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

Energy and Natural Resources Discipline Report

Washington State Board of Pilotage Commissioners

Washington State Department of Ecology

Olympia, WA

June 2025

DEPARTMENT OF ECOLOGY
State of Washington

BOARD of PILOTAGE COMMISSIONERS
WASHINGTON STATE

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Acronyms and Abbreviations

AIS	Automatic Identification System
ANT	Advance Notice of Transfer
ATB	Articulated tug barge
BC	British Columbia
BPC	Washington State Board of Pilotage Commissioners
CFR	Code of Federal Regulations
DWT	deadweight tons
ECA	Emission Control Areas
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESHB	Engrossed Substitute House Bill
FORs	functional and operational requirements
GHG	greenhouse gases
IMO	International Maritime Organization
MARPOL	International Convention for the Prevention of Pollution from Ships
OTSC	Oil Transportation Safety Committee
PSHSC	Puget Sound Harbor Safety Committee
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SME	subject matter expert
SOC	Standard of Care
SRKW	Southern Resident killer whale
US	United States of America
USCG	United States Coast Guard
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 Energy and Natural Resources Discipline Report describes the existing conditions and potential impacts to escort tug fuel use and marine fuel availability 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 energy and natural resources 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 energy and natural resource topics were analyzed:

- Amount of marine fuel transferred over water in Washington state
- Estimate of fuel use per underway hour for escort tugs
- Estimate of fuel use by escort tugs in Washington state under four alternatives

No significant and unavoidable adverse impacts to energy and natural resources were identified under any of the four rulemaking alternatives. Table 1 summarizes the changes in escort tug activity under each alternative, the resulting impacts on fuel use, mitigation measures identified, and determinations of significance.

Table 1. Energy and natural resources impact summary.

Change in Activity	Resulting Impact on Energy and Natural Resources	Comparison to No Action Alternative	Mitigation	Significant and Unavoidable Adverse Impact?
Alternative A: No Action				
Continued operation of escort tugs throughout the EIS Study Area with no change to fuel use patterns.	Escort tugs use approximately 1.27 million gallons of diesel to implement the current requirements each year.	N/A	Tugs continue to comply with existing federal regulations about fuel use and vessel traffic safety. Tugs are encouraged to implement voluntary measures to reduce fuel use and consider transition to propulsion systems that reduce fuel use.	No
Alternative B: Addition of Functional and Operational Requirements (FORs)				
Continued operation of escort tugs throughout the EIS Study Area, but with the addition of FORs	Same as Alternative A	Same as Alternative A	Same as Alternative A	No
Alternative C: Expansion of Tug Escort Requirements				
Increase in escort tug time by 2.41% due and shift northwards in vessel traffic to	Escort tugs use approximately 1.3 million gallons of diesel to implement the expansion	Increase of 2.41% in fuel use. Potential for minor shifts in fuel use and fueling locations if	Same as Alternative A	No

Change in Activity	Resulting Impact on Energy and Natural Resources	Comparison to No Action Alternative	Mitigation	Significant and Unavoidable Adverse Impact?
account for expanded tug escort requirements.	of tug escort requirements each year.	smaller tugs are used less frequently.		
Alternative D: Removal of Tug Escort Requirements				
Elimination of escort tug activity associated with target vessels throughout the EIS Study Area.	Reduction of 1.27 million gallons of diesel use per year. Tugs would remain operational in the region conducting other work.	Reduction of 1.27 million gallons of diesel use per year.	Same as Alternative A	No

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 (DWT).
  - Articulated tug barges (ATB) and towed waterborne vessels or barges greater than 5,000 DWT 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 on the scope of the EIS and a comment period was open from February 22 through April 8, 2023.

Note: Unless specified otherwise, the following terminology applies throughout this EIS:

- **"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.

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 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 on 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.
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

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

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 to 1) simulate the tracks of escort and assist[2] tug traffic, based on 2015-2019 historical AIS data, and 2) 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.

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,

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

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[3,4] 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 per yr) of target vessel 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 Appendix B Transportation: Vessel Traffic Discipline Report for details regarding the vessels activity simulation methodology and results.

[3] Escort tug underway time includes time spent traveling to an escort job, time while escorting a target vessel, and time spent traveling from an escort job.

[4] Unless specified otherwise, the terms “escort tug” and “tug escort” refer to the subset of overall tug escort activity or underway time associated with the escort of target vessels that are specifically affected by this rulemaking. It includes both active escort and commute time.

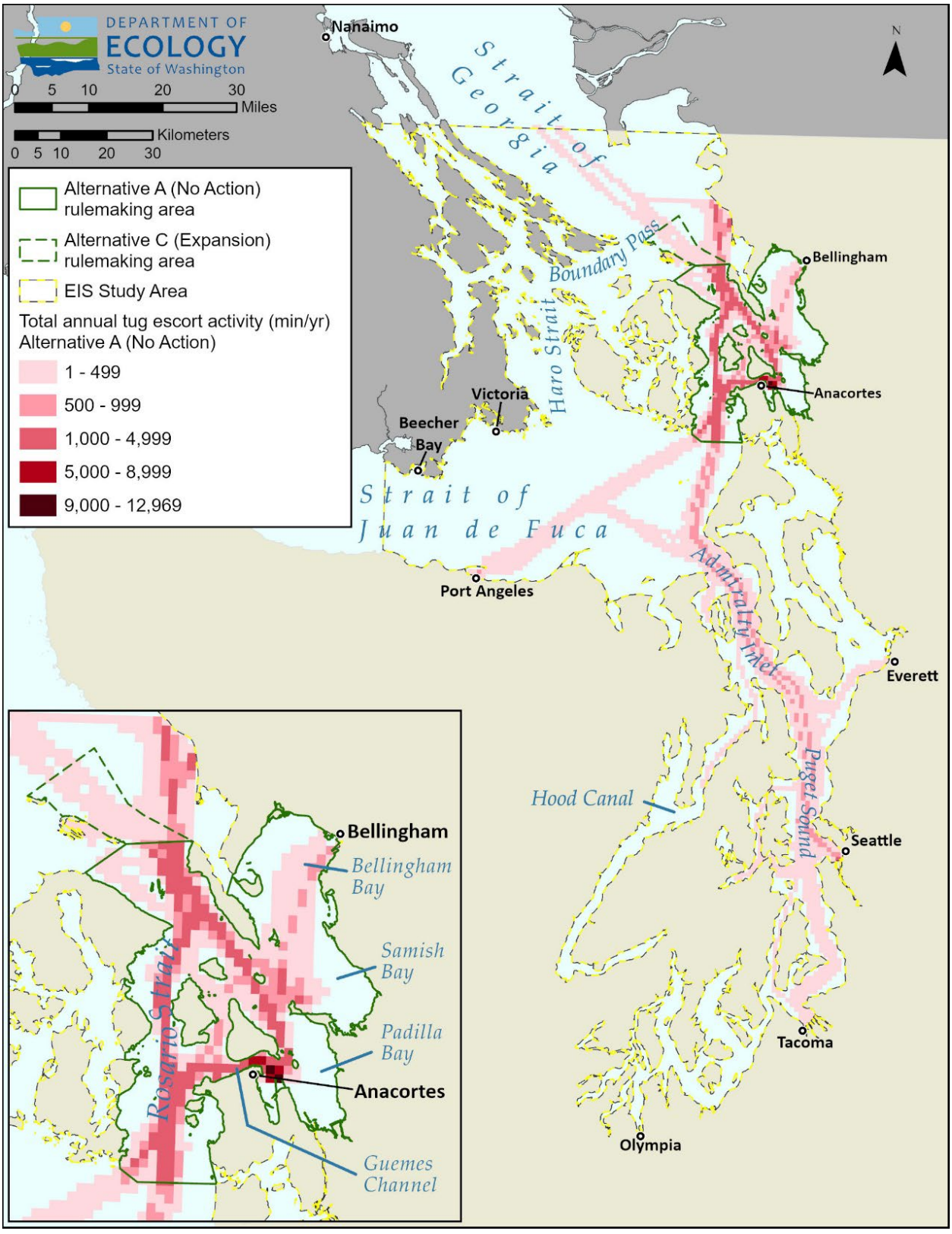

Figure 2. Simulated escort tug underway time under Alternative A and B.

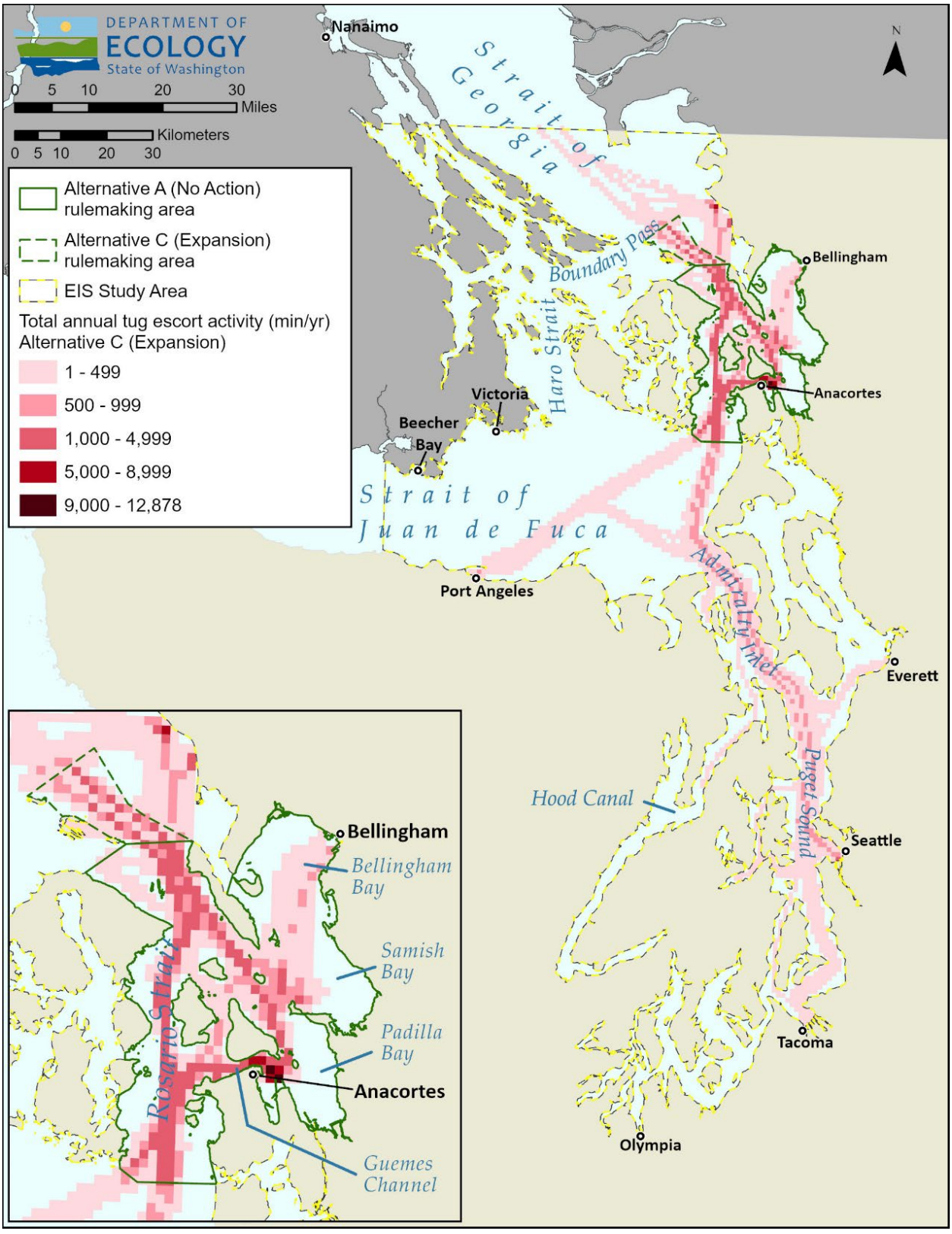

Figure 3. Simulated escort tug underway time under Alternative C.

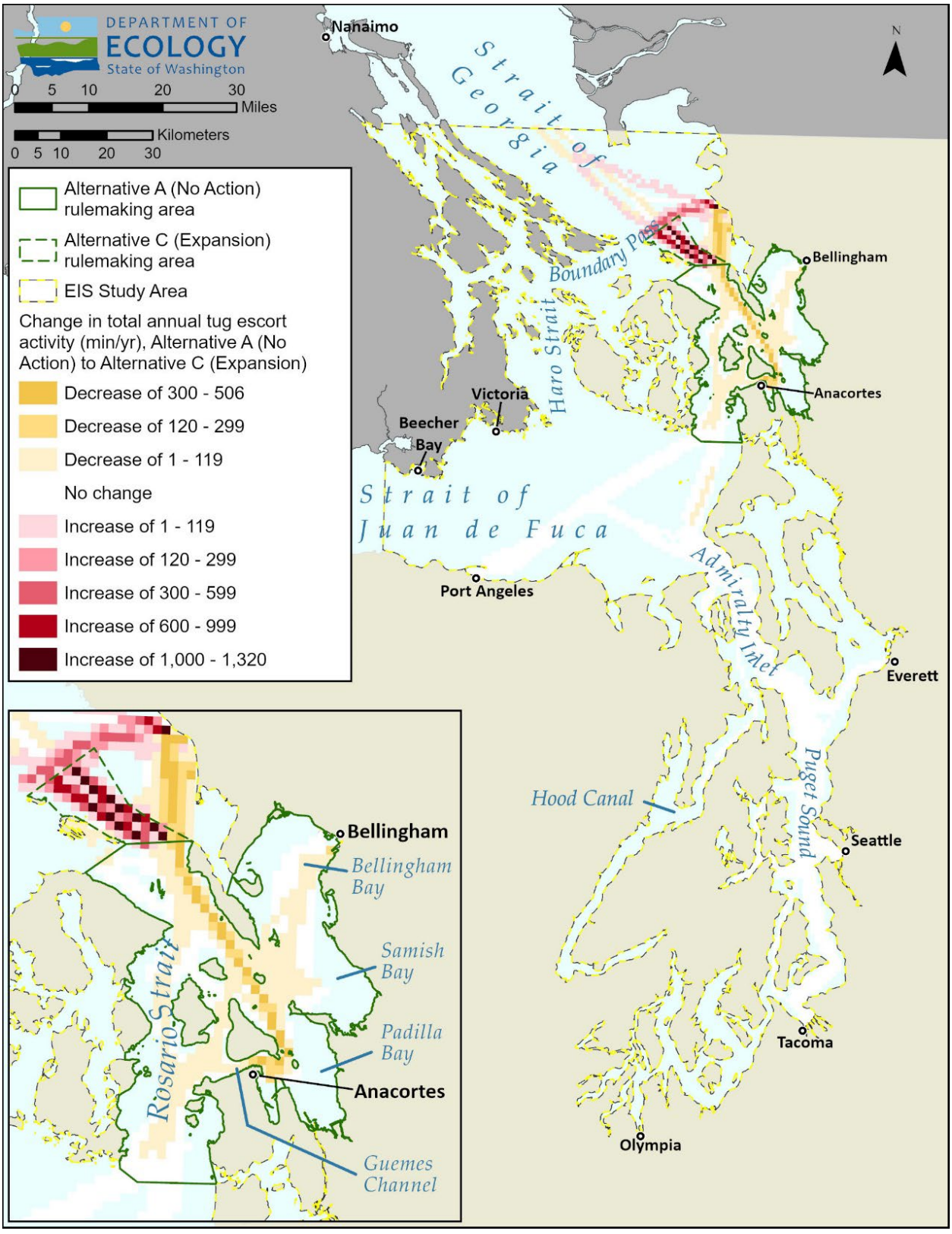

Figure 4. Simulated change in escort tug underway time between Alternative A and Alternative C. An additional accessible version of this map is available in Appendix M.

1.3 Resource Study Area

The EIS Study Area includes the rulemaking alternative boundaries and potential areas for tug escort commutes to and from the alternative boundaries. Specifically, the EIS Study Area includes all connected marine waters in the Salish Sea[5] 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 study area for energy and natural resources also includes all locations where transfers of fuel over water occurred in Washington state.

[5] 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.

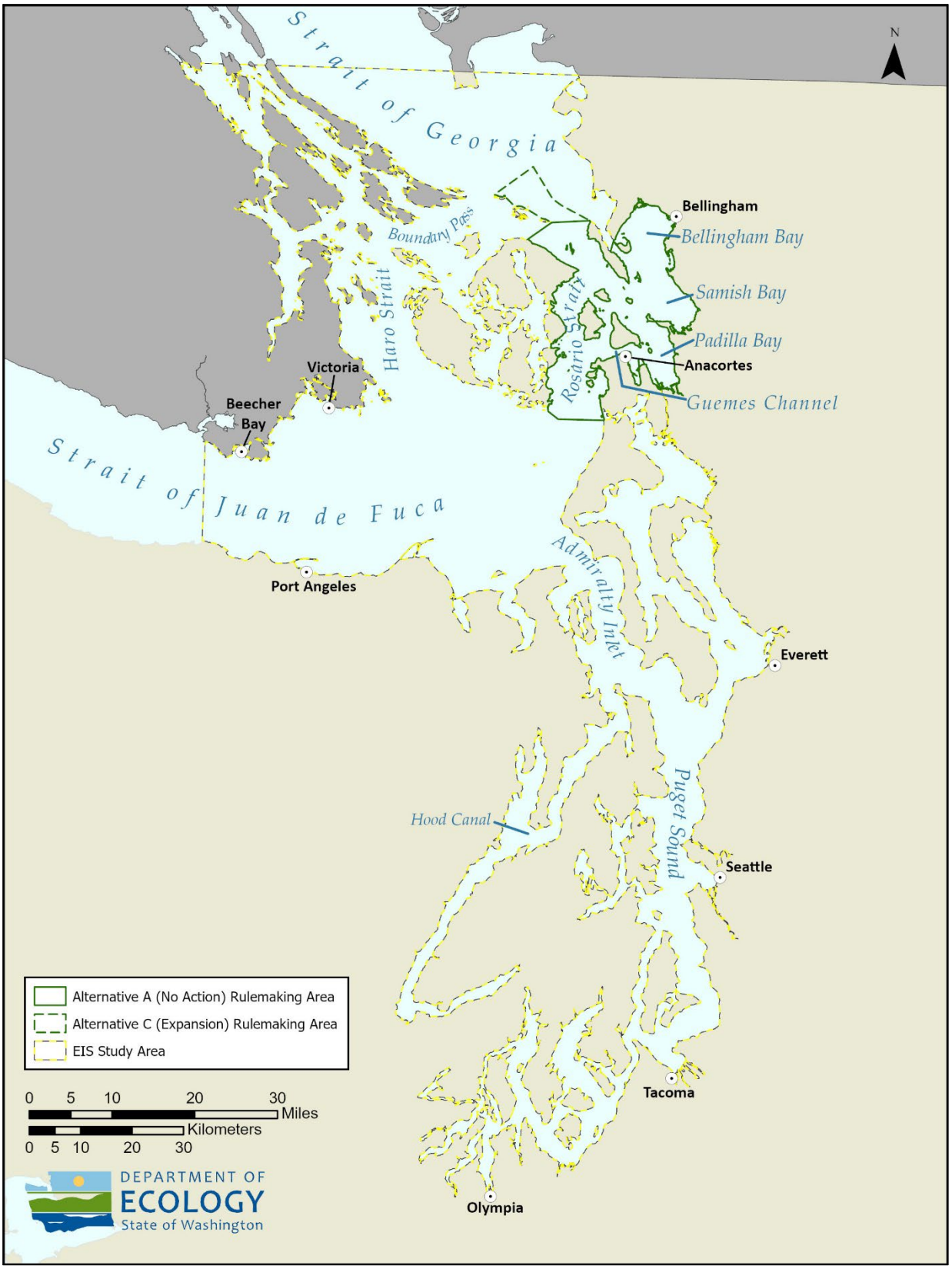

Figure 5. Boundary of the EIS Study Area.

1.4 Resource Description

This Energy and Natural Resources Discipline Report estimates maritime fuel use in the EIS Study Area using fuel transfer data collected by Ecology. Fuel is the primary energy input associated with the implementation of the rule. The analysis focuses on escort tug fuel use, which we estimate in gallons per hour of underway time. We use the results of the vessel traffic assessment to estimate underway time for each alternative, as well as a rate of fuel use developed in coordination with Ecology subject matter experts from the tug industry.

1.5 Regulatory Framework

Table 2 summarizes relevant federal, state, local, and Tribal laws, plans, and policies related to maritime fuel use. Discussion of these laws, plans, and policies 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. See Appendix H Air Quality and Greenhouse Gases Discipline Report for a more detailed description of the regulatory context as it relates to air pollutants and greenhouse gas emission reduction.

Table 2. Statues, regulations, and policies related to the implementation of the Clean Air Act.

Regulation, Statute, Guideline	**Description**
Federal & International	
International Convention for the Prevention of Pollution from Ships (MARPOL): Annex VI Prevention of Air Pollution from Ships (2005)	Annex VI sets limits on air emissions, affecting the type of fuel that ships use. An amendment that went into effect on January 1, 2020, limits the sulfur in fuel oil used on board ships outside designated emission control areas to 0.50%. Within designated Emission Control Areas (ECAs) sulfur content is restricted to 0.10%. The EIS Study Area is within the North American ECA.
75 CFR 22896 (EPA Category 3 Marine Rule)	Adopts emissions standards equivalent to those adopted in Annex VI of MARPOL (EPA, 2016).
Tribal	
Individual Tribal government plans	Individual Tribes may have energy plans that include fuel use reduction goals and document their fuel use and emission reduction efforts. See for example, Lummi Nation Energy Plan (Lummi Water Resources Division & Lummi Natural Resources Department, 2016).
State	
Chapter 19.285 RCW (Energy Independence Act of 2020)	Sets GHG emission reduction targets with the following goals: 45% below 1990 levels by 2030, 70% below 1990 levels by 2040, and 95% below 1990 levels by 2050.
RCW 43.21F.010 and RCW 43.21F.088 (Washington State Energy Strategy)	Requires the Washington State Department of Commerce to create and maintain a State Energy Strategy (Washington State Department of Commerce, 2020). The Strategy

Regulation, Statute, Guideline	Description
	outlines how the State will achieve the emission reduction goals outlined. It discusses electrification of marine vessels, in particular the State's ferry system.
Local	
Whatcom County Climate Action Plan	Outlines GHG emission reduction and climate resilience goals. Includes discussion of electrification of county ferries. Adopted by Resolution 2021-049 in 2021 (Whatcom County, 2021).

2.0 Methodology Summary

Ecology identified and reviewed technical reports and data regarding maritime fuel transfers and escort tug fuel use within the EIS Study Area. Ecology also reviewed Tribal government and stakeholder input received from the scoping and workshop phases. During scoping, industry shared that while there has been a fuel increase since the 2020 tug escort requirements were implemented, it has not been a significant change from previous fuel use. Comments also identified a transition to alternative fuels as an important consideration.

Ecology primarily reviewed Advance Notice of Transfer (ANT) data to provide an estimate of maritime fuel use in Washington state (Ecology, 2024). Ecology requires that vessels and facilities that transfer large quantities of oil over water provide advance notice of transfer to the agency (Ch. 173-180-215 WAC) (Ecology, n.d.). Both escort tugs and target vessels under this rulemaking participate in oil transfers over water. Escort tugs do not carry oil as cargo and are typically the receiving vessel in an over-water transfer (fuel). The target vessels carry oil as cargo and fuel and can be either the delivering vessel or the receiving vessel. In cases where target vessels are transferring as a delivering vessel, they are required to provide advance notice of the transfer. We used ANT data filtered by fueling transfers only to provide an estimate of maritime fuel use in Washington state.[6] This information is used to establish context and provide an estimate of maritime fuel use in Washington state only.

To estimate the rate of fuel use for escort tugs, we worked with Ecology subject matter experts (SMEs) with experience in the tug industry. Determining actual tug fuel usage rate involves many factors (tug hp, idling time, escorting time, underway time, weather and ocean conditions, wind, engine efficiency, job complexity, etc.). Still, some general estimates can be used to estimate fuel usage. For the purposes of the EIS, we estimate that a 3,000 to 3,500 horsepower (hp) tug will use 3,000 gallons per day (125 gallons per hour) at a 90 percent load (towing a fully laden barge). The escort tugs identified as actively engaged in the escort of target vessels range from 2,400 hp to over 10,000 hp (Washington State Board of Pilotage Commissioners, 2021), so some of these tugs would use fuel at a higher rate. However, we also know that for most of the time spent commuting and actively escorting, the tug would be operating "light" (not towing or pushing a larger vessel) and would be using fuel at a lower rate. This estimate is also consistent with other published estimates of tug fuel use (Professional Mariner Staff, 2008).

Estimates of underway time for each alternative come from the vessel traffic analysis (see Appendix B Transportation: Vessel Traffic Discipline Report for more details).

[6] This is an estimate only. Vessels could be fueling outside of Washington state (Oregon, Canada) for work performed inside Washington state, or while dry docked. Vessels also may take on fuel for ballast.

2.1 Assessment of Significance

Ecology assessed whether escort tug fuel use likely results in significant adverse environmental impacts, using the significance threshold outlined below in Table 3. This threshold focuses on whether the energy (fuel) required to implement this rulemaking would affect the availability of energy (fuel) resources for the maritime industry in Washington state. Impacts to air quality are covered in the Appendix H Air Quality and Greenhouse Gases Discipline Report. In 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 3. Significance thresholds for energy and natural resources

Indicator	Significance Thresholds
Maritime fuel use	Use of energy totaling greater than 5 percent of maritime fuel use in Washington state on an annual basis. Change in fuel use would significantly impact local and/or regional availability of marine fuel.

3.0 Technical Analysis and Results

This section describes the affected environment for energy and natural resources focusing on maritime fuel use within the EIS Study Area. It also calculates anticipated escort tug fuel use and associated impacts under each of 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). Finally, this section 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

This section describes maritime fuel use and escort tug fuel use in Washington state. The transportation sector is the largest energy consumer in Washington state, accounting for 39.5 percent of all energy consumption (U.S. Energy Information Administration, n.d.). The transportation sector is also responsible for 80 percent of petroleum fuel use in Washington state, of which approximately 20 percent is diesel. Escort tugs have diesel engines and use distillate fuel oil (diesel) as fuel. Many vehicles and vessels use diesel fuel including heavy trucks, ferries, and tugs.

3.1.1 Maritime Fuel Use in Washington State

Maritime fuel use in Washington State includes a variety of fuel types. The total volume of fuel transferred to and from large commercial vessels has decreased over time (see Figure 7 below). The implementation of the 2020 IMO Clean Fuel regulations likely influenced this reduction in the volume of fuel transferred over water. Between 2017 and 2019, the volume of fuel transferred over water was an average of approximately 679 million gallons per year. Between 2021 and 2024, the volume of fuel transferred over water was 400 million gallons per year. This is a decrease of around 279 million gallons or approximately 41 percent. Note that while the expanded requirements for tug escorts for target vessels were effective on September 1, 2020, this data suggests that the impact of the IMO regulations is the dominant trend. While the number of fueling transfers has returned to pre-2020 levels, the volume transferred has remained relatively consistent at this lower level. We use this post-2020 estimate of maritime fuel use as a comparison for the rest of this analysis.

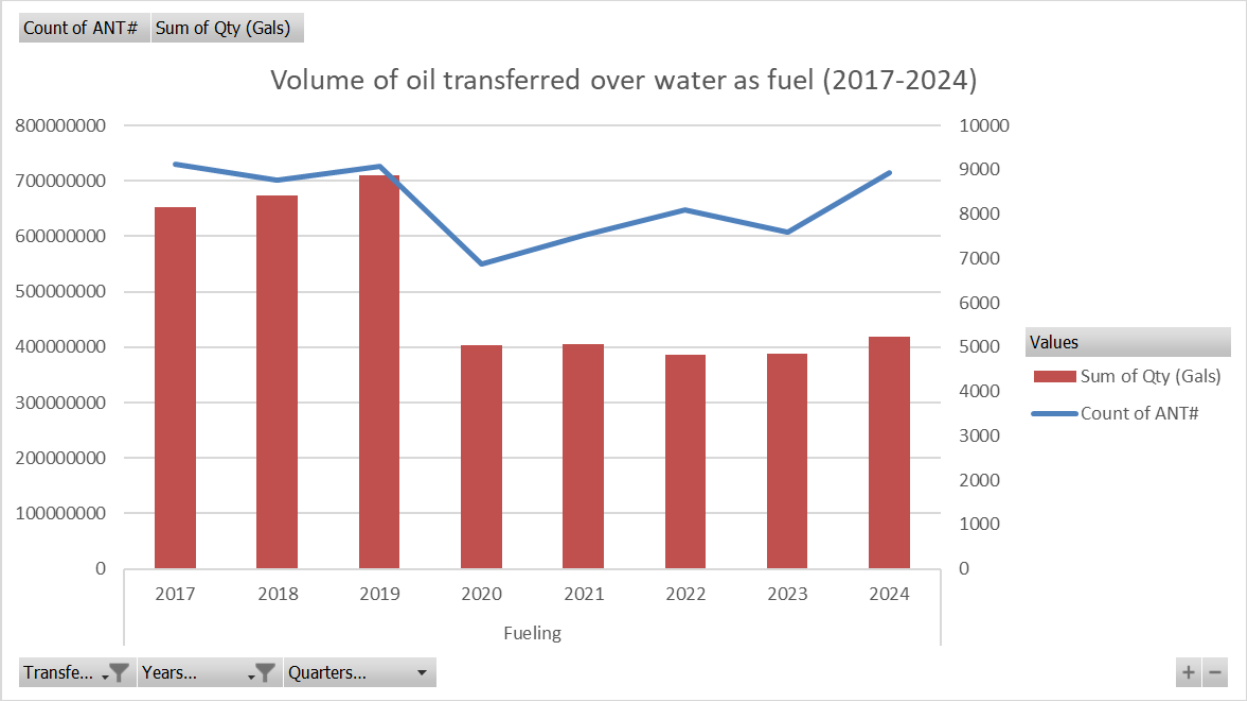

Figure 6. Volume of oil transferred over water by all vessels (2017-2024). This graph includes the volume transferred (bars) and the number of individual transfers (line).

Escort tugs make up a small portion of total maritime fuel use, as measured by ANT data. Figure 8 shows total maritime fuel use and fuel use by escort tugs observed escorting target vessels.[7] Escort tug fueling accounts for between 0.72 percent to 0.82 percent of total maritime fueling transfers by volume between 2021 and 2023. Figure 8 shows current conditions, or the regulatory conditions of Alternative A. It includes the current tug escort requirements.

[7] ANT data was filtered by the list of tugs identified performing escort work for target vessels in the 2021 Synopsis of Changing Vessel Traffic Trends report, Appendices P and Q.

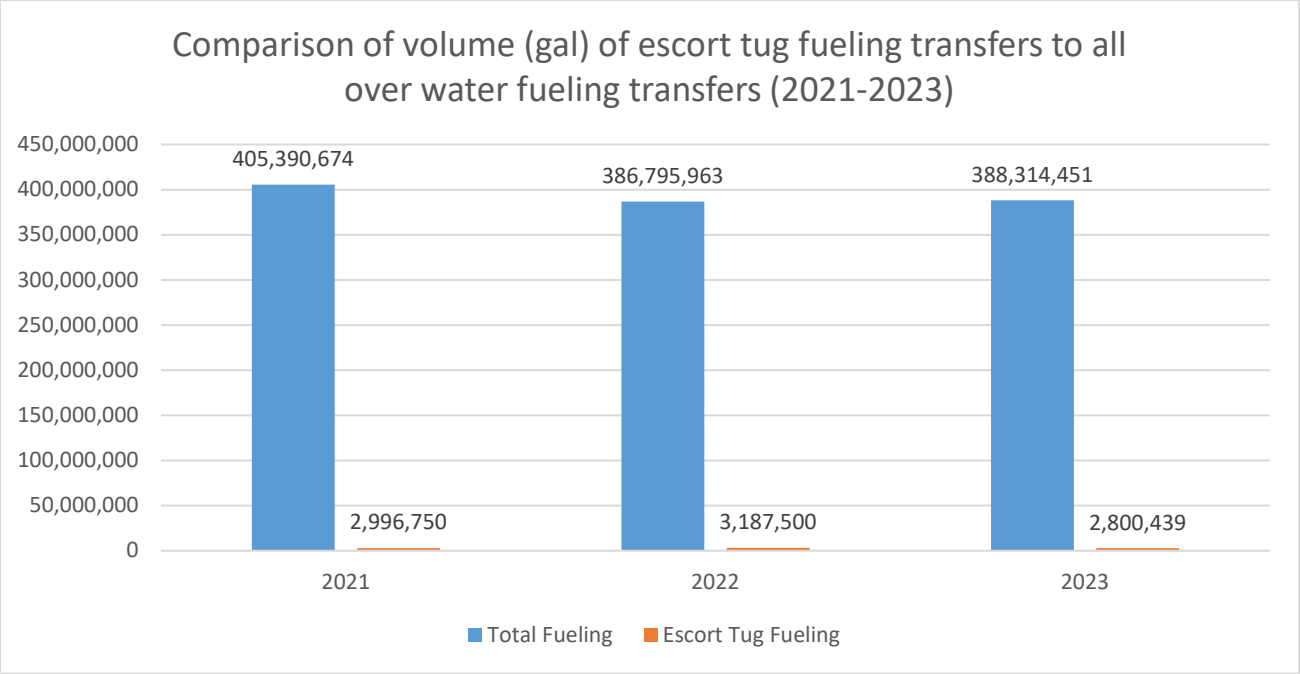

Figure 7. Comparison between the volume of fueling transfers over water by all covered vessels vs. the volume of fuel transferred to escort tugs between 2021-2023)

3.1.2 Escort Tug Fuel Use in Washington State

The ANT data for the group of escort tugs used in this analysis showed a steady increase in the volume of fuel transferred since 2017, with continued increases after 2020 (see Figure 9 below). This trend is different from the patterns shown in ANT data for maritime fuel transfers for all large commercial vessels. It is possible that some of this increase could be due to the tug escort requirements implemented in 2020. However, many other factors could be at play, including the closure of the U.S.-Canada border in 2020, which eliminated cross-border tug work and would have increased the amount of fueling taking place in Washington state. Under Alternative A, approximately 3 million gallons of fuel are transferred to these escort tugs in Washington state annually.

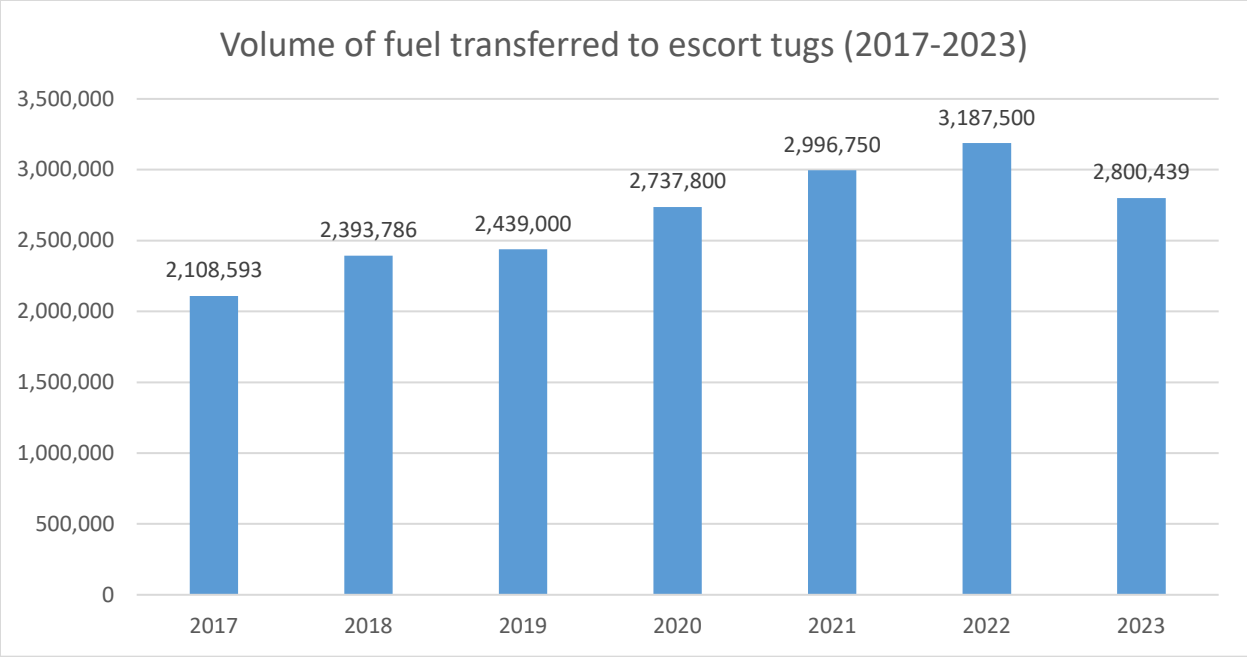

Figure 8. Volume of fuel transferred to escort tugs over water in Washington state (2017-2023)

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). Under Alternative A, Ecology's modeling estimates that 610,107 minutes of escort tug underway time are associated with the target vessels. Estimating escort tug fuel use depends on many factors including, but not limited to tug hp, wind, currents, weather, engine efficiency, job complexity, etc. For the purposes of this assessment, we estimate that an average 3,500 hp tug will use approximately 3,000 gallons per day at 90 percent load in a 24-hour period. This equals approximately 125 gallons per hour or 2.08 gallons per minute. Tugs with more horsepower would use fuel at a higher rate, but tugs would also not be operating at 90 percent load all the time. This rate accounts for the varying sizes of tugs in the identified group of escort tugs, and the fact that tugs would likely be operating "light" (not actively pushing the target vessel) most of the time.

Therefore, under Alternative A, we estimate that the tug escort requirements would require approximately 1,271,056 gallons of fuel per year to implement. This is approximately 0.32 percent of the annual average of fuel transferred over water in Washington state. It is a minor component of overall fuel use by the maritime sector, and is unlikely to affect maritime fuel availability in Washington state. In developing the EIS, we received no comments suggesting that the implementation of the rule so far has affected fuel availability.

3.2.2 Proposed Mitigation Measures

Implementation of the required and/or voluntary mitigation measures described in this subsection would further reduce the potential energy and natural resource-related impacts from tug escorts under Alternative A.

Required Mitigation (Rulemaking or Other Existing Regulations)

Escort tugs are required to adhere to all applicable requirements regarding clean fuels. Escort tugs are also required to adhere to existing vessel traffic safety and vessel speed requirements, which contribute to the rate of fuel use.

Recommended Mitigation Measures

Ecology recommends that escort tugs continue participating in the Puget Sound Harbor Safety Committee Standard of Care recommendation, which limits escort speed through Rosario Strait to 10 kts (PSHSC, 2023). Ecology also encourages escort tug operators to continue participating in voluntary slow down measures, which may reduce fuel use while reducing underwater noise.

The use of hybrid-electric and electric vessels may help reduce fuel use. Both hybrid technologies and the use of drop-in renewable fuels are discussed in the Northwest Ports Clean Air Strategy (Northwest Ports, 2020) as part of reducing emissions, and would also reduce diesel use. Examples of these types of technologies and their applicability and technological readiness as it relates to escort tugs are described in more detail in Appendix E Environmental Health: Noise Discipline Report and Appendix H Air Quality and Greenhouse Gases Discipline Report. Ecology recommends that escort tug operators to consider transitioning to more efficient and zero-emission propulsion as technological readiness and cost increase the feasibility of these technologies.

3.2.3 Significant and Unavoidable Adverse Impacts

We estimate that continuing to implement the tug escort requirements for target vessels would require approximately 1,271,056 gallons of diesel fuel per year. This represents less than one percent of total maritime fuel use, as estimated by the ANT data. This is unlikely to have a significant impact on the availability of marine fuel. Ecology has not received any feedback so far indicating that the availability of marine fuel has become a challenge after this requirement went into effect in 2020. Ecology's analysis shows that Alternative A would not result in significant and adverse impacts to energy and natural resources.

3.3 Alternative B: Addition of Functional and Operational Requirements (FORs)

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 functional and operational requirements include 1) a minimum of either 2,000 or 3,000 hp 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.

Two of the 18 tugs identified in the 2021 Vessel Traffic Trend Study (BPC & Ecology, 2021) as performing target vessel escort work, 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 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. Alternative B would not be anticipated to impact the type, quantity or frequency of escort tug fuel use relative to Alternative A.

3.3.2 Proposed Mitigation Measures

No additional mitigation measures outside of those included for Alternative A in Section 3.2.2 (Proposed Mitigation Measures) have been identified under Alternative B. Escort tugs under Alternative B adhere to the same requirements regarding clean fuel, vessel traffic safety, and vessel speed requirements. Ecology also recommends the same set of voluntary mitigation measures to further reduce potential impacts.

3.3.3 Significant and Unavoidable Adverse Impacts

Alternative B is unlikely to significantly change the overall underway time or fuel consumption for escort tugs relative to Alternative A. Fuel use by escort tugs to implement Alternative B would remain a small portion of total maritime fuel use in Washington state, and fuel availability would be similarly unaffected. Therefore, we find that Alternative B would not result in significant and adverse impacts to energy and natural resources.

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.

As discussed in Section 3.3, FORs would not have any meaningful impact on the escort tug fuel use relative to Alternative A. Under Alternative C, we estimate that there would be an additional 14,677 minutes of escort tug underway time. Using the fuel rate described under Alternative A, this is an additional 30,577 gallons of fuel per year for a total of 1,301,633 gallons of fuel per year to implement Alternative C. This is an increase of 2.41 percent from fuel use

under Alternative A. This is approximately 0.33 percent of the annual average of fuel transferred in Washington state. It is a minor component of overall fuel use by the maritime sector. It is unlikely to affect maritime fuel availability in Washington state. In developing the EIS, we received no comments suggesting that the implementation of the rule so far has affected fuel availability.

3.4.2 Proposed Mitigation Measures

No additional mitigation measures outside of those included for Alternative A in Section 3.2.2 (Proposed Mitigation Measures) have been identified under Alternative C. Escort tugs under Alternative C adhere to the same requirements regarding clean fuel, vessel traffic safety, and vessel speed requirements. Ecology also recommends the same set of voluntary mitigation measures to further reduce potential impacts.

3.4.3 Significant and Unavoidable Adverse Impacts

We estimate that implementing Alternative C would require approximately 1,301,633 gallons of diesel fuel per year. Alternative C represents less than one percent of total maritime fuel use, as estimated by the ANT data. Alternative C is unlikely to have a significant impact on the availability of marine fuel. Ecology has not received any feedback so far indicating that the availability of marine fuel has become a challenge after this requirement went into effect in 2020. Ecology's analysis shows that Alternative C would not result in significant and adverse impacts to energy and natural resources.

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. Escort tug underway time associated with this proposed rule would decrease to zero minutes of underway time in all areas of the EIS Study Area and the resulting fuel use would be eliminated. This represents a reduction in fuel use of 1,271,056 gallons per year, or 0.33 percent of total maritime fuel use.

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. The tugs would continue to use marine diesel as fuel for this other work. While the individual tugs may continue to have a minor impact on fuel use in Washington State, they would be unrelated to this rulemaking and are not considered in this EIS.

3.5.2 Proposed Mitigation Measures

No mitigation measures have been identified under Alternative D as escort tug activity under this rulemaking would be eliminated.

3.5.3 Significant and Unavoidable Adverse Impacts

Alternative D eliminates any fuel use associated with the implementation of the rule. Alternative D would not result in significant and adverse impacts to energy and natural resources.

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