Board of Pilotage Commissioners Tug Escort Rulemaking (Chapter 363-116 WAC)
State Environmental Policy Act Draft Environmental Impact Statement

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Water Quality Discipline Report

Washington State Board of Pilotage Commissioners

Washington State Department of Ecology

Olympia, WA

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DEPARTMENT OF
ECOLOGY
State of Washington

BOARD of PILOTAGE COMMISSIONERS
WASHINGTON STATE

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Acronyms and Abbreviations

AIS	automatic identification system
ATB	articulated tug barge
BMP	best management practice
BOEM	Bureau of Ocean Energy Management
BPC	Board of Pilotage Commissioners
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CWA	Clean Water Act of 1972
Ecology	Washington Department of Ecology
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESHB	Engrossed Substitute House Bill
FOR	functional and operational requirement
HAB	harmful algal bloom
hp	horsepower
kg/day	kilograms per day
kg/yr	kilograms per year
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OTSC	Oil Transportation Safety Committee
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
TAS	Treatment in a Similar Manner as States
TMDL	Total Maximum Daily Load
TPH	total petroleum hydrocarbon
USCG	U.S. Coast Guard
VGP	EPA's 2013 Vessel General Permit
VIDA	Vessel Incidental Discharge Act
VOC	volatile organic compound
WAC	Washington Administrative Code

Summary

This Discipline Report is produced by the Washington State Department of Ecology (Ecology) as part of the development of an Environmental Impact Statement (EIS) as required pursuant to the State Environmental Policy Act (SEPA).

The Board of Pilotage Commissioners (BPC), in consultation with Ecology, is conducting a rulemaking to amend Chapter 363-116 of the Washington Administrative Code (WAC), Pilotage Rules. The rulemaking will consider 2019 legislative changes made to Chapter 88.16 of the Revised Code of Washington (RCW) (Pilotage Act) through the passage of Engrossed Substitute House Bill (ESHB) 1578. The rules will be designed to achieve best achievable protection, as defined in RCW 88.46.010, and will be informed by other considerations in ESHB 1578. The BPC and Ecology determined that the rulemaking may have significant adverse impacts on the environment and are developing an EIS.

This Water Quality Discipline Report describes the existing conditions and potential impacts to water quality resulting from the four rulemaking alternatives: No Action (Alternative A), Addition of Functional and Operational Requirements (FORs) (Alternative B), Expansion of Tug Escort Requirements (Alternative C), and Removal of Tug Escort Requirements (Alternative D). The study area for the water quality resource analysis includes the EIS Study Area which encompasses the rulemaking alternative boundaries and potential areas for tug escort commute to and from the alternative boundaries.

The following water quality-related topics were analyzed:

- Impacts on surface water quality in the study area due to escort tug discharges that could affect water quality.
- Impacts on surface water quality in the study area due to oil spills.

Significant and unavoidable adverse impacts to water quality were identified under Alternative D. Table 1 summarizes the changes in escort tug activity under each alternative, the resulting impacts on water quality, mitigation measures identified, and determinations of significance.

Table 1. Water quality impact summary.

Change in Activity	Resulting Impact on Water Quality	Comparison to Alternative A	Mitigation	Significant and Unavoidable Adverse Impact?
Alternative A: No Action				
Continued operation of escort tugs throughout EIS Study Area, resulting in continued routine wastewater discharges and pollutant releases (e.g., anti-fouling coatings) from escort tugs.	Continued potential for minor, localized water quality impacts where routine discharges and releases occur.	N/A	Continued adherence to regulations and conditions in environmental permits (e.g., No Discharge Zone, Vessel General Permit); implementation of the Standards of Care and best management practices; ballast water industry practices (use of municipal water, declining reliance on ballast tanks, staying within the Puget Sound Captain of the Port Zone).	No
	Probability of any hazard incident from an escort tug is low: probability of 0.86/year. Potential impact from diesel fuel spill is likely to be small. This risk level would continue.	N/A	Continued adherence to requirements of existing vessel traffic and oil pollution safety regime.	No

Change in Activity	Resulting Impact on Water Quality	Comparison to Alternative A	Mitigation	Significant and Unavoidable Adverse Impact?
Target vessels continue to have tug escorts within rulemaking area.	Probability of a drift grounding from a target vessel is low: a 186-year event in the EIS Study Area. A spill from a drift grounding is a potentially catastrophic event. This risk level would continue.	N/A	Continued adherence to requirements of existing vessel traffic and oil pollution safety regime.	No
Alternative B: Addition of Functional and Operational Requirements				
Continued operation of escort tugs throughout EIS Study Area, resulting in continued routine wastewater discharges and pollutant releases (e.g., anti-fouling coatings) from escort tugs.	Continued potential for minor, localized water quality impacts where routine discharges and releases occur.	Same as for Alternative A.	Same as for Alternative A.	No
	Probability of any hazard incident from an escort tug is low: probability of 0.86/year. Potential impact from diesel fuel spill is likely to be small.	Same as for Alternative A.	Same as for Alternative A.	No
Target vessels continue to have tug escorts within rulemaking area, with added FORs.	Probability of a drift grounding from a target vessel is low: a 186-year event in the EIS Study Area. A spill resulting from a drift grounding is a potentially catastrophic event. This risk level would continue.	Some minor and unquantified reduction in risk due to standardization of FORs, resulting in slightly lower risk of catastrophic water quality impacts.	Same as for Alternative A.	No

Change in Activity	Resulting Impact on Water Quality	Comparison to Alternative A	Mitigation	Significant and Unavoidable Adverse Impact?
Alternative C: Expansion of Tug Escort Requirements				
Increase in escort tug underway time (by 2.41%) and shift in escort tug commute and escort locations, with continued routine wastewater discharges and pollutant releases (e.g., anti-fouling coatings) from escort tugs.	Continued potential for minor, localized water quality impacts where routine discharges and releases occur.	Minor changes to the locations and quantities of discharges.	Same as for Alternative A.	No
	Probability of any hazard incident from an escort tug increases but remains low: probability of 0.88/year. Potential impact from diesel fuel spill is likely to be small.	2.41% increase in risk of a hazard incident from an escort tug (risks concentrated in the expansion area), resulting in higher risk of water quality impacts.	Same as for Alternative A.	No
Target vessels have tug escorts within expanded rulemaking area, with added FORs.	Probability of a drift grounding from a target vessel is a 189-year event in the EIS Study Area. A spill from a drift grounding is a potentially catastrophic event.	1.6% reduction in risk of drift grounding across the EIS Study Area (benefits concentrated in the expansion area), resulting in lower risk of catastrophic water quality impacts.	Same as for Alternative A.	No

Change in Activity	Resulting Impact on Water Quality	Comparison to Alternative A	Mitigation	Significant and Unavoidable Adverse Impact?
Alternative D: Removal of Tug Escort Requirements				
Elimination of escort tug activity throughout EIS Study Area, resulting in the elimination of routine wastewater discharges and pollutant releases (e.g., anti-fouling coatings) from target vessel escort tugs.	Potential for minor, localized water quality improvements where existing routine discharges and releases occur.	Greater water quality impacts.	None	No
	Risk of any hazard incident from an escort tug associated with this rule is eliminated (0/year).	Risk associated with tugs escorting target vessels is eliminated, resulting in lower risk of water quality impacts.	None	No
Target vessels no longer have tug escorts within rulemaking area.	Probability of a drift grounding from a target vessel is a 167-year event in the EIS Study Area. A spill from a drift grounding is a potentially catastrophic event.	11.84% increase in risk of drift grounding across the EIS Study Area (increases in risk concentrated in the rulemaking area), resulting in higher risk of catastrophic water quality impacts.	Same as for Alternative A.	**Yes**

1.0 Introduction

1.1 Background

The Board of Pilotage Commissioners (BPC), in consultation with the Washington Department of Ecology (Ecology), is conducting a rulemaking to amend Chapter 363-116 of the Washington Administrative Code (WAC), Pilotage Rules. The rulemaking will consider 2019 legislative changes made to Chapter 88.16 of the Revised Code of Washington (RCW) (Pilotage Act) through the passage of Engrossed Substitute House Bill (ESHB) 1578. The rules will be designed to achieve best achievable protection, as defined in RCW 88.46.010, and will be informed by other considerations in ESHB 1578.

The rulemaking will:

- Describe tug escort requirements for the following vessels (referred to as "target vessels" throughout this report) operating in the waters east of the line extending from Discovery Island light south to New Dungeness light and all points in the Puget Sound area:
    - Oil tankers of between 5,000 and 40,000 deadweight tons.
    - Articulated tug barges (ATBs) and towed waterborne vessels or barges greater than 5,000 deadweight tons that are designed to transport oil in bulk internal to the hull.
- Specify operational requirements for tug escorts, where they are required.
- Specify functionality requirements for tug escorts, where they are required.
- Consider the existing tug escort requirements applicable to Rosario Strait and connected waterways to the east, established in RCW 88.16.190(2)(a)(ii), including adjusting or suspending those requirements, as needed.
- Describe exemptions to tug escort requirements, including whether certain vessel types or geographic zones should be precluded from the escort requirements.
- Make other changes to clarify language and make any corrections needed.

This rulemaking could potentially increase or decrease tug escort activity and the risk of oil spills in Puget Sound. The BPC and Ecology therefore determined that the rulemaking may have significant adverse impacts on the environment. The BPC and Ecology issued a Determination of Significance on February 22, 2023, which initiated development of an Environmental Impact Statement (EIS) as required under RCW 43.21C.030 (2)(c) pursuant to the State Environmental Policy Act (SEPA). At the same time, Ecology also issued a formal scoping notice as required through the SEPA process. Ecology conducted an EIS Scoping Meeting on March 21, 2023, to invite comments

> **Note:** Unless specified otherwise, the following terminology applies throughout this discipline report:
>
> - **"Tug escort"** refers to the act of a tug escorting a target vessel that is specifically affected by this rulemaking.
> - **"Escort tug"** refers to the tug that conducts escorts of target vessels. Underway time for an escort tug includes active escort time and time spent commuting to and from an escort job.

on the scope of the EIS and a comment period was open from February 22, 2023, through April 8, 2023.

The BPC and Ecology have agreed to act as co-lead agencies under SEPA and share lead agency responsibility for the EIS. The elements of the environment to be included in the EIS were preliminarily identified in the scoping notice. This Discipline Report serves as the detailed analysis of an element identified for inclusion in the EIS and will serve as supporting documentation to the EIS.

The BPC is conducting the rulemaking process concurrently with the EIS development and works closely with Ecology to coordinate the public involvement process. The rulemaking effort includes regular public involvement workshops that are designed to share information with stakeholders, Tribal Government representatives, and the interested parties. The BPC also appointed the Oil Transportation Safety Committee (OTSC) as an advisory committee of subject matter experts representing different areas like the regulated industry, Tribal Governments, and environmental groups. The OTSC meets regularly to develop recommendations for the BPC, and the BPC makes the final decisions related to this rulemaking.

1.2 Rulemaking Alternatives

Through the rulemaking public involvement process, the BPC developed rulemaking alternatives for consideration in the EIS. The BPC has proposed four reasonable[1] rulemaking alternatives to be analyzed in the EIS. This Discipline Report analyzes the impacts associated with the four proposed rulemaking alternatives: No Action (Alternative A), Addition of Functional and Operational Requirements (FORs) (Alternative B), Expansion of Tug Escort Requirements (Alternative C), and Removal of Tug Escort Requirements (Alternative D). The proposed rulemaking alternatives are summarized below and are shown in Figure 1.

Alternative A. No Action. Under Alternative A, the existing tug escort regulations would continue in effect with no changes.

Alternative B. Addition of Functional and Operational Requirements. The existing tug escort regulations would continue with the addition that escort tugs operating under the rule would need to meet the following three functional and operational requirements:

1. Pre-escort conference: Prior to beginning the escort, the escort tug and the target vessel need to coordinate and discuss safety measures and other standard requirements.
2. Minimum horsepower: Escort tugs must meet minimum horsepower (hp) requirements based on the DWT of the escorted vessel:
    - Escort tugs must have 2,000 hp for vessels greater than 5,000 and less than 18,000 DWT
    - Escort tugs must have 3,000 hp for vessels equal to or greater than 18,000 DWT and less than 40, 000 DWT.

[1] As defined in Chapter 197-11-786 WAC.

3. Propulsion specifications: To ensure sufficient propulsion, escort tugs must have a minimum of twin-screw propulsion.

Alternative C. Expansion of Tug Escort Requirements. This alternative would maintain the geographic scope of the current tug escort regulations and extend them to the northwest (See Figure 1 below). This alternative would add 28.9 square miles (74.9 square kilometers) to the existing geographic extent where tug escort requirements apply. The expansion area would be located at the northern boundary of the existing tug escort requirement. This alternative would include the above-mentioned three functional and operational requirements set forth under Alternative B.

Alternative D. Removal of Tug Escort Requirements. This alternative would remove the current tug escort requirement for the target vessels within the rulemaking boundaries.

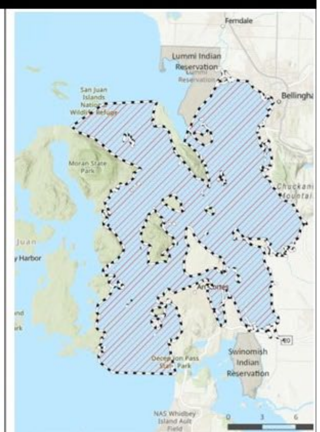
Alternative A (No Action)	Alternative B (Add FORs)	Alternative C (Expansion)	Alternative D (Removal)
			
No change to geographic scope of requirements	No change to geographic scope of requirements	Expand current requirements north to Patos Island	Remove requirements within current boundary
No change to existing functional and operational requirements (FORs)	Add pre-escort conference, minimum horsepower, and propulsion requirements	Add pre-escort conference, minimum horsepower, and propulsion requirements	N/A – tug escort requirements for target vessels are removed

Figure 1. Proposed rulemaking alternatives.

Under ESHB 1578, Ecology developed a model to simulate vessel traffic patterns and oil spill risk, including tug escort activity. The model was based on historical automatic identification system (AIS) data from 2015-2019 and was used to inform the 2023 Analysis of Tug Escorts for Tank Vessels. For the current EIS effort, Ecology used the model 1) to simulate the tracks of escort and assist[2] tug traffic, based on 2015-2019 historical AIS data, and 2) to simulate the current volumes of escort and assist tug traffic along these tracks while accounting for tug escort requirements that went into effect in 2020.

[2] Escort tugs are sometimes referred to as "escort/assist tugs" in this analysis because the same vessels typically perform both escorting and assisting work. Ecology used the risk model to simulate traffic for both escorting and assisting work; however, only escorting work would be affected by the rulemaking alternatives.

The model produced 1,000 annual simulations of escort and assist tug traffic. To represent current conditions and Alternative A, Ecology selected the simulation output with the highest amount of escort tug traffic (i.e., the "worst case scenario") to ensure that the EIS does not undercount potential environmental impacts and to account for other potential near-term growth in vessel traffic (e.g., traffic from the Trans Mountain Expansion). For Alternative C, Ecology modified the Alternative A simulated traffic outputs to account for the proposed changes in tug escort requirements under that alternative.

Ecology used 2023 historical AIS data (i.e., not simulated) to represent all vessel categories other than escort and assist tugs, with some adjustments to account for recreational and fishing vessels that are not equipped with AIS. Traffic for these other vessel categories did not require simulation because it would not change based on the rulemaking alternatives.

The simulation outputs are used here to show the differences in underway time for escort tugs under Alternative A and Alternative C. Figure 2 and Figure 3 show the results of these simulations, compiled to indicate the total minutes per year (min/yr) of escort tug underway time within each one-square-kilometer grid cell. Figure 4 depicts the change in escort tug underway time between Alternatives A and C. Escort tug activity under Alternative B would not be expected to be meaningfully different than under Alternative A, while Alternative D would result in zero tug escorts. Refer to the Transportation: Vessel Traffic Discipline Report for details regarding the vessels activity simulation methodology and results.

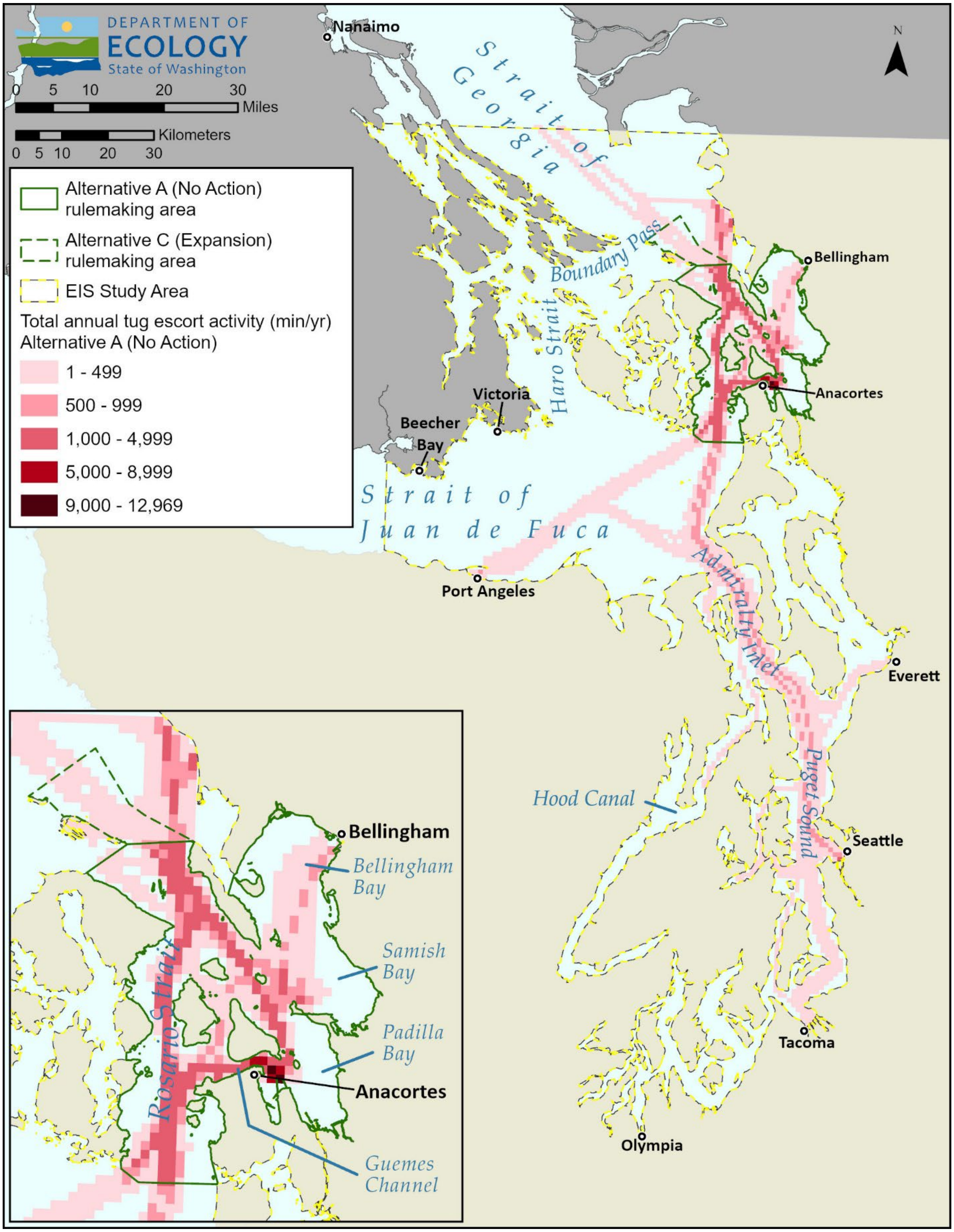


Figure 2. Simulated escort tug underway time under Alternative A and B.

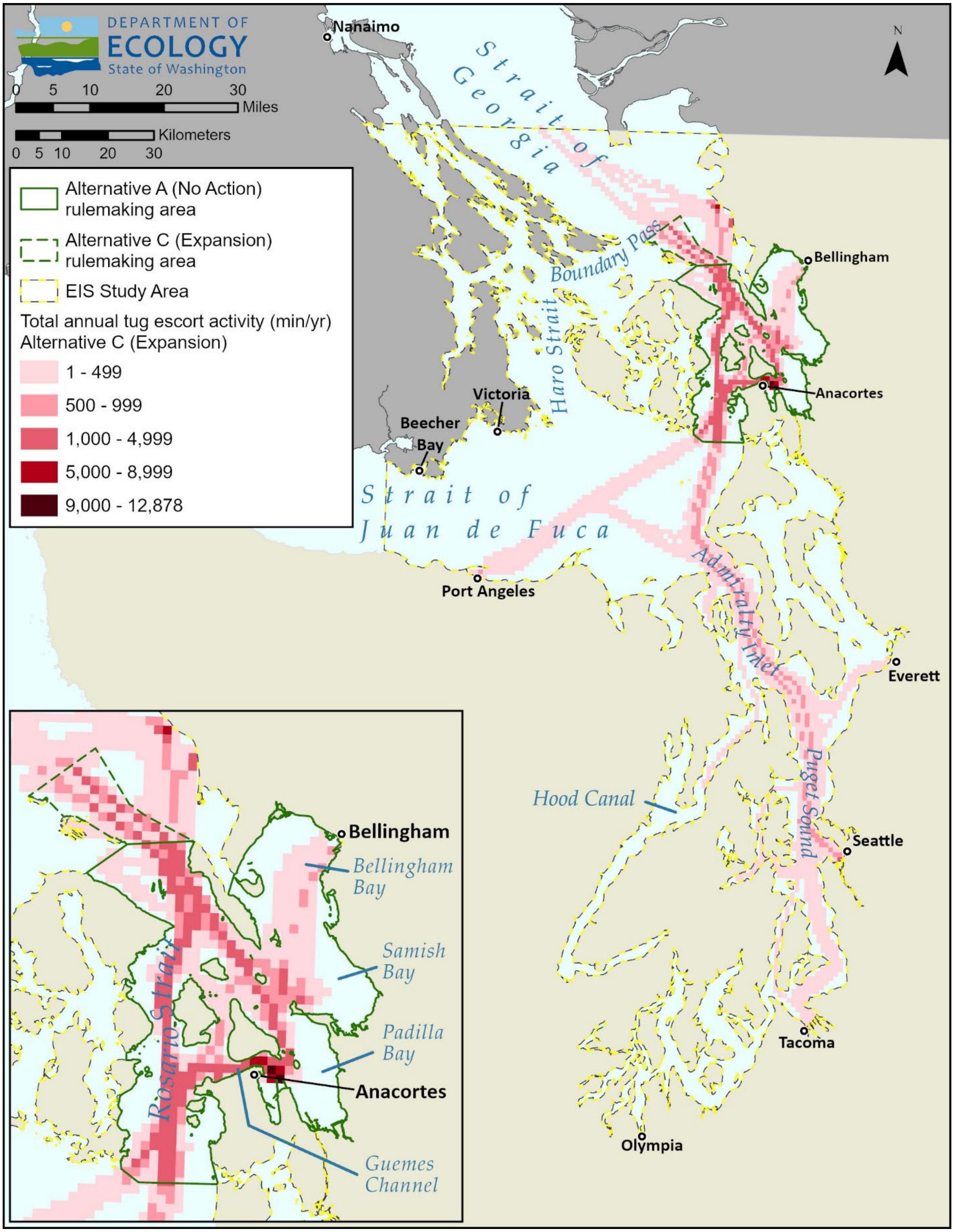


Figure 3. Simulated escort tug underway time under Alternative C.

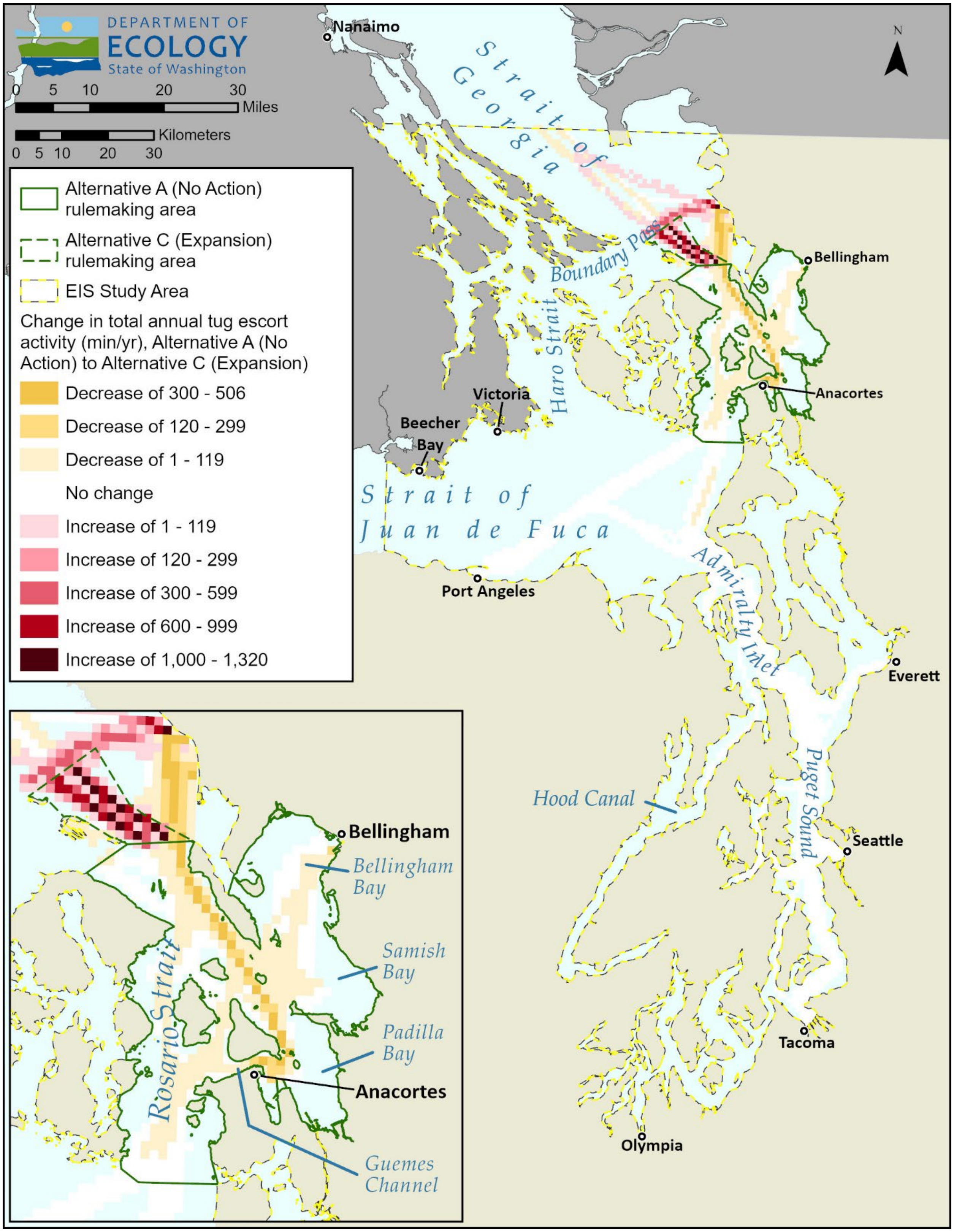


Figure 4. Simulated change in escort tug underway time between Alternative A and Alternative C. An additional accessible version of this map is available in Appendix M.

1.3 Resource Study Area

The EIS Study Area includes the rulemaking alternative boundaries and potential areas for escort tug commutes to and from the alternative boundaries. Specifically, the EIS Study Area includes all connected marine waters in the Salish Sea[3] network of coastal waterways (including Puget Sound), bounded to the north by the 49th Parallel and bounded to the west by a line extending across the Strait of Juan de Fuca from Pike Point to Tongue Point (see Figure 5).

[3] The term "Salish Sea" is used here to describe the transboundary waters of the Strait of Juan de Fuca, the Puget Sound, and the Georgia Strait. The name for this waterbody was proposed in 1989 by a marine science professor at Western Washington University to emphasize the region as a single ecosystem. It has since been formally adopted by the Washington State Committee on Geographic Names (Chapter 237-990 WAC) and the British Columbia Geographical Names Office (BC Geographical Names, n.d.). It was named for the Coast Salish Tribes who live on or near the Salish Sea on both sides of the U.S.-Canadian border. However, the defined geographic boundary of the Salish Sea also extends into the lands and waters of Tribes that are not Coast Salish, including the Makah Tribe (Nuu-Chah-Nulth). We use the term "Salish Sea" in this analysis, but recognize the diversity of native peoples that have lived in and used these waters since time immemorial.

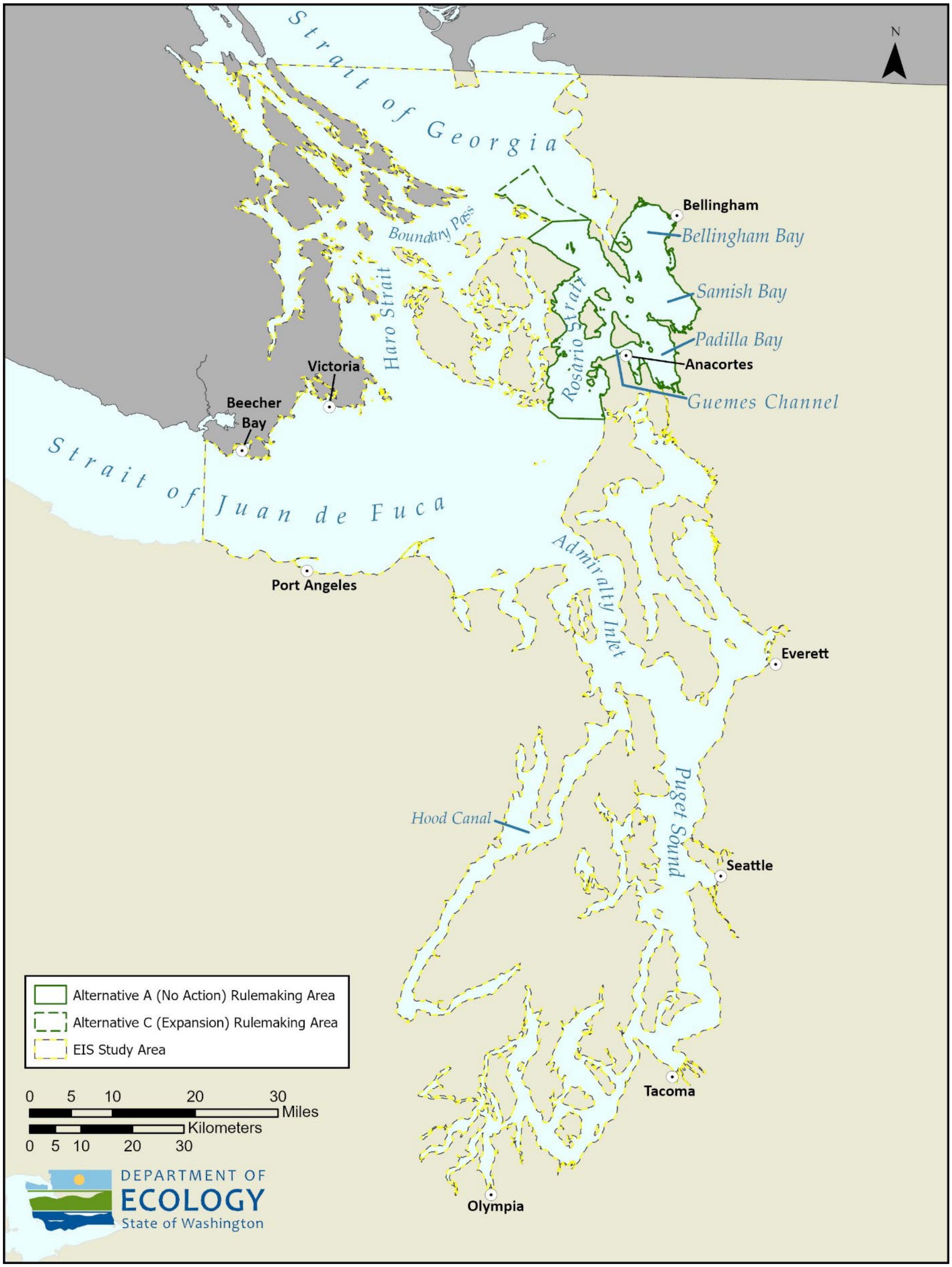


Figure 5. Boundary of the EIS Study Area.

1.4 Resource Description

This Water Quality Discipline Report describes the existing water quality in the EIS Study Area and evaluates the potential water quality impacts of each rulemaking alternative. The assessment is focused on marine surface waters and does not evaluate marine sediments or groundwater. The quality of marine surface waters can be assessed by their physical, chemical, biological, and aesthetic characteristics, which are used to measure the ability of water to support aquatic life and human uses. Water quality in the marine environment is typically measured by parameters such as temperature, turbidity, pH, dissolved oxygen, bacteria, and toxics. Marine water quality is influenced by many different factors, such as circulation patterns, climate and weather, and inflow from rivers and streams. Water quality can be impaired by natural processes as well as contaminants introduced anthropogenically.

1.5 Regulatory Framework

Several federal, Tribal, state, and local laws, plans, and policies are applicable to water quality in the EIS Study Area. Discussion of these laws, plans, and policies related to water quality is intended to provide a framework for the overall regulatory context of the action but is not necessarily intended to imply applicability or compliance requirements for the four regulatory alternatives evaluated in the EIS.

Table 2 summarizes relevant federal regulations for water quality.

Table 2. Relevant federal laws related to water quality.

Regulatory Program	Lead Agency or Entity	Description
Clean Water Act of 1972 (CWA)	Ecology or Respective Tribe Authorized by U.S. Environmental Protection Agency (EPA) [a]	Establishes legislation for the control of pollution into U.S. waters and water quality standards

[a] Under the CWA, certain federally recognized Tribes are authorized by the EPA to be treated in a similar manner as a state (TAS). These Tribes have independent authority for setting water quality standards and implementing regulations for waters on reservation lands.

Table 3 summarizes relevant federal, state, local, and Tribal laws, plans, and policies pursuant to sections of the CWA. Section 3.0 (Technical Analysis and Results) further discusses these laws, plans, and policies as they relate to the EIS Study Area and impacts potentially resulting from the rulemaking alternatives.

Table 3. Statues, regulations, and policies related to the implementation of the Clean Water Act.

Statute, Regulation, Policy	Description
Federal	
CWA, Section 301(a)	• Prohibits the discharge of any pollutant into navigable waters except in compliance with certain other sections of the CWA (such as Section 402)

Statute, Regulation, Policy	Description
CWA, Section 303(d) (Impaired Waters and Total Maximum Daily Loads)	• Establishes a process to identify and clean up polluted waters
CWA, Section 312	• Establishes framework for regulating sewage discharges from vessels into navigable waters
CWA, Section 402 (National Pollutant Discharge Elimination System [NPDES])	• Establishes the NPDES program, requiring that pollutant discharges to surface waters be authorized by a permit • EPA's 2013 Vessel General Permit (VGP) provides CWA Section 402 permit coverage nationwide for discharges incidental to normal operation of commercial vessels greater than 79 feet in length.[a] Section 6.24 of the VGP includes specific conditions required for the State of Washington
CWA, Section 518	• Authorizes the EPA to treat an Indian tribe as a state for purposes of administering water quality standards
State	
Water Quality Standards for Surface Water (WAC 173-201A)	• Establishes water quality standards for surface waters • Marine designated uses and associated criteria are identified in WAC 173-201A-210
Water Pollution Control (RCW 90.48)	• Establishes authority to control and prevent pollution and maintain high standards for all waters of the state
Chapter 173-228 WAC, Vessel Sewage No Discharge Zone (NDZ)	• Established pursuant to CWA Section 312 and RCW 90.48 to prevent vessel discharge of sewage within a defined geographic area off the coast of Washington state (see below for additional information)
Total Maximum Daily Load (TMDL) Process	• Specifies the maximum amount of a pollutant that a 303(d)-listed water body can receive and still meet applicable water quality standards
Tribal	
Treatment in a Similar Manner as States (TAS)	• TAS tribes may implement and manage CWA programs under Sections 303(c), 303(d), 401, 402, and 404 • Jamestown S'Klallam Tribe, Lummi Tribe of the Lummi Reservation, Port Gamble S'Klallam Tribe, Puyallup Tribe of the Puyallup Reservation, Squaxin Island Tribe of the Squaxin Island Reservation, Swinomish Indian Tribal Community, and Tulalip Tribes of Washington are all Tribes approved for TAS within or adjacent to the EIS Study Area (EPA, 2024c)

[a] Ballast water is regulated by the EPA and the U.S. Coast Guard (USCG). The Vessel Incidental Discharge Act (VIDA) was signed into law in 2018. This act amended CWA Section 312 to require EPA to develop new performance standards for commercial vessel incidental discharges and requires the USCG to develop corresponding implementing regulations. VIDA will replace the VGP; however, this is anticipated to occur no earlier than 2026 and has not occurred at the time of this writing. Therefore, provisions of the VGP are still in effect until new regulations are finalized.

Washington Water Quality Standards and Assessment

The CWA is the guiding federal regulation for discharges of pollutants into waters of the U.S. and for surface water quality standards. The CWA establishes the structure for creating and implementing pollution control programs (e.g., NPDES permitting) and water quality criteria for pollutants in surface waters. Additionally, the CWA contains regulations related to accidental releases of oil and other hazardous substances into surface waters. Under RCW 90.48.260, Ecology is the State's water pollution control agency for all purposes of the CWA.

Chapter 173-201A WAC establishes surface water quality standards for the State of Washington. Surface waters are evaluated against these criteria to ensure consistency with public health and public enjoyment of the waters as well as propagation and protection of fish, shellfish, and wildlife (WAC 173-201A-010). The State of Washington has established four designated use types for marine waters under WAC 173-201A-210: aquatic life use, shellfish harvesting, recreational uses, and miscellaneous uses (i.e., wildlife habitat, harvesting [salmonid and other fish harvesting, and crustacean and other shellfish], commerce and navigation, boating, and aesthetics). Table 610 of WAC 173-201A-610 and Table 612 of WAC 173-201A-612 describe the designated uses for specific marine water bodies. All marine waters listed in Table 612 are protected for the miscellaneous uses of aesthetics, boating, commerce/navigation, and wildlife habitat.

Water quality criteria are set to ensure the specified designated uses are met and protected. Ecology's water quality standards, which are described in WAC 173-201A-210, have numeric and narrative criteria for marine waters. Numeric criteria specify numeric limits and/or ranges of parameters such as oxygen or water temperature. Narrative criteria are statements for desired water quality in which contamination and pollution may be difficult to quantify, such as "free from" color and odor or oil and scum. Toxics criteria, defined in WAC 173-201A-240, are set for specific chemicals and compounds with different standards for the protection of freshwater aquatic life, marine aquatic life, and human health (based on consumption of water and/or organisms). The aquatic life criteria include separate benchmarks for the prevention of acute versus chronic effects.

Under the CWA, Ecology is responsible for assessing water quality in surface water bodies and reporting on the attainment status of state waters to the EPA. This includes the identification of 303(d) water bodies—also described by Ecology as "Category 5: Polluted water that requires a water improvement project"—which are water bodies that are found to be impaired by certain pollutants, causing designated uses not to be met, and that do not have a program in place to control the identified pollutant exceedances. Ecology must develop TMDLs, or water quality improvement projects, which identify the pollutant sources throughout the watershed, estimate the highest amount of a pollutant the water body can receive and meet the designated uses, and establish controls for exceedances (e.g., management of discharges or implementation of best management practices (BMPs)).

No Discharge Zone (NDZ)

Washington's NDZ became effective on May 10, 2018, making it illegal for treated or untreated vessel sewage to be discharged into Puget Sound and certain connecting waters (see Figure 6 below). The NDZ covers approximately 2,300 square miles of Washington waters and includes all the marine waters of Washington state inward from the line between New Dungeness Lighthouse and the Discovery Island Lighthouse to the Canadian border, and fresh waters of Lake Washington, Lake Union, and connecting waters between and to Puget Sound. Certain vessels, including tugs, had until May 10, 2023, to comply with the NDZ to allow time to retrofit the existing vessels with sewage holding tanks. The NDZ covers only sewage wastewater and does not regulate other marine vessel discharges such as segregated graywater, bilgewater, or ballast discharges.

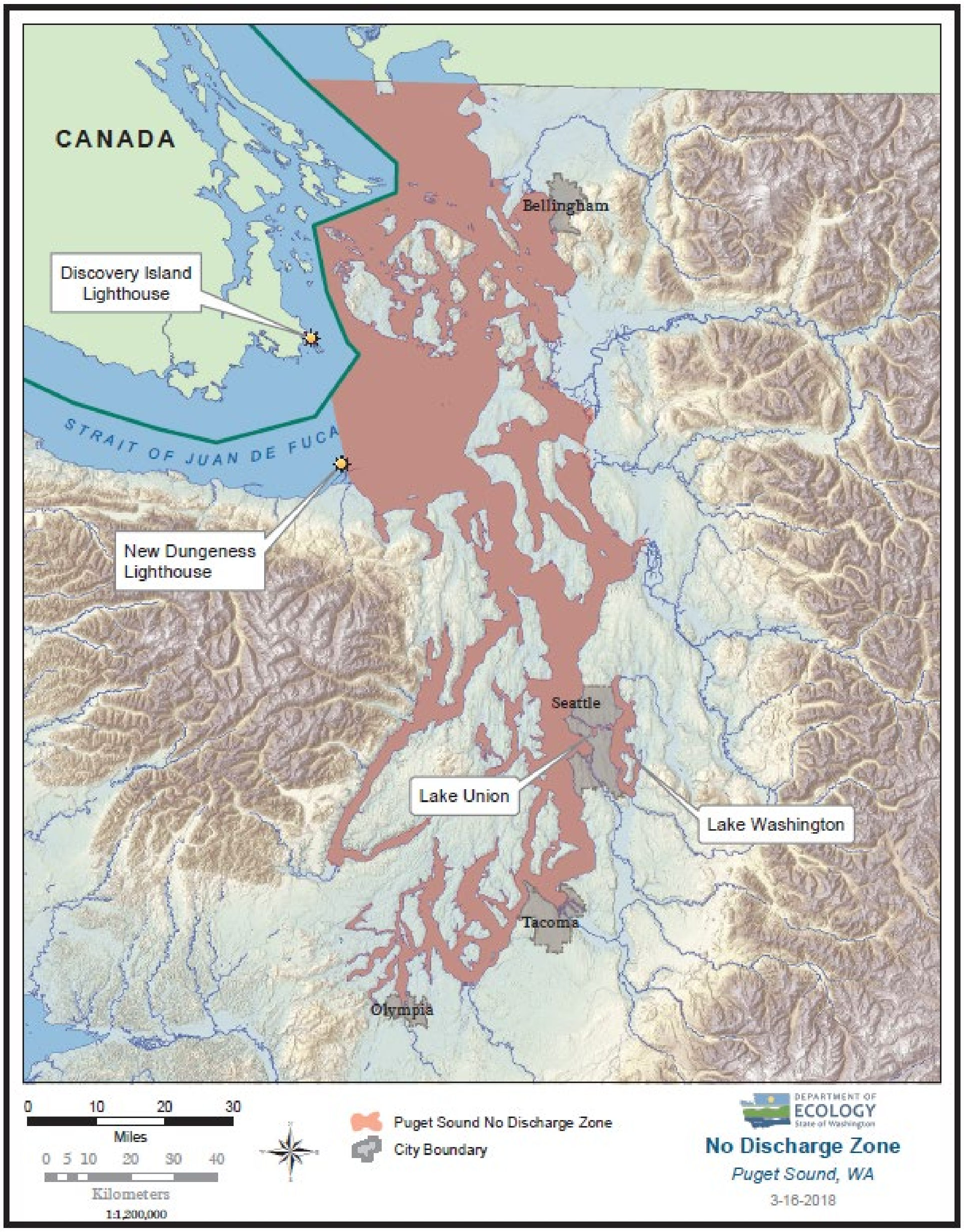


Figure 6. Puget Sound No Discharge Zone.[4]

[4] Source: (Ecology, 2018)

Vessel General Permit

The VGP authorizes “discharges incidental to the normal operation of a vessel” into U.S. waters from commercial vessels 79 feet or greater in length. Section 1.2.2 of the VGP lists all vessel discharges eligible for coverage, including graywater, bilgewater, ballast water, deck washdown and runoff, and anti-fouling coating leachate, which are discussed in Section 3.0 (Technical Analysis and Results) of this Water Quality Discipline Report. Section 2 of the VGP outlines effluent limits and related requirements applicable to all vessels, such as materials storage; toxic and hazardous materials; fuel spills/overflows; and discharges of oil or oily mixtures, as well as the specific discharges listed in Section 1.2.2 of the VGP. Additionally, the VGP requires discharges be “controlled as necessary to meet applicable water quality standards in the receiving water body or another water body impacted by your discharges,” which is expected to occur through compliance with other conditions of the VGP.

2.0 Methodology Summary

Ecology identified and reviewed scientific literature, technical reports, and data regarding marine waters and existing water quality conditions within the EIS Study Area. Ecology also reviewed Tribal and stakeholder input received from the scoping and workshop phases. During scoping, the NDZ was identified as a way of limiting sewage inputs from vessels to Puget Sound, although pump out availability was reported as “limited” for escort tugs to meet the NDZ standards. Commenters also suggested that additional discharges such as graywater, ballast water, and other incidental discharges should be considered in the EIS; these discharges are therefore discussed herein.

Ecology identified the main contaminants impacting water quality within the EIS Study Area, including nutrients, low dissolved oxygen, low pH, bacteria, and toxic chemicals. Then, Ecology identified 303(d)-listed marine water bodies within the EIS Study Area and rulemaking areas. Waters that are 303(d) listed are “impaired” and do not fully meet all applicable state water quality standards for their intended use under existing conditions.

The effect of water quality on harmful algal blooms (HABs) is examined, followed by the effect of water quality on marine plants and animals of the EIS Study Area. Ecology then identified environmentally sensitive and protected areas present in the EIS Study Area that are dependent on good water quality and could therefore be impacted by potential degradation of water quality under the rulemaking alternatives.

To determine how existing marine vessel and escort tug operations affect water quality conditions, Ecology first reviewed available literature and data from previous studies and other technical sources associated with marine vessel discharge regulatory efforts. Ecology researched impacts from sewage; graywater; bilgewater; ballast water; deck runoff; oils, grease, and lubricants; and leaching of anti-fouling coating (bottom paint). Oil spill risk from target vessel drift groundings and escort tug incidents are considered in detail in Appendix C. Ecology then reviewed the results of vessel activity simulations, which estimated the existing annual underway minutes for escort tugs and how escort tug underway times are projected to change under the rulemaking alternatives (see Appendix B for details). Further, Ecology contacted maritime subject matter experts to improve our understanding of escort tug wastewater management and discharge practices within the EIS Study Area.

Ecology used median and average datasets for various known vessel discharges, and applied these to the estimated crew size, operating times, operating days per year, and operating fleet size, coupled with consideration of environmental regulatory requirements, control measures and best management practices, to characterize how existing escort tug activities contribute to existing water quality conditions. Ecology then reviewed the changes in escort tug activity (duration of underway time, locations and pathways of activity) simulated under each of the four alternatives, and considered how those changes in tug escort activity would impact water quality. Finally, Ecology assessed whether those impacts would be likely to result in significant adverse environmental impacts, per the significance thresholds outlined below in Table 4. Per WAC 197-11-794, significant “means a reasonable likelihood of more than a moderate adverse impact on environmental quality” and should rely on context (e.g., physical setting) and intensity (e.g., magnitude and duration of impact). Findings of significance were reported for each alternative, where identified.

Table 4. Significance thresholds for water quality impacts.

Indicator	Significance Thresholds
Water quality standards	• Reasonable likelihood of a chronic and recurring increase in the frequency, severity, and/or extent of numeric or narrative water quality criteria exceedances; or • Meaningful increase in the relative frequency and/or volume of spills, resulting in a reasonable likelihood of an increased frequency, severity, and/or extent of acute water quality criteria exceedances
HABs	• Reasonable likelihood of a chronic and recurring increase in the frequency, severity, and/or extent of recurring HABs
Water-quality-dependent habitats or activities	• Substantial degradation of water quality in protected habitats; or • Reasonable likelihood of disruption of Tribal, recreational, and/or commercial activities that are dependent on water quality

3.0 Technical Analysis and Results

This section describes the affected environment for water quality within the EIS Study Area. It also describes the anticipated qualitative impacts on water quality from the four alternatives: No Action (Alternative A), Addition of FORs (Alternative B), Expansion of Tug Escort Requirements (Alternative C), and Removal of Tug Escort Requirements (Alternative D). This section also identifies mitigation measures that could avoid, minimize, or reduce the potential impacts and determines if there would be significant and unavoidable adverse environmental impacts.

3.1 Affected Environment

The EIS Study Area for water quality includes all connected marine waters in the Salish Sea network of coastal waterways (including Puget Sound), bounded to the north by the 49th Parallel and bounded to the west by a line extending across the Strait of Juan de Fuca from Pike Point to Tongue Point (see Figure 5). The Salish Sea is a geographic area encompassing land and water bodies of southern British Columbia, Canada, and northern Washington state. Major waters that make up the Salish Sea estuarine ecosystem include the Strait of Georgia, Strait of Juan de Fuca, and Puget Sound. Within these major waters are numerous straits, inlets, canals, and bays (Western Washington Institute, 2024).

The rulemaking areas include marine waters of San Juan, Skagit, and Whatcom counties, and a small portion of Island County, Washington. Specific waters include Bellingham Bay, Samish Bay, Rosario Strait, Thatcher Pass, Burrows Bay, and smaller areas such as Boat Harbor, Deepwater Bay, Strawberry Bay, Secret Harbor, and Cooks Cove.

Washington's marine waters support Tribal treaty fishing rights and cultural practices (see Appendix K Tribal Resources Discipline Report for further discussion), support habitat for a vast array of species, produce income from maritime sector economic activities, and provide recreational opportunities. Vessels that utilize the EIS Study Area include recreational boaters as well as commercial vessels such as container ships, tank barges, ATBs, ferries, cruise ships, and commercial and factory fishing vessels. For the purposes of this analysis and consistent with previous analyses, Ecology is considering the escort tug population of this EIS to be the 18 escort tugs identified in Appendices P and Q of the 2021 Vessel Traffic Trend Study (BPC & Ecology, 2021). Ecology assumes that, while the fleet conducting tug escort activity may have changed since the 2021 study (and may continue to change), the fleet will remain generally similar in composition and characteristics (e.g., length) to those identified in the 2021 study. Ecology estimates that escort tug underway time associated with this rulemaking currently represents approximately 0.96 percent of the overall marine vessel activity with AIS in the EIS Study Area. See Appendix B Transportation: Vessel Traffic Discipline Report for details.

3.1.1 Water Quality in Puget Sound and the Rulemaking Areas

Marine waters of the EIS Study Area are highly connected through circulation patterns, which also influence water quality. Circulation within Puget Sound and the Straits of Georgia and Juan de Fuca is largely influenced by tidal exchanges, estuarine circulation, winds, and the shape of the water bottom and shoreline. Water quality across the EIS Study Area is highly variable due to these differences in water circulation patterns, water temperatures, wind, precipitation, and sources of inflow (Levin et al., 2011).

Generally, rates of circulation and flushing are quicker in the northern portions of Puget Sound, as this area receives more substantial flows from rivers and is more directly connected to the Pacific Ocean. Hood Canal and South Puget Sound, where the geology restricts exchange with the rest of Puget Sound, are more poorly flushed (Ecology, 2016). Areas that have greater flow rates and circulation generally flush nutrients more quickly, resulting in a decreased probability of adverse water quality impacts such as eutrophication (abnormally high nutrient levels) and lower dissolved oxygen levels.

Ecology has previously identified high nutrient levels (and subsequently lower dissolved oxygen), ocean acidification, high bacteria levels, and toxic chemicals as the primary water quality issues in Puget Sound and are further discussed below (Ecology, 2024d). Over the past several decades, nutrients, pathogens, and toxic contaminants introduced to Puget Sound from anthropogenic sources and activities, such as from wastewater treatment plants and septic systems, fertilizers and agricultural runoff, are believed to have degraded the water quality (Ecology, 2016). Additionally, as discussed later in this section, rising temperatures of freshwater and marine waters can result in decreased dissolved oxygen levels, worsening algal blooms, and adverse effects on aquatic life and those dependent on marine resources.

Nutrients and Dissolved Oxygen: Nutrient loads, particularly nitrogen, have been identified as a potential stressor to Puget Sound. Excessive nutrients from natural and anthropogenic sources can cause algae growth, which eventually leads to algae decomposition that depletes dissolved oxygen levels (Ecology, 2023). The largest source of nitrogen to Puget Sound is from the nitrogen-rich, oxygen-poor upwelled water from the Pacific Ocean off the continental shelf, which enters Puget Sound from the Strait of Juan de Fuca and Admiralty Inlet (Ecology, 2024c). Long-term trends in nitrogen concentrations expected under climate change scenarios from this upwelling are not well identified (Ecology, 2024c). However, generally, marine water quality in the EIS Study Area is declining based on increased nitrogen loads from local anthropogenic sources (Ecology, 2024h).

Rivers flowing into Puget Sound and Straits of Georgia and Juan de Fuca are significant contributors of nitrogen (Ecology, 2023). Other natural sources of nutrients include soil, plant material, and animal waste that can enter Puget Sound via runoff.

Key anthropogenic (i.e., human-caused) sources of nitrogen to Puget Sound include wastewater, agricultural land uses, urban development and associated wastes, and atmospheric deposition of emissions from mobile sources and industrial activity (Ecology, 2024c). Ecology determined that wastewater treatment plants are the largest anthropogenic source of inorganic nitrogen loading to Puget Sound and are a significant contributor into the Straits of Georgia and Juan de Fuca. Municipal wastewater treatment plants and other permitted industrial sources discharge wastewater directly into Puget Sound waters via marine outfalls or to rivers that flow into Puget Sound (Ecology, 2024f). Ecology conducted a nitrogen loading study, analyzing river and wastewater treatment plant data for Canada and the U.S. near the Washington Coast from 1999 through 2008, and found that Puget Sound and the

Straits of Georgia and Juan de Fuca receive 46,000 kilograms per day (kg per day) of dissolved inorganic nitrogen from human point and nonpoint sources and 17,600 kg per day from natural processes (Ecology, 2023). This equates to approximately 17,000,000 kilograms per year (kg per year) from anthropogenic sources and 6,500,000 kg per yr from natural sources (Ecology, 2023).

Anthropogenic sources of nutrients are projected to contribute to worsening water quality in the future. Human sources of nutrients are projected to potentially increase by more than 40 percent in the next few decades based on estimates of population increase in the Puget Sound region (Ecology, 2024g). Additionally, changes in land use, including development and agriculture, are projected to cause increases in nitrogen concentrations in rivers by approximately 14 percent by 2040 (2035-2044) and 51 percent by 2070 (2065-2069), relative to 2006 levels (Mauger et al., 2015).

Climate change is also expected to change other environmental conditions that could subsequently affect nutrient-related water quality concerns. Under various climate change scenarios, average summer streamflow into Puget Sound is projected to decrease by approximately 24 to 31 percent by the 2080's (2070-2099), relative to 1970-1999 levels (Mauger et al., 2015). This reduced freshwater flow into Puget Sound would reduce circulation and flushing and increase nutrient retention. Increased water temperature also presents additional stresses, such as lower dissolved oxygen and increased bacteria levels and occurrences of harmful algal blooms (HABs) (Ecology, 2024g).

Excessive nutrient loads may contribute to rapid algae growth, which results in lower dissolved oxygen concentrations when the algae die and decompose. Dissolved oxygen concentrations have declined in the North Pacific over a 50-year period (Ecology, 2014) and are expected to continue decreasing in the Salish Sea, with a projected decrease of approximately 0.77 milligrams per liter by 2095 relative to 2000 levels (Khangaonkar et al., 2019). Sampling conducted by Skagit County in the Swinomish Channel, located immediately south of the rulemaking areas, showed declining ammonia concentrations but generally worsening water quality over the past 20 years with increasing levels of fecal coliform, nitrate + nitrite, orthophosphate, and total phosphorus, as well as a significantly decreasing trend in pH (i.e., more acidic waters) (Skagit County Public Works, 2024).

Ocean Acidification: Ocean acidification in the EIS Study Area is believed to be caused by a variety of natural and anthropogenic factors at the global, regional, and local scales. As a result of increasing and accumulating atmospheric carbon dioxide (CO_2), the waters of the North Pacific Ocean and Puget Sound are experiencing a decrease in pH (Mauger et al., 2015). Deep ocean water upwelling from the Pacific Ocean into Puget Sound and coastal inlets brings nutrient-rich and naturally lower pH water (due to decaying organic matter in the deep ocean) closer to the surface, where it is further spread by coastal winds. Localized anthropogenic sources of carbon and nutrient pollution (e.g., nitrogen) from industrial emissions can also result in these emissions being deposited to Puget Sound marine waters (Ecology, 2024f). In addition, algal growth from excessive nitrogen loading can also increase CO_2 levels in the water, effectively lowering water pH levels. With climate change, pH in Washington's coastal waters is expected to decrease by approximately 0.14 to 0.32 pH units by 2100, relative to 1986-2005 levels (Khangaonkar et al., 2019; Mauger et al., 2015).

Bacteria: Bacteria in Puget Sound is largely believed to come from anthropogenic sources such as municipal wastewater treatment plants; failing septic systems; vessel discharges; and farm, pet, and livestock waste (Ecology, 2024e). Bacteria from these sources enter Puget Sound through direct discharges or can be transported via stormwater runoff. As discussed in Section 1.5 (Regulatory Framework), Ecology has implemented the NDZ in an effort to decrease bacteria inputs from vessel discharges, including escort tugs. Section 3.1.2 (Escort Tug Wastewater and Pollutant Discharges) further discusses escort tug discharges within the EIS Study Area.

Toxic Chemicals: Toxic chemicals are introduced to Puget Sound from everyday anthropogenic items and sources, including petroleum combustion, brake pads, boat paints, building materials, and more (Ecology, 2024d). The most common pathway through which toxic chemicals reach Puget Sound is surface runoff (Ecology, 2011b, 2011a, 2024i). Stormwater may pick up pollutants such as oil, fertilizers, pesticides, soil, trash, and animal waste as it runs off impervious surfaces such as rooftops, paved streets, highways, and parking lots. Chemicals of concern found in polluted runoff may include copper and other metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), petroleum, oil and grease, and a more recently identified toxin known as 6PPD-quinone that originates from tire rubber (Ecology, 2011b, 2011a; Tian et al., 2021).

The major sources of toxics in stormwater runoff are mainly anthropogenic, including pesticides, tires/tire wear particles, brake pads, roofing materials, and improper disposal of consumer products. The highest concentrations of toxic pollutants in runoff therefore come from highly developed areas (including residential, commercial, and industrial) and agricultural land uses. Polluted runoff entering Puget Sound leads to impaired water quality, making water and shellfish unsafe for humans and other animals, and can harm fish and wildlife habitat.

Additional major pathways for toxic chemicals reaching Puget Sound waters include air deposition, wastewater treatment plants, and groundwater (Ecology, 2011b, 2011a). Air deposition is a significant pathway for flame retardants and some PAHs to reach Puget Sound, and wastewater treatment plants are also a significant pathway for flame retardants (Ecology, 2011b, 2011a). Groundwater is a significant pathway for cadmium and some PAHs (Ecology, 2011a). Further, leaching of vessel anti-fouling coating is a major source of copper to Puget Sound (see Section 3.1.2 [Escort Tug Wastewater and Pollutant Discharges] for further discussion) (Ecology, 2011a).

Additionally, oil spills are a concern in Washington due to the volume of oil that is refined and transported through pipelines, rails, and vessels, as well as the expansion of this infrastructure, particularly on the Canadian side of the border. The movement of oil can result in spills due to a variety of factors, from mechanical failures to collisions. Spills from vessels specifically can be caused by groundings, collisions or allisions, refueling, human error, and many other factors. A significant majority (88.4 percent) of oil and non-oil spills to water in Washington State between 2008 and 2018 were less than 25 gallons (Ecology, 2020). Due to the large amount of recreational and fishing vessels that utilize Puget Sound, it is estimated that these sources comprise the largest source of oil pollution even though these spills are generally small in volume (National Oceanic and Atmospheric Administration [NOAA], 2022). Oil spill impacts are further discussed in Section 3.1.3 (Oil Spill Risk) and Appendix C Environmental Health: Releases Discipline Report.

Based on the results of previous Ecology studies analyzing pollutants and major pathways, as well as vessel permit regulations, escort tugs are estimated to contribute minor pollutant loads into the EIS Study Area in comparison to other more abundant vessel types and almost negligible pollutant loads on a larger watershed scale. Nonetheless, discharges from escort tugs contain various pollutants that can result in incremental adverse impacts on water quality over time. Wastewater and pollutant discharges from escort tugs, including typical contaminants and estimated volumes, are discussed further in Section 3.1.2 (Escort Tug Wastewater and Pollutant Discharges).

Water Quality Standards

Ecology has designated uses, water quality criteria, and antidegradation policies in place to protect the state's surface waters.

Designated uses are assigned to marine waters in the EIS Study Area under four use categories—aquatic life use, primary contact recreation, shellfish harvesting, and miscellaneous uses. As discussed in Section 1.5 (Regulatory Framework), numeric and narrative surface water quality criteria are set to be protective of the designated (intended) use of the water body. All marine waters in Washington—and therefore, all marine waters in the EIS Study Area—are designated as primary contact recreation and for miscellaneous uses (aesthetics, boating, commerce/navigation, and wildlife habitat). Marine waters in the rulemaking areas also have a designated use for shellfish harvesting (WAC 173-201A-612).

To further refine the surface water quality criteria for aquatic life use, Washington State employs a classification system with the following categories: *fair, good, excellent*, and *exceptional*. For example, a category of *exceptional* indicates that the waters are designated to "markedly and uniformly exceed the requirements for all uses including, but not limited to, salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (e.g., crabs, shrimp, crayfish, and scallops) rearing and spawning" (Ecology, 2024l). These waters should support thriving aquatic life and may contain outstanding natural habitat characteristics, exceptional or unusual assemblage of species, exceptionally high diversity and species richness, and/or a balanced trophic structure. Comparatively, *fair* might indicate that waters should still support some level of aquatic life (particularly salmonid and other fish migration uses) despite having less stringent water quality parameters to adhere to (Ecology, 2024l).

Throughout the EIS Study Area, these assigned categories range from *fair* (least stringent water quality criteria) to *extraordinary* (most stringent water quality criteria). In the rulemaking areas, categories range from *extraordinary* to *excellent* for aquatic life use, indicating a higher level of protection and stricter water quality criteria imposed in these areas.

Concentrations of selected pollutants in water bodies are measured and compared against the established numeric and narrative water quality criteria to determine whether designated uses are being met. Water bodies whose designated uses are impaired by certain pollutants, and that do not have a program in place to resolve these pollutant exceedances, are identified as "impaired" waters or 303(d) water bodies.[5]

Many 303(d) waters within the EIS Study Area are impaired due to dissolved oxygen, fecal coliform, or enterococci (Ecology, 2024k, 2024j). The 303(d) water bodies within the rulemaking areas are mainly found along the shores of densely populated areas and within bays. Most approved TMDLs in the EIS Study Area are targeted toward fecal coliform and dissolved oxygen. Figure 7 below shows the 303(d)-listed marine water bodies within the rulemaking areas based on Ecology's current (2018) EPA-approved Water Quality Assessment.

As shown in Figure 7, 303(d)-listed marine waters within the rulemaking areas are mainly present along the shorelines near Anacortes and Bellingham, with additional impairments near Samish and Lummi Islands. As described in Section 1.2 (Rulemaking Alternatives) and the Transportation: Vessel Traffic Discipline Report (Appendix B), Ecology developed a model to simulate escort tug traffic within the EIS Study Area and the rulemaking areas. Based on this dataset, approximately 5.3 percent of existing escort tug underway time within the EIS Study Area occurs within 303(d) impaired marine waters. Within the rulemaking areas (the region defined by the Alternative C boundary), approximately 6.6 percent of existing escort tug underway activity occurs within 303(d) impaired marine waters.

Further, approximately 75 percent of this existing escort tug underway activity within 303(d) impaired marine waters occurs in the Guemes Channel and Fidalgo Bay near Anacortes. These waters include impairments for chemicals including chrysene and benzo(a)anthracene, which are PAHs, and 2,3,7,8-TCDD (dioxin). PAHs occur naturally within crude oil and gasoline but can also be produced during burning/combustion processes. In Washington, petroleum refineries as well as vessel oil spills are known sources of PAHs. The Guemes Channel and Fidalgo Bay area includes refineries (e.g. Marathon Oil Refinery) as well as significant vessel traffic and oil transportation; both of which could be contributors of PAHs if a spill occurred (Ecology & Washington State Department of Health, 2012). Further, dioxin is produced during combustion of fossil fuels, as well as waste or wood. As such, oil refineries are known sources of dioxins (Ecology, 1998). Cap Sante Marina, a marina used by recreational and commercial vessels in the Port of Anacortes, is impaired for copper. Ecology's vessel activity data indicate that escort tugs operate near, but not within, Cap Sante Marina.

[5] 303(d) listed water bodies are so named because Section 303(d) of the CWA requires states to identify and list polluted water bodies.

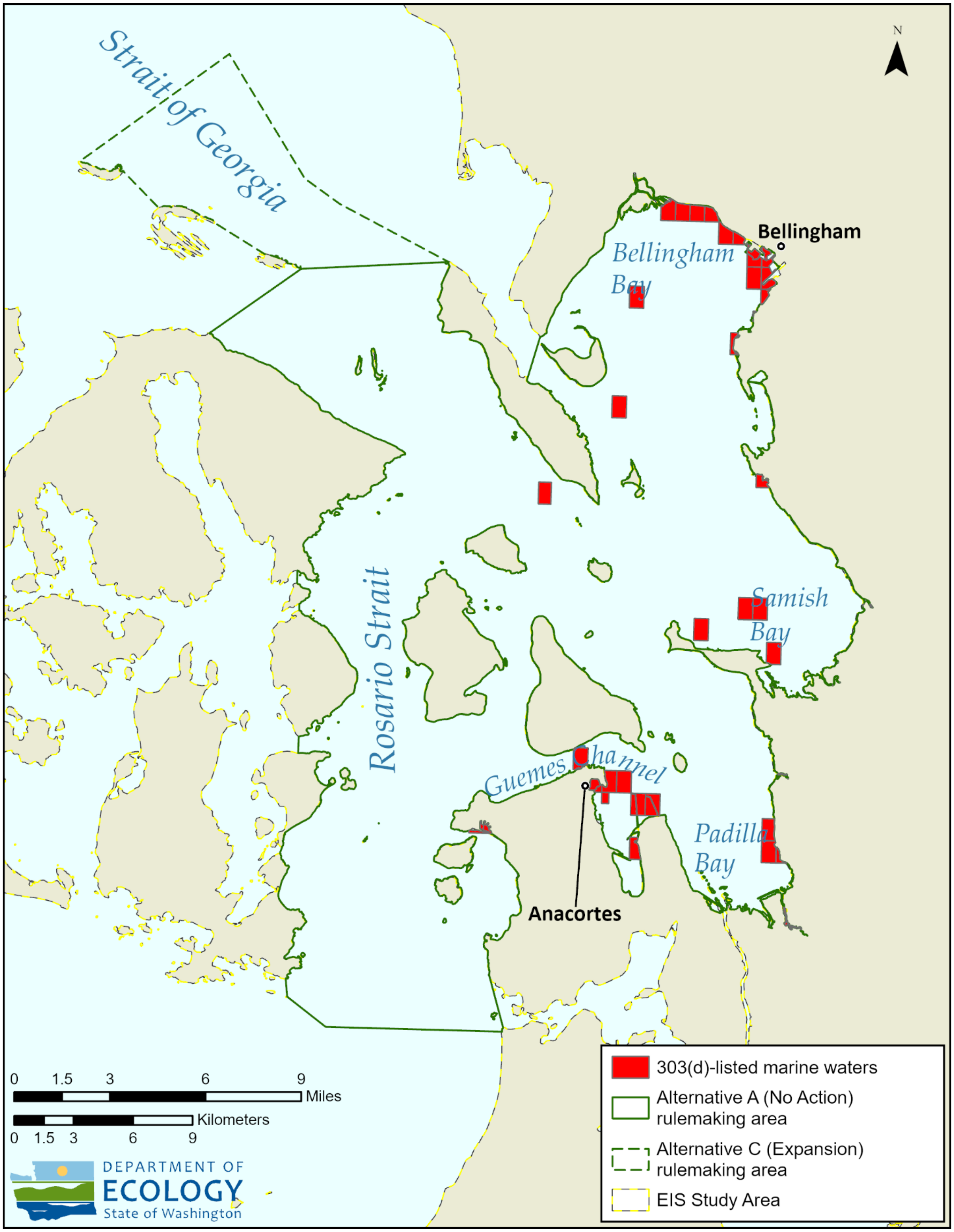


Figure 7. 303(d)-listed marine waters in the rulemaking areas.

Harmful Algal Blooms (HABs)

The HABs, such as “red tides,” are events where large colonies of accumulated algae develop within a water body, which can disrupt aquatic ecosystems and introduce biotoxins that then travel through the food web. The HABs thrive in environments rich in nitrogen and other nutrients, especially when these nutrients are excessive from sources such as agricultural runoff (NOAA, 2024a). Wastewater discharges, including those from marine vessel activity, can introduce additional nutrients and further exacerbate conditions that promote HAB growth (Ecology, 2016). Other factors potentially contributing to formation and increased severity of HABs include slow water flow, higher water temperatures, and weather events such as floods and droughts (NOAA, 2024a). Ballast water from marine vessels can also transport microalgae from the ballast intake source and introduce it to new water bodies upon release, thereby potentially spreading HABs.

While not all algal blooms pose threats to human or environmental health, at least seven HABs of concern have been identified within the Salish Sea as of 2016 (Encyclopedia of Puget Sound, 2016). These include blooms of *Alexandrium* spp., which can produce neurotoxins that may cause vomiting, muscle paralysis, and even death when consumed by humans via contaminated shellfish (Moore et al., 2015), and which can be lethal to marine mammals, birds, and fish (U.S. National Office for Harmful Algal Blooms, n.d.). Other regional HABs of concern can produce biotoxins and poison shellfish, resulting in the closure of commercial and recreational harvesting areas due to the possibility of significant and potentially deadly health impacts to mammals, birds, and humans (Cole, 2016; PSEMP Marine Waters Workgroup, 2023).

In addition to introducing biotoxins into the food chain, HABs can present direct threats to water quality. For example, as algae die, the decomposition process depletes the amount of oxygen in the water, ultimately leading to eutrophication and dead zones (NOAA, 2024b), although eutrophication is more common in closed freshwater bodies (e.g., lakes) than in open marine systems (Heisler et al., 2008). Oxygen-depleted waters can put stress on marine flora and fauna and lead to increased morbidity.

Various factors contribute to HAB development, and Washington state is actively monitoring and working to address water quality issues through efforts such as the ongoing Puget Sound Nutrient Source Reduction Project (Ecology, 2019). However, climate change-induced warmer sea surface temperatures and ocean acidification could lead to earlier and more toxic algal blooms, increased growth rates, and more days with conditions that support HAB growth (Lepori-Bui, 2024; Mauger et al., 2015; Moore et al., 2015).

In part to reduce vessel (including escort tug) contributions to HAB growth, Washington’s NDZ prohibits vessel operators from discharging treated or untreated sewage into Puget Sound and specific connecting waters (see Section 1.5 [Regulatory Framework]). Additionally, federal and state regulations on ballast water intake and discharge are in place to reduce the potential spread of HABs. While some escort tugs use ballast water to aid maneuverability, escort tugs in the EIS Study Area are not expected to pose a meaningful risk of spreading HABs, as many escort tugs operating in Puget Sound do not have ballast tanks, rarely discharge ballast water, and/or collect their ballast water from municipal sources (e.g., potable water). Section 3.1.2

(Escort Tug Wastewater and Pollutant Discharges) further discusses escort tug use of ballast water and the associated regulations.

Influence of Water Quality on Ecological Resources

Puget Sound is home and resource to a diverse array of flora and fauna. Discussion of marine wildlife present within the EIS Study Area and rulemaking areas, as well as potential impacts from escort tugs to wildlife, are discussed further in the Plants and Animals Discipline Report (Appendix F).

Degraded water quality threatens the health of the marine ecosystem within Puget Sound. Water quality issues identified in Puget Sound directly affecting biological resources include excessive nutrient loadings, low dissolved oxygen, water acidification, and introduction of toxic chemicals into the water (Ecology, 2024d). These water quality issues compounded with other environmental stressors, such as warming temperatures under climate change and overall habitat loss, can systematically threaten the health of the Puget Sound biome.

Reduced dissolved oxygen levels, which are often linked with acidification and exacerbated by excessive nutrient loadings and HABs, can stress or even suffocate marine wildlife (Ecology, 2023; Gobler & Baumann, 2016). Persistent bioaccumulative and toxic chemicals can take many years to break down and are known to threaten wildlife in Puget Sound. For example, PAHs, often released from petroleum and other combustion products, have been found to lower immune systems, growth, and reproductive function in certain fish species within Puget Sound (Johnson et al., 2008). Further, PAHs were recently documented in skeletal muscle and liver samples of stranded Southern Resident Killer Whales and Bigg's killer whales and evidence of in-utero maternal transfer of PAHs was observed in a Southern Resident Killer Whale mother-fetus skeletal muscle pair (Lee et al., 2023).

Ocean acidification inhibits shell and skeleton growth in shellfish, plankton, and fish (Ecology, 2024a). This results in higher mortality rates among these prey species, thereby depleting food sources for predators such as salmon, birds, whales, and other marine species. Further, predators that consume contaminated prey can bioaccumulate high levels of toxins at rates faster than their bodies can break down.

Climate change could further exacerbate the impacts of existing water quality issues on marine plants and animals. For example, six discrete marine areas in the EIS Study Area are 303(d)-listed for not meeting aquatic life designated uses for temperature (Ecology, 2024k, 2024j). The continued increase of sea surface temperatures can lead to increased water stratification (i.e., larger differences in temperature between the top and bottom of the water column), which can further reduce oxygen availability to marine organisms (EPA, 2021).

Environmentally Sensitive and Protected Areas

The EIS Study Area supports a wide array of wildlife and aquatic species, such as marine mammals, finfish, aquatic invertebrates, terrestrial and semi-aquatic animals, and plants. As well as being key indicators of environmental and ecosystem health, certain species in the EIS Study Area are also culturally and socially significant. As the EIS Study Area is an important ecosystem with unique habitat, areas have been designated as protected or special areas to help preserve wildlife and their other important characteristics. Environmentally sensitive and protected areas present in the EIS Study Area include national monuments, U.S. Fish and Wildlife Service National Wildlife Refuges, Washington Department of Fish and Wildlife Marine Protected Areas (i.e., Conservation Areas, Marine Preserves, and Sea Urchin/Sea Cucumber Exclusion Zones), Washington Department of Natural Resources Aquatic Reserves, Essential Fish Habitat, and Habitat Areas of Particular Concern. Commercial fisheries (e.g., shellfish growing areas) and recreational areas (e.g., for fishing, boating, kayaking, crabbing) are also present in the EIS Study Area. These areas are dependent on good water quality and could potentially be impacted by a degradation of water quality.

An example of a threat to these environmentally sensitive and protected areas is the discharge of treated sewage effluent, which is typically discharged by escort tugs west of Dungeness Spit outside of the NDZ. This area is directly adjacent to the Dungeness National Wildlife Refuge and contains Groundfish and Coastal Pelagic Species Essential Fish Habitat; kelp Habitat Areas of Particular Concern; and critical habitat for bocaccio, yelloweye rockfish, Chinook salmon, green sturgeon, and killer whales. Nutrients in sewage could contribute to water quality concerns—such as HABs, eutrophication, and subsequent fish kills that limit food availability for species at higher trophic levels—in these important areas; however, escort tugs are expected to have a minor and localized contribution to these impacts. Additional information regarding these protected ecological areas, special aquatic habitats, and species present in the EIS Study Area and rulemaking areas is presented in the Plants and Animals Discipline Report (Appendix F).

3.1.2 Escort Tug Wastewater and Pollutant Discharges

Approved operational discharges from escort tugs may include graywater (e.g., shower and sink drains); bilgewater; ballast water; deck runoff; lubrication discharges from oil sea interfaces; and leaching of anti-fouling coating. While these discharges are regulated by EPA's 2013 Vessel General Permit (VGP), they contain various pollutants such as bacteria and pathogens, nutrients, metals, oil, grease, and other toxics that can result in incremental adverse impacts on water quality. Escort tugs may also discharge treated sewage in areas of the EIS Study Area that fall outside the NDZ, and untreated sewage in areas outside the NDZ that are more than 3 miles from shore.

Sewage

Generally, pollutants in vessel sewage include nutrients, metals, solids, toxics, endocrine disrupters, and pathogens (EPA, 2024b). These pollutants can cause water quality impairments, such as low dissolved oxygen and high concentrations of fecal bacteria, and adversely affect aquatic habitat. Some marine waters within the EIS Study Area, including the rulemaking areas, are 303(d) listed due to failure to meet aquatic life, primary contact recreation, and/or shellfish harvesting water quality standards based on concentrations of dissolved oxygen, fecal coliform, and/or enterococci (Ecology, 2024j).

Ecology identified the need for a NDZ, a geographical area in which vessel sewage discharges (both treated and untreated) are prohibited, primarily due to bacterial impacts to shellfish aquaculture and harvesting areas, recreational swimming opportunities, and water quality impairments (Ecology, 2016). Almost all of the EIS Study Area is located within the NDZ except for waters of Washington state west of New Dungeness Lighthouse and Canadian waters of the Strait of Juan de Fuca, Haro Strait, Boundary Pass, and Strait of Georgia. All of the proposed rulemaking areas are within the NDZ. Therefore, marine vessels (including escort tugs) cannot discharge treated or untreated sewage within the rulemaking areas or within most of the EIS Study Area. Escort tugs may discharge treated sewage in areas of the EIS Study area that fall outside of the NDZ and untreated sewage in areas outside of the NDZ that are more than three miles from shore.

In Canadian waters, untreated vessel sewage discharges are prohibited within either 3 nautical miles or 12 miles of land, depending on the size of the vessel. Treated vessel sewage discharges are allowed, but are subject to specified limits on fecal coliforms per 100 milliliters of water (Transport Canada, 2019).

Based on EPA estimates derived from their VGP Notice of Intent database, escort tugs may generate a median of 11 gallons of sewage per day per person (EPA, 2023). Assuming a crew of 6 people and operation for 335 days per year (Captain Jeff Slesinger, OTSC Tug Industry Representative, personal communication, October 10, 2024), escort tugs are estimated to generate a total of approximately 398,000 gallons of sewage per year.

Ecology estimates that escort tugs operate almost entirely within the boundaries of the NDZ (98.6 percent of underway minutes). Based on information from industry contacts, Ecology's understanding of escort tug sewage discharges in the EIS Study Area is that treated sewage effluent is typically discharged west of Dungeness Spit, outside of the NDZ. Stationary pumps for commercial vessel sewage are available in Bellingham (Port of Bellingham, 2024). Other options include use of a pump-out truck or pump-out barge, which may have limited availability or capacity and require payment of a fee, which has been described to Ecology as cost prohibitive (Dan Morrison, Centerline Logistics, Industry Meeting August 2024).

Graywater

Sources of graywater from escort tugs may include showers, sinks, kitchen spaces, and laundry. While these discharges are regulated by the EPA 2013 VGP, they may contain bacteria, pathogens, oil and grease, detergent and soaps, metals, solids, and nutrients. The amount of graywater produced and discharged by vessels is based on a number of factors including the type of facilities onboard, crew size, and hours of operation. A study from the EPA estimated that tugs greater than 75 feet in length may generate 12 to 45 gallons of graywater per day per person (EPA, 2011).

Assuming the maximum of 45 gallons per day per person, a crew of 6 people, and operation for 335 days per year (Captain Jeff Slesinger, OTSC Tug Industry Representative, personal communication, October 10, 2024), escort tugs are estimated to generate a total of approximately 1,630,000 gallons of graywater per year.

Most escort tugs in the EIS Study Area are not anticipated to have capacity to store and treat graywater (Captain Jeff Slesinger, OTSC Tug Industry Representative, personal communication, October 10, 2024); therefore, for the purposes of this analysis, Ecology assumes all the escort tugs analyzed herein discharge untreated graywater. Graywater discharges from escort tugs are subject to the requirements of Section 2.2.15 of the VGP, which include general control measures and BMPs for graywater as well as specific measures for vessels that cannot store graywater, such as the escort tugs analyzed herein. Under Section 2.2.15 of the VGP, vessels that cannot store graywater must minimize such discharges while in port and minimize discharges into nutrient-impaired waters or waters that are impaired as a result of nutrient impairment (e.g., phosphorus, nitrogen, or low dissolved oxygen). Further, any such discharge of graywater into nutrient-impaired waters or waters that are impaired as a result of nutrient impairment must be conducted while the vessel is underway and within areas that have significant circulation and depth (as feasible). Additional measures applicable to all vessels that produce graywater include using phosphate-free and minimally toxic soaps and minimizing the disposal of food waste and kitchen/cooking oils into the graywater.

Bilgewater

Bilgewater effluent consists of the water that collects in the bottom of the vessel from sources such as precipitation and spray, fuel spills, leaking sewage and graywater piping, condensates, and deck washing. A number of oily and non-oily wastewater sources may drain intentionally or unintentionally into the bilge. Oily wastewater sources include oil, fuel, and antifreeze leaks from engine and machinery operation and maintenance. The composition and volume of bilgewater is highly dependent on the specific sources of wastewater that accumulate in the bilge, as well as vessel size, hull design and construction, vessel operation, and a variety of additional factors (EPA, 2010).

The EPA estimated that many commercial vessels 79 feet and under generate an average of 10 to 15 gallons of bilgewater per day; however, vessels might generate as little as 2 gallons of bilgewater or as much as 750 gallons of bilgewater per day (EPA, 2010). Assuming 15 gallons of bilgewater per day and operation for 335 days per year (Captain Jeff Slesinger, OTSC Tug Industry Representative, personal communication, October 10, 2024), escort tugs are estimated to generate a total of approximately 90,500 gallons of bilgewater per year.

Bilgewater discharges from escort tugs are subject to the requirements of Section 2.2.2 of the VGP, which include minimizing the production and/or discharge of bilgewater into surface waters, prohibiting the addition of any substances to the bilgewater that do not occur during normal operation, and prohibiting the use of substances that remove sheens in discharges.

Ballast water

Ballast water is water stored in the hull of a vessel and generally provides stability and aids in maneuverability. The primary concerns regarding intake and discharge of ballast water are the transport of aquatic invasive species and algae that may contribute to HABs. Ballast water is also of concern regarding water temperature changes from ambient conditions in areas of discharge.

Based on input from local maritime subject matter experts, most of the escort tugs in the EIS Study Area may not have ballast tanks, as newer designs use other structural and design features to create the stability that ballast water provides. This trend is expected to continue, as complexity and uncertainty of the ballast water regulatory environment encourage new designs to continue to avoid the use of ballast tanks.

Escort tugs in the EIS Study Area that do have ballast tanks typically manage ballast water in one of two ways. The escort tug operators may use municipal water to fill their tanks, which is only available at docks but is less corrosive than marine water, and simplifies compliance with ballast water regulations.[6] Alternatively, pursuant to 33 CFR 151.2015(c), escort tugs that operate exclusively within a single Captain of the Port Zone[7] are exempt from the ballast water management requirements in 33 CFR 151.2025. Escort tugs operating within the EIS Study Area, and therefore those operating within the rulemaking areas, generally do not operate outside of the Puget Sound Captain of the Port Zone and are therefore able to discharge untreated ballast water.[8] However, escort tug ballasts are generally emptied only for dry dockings, inspections, or repairs (Captain Jeff Slesinger, OTSC Tug Industry Representative, personal communication, September 18, 2024, and Captain Dave Corrie, personal communication, September 24, 2024).

Section 2.2.3 of the VGP identifies control measures and BMPs for reducing pollutants from ballast water. Vessels must adhere to the USCG's ballast water regulations in 33 CFR Part 151 as well as requirements in Section 2.2.3 of the VGP, such as the development of ballast water management plans, training crew members on ballast water discharge, and other mandatory and suggested management practices. However, based on the information from local maritime subject matter experts above, it is unlikely that escort tugs are discharging ballast water on a regular basis, and when they do, it primarily consists of municipal water discharged in the same Captain of the Port Zone.

Additionally, the Washington Department of Fish and Wildlife implements state ballast water regulations under Chapter 77.120 RCW and Chapter 220-650 WAC. These state regulations include management and discharge regulations as well as recordkeeping and reporting requirements. The regulations apply to all vessels of 300 gross tons or more, and vessels that are capable of carrying ballast water into state waters after operating outside of the state waters. As the escort tugs analyzed herein are presumed to operate in a single Captain of the Port Zone and only 4 of these escort tugs are over 300 gross tons, these regulations are assumed to have limited applicability to escort tugs.

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[6] Pursuant to 33 CFR 151.2025(a)(2), water from a U.S. public water system may be discharged untreated.

[7] USCG Captains of the Port are in command of their respective Captain of the Port Zones, which are geographic boundaries for U.S. Coast Guard organizational and administrative purposes. Captains of the Port enforce regulations for marine environmental protections as well as safety and security within their respective zones.

[8] Simulated vessel data indicates that the escort tugs may spend a limited amount of time in Canadian waters. These tugs that may enter Canadian waters would be operating outside of the Puget Sound Captain of the Port Zone and would be required to follow more stringent ballast water management requirements, pursuant to 33 CFR 151.2025.

Oils, Grease, and Lubricants

Oil, grease, and lubricants can be released from escort tugs from a variety of sources, including bilgewater (discussed above), deck washdown and runoff, oil-to-sea interfaces,[9] and minor spills and incidents.

Deck washdowns typically use pressurized water from hoses or mops to rinse or wash boat surfaces of dirt, grit, or other material. Based on sampling conducted by the EPA, deck washdown from utility vessels (including tug boats) showed elevated dissolved and total metal concentrations (e.g., aluminum), likely associated with decks composed primarily of metal (EPA, 2010). Additionally, some deck washdown samples contained biochemical oxygen demand, total suspended solids, nonylphenols, total phosphorous, and total residual chlorine pollutants, all of which are associated with detergents and disinfectants (EPA, 2010). The EPA estimated that tow boats less than 79 feet generate an average of 20 to 30 gallons of deck washdown per day during the summer (peak season), assuming decks are washed once per week (EPA, 2010). Applying the maximum estimate of 30 gallons per day, and operation for 335 days per year (Captain Jeff Slesinger, OTSC Tug Industry Representative, personal communication, October 10, 2024), escort tugs are estimated to generate a total of approximately 181,000 gallons of deck washdown per year.

Deck runoff is produced when water falls on or is applied to the vessel’s exposed surfaces. Contaminants may include oil and grease; petroleum hydrocarbons; surfactants; cleaners; glycols; solvents; and particulates, such as soot, dirt, or metallic particles. Precipitation is generally considered the largest contributor to deck runoff in all types of vessels. Assuming 40 inches of rainfall per year, escort tugs are estimated to generate a total of approximately 1,660,000 gallons of deck runoff per year.

Section 2.2.1 of the VGP identifies control measures and BMPs for reducing pollutants in deck washdown and runoff. These include brooming or otherwise cleaning the deck prior to washdowns; generally minimizing on-deck debris, residue, and spills; and maintaining the topside surface and other portions of the vessel above the waterline to minimize rust, cleaning compounds, and other materials from entering deck washdown and runoff discharges.

Daily marine vessel operations can also result in incidental discharges from oil-to-sea interfaces such as stern tubes and packing glands. Stern tubes are hollow tubes around the propeller shaft; the propeller shaft connects the engine to the propeller. These systems are often lubricated by seawater to cool and lubricate the turning shaft. In older vessels, the packing glands, or stuffing boxes, provide a seal around a propeller shaft to prevent seawater from entering the hull. Packing gland effluent may contain metals (from contact of the discharge with the drive shaft), hydraulic fluid, grease or lubricants found in the gland, and fuel constituents. EPA sampled stern tube packing gland effluent of tugs 79 feet or less in length and found metals were the constituent detected the most frequently and with the highest magnitude of

[9] Oil-to-sea interfaces include “any mechanical or other equipment on board a vessel where seals or surfaces may release quantities of oil and are subject to immersion in water.” (EPA, 2024a)

exceedance (EPA, 2010). Oil and grease, total suspended solids, and a chemical used in the production of polyvinyl chloride were also detected in some samples (EPA, 2010). However, newer dripless seals lubricate with seawater and the VGP (see below) requires the use of environmentally acceptable lubricants. Therefore, the below estimates of effluent and associated oil and grease may be overestimates.

The EPA estimated that tugs generate approximately 4 gallons of stern tube packing gland effluent per propeller shaft, per day.[10] Most of the escort tugs analyzed herein have dual propeller systems (generating 8 gallons per day) and one escort tug has a triple propeller system (generating 12 gallons per day). Assuming the escort tugs are operating 335 days per year (Captain Jeff Slesinger, OTSC Tug Industry Representative, personal communication, October 10, 2024), they are estimated to generate a total of approximately 49,600 gallons of stern tube packing gland effluent per year.

Section 2.2.9 of the VGP identifies control measures and BMPs for reducing pollutants from oil-to-sea interfaces, such as stern tubes. These include maintaining any oil-to-sea interfaces in good operating condition, conducting maintenance activities for oil-to-sea interfaces out of water when possible, using environmentally acceptable lubricants (biodegradables, minimally-toxic, and not bioaccumulative), and removing excess lubricant after application.

Under the VGP, fuel spills and overflows must not result in a discharge of oil in quantities that may be harmful. Pursuant to 40 CFR Part 110, 'harmful' quantities would violate applicable water quality standards; cause a film, sheen, or discoloration of the surface or shorelines of the water; or cause sludge or emulsion beneath the water surface or upon shorelines.

Anti-Fouling Coating

The hulls on most boats used in marine waters are coated with anti-fouling coatings—soft toxic paints that contain toxic chemicals, such as copper, to limit the growth of marine organisms on the hull. Leaching of these chemicals into the surrounding waters can be poisonous to aquatic life. Ecology estimates that approximately 26 tons per year of copper is leached from vessel anti-fouling coating, presumably entirely to marine waters with exception of the Lake Washington/Lake Union system and freshwater marina areas near the mouths of the Snohomish and Duwamish Rivers (Ecology, 2011a). As noted previously, Cap Sante Marina in the Port of Anacortes is impaired for copper. Ecology's vessel activity data indicate extensive escort tug activity near, but not within, Cap Sante Marina.

Anti-fouling hull coatings and related leachate are regulated under Section 2.2.4 of the VGP, which states that environmentally considerate anti-fouling coatings (e.g., lowest effective biocide release rates, rapidly biodegradable components) should be considered for any initial application or reapplication.

[10] Estimate is taken from a study of vessels less than 79 feet in length and may therefore slightly underestimate the volume of stern tube packing gland effluent from escort tugs, which are greater than 79 feet in length.

Summary and Context

Overall, this Discipline Report focuses on the impacts of escort tugs that were identified as escorting target vessels within the rulemaking areas, as well as the tugs' commutes throughout the EIS Study Area to and from these escort jobs. As discussed in the Transportation: Vessel Traffic Discipline Report (Appendix B), these escort tugs are estimated to have approximately 610,107 minutes of underway time per year within the EIS Study Area. As stated above in Section 3.1 (Affected Environment), Ecology estimates that these escort tugs represent approximately 0.96 percent of the overall underway time for vessels with AIS in the EIS Study Area. Other marine vessel types (recreational, fishing, passenger, cargo tank vessels, etc.) are anticipated to have greater impact on water quality than escort tugs. These other vessel types constitute a higher proportion of underway time and a larger number of crew and/or passengers onboard in comparison to the escort tugs. They would have a higher potential impact on water quality.

The preceding subsections summarize the types (and, where feasible, approximate quantities) of wastewater and pollutant discharges and other pollutant releases anticipated from escort tugs. These releases are highly regulated and managed through compliance with the VGP and adherence to the NDZ discharge restrictions. Escort tugs have relatively small crew sizes and carry no passengers, thus generating minor amounts of sewage and graywater compared to other vessel types such as ferries and cruise ships. Discharge volumes of bilgewater and deck washdowns and runoff are largely dependent on the build and size of a vessel as well as the vessel use.

Overall, escort tugs are expected to generate lower volumes of such discharges that could affect water quality than larger vessels. While the fleet of tugs conducting escort work for target vessels may grow slowly over time, target vessel transits are currently a small portion of overall vessel traffic (<1 percent) and the contribution of pollution from these activities is likely to remain minimal. Further, as the escort tugs are not as numerous as recreational vessels or other commercial vessels in the EIS Study Area, the amount of copper leached from anti-fouling coatings is expected to be minimal in comparison. As discussed further above, ballast water discharges from escort tugs in the EIS Study Area occur infrequently (typically only for maintenance or inspection) and are largely comprised of municipal water. Escort tug activities are therefore not likely to be a substantial contributor to water quality concerns in the EIS Study Area such as impaired waters or HABs. However, in some circumstances (e.g., graywater discharge in poorly flushed areas, or treated sewage discharge outside the NDZ), these discharges could result in minor and localized water quality impacts. It is also possible that intensive escort tug activity near Anacortes could contribute incrementally to the existing copper impairment in the nearby Cap Sante Marina due to copper leaching from anti-fouling coatings.

3.1.3 Oil Spill Risk

Puget Sound has experienced relatively few major oil spills over the past several decades; however, a catastrophic oil spill is a high-impact risk to the many resources and recreational and commercial opportunities relied on by humans, wildlife, and flora of the area (Puget Sound

Partnership, 2024). Even a quart of oil spilled can contaminate acres of water and resources such as shellfish beds (Ecology, 2024b).

Petroleum products contain hundreds of chemicals, of which the most commonly measured are total petroleum hydrocarbons (TPHs) and PAHs. Volatile organic compounds (VOCs) are also present, but are typically only of concern for a short period of time following a spill as they readily evaporate and are therefore infrequently measured in water samples (Bureau of Ocean Energy Management (BOEM), 2021).

Spills of gasoline, light diesel oil, diesel-like products, condensate, and light crude oils that occur on the surface of a water body generally have less persistent effects on water quality (compared to heavier crude oils) as these products are up to 75 percent VOCs by weight, which readily evaporate (BOEM, 2021; ITOPF, 2024). Heavier crude oils are composed of hydrocarbons of higher weights, and only 5 to 10 percent by weight of a heavy crude oil surface spill typically will evaporate (BOEM, 2021).

Severe oil spills could result from target vessels or escort tugs. Oil spills from target vessels, such as those carrying crude oil, would have a greater impact on water quality than spills from escort tugs due to the types of oil potentially released as well as the larger quantity that could be released. A spill from escort tugs would release diesel fuel in a smaller quantity than target vessels. Any oil spill would have a negative impact on water quality. However, many factors must be taken into account to predict the severity and extent of water quality impacts. Factors such as the location and timing of a spill highly influence the trajectory of oil after a spill has occurred. Response options to spills are dependent on a variety of factors, such as the nature and amount of oil, proximity to the shoreline and sensitive areas, timing of the response, environmental conditions, and authorizations to use certain response methods.

Ecology performed oil spill trajectory modeling, which simulates the trajectory of spills in locations where incidents have a relatively high likelihood of occurrence. These simulations suggest that PAH-impaired areas near Anacortes are currently at a slightly elevated risk of being affected by diesel fuel pollution from an escort tug spill. An oil spill in this area could further worsen the already impaired waters, in turn impacting users and fauna dependent on these areas. Oil spill risk is considered in detail in the Environmental Health: Releases Discipline Report.

3.2 Alternative A: No Action

3.2.1 Impacts from Implementation

Alternative A represents the most likely future conditions if we make no changes to existing tug escort requirements for target vessels. Tug escort requirements for target vessels would remain in place in the current rulemaking area as established by RCW 88.16.190(2)(a)(ii).

As discussed above in Section 3.1.2 (Escort Tug Wastewater and Pollutant Discharges), escort tugs under Alternative A would continue to discharge sewage, graywater, bilgewater, ballast water, lubricants from oil-to-sea interfaces, deck runoff, and leaching of anti-fouling coatings, all of which may impact water quality in the EIS Study Area. Further, estimates of annual discharges for the escort tugs provided in Section 3.1.2 (Escort Tug Wastewater and Pollutant

Discharges) would continue to occur under Alternative A. The pollutants typically present in these discharges, such as bacteria and pathogens, nutrients, metals, and toxics, would continue to be discharged under Alternative A.

In some circumstances (e.g., graywater discharge in poorly flushed areas, or treated sewage discharge outside the NDZ), escort tug discharges could result in minor and localized water quality impacts, which would continue under Alternative A. Although escort tugs cannot discharge treated sewage within the NDZ, discharges of treated sewage are likely to continue to occur to the west of the NDZ, where certain waters are currently impaired due to bacteria and/or dissolved oxygen. Further, it is also possible that intensive escort tug activity near Anacortes could continue to contribute incrementally to the existing copper impairment in the nearby Cap Sante Marina due to copper leaching from anti-fouling coatings. While anti-fouling coatings from escort tug underway activity would continue to potentially leach copper in this area, escort tugs represent a small amount of activity around this area compared to other vessels, such as recreational vessels, and are anticipated to have less impact on water quality than vessels regularly moored or stored within the marina.

Based on information from maritime subject matter experts in the EIS Study Area, ballast water discharges from escort tugs in the EIS Study Area occur infrequently (typically only for maintenance or inspection). Ballast water discharges are often municipal water which does not require treatment (33 CFR § 151.2025(a)(1)). Therefore, escort tug ballast water discharges are not anticipated to have meaningful impacts on water quality, including HABs, and this would continue under Alternative A.

As discussed above in Section 3.1.2 (Escort Tug Wastewater and Pollutant Discharges), existing escort tug activity is not likely a substantial contributor to water quality concerns in the EIS Study Area (e.g., impaired waters or HABs) and no additional impacts would occur under Alternative A. As mentioned below in Section 3.2.2 (Mitigation Measures), the escort tugs would continue to manage operational discharges in accordance with all applicable conditions of the VGP, compliance with which is expected to regulate discharges in such a way as to not cause exceedances of water quality standards. Water quality-dependent habitats and activities, and environmentally sensitive and protected areas are not expected to experience significant water quality impacts.

As described throughout Section 3.1.1 (Water Quality in Puget Sound and the Rulemaking Areas), climate change is expected to impact water quality through declining dissolved oxygen levels, increased water temperatures (and subsequently increased stratification), changes to circulation, ocean acidification, and more frequent and toxic HABs. Pollutant loadings from sources such as escort tugs could become more likely to trigger or compound adverse effects under these future scenarios. For example, nutrients from escort tugs are more likely to cause adverse impacts in warmer waters. Despite the projected worsening of many water quality parameters under future climate change scenarios, the impact of escort tug discharges to marine surface water quality would remain minor at the watershed scale.

Escort tug activity under Alternative A would continue to have beneficial impacts related to oil spill risks, compared to the risks when escort tug requirements are removed under Alternative D. There would be a 1-in-186 chance that a target vessel drift grounding occurs in any given year throughout the EIS Study Area and a once-every-25,546-years risk of a drift grounding resulting in an oil spill that could negatively impact water quality. In this alternative, escort tugs have an incident rate of 0.86 per year. Potential incident types included in this rate range from equipment malfunctions and small fueling spills to collisions and groundings. These incidents generally have a lower spill potential than a catastrophic target vessel spill because the volume of oil on tugs (fuel) is much less than the volume carried by target vessels (fuel and cargo).

Under Alternative A, the existing spill risks and possible resulting impacts discussed above in Section 3.1.3 (Oil Spill Risk) would continue. Any such impacts due to spills could be exacerbated by continued and increasing water quality impacts and stressors associated with climate change (see Section 3.1.1).

3.2.2 Proposed Mitigation Measures

Implementation of the required and/or recommended mitigation measures described in this subsection would further reduce the potential for spills and discharges of oil, toxics, and other pollutants near and in surface waters under Alternative A.

Required Mitigation (Rulemaking or Other Existing Regulations)

Escort tugs are required to adhere to the NDZ and to vessel discharge requirements, including those imposed through the VGP. Further, escort tugs must comply with all relevant federal and state vessel traffic safety and oil pollution prevention, preparedness, and response measures as well as with existing vessel traffic safety measures outlined in Appendix B Transportation: Vessel Traffic Discipline Report and requirements outlined under 46 CFR Chapter I, Subchapter M.

Target vessels must comply with all relevant federal and state vessel traffic safety and oil pollution prevention, preparedness, and response measures as well as with additional oil pollution prevention, preparedness, and response requirements, which are further outlined in the Environmental Health: Releases Discipline Report (Appendix C). Target vessels follow traffic safety measures that are outlined in the Vessel Traffic Discipline Report (Appendix B).

Recommended Mitigation Measures

In addition to these requirements, Ecology recommends that escort tugs and target vessels continue to implement the Puget Sound Harbor Safety Committee’s Standards of Care, as well as any relevant marina/port-specific requirements and best practices aimed at reducing water quality impacts.

3.2.3 Significant and Unavoidable Adverse Impacts

Existing escort tug activities may result in localized water quality impacts depending on the type, volume, location and/or timing of discharges and releases. However, these are not likely to cause chronic or recurring water quality standard exceedances, or HABs, or disrupt water quality-dependent habitats and activities throughout the EIS Study Area. The risk of a diesel spill resulting from an escort tug incident would continue under Alternative A, but the probability is low under current conditions and is partly mitigated through adherence to federal and state regulations and existing safety measures outlined in Section 3.2.2 (Mitigation

Measures). Therefore, Alternative A would not have significant or unavoidable adverse environmental impacts on water quality.

3.3 Alternative B: Addition of Functional and Operational Requirements

3.3.1 Impacts from Implementation

Alternative B adds functional and operational requirements intended to increase safety and formalize existing best practices. It makes no change to the geographic boundaries described in Alternative A. The added functional and operational requirements (FORs) include 1) minimum either 2,000 or 3,000 horsepower requirements for the escort tugs based on the DWT of the escorted vessel, 2) minimum of twin-screw propulsion, and 3) a pre-escort conference between the tug and the escorted vessel.

Of the 18 tugs identified in the 2021 Vessel Traffic Trend Study (BPC & Ecology, 2021) as performing target vessel escort work, two are between 2,000 and 3,000 hp. Ecology reviewed the data used in this report and found that the escort tugs between 2,000 and 3,000 hp were only escorting target vessels under 18,000 DWT. The horsepower requirement codifies existing industry practices and ensures that tugs have sufficient power to intervene to prevent a drift grounding (and potential subsequent spill). Additionally, all 18 of the identified tugs meet the minimum twin screw propulsion requirement. These two requirements reflect today's industry practices and are therefore unlikely to result in changes to the distribution of escort tugs and their associated impacts. The FORs are intended to increase safety and formalize existing best practices.

The addition of FORs would not be anticipated to have any meaningful changes in the type, quantity or frequency of wastewater and pollutant discharges from escort tugs compared to Alternative A, since all escort tugs in the existing fleet already meet the proposed horsepower and propulsion requirements.

The addition of FORs could result in a minor but unquantified decrease in the risk of oil spills from target vessels due to drift groundings but would not be expected to change the existing risk of a diesel fuel spill from escort tug incidents.

3.3.2 Mitigation Measures

No additional mitigation measures than those included for Alternative A in Section 3.2.2 (Mitigation Measures) have been identified under Alternative B. This includes compliance with existing federal and state regulations for vessel traffic safety and oil pollution as well as the requirements of the NDZ and the VGP. Ecology also recommends continued participation in the PSHSC SOCs and other port and/or marina-specific requirements and best practices aimed at reducing water quality impacts.

3.3.3 Significant and Unavoidable Adverse Impacts

As stated in Section 3.3.1 (Impacts), the addition of the FORs would not change the anticipated type, quantity, or frequency of escort tug wastewater or incidental discharges relative to

Alternative A. Additionally, Alternative B would not meaningfully change the predicted frequency of spills from escort tugs and target vessels relative to Alternative A. Therefore, Alternative B would not have significant or unavoidable adverse environmental impacts on water quality.

3.4 Alternative C: Expansion of Tug Escort Requirements

3.4.1 Impacts from Implementation

Alternative C maintains the tug escort requirements outlined in Alternative A and expands them northwest towards Patos Island. Alternative C would result in a 2.41 percent increase in escort tug underway time. The net increase in escort tug underway time would occur primarily within and near the expansion area (i.e., in the Strait of Georgia and the Strait of Georgia South Zones). Escort tug underway time in the rest of the EIS Study Area would decrease slightly or remain the same (see Figure 4). Alternative C also includes the FORs included in Alternative B.

Alternative C is not anticipated to have any impact on the types of escort tug discharges relative to Alternative A; however, minor changes in the locations and quantities of certain discharges or releases may occur. While escort tug underway activity would increase from existing conditions, generation of the wastewaters described in Section 3.1.2 (Escort Tug Wastewater and Pollutant Discharges) is generally driven by factors other than whether the vessel is underway versus stationary (e.g., presence and size of crew, frequency of maintenance activities, and ballast water practices). Escort tugs within the EIS Study Area are manned by crews all hours of the day (except when out of service), resulting in the generation of sewage and graywater during both underway and stationary periods. The slight increase in underway time would not be expected to meaningfully influence the frequency of maintenance activities that generate wastewater. Overall, the amount of discharges that escort tugs would generate under Alternative C would not be expected to meaningfully increase due to an increase in underway activity.

No additional impacts related to escort tug sewage discharges other than those discussed for Alternative A would occur as the rulemaking expansion area under Alternative C is also within the NDZ. As such, escort tug sewage discharges would not occur in the rulemaking expansion area and the associated pollutants in treated vessel sewage would not impact water quality in this area.

As shown in Figure 7, no additional 303(d)-listed water bodies are within the rulemaking expansion area under Alternative C. Therefore, escort tug activity in this area is not expected to impact degraded waters relative to current activity. Because escort tug underway time could shift slightly north under Alternative C, there is a slight decrease in tug activity throughout the majority of the existing rulemaking boundary. This decrease could result in minor benefits to water quality in the region, particularly near Anacortes and Cap Sante Marina (3.26 percent reduction in underway time).

The slight increase in escort tug activity in the expansion area would have a corresponding increase in propeller use and incidental discharges from oil-to-sea interfaces such as stern tubes and packing glands. However, as discussed in Section 3.1.2 (Escort Tug Wastewater and

Pollutant Discharges), these types of releases are minor and should involve environmentally acceptable lubricants.

Additionally, the geographic area where the risk of incidental spills or discharges of oil and grease could occur would increase. However, compliance with VGP requirements and best management practices, is expected to control discharges in such a way as to not cause an exceedance in water quality standards.

As discussed in Section 3.3 (Alternative B: Addition of Functional and Operational Requirements), FORs would not have any impact on the type, quantity, or frequency of escort tug wastewater and pollutant discharges relative to Alternative A.

The rulemaking expansion area under Alternative C increases the geographic range of the existing tug escort requirements; therefore, potentially decreasing the risk of drift groundings (1-in-189 chance that a target vessel drift grounding occurs in any given year) and decreasing the risk of drift grounding resulting in an oil spill from target vessels (once every 25,830 years). These decreased risks thereby minimize the potential to adversely affect water quality due to oil spills. Conversely, the expanded range of tug escort requirements and increase in escort tug activity would slightly increase the escort tug incident rate from 0.86 to 0.88 per year. As discussed above in this section, no additional 303(d)-listed water bodies are within the rulemaking expansion area under Alternative C. Therefore, no additional impaired waters would be directly affected. The expansion area includes environmentally sensitive and protected areas. Trajectory modeling suggests that tug escort requirements in the expansion area decrease the risk of these areas being impacted by an oil spill from a target vessel. For areas near Anacortes that are currently impaired for PAHs, Ecology's spill trajectory modeling suggests that Alternative C would not result in a meaningful change in the risk of impacts by diesel fuel pollution from a major escort tug spill.

3.4.2 Mitigation Measures

No additional mitigation measures other than those included for Alternative A in Section 3.2.2 (Mitigation Measures) have been identified for Alternative C. This includes compliance with existing federal and state regulations for vessel traffic safety and oil pollution as well as the requirements of the NDZ and the VGP. Ecology also recommends continued participation in the PSHSC SOCs and other port and/or marina-specific requirements and best practices aimed at reducing water quality impacts.

3.4.3 Significant and Unavoidable Adverse Impacts

Escort tug activities may result in localized water quality impacts depending on the type, volume, location and/or timing of discharges/releases, the overall amount, location, and frequency. However, these discharges are not likely to cause chronic or recurring water quality standard exceedances or HABs, or disrupt water quality-dependent habitats and activities throughout the EIS Study Area. Although Alternative C may result in minor changes in the locations and quantities of certain discharges, the adherence to the VGP, as well as other voluntary practices is considered technically feasible as well as economically practicable, and is expected to regulate discharges in such a way as to not cause exceedances of water quality standards. As stated in Section 3.3 (Alternative B: Addition of Functional and Operational

Requirements), the addition of the FORs would not change the anticipated types or quantities of escort tug wastewater and pollutant discharges nor would it change the predicted frequency or volume of incidental spills from escort tugs relative to Alternative A. Although possible, the spill risk from escort tugs is low overall. Therefore, the increase in spill risk relative to Alternative A is minimal. Therefore, Alternative C would not have significant or unavoidable adverse environmental impacts on water quality.

3.5 Alternative D: Removal of Tug Escort Requirements

3.5.1 Impacts from Implementation

Alternative D removes the existing tug escort requirements for target vessels, eliminating escort tug underway time associated with this proposed rule. We can reasonably assume that most or all of the 18 identified escort tugs would remain within the EIS Study Area but shift to other assisting and/or escort work for larger vessels. While the individual tugs may continue to have a minor impact on water quality from discharges and associated pollutants, they would be unrelated to this rulemaking.

Impacts on water quality associated with this proposed rule and associated pollutants typically present in these discharges, such as bacteria and pathogens, nutrients, metals, and toxics, are anticipated to decrease. This would result in a minor benefit to water quality in the EIS Study Area. However, as discussed in Section 3.1.2 (Escort Tug Wastewater and Pollutant Discharges) and under Alternative A, the existing escort tug activity is not likely a substantial contributor to water quality concerns in the EIS Study Area (e.g., impaired waters or HABs). Therefore, a significant improvement in water quality under Alternative D is not anticipated. Water-quality dependent habitats and activities and environmentally sensitive and protected areas are not expected to experience a significant benefit from Alternative D.

Under Alternative D, the probability of a target vessel drift grounding would increase by 11.84 percent within the EIS Study Area (relative to Alternative A) and by 90.50 percent within the rulemaking area. This means that a catastrophic spill from a target vessel drift grounding is more likely to occur. Acute water quality impacts could occur as a result of a catastrophic oil spill. Worsening water quality resulting from oil spills would impact those dependent on the environmentally sensitive and protected areas in the EIS Study Area. Ecology used NOAA trajectory modeling tools to model three target vessel worst case spills from origin points within the rulemaking area for a drift grounding and a worst case discharge[11] spill at James Island, North Peapod Island, and Hat Island. These locations were selected because they were identified by Ecology's risk model as high risk for drift groundings in the absence of tug escort requirements. While a worst case discharge spill resulting from a drift grounding in these locations would be a low probability, such an event would be of high consequence and could have a trajectory that reaches north into the Strait of Georgia, west to Victoria, South to Whidbey Island, and covers most of Rosario Strait, Bellingham, Samish, and Padilla Bays,

[11] Worst case discharge incident is defined as "for a vessel, a spill of the vessel's entire cargo and fuel complicated by adverse weather conditions" (WAC 173-182-030 (73)(c)).

depending on the specific origin point. Further discussion of each modeled spill and the distribution of impacts is presented in the Environmental Health: Releases Discipline Report (Appendix C).

While the risk of major spills from target vessels would increase under Alternative D, the elimination of escort tug activity would also result in an eliminated risk of escort tug incidents that could result in a smaller spill of diesel fuel to marine waters. As discussed in Section 3.1.3 (Oil Spill Risk), a diesel spill from escort tugs occurring near Anacortes, where there are existing impaired waters due to PAHs within the rulemaking area, could further worsen water quality in this area.

3.5.2 Mitigation Measures

Escort tugs mitigate (reduce) the risk of a spill from target vessels; however, Alternative D removes the tug escort requirements for target vessels. The mitigation measures described in Alternative A in Section 3.2.2 (Mitigation Measures), would only apply to target vessels under Alternative D.

3.5.3 Significant and Unavoidable Adverse Impacts

Alternative D would result in significant and unavoidable adverse impacts water quality in the EIS Study Area due to the increased risk of catastrophic oil spills from target vessels. While the probability of such an event remains low, the increased probability of a catastrophic oil spill and the resulting environmental consequences would be reasonably likely to result in adverse effects beyond a moderate level to water quality in the EIS Study Area.

4.0 References

33 CFR § 151.2025. Ballast Water Management Requirements. (2017). Retrieved March 19, 2025, from https://www.ecfr.gov/current/title-33/chapter-I/subchapter-O/part-151/subpart-D/section-151.2025

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