waters of the Salish Sea.[1]

The Seattle Aquarium appreciates the Department of Ecology's work to address water quality issues caused by excess nutrients from human sources. These excess nutrients are upsetting the balance in Puget Sound, where wastewater effluent is the largest local human source of inorganic nitrogen.[i] We support a Nutrient General Permit with more protective sewage treatment standards as an important tool to improve the health of the marine ecosystem and all who rely on it, and we hope to see the draft permit strengthened as it advances to a final draft.

The science is clear that excess nitrogen causes algal blooms that consume oxygen and release carbon dioxide, impairing conditions for aquatic life with a cascading effect through the food web.[ii] The excess nitrogen from human sources also exacerbates ocean acidification in key coastal areas, impacting planktonic food webs and making it harder for shellfish to form shells during critical life stages.[iii] Here in the Salish Sea, that includes harm to forage fish, shellfish, endangered salmon, and the endangered southern resident orcas. In addition, as Ecology has noted, nuisance macro-algae caused by excess nutrients can also impair the health of eelgrass beds.[iv] Eelgrass provides an important, irreplaceable home for young marine creatures including crabs, salmon, scallops, herring and more; it also builds coastal climate resilience by cushioning the impact of waves and preventing erosion.

We appreciate that Ecology is working with over two decades of science and monitoring data to understand the scope of the problem and needed solutions. Ecology's modeling shows, for example, that dissolved oxygen levels are lower than what would be seen from natural influences

[1] Except for federal and Tribal lands and waters.

alone, and that the impact from human sources is more than is allowed by state water quality standards.[v] More than 126,000 acres of greater Puget Sound waters did not meet the marine dissolved oxygen standard in the most recent year of analysis (2014).[vi] Without action, wastewater nitrogen loads to Puget Sound will almost double from 2006 to 2070 as the region's population grows.[vii]

Requiring reductions in nutrient pollution from WWTPs will directly address the problem and improve the health of the marine food web in the Salish Sea. In fact, the largest estimated improvements come from implementing seasonal biological nitrogen removal at WWTPs.[viii] Ecology's modeling shows that it "would provide significant progress toward meeting the dissolved oxygen water quality standards in the Sound."[ix] The increase from population growth can be more than offset—with a net benefit for the marine ecosystem now and beyond that timeline—by requiring wastewater facilities to upgrade their treatment technologies. Meanwhile, secondary and tertiary wastewater treatment methods may bring other co-benefits for ocean health, such as helping to filter out microplastics.[x]

While addressing wastewater contributions will not completely resolve the problem of excess nitrogen, it will bring significant benefits for the marine ecosystem and the human communities that rely on it. If reductions are made at all wastewater treatment plants, only 10% of greater Puget Sound would not meet dissolved oxygen standards, compared to 20% today.[xi] The state and its partners must continue to work to reduce other sources of nutrient pollution—and we look forward to reviewing Ecology's plan in 2022—but we cannot let this opportunity to address the largest anthropogenic source pass us by or wait until the impacts are even worse and the costs are greater.

Nutrient removal technology is available, already in use, and working, and the time is ripe to make it standard practice in the Puget Sound region. On Long Island Sound, WWTPs cut their nitrogen output by 69% from the 1990s to 2013.[xii] Here in the Puget Sound region, the Lacey, Olympia, Tumwater, and Thurston County (LOTT) facility upgraded in the 1990s with federal, state, and local funding; it now has some of the lowest nitrogen concentrations. About 15 other plants discharging to Puget Sound have also invested in nutrient removal technology, and Pierce County's Chambers Creek regional treatment facility was built to transition to nutrient removal when it was designed in the early 2000s.

We would like to see this permit move forward with many of its existing elements—including retaining the distinction between dominant and small dischargers—as well as some targeted improvements to ensure that it will really result in cleaner water and achievement of water quality standards.

While this permit has a five-year duration, we urge Ecology to set clear deadlines in this permit for ultimate implementation of capital investments rather than leaving it up to cities, counties, and utilities. The technology is available[2] and communities like Shelton, Sequim, and Oak Harbor have already invested in nutrient removal; dominant dischargers need to take concrete steps for

[2] EPA provides free resources such as operation and performance information from publicly owned treatment works that have already achieved successful, cost-effective approaches to nutrient removal. https://www.epa.gov/eg/national-study-nutrient-removal-and-secondary-technologies#accomplished

nutrient removal, ideally within the next decade. The required timeline must be made explicit now and reflect the urgency of the problem.

We also understand that the required work will be significant, and we urge both the state and federal governments to step up in a substantial way to help fund implementation. The Seattle Aquarium stands ready to advocate for state and federal funding to facilitate the necessary WWTP infrastructure upgrades to maximize nutrient removal and protect marine ecosystems.

Washington must move forward now with meaningful measures to reduce pollution and clean up our waters, and a strong Nutrient General Permit is a vital part of that work.

Sincerely,

Robert W. Davidson
President & CEO
Seattle Aquarium

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[i] https://www.seattletimes.com/seattle-news/rivers-sewage-treatment-plants-carry-nitrogen-to-sound/
Also see: Department of Ecology. Nitrogen in Puget Sound Story Map (https://waecy.maps.arcgis.com/apps/MapSeries/index.html?appid=907dd54271f44aa0b1f08efd7efc4e30)

[ii] https://www.epa.gov/nutrientpollution/effects-dead-zones-and-harmful-algal-blooms

[iii] "Anthropogenic nitrogen and sulfur deposition to the ocean surface alters surface seawater chemistry, leading to acidification and reduced total alkalinity. Lower pH and resulting lower CO3 2– concentrations are of particular concern for a range of benthic and pelagic organisms that form calcareous (CaCO3) shells (e.g., corals, coralline algae, foraminifera, pteropods, and coccolithophores). The acidification effects…could be significant in coastal ocean regions…" Scott C. Doney et al. "Impact of anthropogenic atmospheric nitrogen and sulfur deposition on ocean acidification and the inorganic carbon system," *Proceedings of the National Academy of Sciences* Sep 2007, 104 (37) 14580-14585; DOI: 10.1073/pnas.0702218104
"Results from this effort indicate that increased dissolved inorganic nitrogen (DIN), phytoplankton biomass, and non-algal organic carbon caused by regional anthropogenic nutrient sources can constitute significant contributors to acidification in the Salish Sea." Pelletier, G., L. Bianucci, W. Long, T. Khangaonkar, T. Mohamedali, A. Ahmed, and C. Figueroa-Kaminsky. Salish Sea Model: Ocean Acidification Module and the Response to Regional Anthropogenic Nutrient Sources. Washington Department of Ecology, June 2017, Publication No. 17-03-009.
Also see: https://oceanservice.noaa.gov/facts/eutrophication.html/

[iv] https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients

[v] https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients

[vi] Department of Ecology. Puget Sound Nutrient Source Reduction Project: Volume 1: Model Updates and Bounding Scenarios. January 2019, Publication No. 19-03-001

[vii] Department of Ecology. Nitrogen in Puget Sound Story Map.
https://waecy.maps.arcgis.com/apps/MapSeries/index.html?appid=907dd54271f44aa0b1f08efd7efc4e30

[viii] Ibid.

[ix] https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients/Nutrient-pollution-studies

[x] https://www.epa.gov/salish-sea/marine-water-quality

[xi] Department of Ecology. Puget Sound Nutrient Source Reduction Project: Volume 1: Model Updates and Bounding Scenarios. January 2019, Publication No. 19-03-001

[xii] https://crosscut.com/environment/2020/12/outdated-sewage-treatment-suffocating-fish-puget-sound