Puget Sound Naval Shipyard & Intermediate Maintenance Facility

See attached file.

Nutrient General Permit Comments

1. Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS & IMF) located in Bremerton, WA employs approximately 13,500 people and is a contributor to the City of Bremerton for its domestic wastewater treatment at the City's wastewater treatment plant (WWTP). PSNS & IMF is committed to being good environmental stewards and is concerned that the draft Puget Sound Nutrient General Permit (PSNGP) of June 16, 2021 was developed based on an inadequate model which may not achieve any meaningful reduction of inorganic nitrogen in Puget Sound and will result in expensive upgrades to wastewater treatment plants. Our specific comment on the inadequacy of the Salish Sea Model (SSM) is provided below, with a proposal of an alternative modeling approach.

   The Naval Information Warfare Center Pacific (NIWC PAC) is a Department of the Navy technological and engineering research and development office that supports PSNS & IMF with studies and research related to environmental protection. On behalf of PSNS & IMF, NIWC PAC has followed the PSNGP development process. NIWC PAC supports the assertion made by Dr. Gordon Holtgrieve in his comment to the Puget Sound Nutrient General Permit, Preliminary Draft dated March 15, 2021 that "…Ecology has not made a scientifically defensible case that human nutrients, including those from WWTP, are contributing to dissolved oxygen declines in the Puget Sound." Much of Dr. Holtgrieve's argument centers on the questionable sufficiency of the SSM to precisely and accurately determine compliance to the dissolved oxygen (DO) standard. The SSM lacks the exactness and accuracy necessary for regulatory purposes when addressing the complexities associated with shallow embayments throughout Puget Sound.

   The limitations of the SSM can be attributed to its spatial and temporal resolutions. The SSM is a large-scale model. It incorporates a ten-layer cell grid with coverage area too great for differentiating small bays and inlets, and layers too thick for defining many of the hydrodynamic mixing and water quality processes that require scales less than the layer thickness (e.g., 3 meters). Time scales are relatively coarse for prediction of patterns during discharge/mixing at different tidal stages. Thirdly, for any minor changes of model parameters for subregions of the Sound, the SSM, which includes the entire Puget Sound, would have to be re-run, demanding a large computation resource and subsequent data processing effort. The SSM may be suitable for predicting fate and transport patterns over all of Puget Sound in general, but for studies that include processes requiring accurate predictions at relatively small scales (such as specific bays and inlets in Puget Sound), the dynamics of mixing and transport require finer resolutions both spatially and temporally. Modeling DO is a complex and challenging task. One would need to have both good knowledge of the DO dynamics (both from field data and study results), and an appropriate model that is able to address the water quality dynamic processes. Sources and sinks for DO are involved with processes that have the temporal scales ranging from a few minutes to 12-24 hours (tidal cycles) and spatial scales ranging from less than one meter (water

column) to several kilometers; capabilities that cannot be addressed appropriately using the SSM, exclusively.

An alternative to the inadequacies of a "one-size-fits-all" approach is to link the SSM with other water quality models. The combined capabilities through this linkage would result in marked improvements in DO predictions covering the dynamics mentioned above. In this arrangement, the SSM would be used for predicting extensive circulations and transport in the central Puget Sound basin. A hydrodynamic model with much finer grid and temporal resolutions would be used for detailed predictions in the outlying embayments.

Through the support of PSNS & IMF, NIWC PAC is proposing just such a linkage. The goal of this effort is the attainment of more accurate and precise water quality predictions in the Sinclair and Dyes Inlet Watershed, relative to outputs from the stand-alone SSM. The SSM is being linked with a fine-scaled hydrodynamic model that, in turn, is linked with the US EPA's Water Quality Analysis Simulation Program (WASP) model. Under its collaboration with US EPA, NIWC PAC has demonstrated the success of a fine-scale hydrodynamic model/WASP model linkage for achieving accurate water quality predictions at another location (Wang et al., 2016).

It is our hope that Ecology is receptive to alternative modeling approaches that will reduce uncertainty with regard to the role that anthropogenic (and specifically WWTP-sourced) nutrients play in the impairment of water quality throughout Puget Sound. We agree with the comment by Dr. Holtgrieve that more technically capable experts with objective reviews are needed. NIWC PAC looks forward to working with Ecology and outside technical experts in providing solutions to this complex water quality issue.

2. PSNS & IMF questions whether there will be any meaningful reduction in inorganic nitrogen in Puget Sound resulting from the implementation of the PSNGP. Puget Sound Dissolved Oxygen Model (Nutrient Load Summary for 1999-2008, WDOE Publication No. 11-03-057), on page 61, states that net oceanic dissolved inorganic nitrogen (DIN) load into Puget Sound south of Deception Pass contributes 68% of the total DIN, which leaves 32% of the total DIN load into Puget Sound from local rivers and WWTPs. Of this 32%, WWTPs contribute 44% annually (page 59 of Puget Sound Dissolved Oxygen Model). Therefore, the current dissolved inorganic nitrogen load from WWTPs into Puget Sound is only about 14%. How much of this 14% will be reduced from the implementation of the PSNGP? Will that have any impact on dissolved oxygen level in Puget Sound?

3. Page 31 of the draft Puget Sound Nutrient General Permit Fact Sheet describes the Puget Sound Nutrient Reduction Plan that comprehensively addresses reduction of all human nutrient sources to Puget Sound. This Plan appears to document contributions from all sources into Puget Sound, including WWTPs and nonpoint sources. It will also provide methods for reducing nutrients in order to meet reduction targets. If not already included in this Plan, PSNS & IMF requests that it include cost-benefit analysis for each nutrient reduction method that would in turn prioritize the action being taken. The Nutrient Reduction Plan should be reviewed by

independent scientists for its accuracy. Implementation of the draft PSNGP should also be delayed until determined to be necessary and cost effective by the approved Nutrient Reduction Plan.

4. The issuance of the PSNGP at this time is premature. Nutrient removal technologies are still evolving and not widely practicable, as acknowledged by WDOE in the PSNGP Fact Sheet as follows. "The current body of knowledge regarding nutrient treatment technologies continues to evolve as researchers develop and study new microbial populations and advanced treatment processes." "Ecology encourages creative approaches to reducing nutrient loads in Puget Sound and understands the Agency will need to support any permittee that elects to pursue innovative solutions that have not yet seen full-scale implementation in the state." It is not cost effective for POTWs in Puget Sound to determine for themselves what is best available technology that is economically achievable for the removal of nitrogen (i.e., all known and reasonable treatment (AKART) analysis). WDOE is not doing its part to help providing POTWs with treatment technology and economic effects information.

   The permit development process for the PSNGP seems to be going against typical technology-based permitting process. When trying to regulate an industry, the EPA gathers information on the industry's wastewater pollutants, technologies used to remove the pollutants, and economic characteristics, to identify the best available technology that is economically achievable for that industry. Regulatory requirements (i.e., effluent limits) are then imposed based on the best available technology that is economically achievable. Prior to proposing a discharge control regulation on an industry, the EPA evaluated availability and cost of the pollutant removal technologies, and economic effects. If the discharge control regulation is finalized, a technical guidance providing all treatment technology and cost is available to help the industry.

5. In summary, the PSNGP process should be delayed until the SSM's inadequacy has been resolved, the model's results are validated with sufficient sampling data and reviewed by independent third party experts, other nitrogen inputs into Puget Sound such as nonpoint sources and river inflows are evaluated and prioritized for nitrogen reduction efforts, and lastly more guidance on how to optimize WWTPs for nitrogen reduction are included.