

FINAL 2017 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: Fifth year of multi-year contract: January 1, 2017 through December 31, 2017

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 2017 killer whale watching season and to provide a data update to the **RA-133F-12-CQ-0057**. 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 Program is to reduce vessel disturbance to killer whales and other marine wildlife through educating recreational boaters on regional guidelines and regulations, to provide systematic monitoring of vessel activities around all cetaceans within the program area, and to present a data update to the 2016 report on whale watching trends in the Haro Strait region to inform future management strategies. The program area includes the north central Salish Sea: the boundary waters of the Canadian Gulf and San Juan Islands, located in northwestern Washington State and southwestern British Columbia in the Puget Sound/Georgia Basin. The Salish Sea includes Puget Sound and the Straits of Georgia and Juan de Fuca.

The objectives of this 2017 project were to: provide boater education services through public outreach and on-the-water stewardship activities, to monitor vessel activity within 0.5 mile radius of whales, specifically killer whales (*Orcinus orcas*) with a priority to Southern Resident killer whales (SRKWs) from May-September, collect data on vessel activities, and conduct analysis on vessel activities in the Central Salish Sea around killer whales and other marine wildlife

SRKWs have been closely monitored for several decades. Their population peaked at 97 whales in the 1990s and then declined to 79 whales in 2001. NMFS listed the Southern Resident killer whale distinct population segment (DPS) as endangered under the ESA on November 18, 2005 (70 FR 69903). At the end of 2017, there were 76 whales (Center for Whale Research).

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 77.15.740) on SRKWs in 2012 to match the Federal 200 yard and 400 yard in-the-path approach distances for inland waters.

The 2017 Soundwatch data collection consisted of: counts of vessels within one half-mile of any cetacean by type, location and activity ("vessel counts"), cetacean behavior data: identification, number of animals/groups, location, travel direction and behavior states, vessel contact information ("recreational contacts") as well as EcoTour (commercial) and private recreational vessel compliance with voluntary guidelines and/or regulations ("vessel incidents"). A brief summary of whale presence in the Central Salish Sea is given in this report. The entirety of Soundwatch data on cetacean identification, number of animals/groups, location, travel direction and selected behaviors is incorporated into The Whale Museum's long-term Whale Sightings' database. Soundwatch data specific to SRKWs is compiled into the Museum's annual Orca Master NOAA Contract Report. All Soundwatch data is available through The Whale Museum's data sets or upon request.

Data analyzed for this annual update report reflects data collected by The Whale Museum's Soundwatch Boater Education Program in 2017 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.

*This updated 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 2017 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 2017 whale watching season and provide data analysis updates to the 2016 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 2017 whale watch season
- 2) Collect data on vessel activities during the 2017 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 2017 data updates to the 2016 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 2017.

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 vessels from U.S. and Canada.
- 2) Growth of Commercial (EcoTour) Whale Watching in the Boundary Waters of Haro Strait May-September in number of vessels.
- 3) Commercial (EcoTour) Whale Watch Platforms in the Boundary Waters of Haro Strait May-September in numbers of vessels.
- 4) Average Number of Vessels with killer whales Per Month May-September in numbers of vessels.

- 5) Annual Average Numbers of Vessels with killer whales at Different Times of Day, May-September in number of vessels.
- 6) Annual Vessel Type Averages and Maximum Vessel Type Numbers of Vessels.
- 7) Mean Annual Daily Average of Number of EcoTour (Commercial) and Private recreational boats with Whales in Haro Strait Region May-September with Standard Deviation in number of vessels.
- 8) Annual Distribution of Vessels within ½ Mile Radius of Whales May-September in percentages.
- 9) Distribution of EcoTour (Commercial) Whale Watch within ½ Mile Radius of Whales in percentages.
- 10) Distribution of Private recreational vessels 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 vessels from U.S. and Canada.
- 2) Growth of EcoTour (Commercial) Whale Watching in the Boundary Waters of Haro Strait May-September in number of vessels.
- 3) EcoTour (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 vessels.
- 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 vessels and by types of vessels.
- 7) Mean Annual Daily Average of Number of EcoTour (Commercial) and Private recreational vessels 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 EcoTour (Commercial) Whale Watch within ½ Mile Radius of whales in percentages.

- 10) Distribution of Private recreational vessels 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 - 2017).

Section I: Summary of 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, intern, and volunteer crews educate boaters on the current established regulations, guidelines, best practices for viewing, and vessel operations around marine wildlife, specifically killer whales. 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 implemented guidelines or regulations (Seely et al. 2017).

The Whale Museum's Soundwatch Boater Education Program has developed standardized procedures for the training of new and seasonal staff with data collection, data entry, and analysis. Soundwatch data collection procedures are designed to follow protocols using regionally established data parameters for SRKWs. Soundwatch staff and paid seasonal vessel drivers are required to undergo on and off-the-water training using standardized instruction. Training protocol states that vessel drivers observe vessel and cetacean interactions and dictate all data observations to interns and volunteers who record the driver's observations onto data collection forms and help hand off educational materials to recreational 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, 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.

Soundwatch has collected data on vessel numbers, types and behaviors around SRKWs since 1998. These findings are provided to the whale watch industry, the public and regional managers. Vessel trend data has been used as the primary data source to inform SRKW recovery strategies in terms of vessel management decisions as well as aided in the creation and/or implementation of San Juan County, Washington State, 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 (EcoTour) vessel and kayak tour operators and in planning for education and monitoring program efforts.

From May – September 2017, Soundwatch operated vessel patrols to educate and monitor boaters an average of six days per week under National Marine Fisheries Service (NMFS) research issued permit no. 16160/21114. Soundwatch staff and volunteer crews spent a total of 123 days on the water with marine wildlife between May 10, 2017 and September 28, 2017, totaling 812 on the water hours and traveling 6,385 nautical miles (Figure 3). Whales were present on 81 days and killer whales on 78 days, for 689 hours,, averaging six hours per day of on the water effort (Figure 4). Over the summer seasons (May-September) since 1998, Soundwatch has totaled more than 11,954 observational and outreach hours with vessels and whales in the Haro Strait region (Figure 2).

Soundwatch crew included; one full-time paid program coordinator, one seasonal part-time vessel driver/educator, two full-time summer interns, one-part-time intern, *25 dedicated on-boat volunteers*, and many other community volunteers. Approximately 1,000 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. Soundwatch staff, the seasonal vessel driver, interns and volunteers, totaled 812 hours 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. Training exercises continued through June and data collection during that time was included in the overall data analysis (June-September 2017). Data collected during on-the-water training/monitoring in May were not included in analysis to minimize the bias during data collection. Figures 1 and 2 show a brief overview of Soundwatch activities from 2017 and from 1998 – 2017.

The on-the-water crew operated with a minimum of two and a maximum of four crew members. Equipment utilized in 2017 consisted of a 17' American Eagle rigid hulled vessel, R/V Raydiance. Raydiance's fuel tank was expanded from 17 to 58 gallons providing a greater geographic range to monitor vessel presence in proximity to killer whales. An alternate 19' Safe Boat rigid hulled vessel, R/V L-98, was repowered with an inboard gasoline engine. L-98 was used for four monitoring days in the 2017 summer season. Both vessels were fully equipped with safety equipment, VHF radios, and chart plotters. The radar on R/V L-98 (used for accurate distance calculations of vessels) was not available in 2017 season. R/V Raydiance is not equipped with a radar but does have a Garmin GPS unit.

Soundwatch and Washington State Fish and Wildlife received a Section 6 ESA Grant that has helped provide funding through June 2019, enabling both programs to maintain vessels and operate on the water on a more consistent basis.

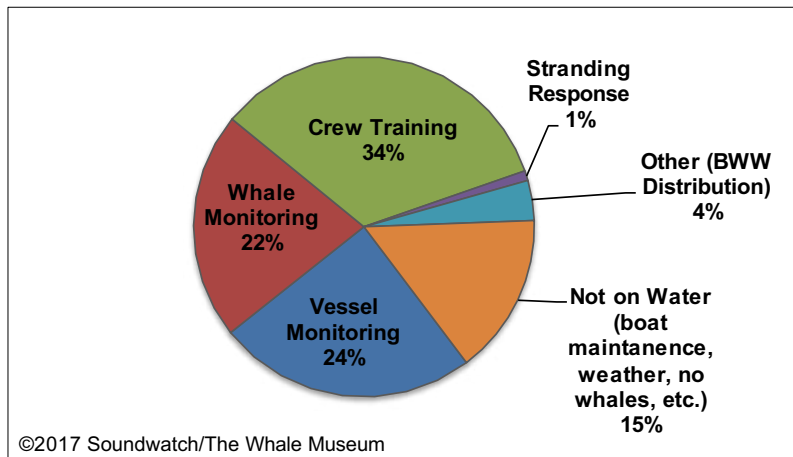


Figure 1: Distribution of Soundwatch of On-the-Water Activities 2017.

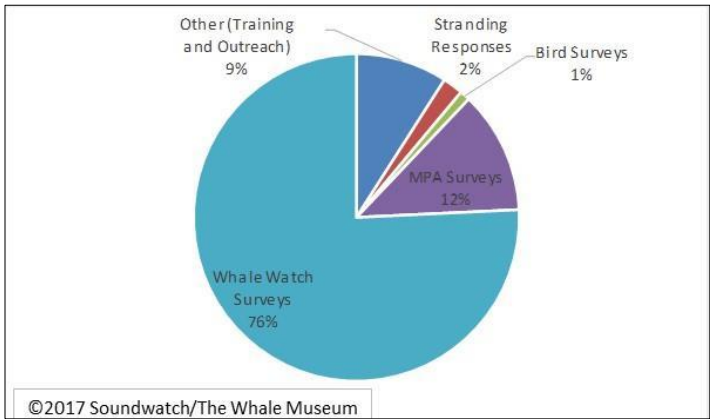


Figure 2: Distribution of Soundwatch - On-the-Water Activities 1998-2017. Total Observation Hours: 11, 954.

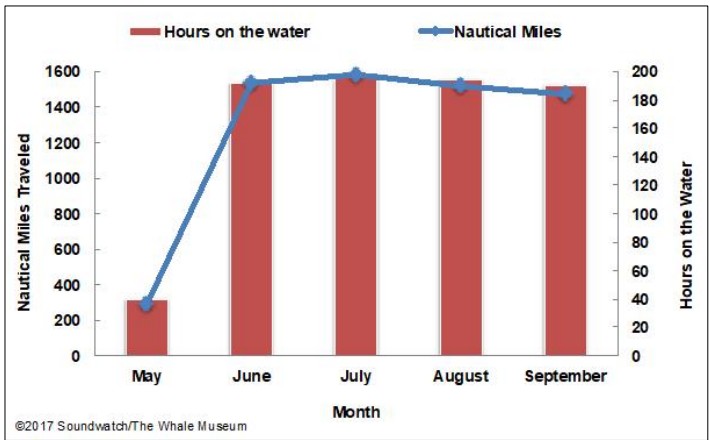


Figure 3: Distribution of Soundwatch Vessel Hours and Miles by Month for 2017.

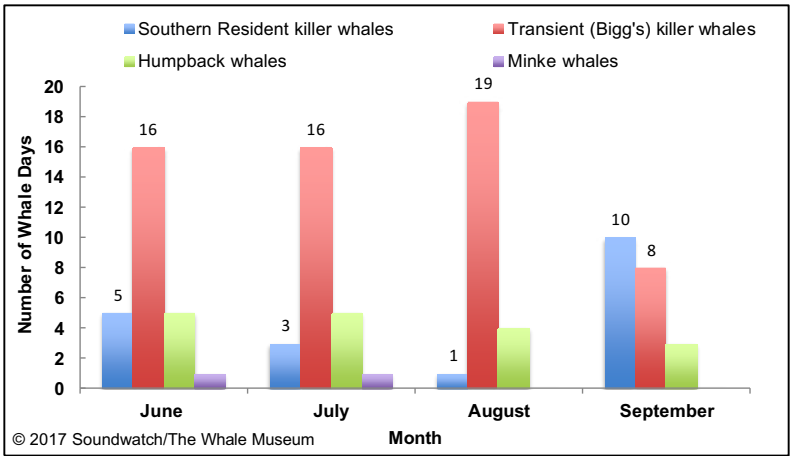


Figure 4: Distribution of Soundwatch monitoring days by species.

In 2017, 652 Vessel Count/Whale surveys were conducted with a variety of cetacean species, the majority being Transient (Bigg's) killer whales (60% or 59 days) and Southern Resident killer whales (19% or 19 days), in the Haro Strait Region of Washington State, U.S. and Southern Vancouver Island, British Columbia, Canada (Figure 4). Soundwatch observed far more Transients in the Haro Strait region than in 2016 or in any past years. As a result, vessel monitoring was spread over a larger region in the space of a single day. Additional educational outreach included 35 hours of dedicated off the water dock talks, reaching approximately 326 guests in the Friday Harbor and Roche Harbor marinas and 50 hours of Kayak Education Leadership Program (K.E.L.P.).

Whale Watching Trends

Soundwatch has created an annual vessel catalog with the number of Eco Tour companies, vessels, trip frequency, and homeports engaged in whale watching activities based from on-the-water observations from May-September. On the water observations included fishing and overnight charters that were engaged in whale watching, although that may not have been a primary focus of their business. Those companies were placed in either 'occasional' or 'rare' vessel frequency categories. Vessel frequency definitions are: 'active' is greater than one day per week from May-September; 'occasional' is less than one day a week from May-September; and 'rare' is equal to or less than once a month from May-September. For simplicity, all companies that were no longer in operation ('inactive') were not included in total company/vessel counts.

In 2017, 64 total EcoTour whale watch companies offered whale watching trips from 96 'active' vessels in the U.S. and Canadian Haro Strait region and 25 'occasional' vessels which is lower than the total active vessels in 2016 representing the peak in active vessels for the long term data set (Figures 5-9). A combined total of 121 commercial vessels on the water at any given time. It is not uncommon for active/occasional vessels to change year-to-year within companies and therefore, overall totals may vary each season. Since 1998, the majority of U.S. and Canadian EcoTour companies operating in the transboundary waters were members of the Pacific Whale Watch Association (PWWA). PWWA is currently comprised of 32 members, including two kayak companies. Canadian EcoTour vessels mostly smaller rigid hull inflatable (RHIB) style vessels, while the U.S. fleet is made up of larger passenger-style vessels, with a growing number of smaller 6 - 8 person fiberglass vessels. Canadian companies are also continuing to add some large passenger-style vessels, to their fleet in addition to existing RHIB vessels. Three U.S. companies are now operating RHIB style vessels that hold between 10-25 approximate passengers. Kayak companies were not tallied in the 2017 total vessel counts because of the lack of on the water sightings due to where whales were observed over the course of the season. EcoTour vessel counts include motor and sailing vessels only.

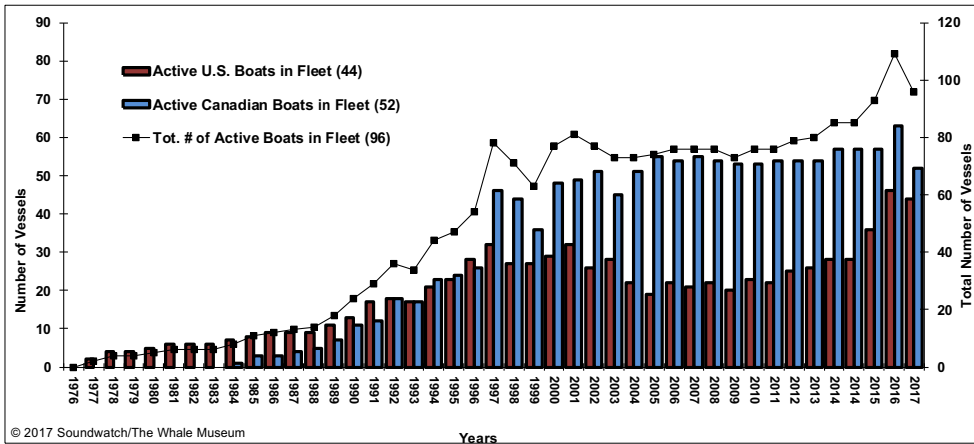


Figure 5: Growth of Commercial Whale Watching in the Boundary Waters of Haro Strait 1976-2016.

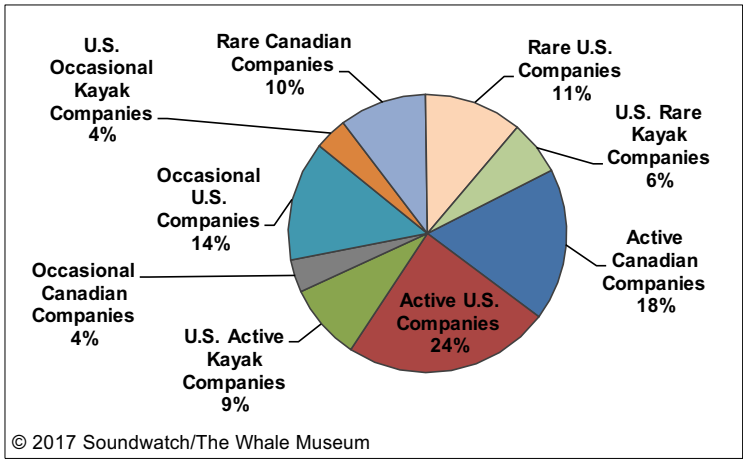


Figure 6: 2017 Distribution of Whale Watch Companies from the US and Canada.

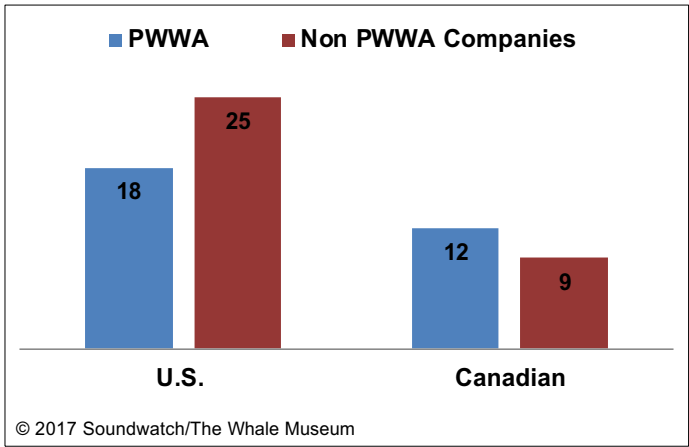


Figure 7: 2017 Percentage of U.S. and Canadian power vessel Companies in the PWWA.

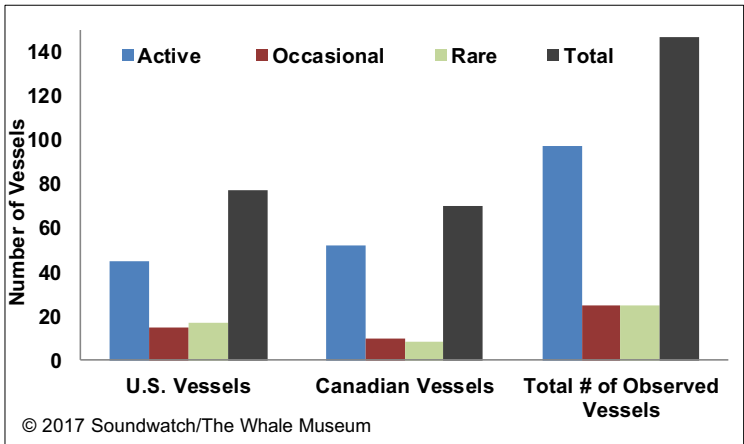


Figure 8: Number of commercial vessels (n=146) engaged in whale watching observed by Soundwatch from June-September 2017. Fishing and overnight charters that became ‘whale oriented’ are also included in these categories.

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>). Lime Kiln State Park/Whale Watch Park (a Whale Trail Site) estimated the total number of visitors in 2017 to be approximately 237,000 people, approximately 110,000 fewer people than 2016 (Figure 9). The decrease in attendance is unexpected given the upward trend from previous years. The increase in shore-based viewing since 2014 was believed to be due partly to an increased awareness of killer whales in social media reports (photos, tweets, etc.), recent media articles and publications regarding the regulations, killer whale research, decrease in Chinook salmon, and it is a more affordable and opportunistic way to see whales while visiting the San Juan Islands.

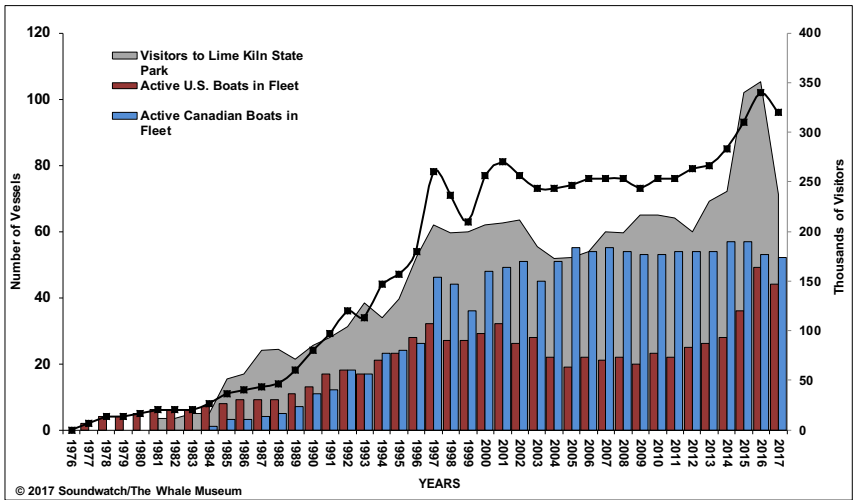


Figure 9: Growth of whale watch industry including Lime Kiln Point State Park.

Soundwatch rarely observed kayak presence and on-the-water frequency in 2017, primarily due to the location of the Soundwatch vessel during vessel monitoring surveys. The increased presence of Transient (Bigg's) killer whales caused the Soundwatch vessel to be further offshore and further from San Juan Island's West side EcoTour kayak routes, usually in locations too far for commercial or recreational kayakers to reach. Therefore, kayakers were present for *six* days in Soundwatch vessel counts along the west side of San Juan Island from June-September 2017. Kayak company activity frequency was updated in the vessel catalog based on San Juan County Park sign-in sheets, company websites, and personal communications (this does not take into account the kayak companies based on other islands within San Juan County that launch from different parks). The number of EcoTour kayakers being launched from San Juan County Park has decreased since 2015 however the exact cause of the decrease is unknown but does correlate to the decrease in "active" EcoTour power vessels and the decrease in Lime Kiln Point State Park attendance (Figure 10).

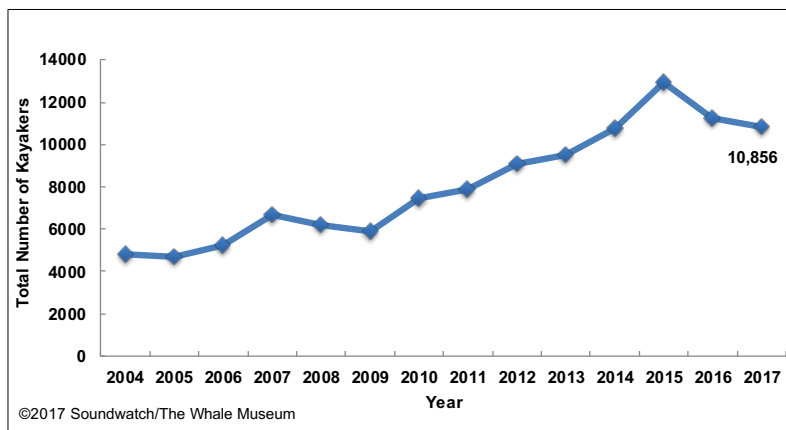


Figure 10: San Juan County Park EcoTour Kayaker Launch information. The total number represents individual kayakers and not the total number of kayaks launched.

Education & Outreach

When Soundwatch crews encounter recreational vessels traveling in known whale or other wildlife areas, they contact the vessel, provide marine wildlife viewing guidelines and regulations as well as collect data on the interaction. 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). Washington State Fish and Wildlife officers handed out the Washington State Law Rack Card (RCW 77.15.740) and *Be Whale Wise* brochures when educating vessels (Appendix B & B1).

In July 2016, The Whale Museum installed a permanent exhibit featuring *Be Whale Wise*, Federal and State regulations for killer whales, and vessel effects on killer whales. The exhibit has been viewed by approximately 53,000 museum visitors and education program participants (number of visitors approximated from mid-July 2016 through December 2017). In addition, materials were given to approximately 2,600 people through either The Whale Museum's Memberships and/or Orca Adoption Program.

The Soundwatch Kayak Education and Leadership Program (KELP) targets outreach to recreational and EcoTour kayakers and includes all other human-powered vessels such as paddle boards and canoes. Since 2010, Soundwatch has been contracted by San Juan County Parks to assist with the planning and implementation of a 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 (SJCP). The San Juan County Park administered the permit system, implemented the outreach program and reported 10,856 kayakers launched from the park in 2017 (Figure 10). From 2013 - 2017, Soundwatch provided kayak guide training (K.E.L.P.) and the County Park provided a narrated slideshow training for recreational boaters to view before launching. The slideshow at SCJP was updated in 2016 to review more of the *Be Whale Wise* guidelines and Federal/State vessel regulations. Data collection on vessels launching from the park was done through a boater self-reporting system and was administered by the San Juan County Park staff. (Appendix C, C2 and D). The 2016 updated *Be Whale Wise* brochures were also distributed at San Juan County Park for recreational boaters.

When kayakers were easily approached on the water, Soundwatch driver/educators communicated the special concerns for kayakers paddling around marine wildlife and additionally distributed the current *Kayakers Code of Conduct Rack Card* (Appendix E). A *Kayakers Code of Conduct* brochure (Appendix F) was updated in 2016 and distributed to all kayakers who attended the KELP training at San Juan County Park. A KELP training was not run by The Whale Museum in 2017. Instead, KELP training for kayak guides was updated in the Winter of 2017 to be a self-taught online PowerPoint training presentation and included an online testing platform (Classmarker.com and is available upon request). Returning guides (one year or more of experience in the Salish Sea) were required to pass the online exam with a 90% or higher. New guides were required to pass with an 80% or higher. The idea was to create a greater sense of responsibility and understanding of the regulations and guidelines amongst the guides. Kayak Education and Leadership Training Video can be found using the following link: <https://youtu.be/xCstTnIHICA>. 89 EcoTour guides completed the online test in 2017. The average test score from 115 attempts was 91.4%. (Guides were allowed to re-take the exam if they did not achieve the required score in the first attempt.)

During 2017, Soundwatch delivered *Be Whale Wise* and *U.S. federal/state vessel regulations* for killer whales to 612 recreational vessels reaching 1,893 recreational boaters (Figure 11). Soundwatch contacted an average of 3.46 persons per vessel. The increase in recreational vessels contacted from 2016 (402 vessels and 1,355 boaters in 2016) is most likely due to the increase of recreational vessels observed during the month of June. The increase was likely affected by the change in Washington State salmon fishing regulations that were altered in 2017 to allow recreational fishing in June that was not previously allowed in 2016. It is also possible with the variety of cetaceans sighted around the region in 2017, and the larger range of the Soundwatch vessel with the updated fuel tank, that the crews were able to stay on the water longer, and overall reach more boaters.

Through continuous Soundwatch monitoring, vessels arriving on scene are observed and 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 G). Soundwatch crews record the date, time, location, type of vessel contacted, the vessel activity, vessel registration, name, port of origin, and number of passengers on board. Soundwatch crews then determine a series of vessel operator attributes using standardized criteria while the Soundwatch driver informs them about the marine wildlife rules. Vessel operator attributes

that Soundwatch records include: why the vessel was contacted, whether they took the information and, if not, were they aware of the information, what was 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. Dot Density maps (pictured below) represent the number of vessels from ports up to 112 miles (180 kilometers) from San Juan Island, Washington. Anacortes, Bellingham, Friday Harbor, and Seattle, Washington and Victoria, British Columbia ports had between 17 and 38 vessels contacted by Soundwatch in 2017. Homeports were also recorded from Washington state all the way to the state of Rhode Island (Figures 12 and 13). Boaters were asked if they were familiar with the *Be Whale Wise* and *U.S. federal/state vessel regulations* for killer whales. Of the vessels contacted, 31% stated they were aware of the guidelines and laws, 48% were transiting through the area and 46% were actively engaged or intended to engage in whale watching activities (Figures 14 - 17).

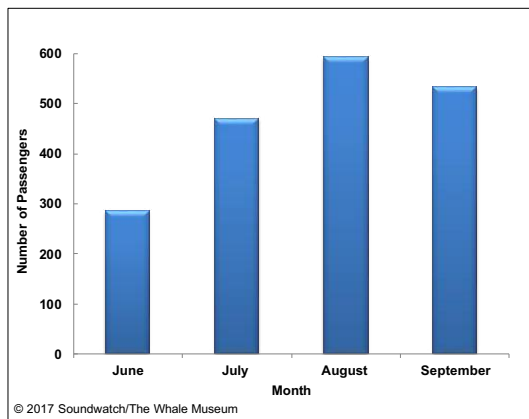


Figure 11: Number of passengers (n=1,893) on private vessels by month contacted by Soundwatch for either prevention and/or education on vessel disturbance to killer whales in the region.

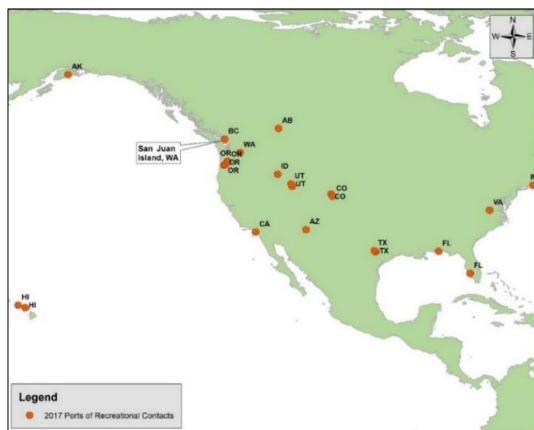


Figure 12: Recreational vessel home ports outside of Washington State, as recorded by Soundwatch from June – September 2017.

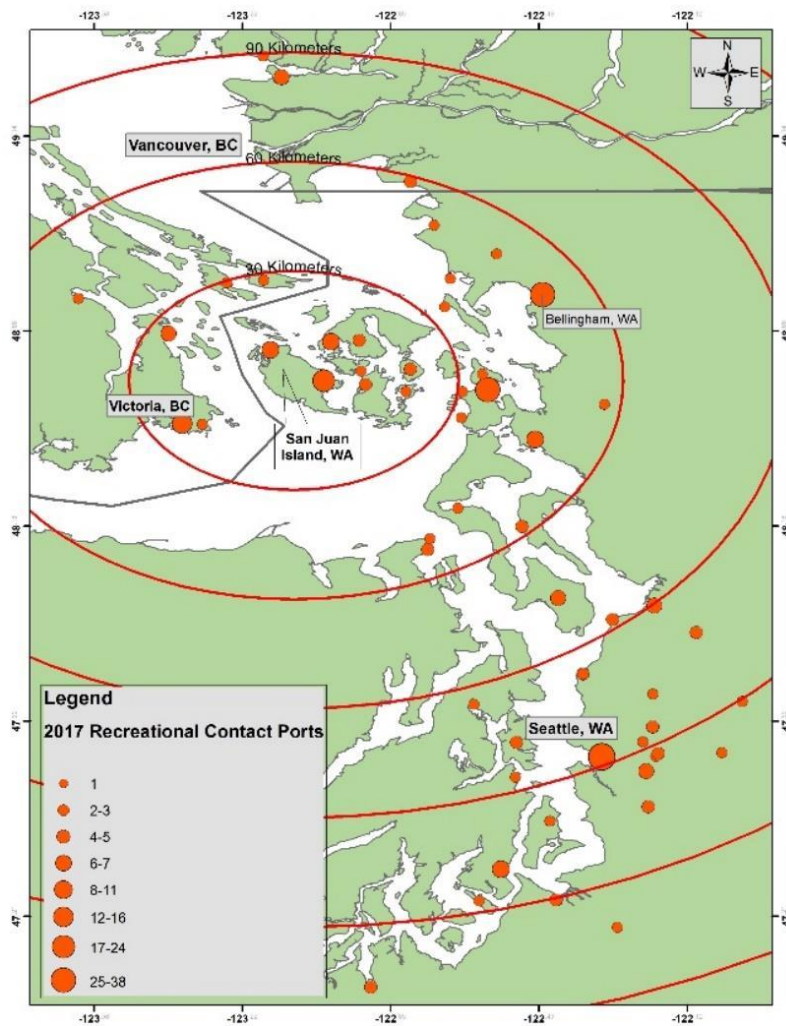


Figure 13: Recreational vessels' homeports in Western Washington State, as recorded by Soundwatch from June-September 2017.

Since 2009, there is a 42% average of recreational vessels contacted that state they were unaware of the guidelines and laws for boating around killer whales (Figure 18). The additional question of how many years the vessel has been visiting the region in the hope of pinpointing where increased outreach and education need to occur in the future. This question along with the dot density maps is a good indicator of where enhanced boater education and new outreach methods should be implemented. There have been varying numbers of recreational vessels contacted over the years. This is due to any of the following reasons; time on the water (4-10 hours/day), different priority level for contacting vessels (based on vessel behavior and activity), 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 further from recreational ports, fewer SRKW days in the Salish Sea, etc.

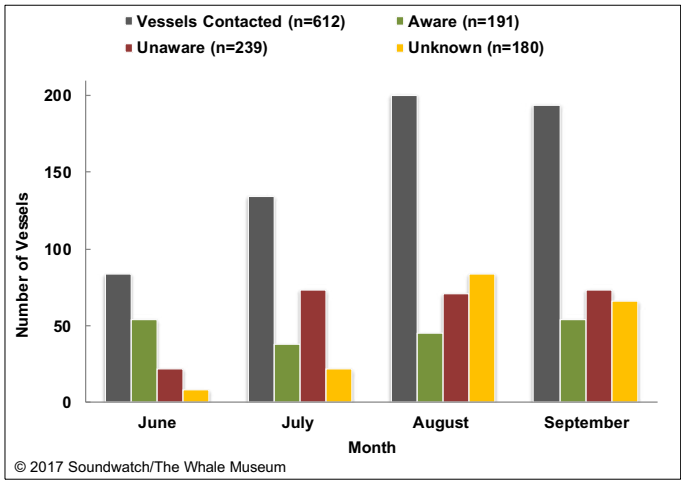


Figure 14: Number of Recreational vessels contacted and the awareness level of each contact by month.

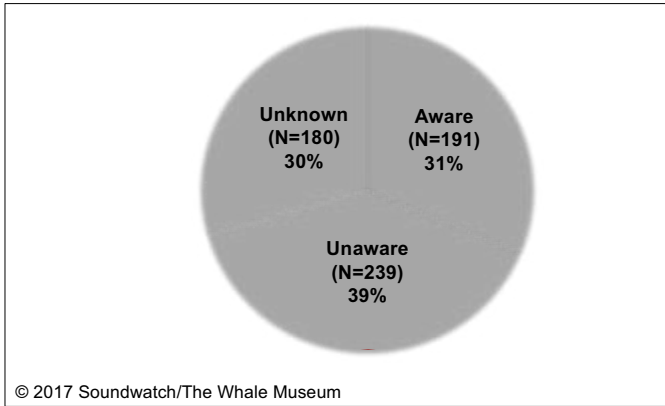


Figure 15: June-September 2017 total Recreational vessel awareness.

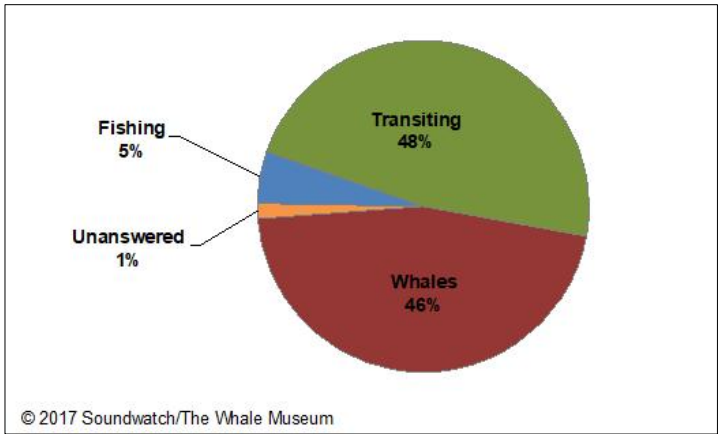


Figure 16: Engaged/Intended activity of Recreational vessels when contacted from June - September 2017.

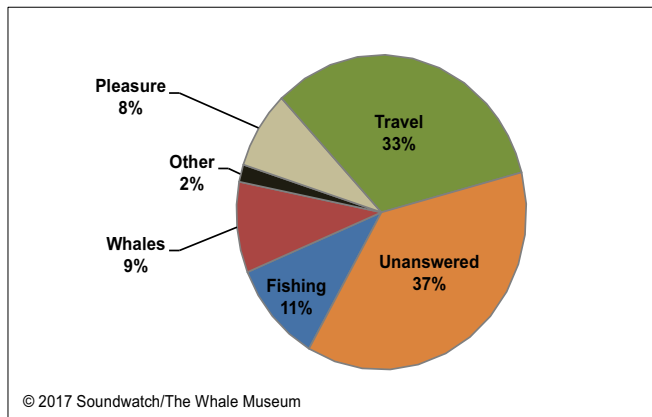


Figure 17: Soundwatch Recreational contact responses to "Reason for Visit to the Region?"

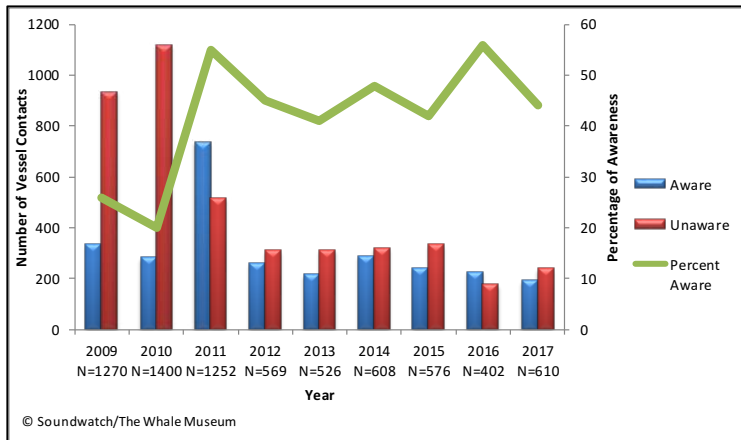


Figure 18: Percentage of Vessels Aware/Unaware Contacted by Soundwatch from 2009 - 2017.

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 H). 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 I). Vessels within one half-mile (880 yards) of all known whale activity are counted according to type and vessel activity (Figure 20). 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.

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 J). 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.).

Descriptions of guidelines and regulations, along with the incident codes used to record incidents of regulation and guideline violations can be found in Appendices K & K1. Incidents are recorded opportunistically as they are observed using a *Vessel Incident datasheet* (Appendix I). Soundwatch staff are conservative in recording incidents.

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 SRKW 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 be found.

Soundwatch totaled 78 vessel/whale days and 652 vessel counts. U.S. EcoTour vessels were observed 78 days and in 584 vessel counts, Recreational-74 days and 511 counts, Canadian EcoTour-75 days and 461 counts, Research 36 and 141 counts, Enforcement 19 days and 66 counts, and kayaks (ecotour and recreational) 34 days and 64 counts (Figure 19).

In 2016, vessel counts may have been limited in geographical range due to vessel fuel capacity (Figure 20). The Soundwatch study area is separated into zones based on the TWM data quadrants and marine fishing zones for the US and Canada (Figure 21). Soundwatch was able to concentrate vessel and whale behavior surveys on locations of vessels engaged in whale watching activities (Figure 22). When looking at previous years vessel count locations, Zone 8 (Rosario Strait), appears to have the greatest differences in monitoring efforts from the current season. In 2017, Rosario Strait had the highest number of vessels counts (n=107). These concentrated efforts suggest a greater presence of killer whales in Zone 8 than in previous years, most likely due to the increase in Transient killer whale sightings. Southern Residents were most often seen along the west side of San Juan Island in Zones 1 and 2 similar to previous years (Figure 23).

There are obvious trends of overlap in overall whale habitat use and vessel 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 2017, 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 and 5), waters surrounding the San Juan Islands (Zone 4) and Rosario Strait (Zone 8 as previously mentioned). These areas are also the areas frequently used by killer whales. However, more groups of Transient killer whales that were spread out over the region and fewer groups of SRKWs were observed than in 2016 (Figure 23). There was a large range of species observed and monitored in 2017. This increased the vessel counts in Rosario Strait as well as in the waters surrounding the San Juan Islands and 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. It also increased the range of the program in 2017 to cover more of Rosario Strait and further North into Canada. (Figures 21-23).

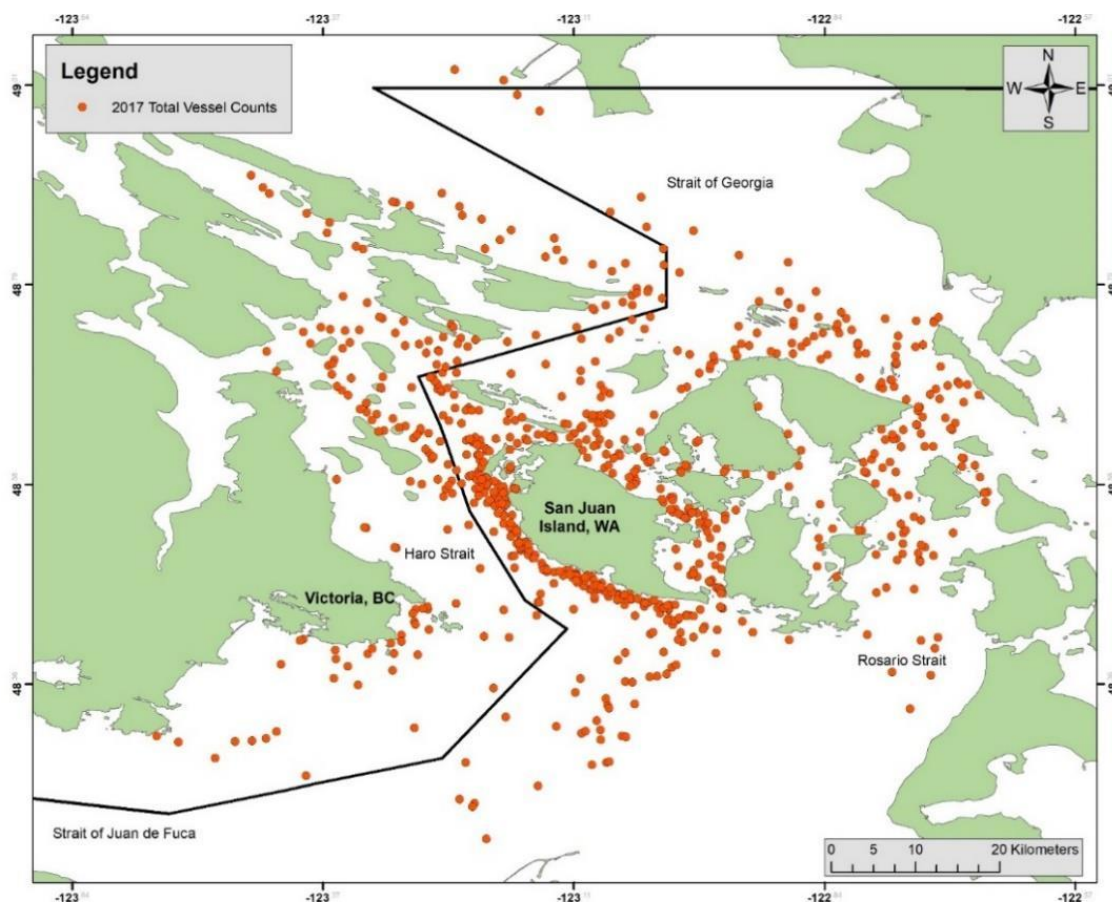


Figure 20: 2017 Soundwatch 652 Vessel Counts by Location Map.

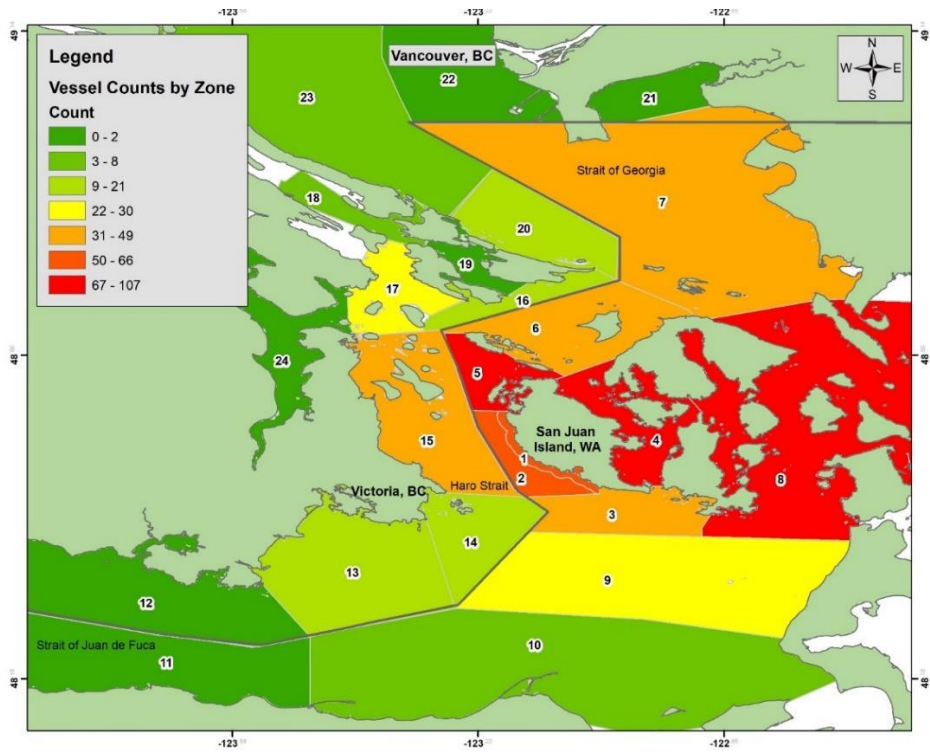


Figure 21: 2017 Soundwatch All 652 Vessel Counts by Numbered Zone Map. Zones in green have lower vessel counts than zones in orange or red. (Zones are labeled in black.)

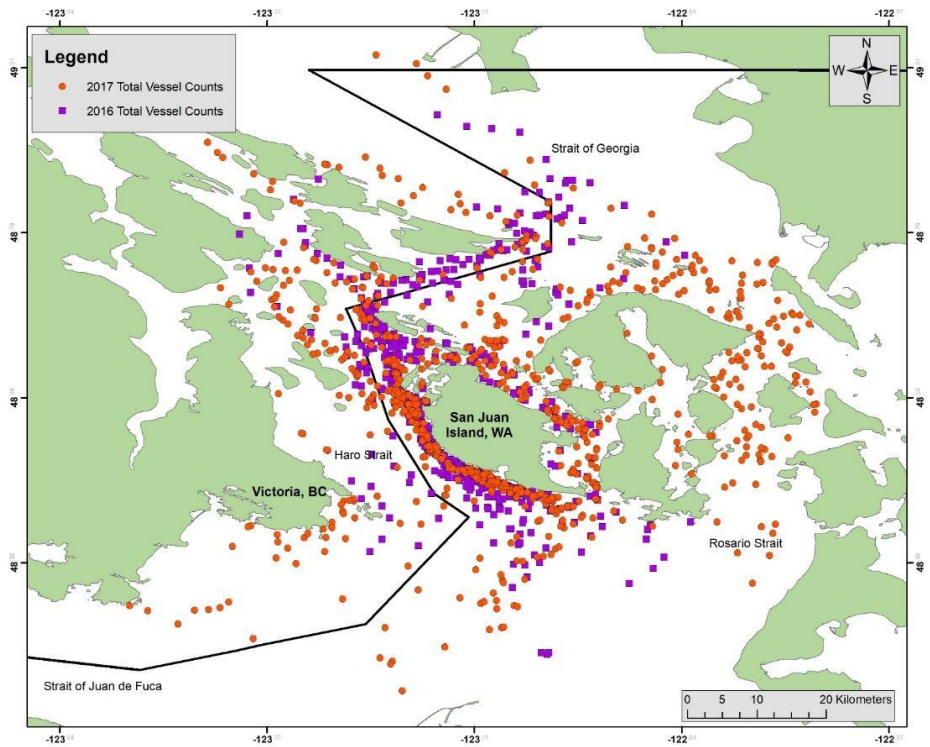


Figure 22: This displays the extended range and distribution of Soundwatch in 2017 compared to 2016.

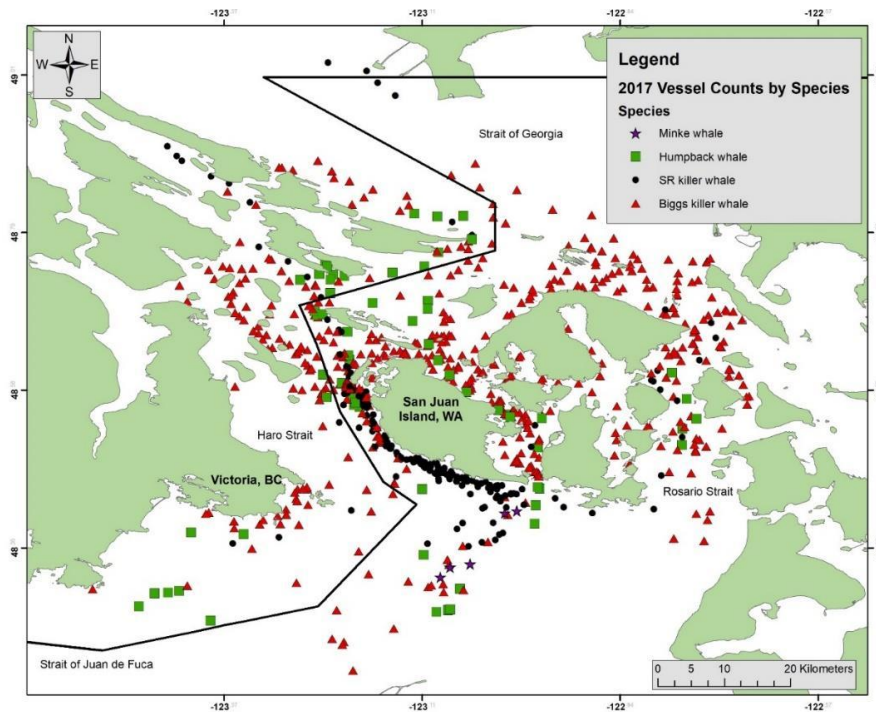


Figure 23: Map of Vessel Count by Species zoomed in to San Juan Island, Washington.

Section II: Patterns of Vessel Activities around Whales

Figure 24, displays the type and number of vessels around whales in 2017. U.S EcoTour and Recreational vessels had the greatest presence around whales in Soundwatch vessel with Canadian EcoTour coming in third highest except for June when US and Canadian EcoTour vessel presence were both higher than Recreational vessels. Recreational vessels had the highest presence in September. Vessel counts in July (30 monitor days/195 hours) included the largest number of vessel counts ($n=2,386$) in the season. EcoTour (Canadian and U.S. commercial wildlife tours) vessel category accounted for 53% and Recreational accounted for 28% of vessels ‘whale oriented’ in 2017 Soundwatch vessel counts (Figure 25). Soundwatch and Straitwatch accounted for the fourth highest presence in vessel counts, an increase from 2016, and shows how much effort the monitoring programs put in during the season (Figure 24 and 25). Vessel presence was 75% whale oriented within one-half mile of the whales (Figure 26).

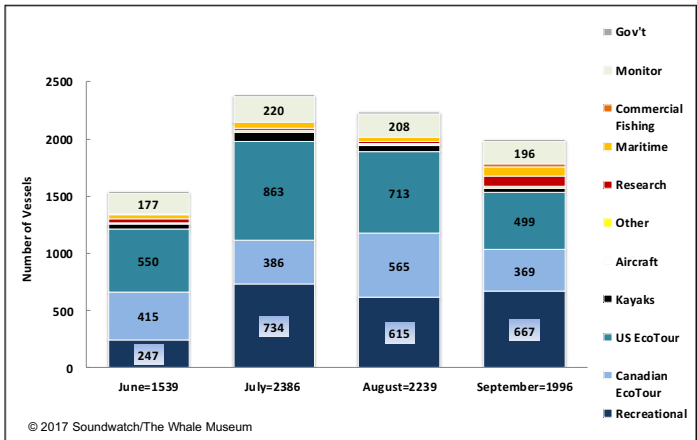


Figure 24: Soundwatch vessel counts included all vessels within one half-mile radius of killer whales. Vessels were categorized by vessel type and primary activity and results are displayed by month.

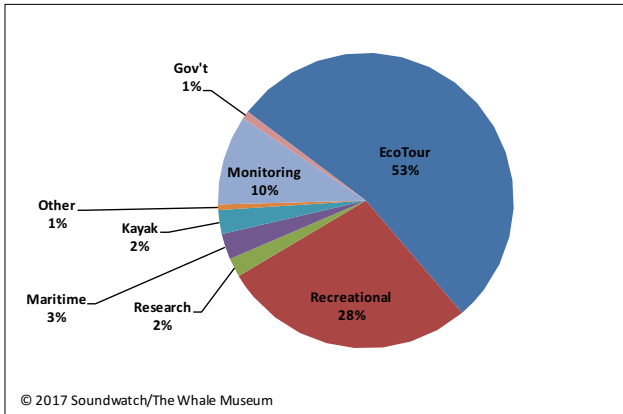


Figure 25: Percentage of vessel distribution by vessel categories and 'whale oriented'. The 'Other' category includes aircraft and charter vessels that became 'whale oriented'.

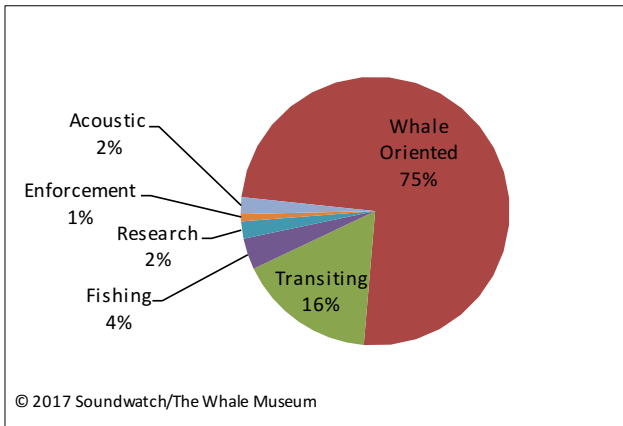


Figure 26: Distribution percentage of vessels by vessel activity within one half-mile of killer whales based on 30 minute vessel counts from June through September.

Number of Vessels Accompanying Killer Whales

During June-September 2017, the average number of vessels observed within one half-mile of whales was 12, which was last observed in 2011 (Figure 27). In 2017, kayak average was lower than previous years likely due to fewer Soundwatch vessel counts/whale presence on West Side of San Juan Island, Washington where a large number of kayakers tour (Figure 28).

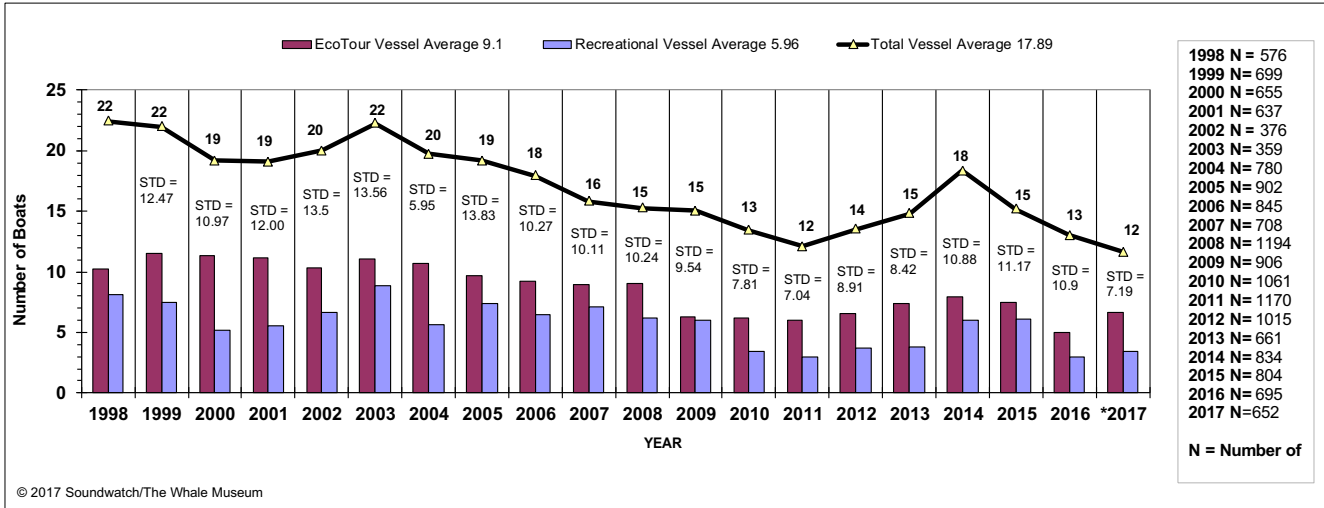


Figure 27: Average number (of recreational, EcoTour (commercial)) and a total of all vessels with killer whales in the last twenty years year in Haro Strait Region (May-September 1998-2016, June-September **2017)

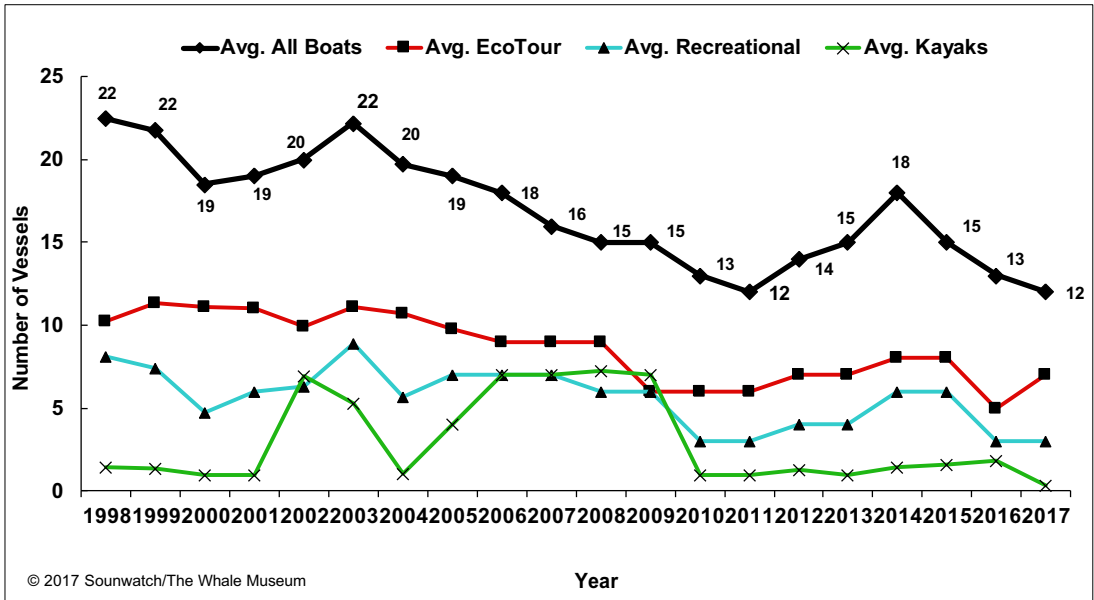


Figure 28: Average number of vessels by vessel category within one half-mile of killer whales from 1998-2017 in the Salish Sea. Average numbers have decreased in each category since 2014, following whale dispersion.

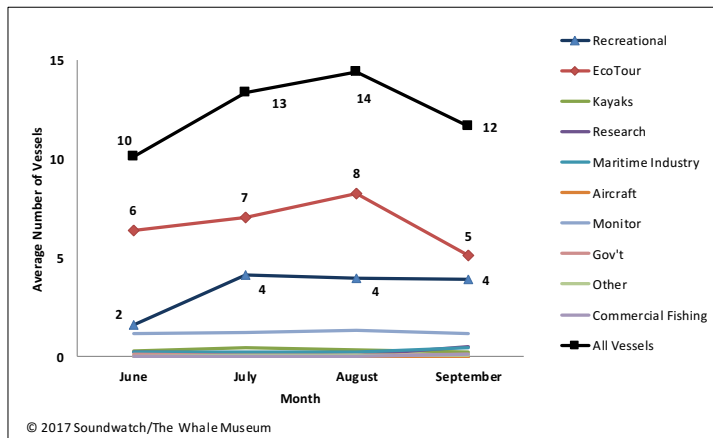


Figure 29: Average number of vessels within one half-mile radius of killer whale by vessel categories and month in 2017 Soundwatch vessel counts.

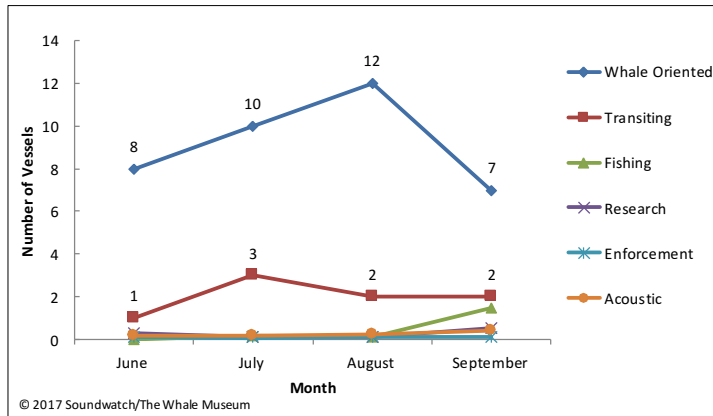


Figure 30: Average number of vessels within one half-mile radius of killer whales by vessel activity and month in Soundwatch 2017 vessel counts.

Vessels engaged in whale watching activities (whale oriented) had a greater average than other vessel activities. Whale watching activities in August had the highest average in 2017 of 12 (Figure 30). The 2017 annual maximum number of vessels observed with whales was 69. The maximum number of vessels around killer whales occurred on a sport fish opener in September, with a large increase from the previous months. The private recreational vessels were fishing (cast and retrieve) while killer whales transited within one half-mile radius. The maximum monthly number of EcoTour vessels in 2017 was 28 (Figure 31), which is slightly higher than 2016's maximum of 26.

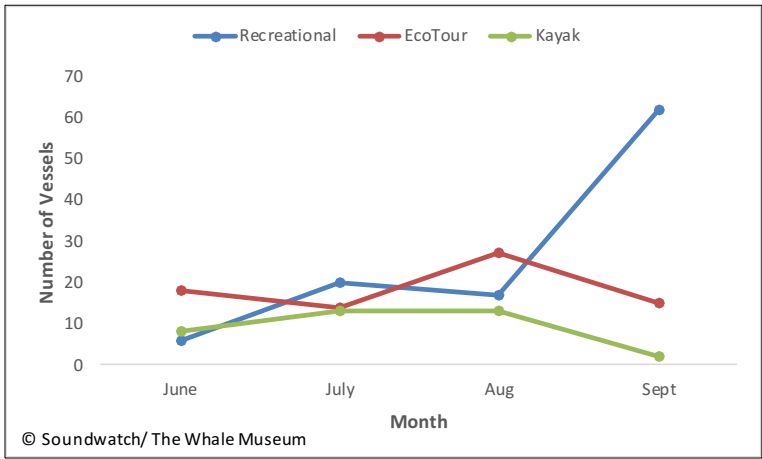


Figure 31: Maximum number of vessels by category and month around killer whales from June-September 2017.

Variations in the maximum number of recreational vessels are dependent on two variables: 1) fishing season and 2) the presence of killer whales in popular fishing locations. In 2017, data collected from June-September by Soundwatch indicates a decline in kayak presence (Figure 32 and 33) around killer whales. The appearance of a decline is likely related to fewer killer whale days near San Juan County Park and foraging on the west side of San Juan Island, where a high percentage of kayakers launch. The decrease in SRKW presence may have also decreased the number of kayaks that Soundwatch observed in the half mile counts.

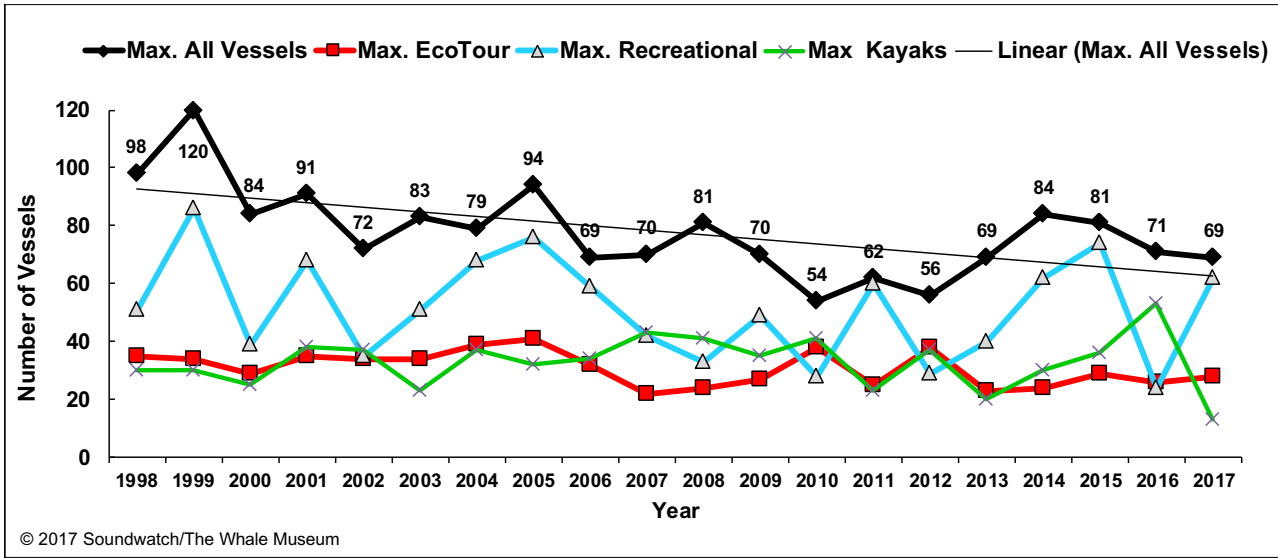


Figure 32: Maximum number of vessels within one half-mile of killer whales in the Salish Sea by vessel category from 1998-2017.

Not only is there variability in vessel averages and maximum by month and activity but also by time of day. In 2017 (June-September), Soundwatch had the greatest number of vessel counts between 11:00 p.m. and 4:00 p.m. (Figure 33). The ‘peak time of day’ was between 1:00 p.m. and 3:00 p.m. Whale presence and EcoTour whale watch schedules contribute to monthly variation. The 2017 average shows an altered trend over the 20-year mean. This may be a reflection of EcoTour companies altering their departure times to decrease the number of vessels on scene with killer whales, or altering their schedules to adjust for sunset trips, the potential change in trips/vessels from commercial companies, and the variety of wildlife that could be observed during a single trip.

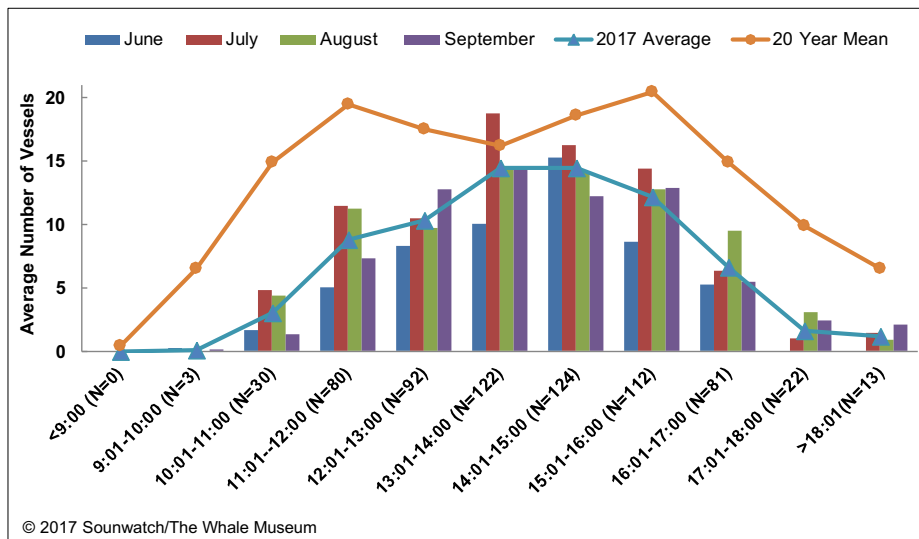


Figure 33: Average number of vessels by time of day includes all vessel categories, the average for 2017 and the 20 year mean.

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 (established in 2011 and updated in 2012, respectively), 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 (Ferrara et al 2017).

Soundwatch monitors commercial whale watch operators, private 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*. A *vessel incident* is specifically defined as a driver of an EcoTour 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 the vessel regulations (Appendices H & H1). This standardized set of definitions is used by the U.S. and Canadian federal governments, Straitwatch of British Columbia, 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 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.

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. This makes comparing overall vessel incident numbers from year to year somewhat difficult. While annual Soundwatch vessel incident summaries (Figure 34) are useful tools to evaluate vessel trends, especially with the implementation of vessel regulations, some diligence is needed to accurately interpret the year-to-year changes. 2017 included vessel incidents that occurred for Transient and SRKWs, since both species are covered under the federal killer whale law. Parked in the Path of whales remains the most frequent vessel incident recorded. 0% categories in 2017 indicate data was not taken on those specific incident categories. To further complicate matters, it is difficult to measure the true effectiveness of guidelines and regulatory measures when they are not consistent on both sides of the U.S./Canadian border (transboundary). 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 (100 meter guideline in Canada (0-100m vessel incident), and 200 yard regulation in US (0-100 yard and/or 0-200 yard regulation incident)).

There are obvious overlapping trends of whale use and boating activities within a one half- mile of whales including whale watching, fishing and transiting. The areas with the most vessel incidents observed by Soundwatch in 2017, were within one half-mile near shore along the west side of San Juan Island (Zone 1), San Juan Channel (Zone 4), Spieden Channel (Zone 5), and Rosario Strait (Zone 8) (Figure 35-36). The increase of observed incidents in Spieden Channel and Rosario Strait is most likely due to the observed increase in Transient killer whales in those locations.

Soundwatch Observed All Vessel Behaviors Contrary to Guidelines and/or Regulations 1998-2017 (© 2017 Soundwatch/The Whale Museum)																				
Behavior Category	Yearly Incident Percentages																			
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
•Notes Categories Not Used During All Years																				
•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%	9%
•Stopped within 0-100 yards of whales														17%	8%	7%	13%	11%	12%	10%
•Under power within 100-200yards of whales														12%	10%	15%	12%	8%	14%	16%
•Stopped within 100-200yards of whales														18%	15%	6%	14%	13%	15%	14%
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%	<1%
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%	<1%
Crossing path of whales	4%	3%	5%	2%	4%	7%	6%	4%	5%	8%	4%	5%	5%	2%	7%	10%	8%	3%	0%	0%
Chasing/pursuing whales	3%	1%	3%	2%	<1%	4%	3%	1%	2%	3%	3%	3%	3%	1%	<1%	<1%	0%	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%	8%
Airplane within 1000 feet	4%	2%	4%	7%	14%	6%	6%	4%	6%	8%	8%	6%	4%	3%	<1%	8%	2%	2%	<1%	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%	<1%
•Other		1%	3%	3%	14%	5%	15%	11%	10%	3%	2%	1%	1%	0%	1%	1%	0%	0%	0%	3%
•Within 220 yards of shore; whales present			4%	4%	2%	<1%	4%	1%	2%	2%	<1%	<1%	1%	1%	2%	1%	0%	0%	<1%	1%
•Repositioning within 100 yards			7%	7%																0%
•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%	23%
•Fast within 1/4 mile					3%	4%	9%	10%	11%	16%	11%	13%	13%	6%	8%	9%	8%	11%	6%	6%
•1st Approach head on, behind, or on shore					4%	2%	1%	<1%	1%	2%	3%	2%	3%	1%	4%	1%	3%	2%	7%	5%
•Kayaks spread out					<1%	3%	0%	<1%	1%	1%	1%	1%	1%	<1%	2%	1%	1%	2%	<2%	<1%
•Kayaks with whales outside 1/4 SJI Zone					<1%	1%	0%	<1%	1%	<1%	1%	1%	1%	<1%	1%	<1%	0%	0%	<1%	<1%
•Kayaks paddling w/in 0-100 yds						3%	0%	<1%	1%	<1%	1%	<1%	1%	<1%	1%	<1%	0%	<1%	3%	<1%
•Kayaks paddling w/in 100-200 yds														1%	1%	1%	1%	1%	3%	<1%
•Kayaks parked on headland															<1%	<1%	0%	0%		0%
Total %	100%	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	2,257
Estimated Annual Observation Hours	426hr	510hr	462hr	486hr	378hr	312hr	486hr	564hr	516hr	420hr	540hr	420hr	442hr	573hr	306hr	331hr	425hr	393hr	451hr	689hr

Figure 34: Summary of vessel incidents as defined by *Be Whale Wise* Guidelines and federal/state vessel guidelines in U.S. and Washington State from 1998-2017.

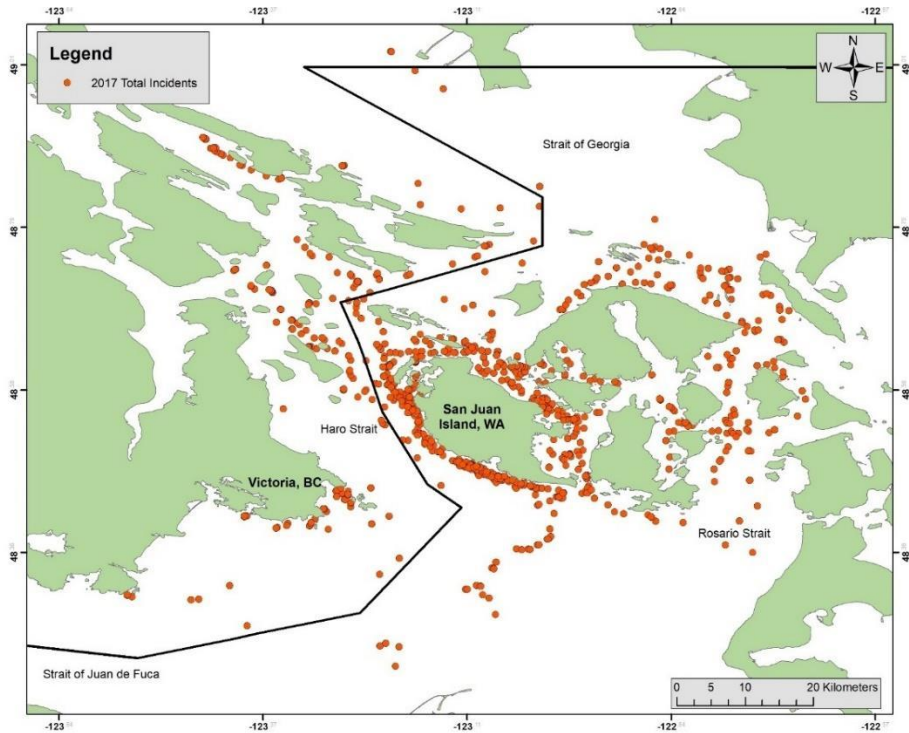


Figure 35: Vessel incident locations observed by Soundwatch from June-September 2017. Transboundary is delineated by solid black line.

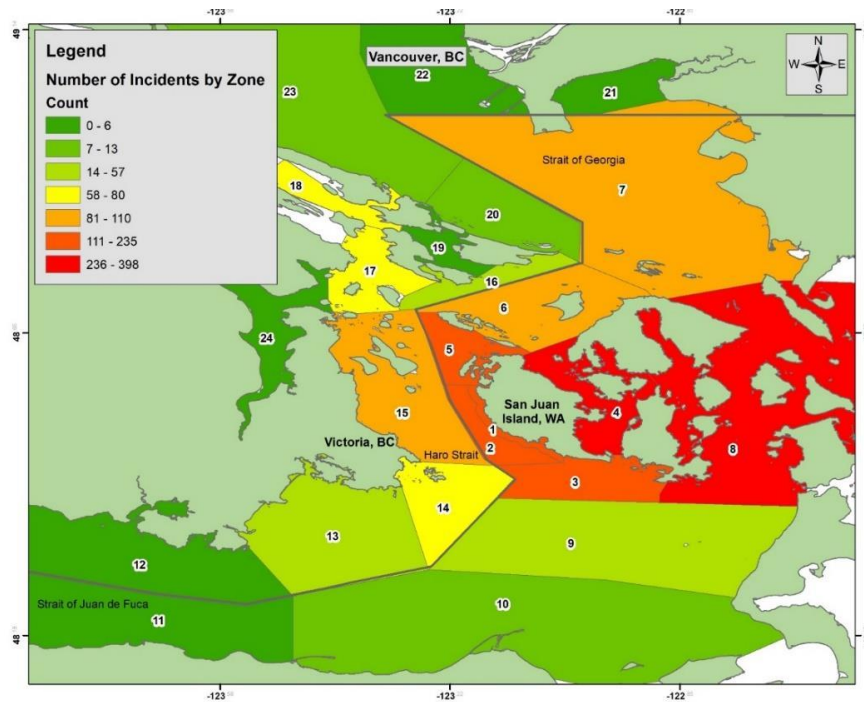


Figure 36: Vessel incidents locations by zone map. Zones in Green have fewer total incidents than zones in Orange or Red.

In 2017, there were a total of 2,260 vessel incidents observed and recorded by Soundwatch staff. Overall in 2017, 71% of recorded vessel incidents were potential violations of the U.S. Federal and Washington State vessel regulations. Of this 71%, the overall regulatory category of **Vessels within 200 yards of Whales** accounted for 48% of all incidents (this category includes Vessels Stopped within 0-100 yards-10%; Vessels Stopped within 100-200 yards-14% (combined 24%); Vessels Motoring within 0-100 yards-9%; Vessels Motoring within 100-200 yards 15% (combined 24%)). These percentages combined with the **Vessels in the Path of Whales** regulatory category (23%) make up the recorded 71% of regulatory vessel incidents. The third most commonly recorded incident type was, **Inshore of Whales** (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 and **Incorrect Fast Approach/Departure** made up 3% of incidents.

Recreational vessel operators accounted for 39% of all incident types in 2017, followed by U.S. EcoTour operators with 24% and Canadian EcoTour operators with 18% of all incidents for a combined EcoTour vessel incident percentage of 42%. Kayakers were recorded with 2% of all incidents, monitoring (Soundwatch/Straitwatch) at 7% of all incidents; 4% by research vessels, and aircraft were recorded at <1%. (Figure 37).

Of the broad categories, incidents with vessels **within 200 yards** of whales accounted for 49% of all incidents. Vessels **Stopped within 0-100 yards** of whales (10%) were made by 22% Recreational vessels, 30% Canadian EcoTour vessels, 31% U.S. EcoTour vessels and 14% monitoring, 3% research vessels. Vessels **Stopped within 100-200 yards** of whales (14%) were made by 24% Recreational

vessels, 30% Canadian EcoTour vessels, 35% U.S. EcoTour vessels and 11% monitoring/research vessels. Vessels **Motoring within 0-100 yards** of whales (9%) were made by 38% Recreational vessels, 17% Canadian EcoTour vessels, 27% U.S. EcoTour vessels, 9% monitoring, and 8% research vessels. Vessels **Motoring within 100-200 yards** of whales (16%) were made by 40% Recreational vessels, 16% Canadian EcoTour vessels, 10% monitoring, and 7% research vessels and 28% U.S. EcoTour vessels. Vessels **in the Path of Whales** regulatory category (23% of total incidents) were made by 46% Recreational vessels, 21% Canadian EcoTour vessels, 25% U.S. EcoTour vessels, and 5% monitoring, 3% research vessels and the **Inshore of Whales** incidents (8%) were made by 52% Recreational vessels, 11% Canadian EcoTour vessels, 29% U.S. EcoTour vessels, 5% monitoring and 3% research vessels (Figures 38 and 39). There was a slight increase between 2016 and 2017 for the EcoTour vessels that were ‘stopped within 200 yards’ of whales (Figure 38).

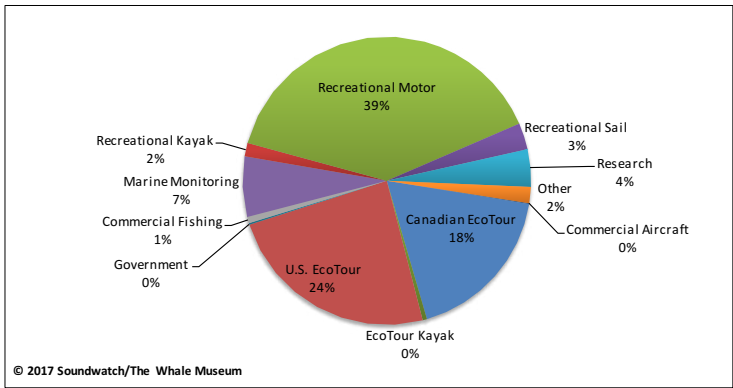


Figure 37: Percentage of all vessel incidents (n=2,260) observed by Soundwatch from June-September 2017 by vessel category.

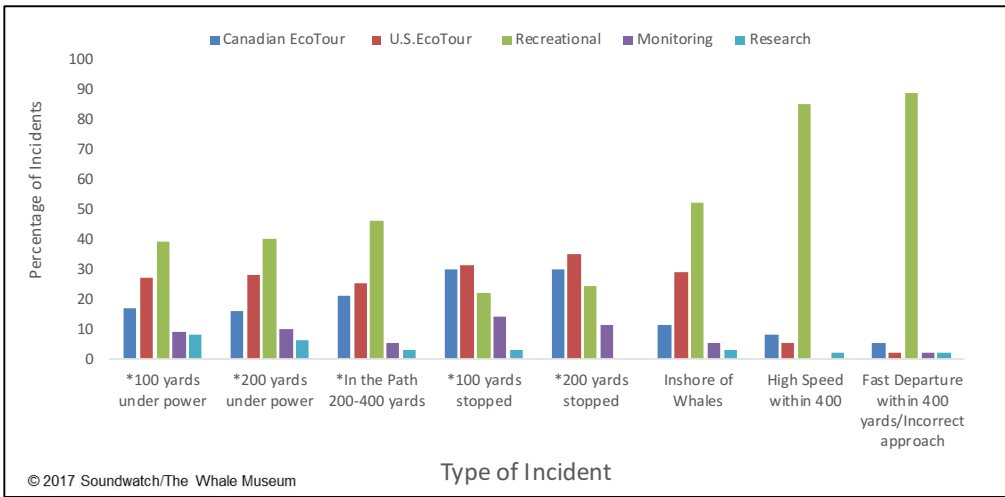


Figure 38: Most frequent vessel incidents observed by Soundwatch from June-September 2017 by incident and vessel categories. *Indicates Federal/State Vessel Regulation

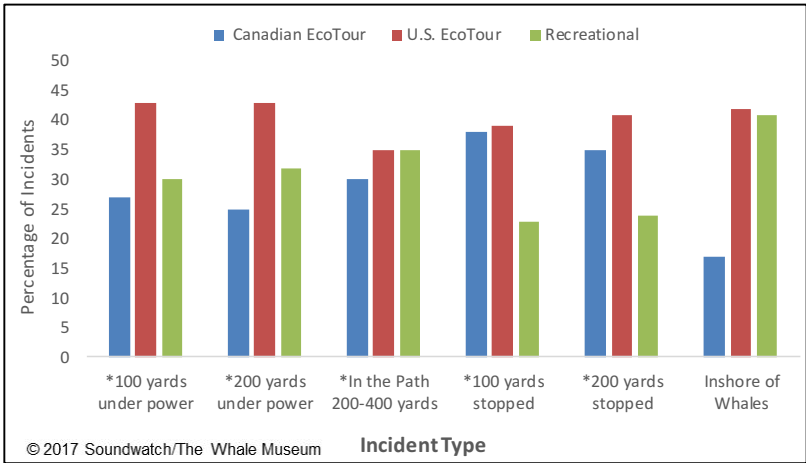


Figure 39: Percentage of most frequent incidents by vessel category observed by Soundwatch from June-September 2017. **indicates Federal/State Vessel Regulation*

Private recreational vessels ranked the highest number of incidents in six out of the eight most frequent incident categories when comparing vessel categories. U.S. EcoTour vessels had the highest number of incidents in Federal/State vessel regulations: **stopped within 100 yards (31%)** and **200 yards (35%)** of killer whales, second highest in **In the Path (25%)**, **200 yards under power (28%)**, and **100 yards under power (27%)** of whales and in the guidelines, **Inshore of whales (29%)**. Figure 39).

Whale watching activities (‘whale oriented’) accounted for 76% of vessel incidents when comparing vessel activities, followed by transiting (20%) activities around whales. Fishing activities were sparse in the 2017 boating season and accounted for a small fraction, 4% of activity around whales. 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. Only transiting incidents by recreational vessels were recorded. (Figures 40 and 41).

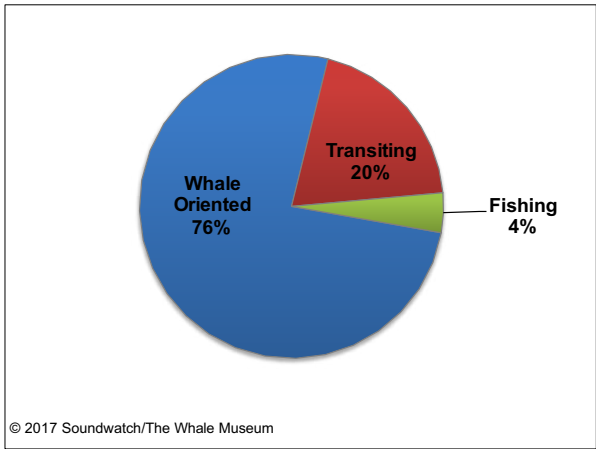


Figure 40: Percentage of all vessel incidents by activity categories observed by Soundwatch from June-September 2017.

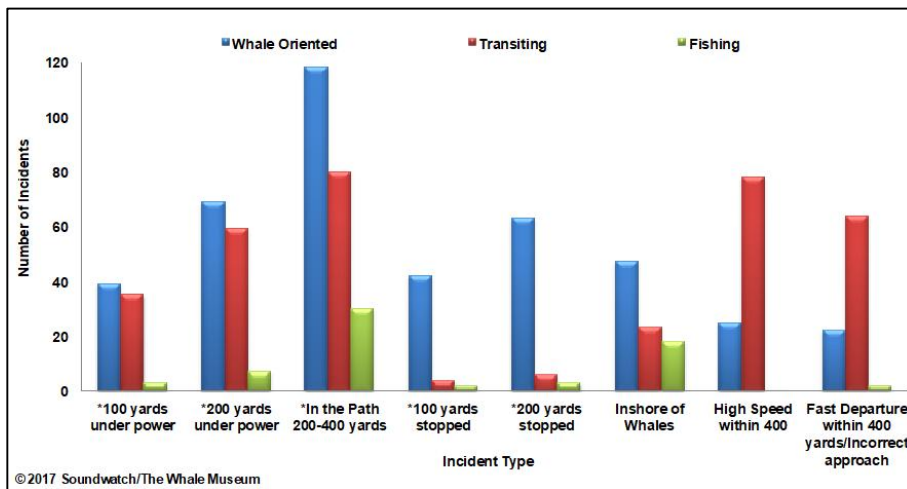


Figure 41: Most frequent vessel incidents of recreational vessels by activities (n=869) observed in Soundwatch vessel counts from June-September 2017. **Indicates Federal/State Vessel Regulation.*

U.S. EcoTour vessels had the highest number of incidents for the six most frequent incident categories while 'whale oriented'. Canadian EcoTour vessels had the second highest number of incidents in 0-200 yards stopped with whales categories. Private recreational vessels transiting accounted for the largest percentage of vessel incidents. Figure 43 displays percentage of vessel incidents while engaged in 'fishing' or 'whale oriented' activities. EcoTour vessels show the largest percentage (51%) of incidents when 'transiting' vessel activities were removed from the analysis. Although the average number of vessels has decreased in the last six years, the total number of incidents has increased. Variations in maximum vessel numbers are likely due to annual variation in whale presence, social cohesion, and fish abundance. Even though there are variations in the vessel numbers, many of the incident percentages are the same as previous years. (Figures 42-45).

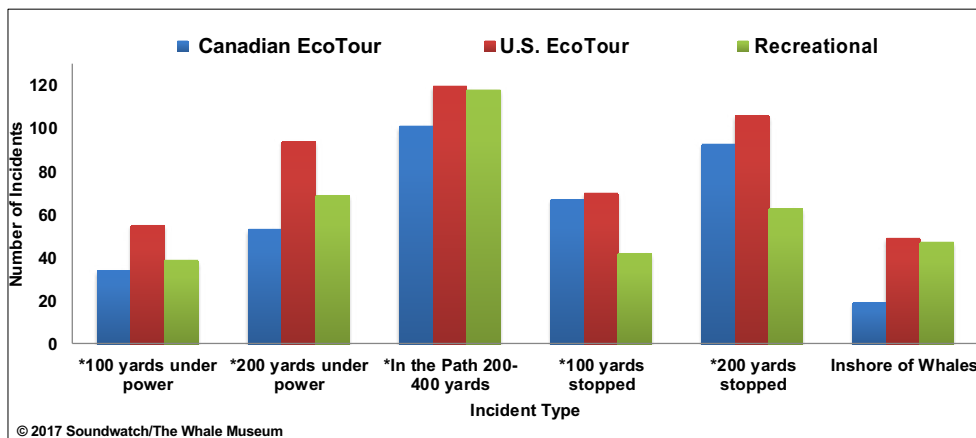


Figure 42: Number of vessel incidents by vessel category for each of the six most frequent incidents categories while 'whale oriented.' Soundwatch data (June-September 2017). **Indicates Federal/State Vessel Regulation.*

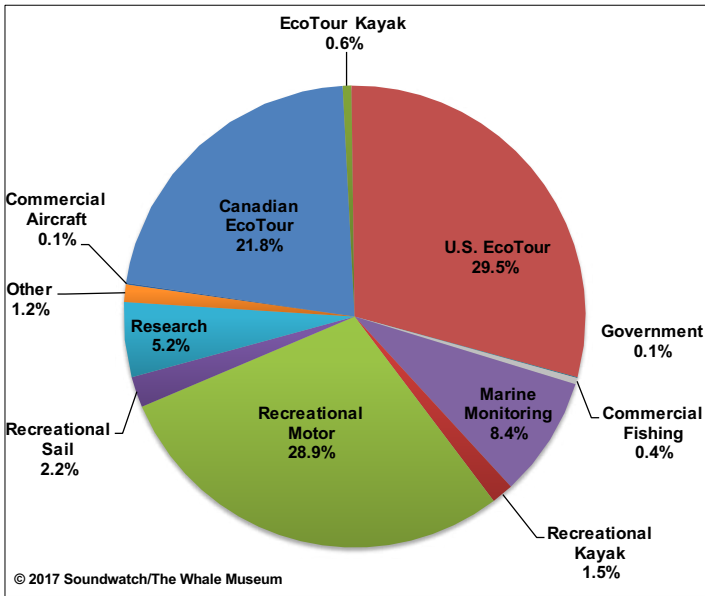


Figure 43: 2017 Soundwatch observed vessel incidents by vessel type and 'whale oriented'/'fishing' activities (n=1813) shown in percentage.

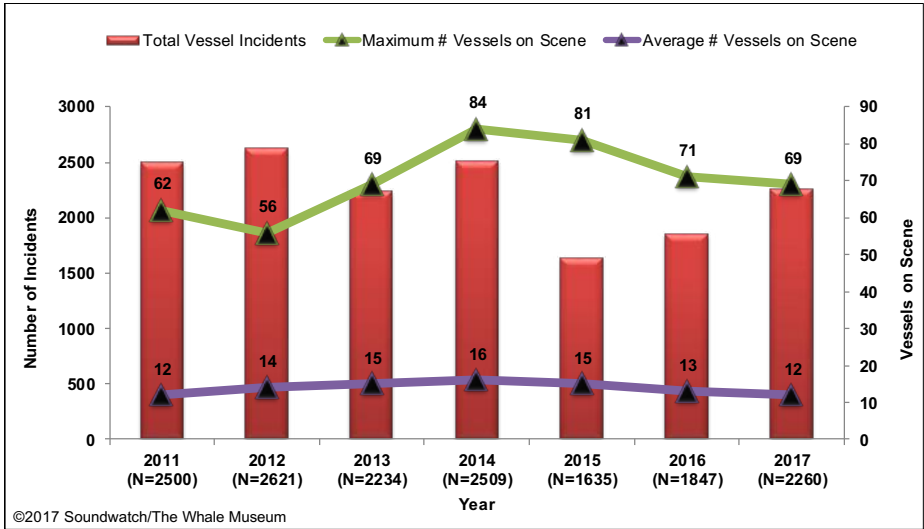
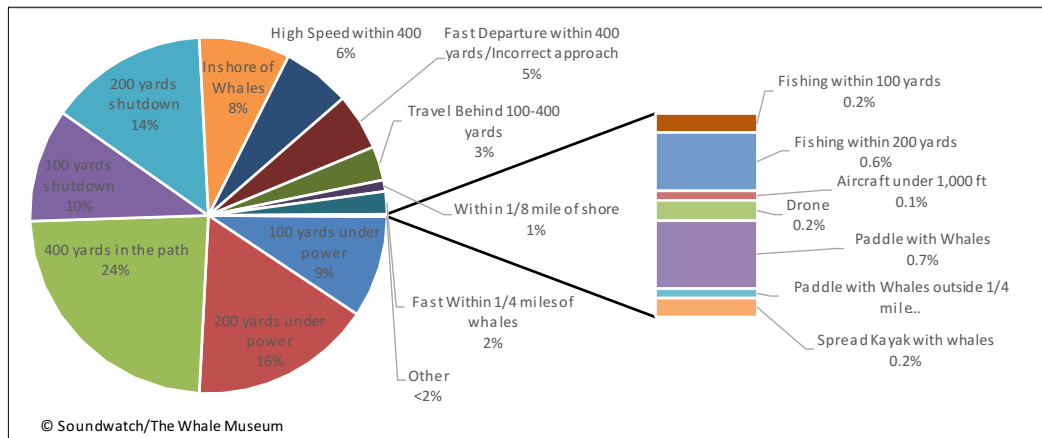


Figure 44: Average, Maximum, and Total number of vessels on scene with killer whales plotted with number of vessel incidents from May-September 2011-2016 and June-September 2017 observed in the Salish Sea by Soundwatch.



Figures 45: Percentage of all of incidents in 2017. Many incidents categories observed were less than 1% and are represented by the column to the right of the pie chart.

Vessel Type Incident Rates

Two different metrics were used in the 2017 analysis. In 2017, monthly incident rates were calculated by the number of vessels on scene with killer whales (Transient and Southern Resident) in Soundwatch vessel counts occurring within a ten minute window of the hour and half hour and divided by the number of incidents observed between vessel counts. Only the top three vessel categories, Recreational, Canadian EcoTour, and U.S. EcoTour vessels were analyzed. Incident rates were averaged monthly and combined for the 2017 average incident rate. Average monthly rates were calculated by number of vessels within one half-mile of killer whales during Soundwatch vessel counts and divided by number of incidents between vessel counts (30 minutes).

The other metric used to determine vessel incident rates per vessel type were: 2 x the annual number of incidents divided by the annual vessel count. Soundwatch observation unit is the annual number of observation hours with whales, which in 2017 was recorded as 324 hours and 652 vessel counts. 2017 incident rate: $2 \times 2,260/652$ resulting in an annual number of 8.09 total incidents per hour (Figure 46-48).

U.S. Federal and Washington State vessel regulations incidents are 200-400 yards in the path of killer whales and less than 200 yards shutdown or under power near killer whales within Washington State Inland waters. Soundwatch incident categories are based on the *Be Whale Wise Guidelines*, which are used in all locations of the Salish Sea, where monitoring is conducted unless otherwise noted.

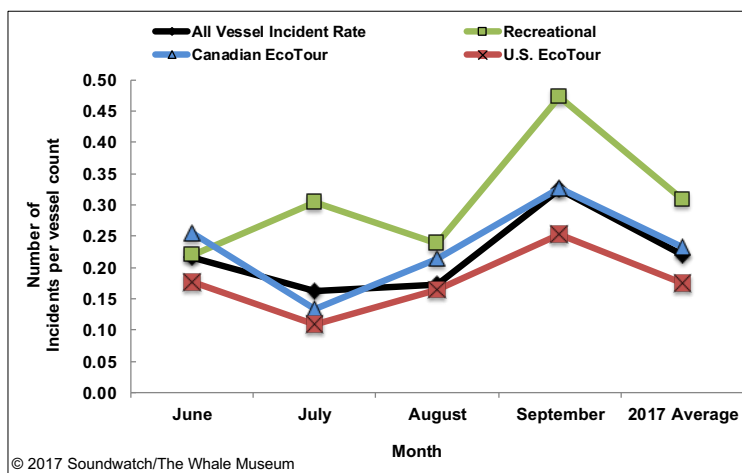


Figure 46: Federal/State Vessel Regulatory incident rates per vessel count in *U.S. and Canadian waters* by vessel categories and month.

Over the past eleven years 2006-2017, recreational vessels remain the most likely vessel type to commit all incidents. Incident rates by hour in 2017 were as follows: Private recreational vessels had a high incident rate of 5.9, U.S. EcoTour vessels-3.3, Canadian EcoTour vessels-2.5 (Figure 47) and all other vessel types were less than 1 incident per unit of time in 2017.

In July and September, private recreational vessel incident rates increased, which may be linked to fishing activities. In June of 2017, Soundwatch observed 0 vessel incidents related to fishing, 36 incidents in July, only 8 incidents which occurred on one day in August, and 43 incidents in September. Presence of SRKW's increased in the month of September (Figure 48) in close proximity to sport fishing areas, which could also contribute to the increased incident rate.

In the Path incidents had a greater vessel incident rate of nearly 3.2 incidents per hour, followed by **200 yards under power and shutdown** at approximately 2 incidents per hour. The higher incident rate in **less than 200 yards of whales** incident category may be attributed to operators staying in close proximity to the whales, shutting down their engines versus attempting to remain at a greater distance by engaging their engines. Soundwatch noted EcoTour operators announcing over VHF radio they were shutting down their engines when killer whales were less than 200 yards from their vessel in efforts to reduce engine noise. (Figures 47-49).

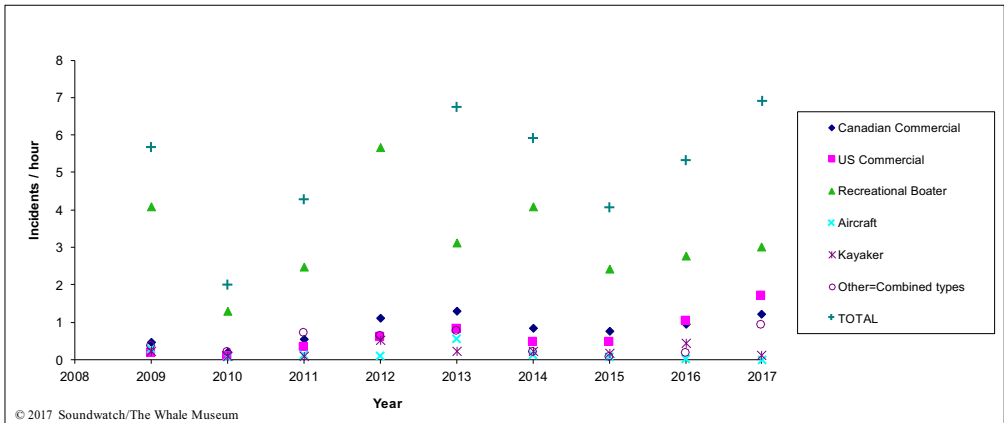


Figure 47: Trend from 2009 – 2017 Guideline and Regulation vessel incidents by type.

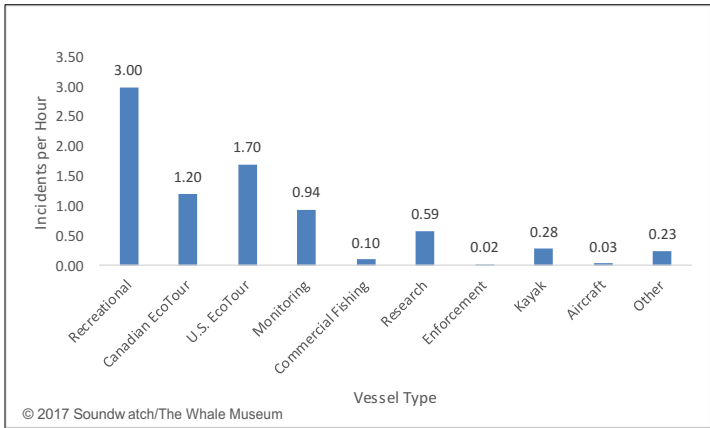


Figure 48: 2017 Vessel incidents per hour by vessel type.

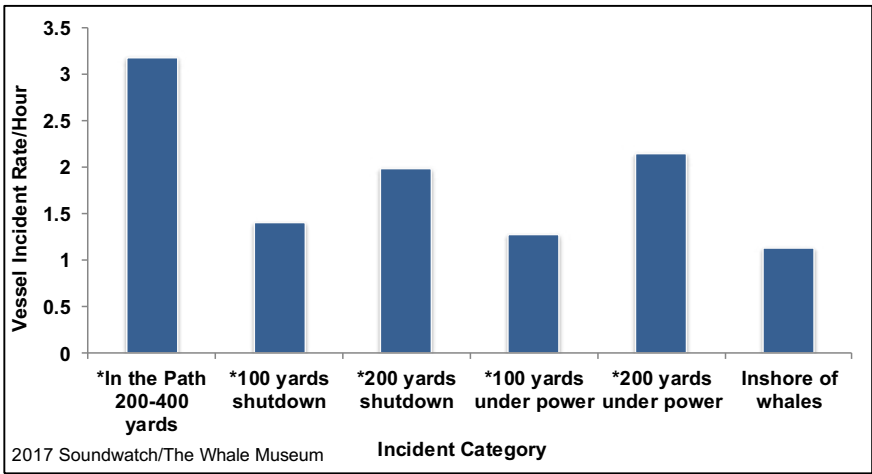


Figure 49: 2017 Vessel incidents per hour by top incident type.

Figure 50 displays a greater level of compliance when law enforcement was monitoring ‘whale oriented’ activities. In 2017, Washington Department of Fish and Wildlife (WDFW) Law Enforcement was present in 66 of the 466 U.S. vessel counts (within one half-mile radius of whales) over 19 days in U.S. waters only due to state jurisdiction. Incident rates were calculated using number of incidents by number of vessels in the top three vessel categories per Soundwatch vessel count (+/- 1SE). Department of Fisheries and Oceans Canada were present in one Soundwatch vessel count in 2017. Otherwise WDFW was the only law enforcement present in 2017 Soundwatch vessel counts.

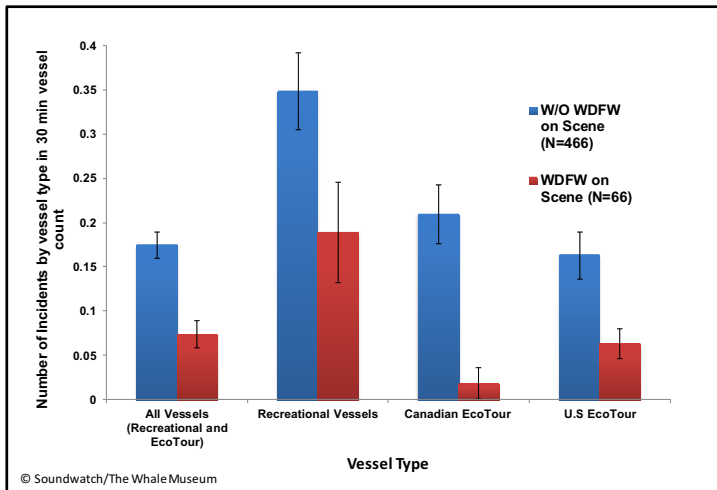


Figure 50: Effects of Washington State Department of Fish and Wildlife (WDFW) Law Enforcement presence on incident rates.

The Whale Museum has operated under a NOAA Research permit since 2012 (NMFS Permit No. 16160/21114). This allows for close approaches in some unavoidable circumstances and these are reported via permit conditions and annual reporting requirements. As part of receiving a research permit, a full review of program methods were completed and impacts of Soundwatch activities fully analyzed under MMPA/ESA. The permit carries with it annual reporting obligations that are submitted at the end of each year.

Killer Whale Attribute Data

Soundwatch collected killer whale behavior (n=620) on the hour and half hour, totaling 324 hours or 648 whale behavior counts. Behavioral categories (Appendix J) were Mod Rest, Rest, Milling, Socializing (surface active), Travel, and Forage. Evidence of prey was necessary to classify ‘foraging’ behavior. Travel was the predominant behavior in all months and across both ecotypes. The only exception to the above mentioned was in September with ‘milling’ as the dominant behavior for SRKWs. Figure 51 summarizes behavioral data collected on Southern Resident (SRKW) and Transient killer whales from June-September 2017. Figure 52 displays a map of the Salish Sea with the Foraging and Milling behaviors of killer whales as observed by the Soundwatch crews. Foraging/Milling behavior for the SRKWs was mainly observed on the West side of San Juan Island, WA. Transient killer whales were observed to be Foraging/Milling across the Salish Sea, and in noted areas of pinniped haul-outs.

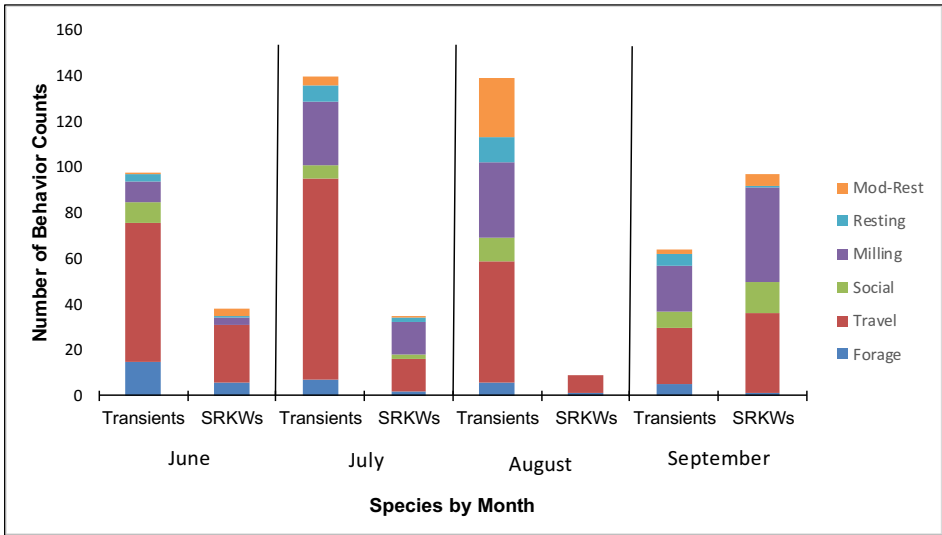


Figure 51: Southern Resident and Transient killer whale behavior counts from June-September 2017 conducted near the hour and half hour by Soundwatch. Behavioral categories include Resting, Modified Rest, Milling, Social, Travel, and Forage.

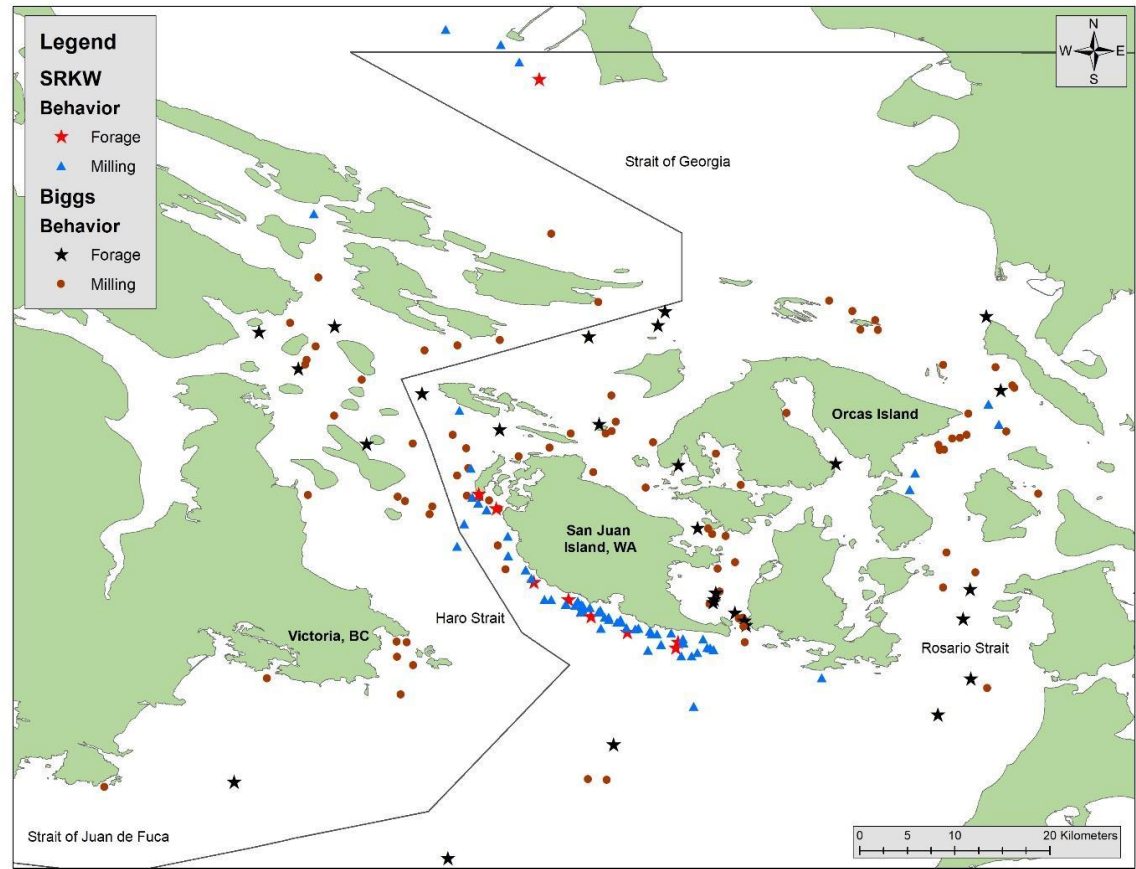


Figure 52. Map of killer whale Foraging and Milling behavior as observed by the Soundwatch vessel.

Discussion and Recommendations

Lack of the whales' social cohesion and multiple matrilineal groups makes it difficult to monitor vessel behavior because as the whales spread out, so do vessels engaged in whale watching activities. Thus, one Soundwatch vessel and/or one WDFW enforcement vessel were left to monitor several groupings of vessels over a greater geographic area instead of just one group in a concentrated area. Because of these challenges, it was necessary for Soundwatch to prioritize monitoring efforts. Prioritization of Soundwatch vessel monitoring were; 1) Southern Resident killer whales, 2) Transient killer whales near/in San Juan County marine waters, 3) killer whales in high traffic areas, and 4) Humpback whales in high traffic areas (San Juan Channel). For the reasons mentioned, Soundwatch results are conservative. A second Soundwatch monitoring vessel on the water would help to increase education and allow the program to more accurately determine vessel trends, incident data, and how vessels are impacting and/or changing whale behavior.

Soundwatch observed vessel trends from 1998-2017 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. EcoTour whale watching activities have increased duration of vessel disturbance (>12 hours) to killer whales by offering year round and sunset trips from July-September. Standard time frames (eight hours) for research analysis may not take the extended hours into consideration. 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. These recommendations were also included in the Technical Memo evaluating the effectiveness of the regulations (Ferrara et al. 2017).

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. Other possibilities include: creating a greater buffer around killer whales could be effective in lessening vessel disturbance to killer whales; create a course on how to safely operate around marine mammals; require whale watch companies to register with the Department of Licensing; distribute BWW information with vessel registration and tabs; and add regulations and guidelines to Washington State Boater Education course. Many of these are potentially being addressed through the Washington State Executive Order, that was signed in March of 2018 (https://www.governor.wa.gov/sites/default/files/exe_order/eo_18-02_1.pdf).

The 2016-2019 ESA Section 6 funding provided enhanced WDFW Enforcement presence in the vicinity of killer whales around the San Juan Islands (including a WDFW vessel and one additional FTE officer). The continuation of ESA Section 6 funding, and/or the funding from Washington State's 2018 budget, and other sources, 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.

Summary of Soundwatch Data Trends

Numbers of Vessels Observed with Whale Trends:

- The numbers of vessels observed within one half-mile of whales (June-September) varied widely by time, date and location. In 2017, maximum vessel number around killer whales was 69, with a vessel average of 12.
- From 1998-2017 (20-year trend) the annual average numbers of vessels with whales was 17 and has been decreasing since 2014.
- In 2017, the average number of vessels within one half-mile of whales per month were: June - 10 vessels, July - 13 vessels, Aug - 14 vessels and September - 12 vessels.
- By vessel category, the 2017 averages were: EcoTour-7, Recreational- 3, and Kayak average were 0.3.
- Monthly averages by vessel category: June: EcoTour-6, Recreational-2, and Kayaks-<1. July: EcoTour-7, Private-4, and Kayaks-<1. August: EcoTour-8, Recreational-4, and Kayaks-<1. September: EcoTour-5, Recreational-4, and Kayaks-<1.
- Higher Average of EcoTour vessels observed around killer whales than Recreational vessels, most likely due to the increased presence of Transient killer whales.
- The annual vessel maximum was 69, EcoTour- 28, Recreational- 62, and Kayak maximum was 13. Recreational vessels observed within one half-mile of whales have had higher maximum numbers than EcoTour vessels, likely influenced by sport fish openers.
- Monthly maximums by vessel category: June: EcoTour-13, Recreational-11, and Kayaks-8. July: EcoTour-13, Recreational-20, and Kayaks-13. August: EcoTour-18, Recreational-17, and Kayaks-13. September: EcoTour-11, Recreational-62, and Kayaks-8.
- In 2017, Soundwatch contacted 612 vessels with 1,883 passengers onboard; averaging 3.46 passengers per vessel.
- 31% of Recreational vessels contacted for educational purposes were aware of the guidelines and laws for boating around killer whales.
- In 2017 there was not a midday dip as has been observed in past years.

EcoTour (Commercial) Whale Watch Industry Trends:

- Wildlife EcoTours occur year round with the primary season occurring between April and October.
- The bulk of EcoTours generally occurs between 9 a.m. and 6 p.m., May-September. Although sunset tours are increasing, extending the number of hours vessels spend with killer whales. The maximum numbers of EcoTour vessels observed within one half-mile of whales occurred in August in 2017. The 2017 annual 'busiest time of day' occurred between 12:00 p.m. and 4:00 p.m. with a peak between 1:00 p.m. and 3:00 p.m.
- In 2017, there were 64 EcoTour companies with 39 U.S. and 25 Canadian companies. Pacific Whale Watching Association (PWWA) accounts for 32 EcoTour companies (motor/sailing vessels and two U.S. kayak companies).

- In 2017 there were 96 'active' EcoTour vessels. (*Active vessels do not include the total number of active kayak vessels from the PWWA kayak companies.) A decrease since 2016.
- 'Active' U.S. EcoTour vessels in 2017 were 45 and 54 Canadian EcoTour vessels.
- In 2017, 10,856 people went kayaking with commercial companies launching from San Juan County Park, a decrease from 2015.
- Observed Kayak presence in Soundwatch vessel counts is expected to increase as SRKW presence increases around San Juan Island, WA.

Vessel Incident Trends:

- In 2017, 71% of recorded vessel incidents were potential violations of the U.S. Federal and Washington State vessel regulations.
- Private recreational vessel operators accounted for 39% of all incident types in 2017.
- U.S. EcoTour operators accounted for 24% of all vessel incidents.
- Canadian EcoTour operators accounted for 18% of all incidents.
- Combined EcoTour vessel incident percentage of 42%.
- Kayakers were recorded with 2% of all incidents, monitoring (Soundwatch/Straitwatch) at 7% of all incidents; 4% by research vessels, and aircraft were recorded at <1%. However the kayak incident numbers should be considered in light of reduced kayaks observed near the whales compared to previous years.
- Of the 71% of all vessel incidents, the overall regulatory category of **Vessels within 200 yards of Whales** accounted for 48% of all incidents (this category included Vessels Stopped within 0-100 yards-10%; Vessels Stopped within 100-200 yards-14% (combined 24%); Vessels Motoring within 0-100 yards-9%; Vessels Motoring within 100-200 yards 14% (combined 24%))
- **In the Path of Whales** were 23% of all vessel incidents.
- The third most commonly recorded incident type was, **Inshore of Whales** (7%).
- **Vessels Motoring Fast (>7 knots) within one quarter mile (440 yards) of Whales** at 6%, both *Be Whale Wise* and PWWA guidelines and **Incorrect Fast Approach/Departure** made up 3% of incidents.
- Vessels **Stopped within 0-100 yards** of whales (10%) were made by 22% Recreational Private vessels, 30% Canadian EcoTour vessels, 31% U.S. EcoTour vessels and 14% monitoring, 3% research vessels.
- Vessels **Stopped within 100-200 yards** of whales (14%) were made by 24% Recreational vessels, 30% Canadian EcoTour vessels, 35% U.S. EcoTour vessels and 11% monitoring/research vessels. This is an **increase** from 2016.
- Vessels **Motoring within 0-100 yards** of whales (9%) were made by 38% Recreational vessels, 17% Canadian EcoTour vessels, 27% U.S. EcoTour vessels, 9% monitoring, and 8% research vessels.
- Vessels **Motoring within 100-200 yards** of whales (16%) were made by 40% Recreational vessels, 16% Canadian EcoTour vessels, 10% monitoring, and 7% research vessels and 28% U.S. EcoTour vessels.

- Vessels **in the Path of Whales** regulatory category (23% of total incidents) were made by 46% Recreational vessels, 21% Canadian EcoTour vessels, 25% U.S. EcoTour vessels, and 5% monitoring, 3% research vessels.
- **Inshore of Whales** incidents (8%) were made by 52% Recreational vessels, 11% Canadian EcoTour vessels, 29% U.S. EcoTour vessels, 5% monitoring and 3% research vessels.
- Recreational vessels ranked the highest number of incidents in six out of the eight most frequent incident categories when comparing vessel categories.
- U.S. EcoTour vessels had the highest number of incidents in Federal/State vessel regulations; **stopped within 100 yards** (70/223) and **200 yards** (106/305) of killer whales, second highest in **In the Path** (121/493), **200 yards under power** (94/338), and **100 yards under power** (55/202) of whales and in the guidelines, **Inshore of whales** (50/171).
- Whale watching activities ('whale oriented') accounted for 76% of vessel incidents when comparing vessel activities, followed by transiting (20%) activities around whales. Fishing activities were sparse in the 2017 boating season and accounted for a small fraction, 4% of activity around whales.
- Vessel incidents categorized by activity and Recreational vessels categories were: fishing (8%), transiting (41%), and whale watching (51%).
- U.S. EcoTour vessels had the highest number of incidents for the six most frequent incident categories while 'whale oriented'.
- Canadian EcoTour vessels had the second highest number of incidents in **0-200 yards stopped** with whales categories.
- Recreational vessels transiting accounted for the largest percentage of vessel incidents (39%).
- When 'transiting' vessel activities were removed from analysis, EcoTour vessels (51%) had the largest percentage of vessel incidents.
- 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)
- In 2017, Soundwatch committed 153 violations of the *Be Whale Wise Guidelines* while monitoring. Out of those *Be Whale Wise* incidents, 138 were federal/state vessel regulations, which accounts for 6% of all incidents. Any close approach to killer whales was recorded as a direct take under our research permit and is submitted in the 2017 annual permit report.

Spatial Trends- Vessel Numbers & Vessel Incidents:

- There are spatial trends indicating that SRKW whales are seen more often along the west side of San Juan Island up to the Canadian border just north of Stuart Island than around other areas in the ESA designated SRKW Core Summer Critical Habitat Areas.
- Spatial trends indicate that the highest concentrations of all vessel types are in San Juan County marine waters, extending to Rosario Strait (Zones 1-4 and 8).
- A large number of vessel types, engaged in a variety of activities, routinely commit a multitude and variety of incident types, throughout the ESA designated SRKW Core Summer Critical Habitat Areas.

- In 2017, the Soundwatch vessel ranged from Race Rocks to Vancouver to north of Active Pass, much further than in 2016, mainly due to the increased presence of Transient killer whales and due to the increase in fuel capacity.
- EcoTour vessels were observed across the Salish Sea, in many more vessel counts than Recreational vessel counts.
- Kayaks were not observed as frequently as previous years due to the locations of the vessel counts and Transient killer whales being the dominant species in the Salish Sea during 2017, often requiring the Soundwatch vessel to travel further from San Juan Island than kayaks are able to paddle during a day trip.
- SRKW Foraging/Milling behavior was observed mainly on the West side of San Juan Island, WA
- Transient killer whales were observed to be Foraging/Milling across the Salish Sea.

Education Materials/Onshore Education:

- 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).
- In 2017, 89 commercial kayak guides were self-trained trained and tested on regional wildlife guidelines and regulations as part of the San Juan County Park Kayak Education and Leadership Program (K.E.L.P.) program.
- An online training video for kayak guides was created and made available at the following link; <https://youtu.be/xCstTnIHiCA>.
- An online test was also created to test the guides' knowledge of the guidelines and regulations before they launched from San Juan County Park and lead tours. (Available upon request.) The test was completed 115 times by kayak guides, company owners, San Juan County Park staff, TWM interns, and TWM staff.
- In 2017, Soundwatch Dock Talks reached 326 guests visiting Roche and Friday Harbor Marinas on San Juan Island, Washington.
- The BWW exhibit at TWM, installed in 2016, has reached over 50,000 people.

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

The Whale Museum staff (Executive Director: Jenny L. Atkinson, Finance Manager: Elli Gull and Soundwatch Coordinator: Sadie Youngstrom) administered grant funds, including accounting and disbursement, from award RA-133F-12-CQ-0057. The Soundwatch Coordinator (Sadie Youngstrom) along with seasonal Soundwatch driver/educator staff (Jesse Hughes), academic interns (Jordan Buxton, Candice Janecka, and Victoria Obermeyer) and almost 40 volunteers were responsible for the outreach, monitoring and data collection activities as well as data entry. Thank you to The Sighting Network Coordinator: Jennifer Olsen, for the data analysis support. 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, the help of Russ Mullins, Taylor Kimball and Washington Department of Fish and Wildlife Law Enforcement Officers, and the assistance and the dedication of the more than 840 past and present interns and volunteers who have collectively contributed more than 68,000 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 West Coast 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!

Literature Cited:

Ferrara, G.A., T.M. Mongillo, L.M. Barre. 2017. Reducing disturbance from vessels to Southern Resident killer whales: Assessing the effectiveness of the 2011 federal regulations in advancing recovery goals. NOAA Tech. Memo. NMFS-OPR-58, 76 p

Seely, E.A., Osborne R.W., Koski K., Larson S. 2017. Soundwatch: Eighteen years of monitoring whale watch vessel activities in the Salish Sea. PLoS ONE 12(12): e0189764.
<https://doi.org/10.1371/journal.pone.0189764>

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 encounter, 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@bc Cetacean Sightings Network
[wildwhales.org](http://www.wildwhales.org), WhaleReport app available on iTunes and Google Play

NEED MORE INFORMATION?
Fisheries & Oceans Canada: www.canada.ca/en/fisheries/oceans.html
Robson Bight (Michael Bay) Ecological Reserve: www.enr.gov.bc.ca/cpwr/kweco/, www.noboundary.net
Strathwatch: www.strathwatch.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: 1-800-853-1984
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): theWhaleMuseum.org or 1-800-562-8832
Coca Network (WA State): infoforcocanetwork.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: <http://www.westcoast.fisheries.noaa.gov>
NOAA Fisheries, Office of Protected Resources: www.mfrs.noaa.gov/

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.

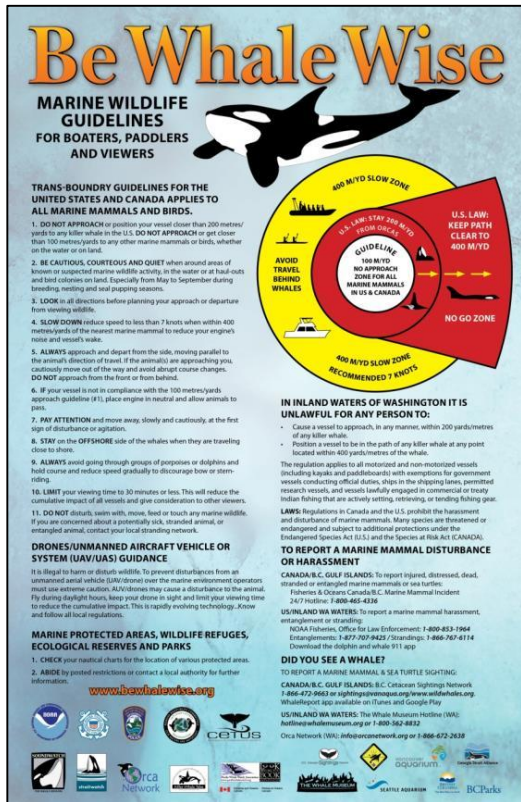
GUIDELINE
100 M/YD NO APPROACH ZONE FOR ALL MARINE MAMMALS IN US & CANADA

U.S. LAW: STAY 200 M/YD FROM ORCAS
U.S. LAW: KEEP PATH CLEAR TO 400 M/YD

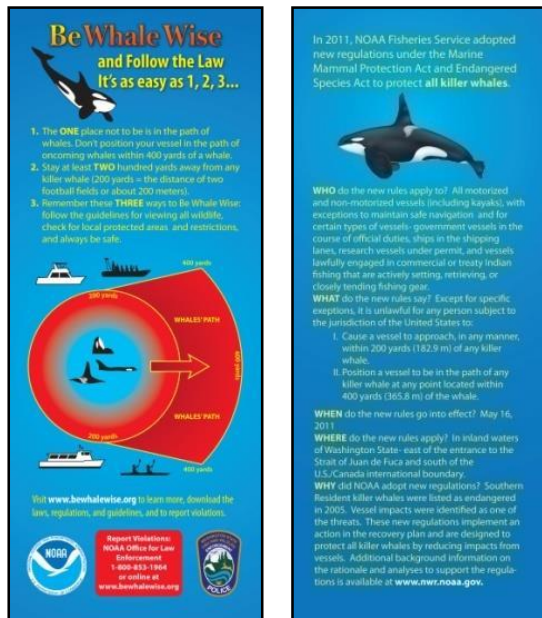
400 M/YD SLOW ZONE
400 M/YD SLOW ZONE
800 M/YD SLOW APPROACH ZONE
100 METRES/YARDS = 1 FOOTBALL FIELD

AVOID TRAVEL BEHIND WHALES
NO GO ZONE

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



Appendix B1 & B2: Federal and State Vessel Regulations for Killer Whales Double-sided Rack Card used by WDFW in 2016 and 2017.



Appendix C: 2017 KERP Program Recreational Boater Launch Sign-out Form.

Appendix C2: 2017 San Juan County Park Commercial Kayaker Launch Sign-out Form.

2015 RECREATIONAL VESSEL LAUNCH SIGN OUT SHEET							
Permit required before launching. Sign EACH vessel out every time you launch!							
DATE	TIME	VESSEL TYPE K-Kayak (includes all human-powered boats) B-Boat (Motor & Outboard)	# of PEOPLE (Board & Vessel)	PRIMARY ACTIVITY Day/ Trip Mornul-day View/ Wildlife Cruising Fishing/ Crab O-Other	ZIP or POSTAL CODE	COMMENTS	STAFF USE
9/12	11:00am	K-88	2	D	99250	South	
9/12	11:04h	K	3	D	98221	South Fork	
9/12	12:50	K	2	D	98250	"	
9/17	2:45p	K	2	D	98177	North	
9/17	120	K	2	D	98230	North	
9/17	180	K	2	D	98250	South	
9/18	4:45	K	1	D	98155	South	
9/18		K	2	D	98117	South	
9/25	1745	K	1	D	98216	South	
9/26	11:00am	K	1	D	88	South Fork	
9/26	12:15p	K	2	D	98221	South	
9/28	12:15p	K	2	D	98221	South	
9/28	12:15p	K	2	D	98221	South	
10/2	11:00	K	2	D	98117	Washington	
10/2	1230	K	1	D	98221	Washington	
10/28	3:30	K	2	F/O	98221	Stockholm	
10/28	4:15	K	3	W	98260		

DATE	COMPANY	# GUIDES	# BGATS	TIME OUT	TIME IN	GUIDE	PARKING	
5/4	DSK	2	1	2	5:30	KAY	NO	
5/6	DSK	2	1	2	12:30	KAY	NO	
5/7	DSK	3	1	2	12	KAY	NO	
5/7	DSK	2	2	2	12:15	YES	YES	
5/7	DSK	2	1	2	12:30	CMO	NO	
5/21	DSK	2	2	3	2:30	KMY	NO	
5/22	DSK	8	1	5	9:45	MUS	NO	
5/23	SKQ	10	1	6	11:00	MUS	YES	
5/23	DSK	2	1	2	7:45	CAJ	NO	
5/24	DSK	2	1	2	2	4:48	KLY	NO
5/24	SKQ	7	3	3	11:00	MUS	YES	
5/26	DSK	5	3	5	12:30	CMJ	NO	
5/27	DSK	1	2	2	2:30	CH	NO	
5/28	SKQ	5	1	3	12:45	MUS	YES	
5/28	DSK	4	1	3	2:15	CM	NO	
5/28	DSK	2	1	2	9:00	11:15	JP	Y
5/28	SKQ	5	1	4	2	5:30	JP	Y
5/30	PSK	2	2	2	2	3:30	NO	NO
5/31	DSK	0	2	1	10	COO	NO	
5/2	DSK	4	1	3	12	4:00	Kelly	NO
4/8	DSK	6	1	3	1	5	JP	Y
4/9	DSK	4	1	3	1	4:30	CAJ	NO

All Karyak Companies Must Obtain Valid Permit
 To Launch and Canopy Tents at All Time of Park Use
 Prior to Launching

Appendix D: 2013 - 2017 San Juan County Park Recreational Boat Launch Permit Form.

VESSEL PERMIT SAMPLE

San Juan County
Parks & Recreation

Complete & deposit with payment

Date permit issued _____

Permit issued by _____

Primary vessel operator _____

City/ST/Zip _____

Number of people ____* (list to right →)

Vessel type: ☐ kayak ☐ power boat

☐ Other _____

☐ Single use ☐ Multi ☐ Seasonal

Date/s valid _____ ☐ campsite # _____

EXACT PAYMENT – NO CHANGE GIVEN

\$ PAID _____ ***NO REFUNDS.***

☐ Cash ☐ Check # _____

☐ Fee waived-San Juan County resident

♦Affix colored TAG
to bow of vessel in clear view

♦Keep Vessel Launch Permit
with you on the water.

Primary vessel operator signature

***Permit issued to (list all names):**

Date permit issued _____

Date/s valid _____

Permit issued by _____

\$ Paid _____

NO REFUNDS


♦Affix colored TAG
to bow of vessel in clear view.

♦Keep Vessel Launch Permit
with you on the water.

THANK YOU!

San Juan County
Parks & Recreation

350 Court Street #8
Friday Harbor WA 98250
Admin. Office 360-378-8420
360-378-8420 parks@sanjuanco.com



SAN JUAN
COUNTY
PARKS & RECREATION

Appendix E: 2017 Kayaker Code of Conduct Brochure, Folded, Double-sided (Available at <http://www.whalemuseum.org>)

ADDITIONAL K.E.L.P. GUIDELINES

All paddlers pledge to abide by 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 the whales, paddlers should start moving out of the path of oncoming 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 & to avoid being in the path of the whales.

- If whales are approaching within 200 yards of shore, paddlers move into shore as close as possible (ideally in help beds), raft up, secure themselves, and stop paddling until the whales have passed by.
- 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 oncoming whales, 400 yards from the whales.

Immediately stop paddling & raft up within 200 yards until the whales have passed by.

- Paddlers shall avoid disturbing haul-out areas for seals/sea lions and/or sea bird nesting sites by paddling in at least a 100 yard arc whenever possible.

Avoid making noise, direct eye contact, and sporadic movements.

May through October is the most sensitive time of the year for breeding, see them, and nesting birds.

- Paddlers will maintain a 200 yard distance from any National Wildlife Refuge. No landings are permitted except at designated areas.

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

The Kayak Education & Leadership Program (K.E.L.P.) informs kayakers and other paddlers about marine wildlife regulations and guidelines in the San Juan Islands with the aim of reducing human-powered craft disturbances to all marine wildlife, including Southern Resident Killer Whales.

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

FEDERAL VESSEL REGULATIONS IN THE INLAND WATERS OF WASHINGTON DECLARE THAT IT IS UNLAWFUL TO:

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

The law applies to all types of boats, including motor boats, sailboats, kayaks, and paddle boards.

**Some exceptions apply, including vessel safety, vessels actively fishing commercially, cargo vessels traveling in established shipping lanes, and government & permitted research vessels.*

TO REPORT MARINE MAMMAL STRANDINGS/ SIGHTINGS: 1-800-562-8822 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.be-whalewise.org

The Whale Museum's Soundwatch Program was created collaboratively by The Whale Museum & the San Juan Island Kayak Association with input from WDFW & NOAA Fisheries.

SAN JUAN ISLAND

MAP INDEX

- NATIONAL WILDLIFE REFUGE
- SENSITIVE AREAS
- PUBLIC LANDS
- BOTTOMFISH RECOVERY AREA
- MARINE PRESERVE
- VOLUNTARY MOTOR BOAT EXCLUSION ZONE

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 areas boating laws, accessible public landing areas, safety issues, and environmental conditions.

Map Index Description

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

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

Bottomfish Recovery Zones
Guidelines: No bottom fishing within 1/4 mile offshore 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 Point State Park area when whales are present.

Sensitive Areas
Are marked for seal haul-outs & seabird nesting sites. Additional Sensitive Areas not marked on the "Area Detail" map include **Eelgrass Habitat**; eelgrass provides critical habitat for juvenile fish. Please avoid disturbing sediments and vegetation.

Appendix F: 2016/2017 Kayaker Code of Conduct Rack Card, Double-sided (Available at <http://www.whalemuseum.org>)

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

The Kayak 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 orca 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.

Marine Preserves
Regulations: Closed to all shellfish & bottomfish activities. (See WDFW Marine Rules 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
Guidelines: No bottomfishing within 1/4 mile of shore to protect & restore regional fishing.

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

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

Appendix G: Soundwatch Data Sheet Vessel Contact.

VESSEL CONTACT								
Time	Location	Latitude	Longitude	why contacted?	Took BWB? 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 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 I: Soundwatch Data Sheet Vessel Count/Whale Survey.

DATE: Weekend <input type="checkbox"/> Weekday <input type="checkbox"/> Holiday <input type="checkbox"/> Boating	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	MM	MX	MY	OTHER/DERIVE:
	Port: J Jp K Kp L Lp T	Vessel Activity?				Whale Cmt/Mintr																
	Soc: DIR/NON DIR: N S E W					Fish																
	Orig: CTC THT LOO SPED SPED Gps: etc tht loo					Transit																
	Rmtm: FLNK LIN NONLIN					Specific Bvrs:				Rsrch NonWhale												
	Soc: Mnts S lo Med Fst Porp					Enforce Active																
	BhvST: Trvl Rst Mill Socl					Acoustic >1/2mi																
	Cmntis:					Other Descp:																

Appendix J: 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 - SJVNBZ 1	vessel w/in 1/4mile (440y/402m) of the SJ 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 - SJVNBZ 2	vessel w/in 1/8mile (220y/201m) of ANY shoreline with whales present
40.7	area restriction - SJ Slow Zone	vessel > 7 knots w/in 1/2mile (880y/808m) SJVNBZ 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 J1: 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 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	
syau	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 K1: Soundwatch Whale Survey & Behaviors Codes for Whale Scans (Page 2).

Species code	Species Name	Latin Name
oror (SR)	killer whale - southern residents	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	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	Milling
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	Sea is mirror flat
1	small waves with the appearance of scales, but without 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	scattered waves, distinctly choppy, many white foam, chance of spray
6	long waves with extensive white foam breaking, crests begin to form, spray begin
7	sea breaks up, white foam breaking waves start to be blown in drifts
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 & Abbrv.
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 apperance 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
CA	Commercial Aircraft	none
EA	Ecotour aircraft	poor
EC	Ecotour Canadian	fair
EK	Ecotour Kayak	good
EU	Ecotour US	excel
PA	Private Aircraft	
PK	Private Kayak/Paddle	
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	

Weather
sunny
sunny w/ partial clouds
overcast - high
overcast
foggy
rain - light
rain - heavy

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:

- 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.
- Contaminants:** Toxins in the ecosystem such as flame retardants (PBDEs), industrial products (PCBs) and pesticides (DDT) negatively affect their health and reproduction.
- Vessel disturbance:** Includes human-made noise and acoustic signatures of all types of vessels (motorized vessels, including recreational boats, commercial whale watching, 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.

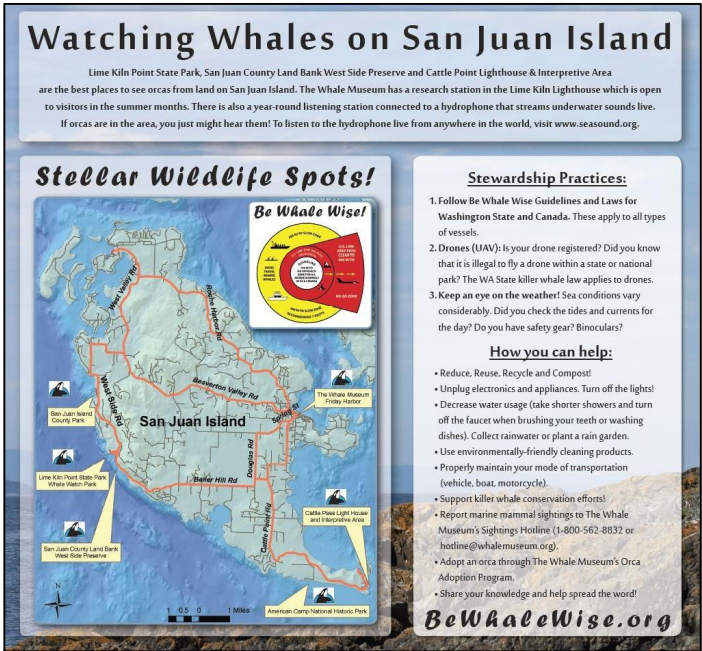
Here are a few things you can do on the water while boating to reduce your impact:

- **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.



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



Appendix N: Map depicting the number of SRKW sightings reported by area in 2016. Its size is proportional to the number of reports in 2016.

