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VESSEL TRAFFIC REGULATIONS TO PROTECT KILLER WHALES IN PUGET SOUND

Final Regulatory Impact Review

November 2010

prepared for:

NOAA Fisheries

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TABLE OF CONTENTS

LIST OF ACRONYMS

CCG	Canadian Coast Guard
CV	Contingent Valuation
CVTMS	United States Cooperative Vessel Traffic Management System
CVTS	Co-operative Vessel Traffic System
DPS	distinct population segment
Draft RIR	Draft Regulatory Impact Review
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
Final RIR	Final Regulatory Impact Review
IFAW	International Fund for Animal Welfare
IRFA	Initial Regulatory Flexibility Analysis
MCTS	Marine Communications and Traffic Services
MMPA	Marine Mammal Protection Act
NAICS	North American Industry Classification System
NMFS	National Marine Fisheries Service
PMC	Pembrokeshire Marine Code of Conduct
PSVTS	U.S. Coast Guard Sector Seattle U.S. Coast Guard Puget Sound Vessel Traffic System
PWWA	Pacific Whale Watch Association
RFA	Regulatory Flexibility Act
RMA	Risk Management Association
SBA	U.S. Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
SVI	Southern Vancouver Island
TSS	Traffic Separation Scheme
USCG	U.S. Coast Guard
VTCs	Vessel Traffic Centers
VTSPS	Vessel Traffic Services Puget Sound
WWOANW	Whale Watch Operators Association Northwest

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CHAPTER 1 | INTRODUCTION AND BACKGROUND

1. In July 2009, the National Marine Fisheries Service (NMFS) proposed vessel traffic regulations under the Federal Endangered Species Act (ESA) and the Marine Mammal Protection Act for killer whales in the Puget Sound region.[1] At that time, NMFS made available for public comment a Draft Regulatory Impact Review (Draft RIR) conducted in accordance with Presidential Executive Order (E.O.) 12866. The purpose of the Draft RIR was to provide a comparative analysis of the costs and benefits of the regulatory alternatives under consideration for the proposed action. This Final Regulatory Impact Review (Final RIR) updates the Draft RIR, incorporating new data gathered since the development of the Draft RIR, as well as additional information provided during the public comment period and by technical reviewers.

2. The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

3. E.O. 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." E.O. 12866 defines "significant regulatory action" as an action that is likely to:

    1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
    2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

[1] National Marine Fisheries Service, "Protective Regulations for Killer Whales in the Northwest Region Under the Endangered Species Act and Marine Mammal Protection Act" 50 CFR Part 224, July 29, 2009.

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

4. The information contained within this Final RIR, along with the information provided during the scoping and public comment period announced in the Advanced Notice of Proposed Rulemaking and Notice of Proposed Rulemaking, assists NMFS in selecting the regulatory approach that maximizes net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity). This Final RIR considers the potential socioeconomic impacts of the regulatory alternatives considered by NMFS, including the alternatives ultimately incorporated into NMFS' final regulations to protect killer whales from vessel effects in Puget Sound.

5. To ensure that the data and information presented within this Final RIR reflect the best available, we first relied on comprehensive literature and data searches. We then made the Draft RIR available for public comment, requesting whether the public was aware of additional data and information sources that should be considered. Finally, we relied on review by two technical reviewers with regional expertise in marine policy and economics.

6. The remainder of this Chapter summarizes the management history of the killer whales in Puget Sound, describes the vessel traffic management alternatives considered by NMFS, details the types and volumes of vessels currently trafficking Puget Sound, and provides an overview of the regional whale watching industry, as whale watching behavior is the primary focus of the proposed regulations. Chapter 2 then characterizes the parties likely to be affected by the vessel traffic management options and Chapter 3 contemplates how these parties may be affected by the regulations. Chapter 4 describes the extent to which the potentially affected parties may be small entities.

1.1 INTRODUCTION

7. NMFS listed the Southern Resident killer whale distinct population segment (DPS) as endangered under the ESA in November 2005, and identified vessel effects, including direct interference and sound, as potential contributing factors to the population decline.[2] The following year, in November 2006, NMFS published a final critical habitat designation for the killer whales.[3]

8. The Final Recovery Plan for the DPS, published in January of 2008, identifies the need to evaluate current guidelines and the need for regulations or protected areas for the killer

[2] National Marine Fisheries Service, "Endangered and Threatened Wildlife and Plants: Endangered Status for Southern Resident Killer Whales," 50 CFR Part 224, November 18, 2005.

[3] National Marine Fisheries Service, "Endangered and Threatened Species: Designation of Critical Habitat for the Southern Resident Killer Whales," 50 CFR Part 226, November 29, 2006.

whales.[4] In March 2007, NMFS published an Advanced Notice of Proposed Rulemaking describing its intent to consider whether to propose regulations governing vessel traffic in the proximity of killer whales.[5] As noted above, in July 2009, NMFS published a Notice of Proposed Rulemaking describing the proposed killer whale vessel regulations and anticipated regulatory impacts of those regulations.[6]

1.2 VESSEL TRAFFIC MANAGEMENT OPTIONS

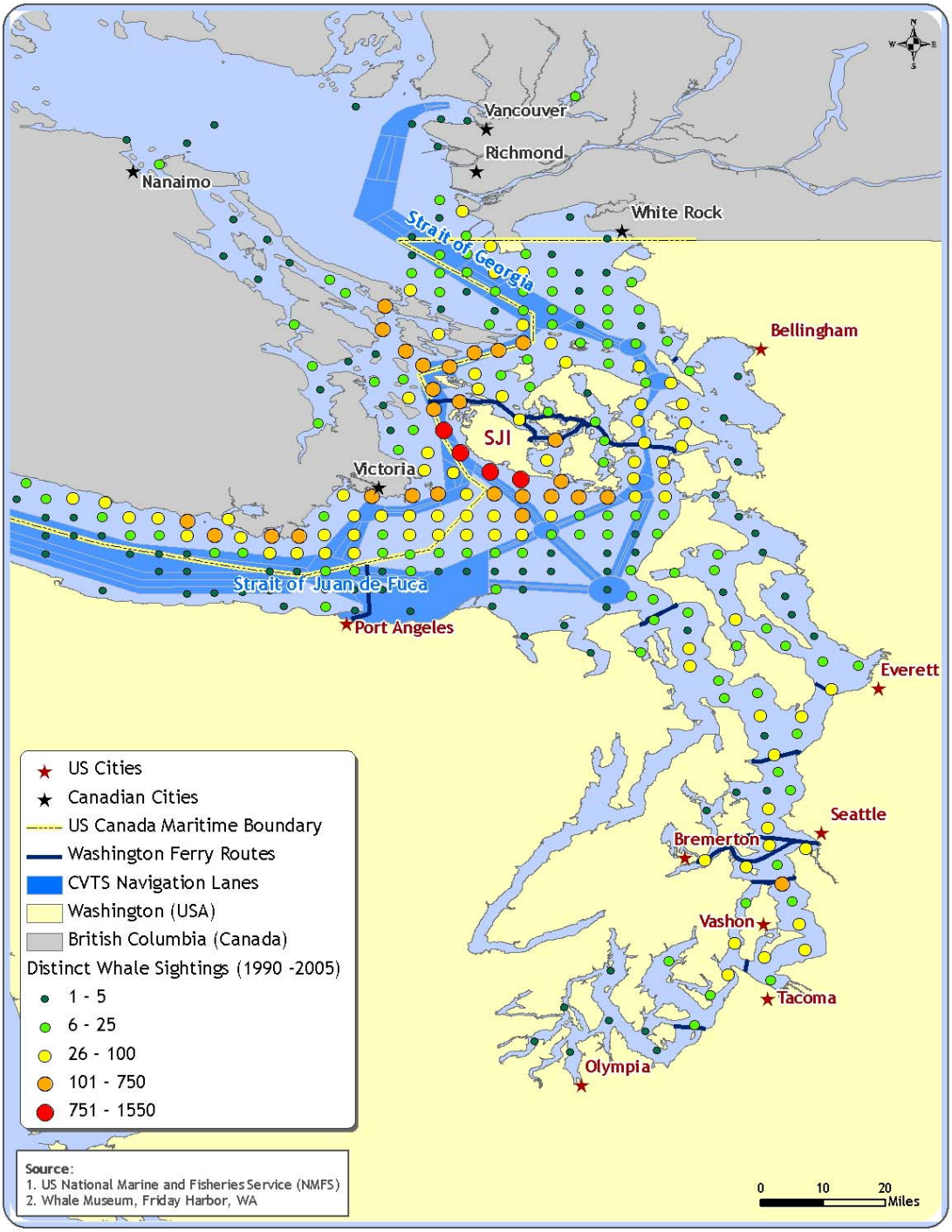
9. The waters of Puget Sound support many vessel-based industrial and recreational activities, including shipping, fishing, military training, and recreational boating, as well as whale and other wildlife viewing opportunities. The purpose of the proposed vessel traffic regulation in Puget Sound is to protect killer whales from potentially harmful vessel effects, as described in NMFS' Proposed Rule. Exhibit 1-1 maps the frequency of whale sightings in Puget Sound and adjacent waters, along with the established ferry routes and navigation routes that overlap the whales' habitat. Killer whales frequent the inland waterways of Puget Sound, Strait of Juan de Fuca, Haro Strait, and Strait of Georgia mostly between April and September. The whales start leaving in November and December for the open waters of the Pacific Ocean. The overlap and interactions between whales and vessel traffic are the focus of this analysis.

[4] National Marine Fisheries Service, Northwest Regional Office. January 2008. Final Recovery Plan for the Southern Resident Killer Whales (*Orcinus orca*).

[5] National Marine Fisheries Service, "Protective Regulations for Killer Whales in the Northwest Region Under the Endangered Species Act and Marine Mammal Protection Act: Advance Notice of Proposed Rulemaking," 50 CFR Part 216, March 22, 2007.

[6] National Marine Fisheries Service, "Protective Regulations for Killer Whales in the Northwest Region Under the Endangered Species Act and Marine Mammal Protection Act" 50 CFR Part 224, July 29, 2009.

EXHIBIT 1-1 WHALE SIGHTINGS IN PUGET SOUND AND ADJACENT WATERS



10. NMFS evaluated multiple options for vessel traffic regulations, including codifying the current whale watching guidelines, establishing a minimum approach rule, prohibiting vessel activities of concern, establishing time-area closures, and developing an operator permit or certification program. The alternatives specifically considered in Chapters 2 and 3 of this report, as described in the Proposed Rule, are:

    Alternative 1: No Action. NMFS would not promulgate any additional regulation. As this Alternative would not result in a change or impact to a regulated community, it is not considered further in this analysis.

    Alternative 2: 100 Yard Approach Regulation. Avoid approaching closer than 100 yards/meters to any whale.[7]

    Alternative 3: 200 Yard Approach Regulation. Avoid approaching closer than 200 yards/meters to any whale.

    Alternative 4: Protected Area – Current Voluntary No-Go Zone. Preclude boats from occupying areas within a quarter mile of the west coast of San Juan Island from Eagle Point to Mitchell Point, and within a half mile of a three kilometer stretch of shore centered on the Lime Kiln lighthouse. No vessels would be permitted in this area from May 1 through September 30.

    Alternative 5: Protected Area – Expanded No-Go Zone. Preclude boats from occupying areas within a half mile of the west coast of San Juan Island from Eagle Point to Mitchell Point. No vessels would be permitted in this area from May 1 through September 30.

    Alternative 6: Vessel speed regulations. Reduce speed to less than seven knots when within 400 yards/meters of the nearest whale.

    Alternative 7: Vessel path regulations. Avoid positioning vessels within the path of the whales.[8]

11. The following exemptions would apply to all regulations:

    1. The regulations would not apply to Federal, State, and local government vessels operating in the course of official duty.
    2. The regulations would not apply to vessels participating in the Vessel Tracking System and operating within the defined Traffic Separation Scheme shipping lanes.
    3. The regulations would not apply to activities, such as scientific research, authorized through a permit issues by NMFS or through a similar authorization.
    4. The regulations would not apply to treaty Indian fishing vessels lawfully engaged in actively setting, retrieving, or closely tending fishing gear.

[7] NMFS' "Be Whale Wise Guidelines" use the terms "yards" and "meters" interchangeably. This report therefore conflates these units of measure absent information on which is the specific standard.

[8] These proposed alternatives are described in more detail in the Proposed Rule: 74 Federal Register 37683.

5. The regulations would not apply to vessel operations necessary for safety to avoid an imminent and serious threat to a person or vessel.
6. The No-Go Zone regulation would not apply to personal use of private vessels owned by landowners for access to private property they owned adjacent to the No-Go Zone.

In addition, all regulations except for the No-Go Zone Alternatives (Alternatives 4 and 5) would not apply to commercial fishing vessels lawfully engaged in actively setting, retrieving, or closely tending fishing gear.[9]

12. Of the considered alternatives, NMFS specified three as part of "Alternative 8": Alternatives 3, 5, and 7. In addition, NMFS considered "Alternative 9," a combination of Alternatives 3 and 7. Ultimately, NMFS specifies Alternative 9 as the final vessel traffic regulations to protect killer whales in Puget Sound. The Final Rule therefore includes a 200 yard approach distance and vessel path regulations. While NMFS does not include a regulated No-Go Zone in the final regulation, NMFS will continue to evaluate the appropriateness of regulating a protected area for the purposes of killer whale conservation. Further information on this decision is provided in the Final Rule.

13. The exemptions described above reflect the focus of the proposed regulation on whale watching vessels in particular. In fact, outside of the No-Go Zone regulations, most other types of vessels (ferries, military vessels, shipping vessels, research vessels, legal treaty and non-treaty fishing vessels) operating in the region would be exempt from the vessel traffic regulations. As such, this Final RIR focuses specifically on potential impacts on the whale watching industry and participants in whale watching activities in the region. To provide context for the analysis, however, this report does provide information, where data are available, on the various vessel types operating within the Puget Sound region.

1.3 PROFILE OF VESSEL TRAFFIC IN PUGET SOUND, WASHINGTON

14. This section describes: 1) the types of vessels in the Puget Sound area by industry type; 2) overall vessel traffic patterns in Puget Sound; and 3) the U.S. and Canadian commercial and private whale watching industries, including background information on the current demand for whale watching in Washington.

15. Puget Sound connects to the Pacific Ocean to the west through the Strait of Juan de Fuca, and to the north through the Strait of Georgia. Haro Strait, which lies to the west of San Juan Island, is the main navigable channel that allows vessels to move between the Strait of Juan de Fuca and the Strait of Georgia.

16. The two largest and busiest ports in Puget Sound are the Ports of Seattle and Tacoma, which, combined, represent the second largest port in terms of volume of container traffic

[9] These proposed exemptions are as described in the Proposed Rule: 74 Federal Register 37683.

in North America, after Los Angeles/Long Beach.[10] Moreover, the Port of Vancouver, situated to the north of the greater Puget Sound area, ranks number one on the west coast of North America in terms of total cargo volume.[11] Thus, the Puget Sound waterways are some of the busiest in the world.

17. Most vessels found in the Puget Sound area can be grouped into five industry categories: shipping, fishing (both commercial and recreational), tourism (e.g., cruises, wildlife tours, Sound tours, whale watching), research, and recreation. The vessels contained in these industry categories vary from large container ships to small recreational vessels. In addition, military vessels operate within the Puget Sound region.

1.3.1 PUGET SOUND VESSEL TRAFFIC SYSTEM

18. Because Puget Sound is a water system that is important to the economies of both the United States and Canada, which share ownership of Puget Sound waters, vessel traffic is monitored at all times by the U.S. Coast Guard (USCG) and the Canadian Coast Guard (CCG). In 1979, the USCG and CCG established the Co-operative Vessel Traffic System (CVTS) by formal agreement to manage the movement of vessels in the shared waters of the two countries. The purpose of the CVTS is to manage vessel movements more efficiently, to promote the safety of vessels, and to minimize the risk of marine pollution.[12] The commercial vessels that participate in the system generally follow a series of well-defined navigation lanes called the Traffic Separation Scheme (TSS) established by the Vessel Traffic Services Puget Sound (VTSPS). The TSS comprises two traffic lanes with a separation zone in between.

19. The coverage area of the CVTS is split into several zones, which are managed by three Vessel Traffic Centers (VTCs): Seattle (United States), Tofino (Canada), and Victoria (Canada). Exhibit 1-2 maps the coverage of the VTCs and also shows the navigation lanes within which the vessels operate.

20. The VTC in Seattle is responsible for managing and monitoring vessels that move through the Strait of Juan de Fuca, Admiralty Inlet, Puget Sound and the San Juan Islands (including Rosario Strait but excluding Haro Strait, Boundary Pass). The Victoria VTC manages all traffic that is headed to Canadian ports through the Haro Strait , Boundary Pass and the Strait of Georgia.

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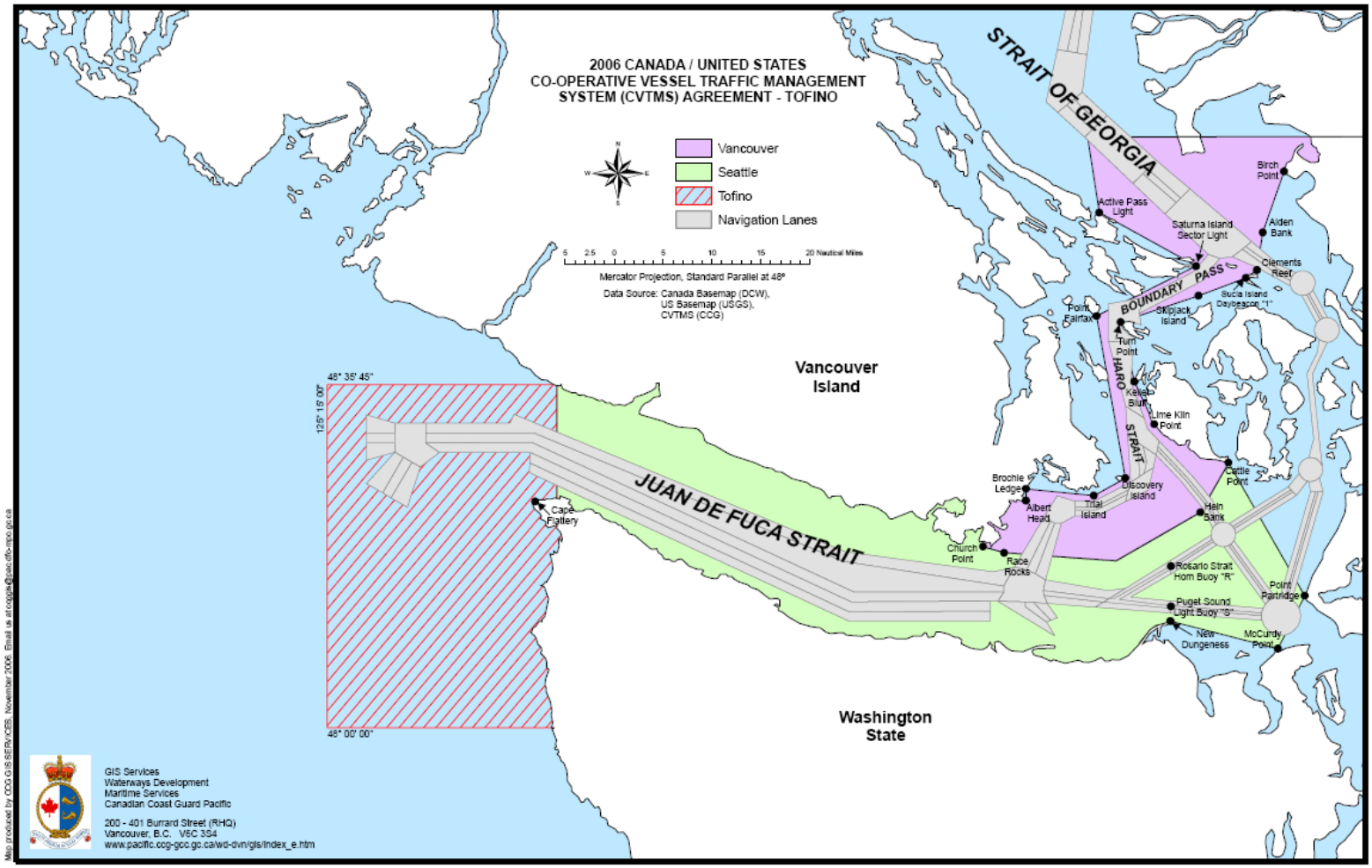
[10] Committee on Maritime Advanced Information Systems, National Research Council. 1999. Applying Advanced Information Systems to Ports and waterways Management, Appendix C: Maritime Advanced Information Systems Puget Sound Region. National Academies Press.

[11] Vancouver Port Authority. The Port of Vancouver. Accessed at http://www.portvancouver.com/trade_shipping/ on January 14, 2008.

[12] United States Coast Guard (USCG). Cooperative Vessel Traffic Service (CVTS) website. Accessed at http://www.uscg.mil/D13/publicaffairs/news/cooperative_vessel_traffic_servi.htm on January 5, 2008.

EXHIBIT 1-2 MAP OF CVTS AREAS MANAGED BY THE SEATTLE, TOFINO AND VICTORIA VESSEL TRAFFIC CENTERS[13]



[13] Map provided by Ian Wade, Regional Program Specialist Marine Communications and Traffic Services (MCTS), Canadian Coast Guard, Pacific Region. 2006 Canada/United States Cooperative Vessel Traffic Management System (CVTMS) Agreement - Tofino.

21. U.S. and Canadian regulations mandate that powered vessels more than 40 meters in length, tugs that are more than eight meters in length, and vessels carrying 50 or more passengers all participate in the monitoring and reporting system set in place by the CVTS. Thus, the VTC databases are a useful source of information on the types of vessels and the number of vessel transits through the region. Exhibit 1-3 summarizes the major types of vessels that operate in the Puget Sound region.

EXHIBIT 1-3 TYPES OF VESSELS OPERATING IN THE PUGET SOUND REGION

VESSEL TYPE	DESCRIPTION
Tanker	Ships in which the greater part of the cargo space is constructed or adapted for the carriage of liquid cargoes (oil, liquid petroleum or liquid chemicals).
Cargo / Freighter	Vessels utilized for the carriage of general cargo (e.g., locomotives, farm machinery, market goods), bulk cargo (e.g., grain, iron ore, coal), and containerized cargo.
Government	Any vessel owned by the Government of any country and not engaged in commercial trade.
Fishing	Any vessel used, outfitted, or designed for the purpose of catching, processing or transporting of fish.
Passenger Vessels	A ship utilized primarily for the carriage of human passengers. This does not include a ship identified as a "ferry" but includes recreational vessels. In the primary data source (VTS) used to measure vessel traffic in the Sound, this category does not include whale watching vessels.
Tugs	A vessel specifically designed for towing purposes.
Ferry	A vessel specifically designed for the carriage of passengers and/or vehicles (including trains) which transits between two ports on a regular schedule.
Other/Whale Watching Vessels	Whale watching vessels are typically classified as “other” types of vessels.

22. The Seattle and Victoria Vessel Traffic Centers record the number of transits made by these different vessel types. Exhibit 1-4 provides an average annual estimate of vessel transits in the area managed by the Seattle center outside of the Haro Strait, Boundary Pass, and Strait of Georgia.[14] Exhibit 1-5 provides a more detailed estimate of the vessel transits as monitored and recorded by the Victoria center specifically for Haro Strait, Boundary Pass and Strait of Georgia specifically during months whales are present. Because of the limitations of the electronic data collection system, it is not possible to describe the transit counts by the individual waterways. For comparison, vessel transits during the winter months of October through March are also provided in Exhibit 1-6.

23. In order to relate these transit counts to vessel counts, it is reasonable to assume that for the larger vessels (e.g., tankers, cargo vessels, and freighters), the ratio of the number of

[14] Personal communication with Mark Ashley, Operations Director, Puget Sound Vessel Traffic Service, U.S. Coast Guard Sector Seattle U.S. Coast Guard Puget Sound Vessel Traffic System (PSVTS).

transits per vessel is considerably smaller when compared to the number of transits made by smaller vessels, such as tugs and ferries. Tugs are servicing vessels that make many more transits to assist the primary vessels transporting goods. Ferries are engaged in shipping of daily passengers to and from the metropolitan areas of Vancouver and Seattle. Given the nature of service provided by tugs and ferries, the number of transits made by each tug and ferry will be substantially higher than the number of transits made by other vessel types. Hence, Exhibits 1-4 and 1-5 also provide vessel transit subtotals that exclude the transits made by tugs and ferries.

24. Although data on the actual number of vessels by type that operate in the area are not available, the Victoria VTC has recently started tracking the number of vessels, in addition to the number of transits.[15] CVTS data contains total vessel counts beginning in April 2007. Exhibit 1-7 lists the monthly vessel counts for April to December 2007 for the areas managed by the Victoria center.[16] The data suggest that on an average, 146 individual vessels use the waterways of Haro Strait, Boundary Pass and Strait of Georgia waterways daily; these are the areas most frequented by the killer whales. These areas are therefore the most likely to experience vessel-whale interactions. The daily average number of participating vessels appears to decrease seasonally, with more vessels operating in the area in summer, as compared to the winter months. As noted above, these vessel count statistics do not include the smaller recreational passenger and fishing vessels that are not required to participate in the CVTS system.

EXHIBIT 1-4 ESTIMATED ANNUAL TRANSITS IN THE PUGET SOUND AREA OUTSIDE OF HARO STRAIT, BOUNDARY PASS, AND STRAIT OF GEORGIA

VESSEL TYPE	AVERAGE ANNUAL TRANSITS
Tanker	636
Cargo/Freighter	3,702
Government	1,488
Other/Whale Watching	1,740
Subtotal	**7,566**
Tug	19,302
Ferry	153,360
Grand Total	**180,228**

Source: Mark Ashley, Operations Director, Puget Sound Vessel Traffic Service, U.S. Coast Guard Sector Seattle US Coast Guard Puget Sound Vessel Traffic System (PSVTS).

[15] The Puget Sound Marine Exchange is a non-profit membership association that maintains a comprehensive database about all *piloted* vessels arriving in Puget Sound and coastal ports of Washington. Data on vessel movements from the Puget Sound Marine Exchange were not available as of the writing of this analysis; these data may, however, supplement the information on transit counts provided by the U.S. and Canadian Vessel Traffic Centers.

[16] Personal communication with Ian Wade, Regional Program Specialist, Marine Communications and Traffic Services (MCTS), Canadian Coast Guard, Pacific Region. 2003 – 2007 summary statistics for Victoria MCTSC (VAK).

EXHIBIT 1-5 ESTIMATED TRANSITS THROUGH HARO STRAIT, BOUNDARY PASS, AND STRAIT OF GEORGIA WATERWAYS (APRIL – SEPTEMBER)

VESSEL TYPE	2007	2006	2005	2004	2003	AVERAGE
Tanker	306	363	405	321	321	**343**
Cargo/Freighter	3,125	4,037	4,190	4,549	4,523	**4,085**
Government	2,126	2,689	2,728	2,474	2,351	**2,474**
Fishing	875	1,301	1,571	1,865	1,418	**1,406**
Passenger Vessels	1,065	1,416	1,600	1,492	2,461	**1,607**
Other/Whale Watching Vessels[1]	3,841	3,981	4,182	4,163	3,672	**3,968**
Subtotal Movements	**11,338**	**13,787**	**14,676**	**14,864**	**14,746**	**13,882**
Tug	22,858	29,525	29,773	28,877	25,876	**27,382**
Ferry	48,968	50,211	51,447	51,201	49,570	**50,279**
Grand Total Movements	**83,164**	**93,523**	**95,896**	**94,942**	**90,192**	**91,543**

[1] "Other vessels" includes all vessels which participate in the VTS System in addition to vessel types defined in this table, including charter vessels, whale watching vessels or other kinds of recreation or private vessels. These vessel types are not tracked uniquely and this analysis can not further break down this category.
Source: Ian Wade, Regional Program Specialist Marine Communications and Traffic Services (MCTS), Canadian Coast Guard, Pacific Region.

EXHIBIT 1-6 ESTIMATED TRANSITS THROUGH HARO STRAIT, BOUNDARY PASS, AND STRAIT OF GEORGIA WATERWAYS (OCTOBER – MARCH)

VESSEL TYPE	2007-08[1]	2006-07	2005-06	2004-05	2003-04	AVERAGE
Tanker	136	316	287	290	266	**259**
Cargo/Freighter	1,536	3,615	4,177	4,178	4,347	**3,571**
Government	902	2,174	2,261	2,092	1,939	**1,874**
Fishing	323	935	1,146	1,523	1,731	**1,132**
Passenger Vessels	91	95	121	158	306	**154**
Other/Whale Watching Vessels[2]	1,816	3,471	3,454	3,722	3,782	**3,249**
Subtotal Movements	**4,804**	**10,606**	**11,446**	**11,963**	**12,371**	**10,238**
Tug	10,528	25,348	28,934	27,130	24,775	**23,343**
Ferry	22,412	44,111	45,664	45,846	45,314	**40,669**
Grand Total Movements	**37,744**	**80,065**	**86,044**	**84,939**	**82,460**	**74,250**

[1] For 2007-2008 data were only available on vessel counts for October, November and December 2007.
[2] "Other vessels" includes all vessels which participate in the VTS System in addition to vessel types defined in this table, including charter vessels, whale watching vessels or other kinds of recreation or private vessels. These vessel types are not tracked uniquely and this analysis can not further break down this category.
Source: Ian Wade, Regional Program Specialist Marine Communications and Traffic Services (MCTS), Canadian Coast Guard, Pacific Region.

EXHIBIT 1-7 DAILY AVERAGE NUMBER OF VESSELS PARTICIPATING IN CVTS FOR THE HARO STRAIT, BOUNDARY PASS, AND STRAIT OF GEORGIA WATERWAYS IN 2007

MONTH	DAILY AVERAGE NUMBER OF PARTICIPATING VESSELS
April	143
May	153
June	158
July	159
August	159
September	151
October	140
November	132
December	115
AVERAGE	**146**

Source: Ian Wade, Regional Program Specialist Marine Communications and Traffic Services (MCTS), Canadian Coast Guard, Pacific Region.

25. Oil tankers provide an important service to the major oil terminals located in the northern section of Puget Sound, which receive shipments from Alaska and elsewhere.[17] Vessels transporting containerized cargo and loose and other bulk goods are the most frequent large vessel types in the region. In addition, the Puget Sound region is also home to a large deep-sea and local fishing fleet, a substantial coastal freighter fleet, and several major U.S. Navy installations.[18]

26. As indicated by the large number of ferry transits in Exhibits 1-4 and 1-5, many passenger and car ferries operate throughout the region. While ferry systems in the Sound are both publicly and privately owned, the largest is the Washington State Ferry system, which is the third largest system in the world, serving eight counties in the Puget Sound and San Juan Islands area in Washington, as well as the Province of British Columbia in Canada. Washington State Ferries maintains a fleet of 28 vessels, making 500 trips per day to serve 20 terminal points along ten ferry routes.[19] Depending on their design, the ferries may carry between 100 to 200 vehicles, and between 1000 to 2500 passengers.[20]

[17] Committee on Maritime Advanced Information Systems, National Research Council, 1999. Applying Advanced Information Systems to Ports and waterways Management, Appendix C: Maritime Advanced Information Systems Puget Sound Region. National Academies Press.

[18] Ibid.

[19] Washington State Department of Transportation, 2002. Washington's Transportation Plan 2003 – 2022, Chapter 2.

[20] Washington State Department of Transportation. Washington State Ferries: History. Accessed at http://www.wsdot.wa.gov/ferries/your_wsf/index.cfm?fuseaction=our_history on January 5, 2008.

1.4 PROFILE OF THE REGIONAL WHALE WATCHING INDUSTRY

27. Puget Sound attracts all manner of recreational boating activities. Whale watching is particularly popular, especially near the western shores of San Juan Islands where most whale sightings are known to occur. As discussed above, killer whales frequent the inland waterways of Puget Sound, Strait of Juan de Fuca, Haro Strait, and Strait of Georgia mostly between April and September. The whale watching vessels are therefore most active during this period in Haro Strait near the San Juan Islands, with the highest densities occurring June through August.[21] The VTS data does not track whale watching vessels as separate vessel categories from other private vessels. Estimates of the number of vessels and areas of operation are therefore derived from whale watching-specific sources. As described above, NMFS' proposed vessel traffic regulations focus in particular on the threat to whales of whale watching vessel behavior. As a result, this analysis focuses on this activity.

1.4.1 ECONOMIC PROFILE OF THE WHALE WATCHING INDUSTRY IN WASHINGTON STATE

28. Most whale watching activity in the Puget Sound area occurs between April and September. The U.S. Fish and Wildlife Service estimated that, in 2006, approximately 304,000 U.S. residents over the age of 16 engaged in marine mammal wildlife viewing activities in Washington State that required travel, representing an increase of 46 percent from 2001.[22] The International Fund for Animal Welfare (IFAW) estimates that 425,000 people engaged in whale watching in Washington State in 2008, and that 150,000 of those were sea-based participants departing from the ports of Friday Harbor, Port Townsend, Anacortes, Port Angeles, and Bellingham in the Sound.[23,24] This estimate is somewhat lower than 1996 estimates from Soundwatch, a program of The Whale Museum that monitors whale watching activity in the Sound and estimated that 500,000 people annually engage in whale watching from commercial vessel and kayaks from both U.S. and Canadian ports in Puget Sound. Soundwatch also estimated that shore-based whale watching at Lime Kiln Point/Whale Watch State Park attracts nearly 200,000 visitors annually.[25]

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[21] Kari Koski, Soundwatch Coordinator, The Whale Museum. 2006. 2004 – 2005 Final Program Report: Soundwatch Public Outreach/Boater Education Project. The Whale Museum, Friday Harbor, Washington.

[22] U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

[23] International Fund for Animal Welfare 2009. 'Whale Watching Worldwide: Tourism numbers, expenditures, and expanding economic benefits." Prepared by Simon O'Connor, Economists at Large and Associates. Melbourne, Australia.

[24] Soundwatch estimates that approximately 500,000 individuals participate in whale watching in Washington State annually (Soundwatch 2009 Final Program Report). This number is relatively close to the 425,000 estimate reported by IFAW. This analysis relies on the IFAW estimate of participation levels to calculate the percentage of whale watchers potentially affected by the various alternatives. In the case that Soundwatch's estimate of 500,000 participants is more accurate, this analysis overstates the percentage of potentially affected whale watchers in Washington State.

[25] Koski, K. 2006. Soundwatch Public Outreach/Boater Education Project Final Program Report. Prepared for The Whale Museum.

29. The nature of the tours offered by different U.S.-based whale watching companies varies. Specifically, there are short (three to four hours) wildlife tours focused primarily on whale watching, similarly short wildlife tours on-board a high-speed boat or zodiac,[26] and full-day or multiple-day harbor cruises with multiple ports-of-call for lunch and shopping.[27] The price of whale watching tours varies with the nature of the tour. The price of a short wildlife tour on a generic boat ranges from approximately $60 to $80; the price of a short wildlife tour on a high-speed boat or zodiac ranges from approximately $99 to $115; the price of a full-day or multiple-day harbor cruise ranges from $250 to $500 depending on the length of the cruise. Private whale watching tours for small groups range in price from $400 to $625 depending on the length of the tour and the size of the group.[28]

30. Whale watching has been increasingly popular since the 1980's in the Haro Strait region.[29] Ticket sales first reached one million dollars in 1991, and reached $5.7 million by 1997.[30] IFAW estimates that the 425,000 whale watchers in Washington State spent $10.8 million in tickets for whale watching, and an additional $50 million on "indirect" expenditures such as food, travel, lodging, and souvenirs.[31] IFAW estimates that approximately 35 percent of participants were from Washington, while 65 percent were from out of state.

31. We applied IMPLAN, a regional economic model, to quantify the dollar value of goods and services produced, and employment generated, by consumer expenditures in the whale watching industry. For purposes of estimation, this analysis relies on the IFAW estimates of 150,000 sea-based participants (including both motorized vessels and kayaks) in commercial whale watching trips in the Puget Sound region. We include the expenditures only of those whale watch participants that depart from U.S. ports as it is most likely that participants on Canadian vessels are not spending in U.S. counties adjacent to Puget Sound. To the extent that additional land-based whale watchers and

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[26] A zodiac is a rigid-hulled inflatable boat. Information on zodiacs was accessed at http://www.zodiacmarineusa.com on January 3, 2008.

[27] Descriptions of the types of tours offered and the respective price ranges of each type of tour are based on a review of all Whale Watch Operators Association Northwest (WWOANW) member websites accessed at http://www.nwwhalewatchers.org/members.html on January 2, 2008.

[28] Descriptions of the types of tours offered and the respective price ranges of each type of tour are based on a review of all Whale Watch Operators Association Northwest (WWOANW) member websites found accessed at http://www.nwwhalewatchers.org/members.html on January 2, 2008.

[29] Data for the analysis presented in this section is courtesy of the Whale Museum that has maintained databases of whale sightings since 1990 and as part of its Soundwatch Program has been tracking commercial whale watch operators, recreational boaters and other vessels to record compliance with current best practice guidelines, especially in the Haro Strait region.

[30] Kari Koski, Soundwatch Coordinator, The Whale Museum. 2006. The Soundwatch Boater Education Program: Trends in vessel traffic with southern resident killer whales; The Whale Museum, Friday Harbor, Washington.

[31] Note that IFAW uses an unconventional definition of "indirect expenditures," classifying all direct trip expenditures other than those for tickets as "indirect." International Fund for Animal Welfare 2009. 'Whale Watching Worldwide: Tourism numbers, expenditures, and expanding economic benefits." Prepared by Simon O'Connor, Economists at Large and Associates. Melbourne, Australia.

those participating in non-commercial whale watching trips also spend on this activity within the regional economy, this analysis underestimates the impacts of the industry.

32. Regional economic modeling accounts for the interconnectedness of industries within a geographic area -- that is, industries not only supply goods and services to consumers, but also to each other. Thus, spending in one economic sector tends to have a larger impact on the regional economy as a whole. This concept is commonly referred to as the "multiplier" effect. IMPLAN is a regional economic model frequently used by state and Federal agencies for policy planning and evaluation purposes. For this analysis, IMPLAN translates estimates of whale watching trip expenditures (e.g., food, lodging, equipment, and gas) into changes in demand for inputs to affected industries within the Washington State counties adjacent to Puget Sound. The analysis estimates the impact of these activities with respect to regional economic output, value added, and employment. These measures are defined as follows:

- **Regional Economic Output —** Output represents the value of industry production. In IMPLAN, outputs are annual production estimates for the year of the dataset (2008 in this case) and are in producer prices. For manufacturers, output is sales plus/minus the change in inventory. For service sectors, production is equal to sales. For retail and wholesale trades, output is equal to the gross margin and not gross sales.[32]
- **Value Added —** Value added is defined as the gross output of an industry less its intermediate inputs; value added is a subset of the regional economic output.[33]
- **Employment —** Full or part-time employment. Employment is defined by the Bureau of Labor Statistics as "the total number of persons on establishment payrolls employed full or part time who received pay for any part of the pay period that includes the 12th day of the month." Temporary and intermittent employees are included.[34]

33. Exhibit 1-8 presents the assumptions used in this analysis about typical expenditures by whalewatchers in Puget Sound. The IFAW report estimates total annual expenditures per whale watching participant of $144.56. The IFAW report does not provide information on how these expenditures are distributed across items and industries (e.g., food or lodging). We therefore employ information from the U.S Fish and Wildlife Service's 2006 Survey of Fishing, Hunting, and Wildlife Viewing in Washington State to determine how expenditures may be allocated across typical wildlife viewing trip-related

[32] IMPLAN glossary, October 2010. Accessed at http://implan.com.

[33] IMPLAN measures value added as the sum of employee compensation, proprietors income, other property income, and indirect business tax. IMPLANPro, User's Guide, Analysis Guide, and Data Guide, 2004; U.S. Bureau of Economic Analysis, accessed at www.bea.gov on November 3, 2009.

[34] Bureau of Labor Statistics, Current Employment Statistics. Accessed at http://www.bls.gov/ces/cescope.htm#3.

industries.[35] Our assumptions regarding the breakdown of expenditures are provided in Exhibit 1-8.

EXHIBIT 1-8 EXPENDITURE PATTERN FOR PUGET SOUND WHALEWATCHERS USED IN REGIONAL ECONOMIC ANALYSIS.

EXPENDITURE CATEGORY	INDUSTRY SECTOR (IMPLAN SECTOR CODE)	ANNUAL EXPENDITURE PER WHALE WATCHING PARTICIPANT
Food	Food and beverage stores/ Restaurants (324/413)	$40.59 [a]
Lodging	Hotels and Motels (411)	$31.50 [a]
Transportation	Gasoline Stations (326)	$46.95 [a]
Other Trip Costs	Sightseeing, Water (338)	$25.52[b]
Total		$144.56[c]

[a] Calculated using the distribution in various expenditure categories by wildlife watchers in Washington State on food, lodging and transportation. (Source: U.S. Fish and Wildlife Service 2006 Survey of Fishing, Hunting, and Wildlife-Associated Recreation)

[b] Total expenditures on tickets by whale watchers in Washington State ($10.8 million) divided by the total number of whale watchers Statewide in 2008 (425,000). (Source: IFAW 2009)

[c] Total expenditures by whale watchers in Washington State on tickets, food, travel, accommodation, film, souvenirs, etc. other than air travel ($61.4 million) divided by the total number of whale watchers Statewide (425,000). (Source: IFAW 2009)

34. Applying the IFAW report estimate of 150,000 people participating in whale watching in Puget Sound, we estimate the regional whale watching industry contributes approximately $22.0 million in regional economic output annually and 196 jobs to the 12 counties adjacent to the whales' habitat area through direct, indirect, and induced expenditures related to the industry, as summarized in Exhibit 1-9.[36]

EXHIBIT 1-9 ESTIMATED REGIONAL ECONOMIC IMPACTS OF WHALE WATCHING INDUSTRY IN PUGET SOUND

EMPLOYMENT	TOTAL VALUE ADDED	REGIONAL ECONOMIC OUTPUT
196	$13,841,147	$21,959,632
Counties included in the study area include: Clallam, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Skagit, Snohomosh, Thurston, Whatcom		

[35] International Fund for Animal Welfare 2009. 'Whale Watching Worldwide: Tourism numbers, expenditures, and expanding economic benefits." Prepared by Simon O'Connor, Economists at Large and Associates. Melbourne, Australia; U.S. Fish and Wildlife Service 2006 Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

[36] IEc IMPLAN analysis using: IMPLAN Professional, Social Accounting, and Impact Analysis Software Version 3.0 in October 2010.

Limitations to IMPLAN Analysis

35. There are two important caveats relevant to the interpretation of IMPLAN model estimates, both generally and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at one point in time. Thus, IMPLAN does not account for subsequent adjustments that may occur, re-employment of workers displaced by the original policy change. Similarly, the analysis does not consider whether or how participants engaged in whale watching may spend on substitute activities absent opportunity for whale watching. In other words, the loss in regional economic output reported does not account for individuals that may substitute, for example, recreational boating or other types of wildlife viewing and therefore continue to spend in the regional economy on these other activities. In this analysis, this caveat implies that the long-run net output and employment effects resulting from cessation or reductions in whale watching activity in Puget Sound would be smaller than the model outputs suggest.

36. A second caveat to the IMPLAN analysis relates to the underlying data. The IMPLAN analysis relies upon input/output relationships derived from 2008 data, the most recent data available at the time of this analysis. The results do not reflect changes in the regional economy that may have occurred since 2008; the magnitude or nature of any such changes is unknown.

1.4.2 NUMBERS AND TYPES OF U.S.-BASED COMMERCIAL WHALE WATCHING VESSELS

37. A 2006 survey of the whale watching industry estimated that 28 to 29 commercial whale watching companies were based in the Puget Sound area of the U.S. Of these, approximately 17 operated motorized whale watching vessels, nine operated sea kayaks, and two offered land-based whale watching. The motorized vessel operating companies were based in eight different U.S. ports: Seattle, Bellingham, Everett, Anacortes, La Conner, Port Townsend, San Juan Island, and Orcas Island (multiple ports were contained on San Juan Island and Orcas Island).[37, 38]

38. Each of the motorized vessel whale watching company operated one to three vessels and offered one to five whale watching tours per day. During the prime whale watching season (May through September), a total of 22 to 24 U.S.-based vessels offered 37 whale watching trips each day in the Puget Sound area. The distributions of the number of

[37] A recent survey of the whale watching industry indicates that 18 U.S. companies may be operating motorized vehicles as of 2006; however, data are only available on 17 of those companies. Source: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[38] The Whale Museum. 2006. Soundwatch Public Outreach/Boater Education Project Final Program Report. The range of numbers for total whale watching vessels in the region reflects slight discrepancies in the two data sources.

vessels operated and the number of trips offered per day by each U.S. company in the Puget Sound area are presented in Exhibits 1-10 and 1-11.[39, 40]

EXHIBIT 1-10 DISTRIBUTION OF THE NUMBER OF VESSELS OPERATED BY U.S.-BASED WHALE WATCHING COMPANIES IN THE PUGET SOUND AREA

NUMBER OF VESSELS OPERATED	NUMBER OF COMPANIES
1	12
2	4
3	1
Total	**17**

Source: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

EXHIBIT 1-11 DISTRIBUTION OF THE NUMBER OF TRIPS OFFERED BY U.S.-BASED WHALE WATCHING COMPANIES IN THE PUGET SOUND AREA

NUMBER OF TRIPS OFFERED BY COMPANY PER DAY	PERCENT OF COMPANIES OFFERING RESPECTIVE NUMBER OF TRIPS	NUMBER OF COMPANIES OFFERING RESPECTIVE NUMBER OF TRIPS[1]
1	41.2%	7
2	29.4%	5
3	11.8%	2
4	5.9%	1
5	11.8%	2

[1] The "number of companies" values are calculated by taking the respective percent of companies out of the 17 total companies and rounding to the nearest integer.
Source: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[39] National Marine Fisheries Service: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[40] The Whale Museum. 2006. Soundwatch Public Outreach/Boater Education Project Final Program Report.

39. The size of the vessels operated by U.S.-based whale watching companies varied from large ferries, such as the fleet of "Victoria Clippers," operated by Victoria Navigation, Inc. with an operating passenger capacity of 200 people, to small recreational style boats, such as the 25-foot long, 2005 Glacier Bay 2270 Isle Runner owned by PrivateWhaleWatching.com and used to provide private tours to small parties no larger than six people.[41,42,43] The average operational passenger capacity of a U.S.-based, commercial whale watching vessel was approximately 55 people.[44] Thus, the maximum number of people participating in U.S.-based commercial whale watching in the Puget Sound area during the whale watching season was approximately 2,305 people per day.[45] Importantly, this should be considered an upper estimate as boats may not have been filled to capacity for each trip. As noted above, this profile reflects the whale watching industry as of 2006, the year in which the survey was implemented.

1.4.3 CANADIAN COMMERCIAL WHALE WATCHING INDUSTRY

40. In 2006, Soundwatch estimated that 22 Canadian-based, motorized vessel operating whale watching companies existed in the Puget Sound area.[46] Canadian whale watching companies were based in Canadian ports, such as, Victoria, Vancouver, Sooke, Sidney, Richmond, and Duncan.[47]

41. The types of whale watching tours offered by the 22 Canadian-based whale watching companies were similar to those offered by U.S. companies in the Puget Sound area.[48] Further, the prices charged by the 22 Canadian-based whale watching companies were comparable to the prices charged by U.S. companies in the Puget Sound area for the same type of tour.[49] Although detailed information is not readily available for Canadian whale watching companies in the Puget Sound area (i.e., vessel size, number of vessels operated, number of trips offered per day), this analysis assumes that Canadian whale watching companies operate similarly to U.S. whale watching companies in the Puget Sound area. To the extent that these vessels accommodate more or less passengers than

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[41] Information on "Victoria Clippers" accessed at http://www.clippervacations.com on January 3, 2008.

[42] Vessel capacity information found in: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[43] Vessel size, capacity, and tour description accessed at http://www.privatewhalewatching.com on January 3, 2008.

[44] Vessel capacity information found in: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[45] (37 trips offered per day) x (average maximum operating capacity of 55 people) = 2,035 people.

[46] The Whale Museum. 2006. Soundwatch Public Outreach/Boater Education Project Final Program Report.

[47] Based on a review of all Whale Watch Operators Association Northwest (WWOANW) member websites accessed at http://www.nwwhalewatchers.org/members.html on January 2, 2008.

[48] Based on a review of all Whale Watch Operators Association Northwest (WWOANW) member websites accessed at http://www.nwwhalewatchers.org/members.html on January 2, 2008.

[49] Kari Koski, Soundwatch Coordinator, The Whale Museum. 2006. 2004 – 2005 Final Program Report: Soundwatch Public Outreach/Boater Education Project. The Whale Museum, Friday Harbor, Washington.

the U.S. vessels, this analysis underestimates or overestimates the number of individuals affected on Canadian whale watching trips.

CHAPTER 2 | PARTIES POTENTIALLY AFFECTED BY VESSEL TRAFFIC REGULATIONS

42. In order to provide greater protection to the Puget Sound population of southern resident killer whales, NMFS considered multiple alternatives for the regulation of vessel traffic in the Sound. The individual regulatory alternatives specifically considered in this RIR, as described in NMFS' Environmental Assessment, include:

Alternative 1: No Action. NMFS would not promulgate any additional regulation. As this Alternative would not result in a change or impact to a regulated community, it is not considered further in this analysis.

Alternative 2: 100 Yard Approach Regulation. Avoid approaching closer than 100 yards/meters to any whale.[50]

Alternative 3: 200 Yard Approach Regulation. Avoid approaching closer than 200 yards/meters to any whale.

Alternative 4: Protected Area – Current Voluntary No-Go Zone. Preclude boats from occupying areas within a quarter mile of the west coast of San Juan Island from Eagle Point to Mitchell Point, and within a half mile of a three kilometer stretch of shore centered on the Lime Kiln lighthouse. No vessels would be permitted in this area from May 1 through September 30.

Alternative 5: Protected Area – Expanded No-Go Zone. Preclude boats from occupying areas within a half mile of the west coast of San Juan Island from Eagle Point to Mitchell Point. No vessels would be permitted in this area from May 1 through September 30.

Alternative 6: Vessel speed regulations. Reduce speed to less than seven knots when within 400 yards/meters of the nearest whale.

Alternative 7: Vessel path regulations. Avoid positioning vessels within the path of the whales.[51]

In addition, the following exemptions would apply to all regulations:

1. The regulations would not apply to Federal, State, and local government vessels operating in the course of official duty.

[50] NMFS' "Be Whale Wise Guidelines" use the terms "yards" and "meters" interchangeably. This report therefore conflates these units of measure absent information on which is the specific standard.

[51] These proposed alternatives are described in more detail in the Proposed Rule: 74 Federal Register 37683.

2. The regulations would not apply to vessels participating in the Vessel Tracking System and operating within the defined Traffic Separation Scheme shipping lanes.
3. The regulations would not apply to activities, such as scientific research, authorized through a permit issues by NMFS or through a similar authorization.
4. The regulations would not apply to treaty Indian fishing vessels lawfully engaged in actively setting, retrieving, or closely tending fishing gear.
5. The regulations would not apply to vessel operations necessary for safety to avoid an imminent and serious threat to a person or vessel.
6. The No-Go Zone regulation would not apply to personal use of private vessels owned by landowners for access to private property they owned adjacent to the No-Go Zone.

43. Further, all regulations except for the No-Go Zone Alternatives (Alternatives 4 and 5) would not apply to commercial fishing vessels lawfully engaged in actively setting, retrieving, or closely tending fishing gear.[52]

44. As described in Chapter 1, NMFS considered three of these alternatives (Alternatives 3, 5, and 7) in the Proposed Rule as "Alternative 8." In its Final Rule, however, NMFS narrows the regulation to include only Alternatives 3 and 7 ("Alternative 9"). The Final Rule does not include a regulated No-Go at this time. Further information on this decision is provided in the Final Rule.

45. Results of this analysis indicate that the parties expected to be affected by potential vessel traffic regulations are individuals engaged in commercial whale watching tours, private vessel-based whale watching activities, private recreational fishing activities, kayakers, and, to a lesser extent, commercial fishing vessels traversing these areas of the Sound. Exhibit 2-1 summarizes the results of this analysis.

- ALTERNATIVE 2: As detailed in Section 2.2.1, this analysis forecasts that Alternative 2 (100 yard approach regulation) may affect 11.25 commercial whale watching trips (carrying 619 passengers), 86.46 private whale watching trips (carrying 296 passengers), 29.04 private fishing trips (carrying 99 passengers), 8.13 kayaks (carrying 16 passengers), and 8.88 other vessel trips (potentially commercial fishing vessels while not engaged in fishing activity and therefore not exempt from the regulation) annually. For perspective, 931 whale watchers affected (the sum of 619, 296, and 16) is significantly less than one percent (0.2 percent) of the estimated 425,000 individuals participating in whale watching activities in Washington State annually.[53] NMFS does not include Alternative 2 in the final vessel traffic regulations.

[52] These proposed exemptions are as described in the Proposed Rule: 74 Federal Register 37683.

[53] The International Fund for Animal Welfare estimates that 425,000 individuals participated in whale watching activities in Washington State in 2008. (International Fund for Animal Welfare 2009. 'Whale Watching Worldwide: Tourism numbers,

- ALTERNATIVE 3: Data are limited regarding the distance of vessels from whales beyond the 100 meters/yards mark identified in existing whale watching guidelines. This complicates an assessment of the number of parties affected by Alternative 3 (200 yard approach regulation). Section 2.2.2 does, however, provide some information regarding number of vessels within 200 yards of whales as a function of the number of vessels within 100 yards. Applying the multiplier assumptions, this analysis estimates 2,811 individuals participating in commercial whale watching, 1,395 individuals participating in private whale watching and private recreational fishing, and 22 kayakers may be affected by Alternative 3. **NMFS includes this Alternative as part of the final vessel traffic regulations.**
- ALTERNATIVE 4: In the case that NMFS codifies the existing voluntary No-Go Zone regulation, this analysis estimates that between 10,676 and 12,267 whale watchers (2,458 on commercial motorized vessel tours, 187 on individual private vessels, and between 8,031 and 9,622 kayakers) may be affected. The potentially affected whale watchers represent up to 2.9 percent of whale watchers in Washington State. Some commercial fishing vessels may also be affected by the regulation of the No-Go Zone. Less than 86 gillnet vessels, 17 purse seine vessels, and three reef net sets, both Tribal and commercial may be fishing and shellfishing within the general region of the No-Go Zone. Information is not available to determine how many of these vessels may be operating specifically within the No-Go Zone and when, however. No other vessel-related activities occurring in the Sound are expected to be measurably affected by these potential regulations as described in Section 2.3.2. NMFS does not include Alternative 4 in the final vessel traffic regulations.
- ALTERNATIVE 5: This analysis estimates that up to 3.6 percent of all whale watchers in the State may be affected (5,382 commercial whale watch passengers, 509 on private vessels, and 8,031 to 9,622 kayakers) if the No-Go Zone off the west coast of San Juan Island is increased to a half mile. Data are not available to estimate how many more kayakers may be affected by the expanded No-Go Zone above and beyond those affected by Alternative 4. Similar to Alternative 4, some commercial fishing vessels may also be affected by the establishment of the expanded No-Go Zone are of Alternative 5. Aerial survey data from San Juan County for 2010 indicate that about 212 commercial fishing trips may be affected by Alternative 5 during peak fishing season (August 9 through September 5). Data are not available at this time, however, to determine how many commercial fishing trips may be affected throughout the entire seasonal closure period. No other vessel-related activities occurring in the Sound are expected to be measurably affected by these potential regulations as described in Section 2.3.3. NMFS does not include Alternative 5 in the final vessel traffic regulations.
- ALTERNATIVE 6: This analysis forecasts that 15.50 commercial whale watching trips (carrying 853 people), 85.91 private whale watching trips (carrying 294 people),

expenditures, and expanding economic benefits." Prepared by Simon O'Connor, Economists at Large and Associates. Melbourne, Australia.)

28.46 private fishing trips (carrying 97 people), and 8.88 "other" vessel trips may be affected annually if NMFS implements a vessel speed regulation in the vicinity of whales. Kayaks are not anticipated to be affected by this regulatory alternative. The 1,147 potentially affected whale watch participants (the sum of 853 and 294) represent less than one percent (0.3 percent) of the 425,000 individuals participating in whale watching activities in Washington State annually. NMFS does not include Alternative 6 in the final vessel traffic regulations.

- ALTERNATIVE 7: This analysis estimates that the potential vessel path regulation may affect 131 commercial whale watching trips (carrying 7,205 people), 85.13 private whale watching trips (carrying 291 people), 26.49 private fishing trips (carrying 91 people), 8.63 kayak trips (carrying 17 passengers), and 3.38 other vessel trips annually. The 7,513 potentially affected whale watch participants (the sum of 7,205, 291, and 17) represent approximately 1.8 percent of the estimated 425,000 individuals participating in whale watching activities in Washington State annually. **NMFS includes this Alternative as part of the final vessel traffic regulations.**

46. Exhibit 2-1 provides a summary of the existing data describing incidents of non-adherence to the whale watching guidelines; the sources of these data are described in Section 2.2 through 2.5. This analysis presents results for the same vessel categories as are considered in the monitoring data. For the approach, path, and vessel speed guidelines, incidents were separately tracked for private whale watching and private fishing vessels. The "private whale watching vessels" include motorized vessels engaged in all private recreational activity excluding fishing, including whale watching or cruising. The analysis conservatively assumes that the activities are whale-based and thus all are considered "private whale watching vessels." We therefore report affected parties associated with "private whale watching vessels" as affected whale watchers.

47. In tracking incidents of non-adherence to the No-Go Zone, however, the monitoring data do not separately report private vessels by activity but include one category for "individual private vessels." This category encompasses vessels engaged in whale watching, fishing, cruising, and other activities undertaken by private vessels. This analysis conservatively assumes that the activities for all of these vessels are whale-based. We therefore report affected parties associated with "private whale watching vessels" as affected whale watchers.

48. While some parties may be negatively affected by the proposed regulations, others stand to benefit. For example, shore-based whale watching at Lime Kiln Point/Whale Watch State Park has increased in recent years to nearly 200,000 visitors annually.[54] These 200,000 shore-based viewers may be positively affected by the reduced density of vessels occupying the Sound. On the other hand, in the case that displaced vessel-based whale watchers decide to instead participate in land-based viewing at Lime Kiln Point, some parties may be negatively affected by increased crowding. The extent to which this whale watcher migration may occur, however, is uncertain as land-based and vessel-based whale watching are not perfect substitutes.

[54]The Whale Museum. 2005. Soundwatch Public Outreach/Boater Education Project Final Program Report.

EXHIBIT 2-1 ESTIMATED NUMBER OF TRIPS/INDIVIDUALS POTENTIALLY AFFECTED BY VESSEL TRAFFIC REGULATIONS PER WHALE WATCHING SEASON

ALTERNATIVE	VESSEL TYPE AFFECTED	A: NUMBER OF TRIPS AFFECTED[1]	B: AVERAGE NUMBER OF PARTICIPANTS PER TRIP[2]	C = (A * B): NUMBER OF INDIVIDUALS AFFECTED[a]
APPROACH REGULATION ALTERNATIVES				
Alternative 2: 100 yard/meter approach	Private whale watching	86.46	3.42	296
	Private recreational fishing	29.04	3.42	99
	Commercial whale watching	11.25	55	619
	Individual kayaks	8.13	2	16
	Other	8.88	Unknown	Unknown
Alternative 3: 200 yard/meter approach	Private (whale watching and recreational fishing) [d]	407.75	3.42	1,395
	Commercial whale watching	51.11	55	2,811
	Individual kayaks	11.18	2	22
	Other	Unknown	Unknown	Unknown
PROTECTED AREA ALTERNATIVES				
Alternative 4: Existing voluntary No-Go Zone	Commercial whale watching	44.69	55	2,458
	Individual private vessels[c]	54.69	3.42	187
	Individual kayaks[b]	Unknown	2	8,031 - 9,622
	Commercial fishing	Unknown	Unknown	Unknown
Alternative 5: Expanded No-Go Zone	Commercial whale watching	97.85	55	5,382
	Individual private vessels[c]	148.77	3.42	509
	Individual kayaks[b]	Unknown	2	8,031 - 9,622
	Commercial fishing	212[3]	Unknown	Unknown
VESSEL SPEED REGULATION				
Alternative 6: Reduce speed to less than 7 knots within 400 meters	Private whale watching	85.91	3.42	294
	Private recreational fishing	28.46	3.42	97
	Commercial whale watching	15.50	55	853
	Other	8.88	Unknown	Unknown
PATH REGULATION				
Alternative 7: Avoid positioning vessels in the path of whales	Private whale watching	85.13	3.42	291
	Private recreational fishing	26.49	3.42	91
	Commercial whale watching	131.00	55	7,205
	Individual kayaks	8.63	2	17
	Other	3.38	Unknown	Unknown

Notes:

[a] The number of individuals affected is estimated by multiplying the number of trips affected by the average number of participants per trip for each vessel type and rounding to the nearest whole.

[b] As described in Section 2.3, the number of kayak trips affected by the Protected Area alternatives was estimated using data collected for use of the San Juan County boat launch during the 2010 whale watching season. The caveats and limitations of these data are described in Section 2.3. These data did not offer information on kayakers potentially affected by Alternative 5. As the No-Go Zone of Alternative 5 in inclusive of the No-Go Zone of Alternative 4, we assume at least as many kayakers would be affected by Alternative 5.

[c] The Protected Area Alternatives do not separately track private vessel activities, for example whale watching, fishing, or cruising. Thus, "Individual private vessels" include private recreation and fishing vessels, including whale watch vessels. Thus, this analysis conservatively assumes that, in the Protected Areas, all private vessels are participating in whale watch activities.

[d] The Alternative 3 analysis applies information from multiple sources, one of which does not separately track private whale watching and private recreational fishing vessels. As a result, private vessels are presented in the aggregate (see Section 2.2.2).

Sources:

[1] Based on data provided by Kari Koski, Soundwatch Coordinator, The Whale Museum: Soundwatch Public Outreach/Boater Education Project Final Program Report Data. 2003-2010.

[2] The average number of private vessel (both whale watching and recreational) trip participants is based on written communication with Kari Koski, Soundwatch Coordinator, The Whale Museum, August 1, 2008. The average number of commercial whale watching trip participants is based on written communication with Suzanne Russell, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Science Center, July 29, 2008. Consistent with assumptions employed by Soundwatch, we conservatively assume the average number of individuals per kayak is two. This likely overstates the number of potentially affected kayakers.

[3] Information on commercial fishing trips potentially affected by Alternative 5 is derived from San Juan County's report to NMFS regarding 2010 aerial survey efforts: Dismukes, Jeffrey S., Jonathan Riley, and Greg Crenshaw. Report to NMFS. "Quantification of Summer Season Marine Vessel Traffic Pressures in the San Juan Islands June 12 – September 5, 2010.

2.1 GUIDELINES FOR VESSELS OPERATING IN PUGET SOUND

49. The killer whales are afforded protection from take and harassment associated with their listing as endangered according to the Endangered Species Act and depleted under the Marine Mammal Protection Act (MMPA). Current MMPA and ESA prohibitions and NMFS Guidelines and Regulations are summarized in the Proposed Rule.[55] Additionally, the 2008 Washington State Orca Protection Law makes it illegal in State waters to:

- Approach within 100 yards of a killer whale;
- Intercept a killer whale by placing a vessel or allowing a vessel or other object to remain in the path and within 100 yards of a killer whale;
- Fail to immediately disengage a vessel's transmission within 100 yards of a killer whale; or
- Feed a killer whale.[56]

50. This State regulation went into effect in June 2008 and the Washington Department of Fish and Wildlife has enforced this law since 2008 with several violations issued and numerous warnings.

51. In addition to these protections, management agencies describe guidelines to ensure the protection of the species from vessels in the Sound. As part of the Soundwatch Public Outreach/Boater Education Project, the Whale Museum developed a set of voluntary guidelines known as the "Be Whale Wise Guidelines" (hereafter "whale watching guidelines"). Currently, the U.S. and Canadian governments and the Whale Watch Operators Association Northwest (WWOANW) have adopted these guidelines as a set of best practices for whale watching in the Puget Sound area.[57] Related to the killer whales, the whale watching guidelines specify:

1. Be cautious and courteous: approach areas of known or suspected marine mammal activity with extreme caution. Look in all directions before planning your approach or departure.
2. Slow down: reduce speed to less than seven knots when within 400 meters/yards of the nearest whale. Avoid abrupt course changes.
3. Avoid approaching closer than 100 meters/yards to any whale.
4. If your vessel is unexpectedly within 100 meters/yards of a whale/stop immediately and allow the whale to pass.
5. Avoid approaching whales from the front or from behind. Always approach and depart whales from the side, moving in a direction parallel to the direction of the whales.
6. Keep clear of the whales' path. Avoid positioning your vessel within the 400 meter/yard area in the path of the whales.

[55] 74 Federal Register 37676.

[56] Revised Code of Washington, Chapter 77.12.

[57] The Whale Museum. 2003. Soundwatch Public Outreach/Boater Education Project Final Program Report.

7. Stay on the offshore side of the whales when they are traveling close to shore. Remain at least 200 meters/yards offshore at all times.
8. Limit your viewing time to a recommended maximum of 30 minutes. This will minimize the cumulative impact of many vessels and give consideration to other viewers.
9. Do not swim with or feed whales.[58]

52. In addition to the whale watching guidelines, two voluntary, seasonal "No-Go Zones" (i.e., areas off limits to motorized vessels) off of San Juan Island are recognized by San Juan County (Exhibit 2-13). A half mile wide zone is located along a three kilometer stretch of shore centered on Lime Kiln lighthouse, and a quarter mile wide zone is located off of the west coast of San Juan Island from Eagle Point to Mitchell point. The No-Go Zones, which are effective only when whales are physically present, were established to reduce vessel presence in the whales' feeding, traveling, and resting areas, and to facilitate shore-based viewing. These areas were established in 1996 and 1999, respectively.

53. The whale watching guidelines, voluntary No-Go Zones, and existing State law provide baseline protection to the killer whales (absent vessel traffic regulation) to the extent that vessels in the Sound abide by these standards. That is, in the case that all vessels operating in the Sound already comply with the whale watching guidelines and No-Go Zones, codifying the potential NMFS regulations will have a limited impact. Importantly, however, some individuals not currently subject to the voluntary No-Go Zone will be affected. For example, currently the voluntary No-Go Zone applies only when whales are present. Alternative 4 would establish the No-Go Zone as an area off limits to vessels from May 1 to September 30. In addition, kayaks and other non-motorized vessels are not currently subject to the voluntary No-Go Zone. Under Alternative 4, kayakers and other non-motorized vessels would also be subject to the guidelines.

Method of Analysis of Soundwatch Whale Watching Guideline Monitoring Data

54. The whale watching guidelines are not enforceable but adherence to these guidelines is monitored. Specifically, the Soundwatch Public Outreach/Boater Education Project includes a monitoring program designed to capture vessel activities in the Puget Sound area during the whale watching season. The Whale Museum monitors: vessels' compliance with the voluntary whale watching guidelines and No-Go Zones, the level of vessel activity in the Sound, and the distribution of vessels in the Sound (e.g., commercial whale watching, private whale watching, commercial fishing, etc) in the time and area when whales are present. Soundwatch data are reported annually in the Soundwatch Public Outreach/Boater Education Project Final Program Report.

[58] Fisheries and Oceans Canada and the U.S. Department of Commerce. 2006. Be Whale Wise: Guidelines for Watching Marine Wildlife.

55. We employ the Soundwatch data to quantify potentially affected individuals applying the following general analytic methodology:

1. **For each regulatory alternative that overlaps the existing whale watch guidelines, identify by vessel type the number of incidents of non-adherence to the corresponding guideline.** We assume that individuals not adhering to existing guidelines are most likely to be affected in the case that those guidelines are codified and enforceable. Where the regulatory alternative does not overlap existing guidelines, Soundwatch does not monitor vessel activity that would be considered non-adherence to the alternative. For these alternatives, this analysis applies the best available source of data to augment the analysis, as described in the following sections.
2. **Where necessary, make assumptions regarding the activity associated with the vessel types monitored.** As described above, in some cases, Soundwatch data on incidents of non-adherence to guidelines aggregate vessel types. For example, the No-Go Zone data include "individual private vessels" as one category, as opposed to separately identifying recreational fishing vessels from whale watching or cruising. Absent information on the activity of private vessels, this analysis assumes that they are engaged in whale-based activities (i.e., whale watching). This is a conservative assumption as it is possible that the participants are fishing or cruising and would not be as likely to be negatively affected as those whose activities relied on seeing whales.
3. **For each vessel type, identify the average number of individuals per vessel.** Data to inform these assumptions are derived from a variety of sources, as well as expert opinion, as described in the following sections of this chapter.
4. **Calculate total individuals affected by the regulatory alternative by activity.** We apply information on vessel trips affected, vessel activity, and individuals per vessel to calculate the number of individuals potentially affected by the regulatory alternatives. This information allows us to consider the types of activities and therefore associated industries that stand to be most affected by the regulations.

56. Although the Soundwatch data accurately describe vessel activity in the Puget Sound area during the whale watching season, the data reported represent a minimum bound on the potential vessel activity given that monitoring does not occur in all areas of the Puget Sound at all times. Thus, the Soundwatch data are not expected to capture all instances of non-compliance with the whale watching guidelines and No-Go Zones.[59]

57. Soundwatch data from 2003 through 2010 are applied in the following sections to describe the extent to which whale watching and other vessels currently adhere to the voluntary whale watching guidelines and No-Go Zones. By determining how many individuals may be engaged in activities which do not adhere to the guidelines, we can develop estimates of individuals whose behavior might need to change should the

[59] The Whale Museum. 2006. Soundwatch Public Outreach/Boater Education Project Final Program Report.

guidelines become enforceable regulations. This assumption is predicated on the idea that codifying the guidelines is most likely to negatively affect those individuals that do not adhere to the guidelines. Conversely, those individuals that already adhere to the guidelines, are not likely to be affected in the case that the guidelines are codified and enforceable.

58. Vessels actively engaged in whale watching activities where whales are most frequently observed, which are the primary focus of the Soundwatch monitoring program, are most likely to be affected by the proposed regulations. For specific regulatory alternatives (i.e., those alternatives that do not overlap the existing whale watching guidelines), additional data sources are applied to enhance the quantification of potentially affected individuals. For example, as described in Section 2.3, this analysis employs data from San Juan County regarding boat launch usage to inform the number of kayakers affected by regulation of the No-Go Zone.

59. Overall, according to Soundwatch observation data, most vessels in the Sound comply with the voluntary guidelines. Nonetheless, the total number of annual "incidents" (defined as non-adherence to the guidelines) observed between May and September has increased annually since 2003 with the exception of 2009 to 2010 (Exhibit 2-2).[60] Several potential explanations exist for the increase in the total number of annual incidents. Specifically, the increase may be due to a greater number of whale watching vessels present in the Puget Sound area (i.e., the whale watching industry has grown since 2003). Alternatively, the apparent number of annual incidents may have increased due to an increase in the number of hours that Soundwatch surveyors spent observing the Puget Sound area for incidents of ignoring the whale watching guidelines.

[60] The total number of annual incidents of noncompliance with the whale watching guidelines includes all incidents not just 100-yard/meter approach incidents, parked in the path of whale incidents, and fast within a quarter mile of whale incidents.

EXHIBIT 2-2 THE DISTRIBUTION OF INCIDENTS BY TYPE (MAY-SEPTEMBER 2003-2006) [NUMBER OF INCIDENTS (PERCENT OF TOTAL INCIDENTS)]

TYPE OF INCIDENT	2003		2004		2005		2006		2007		2008		2009		2010	
	#	% of total	#	% of total	#	% of total	#	% of total	#	% of total	#	% of total	#	% of total	#	% of total
Parked in Path of Whales	62	16.6%	145	19.1%	255	26.6%	330	25.8%	241	22.1%	349	24.6%	510	18.5%	245	23.4%
Inshore of Whales	61	16.4%	164	21.6%	169	17.7%	220	17.2%	174	16.0%	305	21.5%	627	22.8%	184	17.6%
Approaching Whales Closer than 100 meters/yards	56	15.0%	72	9.5%	105	11.0%	169	13.2%	111	10.2%	177	12.5%	378	13.7%	131	12.5%
Fast within 1/4 mile	13	3.5%	69	9.1%	99	10.3%	139	10.9%	175	16.1%	157	11.1%	364	13.2%	135	12.9%
Airplane within 1000 ft*	24	6.4%	47	6.2%	35	3.7%	71	5.5%	88	8.1%	117	8.3%	166	6.0%	44	4.2%
Crossing Path of Whales	25	6.7%	43	5.7%	39	4.1%	67	5.2%	89	8.2%	60	4.2%	120	4.4%	50	4.8%
Within 440 yards of SJI No-Boat-Zone	47	12.6%	30	3.9%	81	8.5%	52	4.1%	49	4.5%	89	6.3%	230	8.4%	110	10.5%
Within 220 yards of shore; whales present	2	0.5%	31	4.1%	11	1.1%	28	2.2%	19	1.7%	8	0.6%	20	0.7%	9	0.9%
Chasing Whales	15	4.0%	20	2.6%	14	1.5%	23	1.8%	35	3.2%	41	2.9%	69	2.5%	33	3.2%
Within 880 yards of Lime Kiln	20	5.4%	9	1.2%	18	1.9%	17	1.3%	29	2.7%	9	0.6%	93	3.4%	41	3.9%
1st approach head on, behind, or inshore	8	2.1%	9	1.2%	14	1.5%	13	1.0%	35	3.2%	41	2.9%	66	2.4%	31	3.0%
Kayaks spread out*	11	2.9%	2	0.3%	NA	NA	10	0.8%	13	1.2%	10	0.7%	48	1.7%	7	0.7%
Kayaks with whales outside of 1/4 mile SJI zone*	5	1.3%	NA	NA	8	0.8%	8	0.6%	5	0.5%	17	1.2%	29	1.1%	5	0.5%
Within 200 yards of NWR	6	1.6%	8	1.1%	1	0.1%	5	0.4%	1	0.1%	11	0.8%	3	0.1%	7	0.7%
Other	18	4.8%	111	14.6%	108	11.3%	129	10.1%	26	2.4%	27	1.9%	27	1.0%	15	1.4%
Total	**373**	100%	**760**	100%	**957**	100%	**1,281**	100%	**1,090**	100%	**1,418**	100%	**2,750**	100%	**1,047**	100%

* While these types of incidents are not relevant to the regulatory alternatives proposed by NMFS, they are provided in this exhibit as context for overall behavior of vessels with respect to established guidelines. Individuals involved in these incidences would not be expected to be affected by NMFS vessel traffic regulations to protect killer whales in Puget Sound. These estimates rely on the datasets developed by the Soundwatch monitoring program and not from the summary of those data provided in the Final Program Reports. The estimates in this table may not match those reported in the Soundwatch reports.

Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Data provided for years 2003-2010.

60. In advance of applying the Soundwatch data to quantify potentially affected individuals, we developed a statistical analysis to determine if the number of vessels observed by Soundwatch in the proximity of killer whales in the Puget Sound area (a measure of the number of whale watching vessels present in the Puget Sound area) and the number of hours Soundwatch spent observing the Puget Sound area for incidents of ignoring the whale watching guidelines are significant predictors (i.e., play a role in determining) of the total number of annual incidents observed in a given year.[61] That is, the objective was to determine whether the number of incidents recorded by Soundwatch is representative of the total number of incidents occurring in the Sound or whether the estimate of recorded incidents is influenced by survey methods. This statistical analysis highlighted that an increased number of vessels near the whales is not related to the number of incidents, and the number of hours spent surveying for incidents does have an effect on the total number of annual incidents estimated by Soundwatch. Specifically:

- The average annual number of vessels observed in the proximity of killer whales at any given time between 9:00 a.m. and 6:00 p.m. in the Puget Sound area from May through September has remained relatively constant at approximately 20 vessels since 1998.[62] The average annual number of vessels observed in the proximity of killer whales in the Puget Sound area is not a significant predictor of the number of annual incidents.[63]
- The estimated number of monitoring hours logged by the Whale Museum increased between 2003 and 2004 and between 2004 and 2005, but decreased between 2005 and 2006 (Exhibit 2-3). The estimated number of monitoring hours is a significant predictor of the total number of annual incidents observed.[64] Specifically, the total number of incidents observed in the Puget Sound area is estimated to increase by 3.27 with every additional hour of monitoring.
- However, because the estimated number of monitoring hours logged by the Whale Museum does not increase each year from 2003 to 2006, it cannot be the only cause of the increase in the total number of incidents observed in the Puget Sound area each year. This is further illustrated by the fact that the number of incidents observed per hour of observation increased annually from 2003 to 2006. Specifically, an average of 1.20 incidents was observed per hour in 2003, while an average of 2.48 incidents was observed per hour in 2006.

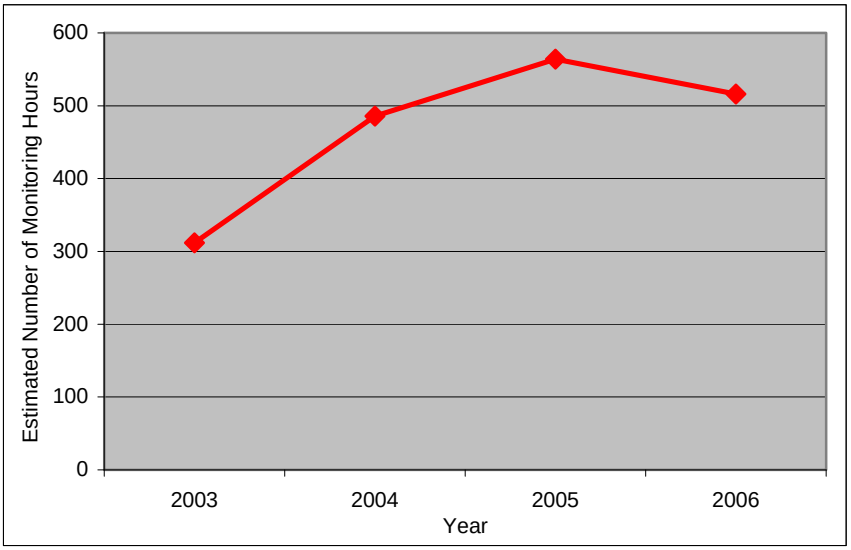
[61] The R version 2.6.1 statistical software program (R Project, 2007) was used.

[62] The Whale Museum. 2006. Soundwatch Public Outreach/Boater Education Project Final Program Report. Note that the Whale Museum does not define a distance within which a vessel is considered to be "in the proximity of a killer whale."

[63] Results of a linear regression analysis run in R version 2.6.1 (*t-test*, $p = 0.1104$, $df = 7$, $\alpha = 0.05$).

[64] Results of a linear regression analysis run in R version 2.6.1 (*t-test*, $p = 0.0123$, $df = 7$, $\alpha = 0.05$).

EXHIBIT 2-3 ESTIMATED NUMBER OF OBSERVATION HOURS (MAY-SEPTEMBER 2003-2006)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report. 2006.

2.2 PARTIES POTENTIALLY AFFECTED BY APPROACH REGULATIONS

61. This analysis employs the Soundwatch data on the number of incidents of ignoring the 100 meter/yard approach guideline in order to approximate the parties most likely to be affected in the case that NMFS' codifies the guideline (Alternative 2), or implements a stricter 200 meter/yard approach guideline (Alternative 3).

62. As described above, a State regulation requiring vessels to stay 100 feet from Southern Resident killer whales went into effect in June 2008. Continued enforcement of this regulation in the future would mean that, the parties potentially affected by Alternative 2, as described in this analysis, may be required to comply with the 100 yard approach limit regardless of NMFS approach regulation. It is also possible that the NMFS regulation would improve compliance with the State regulation, and therefore result in some number of individuals incrementally affected by the 100 yard approach limit above and beyond those complying with the State regulation. Of note, however, the total number of approach incidents (non-adherence to the 100 yard approach guideline) reported by Soundwatch in 2009 and 2010 was, in general, greater than the number of approach incidents between 2003 and 2007, prior to the State regulation. Thus, this analysis assumes that, in spite of the State regulation, individuals may be affected in the case that NMFS codifies an approach regulation.

63. As described in Section 2.2.2, because Alternative 3 does not overlap existing guidelines or regulations, data regarding the number of individuals potentially affected by a 200 yard approach regulation are limited. In its public comment on NMFS' Proposed Rule, however, the Washington Department of Fish and Wildlife supported a 200 yard approach rule. This analysis applies information from a recent report regarding the number of vessels that may occupy the area between 100 and 200 yards of whales as a

function of the number of vessels occupying the area between zero and 100 yards, as described in Section 2.2.2.

2.2.1 PARTIES LIKELY TO BE AFFECTED BY ALTERNATIVE 2 (100 YARD APPROACH REGULATION)

64. The whale watching guidelines currently recommend a 100 yard/meter approach distance from the killer whales for all vessels operating in the Sound. In the case that all vessels are currently complying with this voluntary guideline, no parties would be expected to be affected by a regulation codifying the same approach distance. It is therefore the parties that are not currently complying with the voluntary guideline that will be affected by the regulation, as those parties would be required to alter their current practices.

65. Incidents of ignoring the 100 meter/yard approach guideline represents a significant portion of the total number of annual incidents associated with noncompliance of the guidelines observed in the Puget Sound area in all years from 2003 to 20010 (Exhibit 2-2). Specifically, approach incidents represent at least 9.5 percent of all incidents each year from 2003 through 2010. Overall, the number of approach incidents increased between 2003 and 2006, then dropped in 2007. Approach incidents rose through 2009, reaching a significant peak that year before dropping again in 2010 (Exhibit 2-4). Interestingly, while the *number* of approach incidents varied significantly in recent years (2008-2010), the *percentage* of total incidents associated with the approach regulations remained relatively constant, varying between 9.5 percent and 13.7 percent (Exhibit 2-2). In other words, non-adherence with the approach guideline was high when non-adherence to all guidelines was high.

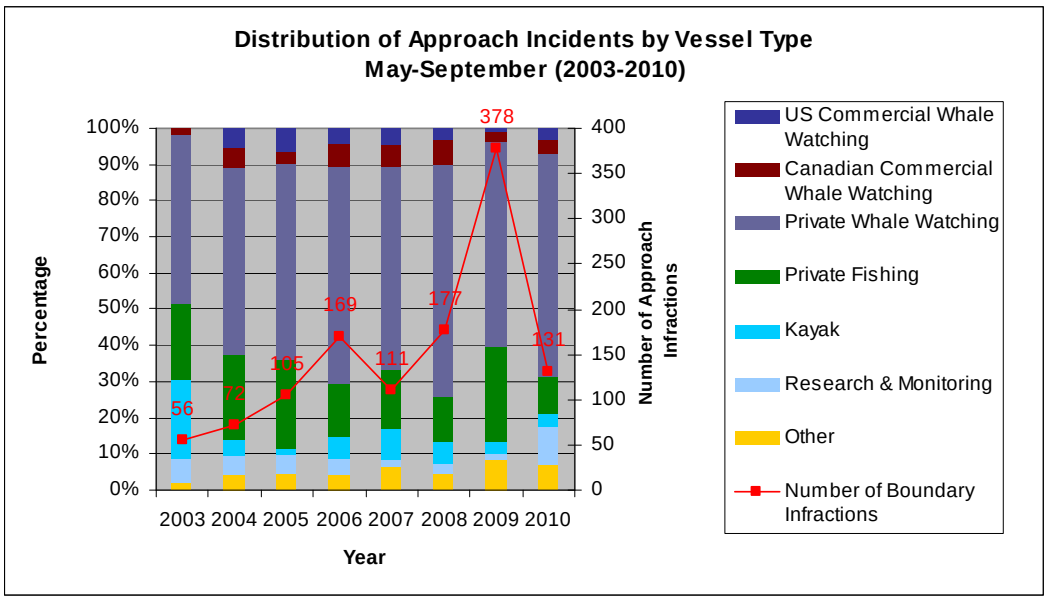
66. Between 2003 and 2010, private whale watching vessels (i.e., private, motorized recreational vessels engaged in whale watching or cruising activities) caused more approach incidents than any other vessel type, accounting for at least 46.8 percent of all approach incidents (Exhibit 2-4). Further, the portion of approach incidents caused by private whale watching vessels has increased annually from 46.8 percent in 2003 to 64.1 percent in 2008. Private fishing vessels have the second highest rate of approach incidents for most years between 2003 and 2010 representing at least ten percent of annual approach incidents. Kayaks were associated with 21 percent of approach incidents in 2003 but less than ten percent in all other years. Commercial whale watching vessels (U.S. and Canadian vessels combined) represent only a small portion of annual approach incidents, representing at most 11.1 percent of the total number of approach incidents in any given year between 2003 and 2010.[65] That is, for the most part, organized whale watching tours are complying with the existing approach guidelines whereas this is less true for individuals independently engaged in whale watching and cruising in the Sound.

67. The vessel types identified in Exhibit 2-4 are the vessel types that may be affected by an approach regulation governing minimum vessel distances from the whales. As shown,

[65] Based on data provided by Kari Koski, Soundwatch Coordinator, The Whale Museum: Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

the largest category of affected vessels is private recreational boat operators engaged in whale watching activities. The remainder of this section describes in more detail the relative magnitude of individuals affected in each of these vessel categories.

EXHIBIT 2-4 DISTRIBUTION OF APPROACH INCIDENTS BY VESSEL TYPE (MAY-SEPTEMBER 2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

Private Whale Watching and Private Fishing Vessels

68. Based on the distribution of 100-meter/yard approach guideline incidents by vessel type, private vessels, more specifically, private whale watching vessels are the most likely to be affected by a 100-yard approach regulation. Specifically, based on recent patterns of incidents, *we estimate that 115.5 private-vessel trips will be affected per whale watching season (86.46 whale watching trips and 29.04 fishing trips) in the case that NMFS codifies the 100 yard/meter approach guideline.*[66] An average of 3.42 people per private vessel was observed between 2006 and 2007.[67] Thus, the potential *NMFS 100 yard/meter approach guideline would affect approximately 395 people on private vessels per whale watching season*. Given that Soundwatch data does not track the specific vessels committing approach infractions, some of the 115.5 affected private-vessel trips may be due to repeat offenders (i.e., the same vessel committing an approach infraction on separate trips). Further, private-vessels are more likely than other vessel types to contain repeat participants (i.e., individuals in their own, private boats recreating and fishing). To

[66] The number of affected trips is estimated by determining the average number of approach incidents per whale watching season from 2003 through 2010 using Soundwatch Public Outreach/Boater Education Program data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data. 2003-2010.

[67] Personal communication with Kari Koski of the Whale Museum on August 1, 2008.

the extent that Soundwatch data captures repeat private-vessel approach infractions involving repeat participants, this analysis overestimates the number of people potentially affected if NMFS codifies the 100 yard/meter approach guideline.

Kayaks

69. The percentage of annual approach incidents involving kayaks was approximately 21 percent in 2003 and less than ten percent per year since then. Next to private whale watching and private fishing vessels, in most years kayaks cause the next greatest fraction of the total approach guideline incidents. Based on recent incident patterns, *it is estimated that, on average, 8.13 kayak trips will be affected each whale watching season by the institution of an enforceable 100 yard/meter approach regulation.*[68] Importantly, however, kayaks most likely carry only one or two individuals and therefore the total number of kayakers potentially affected if the guideline is codified is low. Assuming each incident involves a unique kayak and up to two individuals (a conservative estimate potentially overstating the number of individuals affected), *this analysis estimates up to 16 individuals kayakers may be affected by Alternative 2*.

70. The Soundwatch Program implemented a kayak monitoring program for the 2010 season to focus more specifically on the number of incidents of non-compliance with the whale watching guidelines associated with kayakers. Between June and September of 2010, Soundwatch counted 10 incidents of "kayaks paddling within 100 yards" of whales. This is comparable to the analysis of previous Soundwatch data, which indicates approximately 8.13 kayak trips per year may be affected by Alternative 2. However, the kayak monitoring program in 2010 separately identified 72 incidences of "kayaks stopped within 100 yards of whales."[69] To the extent that these individuals are approaching the whales and would be considered out of compliance with the Alternative 2 approach regulation, the estimate of 8.13 kayaks annually affected by Alternative 2 may be an underestimate. Of note, the Kayak Monitoring Program data consider only one year of observation. The extent to which these data are representative of an average year is uncertain.

Commercial Whale Watching Industry

71. Despite the fact that commercial whale watching vessels are involved in a relatively small percentage of the total number of approach incidents (Exhibit 2-4), these vessels support a greater number of individuals. Thus, individuals participating in motorized (i.e., excluding kayak) commercial whale watching activities are forecast to be the most populous group of individuals potentially affected by codifying the 100 yard/meter approach guideline. This section separately discusses U.S. and Canada-based commercial whale watching vessels.

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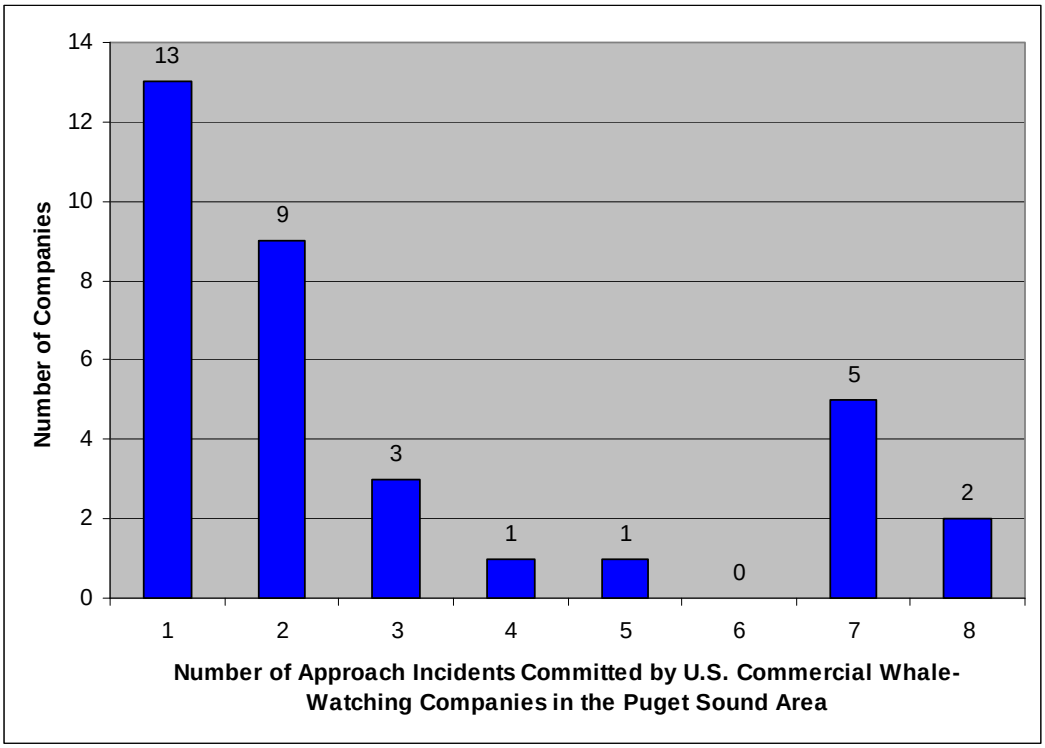
[68] Ibid.

[69] Draft Report from Kari Koski, Soundwatch Program Coordinator, to NMFS. "2010 Soundwatch Kayak Monitoring Program: Overall Data Incident Observations."

72. A total of 100 approach incidents were caused by U.S.-based commercial whale watching vessels in the Puget Sound area between May and September from 1998 to 2010.[70] Further, 34 U.S.-based, vessel-operating, commercial whale watching companies in the Puget Sound area committed an approach incident at least once between 1998 and 2010 (Exhibit 2-5).[71] The majority of these companies (25 out of the 34) caused three or fewer approach incidents between 1998 and 2010; seven of the 34 companies caused seven or more approach incidents in that time.

EXHIBIT 2-5 DISTRIBUTION OF U.S.-BASED COMMERCIAL WHALE WATCHING COMPANIES CAUSING APPROACH INCIDENTS IN THE PUGET SOUND AREA (MAY-SEPTEMBER 1998-2010)



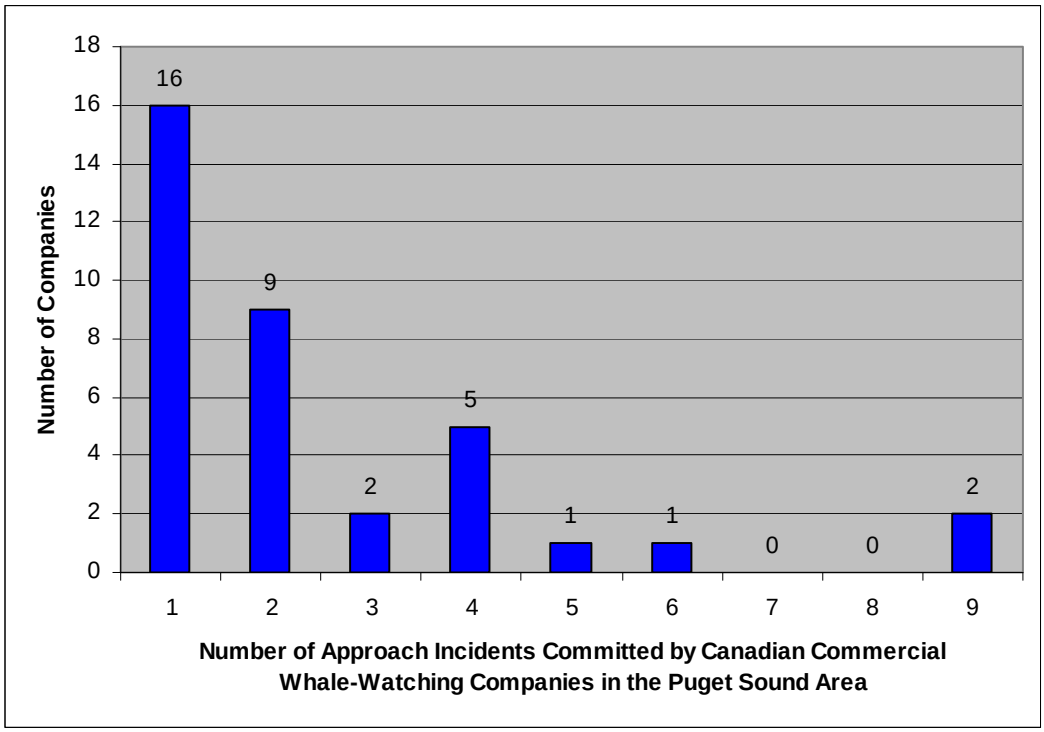
Source: Soundwatch Public Outreach/Boater Education Program data provided by the Whale Museum on January 7, 2008 and October 2010.
Notes: Total number of companies committing approach infractions includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

[70] Based on data provided by Kari Koski, Soundwatch Coordinator, The Whale Museum, "Soundwatch Public Outreach/Boater Education Program data" provided on January 7, 2008 and October 2010.

[71] Although there are only 17 to 19 vessel-operating, U.S. commercial whale watching companies based in the Puget Sound area (see Chapter 1), the 23 companies committing an approach infraction between 1998 and 2006 includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

73. In addition, 36 Canadian-based commercial whale watching companies operating in the Puget Sound area caused 89 approach incidents between 1998 and 2010 (Exhibit 2-6). Sixteen of the 36 caused only one approach incident between 1998 and 2010. Further, only two (5.5 percent) Canadian-based, vessel operating, commercial whale watching companies in the Puget Sound area caused seven or more approach incidents between 1998 and 2010.[72]

EXHIBIT 2-6 DISTRIBUTION OF CANADIAN-BASED COMMERCIAL WHALE WATCHING COMPANIES CAUSING APPROACH INCIDENTS IN THE PUGET SOUND AREA (MAY-SEPTEMBER 1998-2010)



Source: Soundwatch Public Outreach/Boater Education Program data provided by the Whale Museum on January 7, 2008 and October 2010.
Notes: Total number of companies committing approach infractions includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

74. Although a number of commercial whale watching companies in the Puget Sound area caused at least one approach incident since 1998, most companies do not indicate a pattern of non-compliance, having caused few incidents (three or fewer) in that time. In general, both the U.S. and Canadian-based commercial whale watching companies in the Puget Sound area appear to adhere to the 100-meter/yard approach guideline. This analysis therefore does not anticipate that most commercial whale watching companies operating in the Sound will have to significantly alter their current whale watching practices if NMFS establishes an enforceable 100 yard/meter approach regulation.

[72] Based on data provided by Kari Koski, Soundwatch Coordinator, The Whale Museum, "Soundwatch Public Outreach/Boater Education Program data" provided on January 7, 2008 and October 2010.

75. Approximately 11.25 commercial whale watching trips have approached the whales within 100 yards/meters per season on average (including both U.S. and Canadian vessels). This analysis therefore estimates that an average of 11.25 commercial whale watching trips may be affected by a 100 yard/meter approach regulation per whale watching season. Of these trips, 4.5 trips are forecast to be taken by U.S.-based commercial whale watching companies. The 4.5 affected U.S. commercial whale watching trips represent approximately 0.2 percent of the total number of whale watching trips taken by U.S.-based commercial whale watching companies in the Puget Sound area in a whale watching season, assuming that U.S.-based companies take approximately 2,564 whale watching trips each season (Memorial Day to Labor Day). Further, these 4.5 trips represent even less, (less than 0.1 percent) of the 6,264 whale watching trips estimated to occur in an average year.[73] While data are not available to describe the average number of passengers engaged in a Canadian commercial whale watching trip, this analysis assumes for simplicity that it is comparable to the U.S. commercial operations. Thus 11.25 whale watching trips carrying an average of 55 passengers per trip, results in approximately 619 potentially affected whale watch participants.[74,75] The estimate of potentially affected individuals represents 0.1 percent of the estimated 425,000 individuals participating in whale watching activities in Washington State.

Other Vessel Types

76. The remaining vessel types potentially affected by an enforced approach regulation include shipping vessels and commercial fishing vessels.[76] These other vessel types combined have been involved in up to 17.6 percent of annual approach incidents in recent years; thus, the number of vessels within the "other" vessel category that would have to alter their current activities if a 100-yard approach guideline became required is expected to be relatively minor.[77] This analysis estimates that, *on average,8.88 "other" vessel*

[73] Total number of trips taken assumes that 70 percent of the total number of U.S.-based commercial whale watching trips offered in the Puget Sound area between Memorial Day and Labor Day actually occur. Source: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[74] The average number of passengers per commercial whale watching trip is based on vessel capacity information found in: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[75] This analysis forecasts potentially affected individuals for both Canadian and U.S. as data are not available to determine what percentage of the affected individuals may be U.S. citizens. This analysis therefore likely overstates the number of U.S. whale watchers potentially affected by the regulations.

[76] Research and monitoring vessels are assumed to have a vested interest in complying with guidelines and regulations designed to protect and conserve the killer whales and are therefore not forecast to be negatively affected by this regulation.

[77] The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

trips (including commercial shipping and fishing vessels) in the Puget Sound area during the whale watching season may be affected by a 100-yard approach guideline.[78]

2.2.2 PARTIES LIKELY TO BE AFFECTED BY ALTERNATIVE 3 (200 YARD APPROACH REGULATION)

77. Data are not available from Soundwatch regarding distance of vessels from whales beyond the 100 meters/yards mark identified in the existing guidelines. Any vessels not currently adhering to the 100-meter/yard-distance, however, would be required to alter their current practices if a 200-yard approach guideline was made mandatory by the NMFS. That is, the parties identified in Section 2.2.1 as potentially affected by Alternative 2, are a subset of the parties potentially affected by Alternative 3.

78. All whale watching vessels not complying with the 100 yard/meter guideline, as well as additional vessels in all categories that are currently complying with the 100 yard/meter approach guideline but not maintaining an approach distance of 200 yards from whales will likely be affected by an enforceable 200 yard/meter approach regulation. Thus, the number of individuals potentially affected by Alternative 3 is expected to be greater than the number of individuals potentially affected by Alternative 2.

79. A recent study by Giles and Cendak observed vessels operating at various distances from the whales during the 2007 and 2008 whale watching seasons.[79] While the categories of vessels considered, and monitoring methods applied, vary from the Soundwatch data, there are significant parallels between the information presented in the two reports. For example, related to the approach regulation, Giles and Cendak identified a total of 238 vessels observed within 100 yards of whales between 2007 and 2009. Soundwatch reported 288 vessels within 100 yards of whales in that same time period, a notably comparable estimate.

80. Giles and Cendak estimated that the number of vessels observed between 100 and 199.9 yards of whales was significantly greater than the number of vessels between 0 and 99.9 yards. In order to provide NMFS additional information on the number of individuals potentially affected by a 200 yard approach limit, we use the Giles and Cendak study to calculate the percentage increase over the number of vessels within 100 yards, of vessels that occur within 200 yards of whales. We apply this percentage increase to the Soundwatch data regarding vessels affected by the 100 yard limit in order to estimate the number of vessels potentially affected by the 200 yard limit. For commercial whale watch participants, Giles and Cendak estimate the number of vessels within 200 yards of whales was 434 percent of the number of vessels within 100 yards. For private vessels, they estimate 353 percent of the number of vessels within 100 yards occur within 200 yards of whales. For kayaks, they estimate 137 percent of vessels that occur within 100

[78] The number of affected trips is estimated by determining the average number of approach incidents per whale watching season from 2003 through 2010 using Soundwatch Public Outreach/Boater Education Program data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

[79] Giles, Deborah A. and Rose Cendak. June 30, 2009. An Assessment of Vessel Effects on the Cohesion State of Southern Resident Killer Whale Groups, and Measuring Vessel Compliance with Boating Guidelines. Contract Number AB133F-07-SE-3026.

yards, occur within 200 yards of the whales. Giles and Cendak also report numbers of ferries, enforcement vessels, and research and monitoring vessels within various distances from whales. These vessel types, however, would be exempt from NMFS proposed approach regulations in most cases.

81. Applying these percentages, our analysis estimates the following number of individuals potentially affected by a 200 yard approach regulation. These estimates include the subset of individuals who would also be affected by Alternative 2 (i.e., the estimates are inclusive of those individuals within 100 yards of whales). NMFS has included Alternative 3, the 200 yard approach regulation, it the final vessel traffic regulations.

- *Individuals engaged in a motorized vessel commercial whale watching tour (U.S. and Canadian: 2,811;*
- *Individuals engaged in private vessel (private whale watching, cruising, or recreational fishing) activities: 1,395;*
- *Individual kayakers: 22.*

2.3 PARTIES POTENTIALLY AFFECTED BY ESTABLISHMENT OF PROTECTED AREAS

82. This analysis employs the USCG and Soundwatch vessel count data, San Juan County Park Launch Permit Program Data, and San Juan County aerial survey data from 2010, in order to approximate the parties most likely to be affected in the case that NMFS establishes an enforceable No-Go Zone closed to vessels when whales are typically present in the area (May 1 - September 30). Alternative 4 describes the potential effect of preventing vessels from operating in the current voluntary No-Go Zone, including a quarter mile from the west coast of San Juan Island stretching from Eagle Point to Mitchell Point and a half mile wide zone along a three kilometer stretch centered on Lime Kiln Lighthouse. Exhibit 2-7 maps the existing No-Go Zone being considered for codification in Alternative 4. Alternative 5 describes the potential effect of preventing vessels from operating within an expanded No-Go Zone, including a half mile wide area along the west coast of San Juan Island from Eagle Point to Mitchell Point.

83. In addition to the Soundwatch data, San Juan County conducted aerial surveys of the expanded No-Go Zone (Alternative 5) in 2010 in order to gather information on the number and types of vessels, as well as their distribution in the area during the whale watching season. We provide data and information from the 2010 aerial surveys in the discussion of Alternative 5. These data may be compared to the analysis of potentially affected parties using the Soundwatch data and San Juan County boat launch data. We rely on the San Juan County boat launch data as the primary source for potentially affected kayakers and the Soundwatch data regarding potentially affecting recreational fishers. We do, however, report potentially affected commercial fishing trips as determined by the aerial survey as these data were not provided by other sources.

EXHIBIT 2-7 EXISTING, VOLUNTARY NO-GO ZONE FOR KILLER WHALES IN PUGET SOUND

84. This section first describes the distribution of vessel traffic in the proposed No-Go Zone regions (Section 2.3.1). It then quantifies individuals potentially affected by regulatory Alternative 4 (Section 2.3.2) and Alternative 5 (Section 2.3.3). Of note, NMFS does not include either of the protected area alternatives in the final vessel traffic regulations. NMFS is continuing to evaluate the appropriateness of regulating a protected area for the purposes of killer whale conservation.

2.3.1 VESSEL TRAFFIC IN THE HARO STRAIT REGION

85. As described in Chapter 1 of this report, the commercial vessels that participate in the U.S. and Canadian Co-operative Vessel Traffic System (CVTS) generally traverse a series of well-defined navigation lanes called the Traffic Separation Scheme (TSS). The TSS comprises two traffic lanes with a separation zone in between. The USCG ensured that the edges of the navigation lanes were far enough from the western San Juan Island shoreline so as not to interfere with the smaller vessels engaged in whale watching activities.[80] Exhibit 1-1 in Chapter 1 of this report highlights the position of the established navigation lanes, which occur more than a half mile west of the west coast of San Juan Island, and therefore outside of the potential No-Go Zones of Alternatives 4 or 5.

86. In addition, none of the established ferry routes for Washington State Ferries (Exhibit 1-1) occurs within a half mile of the west coast of San Juan Island. Assuming that tankers, freighters, cargo and container ships, tugs, ferries, and governmental and privately-owned vessels that are large enough to require registration with the CVTS are using the established routes, they are not expected to occur within the potential No-Go Zones for the killer whales. As described previously in this chapter, these categories of vessels are exempt from regulatory Alternatives 4 and 5.

87. Commercial fishing in Haro Strait and near the San Juan Islands has been limited in recent years due to decreased catch opportunities and increasing fuel costs.[81] Additionally, a recent biological assessment concluded that the salmon fisheries are unlikely to have direct effects on the killer whales from vessel noise, or contact with vessels and gear. These fishing vessels are not targeting the whales and are primarily found in areas in the northern San Juan Island area where the killer whales spend limited amounts of time.[82] There have been few incidents of commercial fishing vessels approaching close to whales, however, these vessels do at times occur within the potential No-Go Zones and therefore may be affected by enforcement of closing these areas.

88. The level of fishing effort has decreased in the San Juan Islands region from 1999 to present. Specifically, tribal fishing effort has declined by 62 percent (to an average of

[80] United States Coast Guard, 2000. Docket #USCG-1999-4974 Port Access Route Study, Strait of Juan de Fuca and Adjacent Waters, Haro Strait and Boundary Pass Issues 9a - 9d; pp 60 – 64.

[81] National Marine Fisheries Service (NMFS). 2007. Biological Assessment: Effects of the 2007 U.S. Fraser Panel Fisheries on the Southern Resident Killer Whale (*Orcinus orca*) Distinct Population Segment (DPS).

[82] Ibid.

178 gillnet vessels and 22 purse seine vessels for the fishing season) and other, commercial fishing effort by 84 percent (to an average of 109 gillnet vessels, 34 purse seine vessels, and 11 reef net sets). In the Strait of Juan de Fuca, the majority of the remaining fishing activity occurs in the offshore areas, close to the Canadian border. In the San Juan Island area, the level of fishing activity is expected to further decrease even absent the establishment of No-Go Zones due to the limited number of fishing days and high fuel costs.

89. The number of vessels participating in fishing in the entire area of the Strait of Juan de Fuca is expected to be low, less than 30 percent (less than 86 gillnet vessels, 17 purse seine vessels, and three reef net sets, in total), in future years and no fishing activity is expected for the majority of the months that the killer whales will be present (there may be some overlap of whale presence and fishing in July and August). The number of vessels potentially affected is therefore expected to be minor compared to the total number of private and commercial whale watching and recreational vessels that frequent the area.[83]

90. Because larger commercial vessels are not expected to traverse the potential No-Go Zones, and because fishing vessels only occur in these areas to a limited extent, the following sections accordingly focus on small to medium-sized private and commercial recreational vessels (including kayaks), especially whale watching vessels and kayakers that are most likely to occur within the proposed Protected Areas.

91. Exhibit 2-8 summarizes Soundwatch's vessel counts as observed in the western San Juan Island area for the months of April through September for the years 1998 to 2010.[84] Exhibit 2-9 presents the percentages of each vessel type based on the monthly averages estimated in Exhibit 2-10. Commercial whale watching vessels account for over half of the vessels found along western San Juan Island during the whale watching season.

92. Private recreational (including whale watching) and private fishing boats are the second most frequently encountered vessels in the waters along the western San Juan Island, accounting for approximately 35 percent of all vessels. Kayaks and research vessel types comprise about 18 percent of the vessels. Ships and aircrafts have been encountered only rarely in this area. As can also be seen from Exhibit 2-8, the total number of vessels in the area has fluctuated since 1998, with the peak 10,203 vessels for the 2005 whale watching season.

[83] Ibid.

[84] Because the Whale Museum locates vessels based on a quadrant system, and does not always include precise location information, it is not possible to determine the count of vessels exclusively within the ¼ and ½ mile Protected Areas. Thus, the area within which these vessels occur is larger than but fully inclusive of the voluntary Protected Areas. Considering this, the analysis may overestimate the number of vessels potential affected.

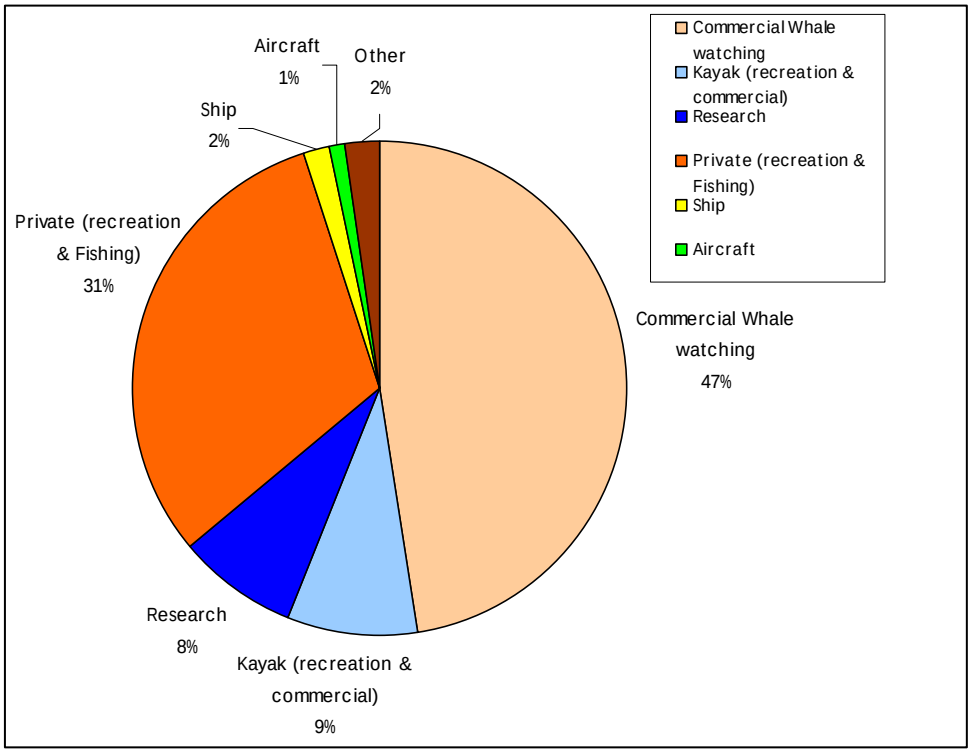
EXHIBIT 2-8 ANNUAL VESSEL COUNTS BY VESSEL TYPE FOR WESTERN SAN JUAN ISLAND OFFSHORE AREAS (APRIL – SEPTEMBER)

YEAR	COMMERCIAL WHALE WATCHING	KAYAK (RECREATION & COMMERCIAL)	RESEARCH	PRIVATE (RECREATION & FISHING)	SHIP	AIRCRAFT	OTHER[1]	TOTAL
1998	3,558	691	425				558	**5,232**
1999	4,871	797	536				129	**6,333**
2000	4,133	556	429				253	**5,371**
2001	4,186	548	439		28		67	**5,268**
2002	1,773	441	223	888	51	53	53	**3,482**
2003	2,162	359	279	2,019	48	42	57	**4,966**
2004	4,546	670	599	2,334	143	113	74	**8,479**
2005	4,642	807	675	3,722	160	78	119	**10,203**
2006	3,850	766	592	2,600	70	71	224	**8,173**
2007	3,243	457	746	2,069	92	37	119	**6,763**
2008	4,674	988	1,343	2,779	183	75	115	**10,157**
2009	3,377	1,058	947	3,706	188	120	314	**9,710**
2010	3,498	833	805	1,945	323	90	279	**7,773**
ANNUAL AVERAGE	**3,732**	**690**	**618**	**2,451**	**129**	**75**	**182**	**7,070**

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.

Source: Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

EXHIBIT 2-9 RELATIVE FREQUENCY OF VESSEL TYPES OBSERVED IN WESTERN SAN JUAN ISLAND OFFSHORE AREAS (APRIL – SEPTEMBER)



93. Exhibit 2-10 highlights the average number of vessels that have been observed in each month of the whale watching season between 1998 and 2010 for western San Juan Island offshore areas. The peak months of activity for all vessel types are July, and August whereas April, the start of the season, vessel numbers off the west coast of San Juan Island are very limited. Overall, June, July and August are the busiest months of the year for whale watching as well as other recreational and fishing activities in the western San Juan Island area of Haro Strait.

EXHIBIT 2-10 AVERAGE MONTHLY VESSEL COUNTS FOR WESTERN SAN JUAN ISLAND OFFSHORE AREAS (1998 – 2010)

MONTH	COMMERCIAL WHALE WATCHING	KAYAK (RECREATION & COMMERCIAL)	RESEARCH	PRIVATE (RECREATION & FISHING)	SHIP	AIRCRAFT	OTHER[1]	ALL VESSELS
April	3.78	0.00	1.22	0.56	0.33	0.11	0.22	6.22
May	243.50	39.50	32.08	37.83	4.17	1.42	5.75	364.25
June	773.15	154.46	116.31	131.92	17.38	8.08	22.31	1,223.62
July	1,309.46	242.15	415.54	367.23	33.46	20.08	27.31	2,415.23
August	974.69	201.46	394.08	422.38	23.31	15.38	93.92	2,125.23
September	419.38	52.92	216.08	163.77	19.31	7.08	32.31	910.85
October	120.00	11.33	54.00	42.67	6.00	1.00	1.33	236.33
MONTHLY AVERAGE	**549**	**115**	**196**	**187**	**16**	**9**	**30**	**1,174**

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.

Source: Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

2.3.2 PARTIES LIKELY TO BE AFFECTED BY ALTERNATIVE 4 (REGULATING THE EXISTING VOLUNTARY NO-GO ZONE)

94. The vessel counts presented above are for an area that includes but is not exclusive to the voluntary No-Go Zones. This section of the analysis specifically quantifies the parties traveling within the existing, voluntary No-Go Zone to provide information on the parties most likely to be affected in the case that the No-Go Zone is made seasonally permanent and enforceable (Alternative 4).

Motorized and Other Non-Human Powered Vessels and Parties Potentially Affected by Alternative 4

95. As described in Section 2.1, Soundwatch monitors commercial whale watch operators, recreational boaters, kayakers, and other vessel operators to record behaviors that are inconsistent with the existing whale watching guidelines.[85]

96. We apply two of the vessel incident types monitored by Soundwatch to estimate the number of motorized vessels observed in the existing, voluntary No-Go Zone: vessels occurring "within 440 yards (a quarter mile) of the San Juan Island No Boat Zone" (San Juan); and vessels occurring "within 880 yards (half mile) of Lime Kiln" (Lime Kiln). Note that the Voluntary No-Go Zone does not exclude kayakers and other non-human powered vessels from the area and thus kayakers currently operating within the existing No-Go Zone are not considered to be acting in violation of the No-Go Zone guidelines.

[85] The Whale Museum. 2006. 2004 – 2005 Final Program Report: Soundwatch Public Outreach/Boater Education Project. The Whale Museum, Friday Harbor, Washington.

97. Exhibit 2-11 presents the vessel counts for all years for which Soundwatch has collected incident data for San Juan and Lime Kiln incidents. The number of incidents has generally increased in recent years, peaking in 2009. Interestingly, Exhibit 2-11 highlights that the number of private recreational and private fishing vessels venturing into the existing No-Go Zone steadily increased through 2009, before decreasing in 2010. In general, 2009 was an outlier year with respect to the number of private recreation and private fishing vessels occupying the No-Go Zone while whales were present. This may be due to an increase in the total number of these vessels over this time, although Exhibit 2-8 suggests no consistent pattern exists for the number of these vessels occurring in the broader region in recent years. In contrast, the number of commercial whale watching vessels present in the No-Go Zone notably decreased from 106 in 1998 to nine in 2010. This is likely due to increased awareness of the whale watching guidelines. While commercial vessels are professionally obliged to be aware of regulations and guidelines, private vessels engaged in recreational whale watching or fishing may be less aware of the existing, voluntary No-Go Zone.

EXHIBIT 2-11 ANNUAL VESSEL OBSERVATION TOTALS BY VESSEL TYPE WITHIN THE VOLUNTARY NO-GO ZONE (APRIL – SEPTEMBER)

YEAR	COMMERCIAL WHALE WATCHING	PRIVATE (RECREATION & FISHING)	RESEARCH	OTHER[1]	TOTAL
1998	106				**106**
1999	162				**162**
2000	94			3	**97**
2001	76	2			**78**
2002	17	5	1		**23**
2003	37	22	2		**61**
2004	27	11			**38**
2005	24	66	2	4	**96**
2006	2	56	5	5	**68**
2007	6	66	1	5	**78**
2008	12	82	4		**98**
2009	9	281	7	25	**322**
2010	9	120	8	13	**150**
TOTAL	**581**	**711**	**30**	**55**	**1,377**

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.
Source: Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

98. Exhibit 2-12 describes the total incident counts within the existing, voluntary No-Go Zone on a monthly basis to assess the variation between the vessel types in relation to the season. The pattern of incidents within the No-Go Zone is consistent with the overall pattern observed in the analysis in Exhibit 2-10 of total vessel counts which peak between July and August. Exhibit 2-12 indicates that vessels are most frequently found within the existing No-Go Zone in the months of July and August and are considerably less frequent before and after those months. Exhibit 2-13 summarizes for every observation hour the number of different types of vessels that were observed. Exhibit 2-13 indicates a general increase in the number of vessels until about 3pm. The greatest number of vessels is observed in the late afternoon between 2pm and 4pm.

EXHIBIT 2-12 TOTAL MONTHLY VESSEL OBSERVATION BY VESSEL TYPE WITHIN THE EXISTING, VOLUNTARY NO-GO ZONE (1998 -2010)

MONTH	COMMERCIAL WHALE WATCHING	PRIVATE (RECREATION & FISHING)	RESEARCH	OTHER[1]	TOTAL
April	1	0	0	0	**1**
May	44	7	0	0	**51**
June	243	49	2	1	**295**
July	175	284	9	7	**475**
August	82	229	14	23	**348**
September	36	140	5	24	**205**
October	0	2	0	0	**2**
TOTAL	**581**	**711**	**30**	**55**	**1,377**

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.

Source: Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

EXHIBIT 2-13 TOTAL HOURLY VESSEL OBSERVATIONS BY VESSEL TYPE WITHIN THE EXISTING, VOLUNTARY NO-GO ZONE (1998 -2010)

TIME	COMMERCIAL WHALE WATCHING	RESEARCH	PRIVATE (RECREATION & FISHING)	OTHER[1]	TOTAL
9 – 10 AM	0	0	5	0	**5**
10 – 11 AM	17	2	59	4	**82**
11 AM – 12 PM	93	4	90	7	**194**
12 PM - 1 PM	69	7	128	3	**207**
1 PM – 2 PM	77	3	112	12	**204**
2 PM – 3 PM	130	5	122	6	**263**
3 PM – 4 PM	105	7	108	16	**236**
4 PM – 5 PM	77	2	62	2	**143**
5 PM – 6 PM	12	0	18	0	**30**
6 PM – 7 PM	1	0	7	5	**13**
TOTAL	**581**	**30**	**711**	**55**	**1,377**

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.
Source: Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

99. Because a vessel may be involved in repeated incidents throughout a month or season, the counts of vessels in the existing, voluntary No-Go Zone are not counts of unique vessels that can be found in the No-Go Zone throughout the season. This analysis assumes, however, that a vessel passes through the Voluntary No-Go Zone only once per trip. In this case, the count of incidents reported in Exhibit 2-14 may be an efficient estimator of the number of vessel trips in the existing, voluntary No-Go Zone during an average whale watching season.

100. As highlighted in Exhibit 2-14, commercial whale watching vessels and private vessels stand to be measurably affected if the existing, voluntary No-Go Zone is codified and enforceable. Additionally, according to these data, relatively few vessels travel within the existing, voluntary No-Go Zone around Lime Kiln lighthouse. Roughly 21 percent of the incidents occurred in this region. Specifically, on average, 4.62 commercial whale watching trips and 15.08 private motorized vessel trips are expected to be affected per whale watching season around Lime Kiln.

EXHIBIT 2-14 AVERAGE ANNUAL VESSEL TRIPS WITHIN THE EXISTING, VOLUNTARY NO-GO ZONE BY VESSEL TYPE (ALTERNATIVE 4, 1998 – 2010)

BEHAVIOR	LOCATION	COMMERCIAL WHALE WATCHING	RESEARCH	PRIVATE (RECREATION & FISHING)	OTHER[1]	TOTAL
Within 440 yards of SJI No-Boat Zone	¼ Mile Protected Area	40.08	1.08	39.62	3.08	**84**
Within 880 yards of Lime Kiln	½ Mile Around Lime Kiln	4.62	1.23	15.08	1.15	**22**
SUBTOTAL		**45**	**2**	**55**	**4**	**106**

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.
Source: Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

101. A greater number of individuals stand to be affected by a regulation enforcing closure of the quarter mile buffer of San Juan Island. Approximately 40.08 commercial whale watching trips and 39.62 private vessel trips, on average, are forecast to be affected annually by the closure of this area to vessels.

102. Assuming an average of 55 participants per commercial whale watching trip and 3.42 participants per private-vessel trip, this analysis anticipates that the following parties may be affected by Alternative 4 per whale watching season:

- *Individuals engaged in a commercial whale watching tour: 2,458;*[86,87]
- *Individuals engaged in private vessel activities: 187.*[88,89]

103. Although the number of incidents occurring in the No-Go Zone by Lime Kiln Lighthouse is less than that within the quarter mile of coast No-Go Zone, the geographic scope of these areas varies considerably. To describe the density of incidents (and therefore affected trips) within the existing No-Go Zone of Alternative 4, Exhibit 2-15 estimates the density of incident counts per square kilometer. While significantly less total incidents occur around Lime Kiln, the number of incidents per square kilometer is four

[86] The average number of passengers per commercial whale watching trip is based on vessel capacity information found in: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[87] This analysis forecasts potentially affected individuals for both Canadian and U.S. as data are not available to determine what percentage of the affected individuals may be U.S. citizens. This analysis therefore likely overstates the number of U.S. whale watchers potentially affected by the regulations.

[88] The average number of participants per private vessel is based on personal communication with Kari Koski of the Whale Museum on August 1, 2008.

[89] To the extent that Soundwatch data captures repeat private-vessels within the current No-Go Zone involving repeat private-vessel participants, this analysis overestimates the number of people potentially affected by Alternative 4.

times the number of incidents per square kilometer that occur within a quarter mile of the west coast of San Juan Island.

EXHIBIT 2-15 AVERAGE ANNUAL VESSELS IN THE EXISTING NO-GO ZONES PER SQUARE KILOMETER BY VESSEL TYPE (ALTERNATIVE 4, 1998 - 2010)

BEHAVIOR	COMMERCIAL WHALE WATCHING	RESEARCH	PRIVATE (RECREATION & FISHING)	OTHER[1]	TOTAL
¼ Mile Protected Area	5.19	0.14	6.00	0.42	12
½ Mile Around Lime Kiln	8.08	2.44	33.97	3.46	48

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.
Source: Data provided by Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

Kayaks and Other Human-Powered Craft Operators Potentially Affected by Alternative 4

104. In contrast to motorized vessels, which whale watch guidelines request remain outside of the existing Voluntary No-Go Zone while whales are physically present, the existing Kayak Education and Leadership Program (KELP) Code of Conduct encourages kayakers to remain *within* ¼ mile of shore when whales are present. Thus, the Soundwatch data employed to quantify incidents do not provide an accurate representation of kayaker presence in the proposed No-Go Zone of Alternative 4.[90]

105. In the absence of historical data describing the number of kayaks and other human-powered vessels using the No-Go Zone, this analysis relies on new (2010) data from San Juan County regarding the number of kayaks and human-powered vessels using County launches.[91] The west side of San Juan Island includes the San Juan County Park boat launch, as well as an additional, more informal, launch location within the park. Both are frequently used by recreational and commercial kayakers, as well as other recreational boaters. Individuals launching from San Juan County Park are required to purchase a Vessel Launch Permit and to attend a Vessel Code of Conduct training, which includes information on the current laws and guidelines for protecting marine wildlife. In response to NMFS' proposed vessel traffic regulations, San Juan County collected data for the 2010 whale watching season regarding the numbers of Vessel Launch Permits purchased, as well as numbers of vessels launched at each facility. These data are intended to inform NMFS of the potential magnitude of individuals affected in the case

[90] In fact, in recent years, Soundwatch did count kayaks operating within the voluntary No-Go Zone. These data, however, relate to the distribution and number of kayaks at various time intervals (e.g., counts of kayaks every ten or 20 minutes) throughout the day. As such, it is difficult to use these data to discern the number of kayaks within the No-Go Zone absent some assumptions regarding how the length of time that individual kayaks are in the area per trip. We therefore rely on the boat launch information as the best available information regarding the number of kayaks within the No-Go Zones during the whale watching season.

[91] "Other human-powered crafts" is reported as one category and includes inflatable kayaks, rowboats/dinghies, paddle boards and canoes.

that the No-Go Zone is made an enforceable regulation that requires seasonal closures of the boat launch.

106. Data collected for the 2010 season (May 1 through September 30) were compiled and analyzed by KELP. Using these data, we estimate the number of potentially affected kayakers and other human-powered vessel operators as follows:

- **Commercial kayakers –** Commercial kayak outfitters report information on the total number of trips and participants.
- **Non-commercial kayakers and human-powered boaters –** This analysis estimates a range of potential affected non-commercial kayakers and human-powered vessel operators. At the low end, we assume the number of individuals with kayak and human-powered craft permits is representative of individuals affected. At the high end, we approximate the number of individuals affected using data on the number of reported launches.

The following discussion describes the results and assumptions of the analysis of the boat launch data.

Commercial Kayaks

107. San Juan County Park is used as a launching point for at least six commercial kayaking outfitters. The County requests commercial outfitters provide information for each trip launched from the park, including the number of vessels, number of guides, and number of guests participating. Exhibit 2-16 summarizes data collected during the 2010 season.

EXHIBIT 2-16 COMMERCIAL KAYAK USAGE OF THE SAN JUAN COUNTY PARK BOAT LAUNCH MAY-SEPTEMBER 2010

	COMMERCIAL KAYAKS LAUNCHED	TOTAL GUIDES	TOTAL GUESTS	TOTAL PEOPLE
May	194	87	235	322
June	701	157	1,022	1,179
July	1,315	276	2,065	2,341
August	1,160	242	1,832	2,074
September	558	128	856	984
TOTAL	**3,928**	**890**	**6,010**	**6,900**

Note: Some individuals, especially guides, may participate in more than one trip per season. To the extent that these figures reflect individuals that participate in more than one trip per season the total values may overestimate the number of individuals participating in trips that launched from San Juan County Park in the 2010 season.

Source: Compiled and analyzed San Juan County Vessel Permit Program Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

108. For the 2010 season, approximately 6,900 people participated in commercial kayaking trips that utilized the area within the No-Go Zone. This estimate is, however, subject to significant uncertainty. First, this estimate may overstate the actual number of unique

individuals who participated in commercial kayak trips in this area during the 2010 season as it is likely that most guides, and potentially some guests, participated in more than one trip during the season. On the other hand, the estimate includes only commercial trips launching from the San Juan County launches. To the extent that other commercial kayak companies may lead trips through the No-Go Zone, this estimate may understate the number of potentially affected commercial kayakers.

Non-Commercial Kayaks and other Human-Powered Vessels

109. Unlike the system established for commercial outfitters, the Vessel Launch Permit Program does not collect information on the number of individuals associated with each reported recreational vessel launch. The Program does however maintain two sources of data: permit data and vessel launch data. We use these data as two separate ways to estimate the number of recreational kayakers potentially affected by Alternative 4. We therefore report a range of potentially affected individuals employing vessel permit data at the low end and reported launch data at the high end.

110. The Vessel Permit Program collects information from recreational kayakers and others utilizing the San Juan County Park boat launch through a sign out sheet system. The sign out sheet is monitored during most daylight hours by Soundwatch staff. When staff members are not present, the Program requests that kayakers self-report information about their trip. Specifically, recreational boaters should indicate the types and numbers of vessels being launched. Exhibit 2-17 describes the number of reported recreational kayak and other human-powered vessel launches in 2010.

EXHIBIT 2-17 NON-COMMERICIAL USAGE OF THE SAN JUAN COUNTY PARK BOAT LAUNCH MAY-SEPTEMBER 2010: REPORTED LAUNCH DATA

	RECREATIONAL KAYAK LAUNCHES	OTHER HUMAN-POWERED CRAFT LAUNCHES[1]
May	67	0
June	366	2
July	482	3
August	253	0
September	188	0
TOTAL	**1,356**	**5**

Notes: Some vessels may be launched in more than one trip per season. To the extent that these figures reflect vessels that participate in more than one trip per season the total values may overestimate the number of unique vessels that launched from San Juan County Park in the 2010 season.

[1] Other human-powered craft is reported as one category and include inflatable kayaks, rowboats/dinghies, paddle boards and canoes.

Source: Data compiled and analyzed San Juan County Vessel Permit Program Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

111. Assuming that each kayak or other human-powered craft held an estimated two individuals, County boat launch data indicate that an estimated 2,722 recreational kayakers and other human-powered vessel operators may be affected by codification of the voluntary No-Go Zone. To the extent that individuals participated in more than one trip during the season, this figure may overstate the number of recreational kayakers and others potentially affected by this alternative. Further, it is likely that not all kayaks held two individuals. As a result, we employ this as our high-end estimate of non-commercial kayakers and other human-powered vessel operators potentially affected. Of note, not included in this estimate are potential non-commercial kayak and human-powered vessel operators that may traverse the No-Go Zone but do not launch from the San Juan County sites. Thus, while this estimate is our high end estimate, it should not be considered an upper bound on potentially affected individuals.

112. The Vessel Permit Program's permit data provide an alternate way to estimate the number of recreational kayakers utilizing the waters within the existing No-Go Zone annually. The County requires permits in order to use the San Juan County Park boat launch, as well as attendance at a Code of Conduct training session. When a permit is purchased, the permit holder must indicate how many individuals will be associated with the vessel (i.e., all individuals that may use the vessel). Thus, assuming that most or all individuals who have purchased, or are associated with, a vessel launch permit utilize the San Juan County vessel launch and adjacent waters (i.e., the voluntary No-Go Zone), permit data may also provide a sense of the number of individuals who may be affected by Alternative 4.

113. Exhibit 2-18 includes the number of vessel launch permits issued in 2010 for kayaks and other human-powered vessels, and the number of individuals associated with those permits.

114. Using the Vessel Permit Program data, this analysis estimates that 1,092 individual kayakers and 39 operators of other human-powered craft - a total of 1,131 individuals - may be affected by codification of the existing, voluntary No-Go Zone. To the extent that individuals who purchased permits participated in kayaking or boating with friends or family not listed on the permit application, this number may underestimate the number of individuals potentially affected. To the extent that individuals associated with a permit did not actually use that permit during the season, the number may overestimate the number of individuals potentially affected. Again, this estimate does not include kayakers and other human-powered boat operators that may enter the No-Go Zone but launch from other sites. As a result, we assume 1,131 is a low end estimate of potentially affected individuals.

EXHIBIT 2-18 TOTAL MONTHLY RECREATIONAL KAYAK AND OTHER HUMAN-POWERED CRAFT PERMITS ISSUED IN 2010 AND NUMBER OF INDIVIDUALS ASSOCIATED WITH PERMITS

	RECREATIONAL KAYAK PERMITS ISSUED	NUMBER OF INDIVIDUALS ASSOCIATED WITH KAYAK PERMITS	OTHER HUMAN-POWERED CRAFT RECREATIONAL PERMITS ISSUED[1]	NUMBER OF INDIVIDUALS ASSOCIATED WITH OTHER HUMAN-POWERED CRAFT PERMITS
May	59	78	1	2
June	151	214	5	8
July	245	408	7	17
August	159	255	1	6
September	109	137	0	6
TOTAL	**723**	**1,092**	**14**	**39**

Note: Some vessels may be launched in more than one trip per season. To the extent that these figures reflect vessels that participate in more than one trip per season the total values may overestimate the number of vessels that launched from San Juan County Park in the 2010 season.

[1] Other human-powered crafts with permits purchased in 2010 include inflatable kayaks, paddleboards, rowboats/dinghies and canoes.

Source: Data compiled and analyzed San Juan County Vessel Permit Program Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

Total Parties Likely to be Affected by Alternative 4

115. The analyses presented above estimate the following individuals may be be affected by an enforceable, seasonal closure of the existing, voluntary No-Go Zone as described under Alternative 4.

- *Individuals engaged in a commercial whale watching tour: 2,458;*
- *Individuals engaged in private vessel activities: 187;*
- *Kayakers and operators of other human-powered craft: 8,031 to 9,622.*

116. Overall, this analysis estimates that up to 12,267 individuals may be affected by this alternative. As described in Chapter 1, Soundwatch estimates that approximately 425,000 individuals engage in commercial whale watching activities annually. The estimated number of individuals potentially affected by Alternative 4 is therefore *approximately 2.9 percent of the estimated total number of individuals engaging in these activities annually*. Of note, however, not all of the kayakers and private vessels quantified in this analysis are necessarily participating in whale watching. Thus, this analysis may overestimate the percentage of whale watchers potentially affected by Alternative 4.

2.3.3 PARTIES LIKELY TO BE AFFECTED BY ALTERNATIVE 5 (EXPANDED NO-GO ZONE)

117. This section of the analysis quantifies the parties traveling within a half mile of the west coast of San Juan Island between Eagle Point and Mitchell Point. These parties are anticipated to be affected by the establishment of an enforceable killer whale No-Go Zone according to Alternative 5 (i.e., an expanded No-Go Zone).

118. Soundwatch tracks incidents of vessels occurring "inshore of whales" when the whales are within a half mile of the shore of western San Juan Island. This analysis uses these data to estimate the parties potentially affected by Alternative 5, an enforceable No-Go Zone within a half mile of the west coast of the Island. These data do not, however, provide information on potentially affected kayakers as currently the guidelines specify that kayaks *should* remain inshore of the whales. Exhibit 2-19 describes the average number of vessels potentially affected by Alternative 5 per whale watching season by vessel type, with the exception of kayak trips.

EXHIBIT 2-19 AVERAGE ANNUAL VESSEL TRIPS WITHIN THE POTENTIAL, EXPANDED NO-GO ZONE BY VESSEL TYPE (ALTERNATIVE 5, 1998 – 2010)

BEHAVIOR	LOCATION	COMMERCIAL WHALE WATCHING	RESEARCH	PRIVATE (RECREATION & FISHING)	OTHER[1]	TOTAL
Inshore of Whales	½ Mile Protected Area	53.15	2.54	94.08	5.85	**156**

[1] "Other" vessels include smaller, inflatable vessels, vessels engaged in commercial fishing, enforcement, and other unclassified activities. These data on "other vessels" were collected at this aggregate level and data are not available to break this information down further.

Source: Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

119. As incidents are only assigned one category in the Soundwatch database, these potentially affected parties are not inclusive of those described in Section 2.3.2 for Alternative 4. As such, this analysis estimates the total number of individuals likely to be affected by Alternative 5 as the sum of the individuals potentially affected in Alternative 5 and those described by Exhibit 2-19. Absent information on the number of kayakers operating within the expanded No-Go Zone, this analysis reports the number of kayakers within the current, voluntary No-Go Zone, as calculated in Section 2.3.2. As these kayakers reflect a subset of kayakers within the expanded No-Go Zone, this analysis understates the number of kayakers potentially affected by Alternative 5.

120. Again, assuming that 55 passengers are engaged per commercial whale watching trip and 3.42 per private vessel trip, this analysis estimates that the following quantities of individuals stand to be affected by the establishment of an enforceable half mile protection area off the west coast of San Juan Island per whale watching season:

- *Individuals engaged in a commercial whale watching tour: 5,382;*[92,93]
- *Individuals engaged in private vessel activities: 509.*[94,95]
- *Kayakers and operators of other human-powered craft: 8,031 to 9,622.*

121. As described in Chapter 1, Soundwatch estimates that approximately 425,000 people engage in whale watching activities annually through commercial motorized vessel or kayak tours. The estimated number of individuals potentially affected by Alternative 5 is therefore *approximately 3.65 percent of the estimated total number of individuals engaging in these activities annually*.

122. In addition, we include an estimate of *212 potentially affected commercial fishing trips* relying on San Juan County aerial survey data, as described below. This estimate includes only those trips potentially affected during peak fishing season. As of the writing of this RIR, data were not available regarding commercial fishing vessel levels across the entire whale watching season. As a result, this estimate likely understates the number of potentially affected commercial fishing trips. We rely on the data sources described above for estimates of potentially affected parties for other vessel categories (commercial whale watching, private vessels (inclusive of recreational fishing), and kayakers). We rely on the aerial survey data, however, to determine potentially affected commercial fishing trips as no other data sources included this category of vessels.

San Juan County Aerial Survey Data[96]

123. To provide more information regarding vessel activity within the expanded No-Go Zone, San Juan County conducted aerial surveys on randomly selected days between June 1 and September 7, 2010. Vessels occurring within the expanded No-Go Zone were identified according to nine categories: power, sail, paddle, cargo, commercial fishing, tour, skiff, recreational fishing, and reef netting. The study also considers the number and composition of vessels over weekdays, weekends, and holidays throughout the season. A key conclusion of the survey is that aerial surveys are preferable to ground-based sightings in determining vessel activity levels due to the clustered distribution and motility of the vessels on the water.

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[92] The average number of passengers per commercial whale watching trip is based on vessel capacity information found in: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[93] This analysis forecasts potentially affected individuals for both Canadian and U.S. as data are not available to determine what percentage of the affected individuals may be U.S. citizens. This analysis therefore likely overstates the number of U.S. whale watchers potentially affected by the regulations.

[94] The average number of participants per private vessel is based on personal communication with Kari Koski of the Whale Museum on August 1, 2008.

[95] To the extent that Soundwatch data captures repeat private-vessels within the expanded No-Go Zone involving repeat private-vessel participants, this analysis overestimates the number of people potentially affected by Alternative 5.

[96] Dismukes, Jeffrey S., Jonathan Riley, and Greg Crenshaw. Report to NMFS. "Quantification of Summer Season Marine Vessel Traffic Pressures in the San Juan Islands June 12 – September 5, 2010."

124. The aerial survey results are presented below for comparison with the estimated number of potentially affected kayakers and recreational fishing trips. We include the estimate of commercial fishing trips identified through the aerial survey in our analysis of potentially affected parties.

125. The aerial survey determined that vessel traffic within the expanded No-Go Zone represented two to three percent of total traffic in the entire region (defined as marine waters bounded by the Straits of Juan de Fuca to the south, Sucia Island to the north, the U.S. Canadian border to the west, and Lummi Island to the east). While only two to three percent of vessel traffic in the entire region occurs in the expanded No-Go Zone, this percentage varies greatly by vessel type. To augment data regarding potentially affected kayakers and recreational fishers, and estimate potentially affected commercial fishing trips, the following bullets summarize the conclusions of the aerial surveys from 2010. Of note, these summaries consider only one year of survey data.

- **Kayaks:** Kayaks and other human-powered vessels accounted for an average of 61 percent of total boats present in the expanded No-Go Zone from June 1 through September 7, 2010. The kayaks and other human-powered vessels within the No-Go Zone accounted for about 28 percent of all kayaks and human-powered vessels in the entire region (as described above). Extrapolating the average number of kayaks on weekdays, weekend days and holidays throughout the season, the aerial survey data indicate that about 1,386 kayak and human-powered vessel trips may be affected by closure of the No-Go Zone over this time period. Assuming, as above, an average of two passengers per vessel, an estimated **2,772 kayakers** may be affected in an average year. This calculation considers each kayak trip to involve unique passengers. That is, it does not consider the potential for an individual to participate in multiple kayak trips. The estimate of potentially affected kayakers using the aerial survey data is significantly lower than the estimate of affected kayakers using the San Juan County boat launch data described above.

- **Recreational Fishing Vessels:** The aerial survey identified the number of recreational fishing vessels occupying the expanded No-Go Zone during "peak fishing season," defined as the time from August 9 to September 5. During peak season, approximately 13 percent of all boats occupying the No-Go Zone were recreational fishing vessels. The recreational fishing vessels in the No-Go zone accounted for 23 percent of all recreational fishing vessels in the entire region. Extrapolating the average number of recreational fishing vessels on weekdays and weekend days and holidays throughout the peak fishing season, the aerial survey data indicate that about 112 recreational fishing vessel trips may be affected by closure of the No-Go Zone over peak season. Assuming, as above, an average of 3.42 passengers per vessel, an estimated **383 recreational fishers** may be affected across the peak fishing season. This calculation considers each recreational fishing trip to involve unique passengers. The estimate of 383 recreational fishers is within the range of private vessels affected as determined using Soundwatch data. Specifically, the Soundwatch data identify 509 individuals on private vessels (inclusive of

recreational fishing and whale watching). The aerial survey data are, however, limited to those recreational fishing vessels only during peak fishing season.

- **Commercial Fishing Vessels:** The aerial survey identified the number of commercial fishing vessels occupying the expanded No-Go Zone during peak fishing season. During peak season, approximately 25 percent of all boats occupying the No-Go Zone were commercial fishing vessels. The commercial fishing vessels in the No-Go zone accounted for 16 percent of all commercial fishing vessels in the entire region. Extrapolating the average number of commercial fishing vessels on weekdays and weekend days and holidays throughout the peak fishing season, the aerial survey data indicate that about **212 commercial fishing vessel trips** would be affected by closure of the No-Go Zone over peak season. The aerial survey indicated that the commercial fishing vessels were regularly spotted in the No-Go Zone not actively fishing. The study also suggested that, because similar behavior occurred outside of the expanded No-Go Zone, as well (i.e., waiting to fish, as opposed to actively fishing), it did not appear to be necessary for these commercial fishing vessels to be within the No-Go Zone while not actively fishing. Thus, it is unclear whether these commercial fishing vessel trips would be measurably affected by seasonal closure of the expanded No-Go Zone during.

2.4 PARTIES POTENTIALLY AFFECTED BY ALTERNATIVE 6 (VESSEL SPEED REGULATIONS)

126. The existing whale watching guidelines specify that vessels should "reduce speed to less than 7 knots when within 400 meters/yards of the nearest whale."[97] Thus, only vessels not currently complying with the speeds specified in the whale watching guidelines stand to be affected by potential NMFS vessel speed regulations. This analysis uses Soundwatch data, which includes information on vessels' adherence to the speed guidelines specified in the whale watching guidelines to determine the parties most likely to be affected by potential vessel speed regulations. Specifically, the number of "fast within a quarter mile of whales" incidents (hereafter "speeding incidents") observed by the Soundwatch Program is used to determine the vessels that may be affected by a potential vessel speed regulation.[98] NMFS does not include a vessel speed regulation in the final vessel traffic regulations to protect killer whales in Puget Sound.

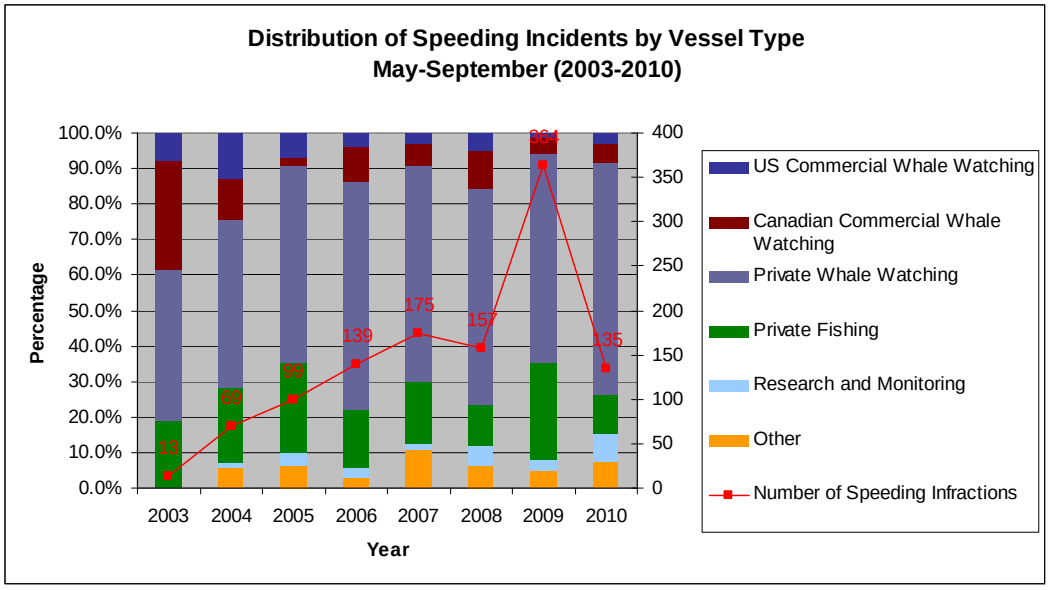
127. Speeding incidents represent a relatively small proportion of the total number of incidents of noncompliance with the whale watching guidelines observed by the Soundwatch Program between 2003 and 2010 in the Puget Sound area (Exhibit 2-2). Specifically, speeding incidents represent at most 16.1 percent of the total number of incidents observed in any given year between 2003 and 2010. However, the total number of speeding incidents generally increased through 2009, before dropping in 2010.

[97] The Whale Museum. 2006. "Be Whale Wise Guidelines for Boaters, Paddlers, and Viewers."

[98] A fast within a quarter mile incident is defined in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report for 2003 as a "vessel motoring faster than 7 knots within 440 yards from whales."

128. Private whale watching vessels were associated with the most speeding incidents of any vessel type in the Puget Sound area between 2003 and 2010, representing at least 42.5 percent of all speeding incidents in any year (Exhibit 2-20). With the exception of 2003, when Canadian commercial vessels caused the second-highest number of speeding incidents, private fishing vessels caused the second-greatest number of speeding incidents in the Puget Sound area. Specifically, private fishing vessels represent between 10.7 and 27.7 percent of all speeding incidents observed annually in the Puget Sound area between 2003 and 2010. The number of speeding incidents caused by commercial whale watching vessels (both U.S. and Canadian vessels) varies by year between 2003 and 2010. In general, U.S. and Canadian commercial whale watching vessels combine to represent between 5.8 and 38.5 percent of the total number of speeding incidents in the Puget Sound area between 2003 and 2010. In 2003, Canadian-based commercial whale watching vessels had the second highest rate of speeding incidents, representing 31 percent of all speeding incidents observed. "Other" vessel types (includes commercial fishing and shipping vessels) represent at most 10.9 percent of the total number of speeding incidents observed in the Puget Sound area between 2003 and 2010. Thus, other vessel types are not expected to be greatly affected by potential speed regulations. Additionally, no speeding incidents involving kayaks were observed between 2003 and 2010 in the Puget Sound area. This is most likely due to kayakers not being able to paddle at sustained speeds greater than seven knots. Thus, kayaks are not expected to be affected by potential vessel speed regulations.

EXHIBIT 2-20 DISTRIBUTION OF SPEEDING IN THE VICINITY OF WHALE INCIDENTS BY VESSEL TYPE (MAY-SEPTEMBER 2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

129. The remainder of this section presents more detailed estimates of the parties that are likely to be affected by potential vessel speed regulations and the degree to which parties might be affected. Of note, NMFS does not include

Private Whale Watching and Fishing Vessels

130. As indicated in Exhibit 2-20, private whale watching and fishing vessels combine to represent the majority of speeding incidents observed in the Puget Sound area between 2003 and 2010. Private vessels represent at least 61.5 percent of all speeding incidents observed annually between 2003 and 2010. Private whale watching vessels caused a total of 687 speeding incidents between 2003 and 2010, while private fishing vessels caused a total of 228 speeding incidents in the same time period. Based on their high rate of speeding incidents, private vessels, in particular private whale watching vessels, are expected to be the most likely vessel type to be affected by potential NMFS vessel speed regulations. Specifically, *this analysis estimates that, on average, 114.38 private vessel trips may be affected by potential vessel speed regulations*.[99] Of these trips, 85.91 are forecast to be taken by private whale watching vessels, while 28.46 are forecast to be taken by private fishing vessels. Assuming that private-vessel trips include 3.42 participants, *an estimated 391 private-vessel trip participants may be affected by potential vessel speed regulations each whale watching season*.[100] To the extent that Soundwatch data captures repeat private-vessel speeding incidents involving repeat participants, this analysis overestimates the number of people potentially affected by vessel speed regulations.

Commercial Whale Watching Industry

131. Based on the distribution of speeding incidents by vessel type, commercial whale watching vessels (U.S. and Canadian vessels combined) are the second most likely vessel type to be affected by potential vessel speed regulations after private vessels. U.S.-based and Canadian-based commercial whale watching companies were involved in similar levels of speeding incidents between 2003 and 2010, with Canadian vessels being responsible for slightly more incidents since 2006. Specifically, 23 U.S.-based commercial whale watching companies caused a total of 43 speeding incidents between 2003 and 2010, while 30 Canadian-based commercial whale watching companies caused a total of 81 speeding incidents in the same time period.[101]

132. Of the 23 U.S.-based commercial whale watching companies that caused at least one speeding incident between 2003 and 2010, the majority of these companies (13) caused only one speeding incident (Exhibit 2-21). Further, only two U.S. commercial whale

[99] The number of affected trips is estimated by determining the average number of speeding incidents per whale watching season from 2003 through 2010 using Soundwatch data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

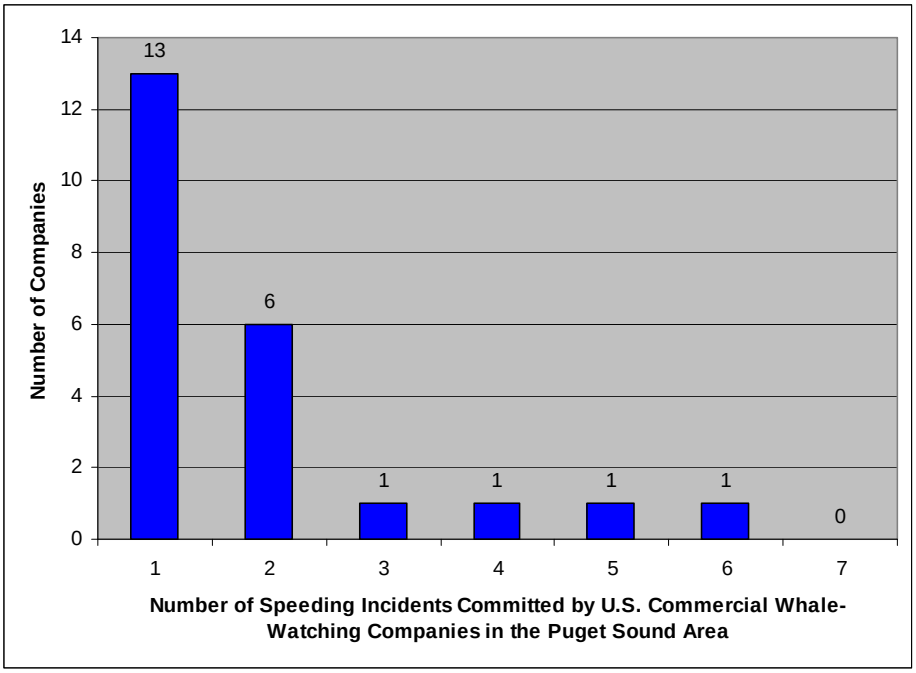
[100] The average number of participants per private vessel is based on personal communication with Kari Koski of the Whale Museum on August 1, 2008.

[101] Based on data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report. Data, 2003-2010.

watching companies caused five or more speeding incidents between 2003 and 2010. Of the 30 Canadian-based commercial whale watching companies causing at least one speeding incident between 2003 and 2010, 12 caused only one speeding incident in that time (Exhibit 2-22). Further, the majority of Canadian commercial whale watching companies (18) caused two or less speeding incidents between 2003 and 2010. Five Canadian commercial whale watching companies caused five or more speeding incidents between 2003 and 2010.

133. Although 53 commercial whale watching companies in the Puget Sound area caused at least one speeding incident between 2003 and 2010, most of these companies did not repeatedly disregard the speeding guidelines specified in the whale watching guidelines. That is, there does not appear to be a systematic lack of compliance with voluntary vessel speed guidelines. Thus, potential vessel speed regulations are expected to have a minimal effect on commercial whale watching activities in the Puget Sound area.

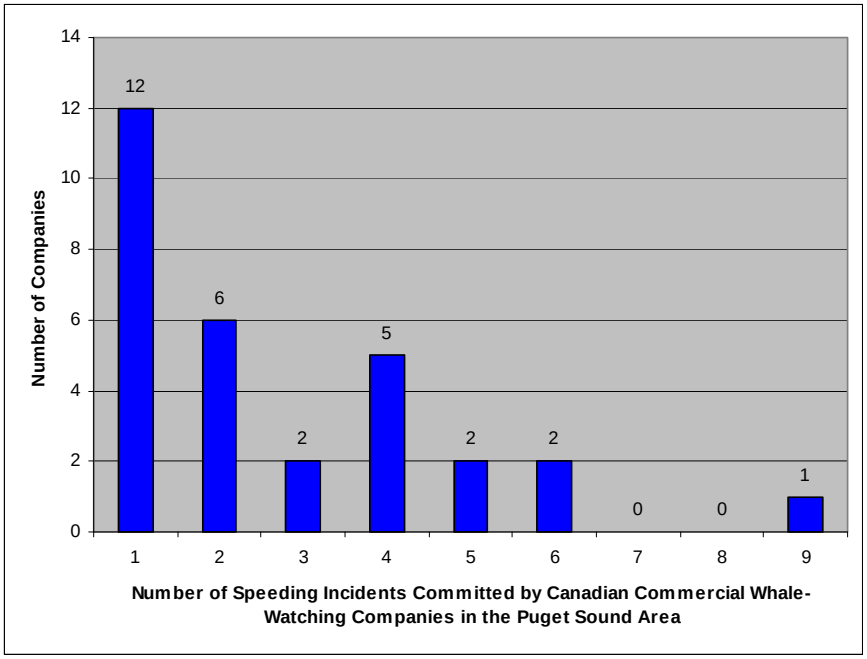
EXHIBIT 2-21 DISTRIBUTION OF U.S.-BASED COMMERCIAL WHALE WATCHING COMPANIES CAUSING SPEEDING INCIDENTS IN THE PUGET SOUND AREA (MAY-SEPT 2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

Notes: Total number of companies involved in speeding incidents includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

EXHIBIT 2-22 DISTRIBUTION OF CANADIAN-BASED COMMERCIAL WHALE WATCHING COMPANIES CAUSING SPEEDING INCIDENTS IN THE PUGET SOUND AREA (MAY-SEPT 2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

Notes: Total number of companies involved in speeding incidents includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

134. Specifically, *this analysis estimates that, on average, 15.5 commercial whale watching trips may be affected annually by potential vessel speed guidelines during the whale watching season in the Puget Sound area*.[102] Of these trips, 5.38 are forecast to be taken by U.S. commercial whale watching companies, while 10.13 are forecast to be taken by Canadian commercial whale watching companies. The 5.38 affected trips forecast to be taken by U.S. commercial whale watching companies represent less than one percent of the total number of trips taken by U.S. commercial whale watching companies in a whale watch season.[103] Given an average of 55 participants per commercial whale watching trip, the 15.5 potentially affected commercial whale watching trips results in *853 commercial whale watch participants that may be affected by the potential vessel speed*

[102] The number of affected trips is estimated by determining the average number of speeding incidents per whale watching season from 2003 through 2010 using Soundwatch data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

[103] Total number of trips taken assumes that 70 percent of the total number of U.S.-based commercial whale watching trips offered in the Puget Sound area between Memorial Day and Labor Day actually occur. Source: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

regulations.[104, 105] The 853 potentially affected commercial whale watch participants represents less than one percent (0.2 percent) of the estimated 425,000 individuals participating in whale watching activities in Washington State.

Kayaks

135. There were no speeding incidents involving kayaks between 2003 and 2006 in the Puget Sound area. This is most likely because kayakers are not able to paddle at sustained speeds greater than seven knots. Thus, potential vessel speed regulations are not expected to affect kayakers.

Other Vessel Types

136. Other vessel types that may be affected by potential NMFS vessel speed regulations include commercial fishing and shipping vessels.[106] These "other" vessels represent at most 10.9 percent of the annual speeding incidents in the Puget Sound area between 2003 and 2010. "Other" vessels caused a total of 71 speeding incidents between 2003 and 2010, an average about 8.88 per year. Thus, it is expected that "other" vessels will be minimally affected by potential vessel speed regulations. Specifically, *this analysis estimates that 8.88 "other" vessel trips may be affected annually during the peak whale watching season in the Puget Sound area.*[107] Of note, these vessel speed incidents are recorded in the areas monitored by Soundwatch. Soundwatch focuses its monitoring efforts on those areas in which whales are most likely to occur. Thus, "other" vessels, such as commercial fishing vessels, operating in the South area of Puget Sound may have been less likely to be encountered by the Soundwatch monitors. These vessels would, however, be required to reduce their speed near whales. Data are not available describing how often a vessel in the South area of the Sound may encounter a whale and therefore be required to reduce its speed. To the extent that the Soundwatch monitoring data did not capture these vessels, this analysis underestimates the total number of "other" vessel trips potentially affected by Alternative 6.

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[104] The average number of passengers per commercial whale watching trip is based on vessel capacity information found in: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[105] This analysis forecasts potentially affected individuals for both Canadian and U.S. as data are not available to determine what percentage of the affected individuals may be U.S. citizens. This analysis therefore likely overstates the number of U.S. whale watchers potentially affected by the regulations.

[106] Research and monitoring vessels are assumed to have a vested interest in complying with guidelines and regulations designed to protect and conserve the killer whales and are therefore not forecast to be negatively affected by this regulation.

[107] The number of affected trips is estimated by determining the average number of speeding incidents per whale watching season from 2003 through 2010 using Soundwatch data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

2.5 PARTIES POTENTIALLY AFFECTED BY ALTERNATIVE 7 (VESSEL PATH REGULATIONS)

137. The whale watching guidelines specify that vessels should "keep clear of the whales' path" and "avoid positioning [themselves] within the 400 meter/yard area in the path of whales."[108] Thus, codifying this guideline through the potential NMFS vessel path regulation is expected to affect only those vessels that do not currently adhere to the whale watching guidelines. This analysis uses the number of times vessels in the Puget Sound area are observed to park in the path of whales, included in the Soundwatch Program data, as a measure of current vessel compliance with the path guideline. NMFS has included Alternative 7 in the final vessel traffic regulations to protect killer whales in Puget Sound.

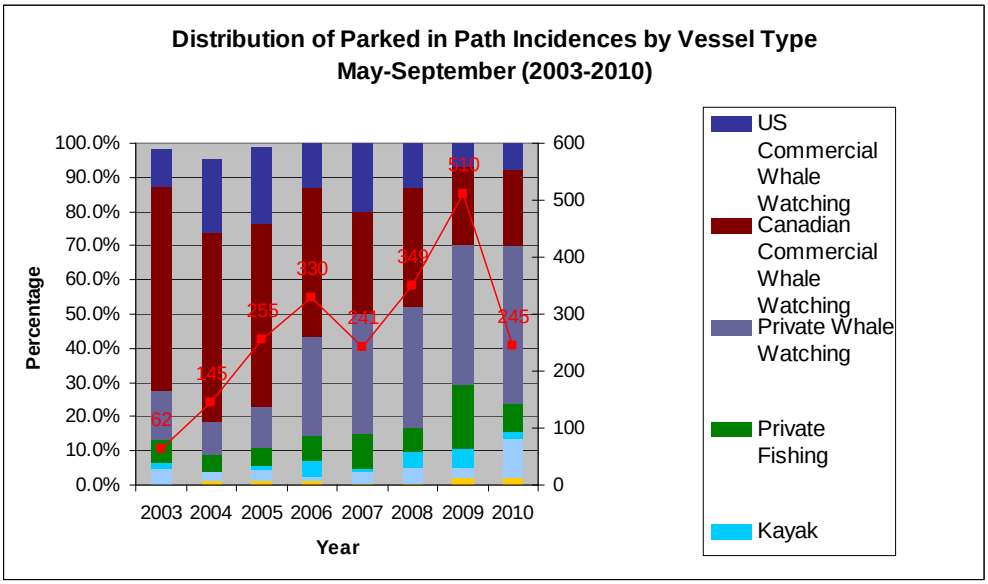
138. Between 2003 and 2010, "Parked in path of whales" (hereafter "path incidents") represented at least 16.6 percent of the total number incidents of noncompliance with the whale watching guidelines observed annually in the Puget Sound area during the main part of the whale watching season (Exhibit 2-2). Further, the number of path incidents has increased from 62 in 2003 to a peak of 510 in 2009 before decreasing to 245 in 2010. The proportion of the total number of incidents of noncompliance with the whale watching guidelines represented by path incidents has varied between 16.6 percent and 26.6 percent between 2003 and 2010.

139. In all years between 2003 and 2006, Canadian commercial whale watching vessels were observed parking in the path of whales more than any other vessel type (Exhibit 2-23). Since 2007, however, private whale watching vessels have been most frequently associated with path incidents. The recent decrease in the proportion of path incidents caused by Canadian commercial whale watching vessels is accompanied by an increase in the proportion of path incidents caused by private (not commercial) whale watching vessels. The portion of path incidents associated with private whale watching vessels has increase each year since 2004, accounting for 46.7 percent of all path incidents in 2010. The proportion of path incidents made up by U.S. commercial whale watching vessels has fluctuated between 6.9 and 22.4 percent between 2003 and 2010. The remaining vessel categories (i.e. private fishing vessels, kayaks, and other vessels) each generally represent less than 12 percent of the number of path incidents observed in a given year between 2003 and 2010. The exception is 2009, where private fishing vessels accounted for 19.1 percent of path incidents.

140. The remainder of this section further examines the magnitude to which different vessel types (represented by the vessel types in Exhibit 2-23) may be affected by potential NMFS path regulations as described by Alternative 1.

[108] The Whale Museum. 2006. "Be Whale Wise Guidelines for Boaters, Paddlers, and Viewers."

EXHIBIT 2-23 DISTRIBUTION OF PARKED IN PATH INCIDENTS BY VESSEL TYPE (MAY-SEPT 2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

Commercial Whale Watching Industry

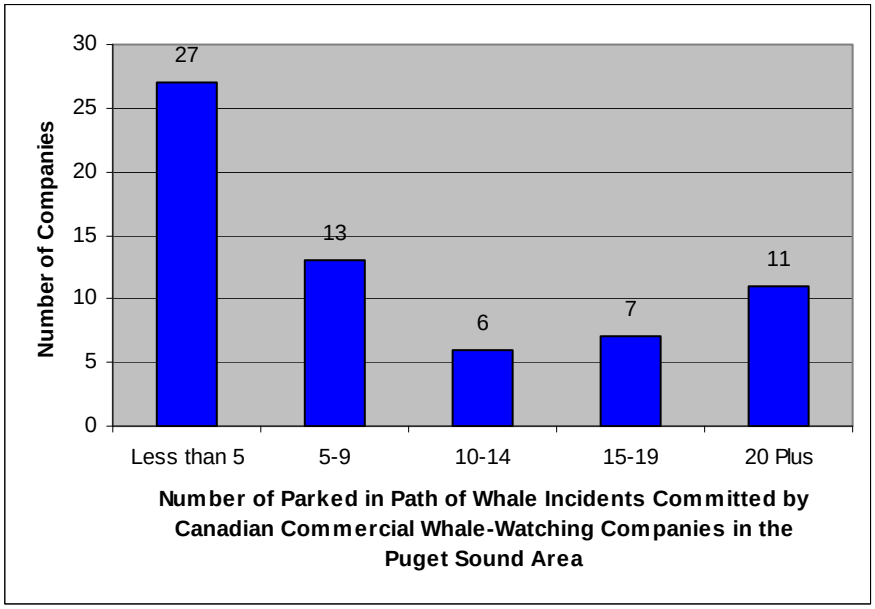
141. As illustrated in Exhibit 2-23, private whale watching and commercial whale watching vessels (U.S. and Canadian whale watching vessels combined) are the most likely vessel type to be affected by potential NMFS path regulations. In particular, Canadian commercial whale watching vessels are most likely to be affected by potential path regulations as they were involved in the highest average number of path incidents between 2003 and 2010. Specifically, 64 Canadian commercial whale watching companies caused a total of 761 path incidents between 2003 and 2010 (Exhibit 2-24). This is compared with 681.06 incidents caused by private whale watching vessels, which caused the second highest number of path incidents in the same time period.[109] Further, 11 Canadian-based commercial whale watching companies caused 20 or more path incidents between 2003 and 2010, while 27 Canadian commercial whale watching companies caused less than five path incidents in the same time period. Exhibit 2-24 indicates that the large number of path incidents caused by Canadian companies is frequently the result of repeated non-compliance with the vessel path guidelines specified in the whale watching guidelines by Canadian whale watching companies.

142. U.S. commercial whale watching vessels caused a total of 287 path incidents between 2003 and 2010. A total of 47 U.S.-based commercial whale watching companies caused

[109] Although there are only 22 vessel-operating, Canadian commercial whale watching companies based in the Puget Sound area (see Chapter 1), the 26 companies involved in a path incident between 1998 and 2006 includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

at least one path incident between 2003 and 2010 (Exhibit 2-25).[110] The majority of these companies (26) caused less than five path incidents in that time. Further, only one U.S.-based commercial whale watching company caused 20 or more path incidents between 2003 and 2010. Thus, the path incidents caused by U.S. commercial whale watching vessels between 2003 and 2010 appear to be the result of occasional non-compliance with the vessel path guidelines specified in the whale watching guidelines by a large number of companies. This differs from the path incidents caused by Canadian whale watching companies in the same time period, which appear to be the result of systematic non-compliance of a few companies with the path guidelines specified in the whale watching guidelines.

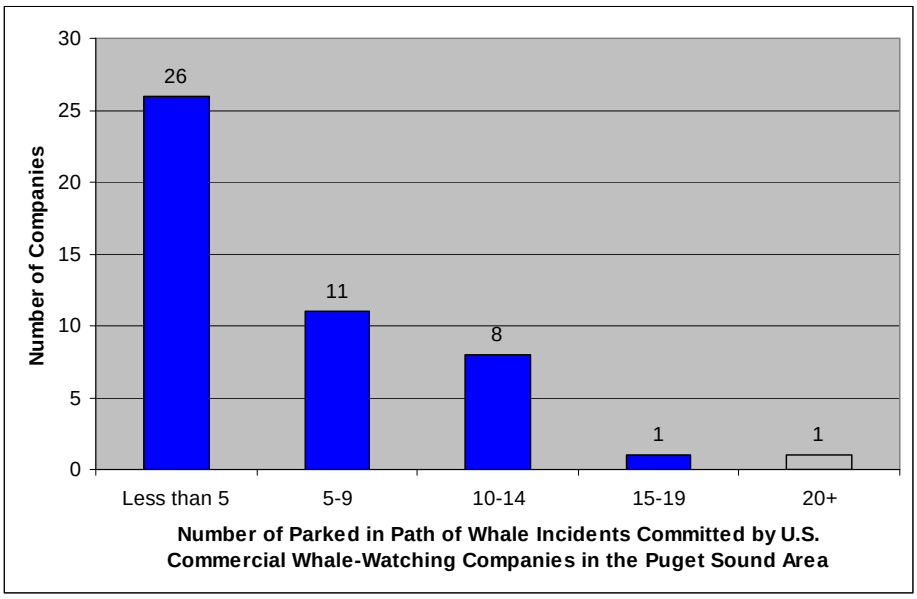
EXHIBIT 2-24 DISTRIBUTION OF CANADIAN-BASED COMMERCIAL WHALE WATCHING COMPANIES CAUSING PATH INCIDENTS IN THE PUGET SOUND AREA (MAY-SEPT 2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.
Notes: Total number of companies involved in path incidents includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

[110] Although there are only 17 to 19 vessel-operating, U.S. commercial whale watching companies based in the Puget Sound area (see Chapter 1), the 24 companies involved in a path incident between 1998 and 2006 includes non-Puget-Sound-based companies and commercial companies that conduct limited whale watching activities.

EXHIBIT 2-25 DISTRIBUTION OF U.S.-BASED COMMERCIAL WHALE WATCHING COMPANIES CAUSING PATH INCIDENTS IN THE PUGET SOUND AREA (MAY-SEPT 2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

Notes: Total number of companies involved in path incidents includes non Puget Sound based companies and commercial companies that conduct limited whale watching activities.

143. Between 2003 and 2010, an average of 131 commercial whale watching vessels caused path incidents in the Puget Sound area during the peak whale watching season (May-September).[111] Therefore, *this analysis estimates that an average of 131 commercial whale watching trips may be affected during the peak of the whale watching season each year*. Of these 131 trips, 95.13 are forecast to be by Canadian-based commercial whale watching companies, while 35.88 are forecast to be by U.S.-based commercial whale watching companies. The 35.88 affected U.S.-based commercial whale watching trips represent approximately 1.4 percent of the total number of the U.S.-based commercial whale watching trips taken in a whale watching season.[112] Given an average of 55 passengers per commercial whale watching trip, *a total of 7,205 commercial whale watch*

[111] Based on data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

[112] Total number of trips taken assumes that 70 percent of the total number of U.S.-based commercial whale watching trips offered in the Puget Sound area between Memorial Day and Labor Day actually occur. Source: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

participants may be affected by potential vessel path regulations.[113,114] The number of commercial whale watch participants potentially affected by vessel path regulations represents 1.7 percent of the estimated 425,000 individuals participating in whale watching activities in Washington State.

Private Whale Watching and Fishing Vessels

144. After commercial whale watching vessels, private vessels cause the next highest number of path incidents in the Puget Sound area. Private whale watching vessels are associated with more path incidents than private fishing vessels. Specifically, private whale watching vessels caused a total of 681.06 path incidents between 2003 and 2010, while private fishing vessels experienced 211.94 path incidents over the same time period. *It is estimated that, on average, 111.63 private vessel trips may be affected by potential vessel path regulations.*[115] Of these trips, 85.13 are forecast to be taken by private whale watching vessels and 26.49 are forecast to be taken by private fishing vessels. Assuming that private-vessel trips include 3.42 participants, *an estimated 382 private-vessel trip participants may be affected by potential vessel path regulations each whale watching season.*[116] To the extent that Soundwatch data captures repeat private-vessel path incidents involving repeat participants, this analysis overestimates the number of people potentially affected by vessel path regulations.

Kayaks

145. Kayaks represent a small percentage of the path incidents caused in the Puget Sound area. Specifically, kayaks represent at most 5.1 percent of the annual path incidents occurring between 2003 and 2010 during the peak whale watching season in the Puget Sound area. Further, kayaks caused 69 path incidents between 2003 and 2010 in the Puget Sound area. *This analysis estimates that, on average, 8.63 kayak trips may be affected by potential vessel path regulations in the Puget Sound area annually.*[117] Assuming each incident involves a unique kayak and up to two individuals (a conservative estimate potentially

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[113] The average number of passengers per commercial whale watching trip is based on vessel capacity information found in: Russell, S., and M. Schneidler. In prep as of November 2010. The U.S. Whale Watching Industry of Greater Puget Sound: A Description and Baseline Analysis. NOAA Technical Memorandum-NMFS-NWFSC. (Available from S. Russell, Conservation Biology Division, NWFSC 2725 Montlake Blvd. E., Seattle, WA 98112.)

[114] This analysis forecasts potentially affected individuals for both Canadian and U.S. as data are not available to determine what percentage of the affected individuals may be U.S. citizens. This analysis therefore likely overstates the number of U.S. whale watchers potentially affected by the regulations.

[115] The number of affected trips is estimated by determining the average number of path incidents per whale watching season from 2003 through 2010 using Soundwatch data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

[116] The average number of participants per private vessel is based on personal communication with Kari Koski of the Whale Museum on August 1, 2008.

[117] The number of affected trips is estimated by determining the average number of path incidents per whale watching season from 2003 through 2010 using Soundwatch data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

overstating the number of individuals affected), *this analysis estimates up to 17 individual kayakers may be affected by potential vessel path regulations.*

146. Soundwatch's 2010 kayak monitoring program identified one incident of "kayaks crossing the path of whales" and 88 incidences of "kayaks parked in the path of whales within 100 yards."[118] To the extent that these individuals would be considered out of compliance with the Alternative 7 vessel path regulation, the estimate of 8.63 kayaks annually affected by Alternative 7 likely underestimates potentially affected kayakers. Of note, the Kayak Monitoring Program data consider only one year of observation. The extent to which these data are representative of an average year is uncertain.

Other Vessel Types

147. Other vessel types that may be affected by potential NMFS vessel path regulations include shipping vessels and commercial fishing vessels.[119] These vessel types represented 2.2 percent or less of the total number of path incidents caused by vessels in the Puget Sound area between 2003 and 2010. Therefore the number of "other" vessels that would have to alter their current behavior following vessel path regulations is expected to be quite small. Specifically, *this analysis estimates that, on average, only two 3.38 taken by "other" vessels may be affected by potential vessel path regulations in the Puget Sound area*.[120]

2.6 SAN JUAN COUNTY PARK VESSEL LAUNCH

148. Following the publication of the Proposed Rule and Draft RIR, San Juan County worked with NMFS to gather more information regarding the use of their County boat launch that occurs adjacent to the proposed No-Go Zone. The purpose of the data gathering effort was to provide more information on the types and numbers of vessels that may be operating within the No-Go Zone during whale watching season. Section 2.3 summarizes the boat launch data to describe the number of kayaks and other human-powered vessels that may operate within the No-Go Zone. This analysis does not specifically rely on the boat launch data to estimate the numbers of other types of vessels potentially affected by the No-Go Zone but instead employs the Soundwatch monitoring data describing potential incidents of other types of vessels potentially affected by Alternatives 4 and 5 (see Sections 2.3.2 and 2.3.3 of this Chapter). This section summarizes the San Juan County boat launch usage data to provide additional information to NMFS regarding the level of use of the launch that occurs adjacent to the No-Go Zone. This information augments the discussion of potentially affected parties in Section 2.3.

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[118] Draft Report from Kari Koski, Soundwatch Program Coordinator, to NMFS. "2010 Soundwatch Kayak Monitoring Program: Overall Data Incident Observations."

[119] Research and monitoring vessels are assumed to have a vested interest in complying with guidelines and regulations designed to protect and conserve the killer whales and are therefore not forecast to be negatively affected by this regulation.

[120] The number of affected trips is estimated by determining the average number of path incidents per whale watching season from 2003 through 2010 using Soundwatch data found in: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

149. As described in Section 2.3, the west-side of San Juan Island includes the San Juan County Park boat launch, as well as an additional more informal launch location within the park, which are frequently used by kayakers and to a lesser extent by other boaters. Thus, codification of the proposed No-Go Zone Alternatives 4 and 5 may result in closure of boat launching facilities within the park during the whale watching season. Boaters launching from San Juan County Park, regardless of whether they remain in the area to utilize the waters of the No-Go Zone, stand to be affected if the existing, voluntary No-Go Zone (Alternative 4) or the Expanded No-Go Zone (Alternative 5) becomes an enforceable No-Go Zone.

150. The launching facilities at San Juan County Park are used by several classes of vessels including motorized boats, row boats, and sail boats; kayaks comprise the vast majority of vessels being launched from the Park launches. These facilities are open to the public and are utilized by both private boaters and commercial kayaking outfitters.

151. San Juan County collected data in 2010 on the numbers of recreational Vessel Launch Permits purchased, as well as numbers of vessels launched at each facility as collected from sign out sheets posted in the vicinity of the launches. Data collected for the 2010 boating season (May 1 through September 30) were compiled and analyzed by KELP. These data provide a sense of the scale of use of these launches in a season. Exhibit 2-26 describes the number of recreational vessel launch permits purchased in 2010 while Exhibit 2-27 describes the number of total launches (commercial and recreational) that took place in San Juan County Park in 2010.

EXHIBIT 2-26 TOTAL RECREATIONAL VESSEL LAUNCH PERMITS PURCHASED FOR THE SAN JUAN COUNTY PARK VESSEL LAUNCH IN 2010

	RECREATIONAL KAYAK PERMITS	RECREATIONAL MOTOR AND SAILBOAT PERMITS	RECREATIONAL OTHER HUMAN POWERED VESSEL PERMITS[2]	TOTAL RECREATIONAL VESSEL PERMITS
May	59	9	1	69
June	151	7	5	163
July	245	19	7	271
August	159	12	1	172
September	109	5	0	114
TOTAL	**723**	**51**	**14**	**789**

[1] All commercial vessel launches were kayaks.

[2] Other recreational vessel permits includes row boats, canoes, inflatable kayaks and paddle boards.

Source: Compiled and analyzed San Juan County Vessel Permit Program Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

EXHIBIT 2-27 TOTAL VESSELS LAUNCHED FROM SAN JUAN COUNTY PARK IN 2010

	COMMERCIAL VESSELS LAUNCHED[1]	RECREATIONAL KAYAKS LAUNCHED	RECREATIONAL MOTOR AND SAILBOATS LAUNCHED	OTHER HUMAN-POWERED RECREATIONAL CRAFTS LAUNCHED[2]	TOTAL VESSELS LAUNCHED
May	194	67	7	0	268
June	701	366	5	2	1,074
July	1,315	482	45	3	1.845
August	1,160	253	47	0	1.460
September	558	188	16	0	762
TOTAL	**3,928**	**1,356**	**120**	**5**	**5,409**

[1] All commercial vessel launches were kayaks.
[2] Other recreational vessel launches in 2010 includes row boats, canoes, inflatable kayaks and paddle boards.

Source: Compiled and analyzed San Juan County Vessel Permit Program Data provided by Kari Koski, Soundwatch Program Director, The Whale Museum, Friday Harbor, Washington.

152. According to the data on vessel launches, up to 5,409 trips may be affected by the closure of the boat launch at San Juan County Park. The San Juan County Economic Development Council estimates that up to 10,000 kayakers (the vast majority of users of this launch) use this vessel launch annually.[121]

2.7 ASSUMPTIONS AND CAVEATS

153. To overcome data limitations, this analysis makes a number of assumptions. Exhibit 2-28 summarizes the major assumptions and caveats underlying the estimation of potentially affected entities.

[121] San Juan County Economic Development Council. 2009. "NOAA No-Go Zone Proposal" Economic Impact Analysis.

EXHIBIT 2-28 CAVEATS AND ASSUMPTIONS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS[1]
Because of the vessel tracking methods employed by the Coast Guard and Soundwatch, not all vessel types occupying the Puget Sound region are quantified. For example, when conducting vessel counts, some vessel types (e.g., commercial fishing, some recreational vessels, enforcement vessels) are grouped into an "other vessel" category.	+/-
Data on the capacity of all Canadian whale watching vessels are not complete. This analysis therefore assumes that average capacity is similar to the United States: 55 passengers.	+
Data are not available on the distribution of fishing vessels across the Protected Areas. This analysis therefore provides information on the total numbers of fishing vessels operating in the vicinity of the Strait of Juan de Fuca overall.	+
To estimate the number of vessels in the Protected Areas, the analysis relies on vessels counted according to a quadrant system established by Soundwatch. The quadrants considered overlap the Protected Area boundaries but also include some areas outside of the Protected Areas. The counts of vessels within these quadrant areas therefore may overestimate the number of vessels in the Protected Areas.	+
The estimate of commercial fishing trips potentially affected by Alternative 5 (expanded No-Go Zone) includes only commercial fishing trips affected during peak season. To the extent that some commercial fishing activity occurs in the expanded No-Go Zone during off-peak days, this analysis underestimates potentially affected commercial fishing trips.	-
The analysis relies on the number of incidents (defined as vessels not complying with the whale watching guidelines) to project the number of entities affected. Because Soundwatch is not continuously monitoring vessels, this analysis may underestimate the number of potentially affected entities.	-
Counts of vessels within the Protected Areas are based on daily counts and assumes that each vessel counted in the Protected Area on a given day is unique (i.e., vessels do not cross the Protected Area more than once per trip). Because a vessel may be involved in repeated incidents throughout a month or season, however, the counts of vessels in the Protected Areas are not a count of unique *vessels* potentially displaced, but rather unique *trips* potentially displaced.	+
The Soundwatch 2010 Kayak Monitoring Program provided information on incidents of noncompliance with various whale watching guidelines. These data indicate that the estimates of kayakers potentially affected by Alternatives 2 and 7, which rely on annual Soundwatch monitoring data of all vessel types, may underestimate potentially affected kayakers.	-

Notes:
+: This assumption may result in an overestimate of real costs.
- : This assumption may result in an underestimate of real costs.
+/-: This assumption has an unknown effect on estimates.

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CHAPTER 3 | POTENTIAL ECONOMIC EFFECTS OF VESSEL TRAFFIC REGULATIONS

154. Existing research does not allow for the quantification of economic impacts of NMFS' alternatives for minimum approach distance, vessel speed, and vessel path regulations or the establishment of enforceable No-Go Zones, and primary research is beyond the scope of this analysis. Information provided in this chapter describes the extent to which the potentially affected parties identified in Chapter 2 may be affected by vessel traffic regulations. This chapter first presents a qualitative discussion of the types of economic impacts that may be generated by such regulations (Section 3.1) and then describes how these types of impacts relate to the management alternatives being considered. Finally, this chapter describes recent research related to the valuation of whale watching activities (Section 3.2).

155. In general, the results of recent research vary concerning the extent to which proximity to whales relates to willingness to pay for a whale watching trip. A recent study focused on the Southern Resident killer whales in Puget Sound, however, concludes that it is more important to whale watching participants that they view whales in a respectful, protective manner than that they get within a specific distance of the whales. This suggests that any negative effects caused by minimum approach distance regulations may be minimized if the participants are educated on the reasons for the regulation.

156. Sections 3.2.1 through 3.2.4 focus in particular on how the proposed regulatory alternatives may affect individuals participating in whale watching. As described in the previous chapters, because of the vested interest to these individuals in seeing whales, we expect whale watching activity is most likely to experience negative effects of constraints on whale watching behavior and activity. However, as described in Chapter 2, other types of vessels operating in the Sound also stand to be affected by the proposed regulations. Section 3.2.5 therefore discusses potential impacts to individuals engaging in activities other than whale watching in Puget Sound.

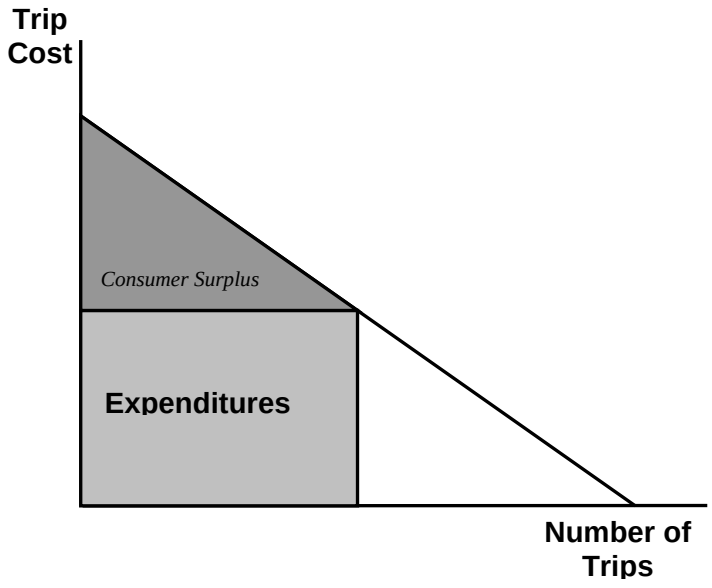
3.1 TYPES OF ECONOMIC IMPACTS ASSOCIATED WITH THE POTENTIAL VESSEL TRAFFIC REGULATIONS

157. As discussed previously, the commercial whale watching industry is most likely to be affected by the proposed regulations. A person's ability to get close to whales, including parking directly in the paths of the whales, vessel speeds, or ability to access No-Go Zones may contribute to an individual's willingness to pay to participate in whale watching activities. As such, potential vessel traffic regulations which limit proximity and

access may generate negative social welfare impacts to many of the individuals forecast to be affected in Chapter 2. Further, to the extent that proximity to whales, vessel speeds, or the ability to access No-Go Zones contribute to an individual's likelihood to participate in whale watching activities, regional economic impacts to industries providing goods and services to the whale watching industry may occur.

158. The economic 'impact' of the whale watching industry consists of two dimensions: net economic or welfare value, and regional economic contribution. Net economic value, or consumer surplus, is measured by what individuals are willing to pay for whale watching above beyond what they are required to spend. Actual expenditures on whale watching (and turn their contribution to output, jobs and wages) provide a measure of the relative importance of different resources or industries within a local or regional economy. The relationship between expenditures and consumer surplus for whale watching is illustrated in Exhibit 3-1.

EXHIBIT 3-1 INDIVIDUALS' DEMAND FOR WHALE WATCHING TRIPS



Social Welfare Impacts

159. Exhibit 3-1 depicts a hypothetical demand curve for whale watching trips. The demand curve indicates what consumers would be willing to pay for various numbers of trips taken over the course of a particular period in time (e.g., a year or season). The downward slope reflects the conventional notion that the lower (higher) the cost per trip, the more (fewer) trips consumers will take.

160. For example, at a cost per trip of $60, consumers may take ten trips. Additional trips at that price would exceed what the consumers are willing to pay. The total expenditures

for these ten trips is equal to the area of the rectangle labeled 'Expenditures', or $600 ($60×10). Note that for each trip leading up to ten, the consumers' willingness to pay exceeds the cost per trip. The area of this triangle, labeled 'Consumer Surplus,' represents surplus that accrues to the consumers and is the total value (or social welfare value) of recreational trips.

161. Changes in social welfare value are typically measured when comparing policy alternatives. Across policy alternatives, expenditures may be transferred from one group or area to another. For example, if the quality of a whale watching trip is compromised because of an increased minimum approach distance, change in method of whale watching (e.g., parking in the path of whales), or lack of access to particular areas, the amount that patrons are willing to pay for trips may decrease. In this case, they may incur greater cost to travel to another area, or they simply may choose a different way to spend their leisure time. Any one of these adjustments would result in a reduction of consumer surplus. While the overall level of spending by an individual on leisure activities is likely to remain constant for a particular individual, the local area or set of businesses that benefit from those expenditures may vary according to the regulatory Scenario.

Regional Economic Impacts

162. As the above example suggests, any change in consumer surplus represents the net change, while any change in expenditures is simply a redistribution from one area or set of businesses to another. However, within a particular local or regional economy, the level of expenditures affects revenues, employment, and tax receipts, all of which are of direct concern to residents and proprietors. While a reduction in spending in County A may be compensated for by increased spending in adjacent County B (and thus represent a transfer at a larger geographic scale), this change nonetheless results in decreased (increased) economic activity in County A (B).

163. Regional economic impact analysis can provide an assessment of the potential localized impacts of economic activity, such as whale watching. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the level of economic activity associated with an industry. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by whale watchers) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to whale watchers). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

164. Regional economic impact analysis provides information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than welfare losses. Thus, these types of effects are reported separately from welfare effects (i.e., not summed).

Benefits of Species Conservation

165. In addition to the types of regulatory costs described above, economic benefits, measured in terms of social welfare or regional economic performance, may also result the broader goal of these regulations to conserve the species. The benefits of actions, such as the proposed vessel traffic regulations, taken to conserve the species are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species. Use values derive from a direct use for the whales, such as recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).

166. Economic research has demonstrated that society places economic value on (relatively) unique environmental assets, whether or not those assets are ever directly exploited. One way to estimate non-market (e.g., existence) values is by surveying people to determine what they are willing to pay for a resource or programs to protect that resource. This approach is termed the "contingent value" method or, alternatively, CV or CVM, and a substantial literature has developed which describes the application of this technique to the valuation of natural resource assets.[122] Economists have developed several studies of the non-use value associated with protection of whales or other marine mammals. While we did not identify any studies that focus specifically on Southern resident killer whales, existing research does suggest that individuals derive economic value from the protection of marine mammals.[123]

3.2 VALUING IMPACTS OF THE POTENTIAL REGULATIONS

167. One factor that should be considered when trying to determine the potential effects of vessel traffic regulations is the different nature of whale watching tours. As discussed in Chapter 1, some whale watching tours are designed only to see whales; they are short (three to four hours), have a moderate cost ($60 to $80), and take place on large-capacity, generic vessels. It is probable that participants on this type of tour are likely to base their willingness to pay on actually seeing and perhaps getting close to whales. Other whale watching tours take place on speedboats that travel at high speeds across the Sound to various destinations. Participants on this type of tour may base a significant portion of their enjoyment on traveling in a unique, high-speed boat and sight-seeing across the Sound. Thus, limiting the proximity these vessels can get to whales may not as significantly limit the participants' willingness to pay for tours. Other tours are longer (a

[122] See, for example, Mitchell and Carson, 1989.

[123] For example, see: Hageman, R., Valuing Marine Mammal Populations: Benefit Valuations in a Multi-Species Ecosystem, Administrative Report LJ-85-22, Southwest Fisheries Center, National Marine Fisheries Service, La Jolla, CA, 1985; and Loomis, J. and D. Larson, "Total Economic Values of Increasing Gray Whale Populations: Results from a Contingent Valuation Survey of Visitors and Households," Marine Resource Economics, Vol. 9, pp. 275-286, 1994.

full day or multiple days) and cruise to different ports-of-call within the Puget Sound and beyond, offering participants the chance to get off the boat and shop or eat; whale watching is only one aspect of this type of tour. Again, due to the nature of this type of tour, limiting the proximity of whale watching vessels to whales, or affecting methods of viewing, may not limit customers' demand or their willingness to pay for harbor cruises because only one enjoyable aspect of the tour is potentially being limited.

168. As described in Chapter 1, the regional economic contribution of the current killer whale watching industry in Puget Sound is approximately $22.0 million in regional economic output annually and 196 jobs to the 12 counties adjacent to the killer whales' habitat through direct, indirect, and induced expenditures related to the industry.[124] This may be considered the regional economic value of the resource (i.e., the whale watching industry in Puget Sound) at risk, providing context for understanding the potential effects of regulations.

169. Sections 3.2.1 through 3.2.4 describe how the proposed regulatory alternatives may affect individuals participating in whale watching. Section 3.2.5 discusses potential impacts to individuals engaging in activities other than whale watching in Puget Sound.

3.2.1 ALTERNATIVES FOR MINIMUM APPROACH DISTANCE REGULATIONS

170. Because so few whale watching trips (less than one percent of all commercial whale watching trips taken in the Puget Sound area during the whale watching season) are estimated to be affected by the potential 100 meter/yard approach regulation, Alternative 2 of proposed regulations (100 yard approach distance) is not expected to significantly affect the price of whale watching trips in the Puget Sound area. Given that data are not available to quantify the economic impacts of either a 100 meter/yard approach guideline or a 200 yard/meter approach guideline, it is difficult to determine the difference in the effects of the two regulations. In the case that the level of enjoyment by whale watchers is proportional to their proximity to the whales, the effects of the 200 yard/meter regulation of Alternative 3 will be greater than the effects of the 100 yard/meter approach regulation of Alternative 2 for any particular set of participants. In addition, because of the greater distance requirement, a greater number of individuals are forecast to be affected in Alternative 3 than in Alternative 2, as described in Chapter 2.

171. A greater impact to individuals engaged in whale watching activities is therefore expected for Alternative 3 than Alternative 2 for two reasons: 1) individuals may be willing to pay less due to the greater minimum approach distance; and 2) impacts are experienced by a greater number of individuals (not only those that are approaching the whales closer than 100 yards/meters, but also individuals approaching whales between 200 and 100 yards/meters).

172. One way impacts may be generated is that commercial operations may adjust their equipment and infrastructure in the case that the distance regulation is 200 yards/meters. For example, they may shift to larger viewing platforms that provide better vantage

[124] IEc IMPLAN analysis using: IMPLAN Professional, Social Accounting, and Impact Analysis Software Version 3.0 in October 2010.

points. The larger vessels that are higher on the water provide better viewing opportunities at greater distances from the whales. The greater distance regulation could therefore shift the focus on the industry to larger vessels with more passengers (which is closer to the current U.S. operations as opposed to the smaller vessels associated with the Canadian commercial operations). NMFS has included Alternative 3, the 200 yard approach distance, as part of the final vessel traffic regulations.

173. The Pacific Whale Watch Association (PWWA, formerly the Whale Watch Operators Association Northwest) provided comment on the Proposed Rule expressing commitment to the conservation of the killer whales. The PWWA supports enforcement of a 100 yard/meter guideline for all vessels operating in the Sound (Alternative 2), but asserted that there is unlikely to be a need for increasing that to the 200 yard approach distance (Alternative 3) ultimately selected by NMFS. The PWWA anticipates that the 200 yard regulation will add little additional protection for the whales but will cause significant negative economic impacts to the whale watch industry. Specifically, PWWA suggests that the 200 yard approach regulation will put "at least one small entity/small business out of business." PWWA supports NMFS' decision to include the vessel path regulation (Alternative 7) and also suggested NMFS include regulation of an expanded "Go-Slow Zone."[125] Multiple other whale watching operators similarly expressed support for codifying the existing 100 yard guidelines and concern about increasing that approach distance. NMFS includes a complete summary of comments on the Proposed Rule and associated responses in the preamble to the Final Rule and the Final Environmental Assessment.

3.2.2 ALTERNATIVES FOR PROTECTED AREA REGULATIONS

174. While NMFS has not included a regulated protected area as part of the final vessel traffic regulations, NMFS continues to contemplate the appropriateness of such a regulation. This section therefore provides NMFS with information regarding how a protected area regulation may result in economic impacts.

175. Quantifying the impacts of enforceable No-Go Zones on vessel traffic requires data on the extent to which travel distance and access to boat launches in these areas contributes to willingness to pay for a trip. While Chapter 2 describes the number of whale watching trips and individuals potentially affected in Alternatives 4 and 5 (Protected Area regulations), information is not available to determine whether these trips would be displaced (i.e., would continue to occur but would travel in alternative areas of the Sound), or would be avoided. In the case that the trips are displaced, the individuals affected are likely to experience social welfare impacts as described above. In the specific case of the San Juan County boat launch, which launches into the No-Go Zone, the extent to which boaters would launch from elsewhere, or avoid trips is uncertain.

[125] Pacific Whale Watch Association to National Marine Fisheries Service. January 15, 2010. Re: Docket No. 070821475-81493-01, RIN 0648 – AV15 - Protective Regulations for Killer Whales in the Northwest Region Under the Endangered Species Act and Marine Mammal Protection Act.

176. To the extent that the trips are avoided, regional economic impacts may occur in addition to the social welfare impacts, as less individuals would be spending money in the regional economy related to whale watching trips.

San Juan County Analysis of Scenario 1 of the No-Go Zone Regulations[126]

177. In 2009, San Juan County prepared an economic analysis, which quantified the impact of the current No-Go Zone on economy of San Juan Island. The analysis considered potential welfare impacts, as well as broader regional economic impacts to San Juan Island of regulating the No-Go Zone. The San Juan County analysis is described below to provide additional detail on the potential effects of Alternative 4 of the No-Go Zone regulations (codifying the existing, voluntary No-Go Zone).

178. San Juan County estimates that 25,000 kayakers visit San Juan Island annually. Of these 25,000 kayakers, over 10,000 (approximately 40 percent)[127] launch from the San Juan County Park boat launch, which is located within the current, voluntary no-go zone. San Juan County estimates that over 5,000 kayakers use commercial outfitters each year (each launch is considered to be a "kayaker" although a single kayaker may launch multiple times throughout the year). San Juan County estimates that the County Park's 5,000 kayak launches with commercial outfitters generated $38,500 in earnings for the County Park through user fees in 2007. In addition, the report notes that the Park is considering adding an additional fee, which would add an additional $36,050 in annual revenues for the park, for a total of $74,550.

179. The San Juan County analysis assumes that if the current, voluntary no-go zone became mandatory, 10,000 kayakers visiting San Juan Island annually would no longer kayak in the region. That is, the analysis assumes that the kayakers no longer spend money on kayaking in alternate locations or at different times of year but that those kayak trips are completely foregone. Assuming that each kayaker would have spent approximately $150 per day for food, accommodations, and various retail items, and each kayaker spends two days, the reduction in kayakers would result in $3.0 million in lost income to the San Juan Island economy annually.[128]

180. The analysis also assumes that half (five) of the existing local outfitters would be eliminated from the boat launch closure. The San Juan County Analysis suggests that this would result in an additional loss of $400,000 in lost income to the Island. The analysis suggests that additional impacts to sportfishermen, power boaters, commercial fisheries, and the whale watch industry, could occur, though these impacts are not quantified. After applying a multiplier of 1.4 to their estimates, San Juan County estimates that a boat launch closure could lead to an annual impact of $6.5 million to the San Juan Island economy.

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[126] San Juan County, Economic Development Council. "NOAA No-Go Zone Proposal" Economic Impact Analysis. September 2009.

[127] Note that San Juan County reports that this number represents 50 percent of all kayakers.

[128] Note that San Juan County reports a figure of $3.1 million.

181. For comparison to the estimated impacts, Chapter 1 of this Draft RIR estimates the regional economic contribution of the U.S. commercial whale watching industry in the broader Puget Sound area to be $22.0 million annually. The analysis provided for context in Chapter 1 applies the regional economic modeling tool IMPLAN, which employs region-specific data to inform the input/output analysis. More specific data on the distribution of expenditures of the San Juan Island kayakers would be required to conduct a formal regional analysis using IMPLAN (i.e., specific dollars spend per participant in various economic sectors, including restaurants, lodging, gas, equipment, etc.) to compare to the San Juan County estimates.

182. Of note, however, the San Juan County analysis presents the *regional economic contribution* of the kayakers that use the boat launch within the existing, voluntary no-go zone. These numbers would only be considered *impacts* of regulating the no-go zone in the case that all of these kayakers no longer visit San Juan Island due to the no-go zone regulation. That is, the regional economic contribution of these kayakers is only lost assuming that the kayakers do not relocate to other areas in the Puget Sound, do not participate in land-based viewing, and do not instead participate in other recreational activities in the region in place of whale watching in the no-go zone. In the case that a portion of the kayakers do substitute alternate locations or methods for whale watching, some portion or none of their expenditures may be lost to the regional economy.

Other Potential Impacts of No-Go Zone Regulations

183. To adjust to the establishment of No-Go Zones, whale watchers may situate themselves at the edges of these zones to view the whales, in which case the impact to the whale watchers would be similar to that of establishing a greater viewing distance (as described above) as opposed to precluding the activity altogether. The existing No-Go Zone in Canada has experienced this type of activity: vessels lining the edges of the area and viewing the whales from a greater distance.[129] In addition, whale watchers may choose instead to participate in land-based viewing, which may result in a change in quality of whale watching experience.

3.2.3 ALTERNATIVE 6: VESSEL SPEED REGULATIONS

184. As with the approach and path regulations, quantifying impacts of enforceable vessel speed limits requires data on the extent to which vessel speed contributes to willingness to pay for a whale watching trip. Chapter 2 describes the number of whale watching trips and individuals potentially affected by vessel speed regulation using historical data regarding the number of whale watching trips that exceed the proposed limit of seven knots when within 400 yards/meters of the whales. While research is not available to quantify the relative importance of vessel speed to a whale watching trip, assuming the primary objective of participants is to view whales, the speed of the whale watching vessel is unlikely to be a primary factor in overall trip enjoyment and, therefore, in willingness to pay for participation. NMFS does not include Alternative 6 as part of the final vessel traffic regulations.

[129] Communication with National Marine Fisheries Service, Protected Resources Division, on February 6, 2008.

3.2.4 ALTERNATIVE 7: VESSEL PATH REGULATIONS

185. Specific data on the extent to which parking in the path of whales contributes to willingness to pay for whale watching are not available. Because incidents of activity have occurred within these areas (as quantified in Chapter 2), it is reasonable to assume that some preference exists to participate in this type of whale watching behavior. The extent to which individuals may decide not to participate in whale watching because of decreased enjoyment associated with precluding the behavior is not known. Alternative 7 is incorporated into NMFS' final vessel traffic regulations.

3.2.5 POTENTIAL IMPACTS TO OTHER INDUSTRIES

186. The effect of the proposed regulations on industries other than the whale watching industry is uncertain. As discussed in Chapter 2, shipping vessels, commercial fishing vessels, aircraft, and other vessels not included in the whale watching industry are involved in some percentage, albeit relatively low, of incidents of noncompliance with the "Be Whale Wise Guidelines" in the Puget Sound area. In general, impacts are expected to be minimal to industries because, unlike the whale watching industry, viewing whales is not the primary objective of the other industries with vessels occupying the Sound.

187. A potential exception to this reasoning is the proposed vessel speed regulation as speed is less related to whale watching behavior and is more likely to be important to vessels engaged in other activities, such as commercial shipping. Commercial shipping and fishing vessels may experience economic impacts if, for example, speed limits affect their ability to meet planned trip schedules; i.e., the value of their time for additional time spent in transit. As described in Chapter 2, however, because the vessel speed regulation as proposed applies only to vessels within 400 yards/meters of the whales, and a relatively small percentage of other vessel types have been identified exceeding the proposed speed limit this close to whales, the effects of the proposed speed regulation on other types of vessels, such as commercial and shipping boats, is expected to be minor.

188. The Western States Petroleum Association provided comment on NMFS' Advance Notice of Proposed Rulemaking that it is concerned that approach rules, if implemented for cargo and other large vessels, may create unpredictable and unsafe vessel traffic patterns and increase the risk of vessel collisions.[130] As described in Chapter 2, however, the large vessel traffic lanes fall outside of the areas densely occupied by the whales and a negligible percentage of the approach incidents in recent years were associated with these types of vessels.

189. The Washington State Department of Transportation, Washington State Ferries submitted a comment on the Proposed Rule, stating that, in the case that NMFS codified the "Be Whale Wise Guidelines," their activities would not be affected by the regulations. Washington State Ferries also requested NMFS include ferries in the exceptions along

[130] Western States Petroleum Association to National Marine Fisheries Service. June 20, 2007. Comments of Western States Petroleum Association on the Advance Notice of Proposed Rulemaking Concerning Protective Regulations for Killer Whales in Puget Sound, Washington.

with other "government vessels operating in the course of their official duties." Washington State Ferries also asserted that establishing a protected area for the whales under Alternatives 4 or 5 would not affect ferry operations.[131] The Northwest Marine Trade Associate further expressed support for the codification of the guidelines.[132] Both organizations, however, expressed the need for further research on the need for, and impacts of, expanding regulation beyond the protections described in the guidelines. NMFS includes a complete summary of comments on the Proposed Rule and associated responses in the preamble to the Final Rule and the Final Environmental Assessment.

3.3 RECENT RESEARCH FOCUSED ON VALUES ASSOCIATED WITH WHALE WATCHING

190. Individuals reveal their preferences for resources through their behavior. To capture these preferences, one branch of research valuing recreation activities is focused on "revealed preferences," identifying what people are spending to participate in recreational activities to reveal the value that people hold for those activities (e.g., travel cost or hedonic studies). Other types of values have also been analyzed in the economics literature, primarily through the use of stated-preference surveys, in which individuals describe their relative values for various resources or activities, for example whale watching. The monetization of these types of values remains controversial and is debated among academics and practitioners.

191. Two key questions in quantifying the economic impact of the regulations is whether or not whale watch participants would change their behavior (i.e., not participate in a whale watching trip or experience reduced enjoyment of a trip) should one of the proposed regulations be codified by NMFS. As seeing whales in their natural habitat is for most the primary impetus for participating on a whale watch, it follows that the distance from which they are able to view whales may be a significant factor in their willingness to pay for a trip. No study was identified that specifically models the relationship between proximity to whales and willingness to pay to participate in whale watching activities, which would allow for quantification of social welfare or regional economic impacts. The following research, however, provides useful information on the value that whale watching participants hold for the activity.

192. The results of seven past studies: Duffus & Dearden (1993), Orams (2000), Andersen (2004), Malcolm (2004), Airey (2007), Stamation (2009), and Shapiro (2006) provide data on the factors that lead to an enjoyable or memorable whale watching tour and how satisfied whale watch participants are with various aspects of their whale watching tour. By evaluating how important proximity to whales is for whale watch participants, we can begin to understand how a regulation that limits proximity may affect whale watch participant behavior.

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[131] Washington State Department of Transportation to National Marine Fisheries Service. January 15, 2010. Docket No. 070821475-81493-01, 50 CFR Part 224, Protective Regulations for Killer Whales in the Northwest Region Under the Endangered Species Act and Marine Mammal Protection Act, Proposed Rule.

[132] Northwest Marine Trade Association to National Marine Fisheries Service. June 11, 2007.

Duffus and Dearden (1993)[133]

193. Duffus and Dearden (1993) surveyed whale watch participants specifically targeting killer whales in the Johnstone Strait of British Columbia, Canada, in July and August of 1986 and 1989. At the time of the study, voluntary 100 meters/yards approach guidelines existed; however, it is unknown whether the vessels from which whale watch participants were surveyed followed these voluntary approach guidelines. Duffus and Dearden found that among the whale watch participants surveyed "close observation of whales" was the second most significant component of trip satisfaction level. The most important component of satisfaction was "encountering whales." Additionally, "seeing displays of whale behavior" and "seeing the coastal scenery" were also significant satisfaction components.

194. The transferability of the results of this study to the approach regulations under consideration for Puget Sound is limited. The Duffus and Dearden surveys took place over 15 years ago and it is not clear how close the whale watching vessels were to the whales when the survey was undertaken. Further, the study does not provide enough information to derive a functional relationship between proximity to whales and trip satisfaction. The research does suggest, however, that proximity to whales and overall trip satisfaction are related.

Orams (2000)[134]

195. Orams surveyed whale watch tour participants targeting humpback whales in Tangalooma, Australia, to determine factors that contributed to their satisfaction or dissatisfaction. Whale watching tours in Tangalooma, Australia, are subject to regulations that restrict vessels from approaching whales closer than 100 meters. Thus, the whale watching tours surveyed by Orams maintain approach distances from whales similar to those that would be maintained by whale watching vessels in the Puget Sound area if the NMFS 100 yard approach guideline became codified.

196. In contrast to Duffus and Dearden, Orams found that proximity to whales ranked relatively low in terms of factors contributing to whale watching tour enjoyment. Specifically, when Orams asked whale watch tour participants "what could have made the whale watch more enjoyable?" only four percent of respondents said they would have preferred to be closer to the whales. The most common responses were "more spectacular behavior" (26 percent) and "more whales" (24 percent). "Closer to whales" also got fewer responses than: "less people," "less sea sick," and "boat construction/angle for viewing." Further, in tours where few to no whales were seen, approximately 30 percent of people said they were dissatisfied to some degree. These results imply that proximity to whales does not play a significant role in determining enjoyment level. Additionally, the satisfaction results for tours seeing few to no whales suggest that people base their tour enjoyment on more than just the presence of whales.

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[133] Duffus, D.A. and P. Dearden. 1993. Recreational use, valuation, and management of killer whales (*Orcinus orca*) on Canada's Pacific Coast. Env. Cons. 20:149-156.

[134] Orams, M.B. 2001. Tourists getting close to whales, is it what whale-watching is all about? Tour. Manag. 21:561-569.

197. Orams does note, however, that a study conducted by Duffus (1988), which found that killer whale watchers in British Columbia listed proximity to whales as a very important part of their whale watching tour.[135] Given the different findings of Duffus (1988) as noted in Orams (2000) and the fact that the Orams study took place in Australia and focused on a different whale species (humpback whales, which are larger than killer whales and therefore may provide better viewing at greater distances), the applicability of the Orams study to whale watching in Puget Sound is limited.

Andersen (2004)[136]

198. Andersen surveyed participants on 15 whale watching tours with two U.S.-based, vessel operating, commercial whale watching companies offering tours from the San Juan Islands, Washington. At the time of the study, both whale watching companies were members of the Whale Watch Operators Association Northwest (WWOANW) and therefore generally followed the "Be Whale Wise Guidelines." Thus, all whale watch tours surveyed maintained approach distances of at least 100 meters/yards, similar to the approach distances that would be maintained in Scenario 1 of the potential approach regulation.

199. One of Andersen's objectives was to determine the expectations whale watch participants had prior to going on a killer whale watching tour in the Puget Sound and participants' reactions to the tour. None of the participants surveyed by Andersen had specific expectations about how close the whale watching tour would get to killer whales. Rather, the most common expectations for a whale watch tour were: to see killer whales; to enjoy the trip onboard the whale watching vessel; to see other wildlife (besides killer whales); and to learn about killer whales, other wildlife, and the Puget Sound area.

200. Further, when asked, "what was most memorable about your whale watching experience?" seeing killer whales got the highest response rate (39.3 percent). A significant percentage of participants surveyed (30.4 percent) said that specific killer whale behavior or killer whales' proximity to the whale watching vessel was the most memorable part of their tour. However, when asked to rank 14 factors in order from most memorable to least memorable, "distance of boat to the whales" received an average rank of 7.67, making it the seventh most memorable factor. The lowest ranked factors (i.e., the most memorable factors) were: seeing a whale; seeing whales in their natural environment; the behavior of whales, and the length of time spent with whales.

201. Finally, when asked if they "were disappointed in any way by their whale watching tour and if so, how?" no participant surveyed listed "not close enough to killer whales" as a source of disappointment without also stating that they understood that vessels could not get closer to whales because of the "Be Whale Wise Guidelines." The findings of

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[135] Duffus, D.A. 1988. Non-consumptive use and management of Cetaceans in British Columbia coastal waters. Unpublished Ph.D. dissertation, University of Victoria, B.C. Canada. As cited in: Orams, M.B. 2001. Tourists getting close to whales, is it what whale-watching is all about? Tour. Manag. 21:561-569.

[136] Andersen, M.A. 2004. Whale watching and onboard marine environmental education in the San Juan Islands, Washington: tourists' expectations and evaluations. Unpublished Master's Thesis, University of Washington, Seattle, Washington.

Andersen imply that while proximity to whales plays a role in how memorable/enjoyable a particular whale watching tour is in the Puget Sound area, it is not the most memorable factor of a whale watching tour. Seeing whales and whales' behavior during the tour are both more memorable factors. Further, the Andersen study implies that whale watch participants in the Puget Sound area are receptive to the "Be Whale Wise Guidelines" and understand their importance of protecting killer whales.

Malcolm (2004)[137]

202. Malcolm surveyed whale watch participants in the Johnstone Strait, Clayoquot Sound, and Southern Vancouver Island (SVI) in British Columbia, Canada from June 1 to September 30, 2000 to determine, among other things, participants' pre-trip expectations and their post-trip satisfaction levels. The idea behind this type of survey is that whale watch participants' pre-trip expectations play a role in determining their post-trip satisfaction levels. For example, if whale watch participants expected to see a large number of whales breaching the surface, but saw only one whale passively swimming along the surface during their whale watching tour, they might be very dissatisfied with their trip. However, if participants' expectations were simply to see whales they might be satisfied with seeing a single whale swimming along the surface.

203. This analysis focuses on the survey results from SVI because whale watching near SVI focuses on viewing southern resident killer whales, while whale watching focuses on viewing northern resident killer whales and gray whales, respectively, in the Johnstone Strait and Clayoquot Sound. All SVI whale watch participants surveyed participated in whale watch tours conducted by Springtide Charters, which operates out of Victoria, British Columbia, Canada. Springtide Charters is a member of WWOANW.[138] Thus, it follows the voluntary 100 meter/yard approach distance specified in the "Be Whale Wise Guidelines."

204. When asked to list their level of agreement with several whale management statements, SVI whale watch participants showed a high level of agreement with, "Boats should have to stay a minimum distance from whales." More specifically, "Boats should have to stay a minimum distance from whales" ranked fourth in terms of the level of agreement expressed by SVI whale watch participants behind, "Protecting whales is important," "The government has an obligation to protect whales," and "A portion of the cost to go whale watching should go directly to research and management."

205. "Seeing whales in a respectful manner" was the most important general pre-trip expectation among all whale watch participants surveyed and among the SVI whale watch participants surveyed. Other general pre-trip expectations that received high importance scores among SVI whale watch participants surveyed were "See a whale even if it is only one," "See marine wildlife in an uncrowded setting," and "Learn about marine

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[137] Malcolm, C.D. 2004. The current state and future prospects of whale-watching management, with special emphasis on whale-watching in British Columbia. Unpublished Ph.D. dissertation, University of Victoria, B.C. Canada.

[138] Based on a review of the WWOANW website accessed at http://www.nwwhalewatchers.org on January 21, 2008.

wildlife." "Seeing whales up close to boat" was the fourth least important general pre-trip expectation among SVI whale watch participants surveyed.

206. In terms of general satisfaction, "The respectful approach to wildlife by the boat you were on" received the highest satisfaction rating among all whale watch participants surveyed and among SVI whale watch participants surveyed. "The distance from which whales were observed" received the fifth (out of 10) highest satisfaction rating among all participants and SVI participants surveyed. Among SVI whale watch participants surveyed, "The number of whales seen," "Whale behaviors," and "What I learned" also received higher satisfaction ratings than "The distance from which whales were observed." All whale watch participants surveyed and SVI whale watch participants surveyed were most dissatisfied with the "Respectful approach to wildlife by other boats" (i.e., the lack of a respectful approach to wildlife by other boats), "The number of boats around whales," and "The variety of wildlife seen."

207. The results of this study indicate that people participating in killer whale watches around SVI place a high value on respecting killer whales in the Puget Sound area. Specifically, whale watch participants surveyed agreed strongly with statements related to the protection of whales. Further, viewing whales in a respectful manner was the most important expectation among participants surveyed and they were most satisfied with the respectful nature in which their whale watching vessel approached whales in the Puget Sound area. It is not clear why participants were most satisfied with the respect their vessels gave whales, but dissatisfied with the lack of respect other vessels in the SVI area gave whales. It could be that a number of other whale watching vessels in the waters around SVI are not members of WWOANW or are private and thus do not adhere to the voluntary 100 meter/yard approach distance specified in the "Be Whale Wise Guidelines." SVI whale watch participants' dissatisfaction with the way other whale watching vessels approached whales could also be related to participants' dissatisfaction with the number of vessels around whales, especially given how important "Seeing marine wildlife in an uncrowded setting" was in the pre-trip survey.

208. More generally, the study implies that whale watchers around SVI are less concerned with getting close to whale as they are with seeing whales in a respectful manner. Thus, the impacts to whale watchers of the 100 yard/meter or 200 yard/meter approach guidelines may be minimized if whale watchers understand that such guidelines are designed to benefit the whales by minimizing the negative effects of whale watching on the whales. Thus, the Malcolm study underscores the importance of managing whale watch participants' expectations through education on current whale watching guidelines during whale watching tours.

Airey (2007)[139]

209. Airey surveyed 129 participants in boat-based marine wildlife tours targeting seabirds, seals, porpoises, dolphins, whales and basking sharks off the Pembrokeshire Coast,

[139] Airey, Steve T. August 2007. Can a Marine Code of Conduct Enhance the Visitor Experience? Unpublished Master's Dissertation: Department of Planning, Oxford Brookes University.

Wales, in July of 2007.[140] The intent of the study was to gauge the impact of the Pembrokeshire Marine Code of Conduct (PMC) on the satisfaction of tourists participating in marine wildlife tours in the region. At the time of the study, 95 percent of the tour boats operating in the study area, and 100 percent of tour boats surveyed, were committed to adhering to the PMC. The PMC includes unique guidelines specific to observations of seabirds, seals, and cetaceans, but the seal guidelines alone include a specific provision related to maintaining distance from the wildlife being observed.

210. Airey found that proximity to wildlife was one of three tour attributes that was significantly correlated to participant satisfaction. ("Being able to see wildlife" and "Educational information about the wildlife" were also found to be significantly correlated to participant satisfaction). Additionally, participants ranked "Being able to get close to wildlife" as fourth of 11 tour attributes in terms of "importance" (as measured prior to the trip) and as fourth in terms of "satisfaction" with the trip's performance relative to that attribute (as measured after the trip). Participants ranked "being able to see wildlife", "boat operator behavior is wildlife-friendly" and "knowledgeable crew" as being more important to them than proximity to wildlife. A gap analysis measuring importance versus satisfaction indicated that participants' desires and expectations relative to proximity to wildlife were met, and that adherence to the PMC still allowed tour operators to get close enough to wildlife to satisfy guests expectations. Although proximity to wildlife ranked highly (4 of 11) in terms of importance to participants, it is interesting to note that "Boat operator behavior is wildlife-friendly" ranked even higher, at two of 11. Finally, no survey participant indicated "Getting closer to wildlife" as a factor that would have increased their satisfaction with the tour.

211. The transferability of the results of this study to the question of the impacts of NMFS' proposed approach regulations is limited. Although the author assumes that all vessels surveyed operated in accordance with the PMC guidelines, there is no indication of whether this assumption was appropriate and accurate. In addition, because an approach guideline exists only for observation of seals, and does not provide information on the types of wildlife viewed on each surveyed trip, it is not possible to identify the distance of a vessel from the wildlife being observed. Thus, while participants expressed general satisfaction with the viewing distance, it is unclear whether their viewing distance was comparable to the approach regulations being proposed by NMFS. Finally, the wildlife viewing trips surveyed include opportunities to observe a wide array of wildlife, and are not targeted specifically to whale viewing. For many of the relatively small species (e.g., sea birds, seals), a closer viewing distance may be required than for larger species, such as whales, in order to provide a satisfactory viewing experience.

212. Overall, while this study indicates proximity to wildlife is a significant factor in trip satisfaction, similar to the findings of the other studies, it does not rank among the top two factors. In addition, this study does not provide quantitative information on satisfaction as a function of viewing distance for particular species, or overall.

[140] The author does not specify the year in which survey data were collected. We assume the data collection occurred in the same year the thesis was completed, but this assumption may be incorrect.

Stamation (2009)[141]

213. Stamation (2009) surveyed 1,018 boat-based whale watch participants in New South Wales, Australia during three years (2002, 2003 and 2005) to determine, in part, their level of satisfaction with their whale watch trip and factors which may have contributed to level of satisfaction with their experience. This research was conducted as part of a multi-faceted dissertation focused on integrating the needs of whales, tourists and the whale watching industry in New South Wales. Whale watching trips in the area are focused primarily on humpback whales, whose migratory path transits the waters of Eastern Australia. Other species typically seen during these trips include southern right whales, killer whales, false killer whales, blue whales, and minke whales. Whale watch vessels in this region are bound by New South Wales whale watching regulations to approach whales no closer than at a 100 meter distance. Thus, these vessels are subject to a similar approach limit as whale watch vessels in Puget Sound would be should NMFS' codify the 100 meter approach limit.

214. Prior to boarding the vessel, participants ranked 14 different features based upon their perception of each feature's importance when seeking a good whale-watching experience. "Seeing whales in their natural environment" and "seeing whales behaving naturally" ranked as the most important features of a good experience according to participants. "Seeing whales up close" ranked third in terms of importance, with 92 percent of respondents indicating it as being "important" for a good experience. However, this statement is not clearly indicating a particular degree of proximity and is subject to interpretation in terms of how to define "close". Other measured expectations of participants focused on species and behaviors that would potentially be observed on the trip, but not on expectations regarding proximity to whales.

215. Stamation also asked a series of questions relative to participants' satisfaction with a variety of aspects of the trip following the trip, including proximity to the wildlife observed. These questions included a self-reported distance from the whales, as well as reported satisfaction with that distance. Sixty-nine percent of respondents estimated that the whales they saw were less than 100 meters from the boat, 26 percent thought they were 100-200 meters away, and four percent estimated that they were more than 200 meters away.[142] Overall, 80 percent of people felt their proximity was "close enough", 19 percent thought they were not close enough, and nine percent felt they were too close. Stamation also considered satisfaction with viewing distance within each distance category. In the case of individuals who believed they were more than 200 meters from the whales, 52 percent indicated they were not close enough. Thirty-five percent of those who were between 100 and 200 meters away felt they were not close enough, and 11 percent of people who were less than 100 meters away felt they were not close enough.

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[141] Stamation, Kasey. May 2009. Whale-Watching in NSW: Research to Integrate the Needs of Whales, Tourists, and Industry. Unpublished Ph.D. Thesis: School of Biological, Earth and Environmental Sciences, University of New South Wales, Sydney.

[142] Although it is not legal in New South Whales to approach whales at a distance less than 100 meters, the descriptions of these trips and of humpback behavior indicates that the whales frequently approach the idle vessel at closer distances.

Interestingly, respondents who had participated in a whale watch trip in the past were more likely to be satisfied with their distance from the whales.

216. Participants were asked to report their overall satisfaction with the experience on a seven point scale ranging from "very boring" to "fascinating." In contrast to Orams, Andersen, and Malcom, Stamation found a significant relationship between the participant-reported distance from whales and overall satisfaction with the experience. Respondents who were greater than 200 meters from the whales had the lowest satisfaction scores, while those who were close than 100 meters had the highest. Additionally, participants also rated, on a five point scale from "very poor" to "excellent", their satisfaction with ten aspects of their trip, including "distance from whales". Out of ten factors presented to respondents, "distance from whales" was identified as the third most satisfying factor, with a mean rating of 4.3. Thus, seven other factors including the number of whales seen, opportunity to see dolphins, whale behavioral displays, method of conveying information, photo opportunities and opportunities to view seals were all less satisfying to participants than their proximity to whales.

217. Respondent-reported suggested improvements were most heavily focused (25 percent) on the quality of information and interpretation, while only 17 percent of people thought some part of combination of a closer view, seeing more whales, and/or seeing more behaviors would have improved their experience. Although "the close viewing of whales" was selected most frequently (29 percent) as the most memorable aspect of the trip, the participants' definition of "close" is uncertain.

218. Overall, this research indicates that proximity to whales (in addition to numbers of whales and observed behaviors) may play a role in a participant's satisfaction with the trip. However, it also indicates that participants can still be satisfied in the absence of these conditions. For example, those individuals who saw whales at distances of greater than 200 meters still ranked their overall satisfaction level as "above acceptable." Results also indicate that very close proximity (<100 meters) to whales influence satisfaction only at the high end of the satisfaction scale. Importantly, 71 percent of participants indicated that they would participate in boat-based whale watching again, and those that would not indicated a variety of reasons for their decision, none of which identified disappointment with distance to whales.

Shapiro (2006)[143]

219. Shaprio (2006) surveyed 488 passengers participating in whale watch tours during March and April of 2005 in Maui, Hawaii to examine preferences for tour attributes and marine management strategies in the Hawaiian Islands Humpback Whale National Marine Sanctuary. At the time of the survey, whale watching vessels were subject to a 100 yard approach limit per NMFS regulations (50 CFR 222.31).[144] Thus, this limit was not a guideline, but an enforceable regulation to which, it can be assumed, whale watch vessels

[143] Shapiro, Kate Rachel. 2006. Whale Watch Passengers' Preference for Tour Attributes and Marine Management in Maui, Hawaii. Unpublished Master's Thesis: School of Resource and Environmental Management, Simon Fraser University.

[144] Shapiro misidentifies this regulation as having been promulgated by the US EPA.

adhere. Conditions relative to allowable proximity to whales were therefore similar to those that may be experienced by Puget Sound whale watch vessels should NMFS codify a 100 yard/meter approach rule.

220. Using a Likert scale, Shaprio assessed respondents' satisfaction with various elements of their trip, including the statement "I was satisfied with how close we got to the whales." Respondents assigned this statement an average satisfaction rating of 4.61 of a possible 5. Seventy-four percent of respondents strongly agreed with this statement and 18.2 percent mildly agreed. Only 4.3 percent of respondents disagreed with the statement. Responses on other factors indicated that the number of individuals on the boat and information on how they could help the Hawaiian marine environment were less satisfying. Overall, 85.9 percent of participants strongly agreed that they would recommend this trip to family and friends, which indicates a high level of satisfaction with the trip itself. This level of satisfaction indicates that the 100 yard approach limit did not limit participants' ability to have a satisfying whale watch experience.

221. This research does not provide insight into the issue of importance of proximity to willingness-to-pay for whale watching or overall enjoyment of a whale watching trip. One of the two primary research objectives was to evaluate the effect of trip characteristics on whale watch passengers' enjoyment of the tour. Although "seeing marine life up-close in their natural environment" was considered very important by 84.2 percent of respondents, and was considered to be the most important attribute of a marine tourism experience, the lack of a specific definition of "close" does not allow us to equate this attribute to a specific distance. Shaprio additionally evaluated participants' feelings on a variety of proposed management measures designed to reduce impacts of whale watching vessels on marine mammals. These proposed changes focused on areas where concern exists regarding impacts on marine mammals including sewage discharge, speed, vessel collisions, etc. As the existing 100 yard approach regulation already provides some level of protection to whales (which we assume the author feels is sufficiently protective), a change in approach distance was not evaluated.

CHAPTER 4 | SMALL BUSINESS ANALYSIS

222. This chapter considers the extent to which the impacts discussed in the previous chapters could be borne by small entities. The analysis is conducted pursuant to the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. Information for this analysis was gathered from the Small Business Administration (SBA), U.S. Census Bureau, and the Risk Management Association (RMA).

223. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).[145] No initial regulatory flexibility analysis (IRFA) is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities. To assist in this process, this appendix provides a screening level analysis of the potential for the proposed vessel traffic regulations to affect small entities. This analysis is intended to improve the NMFS' understanding of the effects of the proposed rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking.

224. The analysis evaluates the potential for economic impacts related to the following land use categories:

- Whale watching (commercial and private, motorized vessels and kayaks);
- Commercial fishing;
- Other vessel activities (including ferries/passenger vessels, and shipping).

225. Three types of small entities are defined in the RFA:

- Small Business - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The U.S. SBA has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System (NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.

[145] 5 U.S.C. 601 et seq.

- Small Governmental Jurisdiction - Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- Small Organization - Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

226. The courts have held that the RFA/SBREFA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly affected within the definition of the RFA.[146]

227. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* (EPA) addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.[147] The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of State plans that incorporated the standards. The court found that, while EPA imposed regulation on States, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly affected within the definition of the RFA.

[146] 773 F. 2d 327 (D.C. Cir. 1985).

[147] 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

228. The Small Business Administration (SBA) in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.[148] "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the Federal agency to some other governing body."[149]

229. This analysis focuses on small entities that may be affected by vessel traffic regulations in Puget Sound for the benefit of killer whales. Chapter 2 describes the number of vessels potentially affected by proposed vessel traffic regulations as summarized in Exhibit 4-1 (more information on the derivation of these estimates is provided in Chapter 2). Of the alternatives described in Exhibit 4-1, NMFS includes Alternative 3 (200 yard approach regulation) and Alternative 7 (vessel path regulation) in the Final Rule. Further information on this decision is provided in the Final Rule.

230. For commercial fishing activities, while information is available on the size of the fishing fleets that operate within the area of the Strait of Juan de Fuca, data are not refined enough to determine how many individual fishing trips may be offset by the establishment of Protected Areas according to the alternative boundaries proposed.

231. Exhibit 4-2 describes the small business profile of the region for context to the analysis in Chapters 2 and 3. As highlighted in this table, most all of the businesses operating in the commercial whale watching and commercial fishing industries are considered small. It is therefore likely that the potentially affected entities are small businesses.

232. As described in Chapter 3, data are not available to describe a specific per entity economic impact associated with the proposed vessel traffic regulations. In fact, the primary impact is expected to be borne by whale watchers and not necessarily by whale watching operations. While operations may be affected to the extent that these regulations are established, the analysis does not project decreases in overall activity levels, but rather describes the potential diminished value that individuals may hold for whale watching as a result. Welfare losses to individuals engaged in whale watching are not borne by small entities.

[148] Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 20.

[149] *Ibid.*, pg. 21.

EXHIBIT 4-1 ESTIMATED NUMBER OF TRIPS/INDIVIDUALS POTENTIALLY AFFECTED BY VESSEL TRAFFIC REGULATIONS PER WHALE WATCHING SEASON

ALTERNATIVE	VESSEL TYPE AFFECTED	A: NUMBER OF TRIPS AFFECTED[1]	B: AVERAGE NUMBER OF PARTICIPANTS PER TRIP[2]	C = (A * B): NUMBER OF INDIVIDUALS AFFECTED[a]
APPROACH REGULATION ALTERNATIVES				
Alternative 2: 100 yard/meter approach	Private whale watching	86.46	3.42	296
	Private recreational fishing	29.04	3.42	99
	Commercial whale watching	11.25	55	619
	Individual kayaks	8.13	2	16
	Other	8.88	Unknown	Unknown
Alternative 3: 200 yard/meter approach	Private (whale watching and recreational fishing) [d]	407.75	3.42	1,395
	Commercial whale watching	51.11	55	2,811
	Individual kayaks	11.18	2	22
	Other	Unknown	Unknown	Unknown
PROTECTED AREA ALTERNATIVES				
Alternative 4: Existing voluntary No-Go Zone	Commercial whale watching	44.69	55	2,458
	Individual private vessels[c]	54.69	3.42	187
	Individual kayaks[b]	Unknown	2	8,031 - 9,622
	Commercial fishing	Unknown	Unknown	Unknown
Alternative 5: Expanded No-Go Zone	Commercial whale watching	97.85	55	5,382
	Individual private vessels[c]	148.77	3.42	509
	Individual kayaks[b]	Unknown	2	8,031 - 9,622
	Commercial fishing	212[3]	Unknown	Unknown
VESSEL SPEED REGULATION				
Alternative 6: Reduce speed to less than 7 knots within 400 meters	Private whale watching	85.91	3.42	294
	Private recreational fishing	28.46	3.42	97
	Commercial whale watching	15.50	55	853
	Other	8.88	Unknown	Unknown
PATH REGULATION				
Alternative 7: Avoid positioning vessels in the path of whales	Private whale watching	85.13	3.42	291
	Private recreational fishing	26.49	3.42	91
	Commercial whale watching	131.00	55	7,205
	Individual kayaks	8.63	2	17
	Other	3.38	Unknown	Unknown

Notes:

[a] The number of individuals affected is estimated by multiplying the number of trips affected by the average number of participants per trip for each vessel type and rounding to the nearest whole.

[b] As described in Section 2.3, the number of kayak trips affected by the Protected Area alternatives was estimated using data collected for use of the San Juan County boat launch during the 2010 whale watching season. The caveats and limitations of these data are described in Section 2.3. These data did not offer information on kayakers potentially affected by Alternative 5. As the No-Go Zone of Alternative 5 in inclusive of the No-Go Zone of Alternative 4, we assume at least as many kayakers would be affected by Alternative 5.

[c] The Protected Area Alternatives do not separately track private vessel activities, for example whale watching, fishing, or cruising. Thus, "Individual private vessels" include private recreation and fishing vessels, including whale watch vessels. Thus, this analysis conservatively assumes that, in the Protected Areas, all private vessels are participating in whale watch activities.

[d] The Alternative 3 analysis applies information from multiple sources, one of which does not separately track private whale watching and private recreational fishing vessels. As a result, private vessels are presented in the aggregate (see Section 2.2.2).

Sources:

[1] Based on data provided by Kari Koski, Soundwatch Coordinator, The Whale Museum: Soundwatch Public Outreach/Boater Education Project Final Program Report Data. 2003-2010.

[2] The average number of private vessel (both whale watching and recreational) trip participants is based on written communication with Kari Koski, Soundwatch Coordinator, The Whale Museum, August 1, 2008. The average number of commercial whale watching trip participants is based on written communication with Suzanne Russell, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Science Center, July 29, 2008. Consistent with assumptions employed by Soundwatch, we conservatively assume the average number of individuals per kayak is two. This likely overstates the number of potentially affected kayakers.

[3] Information on commercial fishing trips potentially affected by Alternative 5 is derived from San Juan County's report to NMFS regarding 2010 aerial survey efforts: Dismukes, Jeffrey S., Jonathan Riley, and Greg Crenshaw. Report to NMFS. "Quantification of Summer Season Marine Vessel Traffic Pressures in the San Juan Islands June 12 – September 5, 2010.

EXHIBIT 4-2 SMALL BUSINESSES THAT MAY BE AFFECTED BY PUGET SOUND VESSEL TRAFFIC REGULATIONS

			San Juan	Cla-llam	Jeffer-son	Mason	Thur-ston	Pierce	King	Kitsap	Island	Snoho-mish	Skagit	What-com		
Fisheries Related Industries																
114111 - Finfish fishing	$4.0 million	Total	4	6	1	4	2	9	81	9	3	27	22	25		
		Small	4	6	1	4	2	9	75	9	3	27	21	25		
114112 - Shellfish fishing	$4.0 million	Total	0	0	7	5	5	3	18	1	1	5	1	3		
		Small	0	0	7	5	5	3	18	1	1	5	1	3		
114119- Other marine fishing	$4.0 million	Total	0	0	1	0	0	1	4	4	0	2	1	0		
		Small	0	0	1	0	0	1	4	4	0	2	1	0	13	**100%**
Whale Watching Industry																
487210 - Scenic and Sightseeing Transpor-tation, Water	$6.5 million	Total	3	0	0	1	0	2	8	3	1	1	4	1	24	
		Small	3	0	0	1	0	2	7	3	1	1	4	1	23	**95.8%**
Other Vessel Traffic Related Industries																
483113 - Coastal and Great Lakes Freight Transpor-tation	500 employees	Total	0	0	0	0	0	2	22	0	0	0	0	1	25	
		Small	0	0	0	0	0	1	11	0	0	0	0	0	12	**48%**

NOTE: Size standard based on SBA's Table of Small Business Size Standards based on NAICS 2002 (http://www.sba.gov/size/sizetable2002.pdf). Numbers of businesses are based on Dun and Bradstreet Business Information downloaded February 2008.

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APPENDIX A: SUMMARY OF TECHNICAL REVIEWER COMMENTS AND RESPONSES

This Appendix summarizes the major comments provided by the Technical Reviewers of the Draft RIR, along with responses to these comments and changes that were made to the Final RIR in response to the comments.

	COMMENT	RESPONSE
COMMENTS IN RESPONSE TO GENERAL TECHNICAL REVIEWER QUESTIONS		
Question 1: Given limitations precluding the conduct of original research, does the analysis reflect the best available data and information regarding: (1) Potentially affected parties (Chapter 2); and (2) Current economic literature describing potential effects of the proposed regulations (Chapter 3)?		
1	"I firmly believe this is true… My only suggestion for the revision is to expand on the description of the data sources and to extend discussion in the text of why these represent the best available scientific information."	We reviewed the report to ensure citations to data sources were clear and incorporate a statement that our literature and data review, combined with information from public comment and technical review, indicate that we are applying the best available information in the development of the analysis.
2	Suggests clarifying how military vessels are taken into account or, rather, why they are not.	The Final RIR was revised to incorporate a discussion specifically on the exemptions to the proposed regulations, which include military vessels. Thus, the analysis does not focus on these vessels.
3	Because the treaty tribes are co-managers of the fin and shellfish resources, suggest addressing their interests or at least recognizing their relevance in the text. Should not change the outcome of the RIR.	As above the discussion regarding exemptions to the vessel traffic regulations describes that treaty Indian fishing vessels lawfully engaged in actively setting, retrieving, or closely tending fishing gear are exempt from the regulations. Thus, the analysis does not focus on these vessels.
4	Suggests usefulness of identifying the positive impacts in terms of existence values as a qualitative note.	Chapter 3 of the Final RIR has been revised to incorporate a brief qualitative discussion acknowledging that the economics literature has demonstrated that positive social benefits are associated with the conservation of threatened and endangered species.
5	Has not found any economic studies pertaining to the Puget Sound killer whales that would provide useful additional information for this study.	

COMMENT		RESPONSE
6	It could be an issue that so much of the information on levels of recreational activity is from the Whale Museum. "I don't know whether the Museum is an independent and unbiased source of data, but I also don't know of any other source of comparable data for this."	Soundwatch is the only organization that tracks much of the data required for the RIR. As a result, in many cases these data represent the best available information. In addition, Soundwatch monitors have a great level of expertise regarding compliance with the whale watch guidelines as they explicitly monitor the region each year. Finally, we NMFS worked with some regional stakeholders, including San Juan County to gather additional information to support the Final RIR. Thus, the Final RIR incorporated additional data gathered by San Juan County for the 2010 whale watching season (e.g., boat launch usage data).
Question 2: Do the assumptions used in the analysis accurately reflect the study area and user characteristics?		
7	Questions the use of CG rated passenger carrying capacity of 55 persons/vessel as an indicator of persons affected. Agrees this is an upper bound but it is not clear how this relates to the actual number carried.	This comment references the assumption that the commercial whale watching vessels operating in Puget Sound carry, on average, 55 participants. The Final RIR clarifies that this assumption results in an upper end estimate of total whale watching participants as it is likely that some vessels do not always operate at capacity. This assumption is, however, consistent with the Soundwatch reports' assumptions for participants per commercial whale watching trip.
8	Similarly, it is not clear the 55 persons/vessel assumption is appropriate for Canadian vessels. Believes Canadians more frequently use smaller vessels with much less capacity.	The Final RIR acknowledges the potential difference in characteristics (including passenger numbers) between U.S. and Canadian whale watching vessels and applies the 55 average persons for vessel as an upper end estimate. This assumption is consistent with the Soundwatch reports' assumptions for participants per Canadian commercial whale watching trip.
9	Not clear whether Canadian activity is included in the Hoyt estimates of whale watching value.	The Final RIR clarifies that the data used for the regional economic value of whale watching analysis does not include Canadian activity.
10	The profile of the regional whale watching industry seems to be useful and well documented.	

	COMMENT	RESPONSE
Question 3: Does the analysis apply well-accepted and appropriate methods to estimate potentially affected parties?		
11	The analysis is creative in light of lack of good data and the analysis is perfectly reasonable.	
12	Suggest more direct discussion of data limitations and direct discussion of methodology followed independent of the vessel category.	We reviewed the report to ensure that discussions of data limitations were added, where appropriate. For example, we incorporated a limitations and caveat section to the IMPLAN regional economic analysis section in Chapter 1. We also incorporated a general description of methodology (Section 2.1) and described the particular limitations of the Soundwatch data (Section 2.1).
13	Nice summary of existing studies dealing with the values associated with whale watching in Chapter 3. Conclusion from the four studies is quite reasonable.	
SPECIFIC COMMENTS AND ASSOCIATED RESPONSES ON CHAPTER 1		
14	May be helpful to state up front why there is a focus throughout the analysis on the whale watching industry.	We update the Final RIR to expand Section 1.2 so that the description of the regulatory alternatives matches those in the Proposed Rule. In addition, we added a new discussion on the various exemptions to the regulations. This section clarifies that, due to the multiple vessel types exempted from the regulations, the whale watching vessels are the primary focus of the Final RIR.
15	Suggests adding some references for peer reviewed publications highlighting the impacts of vessel traffic and noise on cetaceans.	The Final RIR references the Proposed Rule, which includes discussion of the body of literature describing potential effects of vessel traffic and sound on cetaceans.
16	Suggests not using the term “Protected Areas” to refer to the proposed No-Go Zone alternatives as this may confuse readers familiar with the MRC No Take areas around the island.	We revised the Final RIR to use the same language as was included in the Proposed Rule describing the regulatory alternatives. We therefore retain the Protected Area language. We do, however, clarify in the description that the proposed Protected Area regulations refer to the current voluntary No-Go Zone (Alternative 4) and the expanded No-Go Zone (Alternative 5).

COMMENT		RESPONSE
17	The tables and discussion in Chapter 1 should use a standard list of vessel types that can be referred to throughout the document. Currently, the vessel types described are not consistent across the tables.	We updated the tables to reference a consistent list of vessel types and define these vessel types according to the VTC descriptions in Exhibit 1-3. As the analysis relies on multiple data sources that group vessels differently,
18	Although they are not part of the analysis, the report should acknowledge that military vessels may also operate in the area.	Military vessels were added to Section 1.3 describing the various vessel types that occur within the Puget Sound region. These vessels are, however, exempt from the proposed regulations.
19	Section 1.3.1 should describe why the discussion of vessel transits focuses on the Haro Strait, Boundary Pass and Strait of Georgia waterways.	We added a statement clarifying that these are the areas most frequented by the whales, and also where much vessel activity is focused.
20	Conclusions from the IMPLAN model should be described in more detail. Clarify whether the regional contribution is in terms of regional income, labor income, or other. Where this is mentioned in Chapters 1 and 3, suggest noting that this probably overstate the regional income change that would follow a loss of the whale watching activity as expenditures would be shifted to other activities (similar to the note on San Juan County park on page 3-7).	The IMPLAN discussion in Chapter 1 is now expanded to provide more context for the results. We have also incorporated a discussion on the assumptions and limitations of the IMPLAN analysis.
21	Does the IMPLAN analysis include participants on Canadian vessels? If so, does it assume that the Canadian passengers spend in the Counties surrounding Puget Sound?	The IMPLAN analysis incorporates expenditures only for those whale watchers departing from U.S. ports. We clarify this point in the Final RIR.
22	Might want to be clearer that we are shooting for an upper estimate. "We realize that boats are not always filled to capacity and know that boats differ." Also, do we even end up using this number anywhere? Or are we just trying to demonstrate scale?	We incorporated a statement in the Final RIR recognizing this as an upper estimate as not all whale watching trips involved boats filled to capacity.
23	While a lack of data may preclude providing more information on how the Canadian whale watching industry is different than the U.S. industry, suggest including a qualitative statement that we recognize there may be a difference.	The Final RIR discusses the limitations of the assumption that Canadian commercial whale watching vessels operate similarly (in terms of passengers per vessel in particular) to U.S. vessels.

	COMMENT	RESPONSE
SPECIFIC COMMENTS ON CHAPTER 2		
24	The analysis notes that land-based whale watchers may benefit from the decreased density of vessels in the No-Go Zone. Is it possible the land-based viewers may be negatively impacted by additional crowding at the Park?	The Final RIR incorporates a statement regarding the potential for displaced vessel-based whale watchers to participate in land-based viewing at Lime Kiln Point. The analysis notes, however, that the extent to which this migration may occur, however, is uncertain as land-based and vessel-based whale watching are not perfect substitutes.
25	Suggests adding a bit more detail on protection offered Puget Sound killer whales by the MMPA and ESA.	The Final RIR incorporates a reference to the section of the Proposed Rule detailed current MMPA and ESA prohibitions and NMFS guidelines and regulations related to the killer whales in Puget Sound.
26	Suggests providing description of the Soundwatch data: define the vessel categories, describe time of year covered, geographic area of coverage, monitoring season, etc. Might there be whale/vessel interactions outside of when they are monitoring? Suggests describing potential limitations of these data.	The Final RIR responds to this suggestion, aggregating the description of the Soundwatch data and its application in the analysis in Section 2.1. The Whale Museum monitors: vessels' compliance with the voluntary whale watching guidelines and No-Go Zones, the level of vessel activity in the Sound, and the distribution of vessels in the Sound (e.g., commercial whale watching, private whale watching, commercial fishing, etc) in the time and area when whales are present. The report caveats that, although the Soundwatch data accurately describe vessel activity in the Puget Sound area during the whale watching season, the data reported represent a minimum bound on the potential vessel activity given that monitoring does not occur in all areas of the Puget Sound at all times. Thus, the Soundwatch data are not expected to capture all instances of non-compliance with the whale watching guidelines and No-Go Zones.

COMMENT		RESPONSE
27	Define "private whale watching vessels" up front, and be consistent. Some portions of the analysis refer to becomes "Private Whale Watch and Fishing." Need to also explain that we assume any private vessel that is not actively fishing is whale watching. Might also want to add "motorized or wind powered" to differentiate them from kayakers (who are also potentially private whale watchers).	The Final RIR includes note to clarify the definition of private vessels. The section of the report referenced in this comment is a summary of the number of incidents on non-adherence to the whale watching guidelines as determined by Soundwatch. Our analysis therefore is organized according to the same vessel categories as the Soundwatch data. For the approach, path, and vessel speed guidelines, Soundwatch separately tracks incidents associated with private whale watching and private fishing vessels. In this case, private whale watching vessels include vessels engaged in all private recreational activity, including whale watching. The analysis conservatively assumes that the activities are whale-based and thus all are considered "private whale watching vessels." In tracking incidents of non-adherence to the No-Go Zone, however, Soundwatch does not separately report private vessels by activity but includes one category for "individual private vessels." This therefore includes whale watching, fishing, and other activities undertaken by private vessels. This analysis conservatively assumes that the activities for all of these vessels are whale-based and thus all are included as potentially affected whale watchers. We also added clarification that these are "motorized" private vessels.
28	Kayak multiplier of two individuals per vessel might be too high.	The Final RIR acknowledges that the estimate of two individuals per kayak is a high end estimate, and that this assumption may lead to an overstatement of potentially affected kayakers.
29	The analysis focuses on the area where Soundwatch is monitoring. However, a lot of vessel activity is going on in the South Sound and it seems like the regulations could significantly disturb operations.	A caveat is added to the analysis describing that, to the extent that Soundwatch did not identify incidents occurring in the South Sound area, the analysis may underestimate individuals potentially affected.

COMMENT		RESPONSE
SPECIFIC COMMENTS ON CHAPTER 3		
30	Seems like the vessel speed regulation could affect vessels other than whale watching vessels in the Sound. In addition to time and schedule, impacts, decreasing vessel speed could be a safety issue.	As described in Chapter 2, however, because the vessel speed regulation as proposed applies only to vessels within 400 yards/meters of the whales, and a relatively small percentage of other vessel types have been identified exceeding the proposed speed limit this close to whales, the effects of the proposed speed regulation on other types of vessels, such as commercial fishing and shipping boats, is expected to be minor.
31	Include a note about why the summary of existing literature describing factors involved in whale trip enjoyment is included.	The Final RIR incorporated additional introductory text for the write-up of existing whale watch research that examines the extent to which proximity to whales affects trip enjoyment.
OTHER COMMENTS		
32	Include a list of acronym definitions.	This is added to the Final RIR.