Managing the Impacts of Passenger-Only Ferries on Southern Resident Killer Whales

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Abstract

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This thesis examines the impact of passenger-only ferries (POFs) on Puget Sound's endangered Southern Resident Killer Whale (SRKW) population, exploring regulatory gaps, analyzing relevant case studies, and proposing management strategies to mitigate adverse effects. Through qualitative policy analysis, literature review, and elite stakeholder interviews, it identifies the compounding threats posed by vessel traffic to SRKW conservation. Key findings underscore the urgency of addressing vessel-related disturbances, collision risks, and noise pollution to ensure the long-term viability of SRKW. Recommendations consider a multifaceted approach, including establishing voluntary speed reduction zones, deploying real-time monitoring technologies, and fostering multi-agency collaboration to enact effective best management practices tailored to SRKW conservation needs. The analysis underscores the importance of ongoing cooperation, coordination, and communication among managers and stakeholders to navigate uncertainties and achieve meaningful conservation outcomes.

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1. Introduction

The Puget Sound's Southern Resident Killer Whales (SRKW) have been declining for decades following a mass capture for the aquarium trade in the 1970s that left 13 southern residents dead and 45 taken into captivity (*Center for Whale Research,* 2024). Since then, the SRKW population peaked in the late 1990s at 98 individuals but declined sharply to 78 by 2001 (*Center for Whale Research,* 2024). Since 2001, the SRKW population has fallen to just 75 individuals. A calf was born in early 2023 but has not been seen recently and is presumed dead as of early 2024 (*Center for Whale Research,* 2024). Contaminants, oil spills, lack of prey, low reproduction, vessel disturbance, and disease are well-known compounding factors that threaten the long-term survival of this iconic species. Puget Sound's SRKWs are now among the most threatened marine mammals on the planet (*National Oceanic and Atmospheric Association,* 2023).

Against this backdrop, the size of the human population and the cost of living are rising in the Seattle metro area. Between 2020 and 2050, Washington's population is projected to grow by about 2.2 million, reaching 9.9 million in 2050. Approximately 80% (1,788,200 people) of the expected increase is due to net immigration (people moving in versus out), with the other 20% (443,000 people) due to natural increase (*Office of Financial Management,* 2023). Forbes reported that from 2017 to 2022, the Seattle metro area's housing demand and average home prices increased by 50.7%. With the cost of housing becoming unaffordable for many, housing inventory dropping, and the population rising in and around cities in the region, people are forced or choose to relocate to suburban areas where housing is more affordable (Forbes, 2024). People moving to more affordable housing outside the major metropolitan regions potentially also cause increasing traffic on roads, including existing freeways. Commuting by car creates issues like longer traffic times and more vehicle emissions. A recent report estimates that each driver in the Seattle area spent an average of 78 hours in traffic delays in 2017, which has risen from an average of 62 hours in 2008 (*Puget Sound Passenger Only Ferry Study*, Appendix A, 2021).

Enter passenger-only ferries, or POF, which can be seen as one response to help mitigate this increase in the freeway traffic dilemma. As quoted in a Seattle Times article, Kirk Hovenkotter, executive director of Commute Seattle, said, “People are looking for new ways to get into Seattle’s retail and office core.” His organization is seeing more demand from small businesses that want to get their workers into public transit, making it easier to get into downtown Seattle offices (*Kroman,* 2023). POFs are an option in the Seattle metro area due to easy water access, providing a commuting alternative into and out of the city.

The surge in ferry services coincides with municipal efforts to tackle a range of societal, economic, and ecological issues. At the same time, major urban centers explore water transport as a solution to traffic congestion, community connectivity, and urban development objectives (Baker, 2024). In 2023, the Federal Transit Administration (FTA) unveiled grants amounting to $220.2 million for ferry systems. Furthermore, local administrations often provide tax incentives to revitalize abandoned industrial areas into new housing areas (*Baker,* 2024). As a recent NYT article pointed out, the availability of POF service is now an inducement for both developers and potential new residents alike (*Baker,* 2024). Coupled with the federal subsidies, this is spurring additional demand (*Baker,* 2024).

The Puget Sound Regional Council (PSRC) conducted a study in January of 2021 to consider the potential for more POF routes within the Puget Sound and waterways, with various routes bringing commuters into Seattle and other cities and towns (*Puget Sound Passenger Only Ferry Study* 2021). While this may be an effective alternative to clear freeway congestion, it may threaten the SRKWs. Risks associated with adding more vessels, especially POFs that travel at high speeds on recurring and frequent runs, include the risk of vessel strikes, noise disturbance, oil spills, and direct disturbance to the SRKWs and their prey, particularly Puget Sound Chinook Salmon, also endangered.

According to the Southern Resident Orca Task Force report of 2019, data from Puget Sound Harbor Safety Committee bi-monthly report summaries indicate a significant increase in fast ferry and water taxi traffic volume in recent years, with levels now among the highest across all vessel classes in Puget Sound. In 2023, data from the updated bi-monthly report from the Puget Sound Harbor Safety Committee indicated a notable rise in "other ferries," excluding those categorized under Washington state ferries, with a total of 3,178 transits recorded over the past five years (*Puget Sound Harbor Safety Committee,* 2023).

2. Methods

Anticipating that increasing POF service in Puget Sound would increasingly conflict with goals for SRKWs recovery, I analyzed applicable authorities and regulations in search of regulatory gaps and other weaknesses. I also provide suggestions for how we might fill such gaps. The analysis broadly reviews studies spanning a diverse array of reports from across the region, focusing on the intricate interplay between maritime regulations, the conservation of SRKWs (extending into adjacent Canadian waters), the escalating human population, and the varied perspectives of stakeholders. In considering conservation efforts, impacts, and current policies surrounding POFs and SRKW, I interviewed specialists from relevant fields across Puget Sound. Furthermore, I performed an extensive literature review to address key thematic areas, encompassing maritime regulation, SRKW ecology and behavior, conservation strategies, the impact of human population growth, and vessel-related consequences. Finally, I identified management strategies to address the identified deficiencies in POF regulation.

This qualitative policy analysis focuses on the existing regulations and potential regulatory gaps that apply to the current and future POF fleets. The policy analysis assesses current rules and regulations and voluntary advisories in Puget Sound. This analysis also examines the implementation of policies intended to prevent further impacts on cetaceans from vessels in the context of endangered species and vessel regulations in two other geographic regions, British Columbia, Canada, and Boston Harbor, US. Additionally, I investigate upcoming regulatory developments in the region, particularly concerning the SRKW, given their imminent 5-year review status, and explore international regulatory considerations from Canada's Enhancing Cetacean Habitat and Observation (ECHO) program.

The empirical foundation of this research hinges on elite interviews with 14 individuals, encompassing a diverse range of stakeholders directly involved with or familiar with SRKW and their protection and individuals knowledgeable about current and possible future POF service in Puget Sound. These stakeholders include state and local government officials, a representative within the ferry system, leaders of advocacy and environmental groups, a marine engineer, and officials from the United States Coast Guard (USCG) and the National Oceanic and Atmospheric Administration (NOAA). These elite, semi-structured interviews were designed not only to elicit

insights into the current state of regulations but also to discern perspectives on potential gaps and areas for improvement. The inclusion of diverse perspectives provided a well-rounded examination of the interplay between policy, technology, environmental concerns, and the interests of various stakeholders, ultimately contributing to a more informed analysis of current regulation and where gaps could be filled regarding incoming passenger-only ferries. A summary of the various types of stakeholders interviewed can be found in Appendix 1.

The interviews formed the core of my research. The interviews centered on various critical topics, encompassing awareness of the new POFs in Puget Sound, training protocols for crew and captains, existing regulations, and vessel interactions with whales. I obtained permission to conduct interviews through the Institutional Review Board (IRB) at the University of Washington (UW). The questions asked were comprehensive and included but were not limited to the following:

- Would the USCG be involved in POF regulations?
- Are there regulations for how much underwater disturbance can occur in Puget Sound in relation to the conservation of SRKW?
- In your opinion, what agency or entity would regulate POFs in relation to the SRKW?
- What regulations currently exist for POFs in Puget Sound? Are any rules specific to SRKW?
- What, in your opinion, are the most significant risks to the SRKW?
- Do you have any recommendations/opinions on best management practices for vessels and the conservation of the SRKW?
- Have you heard of a new POF potentially coming into service in Puget Sound?
- What, in your opinion, will happen if proposed POF routes are added to the area?

This approach involved posing questions that connected current regulatory efforts with management practices, allowing a comprehensive understanding of the regulatory landscape. It facilitated the development of recommendations for effective best management practices for the anticipated expansion of POFs in the Puget Sound region. Given the potential growth of POFs in Puget Sound, I developed recommendations to minimize impacts on SRKW in Puget Sound.

3. Literature Review

I reviewed the literature to understand better POFs and how their operation in Puget Sound might affect the SRKW. I analyzed public documents, news media accounts, and relevant scientific literature surrounding policies, regulations, and potential gaps for POF service. The literature review offers insights into the historical context and current state of SRKW and conservation efforts. Public records provide valuable sources of policy documents, governmental reports, and official publications, providing insight into the current state of regulations and where gaps should be filled concerning SRKW. News media accounts offer a dynamic perspective, capturing real-time developments, situational awareness, public perceptions, and evolving narratives surrounding SRKW and vessels in Puget Sound. Additionally, a careful examination of scientific literature, found in background research and provided through interviews, enriches the analysis with empirical evidence concerning the complexities of additional and frequent vessel activity in Puget Sound concerning SRKW recovery.

a. Status of SRKW in Puget Sound

i. ESA Listing

Southern Residents were listed as depleted under the US Marine Mammal Protection Act on May 29, 2003, and as endangered under the US Endangered Species Act (ESA) on November 18, 2005 (*NOAA,* 2023). As stated on the EPA's website, the ESA provides a program for conserving threatened and endangered plants and animals and the habitats in which they are found (*Environmental Protection Act,* 2024). The leading federal agencies that enforce the implementation of ESA listings for marine species are NOAA and the U.S. Fish and Wildlife Service (FWS) (*EPA,* 2024). NOAA must review all listed marine species at least once every five years to determine whether the listing status should be changed (*10 years of Research and Conservation | NOAA Fisheries*, 2014).

The National Marine Fisheries Service (NMFS), West Coast Region, completed the most recent review in 2021. In *5 Year Review: Southern Resident Killer Whales/Orcinus orca 2021,* NMFS identified three primary threats to SRKW, one of which is disturbance from vessels and associated noise. Additionally, NMFS highlighted vessel effects as presenting a medium to high

severity risk for SRKW in Table 2.1 of their review. On page 17, NMFS mentions that they are exploring potential updates to federal regulations to better align with changes in Washington state and address the needs of SRKW.

The SRKW were also highlighted in NOAA's Species in the Spotlight 2021-2025 initiative (*NOAA Species in Spotlight,* 2021). A pivotal objective outlined in this five-year plan is to shield SRKW from vessels' detrimental effects through rigorous enforcement, educational initiatives, and comprehensive evaluation (*NOAA Species in Spotlight,* 2021).

ii. Historic presence and status

Southern Resident Killer Whales are an icon in the Puget Sound region. They hold significant cultural value to Indigenous communities and are a top predator in the Puget Sound marine ecosystem (*10 years of Research and Conservation | NOAA Fisheries*, 2014). In eastern Pacific waters, SRKWs are divided into Northern and Southern subgroups (EPA, 2021. Northern Resident Killer Whales (NRKW) inhabit a geographic range from Vancouver Island to Southeast Alaska. Southern Residents are typically found in the waters of Southwest British Columbia and the surrounding areas of Washington state (*NOAA Southern Residents,* 2024). SRKW represent a discreet subgroup of *Orcinus orca* (in ESA terms, a "distinct population segment"), enjoying federal protection as one of only two whale populations to receive such designation (*NOAA Southern Residents,* 2024). These whales are known for their preference for Chinook salmon as their primary food source (*Orca Conservancy,* 2024).

Additionally, SRKW, like other resident orcas, exhibit a matriarchal social structure and maintain close family bonds, often traveling together in pods (*Orca Conservancy*, 2024). Early in the 1970s, many SRKW were corralled and captured, a crusade led by two representatives of Namu, Inc. (*Western Libraries Archives & Special Collections,* 2024). As stated by the Center for Whale Research, captors would circle a pod of orcas with a purse seine net usually filled with fish, and then once the pod was in, the boats would pull the lead line, ensuring no escape downwards or sideways. More than 100 orcas were trapped in 1970 on three separate occasions; ten orcas were sold to the highest bidder, and at least five died in the capture, three of which were found mutilated (*Center for Whale Research,* 2024). SRKW have historically been at low abundance, but following the capture episode in the 1970s, the SRKW peaked in 1996 with 97

individuals and then declined to 79 by 2001 (*NOAA Southern Residents,* 2024). SRKW have yet to rebound (*NOAA Southern Residents,* 2024).

SRKW have long lifespans. Males live up to 20-59 years, with a mean of 19 years, and females live up to 70-90 years, with a mean of 35 years (*Center for Whale Research,* 2024). They also show a declining reproductive rate, from seven births in 2015 to just two births in 2022 (*Center for Whale Research,* 2024). Between 2022 and 2023, the SRKW population increased by two individuals, from 73 to 75 (*Vital,* 2024). The SRKW population declined from 75 to 74 when the newest calf went missing. Of those 74 individuals, only 26 are reproductive-age males, and 28 are females (*2021 Southern Resident Killer Whales (Orcinus Orca) 5-Year Review: Summary and Evaluation | NOAA Fisheries*, 2021). The population is comprised of three pods: J, K, & L. J pod has 25 members: nine reproductive females and four reproductive males (*ORCA Network,* 2024). K Pod has 16 individuals, with six reproductive females and five reproductive males (*ORCA Network,* 2024). L pod has 34 individuals, 12 reproductive females and seven reproductive males (*ORCA Network,* 2024). K and J pods each produced one successful birth in 2022. L pod hasn't had a successful birth since 2004.

iii. Policy response: ORCA Task Force

On March 14, 2018, Washington Governor Jay Inslee signed Executive Order 18-02, which established the Southern Resident Killer Whale Task Force, later termed the Orca Task Force. This order was brought about after NOAA determined SRKW to be one of the eight most at-risk species in 2016 (*NOAA,* 2023). The Orca Task Force was asked to deliver recommendations for recovery for SRKW in Puget Sound. Recommendations were delivered to the Governor in 2018 and revised, updated, and redelivered in 2019. These recommendations were wide-ranging, including salmon habitat restoration and protection, increased hatchery production, re-establishment of salmon runs above dams, reducing bycatch, establishing "go slow" zones for small vessels and whale watchers, establishing limited entry permit systems for vessels, requiring annual "Be Whale Wise" certification for recreational boaters, strengthening and fully enforcing regulations, implementing shipping noise reductions, reducing noise from ferries in particular, requiring permits as a means of reducing vessel traffic and impacts, establishment of a whale protection zone, and more (*Orca Task Force,* 2018).

The Washington state legislature approved $1.96 billion to implement the Governor's Task Force Recommendations in the 2019-2021 Washington state enacted budget. As per the Governor's Salmon Recovery Office, funding was allocated across major categories of threats, for example, $1.3 billion towards increasing prey (salmon), $58.6 million towards reducing vessel noise, $535.9 million towards reducing contaminants, $32.5 million towards climate change, and $5.8 million towards scientific and technical support studies. For 2023-2025, the total amount of funding enacted for vessels is $5.1 million, with $3.1 million targeted explicitly toward SRKW. Small vessels' funding for 2023-2025 is $2.5 million and $543,000, specifically toward reducing their impacts on SRKW. Vessel funding is intended to address a variety of issues:

- Increasing the current required separation zone to 1000 yards
- Increasing the number of enforcement officers assigned to enforcing vessel regulations
- Implementing shipping noise reductions and monitoring programs (e.g., the Quiet Sound Program)
- Reducing the threat of oil spills
  (*Funding and Accountability Recommendations. Southern Resident Orca Recovery,* 2024).

iv. Possible reasons for SRKW's failure to recover.

The SRKW population continues to decline, which is attributable to various factors outlined by the Task Force, encompassing prey availability, potential vessel strikes, underwater noise, and contaminants. While each of these factors is integral to the broader context of SRKW recovery, this analysis focuses explicitly on the impact of vessels on the population decline, especially considering the impending challenges posed by POFs. Examining aspects such as vessel noise, presence, and strikes underscores the critical role of vessels as threats to the SRKW population. As a representative of the SeaDoc Society stated, more boats at higher speeds create more risk of vessel strike while also increasing underwater noise pollution. Underwater noise can disrupt foraging and travel behaviors, increasing the animals' energy expenditures.

v. Vessel noise and presence

In Puget Sound, vessel noise poses a significant threat to the SRKW because it interferes with their communication signals, including clicks, calls, and whistles crucial for foraging and echolocation (*Holt,* 2008). As emphasized by a representative of the SeaDoc Society, vessel noise substantially impacts the whales and hinders species recovery. There is science supporting the fact that vessel presence- even non-motorized vessels- is also an issue. Given the distinct communication frequencies of killer whales, ranging from 500-15,000 Hz, and echolocation frequencies spanning 15-50 Hz (*Malinka et al.,* 2023), the disruption caused by vessel noise undermines the ability of SRKW to coordinate foraging activities, impacting their food location communication *(NOAA Fisheries, 2022).*

In the view of a representative of an environmental organization, vessel-related disturbances and other underwater noise significantly hinder the ability of SRKW to locate their scarce prey, particularly salmon. This disruption in foraging activities, leading to inadequate nutrition, can have far-reaching consequences on immune function, growth, and development, as discussed in Holt et al.'s article, *"Vessels and their Sounds Reduce Prey Capture Effort by Endangered Killer Whales"* (2021). The presence of vessels has been observed to diminish whales' foraging activities, resulting in prolonged dive durations and slower ascents, affecting individuals' growth, reproduction, and overall fitness (*Ferrara et al.,* 2017). This underscores the profound impact vessel-related disturbances, especially noise, can have on SRKW's foraging capabilities and emphasizes the urgency of implementing strategies to alleviate these adverse effects (*Environmental Organization Interview,* October 2023).

The consequences extend to reproductive female orcas, primarily affected by interruptions to foraging behaviors, resulting in a shift from diving to traveling, expending more energy in the process (*Holt et al.,* 2021). This disruption in successful foraging can lead to reproductive stress (NOAA *Fisheries,* 2022). Additionally, female orcas share their prey at the surface, making them vulnerable to disturbances from noise or vessel presence, potentially causing nutritional deficits for pregnant or nursing individuals (*Mapes,* 2021). These findings highlight the importance of minimizing noise and mitigating vessel disruptions to facilitate an improved foraging environment for SRKW, particularly reproductive females, and underscore the need for comprehensive strategies to address these challenges effectively.

The influence of underwater acoustic disturbances extends to the SRKW's preferred prey, salmon. A study by van der Knaap et al. (2022) demonstrated that wild Pacific salmon altered their foraging behavior, impacting their energy consumption and fitness, in reaction to nearby vessel disturbances, predominantly attributable to noise.

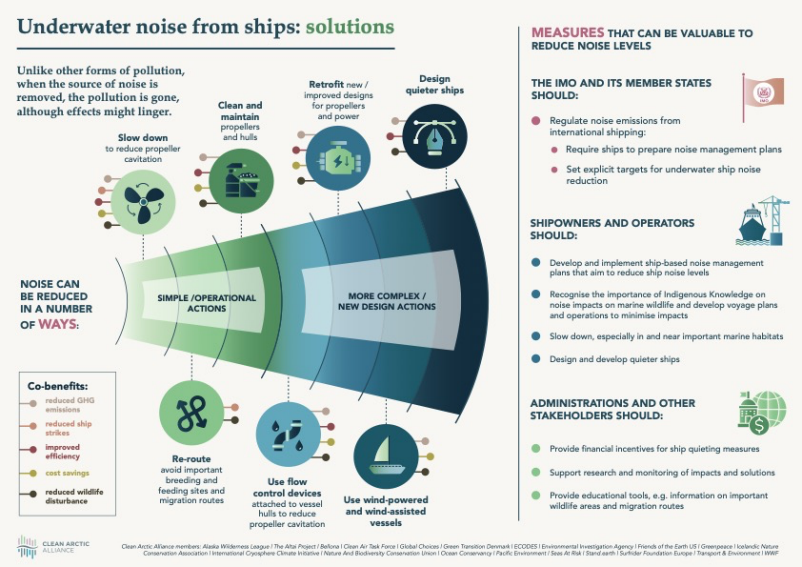

Figure 1.

This graphic shows multiple ways to reduce underwater noise from ships and also outlines potential co-benefits of the reduction measures (CleanArctic, 2024).

vi. Vessel strikes.

Peel et al. (2018) define a vessel strike as any contact between cetaceans and vessels, irrespective of its fatality. Despite the apparent absence of reported vessel strikes on the SRKW in Puget Sound, this lack of reporting does not necessarily indicate their absence. The occurrence of vessel strikes can unfold in two scenarios: either as an event witnessed by observers or as an unnoticed incident where harm is inflicted upon a whale and evidence surfaces only upon post-mortem examination after the whale has died. Quantifying vessel strikes on SRKW, or cetaceans in general, has proven challenging, as explained by a representative from the SeaDoc Society who commented that documenting strikes doesn't accurately show how often they occur. Vessel strikes on cetaceans have been a persistent concern for mitigation efforts over decades (*Baille and Zitterbart,* 2022). Notably, studies by Laist et al. (2011) and Conn and Silber (2013) indicate

a significant reduction in fatal strikes when vessels operate below 10 knots. However, the incoming POFs are expected to travel up to 35 knots, considerably increasing the risk of vessel strikes in Puget Sound.

Amidst Washington state's endeavor to electrify its existing ferry fleet, concerns have also emerged regarding the heightened risks of vessel strikes. While electrification is touted as a solution for addressing pollutants, a pertinent issue arises regarding the potential consequences for cetaceans. A member of the ORCA Network posited that the quiet nature of fast foil ferries, devoid of the typical noise associated with cavitation, could pose an elevated risk of strikes. The rationale behind this concern is that the diminished noise emitted by fast foil ferries may reduce the ability for cetaceans to hear and become aware of vessels nearby, potentially leading them to surface more frequently and increasing the likelihood of encounters or collisions with vessels.

In the section *Noise production by waterjets*, Parchen (2000) discusses how the noise generated by waterjets is comparable to that of traditional ship propellers. This noise arises from various sources, including trailing edge noise (created as water flows past the edges of the water jet), turbulence in the incoming water flow, and noise resulting from variations in water velocity. Unlike traditional propellers, waterjets operate within a duct, often including components called stators. These elements significantly influence the noise produced. The location of the waterjet pump within the duct and the presence of stators can modify the noise characteristics. The design and configuration of these components can either amplify or dampen the noise generated by the waterjet system. The author discusses the potential to decrease the noise generated by waterjet propulsion systems on vessels from prop installation alone.

Currently, Kitsap Transit's fleet is mainly comprised of boats with a hydrofoil-assisted hull, and King County's fast ferry fleet, two vessels, both feature fixed-pitch propellers, one of the most common for small craft. In essence, while waterjets and ship propellers share similar noise-generating mechanisms, the specific design features of waterjet systems, such as the placement of the pump and the presence of stators, play a crucial role in shaping the overall noise profile of waterjet propulsion systems (*Parchen,* 2000). This underscores that technical measures could be undertaken to reduce underwater noise. Another path might be speed controls, as lower vessel speed generally means less underwater noise. Voluntary measures undertaken by vessel operators are yet another path. Beginning with proper installation, implementing strategies to reduce noise generated by water jet cavitation demonstrates the potential for practical noise

reduction efforts. Unfortunately, due to a lack of on-water trials, it's premature to say that propulsion redesign would sufficiently reduce impacts from underwater radiated noise.

b. POFs: Current and Potential Future Service within Puget Sound

Passenger-only ferries are compact vessels designed exclusively for walk-on passengers without the accommodation of vehicles. The prospect of introducing new POF routes in Puget Sound is predicated on relieving traffic congestion on the I-5 freeway or at least giving commuters an alternative to negotiating freeway traffic. The four primary routes under examination in this analysis, as identified in a 2021 study by the PSRC, are the Tacoma-Seattle, Bellingham-Friday Harbor, Whidbey-Everett, and the Des Moines-Southworth routes. The latter runs seasonally from August to October (*Puget Sound Regional Council,* 2021). These routes will feature vessels projected to carry 150 and 250 passengers per trip, operating at top speeds ranging from 28 to 35 knots.

c. Potential Future Puget Sound POF Routes

Routes were assessed by the PSRC according to their environmental impact, competitiveness in travel time, ridership potential, accessibility, compatibility with land use, costs, fare structure, and level of support from the community and stakeholders (*Puget Sound Regional Council,* 2021). Routes that progressed to tier 3 demonstrated the highest level of compatibility with these criteria. The Tacoma-Seattle, Bellingham-Friday Harbor, and Whidbey-Everett routes are all tier 3 routes that advanced to the final analysis stage in the PSRC study. Route profiles that advanced to tier 3 were next examined by the PSRC for potential implementation.

Washington state has allocated $3 million to enhance ferry service expansion in Puget Sound (*Marine Log Webinar,* 2023). I examined the 20-year growth plans for each destination to see if future ferry service was part of their planning. The three I examine below are not presently operating; I have excluded the Des Moines-Seattle route, already serving as a pilot run.

Figure 2.

This figure shows the potential new passenger-only ferry route from Bellingham to Friday Harbor from the PSRC study 2021 *Puget Sound Passenger-Only Ferry Study*, 2021).

BELLINGHAM (Whatcom County)

Bellingham's policy directive ED-36 advocates for promoting and enlarging transportation alternatives that foster connectivity among Portland, Oregon, Seattle, and Vancouver, British Columbia. It also endorses future ferry services extending to the San Juan Islands, as depicted in the figure above (*Bellingham Comprehensive Plan,* 2016).

FRIDAY HARBOR (San Juan County)

The San Juan County Council established the San Juan County Ferries Advisory Committee (FAC) under RCW 47.60.310 and SJCC 2.44 regulations. This committee collaborates with the Washington state ferries (WSF) to tackle community concerns regarding ferry schedules, customer issues, and broader regional matters. The initiative extends to endorsing alternative transportation modes, including privately owned and operated passenger-only ferry services. This effort is not limited to connections with Bellingham; also under exploration are potential

routes originating from Friday Harbor and expanding service to Canada (*2036 comprehensive plan, San Juan County,* 2022).

Figure 3.

This figure shows the potential new passenger-only ferry route from Clinton to Everett from the PSRC study 2021 (*Puget Sound Passenger-Only Ferry Study*, 2021).

CLINTON (Island County)

Anticipated ferry ridership on the existing WSF Clinton/Mukilteo route is projected to increase by 0.7% annually until 2040. This translates to an estimated 1,800 additional daily passengers passing through Clinton by 2040. As the gateway to Whidbey Island for Seattle-area tourists, Clinton holds significance as an entry destination for Whidbey Island travelers. Ongoing studies by the PSRC explore the possibility of a new passenger ferry, with consideration given to tier 3 routes connecting Clinton or Langley to Everett or Seattle. Introducing a POF on Whidbey Island could impact current Clinton vehicle ferry ridership and is poised to attract more visitors relying on non-motorized transportation. Collaborative efforts with Island Transit, the primary transit provider offering free bus services across Whidbey and Camano Islands, become crucial as plans for the passenger ferry and other Clinton development projects progress. Notably, Bus Route 1, extending from the Clinton Ferry Terminal to the City of Oak Harbor transit station,

stands as one of the most utilized routes for commuters on Whidbey Island (*Comprehensive Plan, Island County* 2016).

EVERETT (Snohomish County)

The City of Everett has yet to articulate any prospective strategies for expanding its port facilities to accommodate a POF route. Numerous logistical considerations may slow the development of POF services utilizing Everett. However, should Everett choose to utilize its existing port for a POF route, adjustments would be necessary for parking, accommodations for pedestrians to reach public transit stations, and establishing a ferry terminal center. These potential modifications align with considerations outlined in the 20-year growth plan.

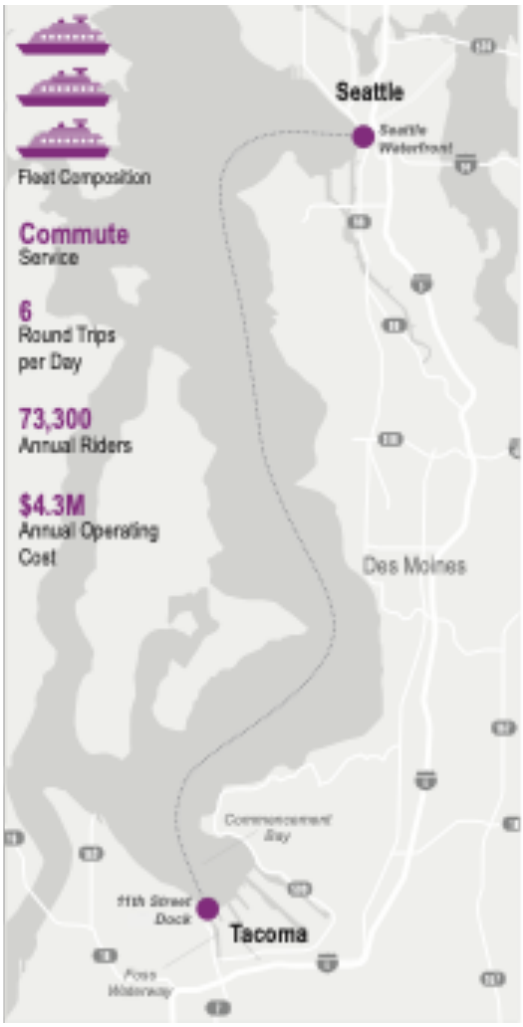

Figure 4.

This figure shows the potential new passenger-only ferry route from Tacoma to Seattle from the PSRC study 2021 (*Puget Sound Passenger-Only Ferry Study*, 2021).

TACOMA (Pierce County)

Like Everett, the City of Tacoma has yet to present any proposed modifications to its port infrastructure or the enlargement of current routes to accommodate a new POF. Although it's not outlined in Tacoma's 20-year plan, Seattle has planned some expansion of services to supplement commuting between the two cities.

SEATTLE (King County)

Seattle acknowledges its role as the primary hub for employment and cultural activities in the Puget Sound Region, as stated in the *Connecting to the Region* section of its 2035 Comprehensive Plan. It emphasizes the importance of fostering a robust ferry system to strengthen connections to the city (*King County Comprehensive Plan,* 2022). Additionally, under the *Transportation in the Shoreline* section, the plan aims to promote the preservation and expansion of intermodal commuter ferry services to supplement existing public transportation networks. This objective is categorized under SA P14 and encompasses travel both within the city and throughout the broader region.

d. Current POF Routes in Puget Sound

Currently, Puget Sound hosts eight POF routes: three operated by Kitsap Transit, two by Clipper Vacations, one by Puget Sound Express, and two by King County Water Taxi. King County vessels can accommodate a maximum of 278 passengers and reach top speeds of 28 knots (*King County,* 2023). Kitsap Transit's fleet varies from approximately 118 to 350 maximum passenger capacity, with top speeds ranging from 10 to 37 knots (*Kitsap Transit,* 2023). Clipper Vacations vessels can accommodate 525 passengers traveling up to 36 knots (*Clipper Vacations,* 2023). Meanwhile, Puget Sound Express can accommodate 50 passengers traveling up to 19 knots (*Puget Sound Express,* 2023). Among these four entities presently operating fast ferries in Puget Sound, there has been a collective increase in transit hours by approximately 4,900 hours since the last reported figure by Puget Sound Partnership in 2019, which stood at approximately 10,000 hours for the year (*Puget Sound Harbor Safety Committee,* 2023). This increase in vessel hours in Puget Sound follows Kitsap Transit's decision to add two routes, Kingston to Seattle and Southworth to Seattle (*Kitsap Transit,* 2023). Kitsap Transit also added 14 sailings to their Bremerton to Seattle route (*Kitsap Transit,* 2023). These increases come after a spike in ridership (*Kitsap Transit,* 2023). This calculation excludes the Des Moines to Southworth route, which is currently being trialed. Table 1 below outlines the fast ferry routes presently operating in Puget Sound, passenger capacity, and vessel speed range.

Table 1. Current Passenger-Only Ferry Service

This table shows the current passenger-only ferry routes on Puget Sound. These are labeled by operator, with passenger capacity and speed ranges shown.

Operator	**King County Water Taxi**	**Kitsap Transit**	**Victoria Clipper**	**Puget Sound Express**
Route	Vashon-Seattle W.Seattle-Seattle	Bremerton-Seattle Kingston-Seattle Southworth-Seattle	Seattle-Victoria	Friday Harbor-Port Townsend
Pass. Capacity	278 passengers	118 passengers, 12 bicycles 349 passengers, 10 bicycles 250 passengers, 26 bicycles	525 passengers	40 passengers
Speed Ranges	28 knots	34-37 knots 30-32 knots 35-37 knots	36 knots	19 knots

e. Current and potential hours of POF travel in Puget Sound

According to the Orca Task Force report of 2019, the Puget Sound Partnership's AIS data evaluation revealed that vessels collectively logged approximately 10,000 hours of travel in 2019 within Puget Sound. Table 2 illustrates a notable rise of approximately 4,900 hours in 2024. Additionally, the Des Moines to Southworth route, commencing trials, is anticipated to increase the total by approximately 1,109 hours (*Puget Sound Express,* 2023). Consequently, the projected service increase amounts to approximately 6,010 hours of additional vessel activity in Puget Sound, an increase of roughly 60.1% since 2019. This data was taken from the operators' websites and the Puget Sound Regional Council's POF study from 2021, where route length and duration are listed, along with all holidays affecting vessel operations.

Table 2. Current Hours for Passenger-Only Ferries operating in Puget Sound

Estimated total operating hours per year for current POF routes. Below the routes and operators are listed followed by their schedules, estimated minutes per trip, and total annual hours, with non-operating holidays included in this calculation. Information is taken directly from the operator's websites.

Route Name	**Vashon-Seattle (King)**	**W.Seattle-Seattle (King)**	**Bremerton-Seattle (Kitsap)**	**Kingston-Seattle (Kitsap)**	**Southworth-Seattle (Kitsap)**	**Seattle-Victoria (Clipper)**	**Friday Harbor-Port Townsend (Puget Sound Express)**
Schedule	(M-F) 12 trips total per day	(M-F) 34 trips total per day (S&S) 22 trips total per day	(M-F) 40 trips total per day (Sat) 7 trips total per day	(M-F) 12 trips total per day	(M-F)16 trips total per day	Varied 1-2x a day; 632 total sailings for 2024	(M-S) 2 trips total per day April 26 – September 22 150 days
Time Per Trip	22 minutes per trip	10-15 minutes per trip	30 minutes per trip	40 minutes per trip	26 minutes per trip	2 hrs 45 min	19knots; 29 miles= 1.5 hrs
Total Hours Per Year	1,095.6 hours per year	2,275.8 hours per year	5,504 hours per year	2,056 hours per year	1,781.9 hours per year	1,738 hours per year	450 hours per year

Operating hours for POFs in Puget Sound are projected to rise further (Table 3), heightening the risks of vessel strikes, acoustic disturbance, and interference with SRKW behavioral and communication patterns. Puget Sound would have an estimated additional 5,131 vessel hours with the proposed new routes. According to the ORCA Task Force recommendations in 2019, this would add approximately 11,142 total hours of fast ferry vessels, a 111.4% increase in vessel hours since 2019.

Table 3 Future Passenger-Only Ferry Routes and Vessel Hours in Puget Sound

This table shows the potential new passenger-only ferry routes, schedules, minutes per trip, and annual hours on Puget Sound. This information was taken from the PSRC Passenger-Only Ferry Study 2021.

Potential Route	**Tacoma-Seattle**	**Bellingham-San Juans**	**Everett-Whidbey**	**Des Moines-Southworth (Puget Sound Express)**
Schedule	(M-F) 12 trips total	(M-Sun) 8 trips total Seasonal (6 Months per year)	(M-F) 12 trips total	(W-Sat) 8 trips total
Min. Per Trip	55 minutes per trip	50 minutes per trip	20 minutes per trip	40 minutes per trip
Total Hours Per Year	2,871 hours per year	1,216.7 hours per year	1,044 hours per year	1,109.3 hours per year

4. Policy Context

Through research and interviews, I identified multiple entities with regulatory authority directed at either POFs or SRKW protection in Puget Sound. However, no specific regulatory framework addressing POFs directly addresses potential impacts on SRKW. This results in a fragmented regulatory landscape, leaving gaps in mitigating risks posed by vessels to SRKW recovery. Despite the complicated nature of the issue, proactively addressing these gaps can significantly contribute to conservation efforts.

Presently, diverse policies concerning vessels and SRKW exist. While these policies typically center on distinct facets like vessel safety, vessel operator safety, and SRKW recovery initiatives, what is missing is an approach that directly integrates safety-focused controls on POFs with the needs of SRKW protection.

Vessel policies, such as those outlined in the Navigation and Vessel Inspection Circular (NVIC) issued by the USCG, primarily aim to bolster the operational safety of vessels. This entails prioritizing the protection of onboard staff and passengers with secondary considerations for preventing or mitigating harm to marine life. NVIC 5-01, revised in 2003, explicitly targets high-speed vessels falling under subchapter categories H, K, and T. Subchapter T vessels are defined as small vessels weighing under 100 tons, which includes most POFs (*46 CFR Chapter I -- Coast Guard, Department of Homeland Security*, n.d.). Subchapter K vessels are categorized

as medium vessels, capable of carrying more than 150 passengers or offering overnight accommodations for more than 49 passengers (*46 CFR Chapter I -- Coast Guard, Department of Homeland Security*, n.d.). Subchapter H vessels, the largest category, include those such as the Washington state ferries (*46 CFR Chapter I -- Coast Guard, Department of Homeland Security*, n.d.). For instance, the Whidbey - Everett POF route is anticipated to utilize a subchapter T vessel. In contrast, the Bellingham - San Juans and Seattle - Tacoma routes are expected to employ subchapter K vessels. As noted by a representative from the USCG, while the NVIC serves as an interpretation of regulations and isn't mandatory, adhering to its guidelines would establish a baseline for craft and passenger safety, including the addition of an extra crew member during periods of low visibility or when the risks of interacting with SRKW are heightened. Interestingly, whales are regarded as a navigational hazard within the NVIC, yet there are no specific provisions addressing the safety of cetaceans.

Contrastingly, the Marine Mammal Protection Act (MMPA) of 1972 advocates for an ecosystem-based approach to natural resource management and conservation. This legislation prohibits the take (including hunting, killing, capture, and harassment) of marine mammals. For cetaceans, oversight of the Act primarily rests with NOAA. All killer whale populations are safeguarded by the MMPA, with the regulatory authority in the hands of NOAA. Only two killer whale populations are granted distinct protections under federal law. The SRKW population is one of the two. It was designated endangered in 2005 under the Endangered Species Act and classified as depleted under the MMPA (*NOAA,* 2024).

In 1994, the MMPA was amended to facilitate an expedited process for citizens and U.S. agencies to seek authorization for the incidental take of small numbers of marine mammals through "harassment," known as Incidental Harassment Authorizations (IHAs). IHAs are now a commonly applied regulatory mechanism under the MMPA and the ESA (*NOAA,* 2024). IHAs are issued by government agencies such as the National Marine Fisheries Service (NMFS) to authorize the incidental, but not intentional, harassment of marine mammals during activities such as seismic surveys, construction projects, or military exercises (*NOAA,* 2024). These authorizations limit the level of harassment allowed and often require measures to minimize impacts on marine mammals (*NOAA,* 2024). IHAs are typically issued for specific periods and locations and may include monitoring requirements to ensure compliance with the conditions outlined in the authorization (*NOAA,* 2024). WSF has acquired IHAs for short-term activities

that may inadvertently harass marine mammals, with most IHAs involving the incidental harassment of marine mammals by noise (*Chapter 320,* 2016).

Washington state agencies play a pivotal role by collaborating with and providing input to federal agencies, particularly NOAA, which holds jurisdiction over issuing IHAs (*Washington Department of Fish and Wildlife,* 2024). Washington state agencies may contribute data, recommendations, or regulatory guidelines to safeguard marine mammals. Moreover, state agencies collaborate with federal counterparts to ensure adherence to state laws and regulations concerning marine mammal protection (*WDFW,* 2024). On the other hand, NOAA assumes a central role in the IHA process by evaluating and granting authorizations for activities that could cause incidental harassment to marine mammals, such as underwater construction or vessel operations (*NOAA,* 2024). NOAA assesses the potential impacts of these activities on marine mammal populations, issuing IHAs with appropriate mitigation measures to minimize harm (*NOAA,* 2024). Furthermore, NOAA oversees compliance with the terms and conditions of these authorizations, conducting environmental reviews, consulting stakeholders, and monitoring activity to uphold marine mammal welfare and conservation (*NOAA,* 2024). In the context of proposed new routes for fast ferries within Puget Sound, which is designated critical habitat under the ESA for the SRKW population, a representative from the Governor's Salmon Recovery office highlighted NOAA's authority to reject IHAs for such routes under the MMPA and the ESA, as a means of safeguarding the SRKW population.

The Washington Department of Fish and Wildlife (WDFW) oversees licensing requirements for commercial whale-watching vessels. WDFW aims to minimize the impacts of recreational and commercial whale-watching activities on SRKW (*WDFW,* 2022). WDFW adheres to the regulations outlined in RCW 77.15.740, which currently mandates a 400-yard distance between vessels and SRKW. However, beginning January 1, 2025, this requirement will be expanded to a 1,000-yard distance for recreational boaters, as stipulated by Senate Bill 5371 (*WDFW,* 2024).

The Quiet Sound initiative is a collaborative program among federal, state, and tribal governments, ports, maritime industry, scientists, and NGOs. It aims to mitigate the impact of large commercial vessels on SRKW through voluntary measures (*Quiet Sound,* 2024). Quiet Sound is a nonprofit initiative of Washington Maritime Blue (*Quiet Sound,* 2024). Stemming from Recommendation 22 of the ORCA Task Force, the program draws inspiration from the established ECHO initiative in British Columbia. Following the submission of a proposal to the

state legislature, funding for Quiet Sound was secured in spring 2021. The Quiet Sound initiative is voluntary and aims to minimize underwater vessel noise during periods when SRKW are present. The program conducted a voluntary slowdown trial within the inbound and outbound shipping lanes of Admiralty Inlet and North Puget Sound, requesting that vessels reduce their speed to 11-14 knots, contingent upon their size (*Quiet Sound,* 2024). This foundational trial was conducted from October 24, 2022, to January 12, 2023 (*Quiet Sound,* 2024). Results from this trial are described in a later section. Quiet Sound is currently evaluating the results of its second slowdown trial, conducted from October 2023 to January 2024 (*Quiet Sound,* 2024).

a. NOAA: Role and Responsibility

As an environmental organization spokesperson highlighted, NOAA holds primary authority due to the endangered status of SRKW. This designation obligates the agency to facilitate the recovery of SRKW under the ESA and the MMPA. NOAA is also the entity that authorizes IHAs under the MMPA (*NOAA,* 2024). IHAs provide a means for NOAA to mitigate disturbance from commercial activity that, if unchecked, could otherwise hinder recovery.

As per a NOAA representative, the agency primarily focuses on establishing rules at a broad level rather than implementing policy changes at finer scales. As a result, according to this interviewee, NOAA doesn't perceive a role as establishing regulations targeted to specific vessel classes, such as fast ferries.

b. USCG and the Cetacean Desk

NOAA holds the authority to establish new regulations or policies concerning vessels and SRKW, tasking the USCG to enforce these regulations on water. The USCG serves as the primary enforcement entity for the navigable waters of the United States, collaborating with various authorities to ensure that enforcement efforts are coordinated and aligned with other federal, tribal, state, and local agencies (*NOAA,* 2024). However, the USCG generally lacks the authority to initiate regulatory procedures or formulate new rules concerning the conservation of the SRKW or other marine mammals. Their primary emphasis lies in ensuring the safety of passengers, crew, and vessels. The USCG also has authority over the Ports and Waterways

Safety Program pertaining to vessels under U.S. jurisdiction, including U.S.-flagged and foreign-flagged vessels (under port state control) *(Thorsell & Leschine,* 2016*)*. This program enables the management of vessel traffic in U.S. waters due to weather conditions, congestion, or other hazardous situations and allows for implementing navigation and traffic separation schemes *(Thorsell & Leschine,* 2016*)*.

Consequently, regulations concerning endangered species fall outside the USCG's regulatory authority. With substantial evidence of whales posing significant navigational hazards to vessels, this leaves room for the USCG to collaborate on regulations with responsible entities and contribute to developing such regulations to ensure effective implementation., as suggested by a representative from the Cetacean Desk.

The USCG and NOAA have recently established a novel initiative within the Vessel Traffic Service Seattle (VTS,) called the Cetacean Desk. This experimental program, currently scheduled for 3-4 years, draws loose inspiration from Canada's Marine Mammal Desk. Its objective is to enhance real-time situational awareness of cetaceans by large commercial vessels. It's important to clarify that the VTS does not normally engage with recreational vessels; therefore, the Cetacean Desk will not interact with recreational vessels directly. As mentioned by a representative of NRDC, the Cetacean Desk aims to leverage federal resources and expertise to safeguard a federally protected species. According to a media advisory notice by the USCG on February 16, 2024, "The cetacean desk pilot program was authorized, developed, and implemented through the Don Young Coast Guard Authorization Act of 2022. This pilot program seeks to provide near real-time data about the location of cetaceans within the Salish Sea to marine pilots and mariners operating in the area using the Puget Sound Vessel Traffic Service system. The program aims to reduce the area's ship strikes and cetacean disturbances" (*USCG,* 2024).

The primary goal of the Cetacean Desk is not to establish new regulations for vessels. Its focus on delivering real-time data to improve mariners' situational awareness of the presence of cetaceans is expected to operate through varied approaches. These include utilizing AIS messaging, leveraging the Whale Report Alert System (WRAS), establishing a hotline system, collaborating with initiatives like Quiet Sound, implementing a data layer for navigation systems to aid pilots in situational awareness, and developing a central database or map aggregating

whale locations from different sources. According to a representative of the Cetacean Desk, these avenues are all under consideration.

Currently, there are several obstacles to overcome. For example, the maritime industry prefers that whale reporting information be kept private out of concern that recreational or whale-watching vessels will converge on shipping lanes, creating collision risks. Additionally, access to WRAS is restricted to those approved by OceanWise, making it a private platform. OceanWise is a global conservation organization dedicated to building a community that protects our oceans (*OceanWise,* 2024). POFs are outside the authorized entities, although their inclusion may be possible.

The Cetacean Desk will be funded under The Coast Guard Authorization Act of 2022. The Coast Guard Authorization Act of 2022 authorizes $1.5 million annually for Washington state and the eastern seaboard, where similar efforts to protect North Atlantic Right Whales (NARW) require ports to work on cetacean mitigation initiatives (*Bipartisan Coast Guard, MARAD Reauthorization, Washington State Priorities Heading to President's Desk as part of NDAA,* 2022). The Cetacean Desk aims to collaborate with existing organizations, like Quiet Sound, dedicated to addressing this issue. Their objective is to facilitate the safe navigation of vessels while protecting marine mammals.

c. State and local governance

The Governor's ORCA Task Force introduced the Quiet Sound initiative to the state legislature. Vessel speed is a major factor in how much underwater sound is generated (*Holt et al.* 2021), and the Quiet Sound initiative aims to reduce underwater noise, particularly that affecting the SRKW (*Quiet Sound,* 2024). The trial slowdown by Quiet Sound proved successful, achieving a 45% reduction in ambient vessel noise, with 70% of participating vessels complying with the program's guidelines (*Quiet Sound,* 2024). Puget Sound Pilots played a crucial role in implementing the trial slowdown when boarding vessels to pilot through Puget Sound, communicating with vessel captains and crews, and verifying compliance with Quiet Sound measures. The program utilized Automatic Identification Systems (AIS) data, providing vessel identification and speed over ground information at various points within the slowdown area

(*Quiet Sound,* 2024). During these trial slowdowns, Quiet Sound requested that commercial vessels reduce their speed when conditions permit, and it is deemed safe and practical to do so during periods when SRKW are likely to be present, typically between October and January (*Quiet Sound,* 2024). The program is evaluating its second trial slowdown period from October 2023 to January 2024.

According to a representative from Quiet Sound, the current voluntary slowdown initiative does not include fast ferries. Its focus is on large commercial vessels under pilotage. Among the fast ferry routes, only the Everett - Whidbey route has the potential to intersect with the boundaries of the Quiet Sound trials.

The State Environmental Policy Act (SEPA) is a state-level environmental law in Washington state that is similar to the National Environmental Policy Act (NEPA) at the federal level (*Washington State Legislature (WSL),* 2024). SEPA requires state agencies to consider the environmental impacts of proposed actions before making decisions (*WSL,* 2024). It aims to ensure that environmental factors are integrated into governmental decisions and that the public is informed and involved in decision-making (*WSL,* 2024). SEPA requires agencies to prepare Environmental Impact Statements (EIS) for specific projects that may have significant environmental impacts (*WSL,* 2024). This includes private-party initiatives and the development of new regulations, policies, or plans (*Washington Department of Ecology,* WDOE, 2024). Consequently, any forthcoming construction or private enterprise, including fast ferries, must undergo a SEPA review. SEPA also incorporates a dedicated Orca Checklist (URL for checklist) to address the specific considerations related to SRKW (W*DOE,* 2024). This supplemental checklist aids lead agencies in assessing potential vessel traffic impacts on the SRKW population within Washington state marine waters (W*DOE,* 2024).

On January 1, 2025, Senate Bill 5371 is scheduled to be enacted, instituting a broader protective perimeter around SRKW. This entails extending the current vessel–cetacean separation zone for Puget Sound from 400 to 1,000 yards, accompanied by a mandatory speed reduction to 7 knots within 1,000 yards of SRKW (*WSL,* 2023). It's important to note that this legislation primarily targets private recreational vessels, as exemptions are granted to government-operated vessels, tribal fishing vessels, scientific research vessels, other ships navigating shipping lanes (such as tugboats), and law enforcement vessels (*WSL,* 2023).

The Harbor Safety Plan 2023, published by the Puget Sound Harbor Safety Committee, delineates a Standard of Care (SOC) for navigating in low visibility conditions within Puget Sound (*Puget Sound Harbor Safety Committee,* 2023). According to this plan, vessels operating in conditions of restricted visibility, where they are not in sight of one another, must proceed at a safe speed adapted to the prevailing circumstances. Additionally, vessels must have their engines ready for immediate maneuver and, if there is a risk of collision, take avoidance action in ample time. This may involve having an additional qualified person on lookout duty.

d. Pacific Whale Watch Association

The Pacific Whale Watch Association (PWWA), a voluntary association of whale-watching tourist boat companies, collaborates closely with Puget Sound Pilots and the WSF to enhance situational awareness of whales in Puget Sound. As stated by a representative of PWWA, PWWA has the capability and commitment to notify ferries or pilots of whale presence along their routes, urging them to reduce speed as necessary. POFs are a significant concern, a representative of the PWWA stated. The slower-moving WSF boats have been involved in at least two whale fatalities in the past four years (*Washington State Ferries Underwater Noise Mitigation and Management Plan for the Protection of Marine Mammals*, 2021). Consequently, if such incidents can occur with ferries traveling at 10 knots, the prospect of ferries traveling at 30 knots is alarming. PWWA has voiced concerns that recreational and commercial vessel operators may not welcome the information provided by PWWA, as it then places the responsibility on the vessels to take appropriate action.

In an interview with a representative of a local environmental organization, the disparity in regulations between recreational boaters and commercial vessels was also highlighted. The representative noted that obtaining a recreational license is much less closely monitored and that the process can be completed directly from a mobile device. For recreational boaters, starting in January 2025, new regulations state that all recreational vessels must stay at least 1000 yards away from SRKW (*WDFW,* 2023).

Table 4.

Governance agencies involved in maritime and marine mammal protection.

Governance Arrangement	Scope and Authority
Federal Regulations (NOAA)	- Regulates under the ESA and MMPA - Issues IHAs for activities affecting marine mammals under the MMPA & ESA - Evaluates impacts on marine mammal populations - Slowdown for certain classes of vessels
USCG	-Primary enforcement entity for the navigable waters -Ensuring the safety of passengers, crew, and vessels - Limited involvement in specific regulations for fast ferries -Navigation and Vessel Inspection Circular (NVIC) isn't mandatory
Cetacean Desk	- Limited involvement in specific regulations for fast ferries -Enhance real-time situational awareness of cetaceans for large commercial vessels -Will not directly interact with recreational vessels
Washington State Regulations (WDFW)	- Collaborates with others to ensure compliance with state laws - Regulates under state mandates, i.e. 1000-yard buffer for SRKW - Insufficient authority for specific fast ferry operations - May contribute data and recommendations
Puget Sound Harbor Safety Committee	- Develops safety standards and recommendations through Standard of Care (SOCs) - Promotes safe navigation in Puget Sound - Advises on maritime issues - Lack of specific guidelines for fast ferry operations
Quiet Sound Initiative	- Trialing voluntary slowdown measures for vessels -Current scope of trial program does not cover private vessels - Collects data on vessel speeds and behavior - No enforcement capabilities for non-compliant vessels -Limited geographic scope of slowdown region in recent trials

5. Relevant Case Studies from Other Regions

An essential component of effective best management practices involves ensuring real-time situational awareness. I elaborate on this concept, providing examples such as Canada's efforts, the ECHO program, and ongoing North Atlantic Right Whales recovery initiatives along the US east coast.

a. Canada’s efforts to protect Southern Residents

Since 2001, SRKW has been designated as threatened under Schedule 1 of the Species at Risk Act (SARA) (*Fisheries and Oceans Canada,* 2018). Canada has established several critical programs and measures, including OceanWise, the ECHO program, the Marine Mammal Desk, Interim Sanctuary Zones (ISZs), and the Whale Report Alert System (WRAS) system, also utilized in the United States for commercial vessels. ISZs are compulsory exclusion zones designated as "no-go" areas due to the presence of the SRKW, a measure not presently implemented in the United States and more difficult to apply to Washington's waterways due to narrow passages in some areas, which could produce conflict with shipping lanes.

Canada's Marine Mammal Desk (MMD), a loose model for Puget Sound's new Cetacean Desk, oversees enforcement in designated slowdown and no-go zones. The MMD utilizes AIS messages and screenshots to identify violations in these areas, which relevant agencies then process. Subsequently, tickets are issued to the owners of vessels found to have violated regulations. Canada's WRAS, established in 2018, enhances situational awareness among large commercial vessels by providing real-time whale sightings and reports (*OceanWise,* 2023).

The ECHO program, initiated in 2014, is a voluntary effort to mitigate acoustic disturbances and address other potential threats to the SRKW in Canadian waters (*Port of Vancouver,* 2024), which the U.S. Quiet Sound program is modeled after. In January and July 2015, a study conducted as part of Canada's ECHO program and published in 2017, *Regional Ocean Noise Contributors | Enhancing Cetacean Habitat and Observation Program,* aimed to assess the noise levels generated by different vessels, including commercial, recreational, and fishing vessels. Canada has led in these efforts, paving a solid path for the U.S. to follow on SRKW conservation efforts.

b. North Atlantic Right Whale

Like the SRKW, the North Atlantic Right Whales (NARW) is listed as endangered under the ESA (*Koubrak et al.,* 2020). NARW are known to frequent the waters off the coast of New England for foraging purposes, extending northward into Canadian Atlantic waters, and ranging as far south as the coast of Florida (*NOAA,* 2024). Following near extinction from overharvest in the early 1900s, the NARW population slowly rebounded, only to face new threats from vessel strikes and entanglement in fishing gear in the Atlantic Ocean (*Marine Mammal Commission,* 2023). Given the extensive migration patterns of NARW, collaborative efforts between the United States and Canada have been underway to develop policies and regulations aimed at their recovery. These initiatives serve as potential models for guiding conservation efforts for SRKW in the Puget Sound region.

The Canadian Government enacted the Canada Shipping Act of 2001, which mandates the rerouting of ships away from whale habitats and establishes stringent speed reduction zones for vessels (*Koubrak et al.,* 2020). In response to the surge in whale deaths during the summer of 2017, stakeholders collaborated on measures such as fishery closures and additional speed reduction zones (*Koubrak et al.,* 2020). Implementing these regulations led to no reported mortalities of NARW in 2018. However, in 2019, 16 deaths were reported (*Koubrak et al.,* 2020). Stakeholders addressing NARW challenges face a situation analogous to that concerning SRKW in Puget Sound: insufficient real-time situational understanding of the whales' whereabouts and behavior.

On March 5, 2024, NOAA organized a workshop on developing technology to reduce the risk of vessel strikes on NARW. As industry, scientists, and environmental organizations noted, what once worked to protect NARW is no longer working (*NOAA NARW Technology Workshop,* 2024). The workshop aimed to bring together diverse stakeholders to assess existing technologies, identify areas where technological advancements are needed, and to promote collaboration among various entities. The overarching objective was to enhance situational awareness and contribute to the overall recovery efforts for NARW (*NOAA NARW Technology Workshop,* 2024). One important lesson from this workshop is the critical need for real-time situational awareness to prevent vessel impacts. It's procedurally challenging to change shipping

lanes, and because the movements of cetaceans are unpredictable, having situational awareness by captains and crew is essential to protect NARWs from additional harm. As of May 22, 2024, the Biden-Harris Administration announced that $6 million of the allotted $82 million in Inflation Reduction Act funding will advance projects developing technologies to minimize risk from vessel strikes (*The Fishing Wire,* 2024).

6. Data gaps and ORCA Task Force Recommendations still unfulfilled

a. Vessel strikes are rare for SRKW; harm from strikes is often unclear.

Quantifying the number of vessel strikes on SRKW presents difficulties. Particularly with larger commercial vessels, collisions may go undetected, with evidence of impact only becoming apparent when a whale surfaces or is found dead. Studies indicate a heightened risk of vessel strikes to marine mammals at higher speeds, such as those reached by vessels exceeding 25 knots. This risk is acknowledged and addressed for the safety of operators, passengers, and crew in the United States Coast Guard's NVIC. According to a representative from the SeaDoc Society, comprehensive data on vessel strikes as a threat to SRKW is lacking. While vessel strikes are known to pose a significant mortality risk for slower and larger whale species, such as humpback whales, instances involving killer whales, including SRKW, are less well documented. Although there have been reports of NRKW being struck by propellers, the extent of such incidents for SRKW remains unquantified.

b. Actual SRKW presence is hard to predict.

The foremost technological gap aboard vessels currently lies in real-time situational awareness of vessel operators. This challenge is particularly pronounced for SRKW, known for their rapid movements, making instantaneous situational awareness a formidable task. In a recent workshop convened by NOAA to address recovery efforts for NARW, participants highlighted the need to effectively relay such data to vessels in real-time (*North Atlantic Right Whale Vessel Strike Risk Reduction Technology Workshop | NOAA Fisheries*, 2024). Additionally, there was a discussion about the optimal range of detection devices for transmitting this critical information. As a speaker at the workshop emphasized, the greater the detection device's range, the more effective it can be, especially for swiftly moving mammals like SRKWs.

SRKW exhibit somewhat unpredictable behavior patterns in Puget Sound. Recently, there have been sightings of SRKW in areas they formerly avoided, such as Saratoga Passage, and they are utilizing Puget Sound earlier in the fall than previously observed. According to a member of the ORCA Network, this shift in behavior is believed to be influenced by the emergence of a new matriarch in J Pod. The unpredictability of SRKW movements raises concerns about the effectiveness of range and real-time detection of whales by vessels, particularly those traveling at speeds exceeding 30 knots through Puget Sound.

c. ORCA Task Force Recommendations still unfulfilled

Recommendation 20 of the ORCA Task Force similarly calls for enhanced enforcement, including rigorous enforcement of regulations concerning small vessels to safeguard SRKW (ORCA Task Force, 2018). No state agency or department is directly responsible for cetacean protection, however. The ORCA Task Force advocates for establishing a Marine Enforcement Division within WDFW, consisting of four additional officer positions dedicated to protection and enforcement in Puget Sound (*ORCA Task Force,* 2018), a recommendation yet to be fulfilled.

Recommendation 19 proposes requiring all recreational vessels to obtain the "Be Whale Wise" certification (*ORCA Task Force,* 2018). Be Whale Wise is a collaborative effort among governmental agencies, non-profit organizations, and other British Columbia, Canada, and Washington state stakeholders. Its mission is to research, promote, and educate on laws and best practices for vessel operation to safeguard the region's distinct and delicate marine ecosystem (Be Whale Wise, 2024). However, this recommendation still needs to be implemented, and the report is silent on how such a rule would be applied to professional mariners such as those captaining POFs.

7. Technology holds promise, but uncertainties remain

a. Technological advances in vessel design

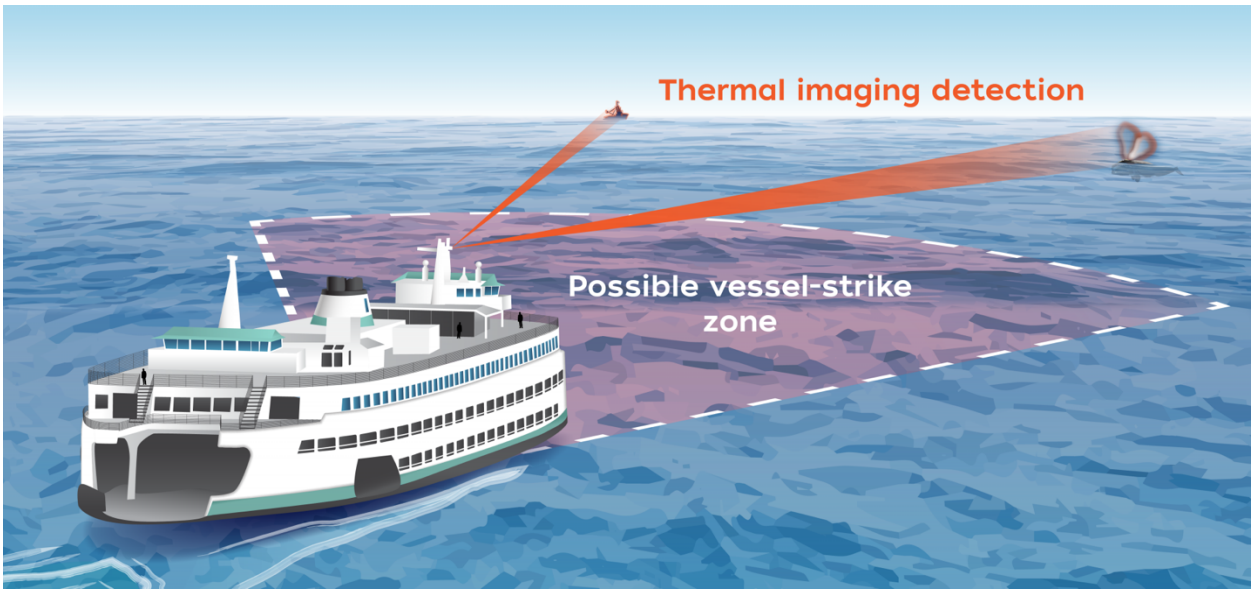

Figure 5.

This graphic shows how a thermal infrared camera could provide real-time situational awareness if mounted on a large vessel (Illustration by Natalie Renier, WHOI Creative) (Hugus, 2020).

Progress is underway in vessel design, encompassing both boat construction and the integration of supplementary technologies, driven by a growing demand for enhanced data collection. One notable example is UnCruise Adventures, a Seattle-based company, which secured the Navy Challenge Project for Autonomous Detection of Marine Mammals, receiving a $50,000 grant to support research and development aimed at commercializing an onboard audio and visual whale detection device (*UnCruise Adventures* 2023). This technology incorporates a data collection system capable of recording time-synchronized audio sensor data alongside video recordings (*UnCruise Adventures,* 2023). Initial detection is performed by an onboard PC, after which the data can be transmitted to the cloud for subsequent analysis (*UnCruise Adventures,* 2023). The collection methodology involves using two underwater acoustic sensors, hydrophones with a bandwidth suitable for detecting killer and right whales' acoustic emissions, and a FLIR M400 premium multi-sensor marine thermal camera (*UnCruise Adventures,* 2023). As of April 2023, this technology was still in the first phases of what they termed “a multi-stage effort” (*UnCruise Adventures,* 2023).

Efforts led by scientists and engineers from Woods Hole Oceanographic Institution (WHOI) have focused on developing a thermal infrared camera designed for whale detection on ships, thereby affording real-time situational awareness of whale presence (*Hugus,* 2020). According to lead scientist Dan Zitterbart, this technology, whether harnessed independently or in synergy with acoustic monitoring systems, holds the promise of markedly reducing vessel risks to whales (*Hugus,* 2020). These efforts have extended to deploying a thermal infrared camera system on a ferry dock on Galiano Island, British Columbia (*Lubofsky,* 2019). Once these technologies are proven effective, integrating such innovations in strategic locales across Puget Sound potentially adds protective measures for SRKW.

Installing thermal infrared cameras in Puget Sound could significantly expedite data transfer to the Cetacean Desk. From there, this information could be quickly sent to ships in the area, helping them navigate more safely. Additionally, there are new developments in how boats are designed, such as the fast foil ferry introduced by Maritime Blue. This new type of ferry supports Washington state's goals to reduce emissions and helps lower underwater noise. Moreover, it supports the ORCA Task Force's Recommendation 23, which aims to decrease noise from ferries. Technology alone is not a complete solution; an all hands on deck approach is necessary to protect the SRKW from POFs.

b. While NOAA holds considerable influence, it has yet to fully engage with this threat in Puget Sound.

NOAA possesses legal authority under both the MMPA and the ESA. Notably, Section 7 of the ESA mandates that federal agencies must engage in consultation with NOAA Fisheries whenever their actions, funding, or authorizations have the potential to impact a species listed as threatened or endangered under the Endangered Species Act or its designated critical habitat (*NOAA,* 2024). However, as per a NOAA representative, the regulation of specific types of vessels falls outside the agency’s purview, and thus far, there has yet to be a situation involving Puget Sound’s POFs that has triggered federal involvement. According to the NOAA representative, should such a situation arise, NOAA could establish a more general set of rules, though not necessarily one specific to POF vessels.

Although applying regulatory restrictions to a particular class of vessels (e.g., POFs) appears to present challenges, the imposition of speed restrictions already has precedent for North Atlantic Right Whales. Vessels > 65 feet long were requested by NOAA in 2008 to voluntarily reduce speeds to 10 knots or less in specific locations at certain times of the year, in so-called Dynamic (or Seasonal) Management Areas (Department of Commerce NOAA 50 CFR Part 224, October 10, 2008). While these measures expired in 2013, NOAA has followed with revisions utilizing a mix of voluntary and mandatory slowdowns (see NOAA Fisheries, "Rule to Amend the North Atlantic Right Whale Vessel Speed Regulations Closed for Comment," July 29, 2022, and "Reducing Vessel Strikes to North Atlantic Right Whales," May 31, 2024). The NARW example illustrates that NOAA has the power to regulate vessel speed to protect endangered cetaceans *(NOAA Fisheries Amendments,* 2024).

NOAA has also developed an interactive speed zone dashboard for NARW, which showcases compliance with speed reductions using AIS (*NOAA North Atlantic Right Whale,* 2024). The same NOAA representative pointed out that NOAA had attempted to establish a similar rule for inland Washington waters on behalf of the SRKW protection, although applied more broadly, as there were no vessel size limitations. An outline for vessel size limitation is a feature of the NARW measures that may have made the rules more acceptable to the shipping industry and others who transit waters. Washington state has now included speed limits in its state regulations.

NEPA requires federal agencies involved in proposed actions to evaluate environmental impacts before making decisions, considering ecological and socio-economic implications (EPA, 2024). In this context, NOAA would be among the federal agencies participating in these assessments. Considering NEPA prerequisites and upon the occurrence of a federal nexus, introducing an additional 6,241 hours of POF service into Puget Sound could significantly impede the recovery of SRKW. In the context of NEPA, a federal nexus is triggered when a federal agency is involved in activities that may have environmental impacts. Once triggered, NEPA requires the federal agency to conduct an environmental review and assess the proposed action or project, considering its potential environmental effects and alternatives. This review process aims to ensure that environmental considerations are integrated into the decision-making process of federal agencies. In this scenario, NOAA may have the opportunity to intervene and

enact provisions, such as imposing specific speed reductions on POFs permitted to operate in Puget Sound.

As evidenced by various studies, including the ORCA Task Force Recommendations, the NMFS 5-year SRKW review, *Species in the Spotlight* report, and a decade of research and conservation efforts, various impacts from vessels, i.e., strikes, noise, and presence, can represent a significant obstacle to recovery. Such an escalation in risks posed by vessels to SRKW could create a procedural tipping point, as the increasing risk posed by vessels negatively impacts SRKW. This underscores the need to strengthen enforcement, including regulating small vessels to safeguard SRKW (*ORCA Task Force,* 2018). Regulating POFs in Puget Sound may prove necessary, along with other measures. However, their enforcement powers would likely be limited to Washington state law, such as enforcing the required separation zone between cetaceans and recreational and commercial whale-watching vessels. The efforts of the USCG Cetacean Desk add yet another dimension, providing real-time data that potentially elevates situational awareness for all parties that engage with the SRKW.

c. Voluntary measures may be the answer.

Future regulations addressing vessel impacts on SRKW in Puget Sound are anticipated.. Encouragingly, Quiet Sound's voluntary slowdown measures have shown promising results, with a 70% compliance rate locally. The Puget Sound Pilots played a vital role, advising masters of foreign flag vessels to heed the slowdowns. USCG's involvement in such voluntary efforts would likely also be instrumental to engaging a greater variety of vessels in Puget Sound, as the original Quiet Sound initiative applied only to foreign-flag vessels under maritime pilotage. Moreover, establishing the Cetacean Desk bridges a crucial data collection and communication gap. Another voluntary measure is the "Whales in Our Waters" training, which aims to help mariners recognize local whales and provides suggested navigation strategies when encountering them on the Pacific Northwest coast (*Whales in Our Waters,* 2024). Whales in Our Waters training is provided online and works with the ECHO Program through the Port of Vancouver (*Whales in Our Waters,* 2024).

The framework provided by the Puget Sound Harbor Safety Committee on Standard of Care (SOC) could be adapted to bolster efforts to protect the SRKW population, particularly

considering the growing risk posed by POF traffic. This could take the form of 1) employing dedicated spotters, the practice reported by Kitsap Transit fast ferries; 2) ensuring that both spotters and bridge crews make efforts to maintain a minimum distance of half a nautical mile (1000 meters) from SRKW; and 3) reducing speed when vessels are within half a nautical mile of SRKW. Such rules could be enforced by the USCG.

8. Conclusion

This analysis mainly addresses threats to the SRKW from vessels: underwater noise, physical disturbance, and strike risk. However, for the SRKW population to recover, many other threats must be addressed, including habitat degradation, pollution, prey depletion, and disturbance by recreational vessel traffic. These additional threats contribute to the overall risk to the declining SRKW population as each poses significant challenges to long-term recovery and survival. Southern Residents will need an all-hands-on-deck approach to address the problem adequately.

In this policy analysis, I have described the known and potential impacts of vessels on Puget Sound's SRKW population. Managing vessel traffic in Puget Sound represents a complex and pressing challenge with significant implications for the conservation and recovery of the SRKW population. Through a comprehensive analysis of existing policies, regulatory frameworks, literature review, and stakeholder perspectives, this analysis has illuminated the complex nature of the issue and identified critical gaps in current approaches. The findings underscore the urgent need for coordinated and proactive measures to mitigate the adverse impacts of vessel traffic on SRKW.

Moreover, the analysis has revealed the limitations of existing regulatory mechanisms in effectively addressing these challenges. While various agencies and organizations play roles in managing vessel traffic, there is a clear need for enhanced coordination, strengthened regulations, and innovative solutions to safeguard SRKW habitat and mitigate the risks posed by vessel traffic.

This thesis advocates for the implementation of standardized speed zones, the utilization of real-time monitoring technologies, and the development of tailored best management practices to address the conservation needs of SRKW. It emphasizes adopting a multifaceted approach, incorporating voluntary initiatives, technological advancements, and regulatory measures.

Recognizing the complexity of the issue, the thesis emphasizes the importance of a collaborative, multi-agency approach, as no single entity possesses all the required resources, expertise, and authority. Effective communication and cooperation among stakeholders is essential for successfully implementing these measures. These initiatives hold promise by reducing vessel-related disturbances, mitigating collision risks, and safeguarding the long-term viability of the SRKW population. However, they also entail challenges and uncertainties that must be addressed through ongoing collaboration, coordination, and communication among agencies.

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10. Appendix

Appendix 1.

Public Officials	**Industry**	**Federal Government**	**Local Agencies**	**Environmental Interests**
-City of Shoreline	-KPFF Consulting Engineers	-Cetacean Desk -National Oceanic and Atmospheric Association -U.S. Coast Guard	-Governor's Salmon Recovery -Pacific Whale Watch Association - Puget Sound Regional Council -Puget Sound Partnership -Washington State Ferries	- Natural Resources Defense Council -ORCA Network -Quiet Sound -SeaDoc Society

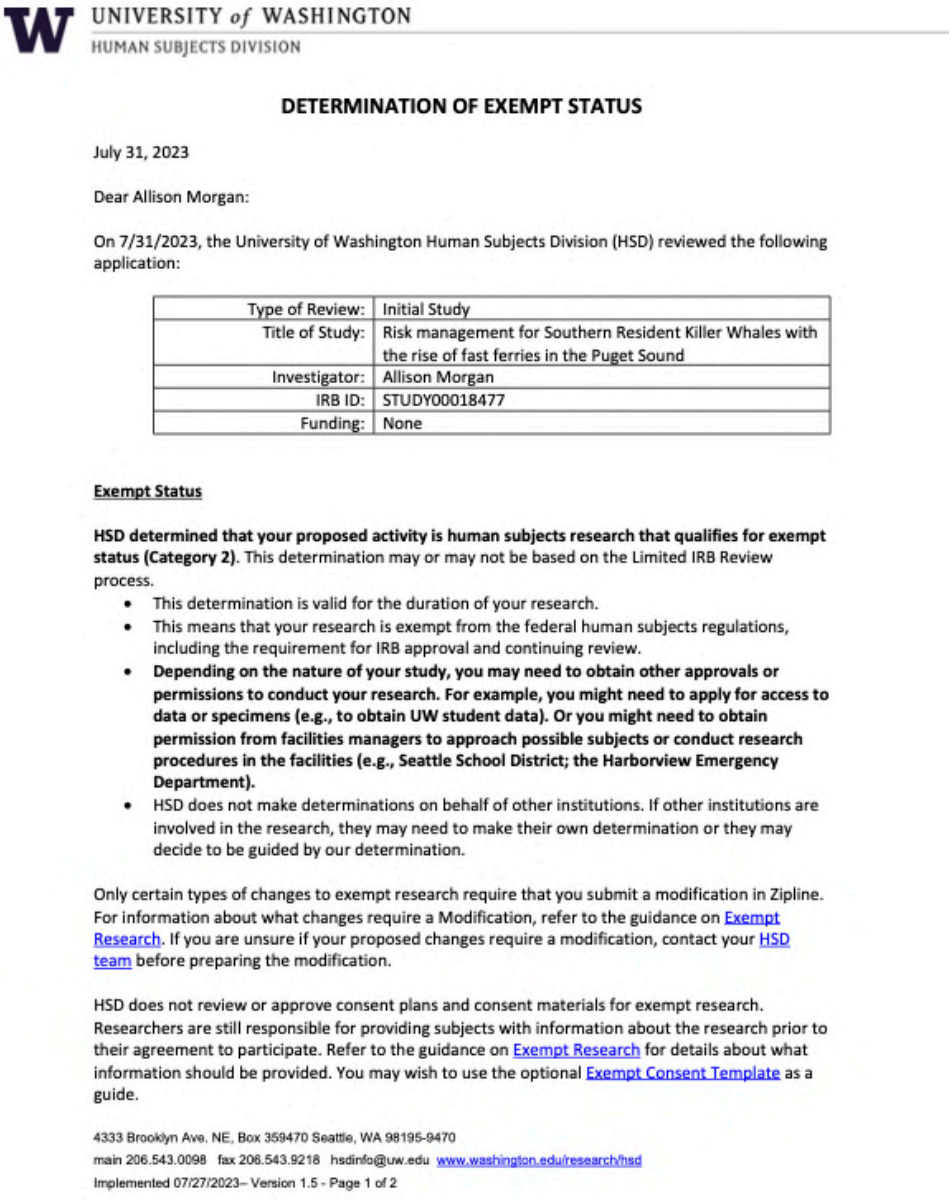
Organizations and entities with which I conducted interviews.

Appendix 2.

ORCA Checklist URL.

https://ecology.wa.gov/regulations-permits/sepa/environmental-review/sepa-guidance/sepa-checklist-guidance/sepa-checklist-supplemental-orca-checklist-guidanc

Appendix 3.



UNIVERSITY of WASHINGTON
HUMAN SUBJECTS DIVISION

DETERMINATION OF EXEMPT STATUS

July 31, 2023

Dear Allison Morgan:

On 7/31/2023, the University of Washington Human Subjects Division (HSD) reviewed the following application:

Type of Review:	Initial Study
Title of Study:	Risk management for Southern Resident Killer Whales with the rise of fast ferries in the Puget Sound
Investigator:	Allison Morgan
IRB ID:	STUDY00018477
Funding:	None

Exempt Status

HSD determined that your proposed activity is human subjects research that qualifies for exempt status (Category 2). This determination may or may not be based on the Limited IRB Review process.

- This determination is valid for the duration of your research.
- This means that your research is exempt from the federal human subjects regulations, including the requirement for IRB approval and continuing review.
- **Depending on the nature of your study, you may need to obtain other approvals or permissions to conduct your research. For example, you might need to apply for access to data or specimens (e.g., to obtain UW student data). Or you might need to obtain permission from facilities managers to approach possible subjects or conduct research procedures in the facilities (e.g., Seattle School District; the Harborview Emergency Department).**
- HSD does not make determinations on behalf of other institutions. If other institutions are involved in the research, they may need to make their own determination or they may decide to be guided by our determination.

Only certain types of changes to exempt research require that you submit a modification in Zipline. For information about what changes require a Modification, refer to the guidance on Exempt Research. If you are unsure if your proposed changes require a modification, contact your HSD team before preparing the modification.

HSD does not review or approve consent plans and consent materials for exempt research. Researchers are still responsible for providing subjects with information about the research prior to their agreement to participate. Refer to the guidance on Exempt Research for details about what information should be provided. You may wish to use the optional Exempt Consent Template as a guide.

4333 Brooklyn Ave. NE, Box 359470 Seattle, WA 98195-9470
main 206.543.0098 fax 206.543.9218 hsdinfo@uw.edu www.washington.edu/research/hsd
Implemented 07/27/2023– Version 1.5 - Page 1 of 2

This is the letter of approval for using interviewing as my research method from the University of Washington's IRB.