

FINAL 2016 SOUNDWATCH PROGRAM ANNUAL CONTRACT REPORT

Project Title: Soundwatch Public Outreach/Boater Education Project.

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Contract Number: RA-133F-12-CQ-0057 **Tasks 6.2A & 6.3**

Contract Date: Third year of multi-year contract: January 1, 2016 through December 31, 2016

Abstract:

The goal of this project was to provide on-the-water stewardship, public outreach and boater education services by The Whale Museum's Soundwatch Boater Education Program during the 2016 killer whale watching season and to provide a data update to the **RA-133F-12-CQ-00572013** Soundwatch Public Outreach/Boater Education Project Final Project Report characterizing general trends in vessel-based whale watching activities associated with Southern Resident Killer Whales in the Haro Strait Region of Washington State and Southern Vancouver Island, British Columbia, Canada.

Executive Summary:

The goal of the Soundwatch Public Outreach/Boater Education Project was to implement The Whale Museum's Soundwatch Boater Education Program (Soundwatch) during the 2016 whale watch season and present a data update to the 2015 report on whale watching trends in the Haro Strait region to inform future management strategies.

The objectives of this 2016 project were to: provide boater education services through public outreach and on-the-water stewardship activities, to collect data on vessel activities during the 2016 whale watching season and to conduct analysis on present whale watching data in order to provide an update to the 2015 Soundwatch Public Outreach/Boater Education Project report.

For the three seasons from 2010 to 2012, supplementary tasks were added to the contract to conduct additional outreach to commercial and recreational kayakers launching from the San Juan Island County Park and to conduct shore-based monitoring of kayaking activities with Southern Resident Killer Whales (SRKWs) within the voluntary no-go zone along the west side of San Juan Island.

From 2013 – 2016, the shore-based monitoring was not funded within this contract. The kayak education component has continued through the cooperation between the San Juan Island Kayak Association (SJKA), San Juan County Parks and The Whale Museum's Soundwatch Boater Education Program ("Soundwatch").

In May 2011, the National Oceanic Atmospheric Administration (NOAA) Fisheries implemented new vessel regulations around all killer whales in the inland waters of Washington State. The regulation included two prohibitions: a prohibition on approaching killer whales within 200 yards and a prohibition on positioning a vessel within 400 yards of the path of killer whales. In addition, Washington State updated the Revised Code of Washington (RCW) on SRKW's in 2012 to match the Federal 200 yard and 400 yard in-the-path approach distances for inland waters (east of the Bonilla-Tatoosh line). This report provides a cursory evaluation of the effectiveness of the new regulations during the first six years of implementation.

Data analyzed for this annual update report reflects data collected by Soundwatch in 2016 and includes vessel incident definitions related to the U.S. Federal and Washington State vessel regulations. This update report depicts general trends in vessel-based whale watching activities associated with SRKWs in the Haro Strait region of Washington State and British Columbia, Canada.

The goal of the Soundwatch Program is to reduce vessel disturbance to killer whales and other marine wildlife through educating boaters on regional guidelines and regulations as well as to provide systematic monitoring of vessel activities around all cetaceans. Soundwatch promotes responsible marine stewardship through the development, distribution, implementation, annual evaluation and adjustment of guidelines and regulations for marine wildlife viewing by residents, visitors and commercial users. Soundwatch aim is to educate boaters on the current guidelines and regulations before they leave the shore, reinforce the learning experience on-the-water where disturbances take place and provide a scientific platform to collect observational data on vessel activities around cetaceans. This annual, long-term data is primarily used to help evaluate effectiveness of current regulations and guidelines and to determine the need for adjusting the regulations and/or guidelines.

The 2016 Soundwatch data collection consisted of: counts of vessels within ½ mile of any cetacean by type, location and activity ("vessel counts"), cetacean data: identification, location, travel direction and behavior states, vessel contact information ("vessel contacts") as well as commercial and private vessel compliance with

voluntary guidelines and/or regulations (“vessel incidents”). Whale sightings, locations, and whale behaviors are not covered in this report. Instead, all Soundwatch data on cetacean identification, location, travel direction and selected behaviors is incorporated into The Whale Museum’s long-term Whale Hotline database. Soundwatch data specific to SRKWs is compiled with other sighting data into the Museum’s annual Orca Master NOAA Contract Report. All Soundwatch killer whale sighting data is available through The Whale Museum’s annual Whale Sightings and Orca Master data sets or upon request.

This update report on the disposition of funds from Contract Number **RA-133F-12-CQ-0057, Tasks 6.2A & 6.3.1**, entitled Soundwatch Public Outreach/Boater Education Project, fulfills reporting requirements under the NOAA Administrative Terms and Conditions of the contract.

Note: Included as an additional appendix to this report are CDs of the Soundwatch Program 2016 data sets in MS Excel.

Project Goal:

The goal of the Soundwatch Public Outreach/Boater Education Project was to implement The Whale Museum’s Soundwatch Boater Education Program during the 2016 whale watching season and provide data analysis updates to the 2015 report on whale watching trends in the Haro Strait region.

Project Objectives:

The objectives of this project were to:

- 1) Provide boater education services through public outreach and on-the-water stewardship activities during the 2016 whale watch season
- 2) Collect data on vessel activities during the 2016 whale watch season, especially relative to the 2011 U.S. Federal and 2012 Washington State vessel regulations
- 3) Conduct analysis on current whale watch activities including continued evaluation of 2011 U.S. Federal vessel regulations
- 4) Provide 2016 data updates to the 2015 Soundwatch Public Outreach/Boater Education Project Report

Project Results:

The contract listed several deliverables including:

Task 6.2A: Conduct estimated 50 days on-the-water education and monitoring activities during the months of May through September 2016.

C.6.2A.1 Deliverables for Soundwatch Education and Monitoring Program. Sub-Task 6.2.1.1: Summary of Soundwatch Activities, Patterns of Vessel Activities Around Whales, and Compliance with Regulations and Guidelines.

- 1) Whale Watching Trends in the Boundary Waters of Haro Strait May-September in numbers of visitors to Lime Kiln Point and number of active boats from US and Canada.
- 2) Growth of Commercial Whale Watching in the Boundary Waters of Haro Strait May-September in number of boats.

- 3) Commercial Whale Watch Platforms in the Boundary Waters of Haro Strait May-September in numbers of boats.
- 4) Average Number of Vessels with killer whales Per Month May-September in numbers of boats.
- 5) Annual Average Numbers of Vessels with killer whales at Different Times of Day, May-September in number of boats.
- 6) Annual Vessel Type Averages and Maximum Vessel Type Numbers of Vessels.
- 7) Mean Annual Daily Average of Number of Commercial and Private Boats with Whales in Haro Strait Region May-September with Standard Deviation in number of boats.
- 8) Annual Distribution of Vessels within ½ Mile Radius of Whales May-September in percentages.
- 9) Distribution of Commercial Whale Watch within ½ Mile Radius of Whales in percentages.
- 10) Distribution of Private Boats within ½ Mile Radius of Whales in percentages.
- 11) Total Vessel Incidents by percentage.
- 12) Annual Vessel Incident Summary by incident and vessel type.
- 13) Top 5 Vessel Incidents by vessel type.
- 14) Geographic distribution of Vessel Incidents.

Sub-Task 6.2.1.2: Summary Copy of Vessel Data in Electronic Form.

Task 6.3: Description of vessel activities around Southern Resident killer whales.

C.6.3. A Seasonal and Yearly Trends in Vessel Activities around Whales.

C.6.3.1 Deliverables for Description of Vessel Activities around Southern Resident killer whales.

Sub-Task 6.3.1.1: Vessel Trends in Proximity to Southern Resident killer whales.

- 1) Whale Watching Trends in the Boundary Waters of Haro Strait May-September in numbers of visitors to Lime Kiln Point, and number of active boats from US and Canada.
- 2) Growth of Commercial Whale Watching in the Boundary Waters of Haro Strait May-September in number of boats.
- 3) Commercial Whale Watch Platforms in the Boundary Waters of Haro Strait by percentage of vessel type.
- 4) Average Number of Vessels Accompanying killer whales per Month May-September in number of boats.
- 5) Annual Average Numbers of Vessels with killer whales at Different Times of Day May-September in number of boats.
- 6) Annual Vessel Type Averages and Maximum Vessel Type Numbers of Vessels with killer whales in Boundary Waters of Haro Strait May-September in number of boats and by types of boats.
- 7) Mean Annual Daily Average of Number of Commercial and Private Boats with whales in Haro Strait Region May-September with Standard Deviation in number of boats.
- 8) Annual Distribution of Vessels within ½ Mile Radius of whales May-September in percentages by vessel type and activity type.
- 9) Distribution of Commercial Whale Watch within ½ Mile Radius of whales in percentages.
- 10) Distribution of Private Boats within ½ Mile Radius of whales in percentages.

Sub-Task 6.3.1.2: Shore-based kayak education and monitoring program (not funded in 2013 - 2016).

Section I: Summary of Soundwatch Activities

The Soundwatch Program reduces vessel disturbance to killer whales and other marine wildlife through on-the-water educational and monitoring patrols. Soundwatch paid staff and volunteer crews educate boaters on the current established regulations and guidelines on the water where wildlife disturbances are likely to take place. Soundwatch crews also monitor vessel activities near whales to characterize regional marine wildlife viewing trends in order to adjust or develop additional marine wildlife regulations and/or guidelines and to evaluate the effectiveness of newly implemented guidelines or regulations.

The Whale Museum's Soundwatch Boater Education Program has developed standardized procedures for the training of new and seasonal staff, data collection, data entry and analysis. Soundwatch data collection procedures are designed to follow strict protocols using regionally established data parameters for SRKWs. Soundwatch staff and paid seasonal vessel drivers are required to undergo rigorous on- and off-the-water trainings using standardized instruction, including comparison of simultaneous double-blind exercises. Soundwatch protocol states that vessel drivers observe vessel and cetacean interactions and dictate all data observations to trained volunteer interns who record the driver's observations onto standardized data collection forms. Trained volunteers assist the interns with data recording tasks and help to hand-off educational materials to boaters. Range finding tools such as laser range finders, electronic radar and chart plotters as well as high-power binoculars are used to gauge distances. In all cases, Soundwatch drivers are instructed to make conservative estimates when determining distance and recording range encroachment. If an observed vessel's distance to a whale is too difficult to ascertain, the driver did not record it; only vessels observed well within the regulatory or guideline approach distances to whales were recorded as *vessel incidents*. In 2016, Soundwatch staff, the seasonal vessel driver, interns and volunteers recorded 17 days, totaling 70.5 hours (approximately 10% of overall time) of on-the-water cetacean and vessel observation and data recording training activities. Additional off the water training and a thorough knowledge of all data was required before permitted activities were allowed. (Figure 1 and 2).

Soundwatch has collected data on vessel numbers, types and behaviors around SRKWs since 1998 and this data has provided the basis for Soundwatch to characterize annual and long-term vessel-based whale viewing trends in the Haro Strait region. Soundwatch provides these findings to the whale watch industry, the public and regional managers. Soundwatch vessel trend data has been used as the primary data source to inform Southern Resident Killer Whale recovery strategies in terms of vessel management decisions as well as aided in the creation and/or implementation of San Juan County, Washington State and U.S. and Canadian Federal vessel regulations for killer whales. The annual and long-term data has also been a valuable tool for the training of Soundwatch staff, commercial vessel and kayak tour operators and in planning for education and monitoring program efforts. Soundwatch data has assisted regional enforcement planning and has been invaluable for adjusting whale watch guidelines and creating vessel regulations designed to reduce the risk of vessel impact to whales.

During the summer months of 2016 (May-September), Soundwatch operated vessel patrols to educate and monitor boaters an average of six days per week with concentrated effort during the busiest months (July & August). Soundwatch staff and volunteer crews spent a total of 123 days on the water with marine wildlife between May 1, 2016 and September 30, 2016, totaling 689 hours. Killer whales were present on 75 of those days, for 451 hours of on-the-water time, averaging 4 hours per day of killer whale vessel monitoring and an average 6 hours per day of on-the-water effort (Figures 1 - 4). Over the summer seasons (May-September) since 1998, Soundwatch has totaled more than 11,142 observational and outreach hours with vessels and whales in the Haro Strait region (Figure 2).

During the 2016 season, Soundwatch used the smaller vessel Raydiance for the season. This vessel has a much smaller fuel tank (15 gallons) compared to our previously used larger vessel and restricted the region we could survey. This is more clearly shown in the figures at the beginning of the report. Additions were made to the smaller vessel such as a dolphin fin on the motor to allow the vessel to “plane” faster, the installation of two bilge pumps plus the crew stored 7 gallons of extra fuel on board each trip which enabled the vessel to travel further for education and monitoring. The Soundwatch teams carried Columbus Dataloggers each day to track the Soundwatch vessel’s movements over the course of the season. (Figure 4).

In 2016, Soundwatch and Washington State Fish and Wildlife received the Section 6 ESA Grant. This grant will enable both programs to maintain vessels and operate on the water on a more consistent basis. The grant is valid from July 2016 – June 2019.

Figure 1: Distribution of Soundwatch On-the-Water Activities 2016.

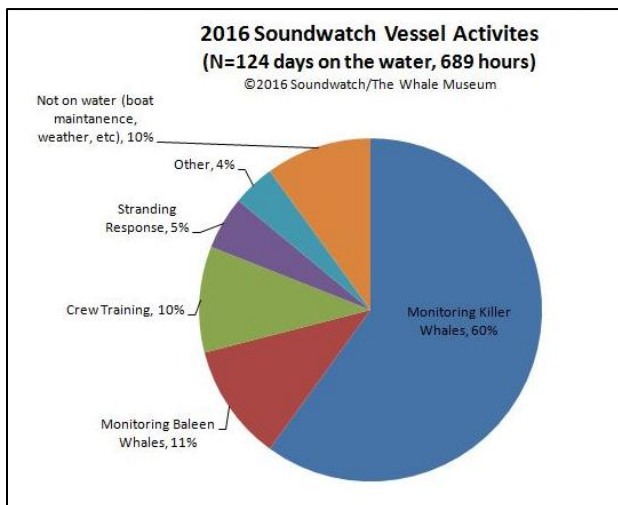


Figure 2: Distribution of Soundwatch On-the-Water Activities 1998-2016.

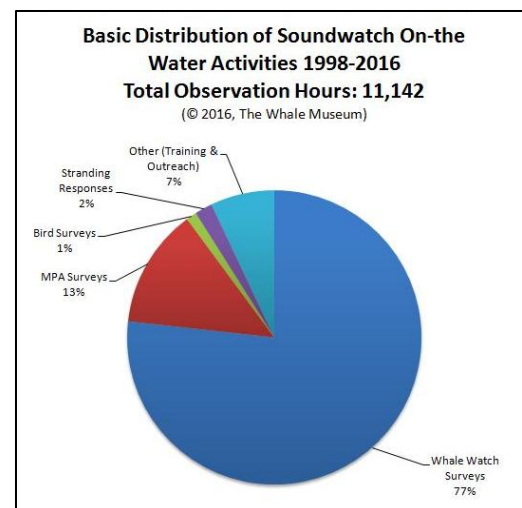


Figure 3: Distribution of Soundwatch Vessel Hours and Miles by Month for 2016.

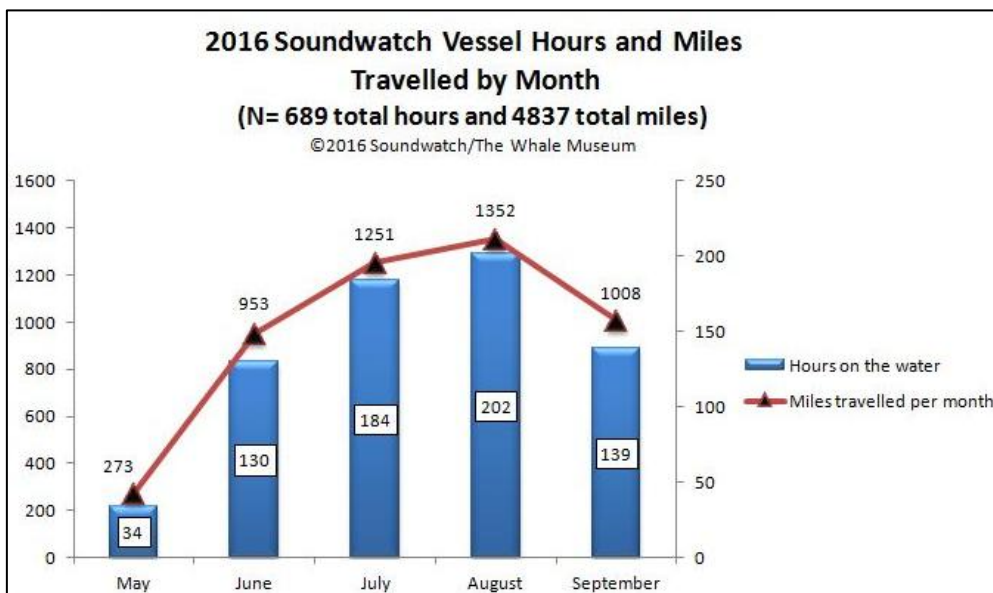
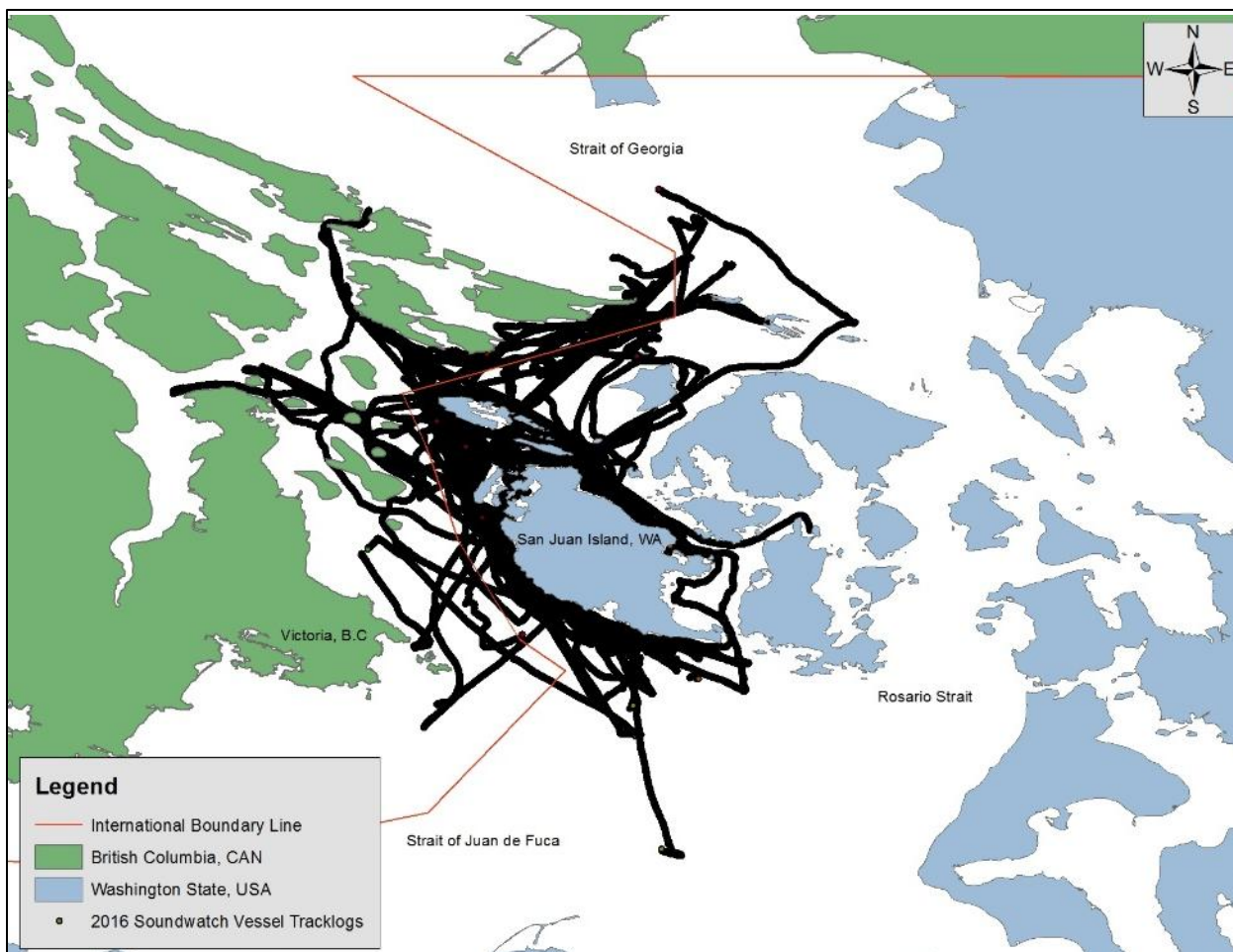


Figure 4: 2016 Soundwatch Vessel Tracklogs.



In 2016, 695 Vessel Count/Whale surveys were conducted with a variety of cetacean species, the majority being Southern Resident Killer Whales, in the Haro Strait Region of Washington State, U.S. and Southern Vancouver Island, British Columbia, Canada (Figure 5). Soundwatch observed far more marine mammals in the Haro Strait region than in 2015 and thus our vessel monitoring was spread over a larger region in the space of a single day. The data in this report will also show all vessels (commercial, recreational, etc.) are more spread out in 2016 than 2015. For example, during the month of June, there were few sightings of the Southern Resident killer whales. However, Transient killer whales, groups of Humpbacks (30-50 individuals) and a Fin whale were common occurrences (Figure 6).

Figure 5: Soundwatch 2016, 695 Vessel Counts & Whale Surveys by Location and Species.

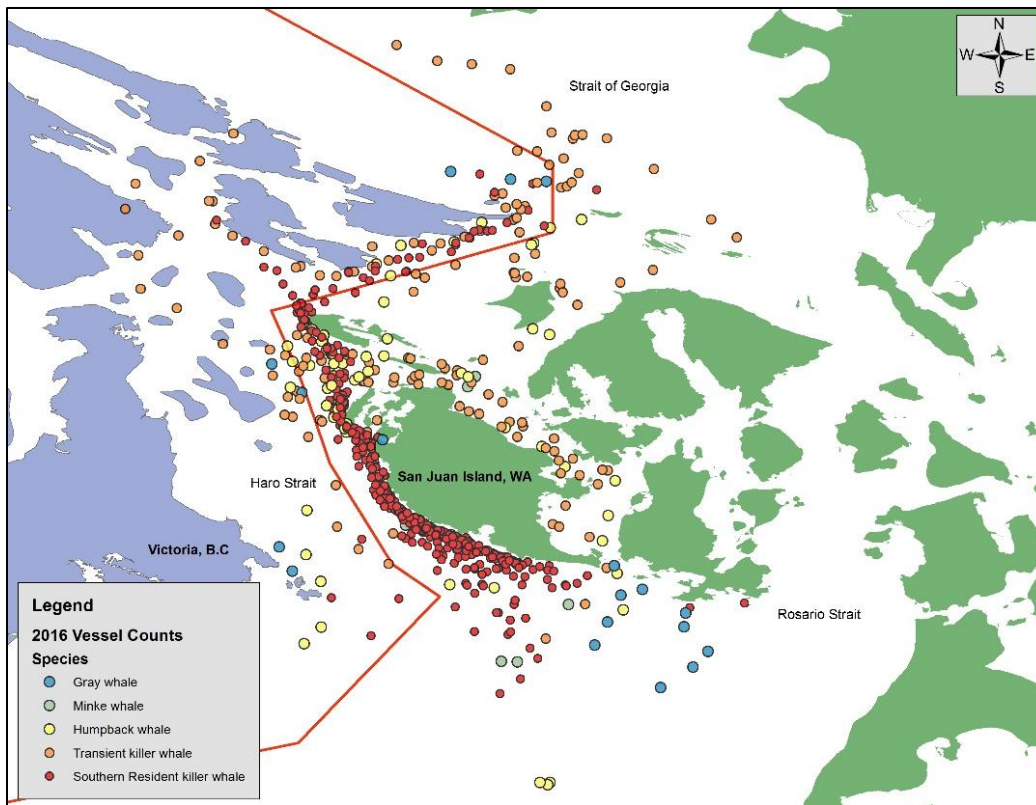
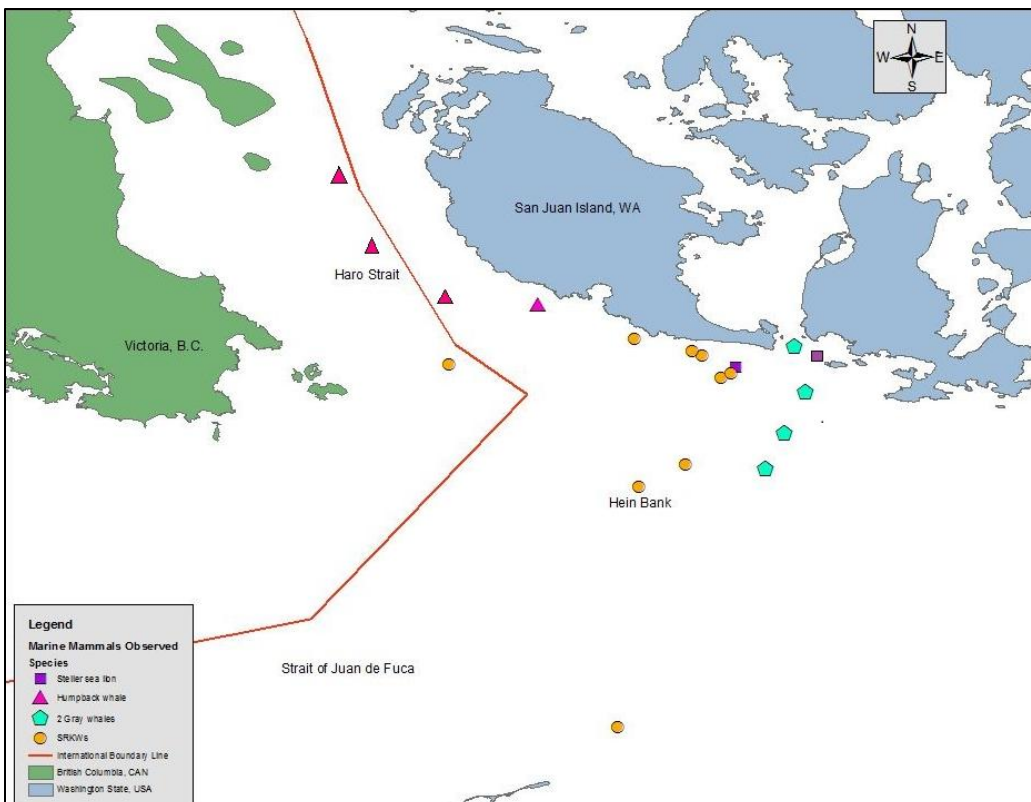


Figure 6: Basic map displaying all marine mammals observed on September 20th, 2016 in Haro Strait Region.

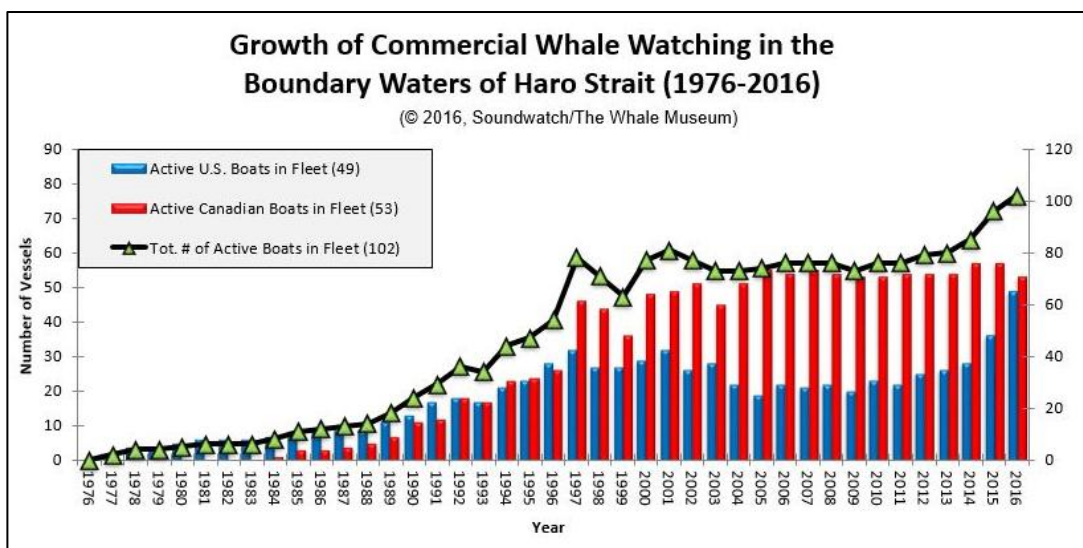


In addition to one full-time paid staff, the Soundwatch program relied on the work of one seasonal part-time vessel driver/educator, 59 dedicated on-boat volunteers, two full-time summer interns, one academic intern from Skagit Community College, and many other community volunteers. Approximately 2,000 hours of volunteer time was spent participating on Soundwatch vessel patrols, distributing educational materials, vessel maintenance, dock talks, assisting with data entry and photo archiving.

Whale Watching Trends

Organized commercial whale watching tours began in the region in the mid-1970's and have steadily increased, reaching its first peak in 1997, with 78 commercial whale watching vessels originating from ports in both the U.S. & Canada. Over the next 2 years, 1998 and 1999, the number of *active* vessels (vessels observed operating more than 1 day per week May-September) dipped down to 63. However, after 1999, the annual number of vessels began to rise again, up to a new high of 81 in 2001. Between 2003 and 2011 the number of commercial vessels hovered between 73 and 77 vessels, before rising again in 2012 to 79. It has since been steadily increasing. This year, 2016, five years after the 2011 Federal vessel regulation update, there is a total of 102 *active* commercial whale watching vessels. This is the highest ever recorded since 1976 and an increase of 30 vessels since 2012. This also marks a 27.5% increase in commercial whale watch vessels over a five-year period in the boundary waters of Haro Strait (Figure 7).

Figure 7: Growth of Commercial Whale Watching in the Boundary Waters of Haro Strait 1976-2016.



In 2016, 67 *total* commercial whale watch companies offered whale watching trips from 102 *active* commercial vessels in the U.S. and Canadian Haro Strait region and 28 *occasional* commercial vessels (Figures 7-9). While the number of *active* commercial companies has remained nearly the same over the past several years (~35), the number of *active* vessels each company operates has recently been increasing. Last year, U.S. companies increased and now equal Canadian companies in operation, at 19 companies each. This year due to companies being purchased by other whale watch companies and companies shutting their businesses, there was a total of 21 *active* US companies, far outweighing the 14 *active* Canadian companies. However, there continues to be more Canadian vessels operated by these companies, totaling 53 *active* Canadian vessels as compared to 49 *active* U.S. vessels. Total (active, occasional and rarely used) U.S. vessels increased by 6 vessels - making it an increase of 20 U.S. vessels in the last two years. Beginning in 2015, a kayak company has been included as a member of the Pacific Whale Watch Association. (*This company is represented as a single*

active U.S. vessel due to the complexity and fluidity of their kayak fleet. It is unknown how many kayaks are in their fleet or how many are utilized daily however it was necessary to represent the company since it is a part of the PWWA since it is an active whale watch company (Figures 7-9.) Canadian commercial vessels continue to be mostly smaller rigid hull inflatable (RHIB) style vessels, while the U.S. fleet is made up of larger passenger-style vessels and a growing number of smaller 6 - 8 person fiberglass vessels. Canadian companies are continuing to add large passenger-style vessels, in addition to existing RHIB vessels, to their company fleets. Most new U.S. companies operate small, cruiser-type vessels, many of them unmarked or minimally identified as commercial whale watching vessels. For the first time, three U.S. companies are now operating RHIB style vessels that hold between 10 -25 approximate passengers. Over the past 2+ decades, the majority of U.S. and Canadian commercial companies operating in the trans-boundary waters were members of the Pacific Whale Watch Association (formerly Whale Watch Operators Association Northwest) as was seen again in 2016 (Figure 7). An additional 32 companies operate 34 vessels as *occasional or rare* whale watch vessels however these vessels are not operated at a rate high enough to classify them as “active.”

Figure 8: 2016 Distribution of Whale Watch Companies from the US and Canada.

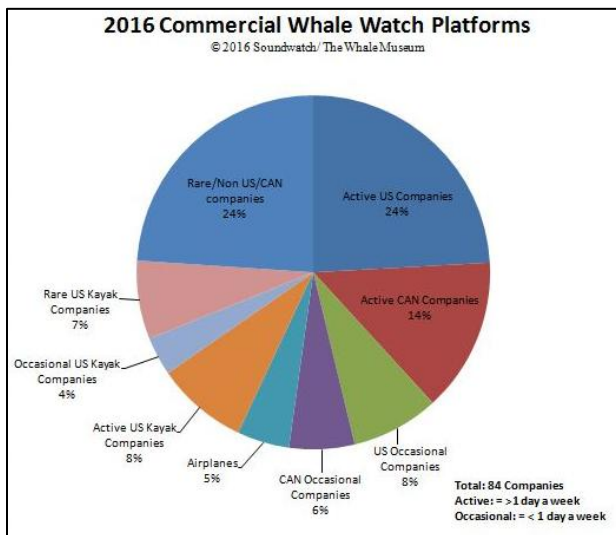
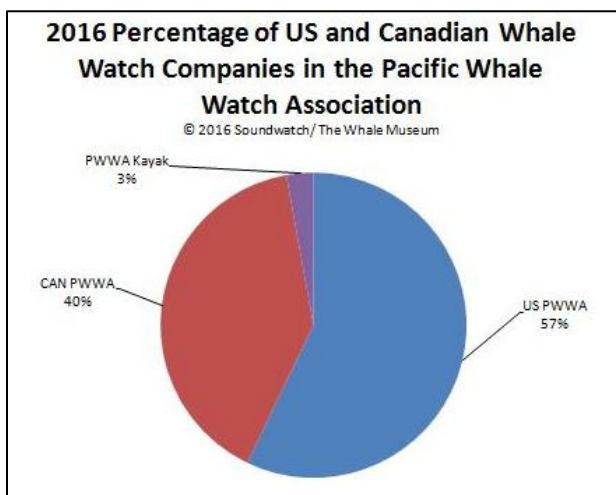


Figure 9: 2016 Percentage of U.S. and Canadian Companies in the Pacific Whale Watch Association



Soundwatch has traditionally used a complex matrix to annually estimate the total number of vessel-based whale watch passengers. This estimate was based on total number of whale watch vessels, estimated % of daily passenger load on each vessel, an estimated number of trips per day and number of total whale days in the region. Previous estimates hovered around 500,000 people engaging in all vessel-based whale watching activities in the region (including kayaks, commercial whale watch and recreational whale watching). It was estimated that the number of passengers originating in the U.S. was very nearly the same as the number originating in Canada, as the smaller Canadian vessels made a greater number of trips per day, per vessel, than the one-trip-a-day, large U.S. passenger vessels.

However, since the composition of the U.S. and Canadian vessel fleet has changed, as well as the number of trips per boat, per day and with an increase in whale detections in the area, it is much harder to realistically estimate the total number of passengers engaging in whale watching in the region but there is potentially a much larger number of people whale watching than previously estimated. This year, for the first time, the Pacific Whale Watch Association (PWWA), (majority of the commercial whale watch companies, not including kayak companies) shared the association's approximate annual numbers of passengers engaged in whale watching in the Haro Strait region, the approximate number of trips per year and approximate amount of economic impact the PWWA brings to the region (Table 1) (per PWWA Executive Director: M. Harris, 2016 PWWA Symposium, as reported by KIRO 7 on October 5, 2016 and Social Media on Oct 4, 2016). The trend shows a considerable increase than previously estimated. (The below numbers are only for the PWWA and do not include the kayak industry, recreational whale watching, land-based whale watching or the commercial whale watch vessels outside of the PWWA.)

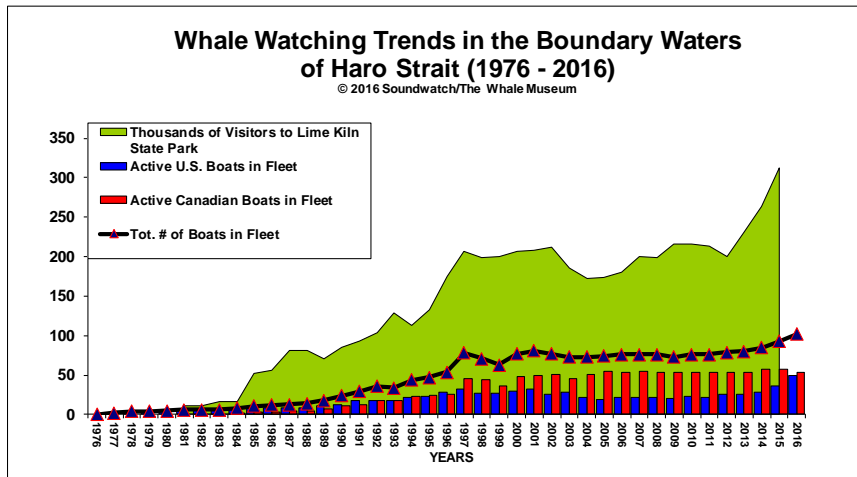
Table 1. PWWA Approximate Numbers of 2015 and 2016.

Year	2015	2016
Trips	13,562	14,000
Guests	400,000	440,000
Approx. Value	\$100,000,000	\$144,000,000

Many shore-based whale watching areas have gained popularity in recent years due in part to the availability of real-time sighting reports using various social media and the efforts of groups such as The Whale Trail promoting shore-based whale watching. The Whale Trail is a partnership of non-profit and localized community groups dedicated to promoting shore-based whale watch opportunities throughout the region (<http://www.thewhaletrail.org>). Funding for Washington State Park employees to count the number of annual visitors to the Lime Kiln State Park/Whale Watch Park (a Whale Trail Site) has recently been cut, however, the current Washington State Parks Office in Olympia estimates that the total number of visitors in 2015 to be approximately 340,000 people (Figure 10). This number, while an estimate, is the greatest number of visitors to the park reported. The increase may be due partly to an increase in the media and social media reports (photos, tweets, etc.) of spectacular shore-based viewing opportunities at this popular whale-watch park, the increase publicity surrounding the new killer whale calves, recent media articles regarding the death of Southern Resident killer whales, the increased awareness of the general public of killer whales in the wild plus the reality that it is a more affordable and opportunistic way to see whales while visiting the San Juan Islands.

*** The estimated attendance for Lime Kiln Point State Park for 2016 has not yet been completed. This report will be updated once that information is available.*

Figure 10: Whale Watching Trends in the Boundary Waters of Haro Strait 1976-2016.



Education & Outreach

When Soundwatch crews encounter vessels traveling in known whale or other wildlife areas, they contact the boater, provide marine wildlife viewing guidelines and regulations as well as collect information on the number of passengers. In 2016, Soundwatch distributed the current *Be Whale Wise Marine Wildlife Guidelines for Boaters, Paddlers and Viewers* that was updated in 2016 to include the *U.S. Federal Vessel Regulations for Killer Whales* (Appendix A & A1). This update combined the 2011 *Be Whale Wise* brochure with the 2011 Federal Regulation Rack Card to consolidate literature, reduce confusion and to create a graphic that displayed both the regulations and the guidelines in one place. This new brochure was presented at the PWWA symposium in April 2016 before it was printed for feedback from the commercial industry. The new brochure was printed in late May and was distributed by all *Be Whale Wise* partners in June 2016. Washington State Fish and Wildlife officers handed out the State Law Rack Card (same as the Federal Law) when educating vessels (Appendix B & B1). When Soundwatch encounters kayakers that are easily approached, Soundwatch driver/educators communicate the special concerns for kayakers paddling around marine wildlife and additionally distribute the current *Kayakers Code of Conduct Rack Card* (Appendix C and D). A *Kayakers Code of Conduct* brochure was updated and distributed to all kayakers who attended the KELP training at San Juan County Park and/or the KELP trainings that took place at The Whale Museum (total commercial guides trained in 2016 was 81). During 2016, Soundwatch delivered *Be Whale Wise* and *U.S. federal/state vessel regulations* for killer whales to 402 recreational vessels reaching 1,355 recreational boaters. Soundwatch contacted an average of 3.4 persons per vessel in 2016. The decrease in recreational vessels contacted from previous years is most likely due to the dramatic decrease of recreational vessels observed during the month of June. This decrease was likely affected by the change in Washington State salmon fishing regulations that included the fishing season being closed for the month of June. In addition, the Southern Resident killer whales were only present in the boundary waters of Haro Strait during four days of Soundwatch vessel monitoring during the month of June. It is also possible with the variety of cetaceans sighted around the region in 2016, that the density of recreational boaters was more spread out and watching whales in an area that the Soundwatch monitoring vessel was not present.

Through continuous Soundwatch monitoring, new vessels arriving on scene are observed and as many as possible are contacted, as are vessels that Soundwatch previously contacted but require some kind of follow-up. Every time a vessel is contacted, specific contact information is recorded on a *Soundwatch Vessel Contact data sheet* (Appendix E). Soundwatch crews record the date, time, location, type of vessel contacted, the vessel

activity, vessel registration, name, description, port of origin and number of passengers on board. Soundwatch crews then determine a series of vessel operator attributes using standardized criteria while the driver informs them about the marine wildlife rules. Vessel operator attributes that Soundwatch records include: the reason the vessel was contacted; whether they took the information and, if not, why; whether they were aware of the information; their reaction to Soundwatch; and whether this vessel had been contacted by Soundwatch before. Additionally, Soundwatch crews record if Soundwatch re-contacted this same vessel again on the same day, if there was a Soundwatch observed vessel incident recorded with this vessel before or after contact, if so, the time of the incident is recorded, if there were photos of this vessel and any other relevant comments.

Since 2009, there is a 61% average of recreational vessels contacted that state they were unaware of the guidelines and laws for boating around killer whales. In 2016, 56% of vessels contacted stated they were aware of the guidelines and laws, however, with much fewer vessels contacted and fewer recreational vessels on the water in 2016, it's likely that the percentage would be closer to previous years if more boaters were on the water (Figure 11). There has also been a steady decrease in the number of vessels contacted over the years. This is potentially due to any of the following reasons; time on the water (10+ hours to approximately 8 hours), different priority level for contacting vessels, if they are behaving well we didn't contact them right away, we didn't try to contact all recreational fishing vessels in high density areas because of the potential for greater disturbance to the whales, less contact for vessels in violation of national wildlife refuge distance, whales more spread out and fewer whale days in the Salish Sea, etc. Soundwatch added the additional question of how many years the vessel has been visiting the region (Figure 12). This question was added in the hope of pinpointing where further outreach and education need to occur in the future. These two questions could indicate that an increase in education including a variety of approaches (shore, water, etc.) to educate boaters along with an increase in enforcement is still needed. Additionally, increasing the range of the educational outreach to all registered vessels, registered Washington state boaters, etc., would promote more awareness of the regulations and guidelines concerning marine wildlife.

Figure 11: Percentage of Vessels Aware/Unaware Contacted by Soundwatch from 2009 - 2016.

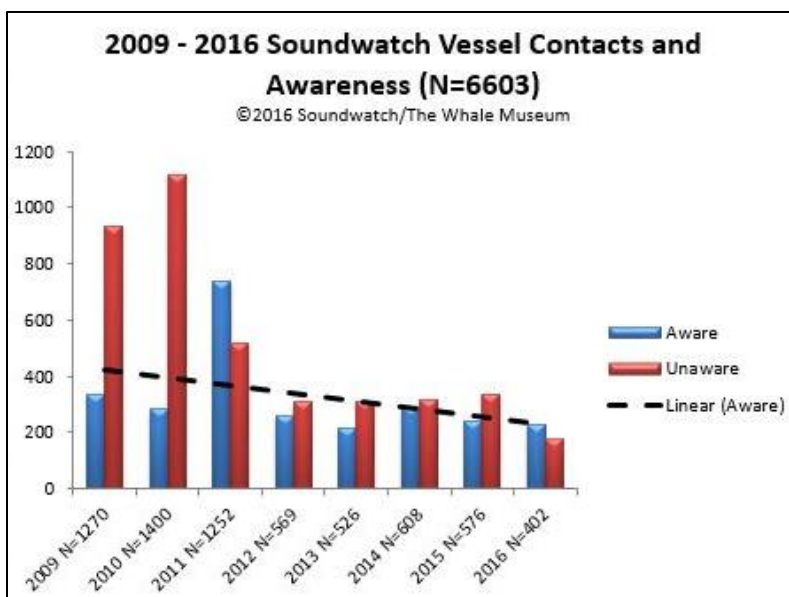
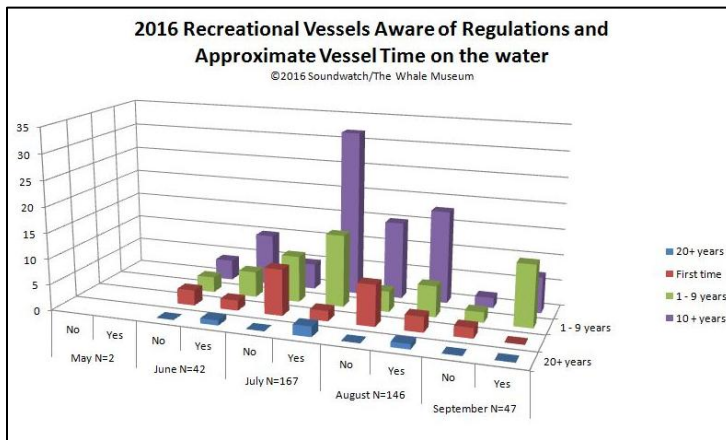


Figure 12: Vessels Aware/Unaware of the Regulations and Approximate time spent boating in the Salish Sea.



In addition to on-the-water outreach, over 4,000 *Be Whale Wise* brochures and approximately 200 posters were distributed in 2016 to regional federal, state, county, and private parks, boating facilities, boating organizations and at regional festivals. Brochures and posters were also made available at regional conferences and marine wildlife related workshops. Soundwatch presented at the Salish Sea Ecosystem conference in April in Vancouver, B.C., explaining a poster titled "Vessel Trends and Boater Education in SRKW Critical Habitat" and a Snapshot Presentation that focused on Soundwatch data and *Be Whale Wise* educational messages (Appendix N). In July, The Whale Museum installed a permanent exhibit featuring *Be Whale Wise*, Federal and State regulations for killer whales and vessel effects on killer whales that has been viewed by approximately 19,000 museum visitors and education program participants (number of visitors approximated from mid-July through December 2016) (Appendix F). In addition, materials were given to approximately 3,000 Whale Museum members and whale adopters through The Whale Museum's Orca Adoption Program. Soundwatch stewardship trainings were conducted for new and returning volunteers and interns, numerous public presentations were given and six trainings were held for San Juan Island commercial kayak guides as part of the Soundwatch KELP kayaker education program. Through the additional outreach mentioned above, the Soundwatch program potentially reached approximately 20,000 people off the water (not including the education at Lime Kiln Point State Park and the marine naturalist at the Land Bank West Side Preserve).

The Soundwatch Kayak Education and Leadership Program (KELP) targets outreach to recreational and commercial kayakers that now includes all other human-powered vessels such as paddle boards and canoes. In 2010, Soundwatch was contracted by San Juan County Parks to assist with planning and implementation of a new seasonal vessel launch permit, a Kayak Vessel Code of Conduct education program and to collect data on kayaker use trends at the San Juan Island County Park. In 2011, the San Juan County Park administered the permit system, implemented the outreach program and a self-reporting data collection system designed by Soundwatch based on KELP (Appendices E, F & G). From 2013 - 2016, the Soundwatch KELP program provided kayak guide training and the County Park provided a narrated slideshow training for recreational boaters to view before launching. The slideshow was updated in 2016 to review more of the *Be Whale Wise* guidelines and State/Federal Laws. Data collection on vessels launching from the park was done through a boater self-reporting system and is administered by the San Jan County Park staff. A survey was sent out by San Juan County Park and The Whale Museum in 2015 at the end of the season for completion by all guides and companies to help improve and update the self-reporting system at the San Juan County Park and the KELP training presentation and material. Based on the survey results, in 2016, Kayak ID badges were suggested and implemented, guides were required to wear a KELP educated sticker, the required dates for recreational and commercial kayakers to be KELP trained was increased to mid-May through the end of September, covering an additional 6 weeks of the summer season. The kayak education material was updated and reprinted for all

commercial guides and any recreational kayakers launching at San Juan County Park (Appendix C, C2 and D, D2). The newly updated 2016 Be Whale Wise brochures were also distributed at San Juan County Park for recreational boaters.

In 2016, Soundwatch was not contracted to continue shore-based monitoring of commercial and recreational kayakers on the west side of San Juan Island. Due to the increase in commercial whale watching and based on the kayaker use trends from San Juan County Parks, a summary of the commercial kayak vessels launched and total commercial guests were computed by month to document the increase in kayak traffic. Since 2011, there has been a 43% increase in the number of commercial kayakers launching from San Juan County Park and a 42% increase in the number of guests with commercial companies (Figure 13). Since 2004, there has been a 62% increase in the total number of kayakers launching with commercial companies (Figure 14). The main kayak trip route for the commercial companies is from San Juan County Park to Deadman's Bay on the west side of San Juan Island (a 6 mile long round trip). In one day, there were 153 kayaks within this 6 mile zone. This increases the congestion in killer whale critical habitat and increases the potential for disturbing the killer whales and other marine wildlife in area. While there is a kayak education program in place for all recreational and commercial kayakers, there has also been a steady increase in kayak incidents observed. Further education, enforcement and safety requirements are greatly needed as forms of prevention in a growing industry.

Figure 13: Commercial Kayakers and Vessels launched from San Juan County Park, WA, 2011 - 2016.

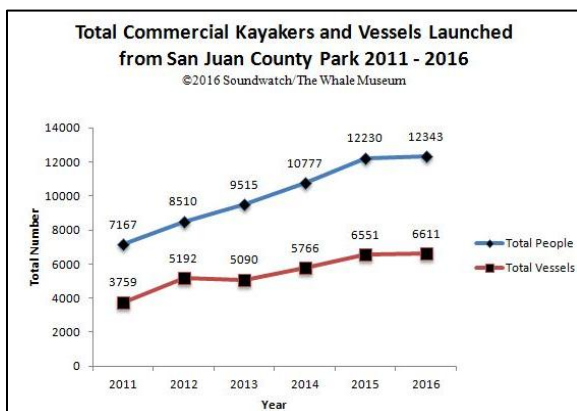
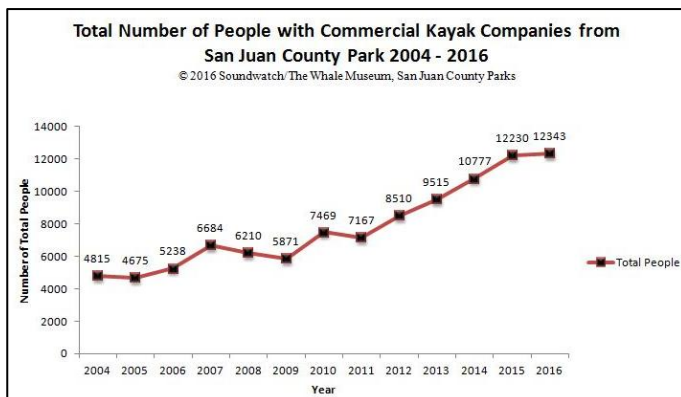


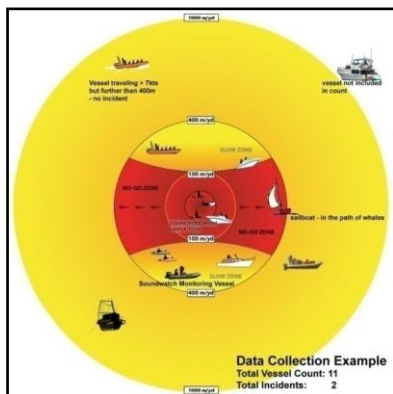
Figure 14: Commercial kayakers launching from San Juan County Park, WA, 2004 - 2016.



Vessel Monitoring

Surveys of whales and a count of vessels within one half-mile of whales are collected every half-hour using a *Soundwatch Vessel Count/Whale Survey data sheet* (Appendix J). Soundwatch staff and volunteer crews record whale and vessel data using a set of standardized vessel type and vessel activity definitions as well as whale attributes agreed upon by U.S. and Canadian cetacean researchers (2004 NOAA SRKW workshop) (Appendix K). Vessels within one half-mile (880 yards) of all known whale activity are counted according to type and vessel activity (Figure 15). Range finding tools such as laser range finders, electronic radar and chart plotters as well as high-power binoculars are used to gauge distances. In all cases, Soundwatch staff are instructed to make conservative estimates when determining distances. The area of known whale activity is variable and not limited to a half-mile, but rather represents the core of individual whales or groups of whales in the immediate area and can range up to one mile. Often the whales are more spread out than one mile. When visibility and conditions are good, a secondary count is made for the group of vessels and whales beyond one mile that the Soundwatch staff can reliably record beyond the primary count, but that the Soundwatch vessel is not with. A count confidence level is determined by choosing it to be an ‘A count’ (highest confidence and usually the count the Soundwatch vessel is in) and a ‘B count’ still reliable enough to count, but with less confidence and usually the count that the Soundwatch vessel is not in.

Figure 15: Soundwatch Vessel Patrol Count and Vessel Incident Data Collection Diagram Example.
(Figure illustration courtesy of Doug Sandilands / Straitwatch Program, B.C.)



Each observed vessel within the count range is categorized according to a vessel type and a specific best-fit vessel activity to describe what the vessel was engaged in (Appendix L). Vessel activity categories include *transiting* (moving through the area within one half mile); *whale oriented* (moving or stationary whale watching); *fishing* (moving or stationary with poles or nets in the water); *research* (engaged in any type of research, including cetology); *enforcement* (enforcement vessel in pursuit or engaged with a vessel at the time of the count); *acoustic* (outside of the count range one half mile, but in acoustic/visual range); or *other* (which must be described, such as a rescued vessel in tow, etc.).

Soundwatch vessel monitoring is conducted continuously by rigorously trained driver/educators to determine vessel activities around whales including commercial and private vessel compliance to the regulations and voluntary guidelines. Trained Soundwatch interns and/or volunteers record observations dictated by the Soundwatch driver/educator. Soundwatch driver/educators are paid staff and undergo substantial training to ensure uniform data collection protocols and minimize inter-observer bias. Descriptions of guidelines and regulations, along with the incident codes used to record incidents of regulation and guideline violations can be found in Appendices H & H1. Incidents are recorded opportunistically as they are observed using a

Vessel Incident datasheet (Appendix I). Soundwatch staff are conservative in recording incidents. If there is any doubt about an incident having occurred, it is not recorded.

Soundwatch Vessel Count Trends

Plotting annual locations of Soundwatch vessel counts can be used as an overall indicator of Soundwatch effort and can be compared to annual and long term Southern Resident Killer Whale Habitat Use Maps generated by The Whale Museum's annual Orca Master Program and presented in annual NOAA Contract Reports (Appendix O). Comparing annual SRKW sightings data with Soundwatch vessel monitoring effort confirms that the Soundwatch program targets effort where the majority of SRKW sightings occur and where the largest concentrations of vessels and whales are likely to overlap (Figures 16 – 18).

There are obvious trends of overlap in whale habitat use and boating activities within a half mile of the whales, including whale watching, fishing, transiting as well as acoustic influence from large vessels transiting greater than a half mile from whales. The majority of vessel counts by Soundwatch in 2016, as in previous years, tended to be within a half mile near-shore along the west side of San Juan Island (Zone 1- Mitchell Point to Eagle Point), outside of a half mile along the west side of San Juan Island and north into Haro Strait (Zones 2, 3 and 5) (Figure 17). The areas observed by Soundwatch with the highest density of vessels within a half mile of the whales occurred in the same areas described above. These areas are also the areas frequently used by SRKWs (Figure 19). However, observationally, Soundwatch observed smaller groups of Southern Resident killer whales in 2016 that were much more spread out than previous years. This made it difficult to monitor and educate recreational boaters. A concerted effort was made to move to the different groups of whales throughout each day to reach as many boaters as possible. As an example, in one day, the Southern Residents were spread from the mouth of the Fraser River, north of Vancouver B.C. to Eagle Point, the southwest end of San Juan Island, Washington (Figure 4, 16 - 19). A comparison of density maps shows that the overall density of boats was very similar from 2012 – 2013 and 2015. In 2014, the density maps portray fewer boats and more spread out, similar to what we observed in 2016 (Figure 18). The density of vessels in 2016 was very spread out with far fewer vessels observed in Zone 1 than previous years (Figure 19).

Figure 16: 2016 Soundwatch 695 Vessel Counts by Location Map.

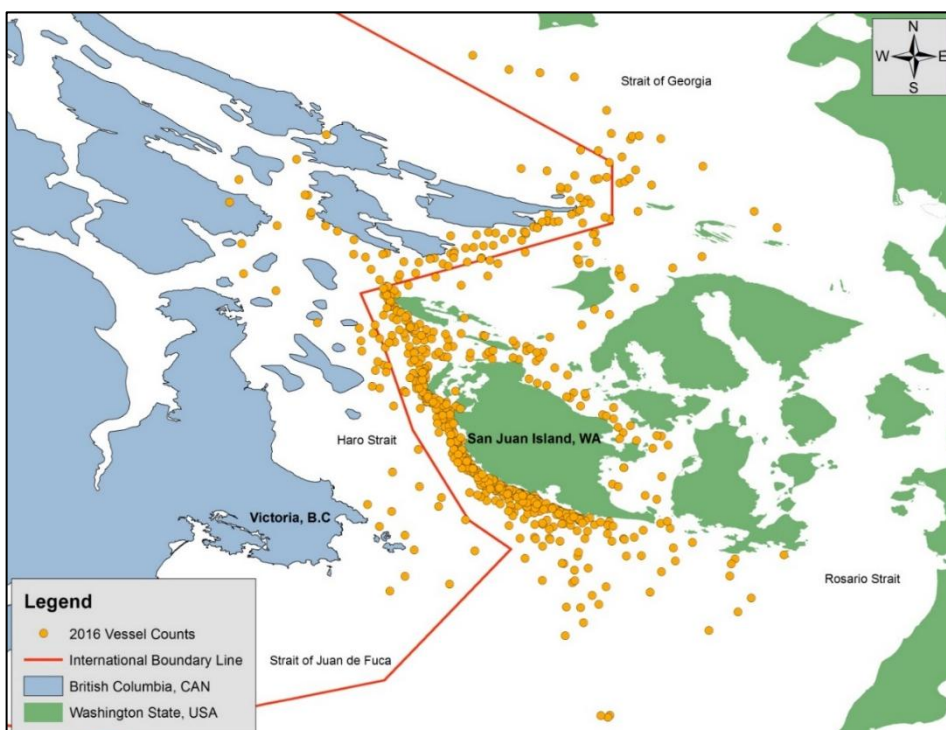


Figure 17: 2016 Soundwatch All 695 Vessel Counts by Numbered Zone Map. (Zones are labeled in black, vessel counts are labeled in square boxes.)

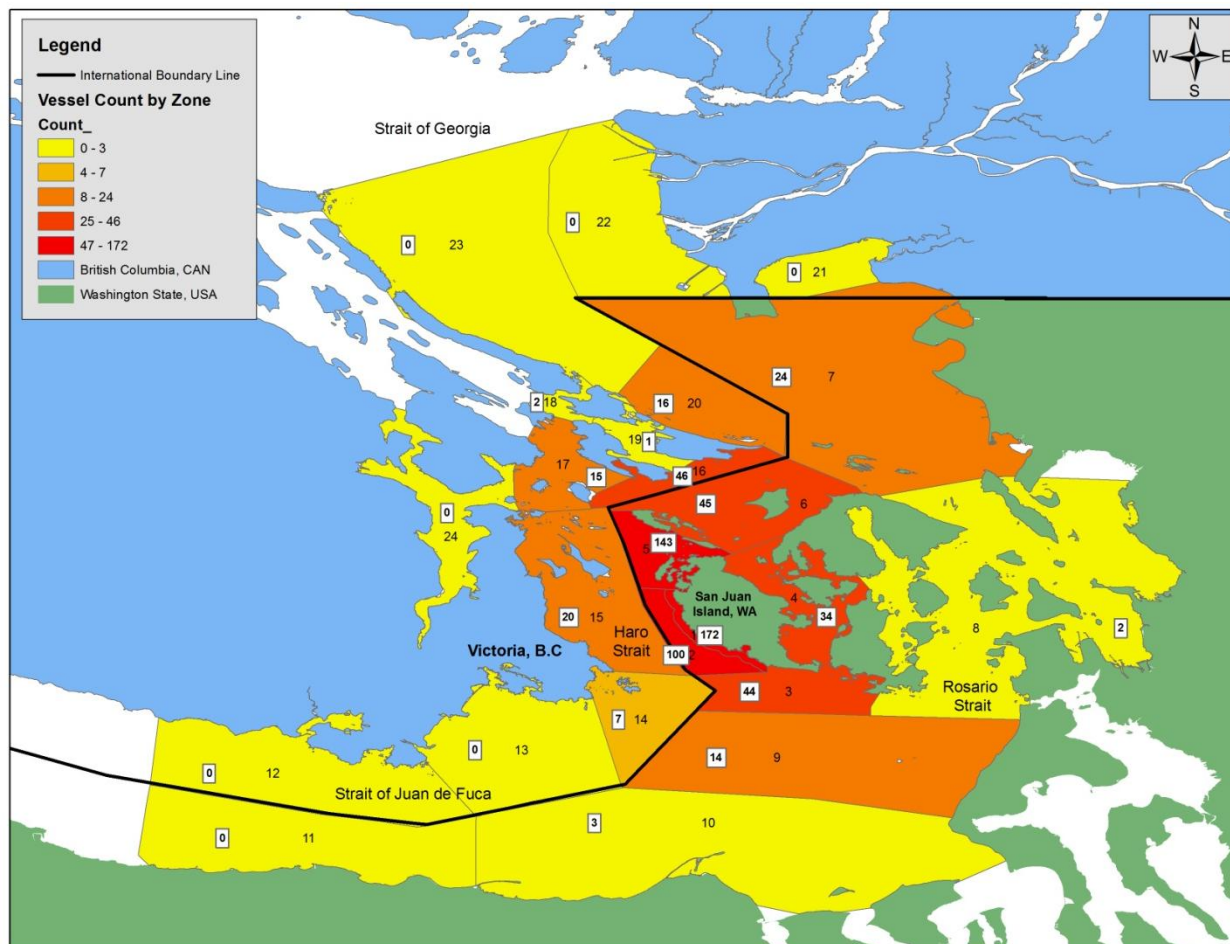


Figure 18: Soundwatch Density Maps 2012 - 2015

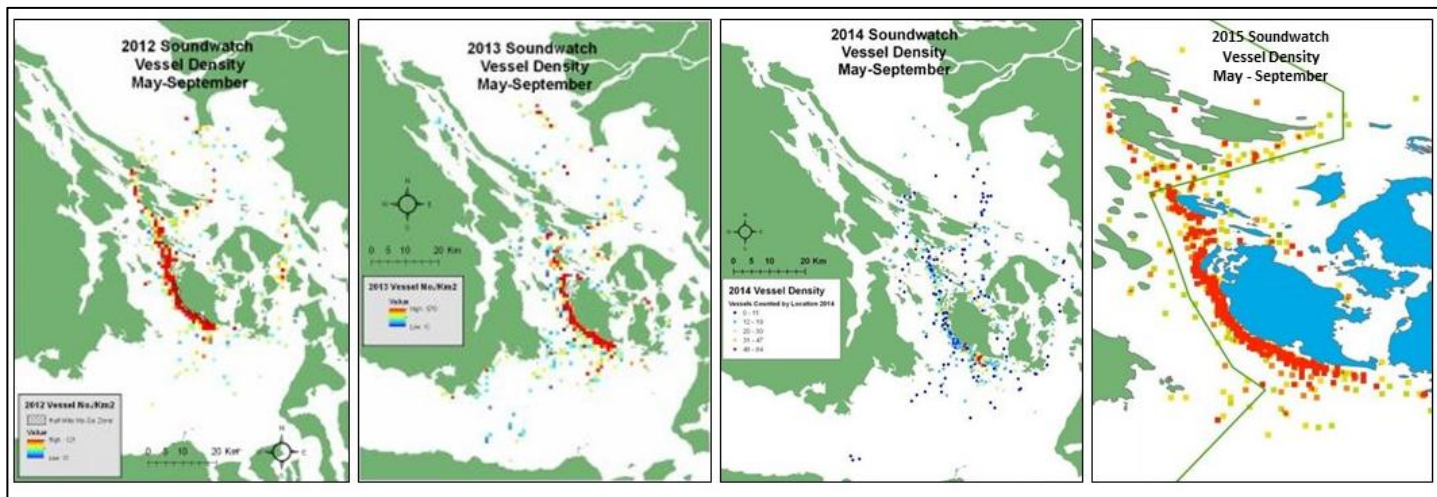
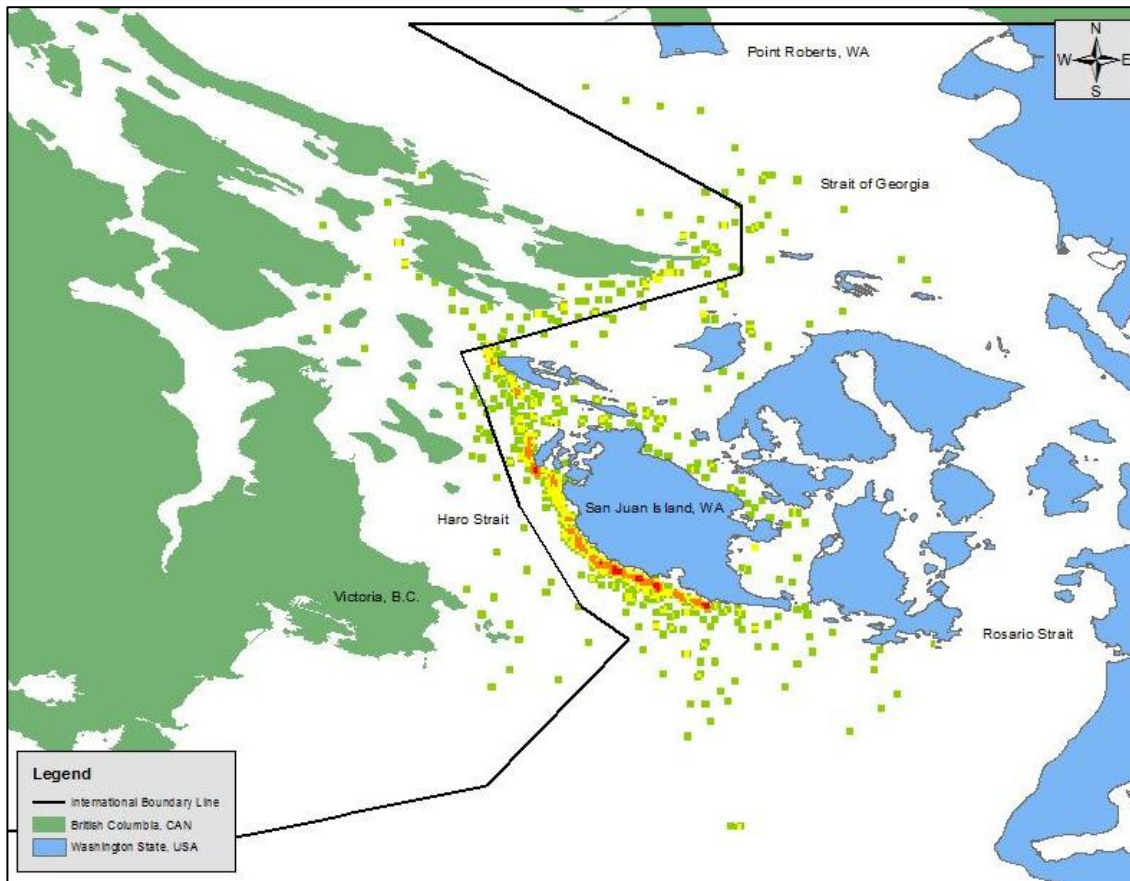


Figure 19: 2016 Soundwatch Vessel Density Map



Section II: Patterns of Vessel Activities around Whales

Southern Resident killer whales have been the primary viewing target for both commercial and recreational boaters and have had an annual and monthly average of nearly 16.5 vessels of various types within a half-mile of their location from May through September between the hours of 9 a.m. and 6 p.m., from 1998-2016, as observed by Soundwatch. In addition, there is a bi-modal vessel peak trend around 11a.m and 3p.m. evident again in the 2016 data (Figures 20-22) which reflects morning and afternoon commercial whale watching trips which often attract even larger numbers of recreational vessels during this same period. In 2016, during May-September, the average number of boats observed within a half mile of whales was 13. The annual average has decreased this year in comparison to an increase in the previous three years. 2011, did have a similar average of 12 vessels within a half mile of whales, this lower average was observed after a few years of a decreasing average (Figures 23-25). The recent increase in average vessel numbers from 2013 - 2015 is consistent with local marina numbers (as reported to the San Juan County Marine Resources Committee [MRC] by Roche Harbor and the Port of Friday Harbor on San Juan Island at various MRC committee meeting presentations) which have had consistently high vessel use during this same 5-year period, even during years of severe economic depression. For 2016, the Port of Friday Harbor reports 1,000 boat nights fewer than 2015. Roche Harbor Marina however is consistent with 2015 or slightly above in boat nights from recreational vessels; however, the increase at Roche does not cancel out the large decrease at the Port of Friday Harbor. The decrease in recreational vessels does not match the increase of recorded growth of U.S. and Canadian commercial whale watch industry vessels (Figure 7). Possible explanations for the low vessel count averages

may be due to the reduced overall number of days of SRKW sightings observed in inland waters during the past several years (Orca Master & Robert Otis, The Whale Museum). During those low sightings years, SRKW also spent fewer days travelling together in large groups and were more likely to be in multiple smaller groups in distinct areas (i.e., part of J pod observed along the south side of San Juan Island and another part of J pod near the Fraser River area) thereby spreading out the number of commercial whale watch vessels and the recreational vessels that they attract. Also, potentially confounding the average annual count, is that SRKWs have spent more time in spread-out groups than in tight groups when travelling; this too spreads out the overall number of vessels beyond half mile (Soundwatch unpublished data). Presumably SRKW sightings are lowest during low salmon return years (as seen in 2013). In years of low salmon returns, the number of opportunities for recreational fishermen are fewer and may be reflected in overall reduced numbers of fishing vessels that overlap with presence of SRKWs and thereby reducing the annual total vessel averages. Another trend is that while overall SRKW sightings have been low, increased numbers of Transient killer whales, Minke whales, Humpback whales, Fin whales, Pacific white-sided dolphins, Common dolphins, Steller sea lions and sea otters have frequented the inland waters also drawing more public interest, in a wider variety of areas. If SRKW sightings in inland waters return to more normal trends (The Whale Museum's Orca Master), it's probable that the annual average number of vessels traveling will potentially increase more. A new analysis focusing on annual whale sightings and vessel trends would provide further explanations.

The 2016 annual maximum number of vessels observed with whales was 71 total boats, which is slightly lower than the maximum from 2014 and 2015 but is still much higher from the maximum recorded in years prior to 2014 and is closer to the normal range of the past 18 years (Figure 23 - 25). There is annual and monthly variability in the maximum and average number of boats in proximity with whales (Figures 26-30) with the maximum number of commercial whale watch vessels being 26, private vessels being 26, both recorded in July. The maximum number of recreational vessels is a decrease of over 40 vessels since 2015. The maximum number of kayakers, 53, was also recorded in July was an increase of 14 vessels since 2015 (Figure 27). The 2016 monthly average of commercial whale watch, private vessels and kayakers remained mostly constant throughout the season, with a peak seen in July (Figures 26-30). Annual and monthly maximum vessel totals are often more than double the annual average vessel total, thus neither the average nor maximum number best describes the actual vessel conditions the whales routinely experience. Vessel numbers observed with whales typically decline dramatically in October both because the whales are less predictably in the area and the main commercial and recreational boating season is over. Overall recreational vessel trends have been decreasing since 1998, with a peak in 2014 and 2015; however 2016 has similar numbers to 2011-2013 (Figure 31).

It should be noted for interpretation of the data presented, that the average and maximum numbers of vessels depicted in the figures are discrete observations and are therefore not totals of each vessel type. For example, in 2016 the maximum number of all vessel types *recorded* within a half mile of whales was 71 (Figures 26-30), with the maximum of commercial vessels observed at 26, private recreational vessels at 26 and kayakers at 53, which if totaled together would equal 105, well above the recorded maximum number of 71 vessels. However, the maximum numbers of each vessel type were not observed all at the same time, on the same day and are therefore not totals of each other.

Figure 21: Average Number of Vessels Accompanying Orcas by Month, 1998-2016.

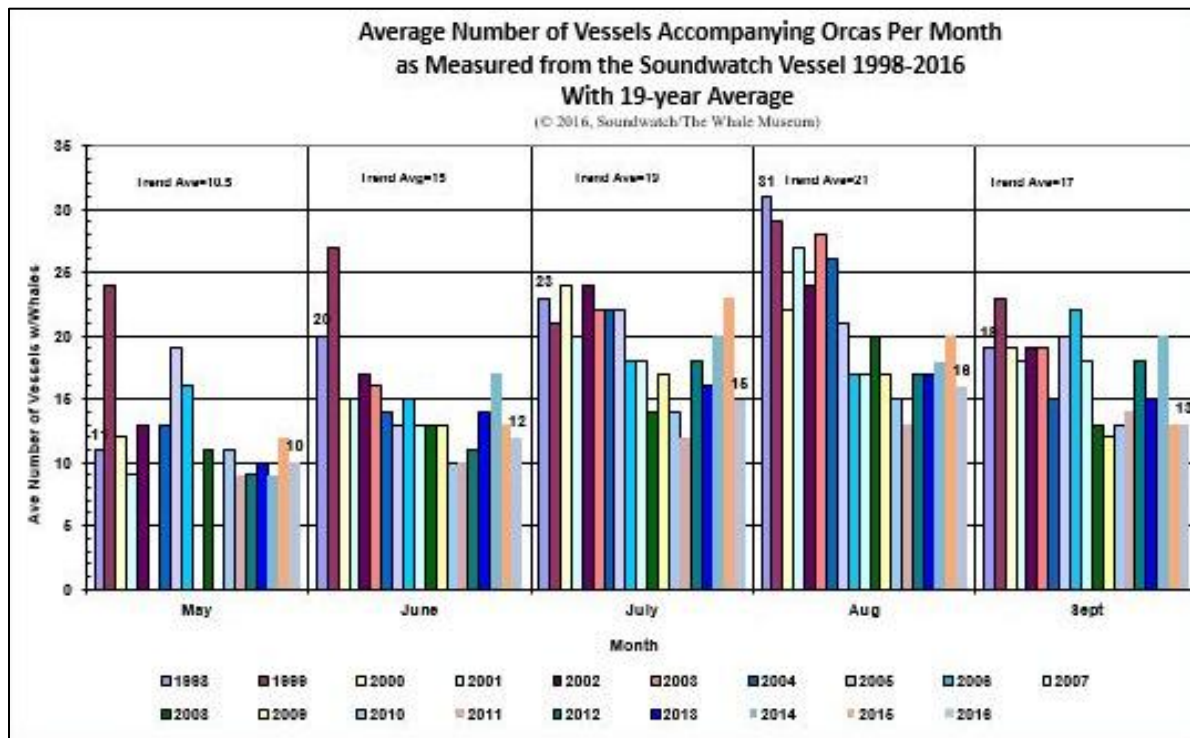


Figure 22: Annual Average Numbers of Vessels with Orcas by Time of Day, 1998-2016.

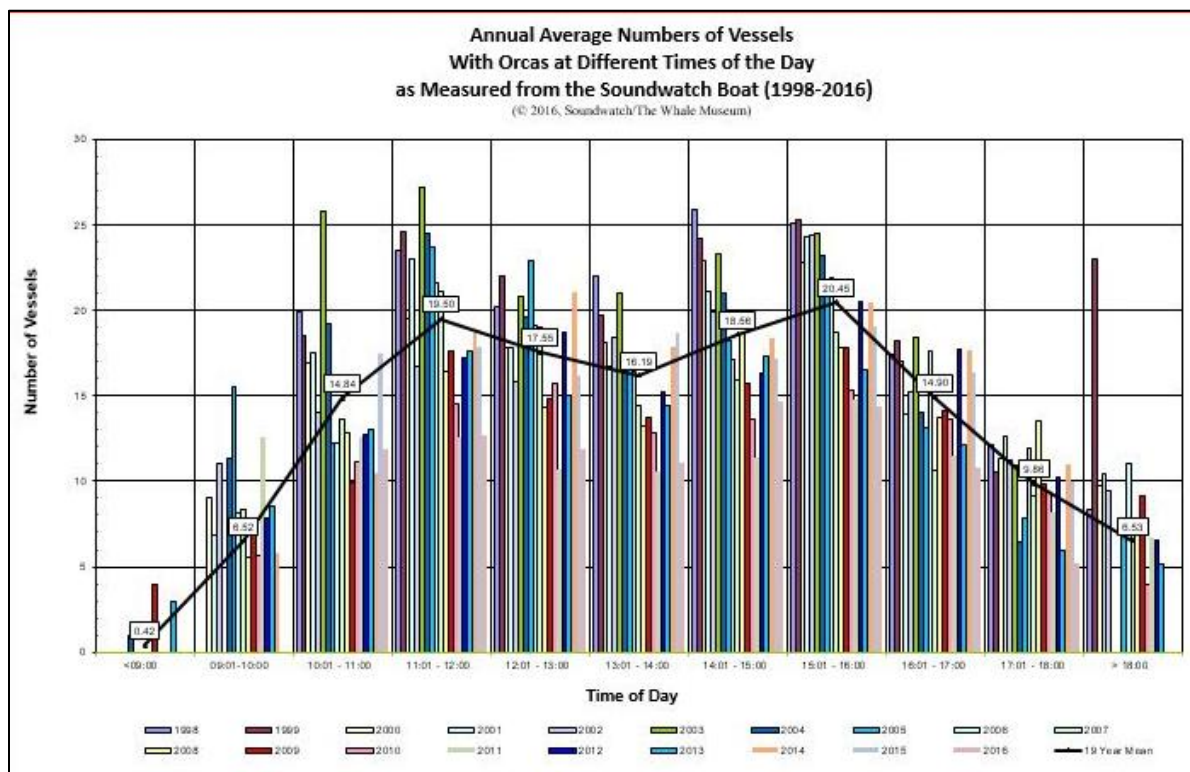


Figure 23: Monthly Number of Vessels with Whales by Time of Day, May-September 2016.

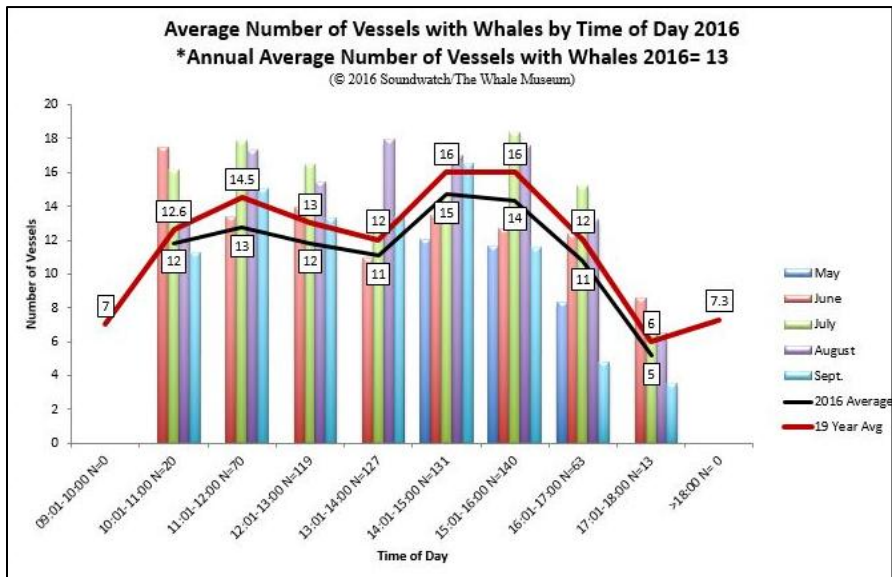


Figure 24: Annual Vessel Type Averages and Maximums Accompanying Orcas in Boundary Waters, May-September, 1998-2016.

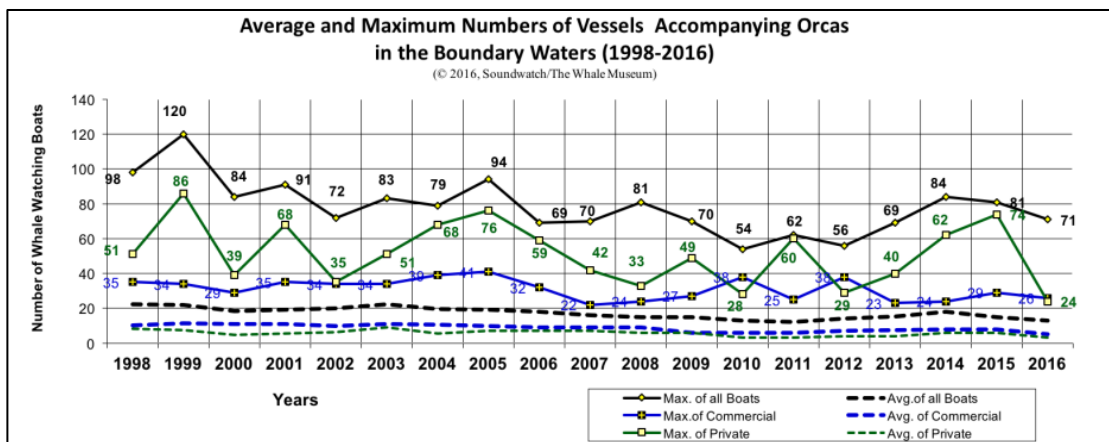


Figure 25: Annual Averages of Vessel Types Accompanying Orcas May-September, 1998-2016.

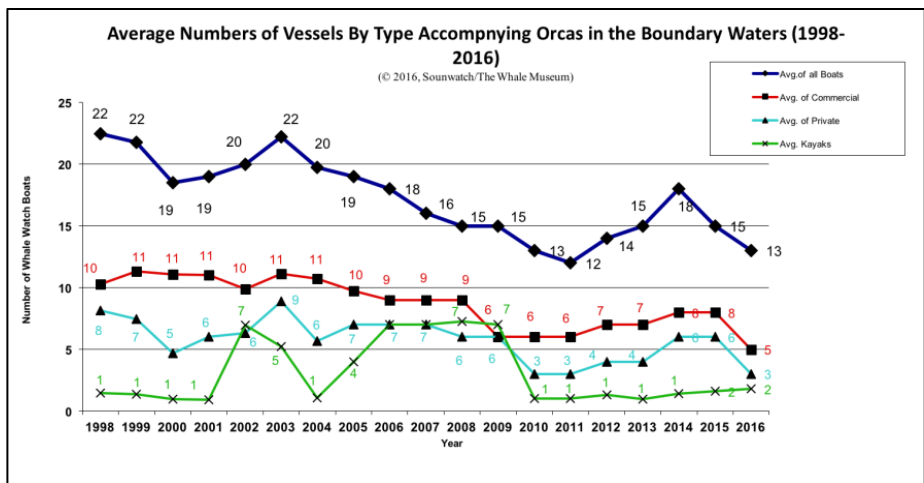


Figure 26: Mean Annual Daily Average of Number of Commercial and Private Boats with Whales in Haro Strait Region May-September 1998-2016 with Standard Deviation.

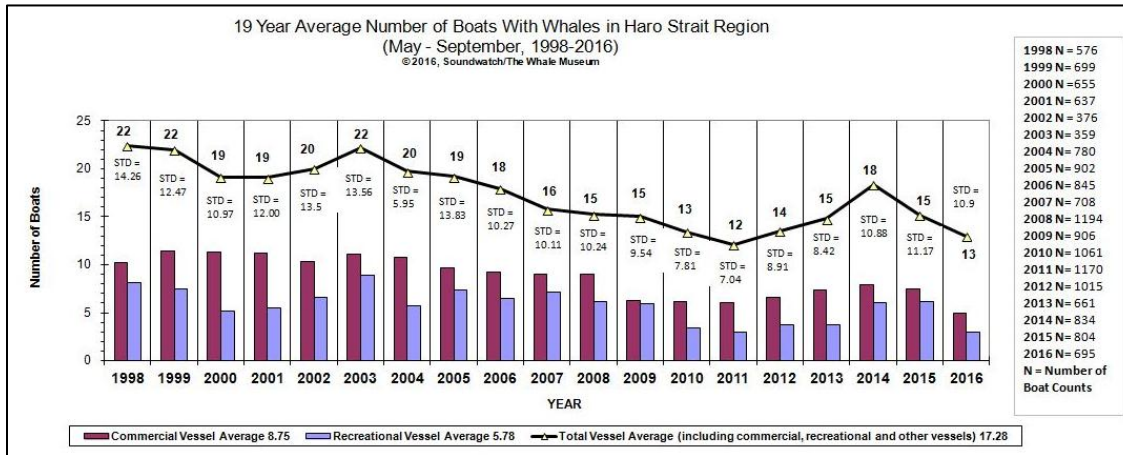


Figure 27: Annual Maximums of Vessel Types Accompanying Orcas May-September, 1998-2016.

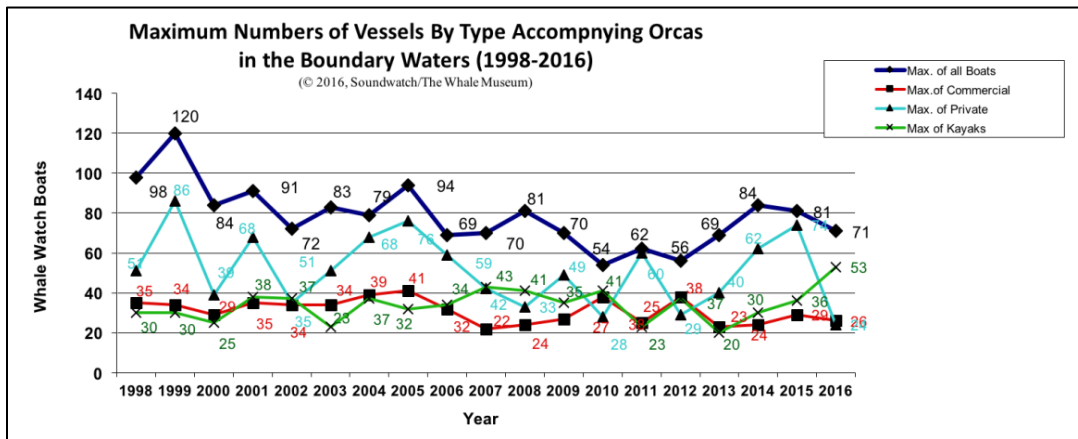


Figure 28: Monthly Average by Type of Vessels with Orcas, May-September 2016.

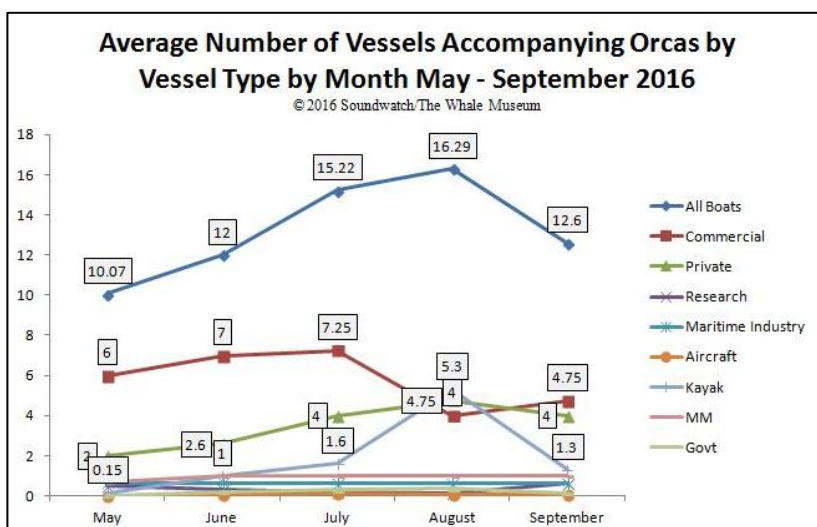


Figure 29: Monthly Maximum by Type of Vessels with Orcas, May-September 2016.

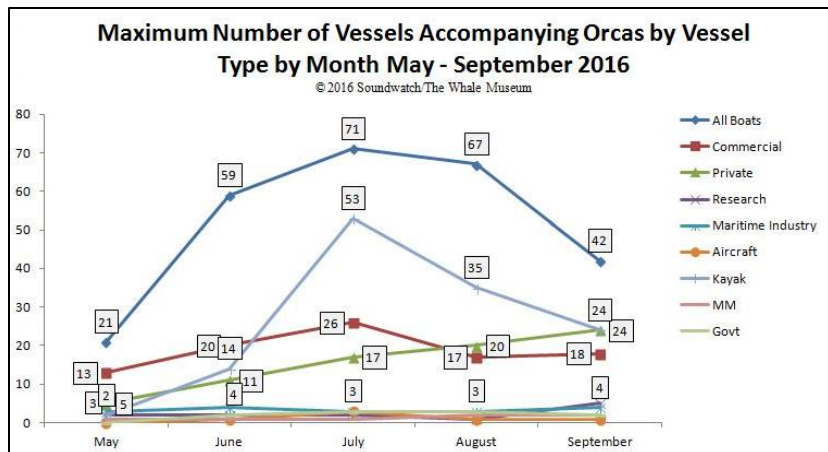


Figure 30: Average Number of Commercial Vessels with Whales by Commercial Vessel Type by Month, 2016.

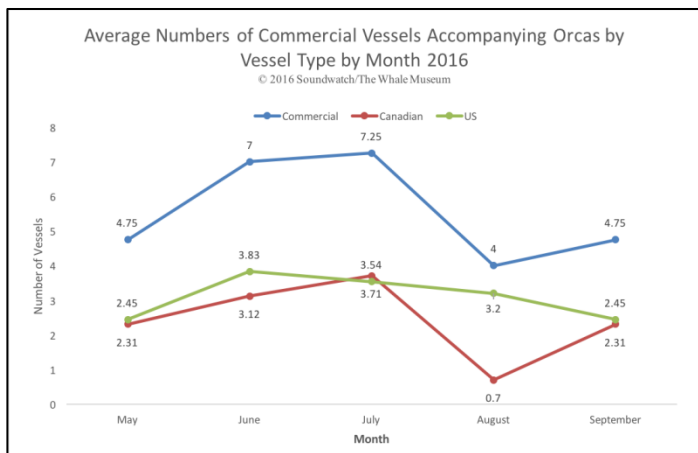


Figure 31: Maximum Number of Commercial Vessels with Whales by Commercial Vessel Type by Month, 2016.

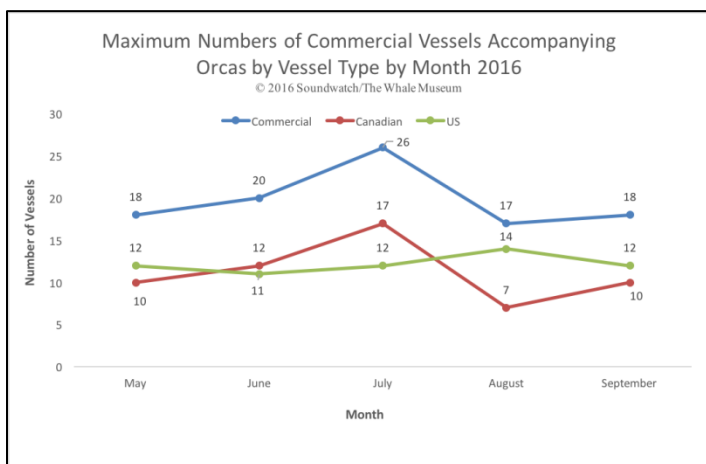
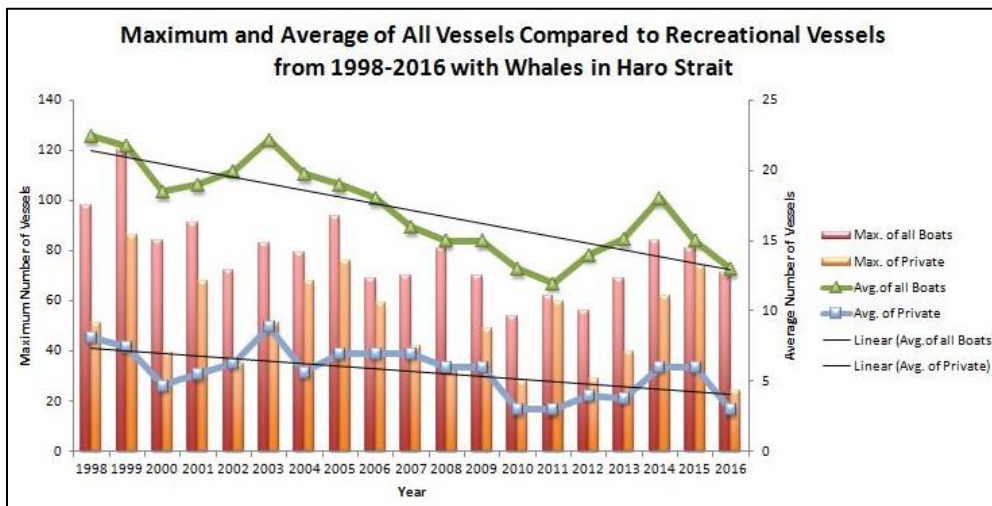


Figure 32: Maximum and Average of Recreational Vessels from 1998 - 2016 with decreasing 19 year trendlines.



There is a great variability in the number and types of vessels with whales (Figures 20-35). This wide variability is a factor not only of month and time of day, but also due to whale locations overlapping with vessels engaged in a variety of activities (Figures 33-34). Of the vessels seen on average with whales in 2016, 47% were commercial whale watch vessels, 28% recreational vessels, 4% marine industry (shipping/cargo and commercial fishing), 7% monitoring vessels (Soundwatch), 9% kayaks, <2% research vessels, <1% airplanes, 2% government (enforcement and military). These numbers are similar to previous years. Throughout the season, the majority (68%) of vessels observed within a half mile of whales, were engaged in whale-oriented activities (Figure 34). Other vessel activities recorded within a half mile of whales included transiting at 20% and recreational and commercial fishing activities at 5%. Fishing activities (Soundwatch recorded only recreational fishing in 2016) increased in July and August, raising the average and maximum number of vessels recorded as engaged in fishing to similar numbers of the average and maximum numbers of commercial and recreational whale-oriented activities near whales (Figures 33 and 34). Soundwatch records large maritime industry vessels such as marine cargo ships, tugs with tows, cruise ships, etc., that are outside of a half mile of whales but are within known acoustic range of whales. If one of these large ships is within a half mile of whales, it is recorded as transiting. In 2016, 4% of vessels recorded with whales were large ships within acoustic range of whales, slightly lower than 2015. However, there was a commercial cargo company that was grounded for financial reasons during the late summer months, potentially causing the decrease in acoustic vessels observed (Figures 33-36).

Figure 33: Distribution of Vessels by Vessel Type When Whales Present May-September 2016.

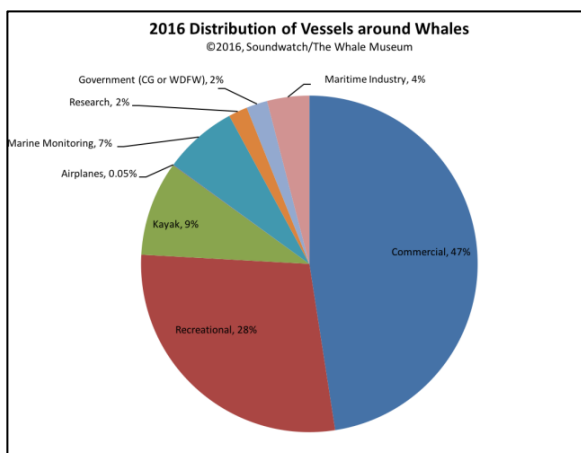


Figure 34: Distribution of Vessels by Vessel Activity When Whales Present May-September 2016.

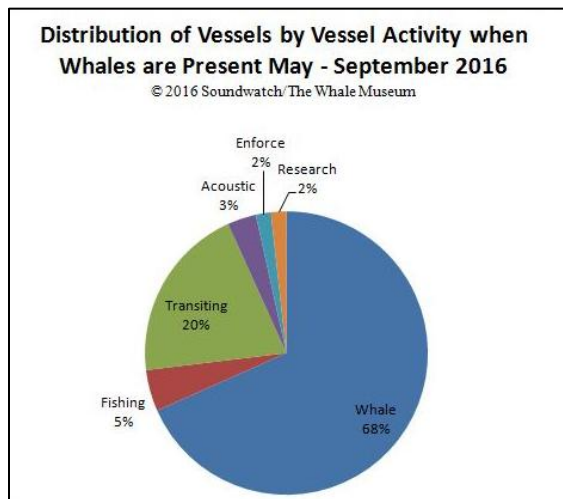


Figure 35: 2016 Monthly Average Numbers of Vessels with Whales by Vessel Activity.

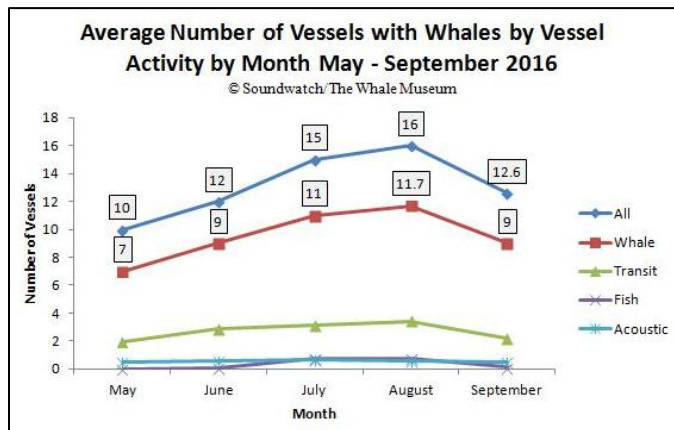
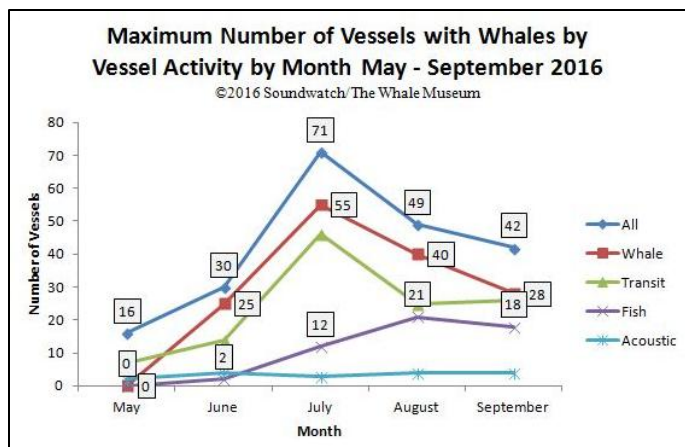


Figure 36: 2016 Monthly Maximum Numbers of Vessels with Whales by Vessel Activity.



Section III: Compliance with Regulations and Guidelines

Soundwatch *Vessel incident* data can be utilized to characterize types of vessels, types of vessel incidents and area locations where vessel incidents are most commonly observed. The incident data can be used to generate future strategies for commercial and recreational whale watching and targeted outreach efforts. With U.S. Federal and Washington State vessel regulations being established in 2011, current and long-term Soundwatch vessel incident trend observations lay the foundation for evaluating the effectiveness of the vessel regulations and regional *Be Whale Wise* guidelines.

Soundwatch monitors commercial whale watch operators, recreational boaters and other vessel operators and records behaviors that are inconsistent with current best practice guidelines and/or vessel regulations as a *vessel incident*. Using a set of incident definitions and incident recording protocols agreed upon previously with commercial whale watch operators, marine mammal management agencies and partner monitoring groups (Straitwatch out of Victoria, B.C.), perceived contradictions of correct vessel operations around whales are recorded as *vessel incidents*. A *vessel incident* is specifically defined as a driver of a commercial whale watch vessel, private boat operator, kayaker or other vessel operating contrary to current voluntary *Be Whale Wise Guidelines*, the *Kayakers Code of Conduct*, the San Juan Marine Stewardship Area (including close proximity to National Wildlife Refuges, Voluntary No-Go Zones, etc.), the PWWA Commercial Whale Watch Guidelines and/or federal and state vessel regulations. Only trained Soundwatch staff driver/educators make the determination of an observation of a potential *vessel incident*.

A set of standardized *incident descriptions* was established in 2007 and updated in 2011 to include new vessel regulations (Appendices H & H1). This standardized set of definitions is used by the U.S. and Canadian federal governments as well as the respective monitoring programs, Straitwatch of British Columbia (funding dependent), Canada and Soundwatch of Washington State. In the same fashion that the vessel type and vessel activity categories for the vessel counts were designed to be multi-tiered, the vessel incident categories are tiered broad to specific and are recorded as vessel incidents at a fine scale. For analysis, they are sometimes lumped into the broad incident categories, but also can be looked at more closely to better understand the incident type. Some older terms (i.e., common term: commercial whale watch; newer term: ecotour) are used in this report when discussing vessel types and vessel incidents because they are more commonly used outside of the monitoring and enforcement programs.

Since 2012, the Soundwatch program has not provided *summary* incident feedback reports to member companies of the Pacific Whale Watch Association (PWWA) as was done from 1996-2011. Instead, this annual program report is provided to the PWWA executive committee and regional enforcement agencies (NOAA, Washington State Fish and Wildlife and the Department of Fisheries and Oceans Canada) and is posted for the public on The Whale Museum's website www.whalemuseum.org. In previous years (1996-2010), Soundwatch also provided incident feedback reports (weekly, monthly and annual vessel incident summaries) detailing Soundwatch-observed, vessel identified, commercial company vessel incident information to the whale watch industry and a generic (no vessel identification, vessel type included) summary to the regional law enforcement agencies. Changes were made to the Soundwatch feedback reporting process in 2011 based in part on feedback from the whale watch industry's concerns about how this potentially sensitive information may be now used in a legal context relating to new vessel regulations (previously they were guidelines) and from concern expressed by the NOAA Northwest Regional Director that Soundwatch not take on the role of law enforcement. Consequently, beginning in 2011, Soundwatch incorporated new data collection protocols to not record specific vessel identification for any vessel (commercial or private) and reduced feedback reports to the annual program reports depicting overall vessel and whale watching trends. The PWWA has since organized an internal compliance liaison for PWWA members to report industry violations to or to express any concerns regarding driving around marine wildlife.

In 2016, the PWWA invited Soundwatch staff to present annual Soundwatch observed vessel trends to PWWA members at their Spring Symposium and attend the PWWA U.S. driver meeting held at the beginning of the season. The PWWA members discussed internally the Soundwatch vessel trends.

Vessel Incident Trends

Soundwatch uses summary statistics to analyze annual vessel incident data. Since its inception in 1993, Soundwatch has used an adaptive management approach (i.e., changing guidelines annually to meet changing vessel/whale conditions) and there have been many shifts in the types and numbers of vessel incident categories over the years (Table 2). This makes comparing overall vessel incident numbers from year to year somewhat difficult. In 2011 there was one new incident category added to reflect the new U.S. Federal vessel regulations: *vessel within 100-200 yards of whales* (the second part of the new 2011 regulation, *stopped 200-400 yards in the path* was captured in a previous guideline “parked in the path” incident category). However, with the addition of this one new incident category, it is now possible to record a single vessel as having 2 simultaneous incidents when the vessel is observed within 100-yards of a whale: 1- *within 100 yards* and 2- *within 200 yards*. In previous years, an observation of this same vessel behavior would have been recorded as one single vessel incident. Thus, while annual Soundwatch vessel incident summaries are useful tools to evaluate vessel trends, especially with the implementation of new vessel regulations, some diligence is needed to accurately interpret the year to year changes.

To further complicate matters, it is difficult to measure the true effectiveness of guidelines and new regulatory measures when they are not consistent on both sides of the U.S./Canadian border (which the whales and vessels frequently travel back and forth across, sometimes straddling the border so that different regulations apply to vessels depending on which side of the whales your vessel is on) - guidelines and regulations are not consistent for other regularly viewed cetacean species and there is not consistent law enforcement and monitoring presence in Canada. The U.S. Washington State Fish and Wildlife did increase the number of days they were on scene with the killer whales and a noticeable difference in incidents was observed (Figure 61). For the 2016 season, the Straitwatch Monitoring Program was funded to be on the water in July. Their season began in August and went through September 20, 2016. A concerted effort was made to monitor different groups of whales in the region to increase the potential for contacting recreational boaters.

Figure 37: 2016 Soundwatch All 1,847 Observed Vessel Incidents by Incident Location Map.

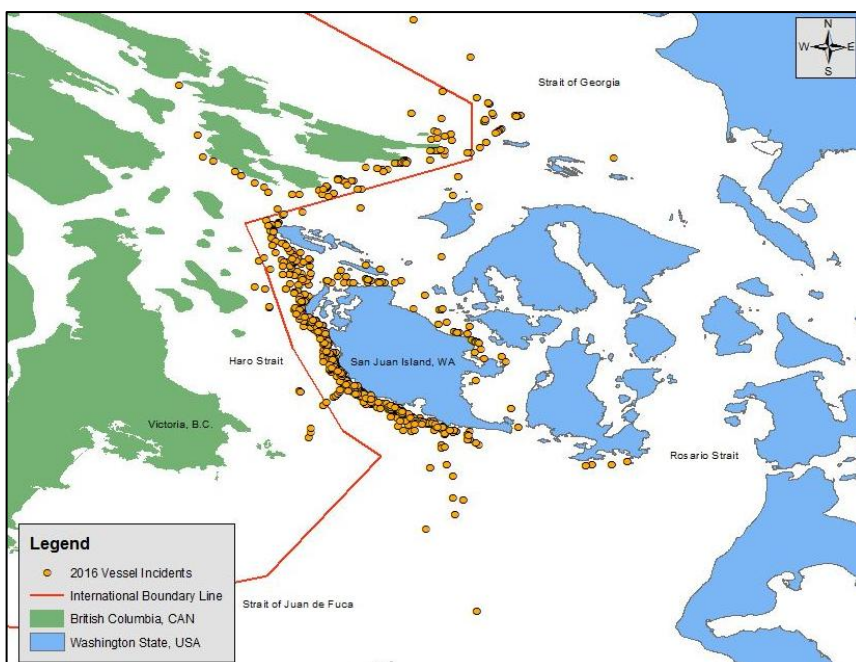
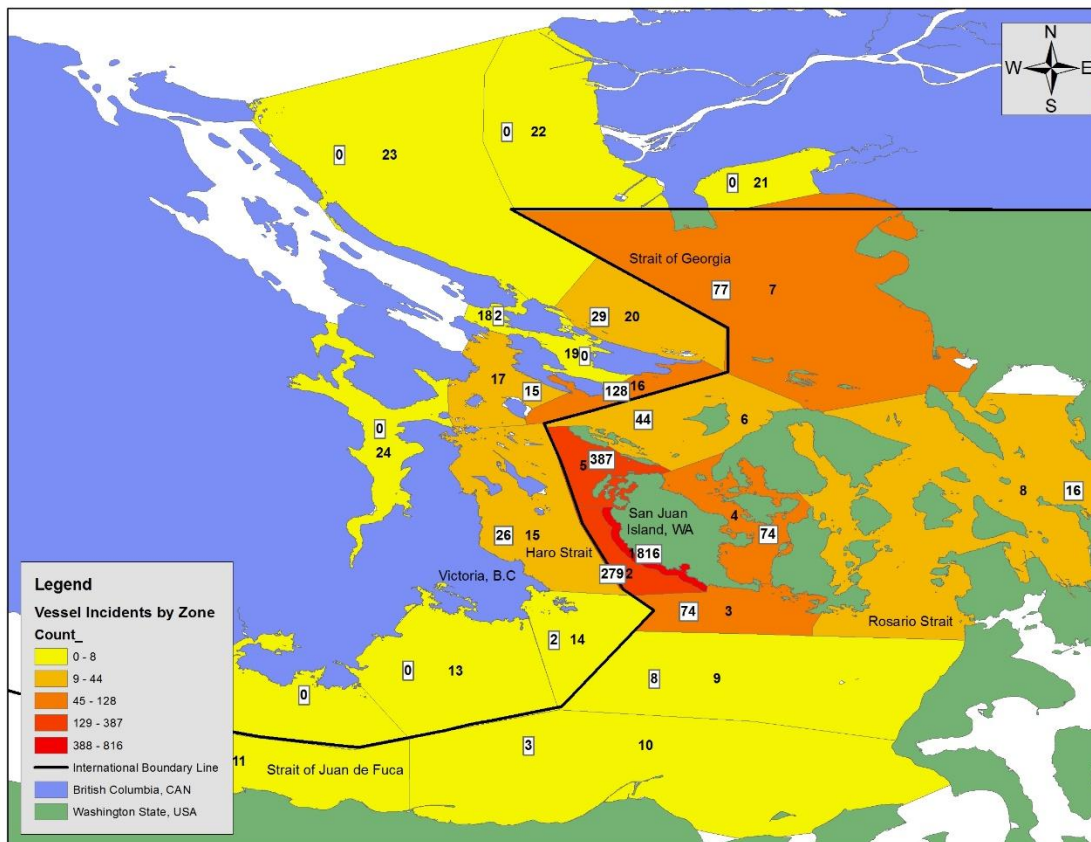


Figure 38: 2016 Soundwatch All Observed Vessel Incident Numbers by Zone Map.



There are obvious overlapping trends of whale use and boating activities within a half mile of whales including whale watching, fishing and transiting. As in previous years, the areas with the most vessel incidents observed by Soundwatch in 2016, tended to be within a half mile near shore along the west side of San Juan Island (Zone 1- the 2009 NOAA proposed vessel restriction area) and outside of a half mile along the west side of San Juan Island and North and South into Haro Strait and (Zones 2, 3 and 5) (Figure 38 - 40). Not surprisingly, the areas with the highest vessel densities also tend to have the highest density of vessel incidents (Figure 39). However, some areas that are less frequented by the whales and have overall less vessel density, do occasionally have high numbers of vessel incidents (Figure 39). These incidents may occur due to poor knowledge of expected whale behavior from vessel operators who may not be familiar with driving around whales or because the whales are in vessel travel corridors with occasionally high vessel densities or perhaps because these areas have less public observation of whale watching boats and vessel operators behave differently when they perceive they are not being observed.

Soundwatch intern Sarah Hyde completed a Hot Spot Analysis on all incidents from 2011 – 2015 looking at high vessel count areas, high incident areas and areas where the whales were documented as having foraging/milling behavior. The analysis looked at all critical areas (greater than 75th percentile) and a Fishnet polygon was applied in ArcGIS to each category. Figures 40 displays the Hot Spot Analysis for vessel counts showing a large concentration around the southwest side of San Juan Island between False Bay and South Beach. Categories were combined and a strong correlation between the Soundwatch Observed Density maps and the Zone maps became apparent (Figure 41). The analysis shows that potentially high probability of vessel incidents occurs on the west side of San Juan Island (Zone 1). This is not new information however it is another way of looking at the data to show where incidents and high traffic areas in critical habitat are occurring.

Figure 39: 2016 Soundwatch Observed Vessel Incident Density per Square Kilometer.

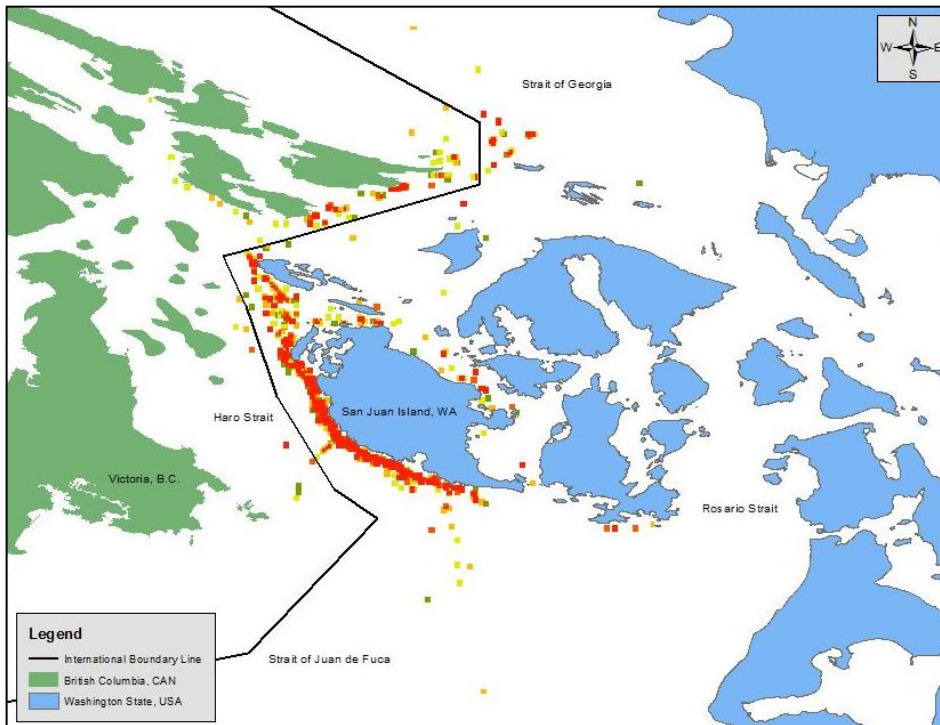


Figure 40: Soundwatch Vessel Incident Hot Spot Analysis Map

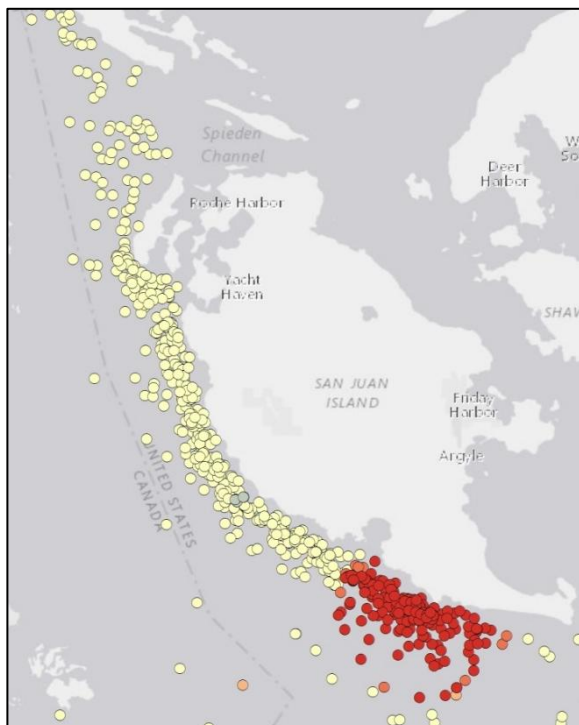
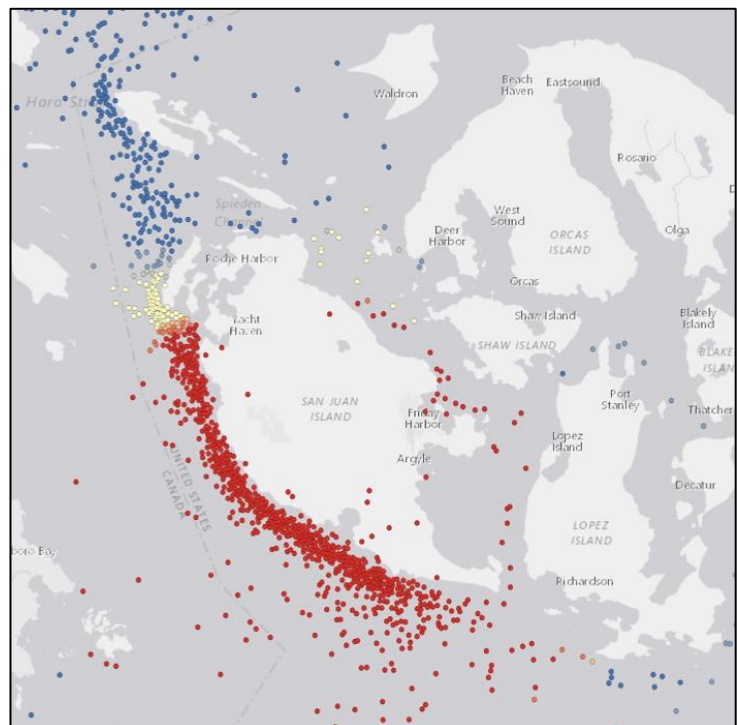


Figure 41: Combination Hot Spot Analysis Map (Foraging/Milling Behavior, Incidents and Recreational Count)

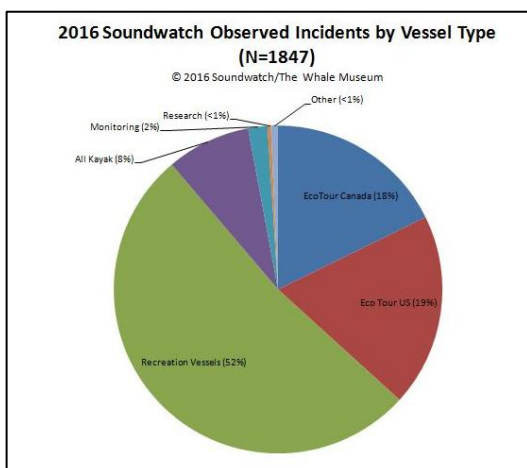


In 2016, there were a total of 1,847 vessel incidents observed and recorded by Soundwatch staff during 452 hours of observation, up from 1,635 vessel incidents observed and recorded during 393 observation hours in 2015 (Figure 42 and 43). The percentage of incident types in 2016 remains consistent with previous years. Overall in 2016, 74% of recorded vessel incidents were potential violations of the U.S. state and federal whale watching regulations. Of this 74%, the overall regulatory category of **Vessels within 200 yards of Whales** accounted for 51% of all incidents (this category includes Vessels Stopped within 0-100 yards 12%; Vessels Stopped within 100-200 yards 15% (combined 27%); Vessels Motoring within 0-100 yards 10%; Vessels Motoring within 100-200 yards 14% (combined 24%)) and the **Vessels in the Path of Whales** regulatory category making up the remaining 23% of the recorded vessel incidents. The third most commonly recorded incident type, **Incorrect Approach** (7%) followed by **Vessels Motoring Fast (>7 knots) within one quarter mile (440 yards) of Whales** at 6%, both Be Whale Wise and PWWA guidelines. **Inshore of Whales** made up 4% of incidents. There was an increase in the number of kayak incidents observed this year with **Kayaks Paddling with Whales (0-200 yards)** making up 6% of the total incidents observed.

Figure 42: 2016 Soundwatch Observed Vessel Incident Percentages.

Soundwatch Observed All Vessel Behaviors Contrary to Guidelines and/or Regulations 1998-2016 (♦ 2016, Soundwatch/The Whale Museum)																			
Behavior Category	Yearly Incident Percentages																		
*Notes Categories Not Used During All Years	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
*Leapfrogging	37%	31%	23%	1%															
Under power within 0-100 yards of whales	6%	4%	5%	4%	5%	12%	9%	10%	12%	15%	12%	13%	12%	8%	4%	10%	9%	7%	9%
*Stopped within 0-100 yards of whales														17%	8%	7%	13%	11%	12%
*Under power within 100-200yards of whales														12%	10%	15%	12%	8%	14%
*Stopped within 100-200yards of whales														18%	15%	6%	14%	13%	15%
Within 440 yards of SJI No-Boat Zone	39%	26%	17%	17%	7%	13%	4%	8%	4%	5%	6%	8%	10%	6%	6%	2%	0%	2%	2%
Within 880 yards of Lime Kiln	2%	2%	2%	1%	2%	5%	1%	2%	1%	3%	1%	3%	4%	1%	2%	1%	1%	2%	<1%
Crossing path of whales	4%	3%	5%	2%	4%	7%	6%	4%	5%	8%	4%	5%	5%	2%	7%	10%	8%	3%	0%
Chasing/pursuing whales	3%	1%	3%	2%	<1%	4%	3%	1%	2%	3%	3%	3%	3%	1%	<1%	<1%	0%	0%	0%
Inshore of whales	5%	29%	24%	25%	19%	16%	22%	18%	17%	16%	21%	24%	17%	13%	10%	10%	9%	9%	4%
Airplane within 1000 feet	4%	2%	4%	7%	14%	6%	6%	4%	6%	8%	8%	6%	4%	3%	<1%	8%	2%	2%	<1%
Within 200 yards of National Wildlife Refuge	0%	1%	3%	1%	2%	2%	1%	0%	<1%	1%	1%	<1%	1%	<1%	1%	<1%	0%	0%	0%
*Other		1%	3%	3%	14%	5%	15%	11%	10%	3%	2%	1%	1%	0%	1%	1%	0%	0%	0%
*Within 220 yards of shore; whales present			4%	4%	2%	<1%	4%	1%	2%	2%	<1%	<1%	1%	1%	2%	1%	0%	0%	<1%
*Repositioning within 100 yards			7%	7%															
*In the Path (formerly Parked in the path of whales)				26%	24%	17%	19%	27%	26%	17%	25%	19%	23%	11%	16%	18%	17%	26%	23%
*Fast within 1/4 mile				3%	4%	9%	10%	11%	16%	11%	13%	13%	6%	8%	9%	8%	11%	6%	
*1st Approach head on, behind, or on shore				4%	2%	1%	<1%	1%	2%	3%	2%	3%	1%	4%	1%	3%	2%	7%	
*Kayaks spread out				<1%	3%	0%	<1%	1%	1%	1%	1%	1%	1%	<1%	2%	1%	1%	2%	<2%
*Kayaks with whales outside 1/4 SJI Zone				<1%	1%	0%	<1%	1%	<1%	1%	1%	1%	1%	<1%	1%	<1%	0%	0%	<1%
*Kayaks paddling w/in 0-100 yds					3%	0%	<1%	1%	<1%	1%	<1%	1%	1%	<1%	1%	<1%	0%	<1%	3%
*Kayaks paddling w/in 100-200 yds														1%	1%	1%	1%	1%	3%
*Kayaks parked on headland															<1%	<1%	0%	0%	
Total %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Total Observed Incidents	398	791	653	533	259	373	761	957	1,281	1,085	1,419	2,572	1,067	2,500	2,621	2,234	2,509	1,635	1,847
Estimated Annual Observation Hours	426hr	510hr	462hr	486hr	378hr	312hr	486hr	564hr	516hr	420hr	540hr	420hr	442hr	573hr	306hr	331hr	425hr	393hr	451hr

Figure 43: 2016 Soundwatch Observed Vessel Incidents Percentages by Vessel Type.



In 2016, recreational (private) vessel operators committed 52% of all incident types (Figures 41-43), followed by Canadian commercial operators with 19% and U.S. commercial operators with 11% of all incidents for a combined commercial vessel incident percentage of 30% of recorded incidents (Figure 41). Kayakers were recorded with 8% of all incidents, along with monitoring (Soundwatch) / research vessels at 2% of all incidents; aircraft were recorded at <1%. In the summer months, especially late August through September, it is not unusual to have commercial & recreational fishing openings in areas that overlap with areas frequented by the whales. However, there were no incidents recorded with commercial fishing vessels due to the season closure for the majority of the season.

Of the broad categories, **Vessels within 200 yards of Whales** incidents (49% of all incidents) is an increase of 11% since 2015. Of the broad categories, the percentage of recreational vessels stopped within 0-100 yards is almost 50% less than 2015 most likely due to the decrease in recreational fishing vessels on the water in 2016. *Vessels Stopped within 0-100 yards* (12%) were made by 27% recreational vessels, 32% Canadian vessels, 31% U.S. vessels and 6% monitoring/research vessels, *Vessels Stopped within 100-200 yards* (15%) were made by 33% recreational vessels, 27% Canadian vessels, 32% U.S. vessels and 3.5% monitoring/research vessels, *Vessels Motoring within 0-100 yards* (9%) were made by 72% recreational vessels, 10% Canadian vessels, 16% U.S. Vessels, 2% monitoring/research vessels, *Vessels Motoring within 100-200 yards* (12.5%) were made by 67% private vessels, 14% Canadian vessels, 4% monitoring/research vessels and 14% U.S. vessels (Figure 53). The **Vessels in the Path of Whales** regulatory category (23% of total incidents) were made by 68% recreational vessels, 21% Canadian vessels, 24% U.S. vessels, <1% monitoring/research vessels and 7% Other (kayak & other human powered craft) and the **Inshore of Whales** incidents (4%) were made by 74% recreational vessels, 14% Canadian vessels, 9% U.S. vessels, 0% monitoring/research vessels and <1% from other vessels (Figure 53).

Figure 44: Soundwatch 1998-2016 All Vessel, All Incident Type Percentages.

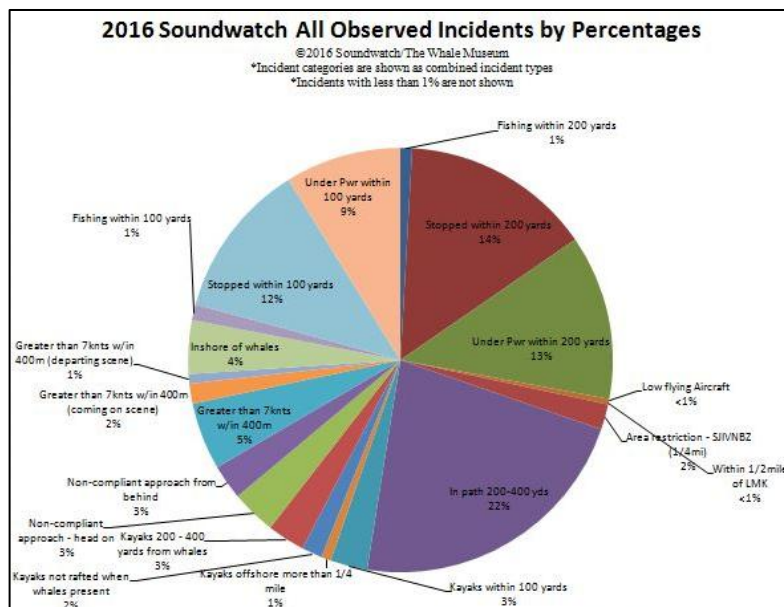


Figure 45: 2016 Soundwatch Observed Top Vessel Incidents.

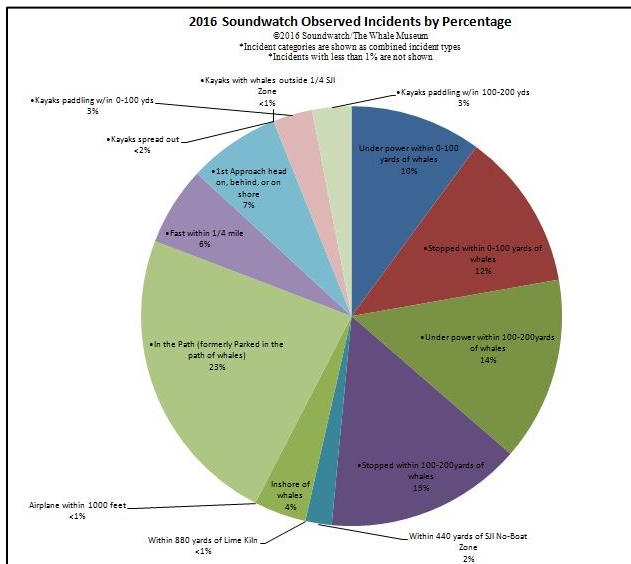
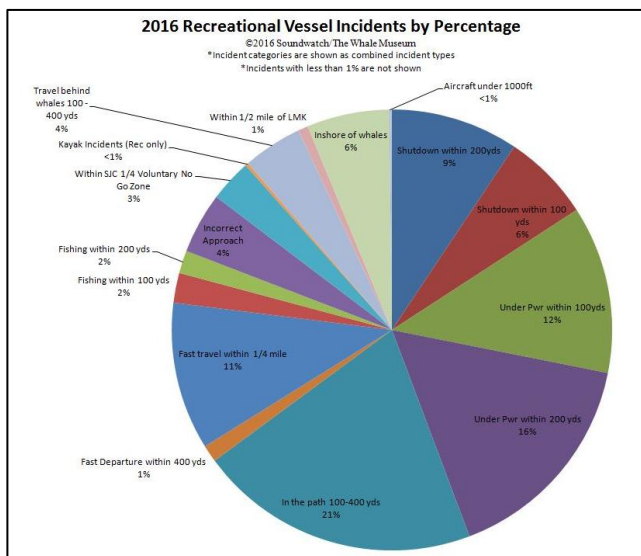


Figure 46: 2016 Soundwatch Observed Private Vessel Incident Percentages.



During the 2016 season, the vessel-based Soundwatch program observed kayakers making 8% of overall observed incidents (Figure 44). The incident categories shown include both the kayaker specific incident categories which include incidents that are guidelines (Kayakers Code Appendix C and C2): *kayaks spread out with whales present, kayakers paddling greater than 1/4 mile offshore with whales* and *kayakers launching into the path of whales* along with other incident types (such as *kayakers paddling within 0-200 yards of whales*), including *Be Whale Wise Guidelines* (Appendix A) and/or U.S. Federal vessel regulations (Appendix B) that include kayakers. Overall in 2016, commercial kayakers were more likely to have an incident recorded than a recreational kayaker despite required training to launch from San Juan County Park (Figure 48).

In 2016, the vessel-based Soundwatch program recorded 1,847 total vessel incidents, with both commercial and recreational kayakers committing 153 total kayak incidents, or 8.2%, of all incident types

(Figure 43). Commercial kayakers committed 84% of recorded incidents and recreational kayakers were recorded with 16% of incidents (Figure 47). Of the 153 total kayak incidents observed, commercial kayakers made up 84% and recreational kayakers made up 16%. These included; **1-Kayakers Not Rafted (or Spread) with Whales** 17%; **2-Kayakers within 0-200 yards of Whales and still paddling** 36%, **3-Kayakers rafted within 100 yards** 15%, **4-Kayakers in the Path** 25%, **5-Kayakers Offshore greater than ¼ Mile with Whales** 7% (Figure 48). The typical kayak scene can largely be depicted as both commercial and recreational kayakers (commercial more likely than recreational groups) being Paddling when whales are approaching to within 400 yards; getting Grouped up and being Stopped In the Path of Whales (w/in 400 yards), remaining Grouped and Stopped at 200-100 yards of whales and still remaining Grouped and Stopped at 100-0 yards of whales; commercial groups are more likely than recreational groups to paddle offshore greater than 1/4 mile to be with whales and commercial groups were more likely to be paddling within 0 – 200 yards of whales.

Figure 47: 2016 Soundwatch Vessel-based Observed Commercial vs Recreational Kayaker Incident Percentages.

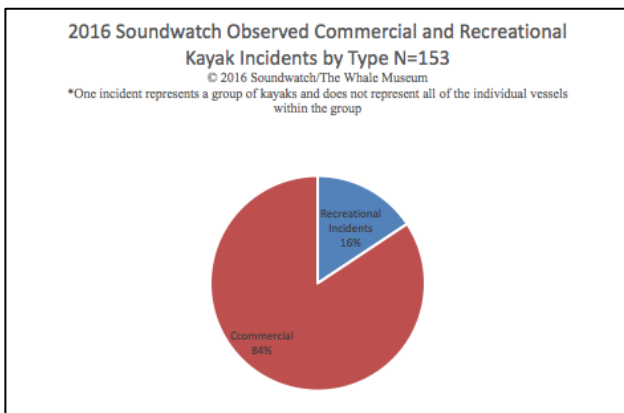
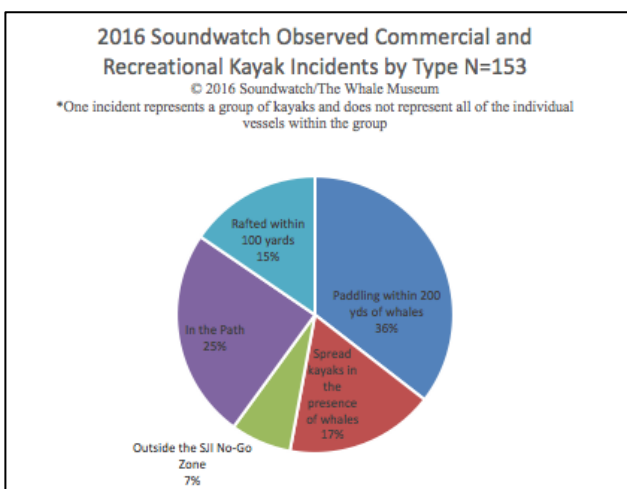


Figure 48: 2016 Soundwatch Vessel-based Observed Kayak Incidents.



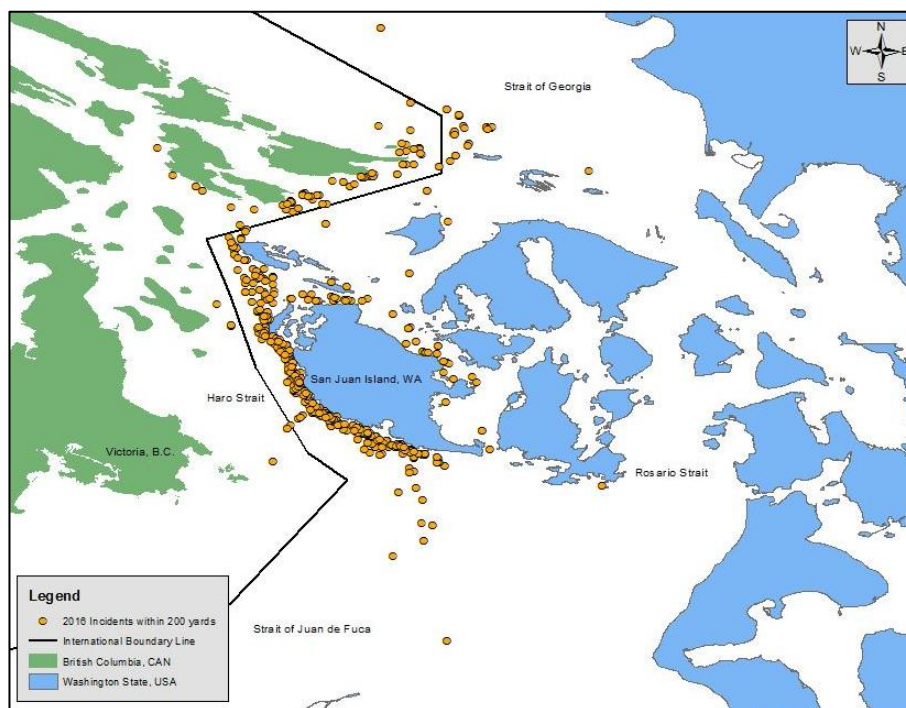
Since San Juan County vessel laws were established in 2008, Washington State vessel laws in 2009 and U.S. federal regulations in 2011, Soundwatch staff has been vigilant about recording every time that the Soundwatch vessel could have possibly been within 400-yards ahead or within 200-yards of whales. Since the

new vessel regulations, Soundwatch staff has also been making a more targeted effort to reach as many boaters as possible before those boaters find themselves out of compliance with vessel regulations. These actions have sometimes led to more times when the Soundwatch vessel is caught stopped with whales as they are talking with a private vessel. The Whale Museum began operating under its own Soundwatch specific NOAA Research permit in 2012 (Permit No. 16160). This allows for close approaches in some unavoidable circumstances and these are reported via permit conditions and annual reporting requirements. All Soundwatch educator/drivers receive thorough training on safe boating in the vicinity of whales. As part of receiving a research permit, a full review of program methods was completed and impacts of Soundwatch activities fully analyzed under MMPA/ESA. The permit carries with it annual reporting obligations. The majority of the time, the Soundwatch vessel is well over 200-yards to the side or beyond 400-yards ahead or behind whales to be in the best position to reach on-coming vessels before they encounter whales. Occasionally the Soundwatch crew finds itself nearer to whales (within 200 yards or 400 yards in the path), unexpectedly or under the course of normal operations and the staff directs the volunteers to record the Soundwatch vessel with an incident(s) just as any other vessel observed by Soundwatch would be.

In 2016, Soundwatch recorded 41 Soundwatch Monitoring Vessel incidents making up 2% of overall vessel incidents. These incidents were recorded even though Soundwatch operates under NOAA research permit #16160. Any intentional close approach to killer whales was recorded as a directed take under our research permit and are submitted in the 2016 annual permit report.

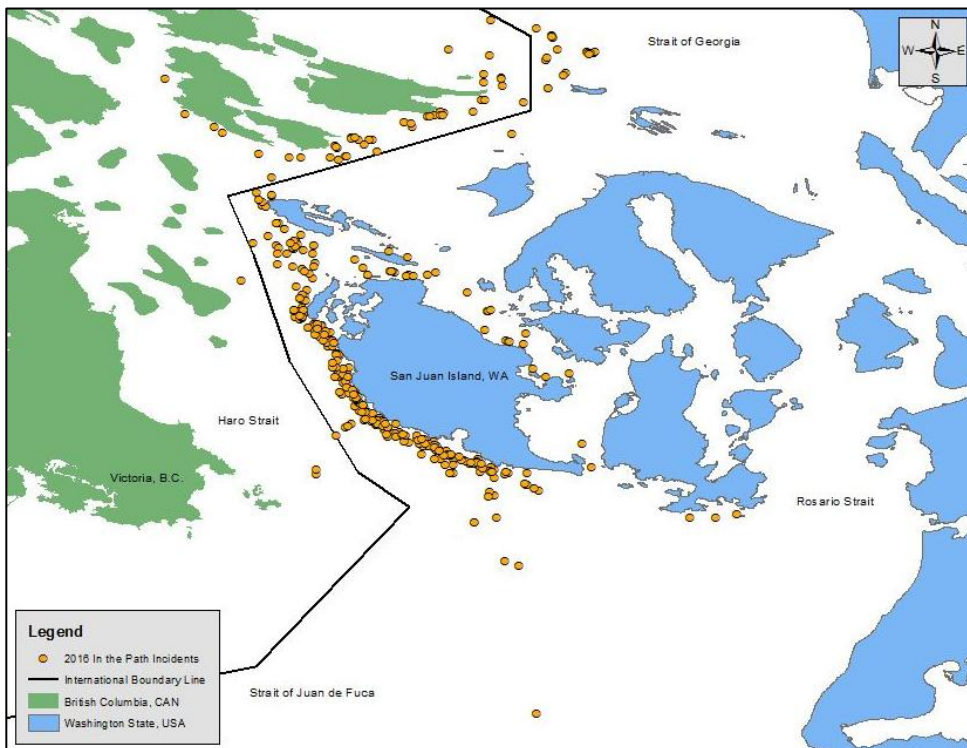
Considering 2011 U.S. federal vessel regulations for killer whales, all Soundwatch observed *vessel incidents* potentially out of compliance with the regulations (1-*Within 0-200 yards of killer whales* and 2-*In the path of killer whales*) were plotted by location (Figures 49 and 50). The U.S. federal regulations only apply to vessels in U.S. waters. However, all *vessel incidents 0-100 yards* (under power and stopped) and all *vessel incidents 100-200 yards* (under power and stopped) were combined and plotted (Figure 49) regardless of country of origin. Likewise, all incidents of *In the path of killer whales* were plotted (Figure 50), regardless of origin. Looking at the trends, most incidents *Within 0-200 yards of killer whales* and *In the path of killer whales* occurred in U.S. waters and were likely violations of the U.S. vessel laws. There is an obvious overlap with the location of these two types of vessel incidents occurring in the high-density vessel areas (Figures 18,20) and high vessel incident density areas along the west side of San Juan Island. (Figures 37-41).

Figure 49: 2016 Soundwatch Observed Vessels **Within 200-yards of Killer Whales* Incidents Location Map.



*Incidents shown depict vessels within 0-100 yards and vessels within 100-200 yards of SRKWs, or the *within 200-yards of a killer whale* vessel regulation and applies only in U.S. waters. In Canadian waters, these same incident types are Be Whale Wise Guideline Incidents only.

Figure 50: 2016 Soundwatch Observed Vessels**In the Path of Killer Whales* Incidents Location Map.



*U.S. regulations restricting vessels *In the Path* 200-400 yards of a killer whale applies in U.S. waters only. Vessel incidents shown occurring in Canadian waters depict Be Whale Wise *In the Path* Guideline incidents only.

Vessel Incident Trends

General trends in the most common incident types for 2006-2016 appear below (Figure 51). Soundwatch has consistently observed the same five or six vessel incident types as the top most frequent vessel incidents (with some variability in ranking order), which include: *Vessels in the path of whales*; *Vessels motoring inshore of whales*; *Vessels motoring within 100 yards of whales*; *Vessels stopped within 100 yards of whales*; *Vessels motoring fast within 400 yards of whales*; and *Vessels motoring within the 1/4 mile voluntary no go zone*. Since 2011, the following vessel incident types were introduced when the updated Federal law was implemented: *Vessels within 200 yards of whales*, this was divided into two main categories: 1- *Stopped within 100-200 yards of Whales*; and, 2- *Motoring (under power) within 100-200-yards of Whales* in the same way that the previous *100-yard guideline incident* was divided into two categories-*stopped* and *motoring*. These incident types are also among the most common incident types, making eight incidents of similar frequency as most common incident types since 2011. In summary, *In the Path* incidents remain high; *Inshore of Whales* incidents were lower than previous seasons, however, recreational fishing vessels at Eagle Point on the west side of San Juan Island were not considered an incident if they were in neutral until the whales passed and there was significant decrease in the number of recreational fishing vessels. Incidents of *Fast within 1/4 Mile* and *Within the 1/4 Mile No Go Zone* decreased from 2015. Vessel incidents *within 100-200 yards, stopped and under power*, remained close to 2014 and 2015. It may be that it is still difficult for boaters to recognize that they must react sooner when they see whales headed towards them to both get out of the path (up to 400 yards). If they attempt to move beyond 200 yards, they get caught in the path and motoring. Once, or if they recognize whales are close, they are then stopped within 200 yards and usually get caught again motoring and stopped within 0-100 yards if they try to get out of the way and fail. It seems that more land-based educational messaging targeting boaters to move their vessel sooner and further out of the way of whales is still needed despite Soundwatch's

concerted effort to reach recreational vessels before they reached the 400 yards of *In the Path*.

Figure 51: 2006-2016 Soundwatch Observed Top Vessel Incident Percentages by Incident Type.

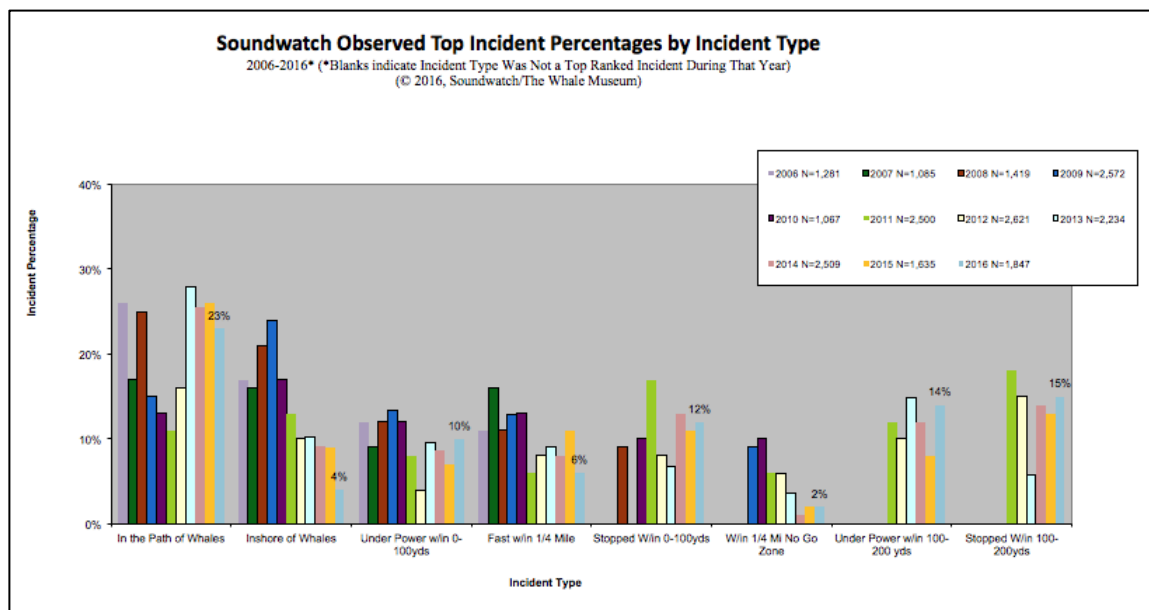
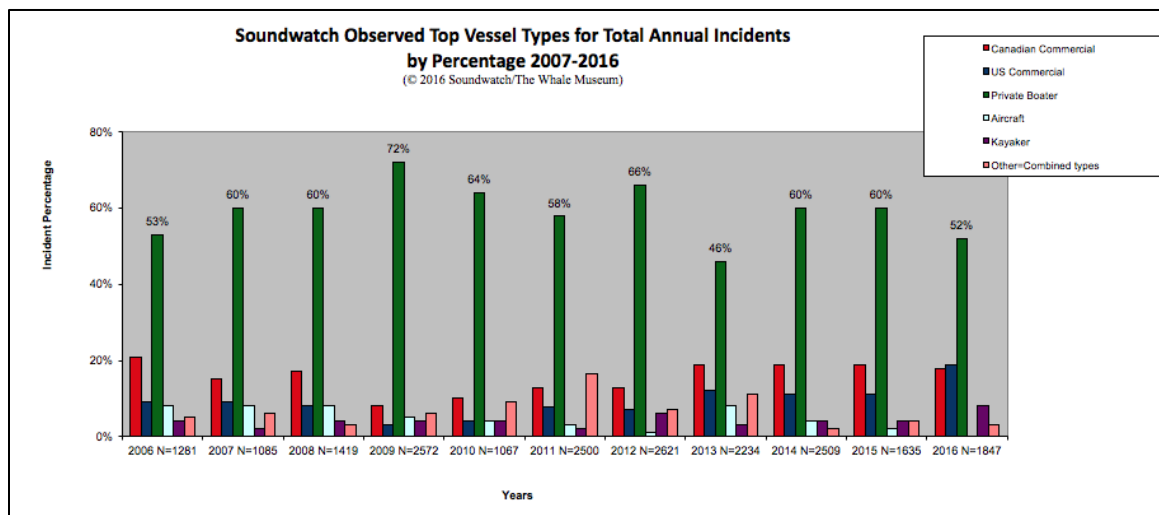


Figure 52: 2006-2016 Soundwatch Observed Vessel Incident Percentages by Top Vessel Type.



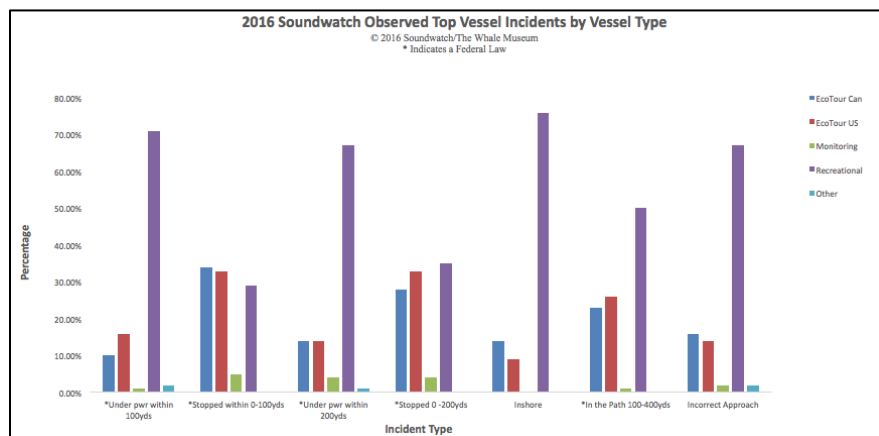
Over the past eleven years 2006-2016, recreational vessels remain the most likely vessel type to commit all incidents with an eleven-year average of 59% of all incidents recorded over that period (Figures 52-54). In 2016, recreational vessels made 52% of all incidents. Commercial whale watch vessels, (combining both U.S. and Canadian vessels), have an eleven-year average of nearly 25% of incidents, having 37% of total incidents in 2016. The average has increased slightly but is most likely due to the lower recreational vessels present on the water. Even though the Canadian vessels make up a larger percentage of the commercial fleet this year, incidents were close to the same percentage as U.S. commercial vessels; 18% and 19% respectively in 2016. The ratio of recreational vessel incidents versus commercial vessel incidents in 2016 is on par with previous years, despite a decrease in recreational vessel incidents. The Soundwatch monitoring program vessel recorded

an average of nearly 6% of total incidents 2007-2014. In 2015 and 2016, the monitoring vessel made an increased effort to contact recreational boaters well before federal and state laws might be violated and therefore were able to decrease the number of incidents recorded (2% of total incidents, Figure 53). There was a low occurrence of aircraft as a vessel type, planes and helicopters committing less than 1% of vessel incidents in 2016. An increased effort to educate recreational pilots was attempted in 2015 and continued in 2016 and a fair number of pilots were reached during dock talks and through social media platforms.

Figure 53: Soundwatch Observed Incident Summary

2016 Soundwatch Observed Incident Summary												
© 2016 Soundwatch/The Whale Museum												
	Vessel Type											
Incident Type	CA	EC	EK	EU	GW	MF	MM	PK	PM	PS	R	Grand Total
100_yards_under_power		17	3	26	1		1		105	13	2	169
200_yards_under_power		33	2	32			8		146	9	1	232
400yd_inthepath		91	24	102	1		4	5	179	19		425
aircraft_under1000ft	5								1			6
fast_departurewithin400yds		1			1				12			14
Fast_withinquartermile_whales				1					28			29
fishing_within100yds									23			23
fishing_within200yds									14			17
high_speed_within_400		10		8	1	1			75	1	2	98
incorrectfast_approach		10		9	1		1		43			63
inshore_of_whales		11	2	7					55	3		78
kayaks_outsideSJlzone			13					1				14
offshore_of_whales			1									1
Paddling_100yds_whale			38					10	1			49
shutdown_within100yds		72	10	71			10	3	57	5		228
shutdown_within200yds		74	10	86			9	2	83	7	1	272
SJCVNGZ		3	1	3					28	2		37
sprdkayaks_whale			25	1				2	1			29
travel_behind100_400yds		2		5		1	1	1	40	2		52
withineighthmile_shore		2							1			3
withinhalfmile_Limekiln				1					7			8
Grand Total	5	327	129	352	6	2	34	24	900	61	6	1847
	<div>Legend</div> <div>CA: Commercial Aircraft</div> <div>EC: EcoTour Canadian</div> <div>EK: EcoTour Kayak</div> <div>EU: EcoTour USA</div> <div>GW: Government</div> <div>MF: Commercial Fishing</div> <div>MM: Marine Monitoring</div> <div>PK: Private Kayak</div> <div>PM: Private Motor</div> <div>PS: Private Sail</div> <div>R: Research</div>											

Figure 54: 2016 Percentage of Top Incidents by Vessel Type.



Vessel Type Incident Rates

The annual installment of this report has used annual incident percentages as above for some time. The below metric is an approach to try and normalize the incident data by dividing the annual vessel incidents by the number of hours observed to try to give an approximate rate of incidents per unit time. While this seems like it would be a more useful way to compare Soundwatch observations of individual vessel types committing incidents from year to year, there are some very real problems with analyzing Soundwatch vessel data in this manner. Soundwatch does not have standardized observation periods or units for monitoring vessel incidents and vessel counts. Vessel counts by type and activity (along with whale attribute data) are recorded every 30 minutes, on the hour and half hour during a monitoring day. Observations and recording of vessels incidents are done continuously and opportunistically during the same time that the Soundwatch driver/educator engages with vessels to educate them on best practices and during vessel counts. The vessel count numbers and the vessels incidents are not linked to each other (therefore a rate of incidents per vessel present cannot be established) and there is no way to tease out the actual annual, monthly or hourly observation time or units spent on viewing vessel incidents. The closest number to an annual Soundwatch observation unit is the annual number of observation hours with whales, which in 2016 was recorded as 451 hours. In 2016, 695 counts of boats were conducted. The metric used in this analysis (2009-2016) to determine vessel incident rates per vessel type was: $2 \times \text{the annual number of incidents} \div \text{the annual vessel count}$ (for example, in 2016: $2 \times 1,847/695$ resulting in an annual number of 5.3 total incidents per hour). The resulting graphs, using that metric, have been plotted for 2 years before and 6 years after the 2011 U.S. regulation (Figures 55-58).

Prior to the U.S. vessel regulations in 2011 there was a long-standing guideline to remain at least *100 yards from whales*, which later became a Washington State vessel regulation in 2008. Soundwatch established a *vessel incident* category to record when vessels were *within 100 yards* when it began recording vessel incidents in 1993. In 2011, when U.S. vessel regulations went into effect, a new vessel incident category was established to reflect the new U.S. federal vessel regulation: *vessel within 100-200 yards of whales* (the second part of the new 2011 regulation, *stopped 200-400 yards in the path* was captured in a previous guideline “parked in the path” incident category). With the addition of the new incident category in 2011, it is now possible to record more incident types than before.

In 2009, three years prior to the U.S. regulations, there appears to be approximately 3.4 *total vessel incidents* committed by *all vessel types* per unit time (approximated to be 1 hour) (Figure 56). *Recreational (private) vessels* made nearly 2 incidents, *U.S. and Canadian commercial vessels* both made less than 1 incident and *Other vessel types* less than .5 as well. In 2009, total vessel incidents increased to nearly 6.0 *total vessel incidents* committed by *all vessel types* per unit time. Total vessel incidents seem to have peaked in 2012 at almost 9.0 *total vessel incidents* per unit time. Since 2013-2015 have shown a decrease in trend of total vessel incidents. In 2016, *total vessel incidents* per hour by *all vessel types* is 5.3 *total vessel incidents*, *recreational (private) vessel incidents* were about 3 incidents per hour, *Canadian commercial vessels* with 1.0 incident, *U.S* 1.0 incidents and *Other vessels* less than 0.5 incidents (Figure 55). 2016 showed a decrease in the total number of vessel incidents from 6.1 in 2014 but a slight increase from 2015. There were greater numbers of spread out whales in 2015 and 2016. Soundwatch was not able to monitor multiple groups at the same time however a concerted effort was made to alternate which group Soundwatch monitored as the whales moved through the region.

In 2009, prior to U.S. regulations (but with WA State regulations), there appears to be 4.5 total *Regulatory vessel incidents (100-yard regulation only)* per unit time by *all vessel types* (Figure 56). *Recreational (private) vessels* had 3 incidents, and both *U.S. and Canadian commercial vessels* as well as *Other vessels* had less than .5 incidents per hour (Figure 56). In 2011, the first year after U.S. regulations and with 1.0 new incident category, there were 3.0 total *Regulatory vessel incidents (100 & 200 yard categories)* per hour by

all vessel types, recreational (private) vessels had 3.0 incidents, and both *U.S. and Canadian commercial vessels* as well as *Other vessels* had less than 0.5 incidents per hour. In 2016, now 6 years after U.S. vessel regulations, there were 4.0 total *Regulatory vessel incidents (100 & 200 yard categories)* per hour by *all vessel types, recreational (private) vessels* had 2.0 incidents, *U.S. commercial vessels* had 1.0 incidents per hour, *Canadian commercial vessels* had 1.0 incidents per hour and *Other vessels* had less than 0.5 incidents per hour (Figure 56). Regulation incidents such as *In the path, under power within 200 yards and stopped within 200 yards* are shown in Figure 58. There appears to be a strong increase in these incidents after 2011 when the regulations took place and an overall decrease in 2015 and 2016. *In the path* incidents seem to be decreasing every year however there was a slight increase in 2016. Further analysis should be completed especially as more data becomes available from the NOAA D-tag research.

In 2009 prior to the U.S. regulations, there appeared to be nearly 4.0 total *Guideline vessel incidents* committed by *all vessel types* per unit time (Figure 57). Recreational vessels made nearly 3.0 *guideline* incidents, U.S. and Canadian commercial vessels and *Other vessel types* made less than 0.5 incidents as well. In 2016, *total Guideline vessel incidents* per hour by *all vessel types* was less with 1.0 overall incidents, *Private* 1.0 incidents, and *U.S. and Canadian commercial vessels* and *Other vessel types* made less than 0.5 incidents as well (Figure 58). There were increases in both 2012 & 2013 for *Guideline total vessel incidents*, but appear to be decreasing since 2014. A stronger emphasis was put on federal and state law incidents in 2016 than guideline incidents for recreational boaters. Since 2013, there has been a steady increase in the presence of enforcement on scene with killer whales. A quick analysis was completed to determine the total number of incidents per hour when enforcement was on scene compared to Soundwatch. Fewer incidents per hour were observed when enforcement was on scene (Figure 60).

To further understand and potentially showcase what the scene on the water is, two additional graphs have been added to this report. Total Soundwatch observed incidents *from all vessels* have been increasing since 1998 and the average number of *all vessels* on scene is steadily decreasing (Figure 61). Additionally, of the 405 recreational vessels that Soundwatch could contact, 225 (56%) stated they were aware of the guidelines and regulations. Of these 225, 86 vessels representing 38%, still had an observed incident (Figure 62). Both graphs are one way of representing the continued need for increased efforts in boater education and enforcement presence on the water.

Figure 56: Total Incidents per hour by Vessel Type for 2009 - 2016.

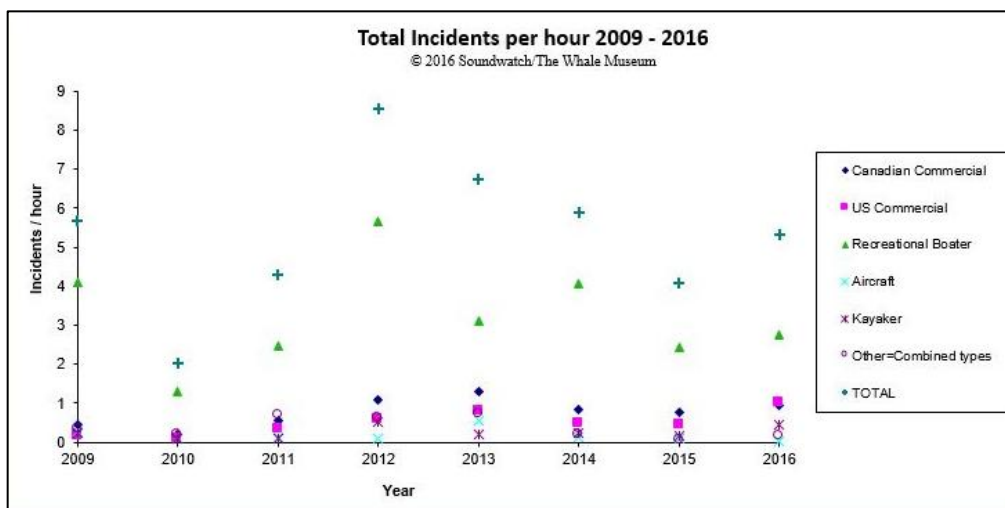


Figure 57: Regulation Incidents per hour by Vessel Type for 2009-2016.

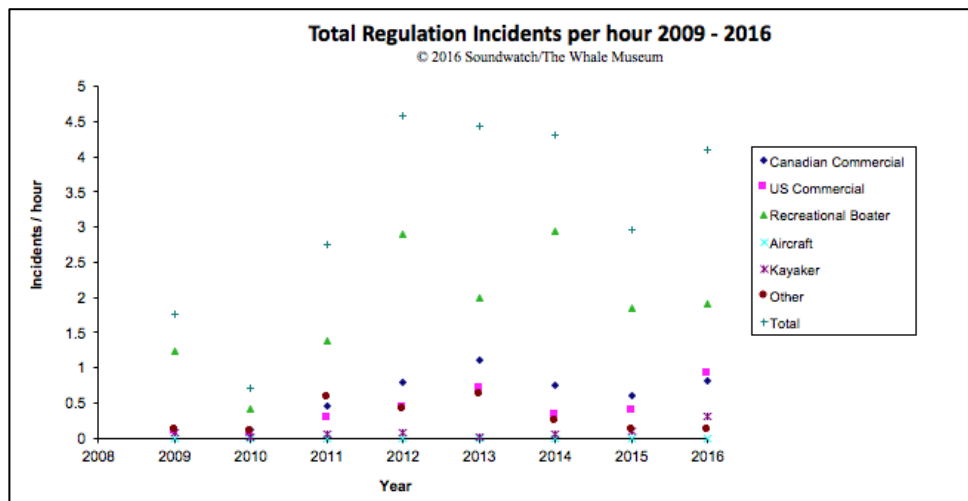


Figure 58: Guideline Incidents per hour by Vessel Type for 2009-2016.

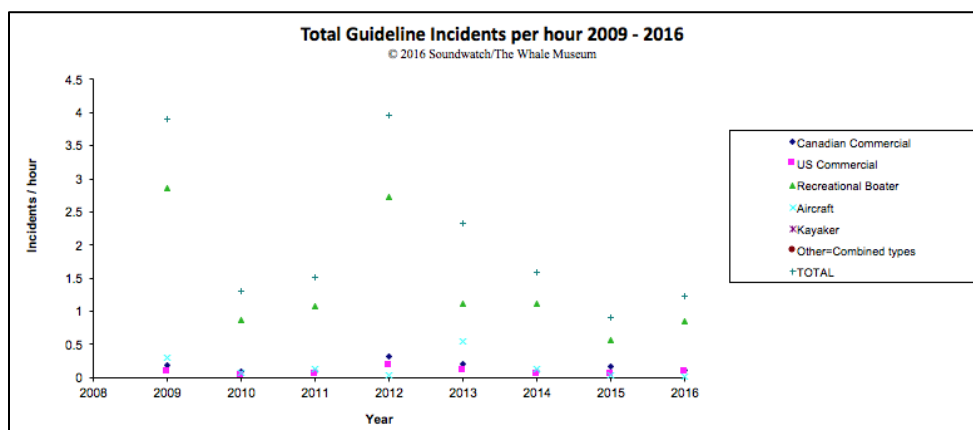


Figure 59: Top Regulation Incidents per hour by total occurrence for 2011 - 2016.

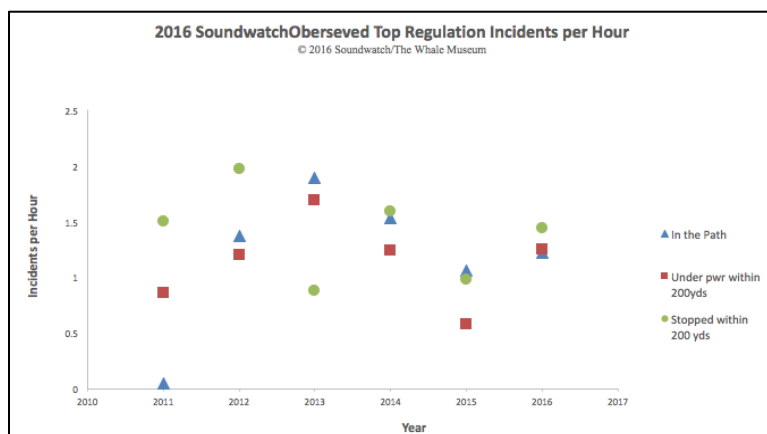


Figure 60: Soundwatch Observed Total Incidents *Only* when Enforcement (WDFW) is On Scene.

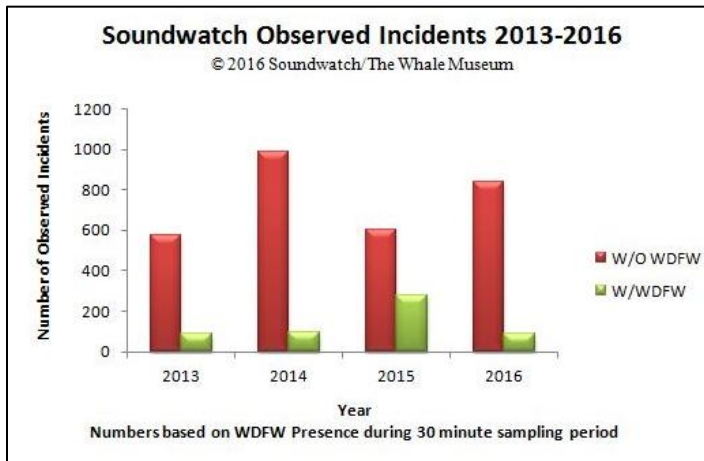


Figure 61: Soundwatch Observed Incidents versus Maximum of *All* Observed Vessels from 1998 – 2016

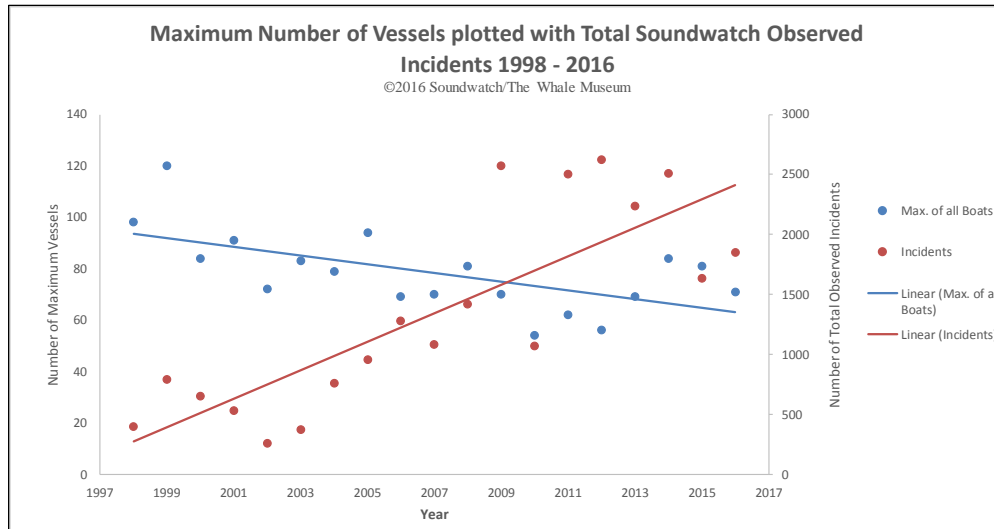
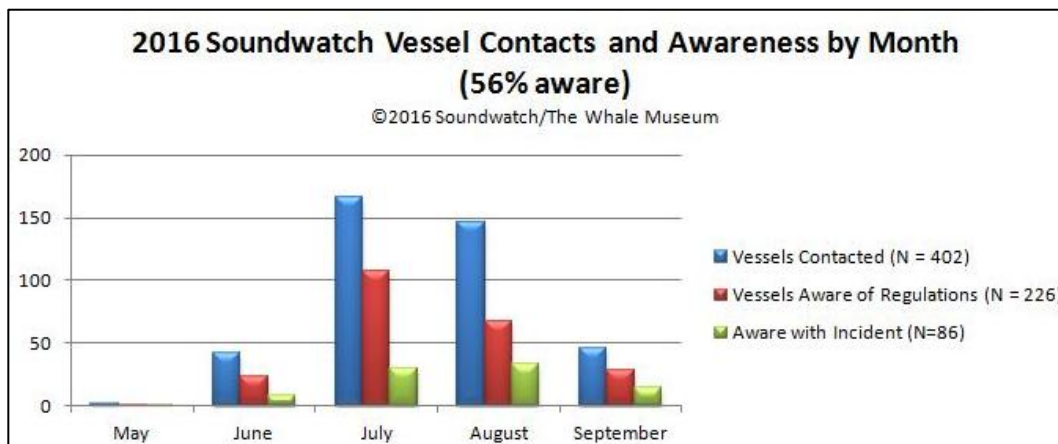


Figure 62: Vessels aware of Regulations/Guidelines with Incidents



Summary of Soundwatch Data Trends

Numbers of Vessels Observed with Whale Trends:

- The numbers of vessels observed within one half mile of whales (May-September) varies widely by time, date and location with maximum numbers over 4 times larger than average numbers (2016 Max.71, Avg. 13)
- From 1998-2016 (19-year trend) the annual average numbers of vessels with whales was 13. From 2003-2011, there was an 8-year trend of reduced annual averages and maximum numbers of vessels with whales that has been increasing since 2011. There are various explanations that need further analysis comparing SRKW trends with vessel trends, including regional marina use data, to fully explain these changes.
- Peak times of the day (May-September) observed with the highest number of vessels within one half mile of whales (19-year trend) usually occurred between 11 a.m. and 3 p.m. with a dip around the 1 p.m. (midday lull most likely attributed to a change in tour groups) (associated with commercial vessel congregations which is believed to attract more recreational vessels).
- The peak month generally observed with the highest number of vessels within one half mile of the whales is July. From 1998-2016, the 19-year trend of average number of vessels within one half mile of whales per month was: May 10.5 vessels, June - 16 vessels, July - 19 vessels, Aug - 21 vessels and September - 17 vessels. In 2016, the average vessels per month were: May - 10 vessels, June - 12 vessels, July - 15 vessels, August - 16 vessels and September - 12.6 vessels.
- Recreational (private) vessels observed within one half mile of whales have had higher maximum numbers than commercial vessels from 2003-2009 and again from 2011-2015. 2016 had a higher commercial maximum than recreational vessels. (2016: recreational maximum was 24 vessels in September, with a recreational average of 4 vessels; the commercial max was in July at 26 vessels, and the commercial average vessels was 4.75).
- Generally, private recreational boaters spend more time with whales being “whale-oriented” (watching whales) than engaged in “fishing” or “transiting”; commercial vessels are most often observed “whale oriented” and less so “transiting” (due in part to PWWA speed & approach guidelines).
- Commercial and recreational fishing activities occur in areas that often overlap with whales as well as other vessel transit corridors. In years with large recreational and commercial fishing opportunities, vessels observed engaged in “fishing activities” increase as do vessel incidents associated with recreational and commercial fishing vessels. In 2016 there were limited salmon openings for commercial and recreational fishing. Recreational fishing vessels in neutral gear around killer whales decreased in 2016 from 2015 with very few commercial fishing vessels around killer whales.
- On average (2001-2011) Soundwatch contacted nearly 1,000 recreational vessels per year with an average of 3.3 people on board each vessel, for an overall average number of 3,300 people given educational materials on the water annually. In 2016, Soundwatch contacted 402 boats with 1,355 people onboard; averaging 3.4 people per vessel. This is most likely due to the decrease in recreational vessels on the water in June.
- An average of 56% of recreational vessels contacted for educational purposes were aware of the guidelines and laws for boating around killer whales.
- Soundwatch does not have consistent monitoring data on vessel trends before 9 a.m. and after 5 p.m., or during the shoulder season, October-April.

Commercial Whale Watch Industry Trends

- Commercial whale watching occurs April –October with increasing numbers of U.S. & Canadian commercial whale watch vessels going out year-round and/or starting earlier and going later into the season.
- The bulk of commercial whale watching generally occurs between 9 a.m. and 6 p.m., May-September, with the maximum numbers of commercial vessels observed within one half mile of whales occurring in July and between 11 a.m. to 1 p.m. and again from 3 p.m. to 4 p.m.; with a reduction in numbers between 12 p.m. and 1 p.m. during trip turn-around periods.
- Commercial whale watching occurs in the evenings with several U.S. & Canadian commercial trips going out again at 5p.m.-sunset (8:30-9:30 p.m., July-September).
- Since 2000, there have been a similar number of 30-40 active Canadian and U.S. commercial companies (Average

number of companies: 36, Average number of U.S. companies: 18, Average number of Canadian companies: 17). In 2016, there were 34 commercial companies with 20 U.S. companies and 14 Canadian companies (In 2016, for the first time, a U.S. kayak company was part of the PWWA).

- Since 2000, there has been a similar number of 70-80 active commercial whale watch vessels. In 2016 there was another peak of 102 active commercial whale watch vessels. (*Active vessels do not include the total number of active kayak vessels from the PWWA kayak company.)
- Since 1997 there have consistently been more *active* Canadian commercial vessels than *active* U.S. commercial vessels (2016: 53 Canadian, 49 U.S.).
- In 2016, 12,343 people went kayaking with commercial companies and launched from San Juan County Park. This is a slight increase since 2015 but adds the overall percentage of overall 30% greater since 2012.
- The majority of *active* Canadian and U.S. commercial companies are members of the trans-boundary Pacific Whale Watch Association (formerly the Whale Watch Operators Association Northwest). (Website is currently under construction.)
- Canadian commercial whale watch vessels continue to be mostly the smaller rigid hull inflatable (RHIB) style of vessels while the U.S. fleet is made up of mostly larger passenger-style vessels. However, recent additions to both fleets have seen increased numbers of large passenger-style Canadian vessels and small cruiser-style U.S. vessels. In 2016, three U.S. companies operated RHIB style vessels, originating from Friday Harbor, WA.
- The total number of passengers engaging in vessel-based whale watching from U.S. and Canadian commercial vessels (including kayaks) and recreational vessels as well as the total number of people engaged in shore-based whale watching in the region is largely unknown and difficult to estimate. However, it is believed to be increasing. Best estimate from the Pacific Whale Watch industry indicates there may be well over 440,000 passengers (does not include non-PWWA vessels, commercial/recreational kayaks or land-based whale watchers).

Vessel Incident Trends

- In 2016, 72% of all vessel incidents observed and recorded by Soundwatch were U.S. Vessel Regulation incidents; **Vessels Within 200 yards of whales** were 49% and **In the Path of Whales** were 23%.
- **Vessels within 200 yards of Whales** incidents comprised of *Vessels Stopped within 0-100 yards* (12%) were made by 27% recreational vessels, a decrease of almost 50% since 2015.
- **Vessels within 200 yards of Whales**; 23% Canadian vessels, 31% U.S. vessels (both are an increase from 2015) and 6% monitoring/research vessels; *Vessels Stopped within 100-200 yards* (15%) were made by 33% recreational vessels, 27% Canadian vessels, 32% U.S. vessels and 3.5% monitoring/research vessels; *Vessels Motoring within 0-100 yards* (12.5%) were made by 67% recreational vessels, 14% Canadian vessels, 4% monitoring/research vessels and 14% U.S. vessels; *Vessels Motoring within 100-200 yards* (12.5%) were made by 68% recreational vessels, 21% Canadian vessels, <1% monitoring/research vessels and 14% U.S. vessels.
- **Vessels in the Path of Whales** regulatory category were made by 68% recreational vessels, 21% Canadian vessels, 24% U.S. vessels, <1% monitoring/research vessels and 7% Other (kayak, government, etc.).
- In 2016, 52% of all observed incidents were committed by recreational vessels, which make up 28% of the vessels observed within ½ mile of whales; 47% of vessels with whales are commercial vessels which committed 37% of total incidents (45% including commercial kayaks).
- The commercial fleet (U.S. and Canadian) had similar incident percentages than U.S, 18% and 19% respectively in 2016 with a 10-year average of 24.3% of total incidents.
- In 2016, kayakers had 8% (84% commercial and 16% recreational) of all incidents which is higher than previous years.
- Soundwatch recorded 41 Soundwatch Monitoring Vessel incidents (2% of total incidents) and made up of **Within 100-200 yards of whales** with 8 incidents or 24%; **Within 0-100 yards of whales** with 1 incident or 3%; **In the path of whales** with 4 incidents or 12%.
- The Soundwatch monitoring program recorded itself making a decreased number of incidents annually over the years 2009-2016, averaging nearly 4% of total incidents 2007-2016 with just 2% of total incidents in 2016.
- From 2007-2016, recreational vessels remain the most likely vessel type to commit all incidents, 10-year year average is 59.8% of all incidents.
- The ratio of recreational vessel incidents versus commercial vessel incidents in 2016 is on par with previous years, despite a dip seen in 2013.

- Despite the low occurrences of aircraft as a vessel type, planes and helicopters committed roughly 4% of vessel incidents annually from 2007-16, with less than 1% in 2016.
- Soundwatch has observed similar top vessel incident types (varying order each year) 2007-2016. *In the Path* incidents remain high and are increasing; *Inshore of Whales* incidents decreased; incidents of *Fast within ¼ Mile* are about the same; *Within the ¼ Mile No Go Zone* are decreasing; and Vessel incidents *within 100-200 yards, stopped and under power*, are increasing 2011-2016 as incidents *0-100 yards, stopped and under power*.

Spatial Trends- Vessel Numbers & Vessel Incidents

- There are spatial trends indicating that the whales are seen most often along the west side of San Juan Island than other areas in the ESA designated SRKW Core Summer Critical Habitat Areas.
- There are spatial trends indicating that the highest concentrations of all vessel types are along the west side of San Juan Island.
- There are spatial trends indicating that the highest concentrations of vessel incident types are along the west side of San Juan Island.
- Vessel Incidents of both U.S. federal regulations, *Within 200 Yards of Whales* and *In the Path of Whales* occur more often in U.S. waters than Canadian waters (the law only applies to vessels in U.S. waters) with the majority of incidents occurring along the west side of San Juan Island.
- A large number of vessel types, engaged in a variety of activities, routinely commit a multitude and variety of incident types, with the majority of incident types being contrary to U.S. federal vessel laws throughout the ESA designated SRKW Core Summer Critical Habitat Areas, especially along the near-shore corridor on the west side of San Juan Island.

Education Materials

- Kayak Education and Leadership (KELP) brochures were updated and printed for all commercial kayak guides. Additional KELP rack cards for companies, San Juan County Park and The Whale Museum were also created and printed. (Appendix C and C2).
- San Juan County Park will be revising their commercial launch permits and kayak training for 2017.
- In 2016 NOAA, DFO and The Whale Museum revised and updated the 2011 Be Whale Wise brochure to include the 2011 US Regulations. These new brochures were printed and ready to use by spring of 2016. The PWWA was consulted for suggestions and/or improvements and their guidelines were reviewed as part of the update.

Recommendations

Soundwatch observed vessel trends from 1998-2016 show continued boating pressures and noncompliance with best practice guidelines and vessel regulations for killer whales throughout the Salish Sea; the inland waters of Washington State and British Columbia. Long-term trends demonstrate the need for the continuation and expansion of shore and water-based boater education and outreach efforts as well as a continued increase in enforcement patrols and enforcement action on the water. Sustainable funding mechanisms for both education and enforcement efforts are critical. In addition, the development and implementation of a collaborative U.S. and Canadian effort to manage both commercial and recreational whale watching as well as other vessel traffic near whales is needed to reduce potential threats to the whales from vessel presence, behavior and underwater noise.

During both the NOAA SRKW Recovery Plan and Proposed Vessel Regulations public input processes, overwhelming support for increased enforcement effort as well as the continuation and expansion of the Soundwatch program was expressed through written and verbal public comments. The effort required to collect and analyze this data annually, as well as prevent countless disturbances to endangered whales, is under-valued and in many cases, is the only data set available. Continued monitoring remains critical to assist in the evaluation of the effectiveness of the guidelines, regulations and enforcement efforts.

The 2016-2019 ESA Section 6 funding will provide enhanced WDFW Enforcement presence in the vicinity of killer whales around the San Juan Islands (including a WDFW vessel and one additional FTE officer). A portion of this funding will support the Soundwatch program with vessel upgrades to the 17-foot American Eagle and the potential purchase of a new education/survey vessel, additional days on the water and funding for data analysis. Funding from the 2013-2016 Section 6 ESA Grant continued through June 2016 to support both WDFW and Soundwatch pre-season efforts. The continuation of ESA Section 6 funding for these programs to conduct more cooperative outreach education, monitoring and enforcement is critically needed. Collaboration of these two programs along with NOAA, DFO, Straitwatch and all Be Whale Wise partners is essential for boater education, marine monitoring and enforcement around killer whales.

Individuals and/or Organizations that Collaborated with the Grantee and Performed the Work:

The Whale Museum staff (Executive Director: Jenny Atkinson, Finance Manager: Elli Gull and Soundwatch Coordinator: Elizabeth Seely) administered grant funds, including accounting and disbursement, from award RA-133F-12-CQ-0057. The Soundwatch Coordinator (Elizabeth Seely) along with seasonal Soundwatch driver/educator staff (Jacob Range), academic interns (Sarah Hyde, Mackenna Neuroth and Jamie Manske) and almost 60 volunteers were responsible for the outreach, monitoring and data collection activities as well as data entry. Soundwatch staff, undertook the bulk of data compilation, assessment and report compilation. Thank you to The Sighting Network Coordinator: Jennifer Olsen, for the 2015 Orca Sightings Data. We could not conduct such a successful program without the Board of Directors and staff of The Whale Museum, the vision of the former Soundwatch Program Directors, Rich Osborne and Kari Koski, the help of Lynne Barre from NOAA Fisheries West Coast Region and the assistance and the dedication of the more than 800 past and present interns and volunteers who have collectively contributed more than 67,500 volunteer hours to Soundwatch activities since Soundwatch 1996. Special thanks also go the numerous supporters along with the following organizations that help support and collaborate with our efforts: NOAA Fisheries Northwest Region, Northwest Fisheries Science Center, Fisheries and Oceans Canada, Washington Department of Fish and Wildlife, San Juan County's Marine Resource Committee, San Juan County Parks, Straitwatch & Cetus Society, U.C. Davis, the Center for Whale Research, Orca Network, North Cove Technical Solutions (data-base support), Snug Harbor, Roche Harbor Marine and Marina, and the numerous, generous contributions from regional foundations, businesses and individuals over the years. To all our partners and supporters, THANK YOU!

Appendix A & A1: Be Whale Wise Guidelines and Federal/State Regulations for Boaters, Paddlers and Viewers; Revised 2016, Poster & Double-sided Brochure Version (Available at <http://www.bewhalewise.org>).



Be Whale Wise
Marine Wildlife Laws & Guidelines for Boaters, Paddlers and Viewers
(Revised 2016)
www.bewhalewise.org

Seeing killer whales and other marine wildlife in their natural environment can be a thrilling experience.
In our excitement, we sometimes forget that our presence has an effect on wildlife and their habitat. Just like us, marine mammals need space to find food, choose mates, raise young, socialize and rest.
When we get too close, approach too fast, or make too much noise, we may be disrupting these activities and causing the animals unnecessary stress. In some cases, we may be threatening their lives. Set an example for others, and help protect our spectacular marine resources.

Be Whale Wise – Follow these guidelines and local laws in the presence of marine wildlife.

Why do we need guidelines?
The diversity and complexity of marine life in the inland and coastal waters of British Columbia and Washington is truly extraordinary.
It is a fragile world. Pollution, global climate change and other impacts are taking their toll at all levels of the coastal food web. Many species of marine wildlife, such as the endangered Southern Resident killer whales, are showing signs of vulnerability.
Meanwhile, vessel traffic in our waters is steadily increasing, placing added pressures on marine animals and their habitats.
We need to minimize our impact.
These guidelines are designed to help you enjoy your wildlife encounters, and reduce the risk of disturbing marine wildlife.

BE WHALE WISE!
DO YOUR PART TO PROTECT MARINE WILDLIFE FROM HARASSMENT AND DISTURBANCE.
FOLLOW THESE GUIDELINES AND ALL LOCAL LAWS.

The laws:
Regulations in Canada and the U.S. prohibit the harassment and disturbance of marine mammals. Many species are threatened or endangered and subject to additional protections under the Endangered Species Act (U.S.) and the Species at Risk Act (Canada).

What is a disturbance?
Disturbance is when we interfere with an animal's ability to hunt, feed, communicate, socialize, rest, breed, or care for its young.
These are critical life processes, necessary for healthy marine wildlife populations.

CANADA/B.C. GULF ISLANDS: To report injured, distressed, dead, stranded or entangled marine mammals or sea turtles:
Fisheries & Oceans Canada/B.C. Marine Mammal Incident Reporting 24/7 Hotline: 1-800-465-4336

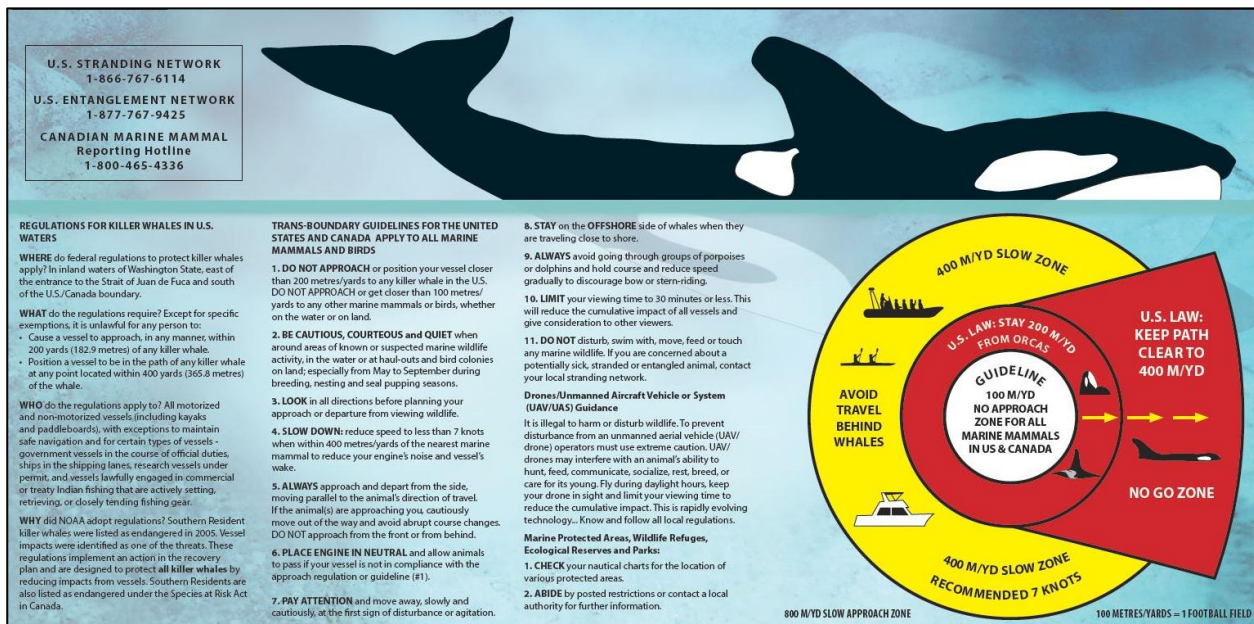
REPORT MARINE MAMMAL & SEA TURTLE SIGHTINGS:
B.C. Cetacean Sightings Network:
1-866-472-9663 or sightings@vancouveria.org
[wildwhale.org](http://www.wildwhale.org) WhaleReport app available on iTunes and Google Play

NEED MORE INFORMATION?
Fisheries & Oceans Canada: www.canada.ca/en/fisheries-oceans.html
Robson Sight (Michael Bigg) Ecological Reserve: www.amn.gov.bc.ca/bcparcs/eco_reserve/robson_et.html
Straitwatch: www.straitwatch.org or 1-250-590-7723
North Island Marine Mammal Stewardship Association: www.nimmsa.org

US/INLAND WA WATERS: To report a marine mammal harassment, entanglement or stranding:
NOAA Fisheries, Office for Law Enforcement:
1-800-853-1964
Entanglements: 1-877-707-9425
Strandings: 1-866-767-6114
Download the dolphin and whale 911 app

TO REPORT MARINE MAMMAL SIGHTINGS:
The Whale Museum Hotline (WA State):
hotline@whalemuseum.org or 1-800-562-8832
Oca Network (WA State):
info@ocanetwork.org or 1-866-672-2638

NEED MORE INFORMATION?
Soundwatch Boater Education Program
www.whalemuseum.org or 1-360-378-4710 ext. 33
NOAA Fisheries, West Coast Region:
www.westcoast.fisheries.noaa.gov
NOAA Fisheries, Office of Protected Resources:
www.nmfs.noaa.gov/pr/



U.S. STRANDING NETWORK
1-866-767-6114

U.S. ENTANGLEMENT NETWORK
1-877-767-9425

CANADIAN MARINE MAMMAL Reporting Hotline
1-800-465-4336

REGULATIONS FOR KILLER WHALES IN U.S. WATERS
WHERE do federal regulations to protect killer whales apply? In inland waters of Washington State, east of the entrance to the Strait of Juan de Fuca and south of the U.S./Canada boundary.
WHAT do the regulations require? Except for specific exemptions, it is unlawful for any person to:
• Cause a vessel to approach, in any manner within 200 yards (182.9 metres) of any killer whale.
• Position a vessel to be in the path of any killer whale at any point located within 400 yards (365.8 metres) of the whale.
WHO do the regulations apply to? All motorized and non-motorized vessels (including kayaks and paddleboards), with exceptions to maintain safe navigation and for certain types of vessels - government vessels in the course of official duties, ships in the shipping lanes, research vessels under permit, and vessels lawfully engaged in commercial or treaty Indian fishing that are actively setting, retrieving, or closely tending fishing gear.
WHY did NOAA adopt regulations? Southern Resident killer whales were listed as endangered in 2005. Vessel impacts were identified as one of the threats. These regulations implement an action in the recovery plan and are designed to protect all killer whales by reducing impacts from vessels. Southern Residents are also listed as endangered under the Species at Risk Act in Canada.

TRANS-BOUNDARY GUIDELINES FOR THE UNITED STATES AND CANADA, APPLY TO ALL MARINE MAMMALS AND BIRDS
1. **DO NOT APPROACH** or position your vessel closer than 200 metres/yards to any killer whale in the U.S. DO NOT APPROACH or get closer than 100 metres/yards to any other marine mammals or birds, whether on the water or on land.
2. **BE CAUTIOUS, COURTEOUS and QUIET** when around areas of known or suspected marine wildlife activity, in the water or at haul-outs and bird colonies on land; especially from May to September during breeding, nesting and seal pupping seasons.
3. **LOOK** in all directions before planning your approach or departure from viewing wildlife.
4. **SLOW DOWN** reduce speed to less than 7 knots when within 400 metres/yards of the nearest marine mammal to reduce your engine's noise and vessel's wake.
5. **ALWAYS** approach and depart from the side, moving parallel to the animal's direction of travel. If the animal(s) are approaching you, cautiously move out of the way and avoid abrupt course changes. DO NOT approach from the front or from behind.
6. **PLACE ENGINE IN NEUTRAL** and allow animals to pass if your vessel is not in compliance with the approach regulation or guideline (#1).
7. **PAY ATTENTION** and move away, slowly and cautiously, at the first sign of disturbance or agitation.

8. **STAY** on the OFFSHORE side of whales when they are traveling close to shore.
9. **ALWAYS** avoid going through groups of porpoises or dolphins and hold course and reduce speed gradually to discourage bow or stern-riding.
10. **LIMIT** your viewing time to 30 minutes or less. This will reduce the cumulative impact of all vessels and give consideration to other viewers.
11. **DO NOT** disturb, swim with, move, feed or touch any marine wildlife. If you are concerned about a potentially sick, stranded or entangled animal, contact your local stranding network.
Drones/Unmanned Aircraft Vehicle or System (UAV/UAS) Guidance
It is illegal to harm or disturb wildlife. To prevent disturbance from an unmanned aerial vehicle (UAV/drones) operators must use extreme caution. UAV/drones may interfere with an animal's ability to hunt, feed, communicate, socialize, rest, breed, or care for its young. Fly during daylight hours, keep your drone in sight and limit your viewing time to reduce the cumulative impact. This is rapidly evolving technology... Know and follow all local regulations.
Marine Protected Areas, Wildlife Refuges, Ecological Reserves and Parks:
1. **CHECK** your nautical charts for the location of various protected areas.
2. **ABIDE** by posted restrictions or contact a local authority for further information.

U.S. LAW: STAY 200 M/YD FROM ORCAS
GUIDELINE
100 M/YD NO APPROACH ZONE FOR ALL MARINE MAMMALS IN US & CANADA
U.S. LAW: KEEP PATH CLEAR TO 400 M/YD
NO GO ZONE
400 M/YD SLOW ZONE
800 M/YD SLOW APPROACH ZONE
RECOMMENDED 7 KNOTS
100 METRES/YARDS = 1 FOOTBALL FIELD
AVOID TRAVEL BEHIND WHALES

Appendix B: Be Whale Wise Guidelines and Federal/State Regulations Poster for Boaters, Paddlers and Viewers; Revised 2016 (Available at <http://www.bewhalewise.org>)

Be Whale Wise

MARINE WILDLIFE GUIDELINES FOR BOATERS, PADDLERS AND VIEWERS

TRANS-BOUNDARY GUIDELINES FOR THE UNITED STATES AND CANADA APPLIES TO ALL MARINE MAMMALS AND BIRDS.

1. **DO NOT APPROACH** or position your vessel closer than 200 metres/yards to any killer whale in the U.S. **DO NOT APPROACH** or get closer than 100 metres/yards to any other marine mammals or birds, whether on the water or on land.
2. **BE CAUTIOUS, COURTEOUS AND QUIET** when around areas of known or suspected marine wildlife activity, in the water or at haul-outs and feed colonies on land. Especially from May to September during breeding, nesting and seal pupping seasons.
3. **LOOK** in all directions before planning your approach or departure from viewing wildlife.
4. **SLOW DOWN** reduce speed to less than 7 knots when within 400 metres/yards of the nearest marine mammal to reduce your engine's noise and vessel wake.
5. **ALWAYS** approach and depart from the side, moving parallel to the animal's direction of travel. If the animal is approaching you, cautiously move out of the way and avoid abrupt course changes. **DO NOT** approach from the front or from behind.
6. If your vessel is not in compliance with the 100 metres/yards approach guideline (1), place engine in neutral and allow animals to pass.
7. **PAY ATTENTION** and move away, slowly and cautiously, at the first sign of disturbance or agitation.
8. **STAY ON THE OFFSHORE** side of the whales when they are traveling close to shore.
9. **ALWAYS** avoid going through groups of porpoises or dolphins and hold course and reduce speed gradually to discourage bow or stern riding.
10. **LIMIT** your viewing time to 30 minutes or less. This will reduce the cumulative impact of all vessels and give consideration to other viewers.
11. **DO NOT** disturb, swim with, move, feed or touch any marine wildlife. If you are concerned about a potentially sick, stranded animal, or entangled animal, contact your local stranding network.

DRONES/UNMANNED AIRCRAFT VEHICLE OR SYSTEM (UAV/UAS) GUIDANCE

It is illegal to harm or disturb wildlife. To prevent disturbances from an unmanned aerial vehicle (UAV/drones) over the marine environment operators must use extreme caution. UAV/drones may cause a disturbance to the animal. By doing daylight hours, keep your drone in sight and limit your viewing time to reduce the cumulative impact. This is rapidly evolving technology. Know and follow all local regulations.

MARINE PROTECTED AREAS, WILDLIFE REFUGES, ECOLOGICAL RESERVES AND PARKS

1. **CHECK** your nautical charts for the location of various protected areas.
2. **ABIDE** by posted restrictions or contact a local authority for further information.

www.bewhalewise.org

IN INLAND WATERS OF WASHINGTON IT IS UNLAWFUL FOR ANY PERSON TO:

- Cause a vessel to approach, in any manner, within 200 yards/meters of any killer whale.
- Position a vessel to be in the path of any killer whale at any point located within 400 yards/meters of the whale.

The regulation applies to all motorized and non-motorized vessels (including kayaks and paddleboards) with exemptions for government vessels conducting official duties, ships in the shipping lanes, permitted research vessels, and vessels lawfully engaged in commercial or treaty Indian fishing that are actively setting, retrieving, or tending fishing gear.

LAWS Regulations in Canada and the U.S. prohibit the harassment and disturbance of marine mammals. Many species are threatened or endangered and subject to additional protections under the Endangered Species Act (U.S.) and the Species at Risk Act (CANADA).

TO REPORT A MARINE MAMMAL DISTURBANCE OR HARASSMENT

CANADA/B.C. GULF ISLANDS: To report injured, distressed, dead, stranded or entangled marine mammals or sea turtles, Fisheries & Oceans Canada/B.C. Marine Mammal Incident 24/7 hotline: 1-866-465-4336

US/INLAND WA WATERS: To report a marine mammal harassment, entanglement or stranding: NOAA Fisheries, Office for Law Enforcement: 1-800-853-1964 Entanglements: 1-877-767-8425 /Strandings: 1-866-767-4114 Download the dolphin and whale 911 app.

DID YOU SEE A WHALE?

TO REPORT A MARINE MAMMAL & SEA TURTLE SIGHTING:

CANADA/B.C. GULF ISLANDS: B.C. Cetacean Sighting Network 1-866-472-9848 or [sightings@bc Cetacean.org](mailto: sightings@bc Cetacean.org) www.bewhalewise.org WhaleReport app available on iTunes and Google Play

US/INLAND WA WATERS: The Whale Museum Hotline (WA): hotline@whalemuseum.org or 1-800-562-4882

Orca Network (WA): info@orcaneetwork.org or 1-866-672-2638

Appendix B1 & B2: Federal and State Vessel Regulations for Killer Whales Double-sided Rack Card used by WDFW in 2016.

Be Whale Wise

and Follow the Law

It's as easy as 1, 2, 3...

1. The **ONE** place not to be in is the path of whales. Don't position your vessel in the path of oncoming whales within 400 yards of a whale.
2. Stay at least **TWO** hundred yards away from any killer whale (200 yards = the distance of two football fields or about 200 meters).
3. Remember these **THREE** ways to Be Whale Wise: follow the guidelines for viewing all wildlife, check for local protected areas, and restrictions, and always be safe.

WHEN do the new rules go into effect? May 16, 2011

WHERE do the new rules apply? In inland waters of Washington State- east of the entrance to the Strait of Juan de Fuca and south of the U.S./Canada international boundary.

WHY did NOAA adopt new regulations? Southern Resident killer whales were listed as endangered in 2005. Vessel impacts were identified as one of the threats. These new regulations implement an action in the recovery plan and are designed to protect all killer whales by reducing impacts from vessels. Additional background information on the rationale and analyses to support the regulations is available at www.nwr.noaa.gov.

Visit www.bewhalewise.org to learn more, download the laws, regulations, and guidelines, and to report violations.

Report Violations: NOAA Office for Law Enforcement 1-800-853-1964 or online at www.bewhalewise.org

Appendix C: 2015 Kayaker Code of Conduct Brochure, Folded, Double-sided (Available at <http://www.whalemuseum.org>)

ALL RESPONSIBLE PADDLERS OF ANY HUMAN-POWERED VESSELS:

- Are aware of and strive to follow all local, state and federal laws and the Be Whale Wise Guidelines governing behavior around killer whales, other marine wildlife and in Marine Protected Areas (see map).
- Have a trip plan before leaving shore. This includes knowing the area's boating laws, accessible public landing areas, safety issues, and environmental conditions.

Map Index Description

Marine Preserves
Regulation: Closed to all shellfish and bottomfish harvest. See WDFW Marine Area 7 rules for exact locations. **Salmon Fishing Closure:** No salmon fishing within 300 yards of Yellow & Low Islands to reduce rockfish mortality.

National Wildlife Refuges
Boaters are advised to stay 200 yards away to avoid disturbing marine mammals and birds.

Bottomfish Recovery Zones
Guideline: No bottomfishing within 1/4 mile of shore to protect and restore regional fishing.

Voluntary Motor Boat Exclusion Zone
Remain 1/4 mile offshore when whales are present. 1/2 mile "no go zone" in Lime Kiln State Park area when whales are present.

Sensitive Areas marked are for seal haul-outs and seabird nesting sites. Additional Sensitive Areas not marked on the "Area Detail" map include **Elgras Habitat**; elgras provide critical habitat for juvenile fish. Please avoid disturbing sediments and vegetation.

ADDITIONAL K.E.L.P. GUIDELINES
All paddlers pledge to observe these voluntary Guidelines to help preserve & protect our marine environment.

- Human-powered vessels may launch if they can safely maintain 200 yards from the whales.
- Paddle on the inshore side of whales. If paddling in a group, all paddlers will stay close together.
- To avoid being in the path of whales, paddlers will need to start moving out of the path of on-coming whales well before the whales are within 400 yards.
- In some cases, paddlers may need to stay where they are, or move further offshore, to avoid being within 200 yards of whales and to avoid being in the path of whales.
- Paddlers can continue as long as they maintain at least a 200 yard distance and avoid the path of the whales. Paddlers need to alter their course and/or position to keep 400 yards out of the whales' path.
- If whales are approaching to within 200 yards of shore, paddlers will move in to shore as close as possible (ideally in help beds, raft up, secure themselves, and stop paddling, until the whales have passed).
- Paddlers will avoid headlands.
- If paddlers have taken all measures and still find themselves unexpectedly out of compliance with the laws, they will:
 - Paddle out of the path of on-coming whales, 400 yards & on whales;
 - Immediately stop paddling within 200 yards until the whales have passed by.
- Paddlers shall avoid disturbing haul-out areas for seals/sealions and/or sea bird nesting sites by paddling in at least a 100 yard arc whenever possible. Avoid making noise, direct eye contact and spook movements. May through October is the most sensitive time of the year for breeding seals, sea lions and nesting birds.
- Paddlers will maintain a 200 yard distance from any National Wildlife Refuge. No landings are permitted except at designated areas.

ALL MARINE MAMMALS ARE PROTECTED
All Marine Mammals are protected from harassment or disturbance under the U.S. Marine Mammal Protection Act and the Canadian Fisheries Act.

Maintain a 100 yard distance from all marine mammals (i.e., humpbacks, minke, harbor seals, sea otters, Steller sea lions). Do not disturb, move, feed, or touch any marine wildlife, including seal pups. If you are concerned about a potentially sick or stranded animal, please contact the local Stranding Network Hotline.

Southern Resident Killer Whales are afforded additional protections as an Endangered Species under the U.S. Endangered Species Act and as a Species at Risk under the Canadian Species at Risk Act.

In Washington State waters, ALL killer whales are protected under RCW 77.15.120

Need more information?
The Whale Museum's Soundwatch Program
www.whalemuseum.org
NOAA Fisheries, West Coast Region
www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/
Protecting Killer Whales
www.wdfw.wa.gov/conservation/orca

To report marine mammal strandings/sightings:
1-800-562-8832 or hotline@whalemuseum.org

To report a marine mammal disturbance or harassment:
U.S. NOAA Fisheries, Office for Law Enforcement
1-800-853-1964 or www.bewhalewise.org
Washington Dept. of Fish and Wildlife Enforcement
1-360-902-2936

Kayaker Code of Conduct Additional Guidelines crafted collaboratively by The Whale Museum and the San Juan Island Kayak Association with input from WDFW and NOAA Fisheries.

Be Whale Wise SOUNDWATCH K.E.L.P.

The Kayaker Education & Leadership Program (K.E.L.P.), is a program that informs kayakers on marine wildlife regulations and guidelines with the aim to reduce human-powered vessel disturbance to Southern Resident orcas and all marine wildlife within the San Juan Islands.

Human powered vessels have the unique challenge of limited maneuverability and a variety of safety concerns that require special consideration to remain in compliance with federal laws and to reduce the overall risks of disturbing marine wildlife.

GUIDELINES FOR KAYAKERS WHEN ORCAS ARE PRESENT

The Kayakers' Code of Conduct is a set of San Juan Island area specific guidelines meant to be used along with regional Be Whale Wise Marine Wildlife guidelines and current Federal Vessel Laws.

- Do not launch from shore if you are unable to maintain 200 yards from the whales.
- Paddle to shore of further offshore to maintain 200 yards to the side and 400 yards out of their path.
- If within 400 yards of whales, kayakers should paddle toward shore, raft up in help beds, stop paddling, secure themselves and wait until the whales are 400 yards away.
- If offshore of whales and within 400 yards, raft up for safety in boat traffic (preferable kayakers will always be in shore of boat traffic).
- Always adjust your plan of action according to the whales' direction of travel and the state and federal laws.

SIKA
SAN JUAN ISLAND KAYAK ASSOCIATION
www.sika.org

Appendix C2: 2015 Kayaker Code of Conduct Rack Card, Double-sided (Available at <http://www.whalemuseum.org>)

Be Whale Wise SOUNDWATCH K.E.L.P.

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SIKA
SAN JUAN ISLAND KAYAK ASSOCIATION
www.sika.org

Marine Preserves
Regulation: Closed to all shellfish & bottomfish activities. (See WDFW Marine Area 7 for exact locations.) **Salmon Fishing Closure:** No salmon fishing within 300 yards of Yellow & Low Islands to reduce rockfish mortality.

National Wildlife Refuges
Boaters are advised to stay 200 yards away to avoid disturbing marine mammals & birds.

Bottomfish Recovery Zone
Guideline: No bottomfishing within 1/4 mile of shore to protect & restore regional fishing.

Voluntary Motor Boat Exclusion Zone
Guideline: Remain 1/4 mile offshore when orcas are present. 1/2 mile "no go zone" at Lime Kiln State Park when orcas are present.

Sensitive Areas
Areas marked are for seal haul-outs & seabird nesting sites. Elgras beds provide critical habitat for juvenile fish. Please avoid disturbing sediments & vegetation.

Be Whale Wise SOUNDWATCH K.E.L.P.

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- If offshore of whales and within 400 yards, raft up for safety in boat traffic (preferable kayakers will always be in shore of boat traffic).
- Always adjust your plan of action according to the whales' direction of travel and the state and federal laws.

SIKA
SAN JUAN ISLAND KAYAK ASSOCIATION
www.sika.org

Appendix D: Soundwatch Data Sheet Vessel Contact.

VESSEL CONTACT								
Time	Location	Latitude	Longitude	Why contacted?	Took BWW? Why Not?	Prev Cntct?	Redo?	Incident Recorded? Time:
					Y N	Y N	Y N	
Vessel Type	Vessel Activity	Vessel Name	Vessel ID	Reaction	Port	# pass	Photo?	Comments:

Appendix H: Soundwatch Marine Wildlife Guideline and Law Incident Codes for Vessel Incident Observations (Page 1).

	FAST/SPEED	
2.0	speed	vessel traveling over 7 knots w/in 400y/366m of whales, fast w/in 1/4 mile (440y/402m)
2.1	speed - approaching scene	vessel traveling over 7 knots w/in 400y/366m of whales, fast w/in 1/4 mile (440y/402m)
2.2	speed - departing scene	vessel traveling over 7 knots w/in 400y/366m of whales, fast w/in 1/4 mile (440y/402m)
	IN PATH	NEW 2011 LAWS
3.1A	In path 200-400 yds	w/in 200y/183m corridor path in front of whales between 200-400y/183-366m ahead of whales
3.3	In path - cross	crossing path of whales, vessel traveling across expected path (200-400yds) whales predictable
	APPROACH	
4.1	approach - head on	vessel approaching a whale/group head on w/in 200-400y/181-366m when whales are traveling in a relatively predictable pattern
4.2	approach - behind	vessel approaching/traveling behind a whale/group w/in 200-400y/181-366m when whales are traveling in a relatively predictable pattern
	W/in 100 YARDS/M	
5.1	100y/91m - stopped	vessel stopped w/in 100y/91m of whales
5.2	100y/91m - under power	vessel under power w/in 100y/91m of whales
5.4	100y/91m - fishing	vessel fishing w/in 100y/91m of whales (did not attempt to move out of path of whales)
	W/in 200 YARDS/M	NEW 2011 LAWS
6.1	200y/183m - stopped	vessel stopped w/in 200y/183m of whales
6.2	200y/183m - under power	vessel under power w/in 200y/183m of whales
6.4	200y/183m - fishing	vessel fishing w/in 200y/183m of whales (did not attempt to move out of path of whales)
7.0	INSHORE	vessel on the inshore side of whales, when whales are traveling close to shore (within 1/2 mile)
	AREA RESTRICTION	**Placeholder for WDFW Proposed New SLOW ZONE Guideline: NOT IN EFFECT as of June 2011**
40.1	area restriction - SJIVNBZ 1	vessel w/in 1/4mile (440y/402m) of the SJL shoreline in the determined zone with whales present
40.2	area restriction - Lime Kiln	vessel w/in 1/2mile (880y/808m) of shoreline 1mile radius of Lime Kiln Light with whales present
40.3	area restriction - NWR	vessel w/in 200y/183m of U.S. National Wildlife Refuge (NWR) site
40.4	area restriction - RRER	vessel w/in 100y/91m of any Race Rocks Ecological Reserve shoreline
40.6	area restriction - SJIVNBZ 2	vessel w/in 1/8mile (220y/201m) of ANY shoreline with whales present
40.7	area restriction - SJL Slow Zone	vessel > 7 knots w/in 1/2mile (880y/808m) SJIVNBZ with whales present **WDFW PROPOSED New Guideline**
	AIRCRAFT	
50.1	aircraft - low flying	aircraft flying lower than 1000feet (333y/305m)
50.2	aircraft - low circling	aircraft circling lower than 1000 feet (333y/305m)

Appendix H1: Soundwatch Marine Wildlife Guideline and Law Incident Codes for Vessel Incident Observations (Page 2).

60.1	kayaks - spread out	kayaks not rafted up (spread loosely) when whales are present
60.2	kayaks - 100y/91m	kayaks paddling w/in 100y/91m of whales
60.3	kayaks - launching	kayaks launching into area when whales are present
60.4	kayaks - offshore 1/4m	kayaks paddling farther than 1/4 mile (440y/402m) offshore when whales are present
60.5	kayaks- parked on headland	kayaks parked on headland with whales present
60.6	kayak - 200y/183m	kayaks paddling w/in 200y/183m of whales NEW 2011 LAW
	BOWRIDING	
20.1	bowriding - erratic	vessel operating in erratic fashion while engaged in bowriding
20.2	bowriding - deliberate	vessel deliberately attempting to have animal(s) bow/stern ride i.e. REPEATED CIRCLING
	HAULOUT	
30.0	haulout - speed	vessel over 7 knots w/in 200y/183m of active haulout
31.2	haulout - no navigation restriction	vessel w/in 100y/91m of an active haulout - no navigation restriction
32.0	haulout - disturbance	vessel w/in 400y/366m of active haulout causing disturbance
32.1	haulout - disturb deliberate	any deliberate disturbance of active haulout
32.2	haulout - disturb maintain	disturbance with no attempt to move away from haulout
32.3	haulout - disturb but moved	disturbance but moved away
9.0	INTERACTION	swimming, feeding, touching wildlife DEFINE INTERACTIONS
10	Other: Define	something out of the ordinary or site specific DEFINE OTHER
8.0	TIME LIMIT	vessel is staying longer than 30 minutes w/in 1/4 Mi (440y/402m) of whales- record if only a few whales

Appendix I: Soundwatch Data Sheet Vessel Incidents.

Vessel Incident Log										
Time 24hour	General Location Name/Dir/Distance	Lat Decimal Minutes	Long Decimal Minutes	Quad Pick one!	Vessel Codes NOVESSEL ID'S NEEDED		Incident Code #'s	Previous Contact: Yes/No?	Photos? Yes/No?	Comments on Situation:
					TYPE	ACT				

Appendix J: Soundwatch Data Sheet Vessel Count/Whale Survey.

DATE:	Time	Lat	Location Name: Dir: Distance:			Total Count:	Total Eco:	Total Priv:	Total: Kayak	Count: A B													
	Sea St.	Long	Quad:	Weather:	Visibility:	EU	EC	PM	PS	EK	PK	CA	PA	MM	RP	GW	GN	GD	MW	MX	MY	OTHER	DERNE:
Weekend <input type="checkbox"/>	Pod: J Jp K Kp L Lp T		Vessel Activity?			Whale Cmt/Mntr																	
Weekday <input type="checkbox"/>	Soc: DIR/NON DIR: N S E W		Fish																				
	Orig: CTC/THT/LOO SPD SPD Gps: etc tht loo		Transit																				
	Brntr: FLNK LIN NONLIN		Rsrch NonWhale																				
Holiday <input type="checkbox"/>	Soc: Mnts S lo Med Fst Porp		Enforce Active																				
	Brntr: Tvl Rst Mill Sod		Acoustic > 1/2mi																				
Boating	Cmnts:		Other Descp:																				

Appendix K: Soundwatch Whale Survey & Behaviors Codes for Whale Scans (Page 1).

Species code	Species Name	Latin Name
oror (SR)	killer whale - southern resident	Orcinus orca
oror (T)	killer whale - transients	Orcinus orca
oror (NR)	killer whale - northern resident	Orcinus orca
esro	gray whale	Eschrichtius robustus
meno	humpback whale	Megaptera novaeangliae
baac	minke whale	Balaenoptera acutorostrata
bamu	fin whale	Balaenoptera musculus
phph	harbour porpoise	Phocoena phocoena
phda	Dall's porpoise	Phocoena dalli
laob	Pacific white-sided dolphin	Lagenorhynchus obliquidens
phvi	harbour seal	Phoca vitulina richardsi
euju	Stellar's sea lion	Eumatopius jubatus
enlu	sea otter	Enhydra lutris
brma	marbled murrelet	Brachyramphus marmoratus
syam	ancient murrelet	Synthliboramphus antiquus
arhe	Pacific great blue heron	Ardea herodias fannini

Common Behaviors		
Spy Hop	Aerial scan	Breach
Half breach	Bellyflop	Pec slap
Pec wave	Inverted pec slap	Tail wave
Tail Slap	Inverted tail slap	Tail lift-headstunt
Dorsal fin slap	Cartwheel	Chasing
Lunging/surging	Rolling at surface	High arch dives
Reverse	Push/lift/carry whale	Playing with log / object
Kelping	Fish seen	Vocalization heard
Bubble blowing	Synchronous surfacing	Mating
Penis seen-whale w/another	Penis seen-whale alone	Other-describe

Configuration	
Contact:	physical contact
Tight:	0 to 10m from another animal
Loose:	10 to 100m
Spread:	Greater than 100m

Orientation/Formation	
Flank:	side-to-side-to-side
Linear:	head-to-tail
Non-linear:	no particular orientation within group

Speed	
Motionless:	0 knots, "hanging", "logging"
Slow:	less than 2 knots, less smooth or "jerky" surfacing
Medium:	2-6 knots, slow roll, "normal"
Fast:	6-10 knots, fast roll
Porpoising:	greater than 10 knots, large portion of body out of water

Direction of travel	
N	North
NW	SouthWest
NE	NorthEast
E	East
S	South
SW	SouthWest
SE	SouthEast
W	West

Directionality	
Directional:	less than or equal to 90deg from previous direction of travel
Non-directional:	deviation of greater than 90deg from previous direction of travel

Appendix K: Soundwatch Whale Survey & Behaviors Codes for Whale Scans (Page 2).

Species code	Species Name	Latin Name
oror (SR)	killer whale - southern resident	Orcinus orca
COOSE ALL THAT APPLY: J Jpartial K Kpartial L Lpartial List ID's If possible		
oror (T)	killer whale - transients	Orcinus orca
oror (NR)	killer whale - northern residents	Orcinus orca
esro	gray whale	Eschrichtius robustus
meno	humpback whale	Megaptera novaeangliae
baac	minke whale	Balaenoptera acutorostrata
phvi	harbour seal	Phoca vitulina richardsi

Common Behaviors/Overall Behavior State		
Spy Hop	Aerial scan	Breach
Half breach	Belly flop	Pec slap
Pec wave	Inverted pec slap	Tail wave
Tail Slap	Inverted tail slap	Tail lift-headstunt
Dorsal fin slap	Cartwheel	Chasing
Lunging/surging	Rolling at surface	High arch dives
Reverse	Push/lift/carry whale	Playing with log / object
Kelping	Fish seen	Vocalization heard
Bubble blowing	Synchronous surfacing	Mating
Penis seen-whale w/another	Penis seen-whale alone	Milking
Tail-Lob	Sharking	Other-describe:
Fast Non-Directional	Long-dives	
Behavior States: TRAVEL REST MILL SOCIALIZE		

Sea State	Effect of Combined Wind And Currents on Sea State
0	like a mirror (flat)
1	ripples form with the appearance of scales, but w/out foam crests
2	small wavelets, crests appear glassy, no breaking
3	larger wavelets begin to break, glassy foam, scattered white caps
4	small waves predominant but fairly frequent white caps
5	moderate waves, distinctly elongated, many white horses, chance of spray
6	long waves with extensive white foam breaking crests begin to form, spray likely
7	sea heaps up, white foam breaking waves start to be blown in streaks
8+	WHY THE HELL ARE BOATS STILL OUT THERE?

Configuration (Overall Group)	
Contact:	physical contact
Tight:	0 to 10m from another animal
Loose:	10 to 100m
Spread:	Greater than 100m
Spread in Groups:	Distinct sprd groups

Formation (Overall Group)	
Flank:	side-to-side-to-side
Linear:	head-to-tail
Non-linear:	no particular orientation within group

Speed	
Motionless:	0 knots, "hanging", "logging"
Slow:	less than 2 knots, less smooth or "jerky" surfacing
Medium:	2-6 knots, slow roll, "normal"
Fast:	6-10 knots, fast roll
Porpoising:	greater than 10 knots, large portion of body out of water

Direction of travel	
Directionality	
Directional:	less than or equal to 90deg from previous direction of travel
Non-directional:	deviation of greater than 90deg from previous direction of travel
N, NW, NE, E, S, SW, SE, W	

Weather & Abbrev.	
sunny	S
sunny w/ partial clouds	SPC
overcast - high	OCH
overcast	OC
foggy	FOG
rain - light	RL
rain - heavy	RH

Appendix L: Soundwatch Marine Conditions & Vessel Codes for Vessel Counts.

Beaufort Scale	Mariner's Description	Wind Speed	Effect of Wind at Sea
0	calm	0-1	like a mirror (flat)
1	light air	1-3	ripples form with the appearance of scales, but w/out foam crests
2	light breeze	4-6	small wavelets, crests appear glassy, no breaking
3	gentle breeze	7-10	larger wavelets begin to break, glassy foam, scattered white caps
4	moderate breeze	11-16	small waves predominant but fairly frequent white caps
5	fresh breeze	17-21	moderate waves, distinctly elongated, many white horses, chance of spray
6	strong breeze	22-27	long waves with extensive white foam breaking crests begin to form, spray likely
7	moderate gale	28-33	sea heaps up, white foam breaking waves start to be blown in streaks, beginning of spindrift
8	fresh gale	34-40	
9	strong gale	41-47	
10	white gale	48-55	
11	storm	56-66	
12	hurricane	above 66	

Vessel Code	Description	Visibility	Weather
CA	Commercial Aircraft	none	sunny
EA	Ecotour aircraft	poor	sunny w/ partial clouds
EC	Ecotour Canadian	fair	overcast - high
EK	Ecotour Kayak	good	overcast
EU	Ecotour US	excel	foggy
PA	Private Aircraft		rain - light
PK	Private Kayak/Paddle		rain - heavy
PM	Private Motor		
PS	Private Sail		
MC	Marine Charter		
MF	Marine Fishing		
ML	Marine Tug with log barge		
MM	Marine Monitoring		
MQ	Marine Cruiseship		
MW	Marine Tug with tow		
MX	Marine Shipping		
MY	Marine Ferry		
GA	Government aircraft		
GB	Government BC Parks		
GC	Government Coast Guard		
GD	Government DFO		
GL	Government military		
GN	Government NOAA		
GO	Government		
GW	Government WDFW		
RP	Permitted Research		

Location	
Prominent Place Name	
Direction:	
N, NE, NW, E, S, SE, SW, W	
Distance:	
1/4 Mi, 1/2 Mi, 1 Mi, 2mi, 2+Mi	

Vessel activity	
W	Whale Oriented
F	Fishing
T	Transiting
R	Research (whale oriented)
E	Enforcement
A	Acoustic Range
O	Other with description

Appendix M1 & M2: The Whale Museum Watching Whales in the Wild Exhibit Hall Panels

Watching Whales in the Wild

Watching whales in the wild is a thrilling experience. The Salish Sea has some of the best whale watching from shore! Remember that our presence has an effect on all wildlife and their habitat.

Southern Resident orcas were listed as an Endangered Species in 2005

The three main threats to Southern Resident orcas are:

- 1. Prey availability:** Chinook salmon in this region are listed as endangered or threatened. They make up 80% of the Southern Resident orcas' diet. Limited prey availability is a result of the decline in salmon populations.
- 2. Contaminants:** Toxins in the ecosystem such as flame retardants (PBDEs), industrial products (PCBs) and pesticides (DDT) negatively affect their health and reproduction.
- 3. Vessel disturbance:** Includes human-made noise and acoustic signatures of all types of vessels (motorized vessels, including recreational boats, commercial whale watching, commercial fishing, tug boats, cargo ships, and military vessels; and non-motorized vessels, including kayaks, sail boats and paddle boards).





Vessel Disturbance Research

Did you know approximately 500,000 people visit San Juan Island every year and many of them by boat? Researchers have been working hard to determine the effect vessels have on killer whales.

Here are a few things you can do on the water while boating to reduce your impact:

- Reduce your speed to less than 7 knots within 1/2 mile of wildlife to minimize wake and underwater acoustic disturbance, pass slowly without stopping and avoid abrupt course changes.
- Maintain a distance greater than the State and Federal laws and turn your engine off when possible.

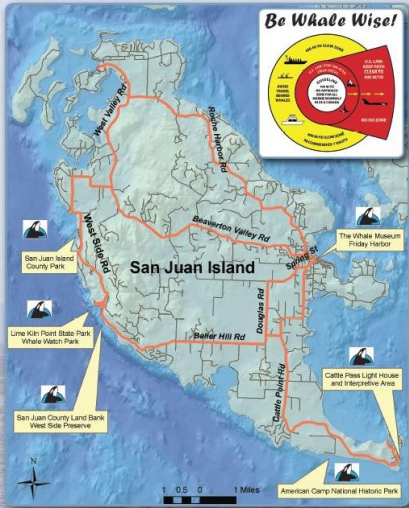
Research has shown that with an increase in ambient noise, killer whales increase the volume of their echolocation clicks and their communication calls to one another. All types of vessels (including non-motorized) have the potential to affect the whales' health, change their behavior, and increase their stress levels.

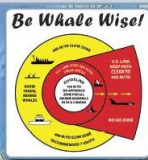
Watching Whales on San Juan Island

Lime Kiln Point State Park, San Juan County Land Bank West Side Preserve and Cattle Point Lighthouse & Interpretive Area are the best places to see orcas from land on San Juan Island. The Whale Museum has a research station in the Lime Kiln Lighthouse which is open to visitors in the summer months. There is also a year-round listening station connected to a hydrophone that streams underwater sounds live. If orcas are in the area, you just might hear them! To listen to the hydrophone live from anywhere in the world, visit www.seasound.org.

Stellar Wildlife Spots!



Be Whale Wise!



Stewardship Practices:

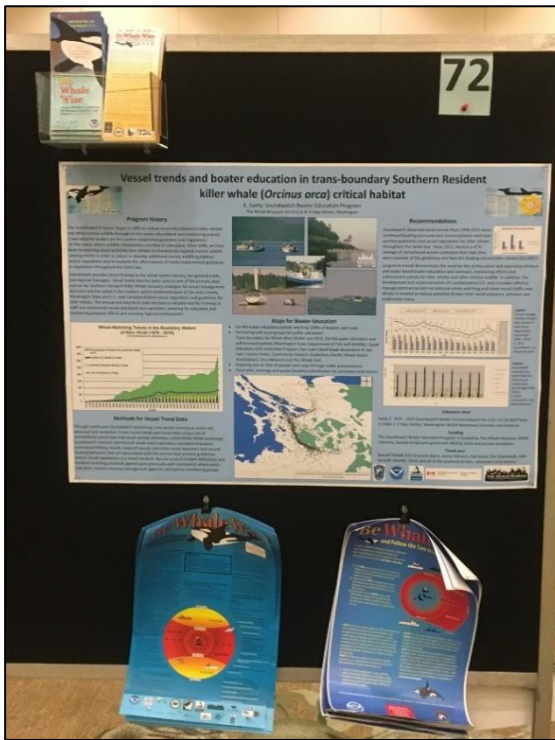
1. Follow Be Whale Wise Guidelines and Laws for Washington State and Canada. These apply to all types of vessels.
2. Drones (UAV): Is your drone registered? Did you know that it is illegal to fly a drone within a state or national park? The WA State killer whale law applies to drones.
3. Keep an eye on the weather! Sea conditions vary considerably. Did you check the tides and currents for the day? Do you have safety gear? Binoculars?

How you can help:

- Reduce, Reuse, Recycle and Compost!
- Unplug electronics and appliances. Turn off the lights!
- Decrease water usage (take shorter showers and turn off the faucet when brushing your teeth or washing dishes). Collect rainwater or plant a rain garden.
- Use environmentally-friendly cleaning products.
- Properly maintain your mode of transportation (vehicle, boat, motorcycle).
- Support killer whale conservation efforts!
- Report marine mammal sightings to The Whale Museum's Sightings Hotline (1-800-562-8832 or hotline@whalemuseum.org).
- Adopt an orca through The Whale Museum's Orca Adoption Program.
- Share your knowledge and help spread the word!

BeWhaleWise.org

Appendix N: Soundwatch Boater Education Salish Sea Ecosystem Poster Session



Appendix O: The Whale Museum's 2015 Orca Master SRKW Plotted Sightings.

