

Puget Sound Nutrient Management Plan Outline

Water Quality Program

May 2020



The Puget Sound Nutrient Management Plan is a comprehensive plan for addressing human nutrient sources to Puget Sound. This Plan is part of the [Puget Sound Nutrient Source Reduction Project](#). The goal of this plan is to meet the marine water quality standards for dissolved oxygen (DO) in Puget Sound.

This document is a draft outline for the Nutrient Management Plan and is intended as a preview of what will be included in the draft plan. As the document is developed, we may update this outline document with new section titles, new information, or re-ordered sections. We will release the draft plan in 2022 and it will be open for public comment.

The final Nutrient Management Plan will detail nutrient reduction targets for human nutrients sources, establish nutrient load allocations for marine and watershed sources, and the actions necessary to achieve the targets. It will also include an adaptive management plan to track effectiveness.

Contact Info:

If you have questions, please contact the Puget Sound Nutrient Source Reduction Project manager, Dustin Bilhimer, at dustin.bilhimer@ecy.wa.gov.

Executive Summary

1. Introduction

- 1.1. History and context of Puget Sound dissolved oxygen (DO) Studies
- 1.2. Why is nutrient management important?
 - 1.2.1. What's wrong with excess nutrients?
 - 1.2.2. Connecting excess nutrients to DO and impacts of low DO on aquatic species
 - 1.2.3. Emerging science to understand relationship between excess nutrients and other eutrophication indicators
 - 1.2.4. Other physical and geochemical factors that affect marine water response to anthropogenic nutrients
 - 1.2.5. Sensitive marine areas of biological, tribal, social, and economic importance

2. Scope of the Problem-Where we are seeing impairments and geographic area for the Plan

- 2.1. Define project area: Washington's marine waters of the Puget Sound and Hood Canal, the Greater Puget Sound, and the Straits of Georgia and Juan de Fuca
- 2.2. Monitoring data that informs our understanding of the problem
 - 2.2.1. Areas in Puget Sound that do not meet DO water quality criteria
 - 2.2.2. Puget Sound water quality trends including: Marine Water Condition Index, Eyes Over Puget Sound results, Ecology's long-term marine water and benthic monitoring, etc.
 - 2.2.3. Freshwater monitoring and nutrient trends
- 2.3. What modeling data tells us about the problem
 - 2.3.1. Summarize Ecology's Salish Sea Model Reports and other relevant reports
- 2.4. Human nutrient sources

3. Water Quality Standards and Clean Water Act (CWA)

- 3.1. CWA and WA State Water Pollution Control Act Authority
- 3.2. Water Quality Standards, marine DO criteria (Part A and B) and designated uses
- 3.3. Ecology's National Pollution Discharge Elimination System (NPDES) regulatory authority over point sources
- 3.4. Ecology's rules, policies, and programs to address nonpoint source pollution
- 3.5. Connection to DO work in Budd Inlet

4. Nutrient Forum stakeholder engagement and collaboration

- 4.1. Summarize Puget Sound Nutrient Source Reduction Project (PSNSRP) engagement, participants, and key outcomes
- 4.2. Nutrient Forum web resources

5. Salish Sea Model

- 5.1. How the model and analysis was used to develop the loading capacity and load reduction targets
 - 5.1.1. Model assumptions used to develop marine and watershed source allocations
- 5.2. Methods used to determine when dissolved oxygen water quality criteria objectives are met
- 5.3. Baseline assumptions (Reference Condition) used for determining nutrient load capacity and allocations
- 5.4. Comparison with other coastal nutrient management approaches for modeling

6. Nutrient Load Reduction Targets for Marine & Watershed Human Sources

- 6.1. Total nutrient load reduction needed to meet water quality criteria
- 6.2. Marine point source wasteload allocations
- 6.3. Watershed sources load allocations
- 6.4. Seasonal and annual variation and critical conditions
- 6.5. Margin of safety and allocation for growth

- 7. Marine Source NPDES Nutrient Control Strategy- the structure and content of this section is dependent on the outcome of the Nutrients General Permit (NGP) development process**
 - 7.1. The importance of marine source nutrient reductions and definition of marine sources
 - 7.2. Wastewater Puget Sound Nutrients General Permit
 - 7.2.1. Stakeholder Advisory Committee engagement summary
 - 7.2.2. NGP and the pathway from Individual Permit to the NGP
 - 7.2.3. How Water Quality Based Effluent Limits will be derived from the nutrient load reduction targets and incorporated into the NGP
 - 7.3. Water Quality Trading discussion
 - 7.4. Reclaimed water as a possible implementation strategy for individual wastewater treatment facilities
- 8. Watershed Source Nutrient Control Strategy**
 - 8.1. Importance of watershed source reductions
 - 8.1.1. Understanding role of nitrogen, phosphorus, carbon, and suspended sediments in watersheds
 - 8.1.2. Human nutrient sources and natural sources in watersheds
 - 8.1.3. The role of groundwater and local nitrate vulnerability
 - 8.1.4. Land use distribution summary and trends over the last several decades
 - 8.1.5. Existing water cleanup plans (TMDLs or other WQ improvement plans) that include nutrient reduction
 - 8.2. Long-term strategy for watersheds
 - 8.2.1. Describe need for allocating nutrient loads among sources within Puget Sound watersheds
 - 8.2.2. Watershed modeling to understand human sources in watersheds and evaluate potential nutrient reduction actions to meet watershed load allocations
 - 8.3. Near-term strategy for human sources of nutrients in Puget Sound watersheds
 - 8.3.1. Priority watersheds- *ranked by watershed load allocation values*
 - 8.3.2. Point sources of nutrients in watersheds
 - 8.3.2.1. Municipal Wastewater and Stormwater
 - 8.3.2.2. Other point sources
 - 8.3.3. Nonpoint sources in watersheds
 - 8.3.3.1. State Clean Water Act Nonpoint Program
 - 8.3.3.2. Agricultural operations (crop and animal)
 - 8.3.3.3. Forestry
 - 8.3.3.4. Urban/rural homeowners
 - 8.3.4. Restoration of natural nitrogen attenuation functions
 - 8.3.5. Implementing Organizations/Partners
 - 8.4. Recovered nutrients are a resource
 - 8.4.1. What happens with the nutrients we don't discharge to Puget Sound?
 - 8.4.2. What is the value and benefits of nutrient recovery and reuse?
 - 8.4.3. Ecology's rules for solids handling and disposition that protect water quality and public health
 - 8.4.3.1. Municipal biosolids permit program
 - 8.4.4. Agricultural manure
- 9. Tracking Implementation Progress and Accountability**
 - 9.1. Tracking implementation activities and measuring progress
 - 9.2. Reporting progress
 - 9.3. Accountability for point source actions in NPDES permits; nonpoint source (NPS) reductions; watershed actions
- 10. Monitoring Marine WQ Improvement and Adaptive Management**
 - 10.1. Current Programs tracking changes in marine dissolved oxygen and other eutrophication indicators

10.1.1. Ecology, UW, King County, Puget Sound Ecosystem Monitoring Program (PSEMP), Department of Natural Resources (DNR), Stormwater Action Monitoring (SAM), et al)

10.2. Fresh water quality monitoring

10.3. Data gaps, and recommendations for additional monitoring

10.4. Adaptive management framework

11. Implementation Schedule and Milestones

11.1. Nutrient General Permit timeline and milestones

11.2. Milestones for watershed reductions

12. Implementation Costs and Funding Needs

12.1. Estimated funding needs for point and nonpoint implementation activities

12.2. State and Federal grant and loan programs for point source improvements

12.3. Funding opportunities for nonpoint source activities

12.3.1. Ecology's Water Quality Integrated Financial Assistance Program

12.3.2. Other state and local funding opportunities

13. Environmental Justice Requirements and Considerations

14. Outreach to encourage implementation

14.1. Human behavior changes and community based social marketing

14.2. Communication resources for watershed nonpoint outreach

14.3. Communication resources for point sources

15. References

16. Appendices

Appendix A: Public participation (more detailed information than what is included in Chapter 4.

Appendix B: Public comments and response to comments

Appendix C: Glossary and Acronyms

Appendix D: Links to Salish Sea Model publications and resources

Appendix E: List of relevant TMDLs or other plans referred to in body of document

Appendix F: Marine Water Quality Implementation Strategy- summary and links to materials

- Conceptual Models and Results Chains
- Priority recommendations for the Action Agenda
- Identifying Benefits and Costs of Marine Water Quality Improvements
- Human Dimensions of Marine Water Quality Improvements

Appendix G: EPA's 9 key elements (NKE), found in [EPA's Handbook for Develop Watershed Plans](#)

- Source identification
- Load reduction estimates
- List implementation activities
- Identify implementation partners
- Communication strategy
- Implementation schedule
- Interim measurable milestones
- Criteria to measure success
- Effectiveness monitoring design