

2018 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: Extension year of multi-year contract: January 1, 2017 through
December 31, 2017, extension September 15, 2018



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 2018 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 2017 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 2018 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). As of November 2018, there were 74 Southern Resident killer 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. In July 2018, Canada passed vessel regulations for killer whale populations in British Columbia and the Pacific Ocean. The new Canadian regulations stated all vessels should operate 200 meters away from all killer whales.

The 2018 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 2018 and includes vessel incidents, behaviors that are inconsistent with current guideline and regulations, definitions related to the Be Whale Wise guidelines and the U.S. Federal, Washington State and Canadian 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 copies of the Soundwatch Program 2018 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 2018 whale watching season and provide data analysis updates to the 2017 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 2018 whale watch season
- 2) Collect data on vessel activities during the 2018 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 2018 data updates to the 2017 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 - 2018).

Section I: Summary of Activities

Soundwatch Boater Education Program reduces vessel disturbance to killer whales and other marine wildlife through educating boaters on regional guidelines and regulations as well as providing systematic monitoring of vessel activities around cetaceans. Soundwatch promotes responsible marine stewardship through the development, distribution, implementation, annual evaluation, and adjustment of guidelines and regulations for marine wildlife viewing by residents, visitors, and commercial users. Soundwatch educates boaters on the current guidelines and regulations before they leave the shore; reinforces the learning experience on-the-water where disturbances take place; and provides a scientific platform to collect observational data on vessel activities around cetaceans. This annual long-term data is primarily used to help evaluate effectiveness of current regulations and guidelines and to determine need for adjusting regulations and/or guidelines (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 2018, 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. 21114. Soundwatch staff and volunteer crews had a total of 93 days of activity, of which a total of 87 days were on the water with marine wildlife between May 24, 2018 and September 26, 2018, totaling 547.2 on the water hours and traveling 4132.8 nautical miles (Figure 1). Killer whales were present on 65 days (34 days with SRKWs and 31 days with Transients), for 449.4 hours, averaging 7.1 hours per day of on the water effort (Figures 2 and 3). Over the summer seasons (May-September) since 1998, Soundwatch has totaled more than 12,501 observational and outreach hours with vessels and whales in the Haro Strait region.

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, 31 dedicated on-boat volunteers, and many other community volunteers. Over the season 997.2 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 547.2 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.

The on-the-water crew operated with a minimum of two and a maximum of four crew members. Equipment utilized in 2018 consisted of a 17' American Eagle rigid hulled vessel, *R/V Raydiance*. An alternate 19' Safe Boat rigid hulled vessel, *R/V L-98*, operated as a secondary vessel after *Raydiance* suffered minor damage on September 4, 2018. *L-98* operated for 14 monitoring days at the end of the 2018 summer season. Both vessels were fully equipped with safety equipment, VHF radios, and chart plotters. The radar unit on *R/V L-98* is utilized for accurate distance calculations of vessels, and on poor weather condition days. *R/V Raydiance* is not equipped with a radar, but does have a Garmin GPS unit.

Soundwatch and Washington Department of Fish and Wildlife (WDFW) 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.

In 2018, 570 Vessel Count/Whale surveys were conducted on a variety of cetacean species, the majority being Southern Resident killer whales 59% (339 counts), Transient (Bigg’s) killer whales 37% (210 counts), and Humpback Whales 4% (21 counts) in the Haro Strait Region of Washington State, U.S. and Southern Vancouver Island, British Columbia, Canada (Figure 3). Soundwatch observed more killer whale groups in the Haro Strait region than in past years. As a result, vessel monitoring was spread over a larger region in the space of a single day. Additional educational outreach included 10 days of dedicated off the water dock talks, reaching approximately 446 guests in the Friday Harbor and 241 guests at Roche Harbor marinas and 50 hours of Kayak Education Leadership Program (K.E.L.P.).

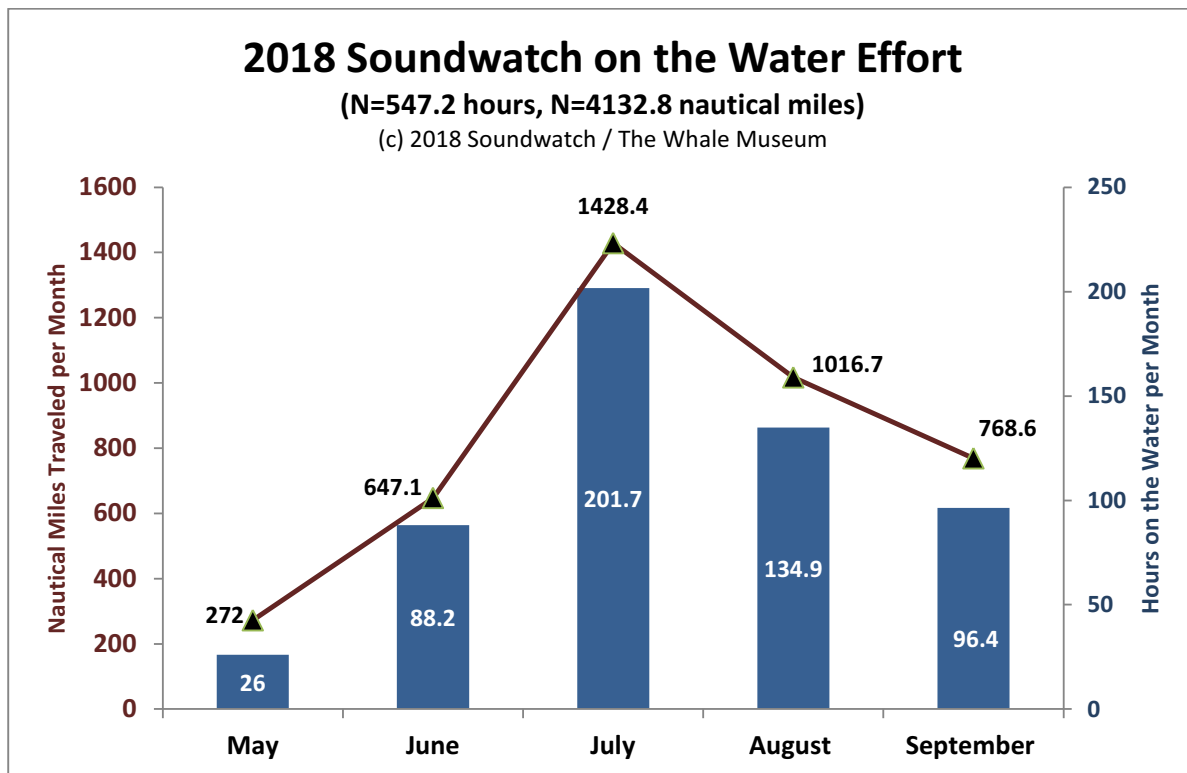


Figure 1: Distribution of Soundwatch vessel hours and miles by month for 2018.

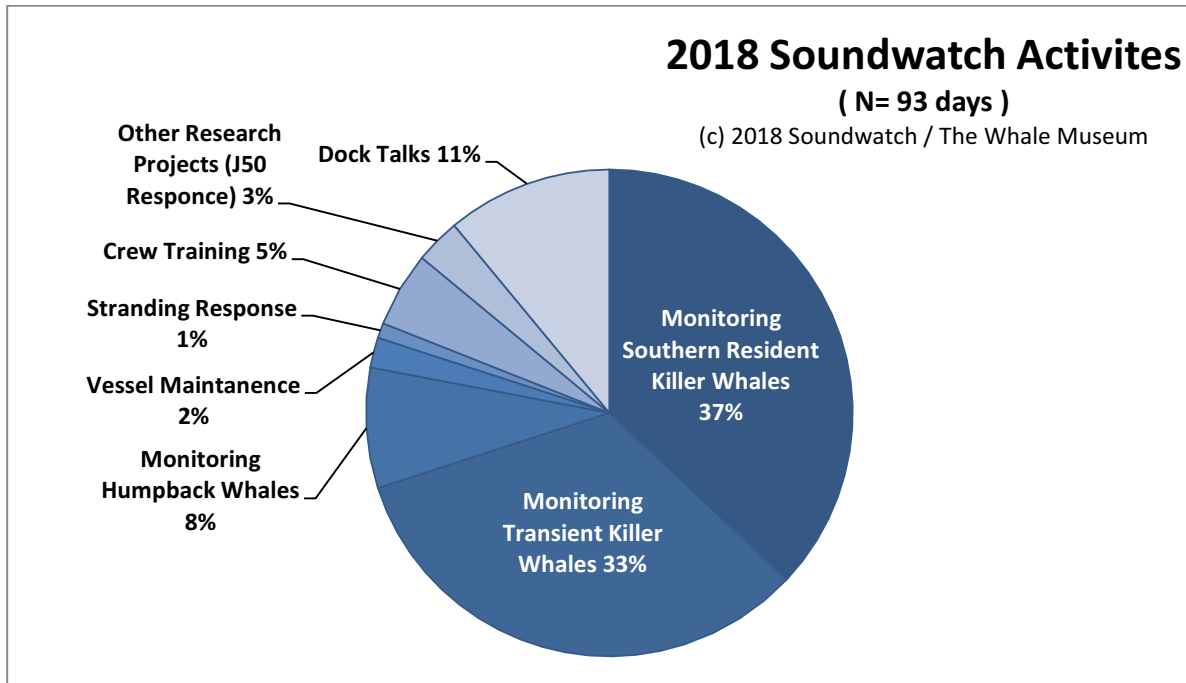


Figure 2: Soundwatch activities during the 2018 season, 87 days on the water plus 6 days solely shore based operations, such as training, “Dock Talks”, and other research projects.

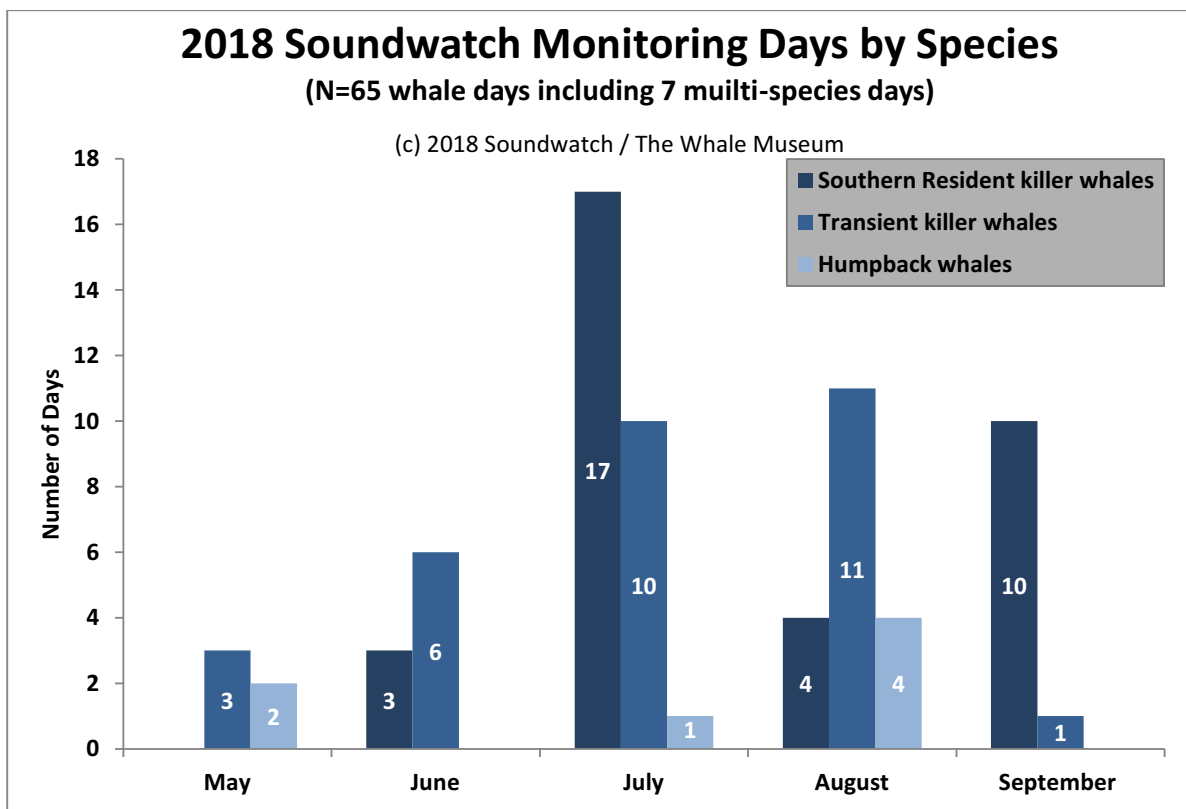


Figure 3: Distribution of Soundwatch monitoring days by species in the summer 2018 season.

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 2018, 57 total EcoTour whale watch companies offered whale watching trips from 106 ‘active’ vessels in the U.S. and Canadian Haro Strait region and 13 ‘occasional’ vessels and 19 ‘rare’ vessels. In 2018, the second highest number of active vessels was recorded after the peak in 2016, representing an increase in active vessels for the long term data set (Figures 4-5). A combined total of 138 commercial vessels could potentially be 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. As of November 2018, the addition of another commercial whale watch vessel for the 2019 season has already been identified.

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 one dedicated sport fishing charter, one dedicated kayak company, and other eco-tour companies that offer whale watching and kayaking. There are 102 active vessels operating from 30 departure locations by the 15 Canadian and 17 USA PWWA members (Figure 6-8). Historically, 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. Recently, the trend has been to add larger passenger-style vessels to the fleet. However, three U.S. companies are now operating RHIB style vessels that hold between 10-25 approximate passengers. Kayak companies are sometimes not included in vessel counts due to the location whales were observed over the course of the season. EcoTour vessel counts include motor and sailing vessels only, kayaks have a separate tally.

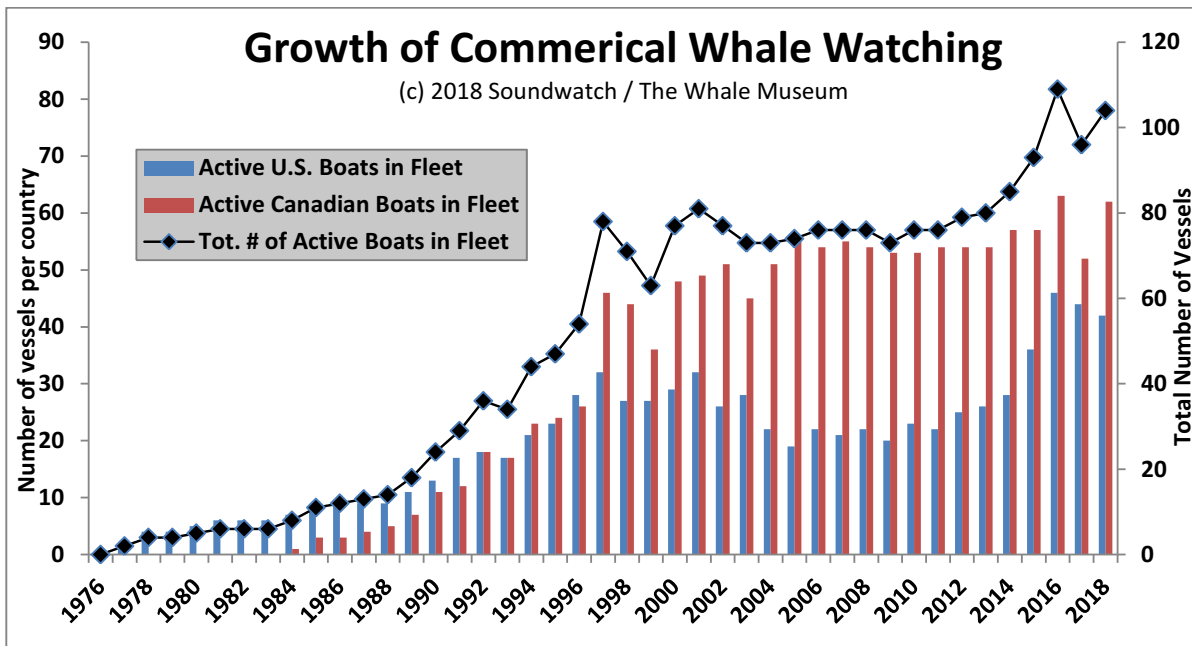


Figure 4: Growth of commercial whale watching in the Salish Sea 1976-2018

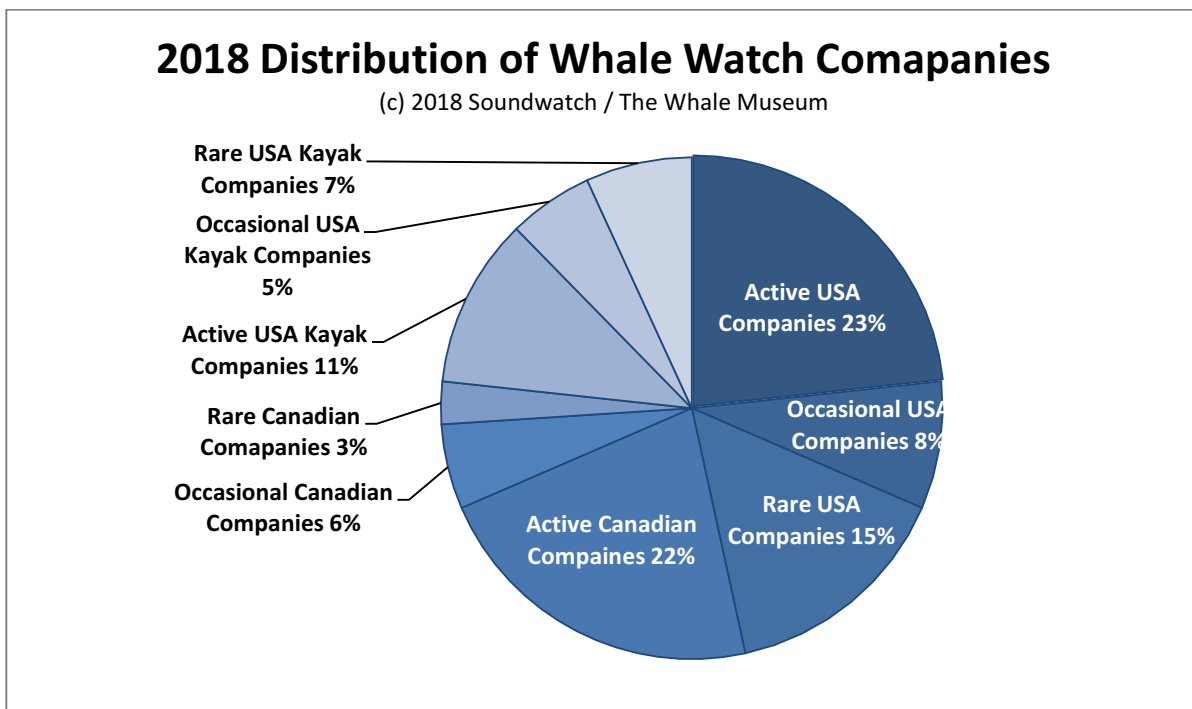


Figure 5: Distribution of whale watch and kayak companies from the USA and Canada in 2018.

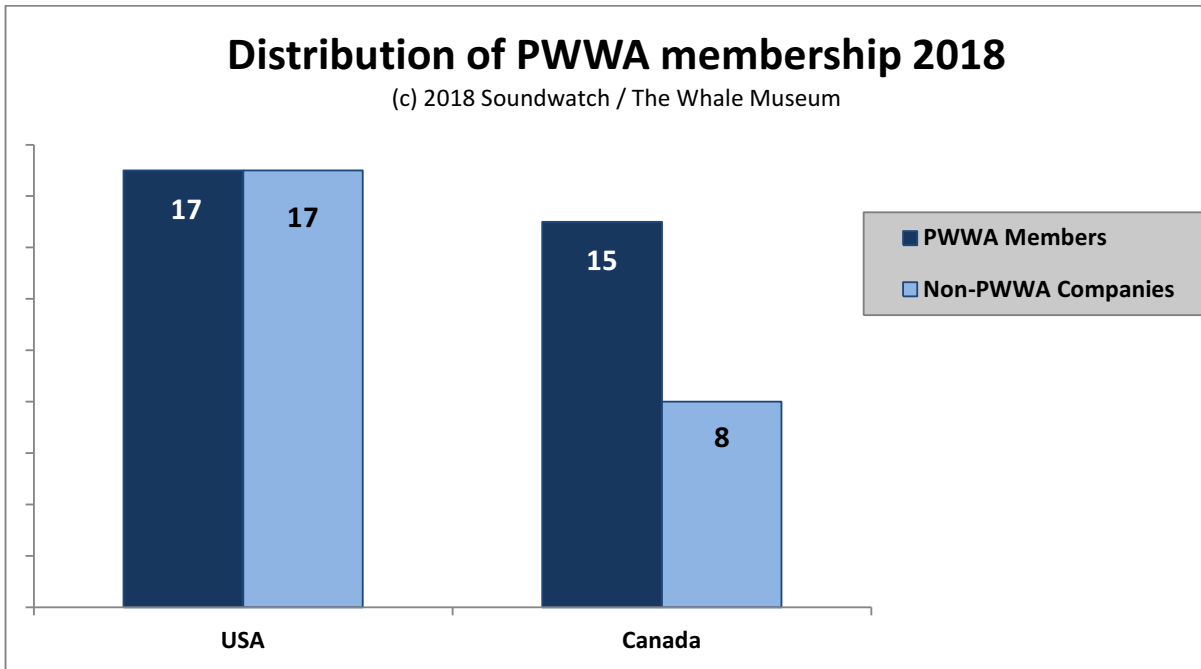


Figure 6: Distribution of whale watch companies that are also members of the Pacific Whale Watch Association in 2018, only including kayak companies within the association.

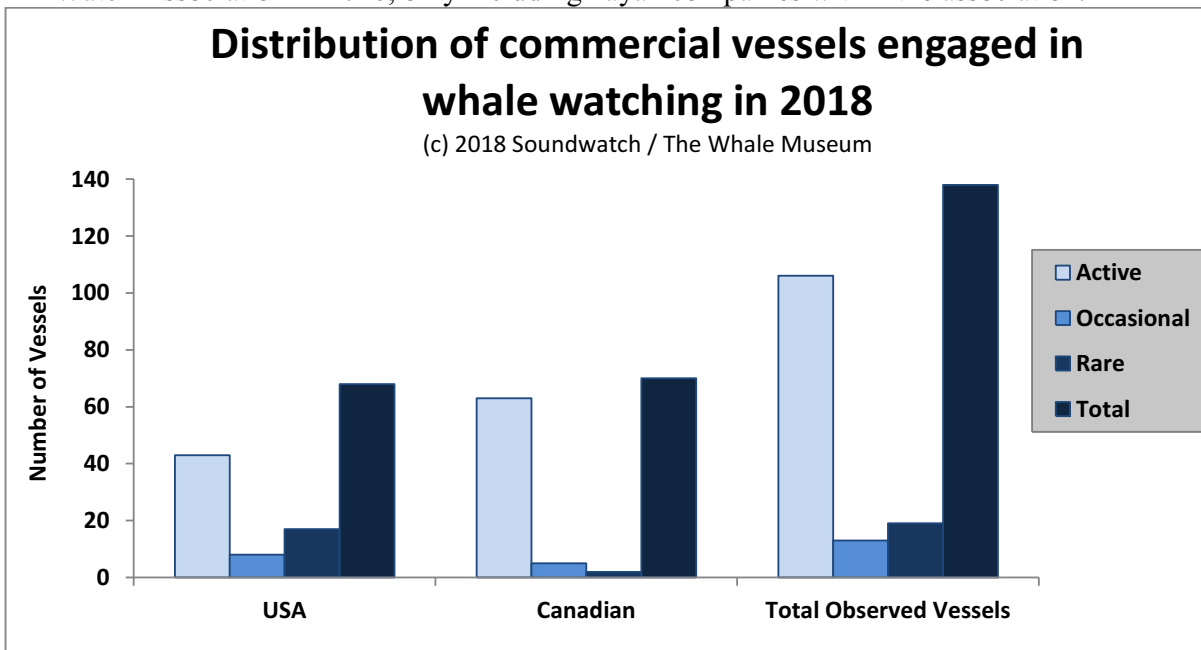


Figure 7: Distribution of total commercial vessels (N=138) engaged in whale watching in 2018.

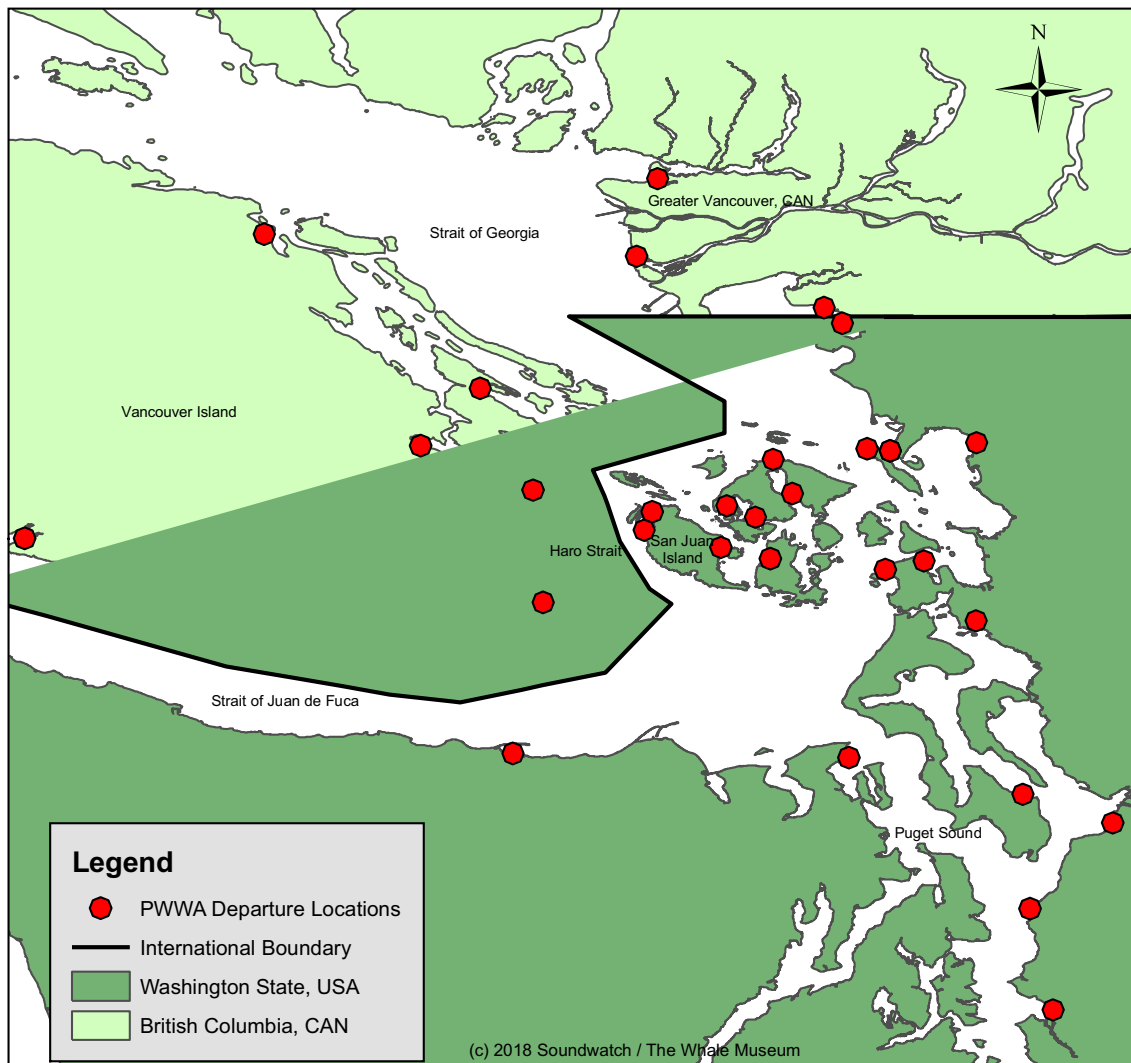


Figure 8: PWWA member vessel departure locations in 2018.

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. Lime Kiln State Park/Whale Watch Park estimated the total number of visitors in 2018 to be approximately 262,001 people, approximately 25,000 more people than 2017 (Figure 9). Attendance data for Lime Kiln was provided by Washington State Parks Office in Olympia, Washington. This increase in visitors to the state park may be due to the heightened awareness of the plight of the Southern Residents in 2018, and the awareness of impacts caused by vessel-based whale watching.

Soundwatch primarily observes commercial kayak presence on the west side of San Juan Island, due to commercial companies launching from San Juan County Park on San Juan Island. Therefore, kayak data is primarily dependent on the location of whales and the Soundwatch vessel during vessel monitoring surveys. The increased presence of Transient (Bigg's) killer whales resulted in Soundwatch operating further offshore and further from San Juan Island's

west side. Commercial kayaks were present for 56 vessel counts over 31 days in Soundwatch vessel counts along the west side of San Juan Island from May-September 2018. 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 kayaks being launched from San Juan County Park has decreased since 2015 however the exact cause of the decrease is unknown. This could be due to companies utilizing alternant launching sites on San Juan Island, such as Friday Harbor (Figure 10).

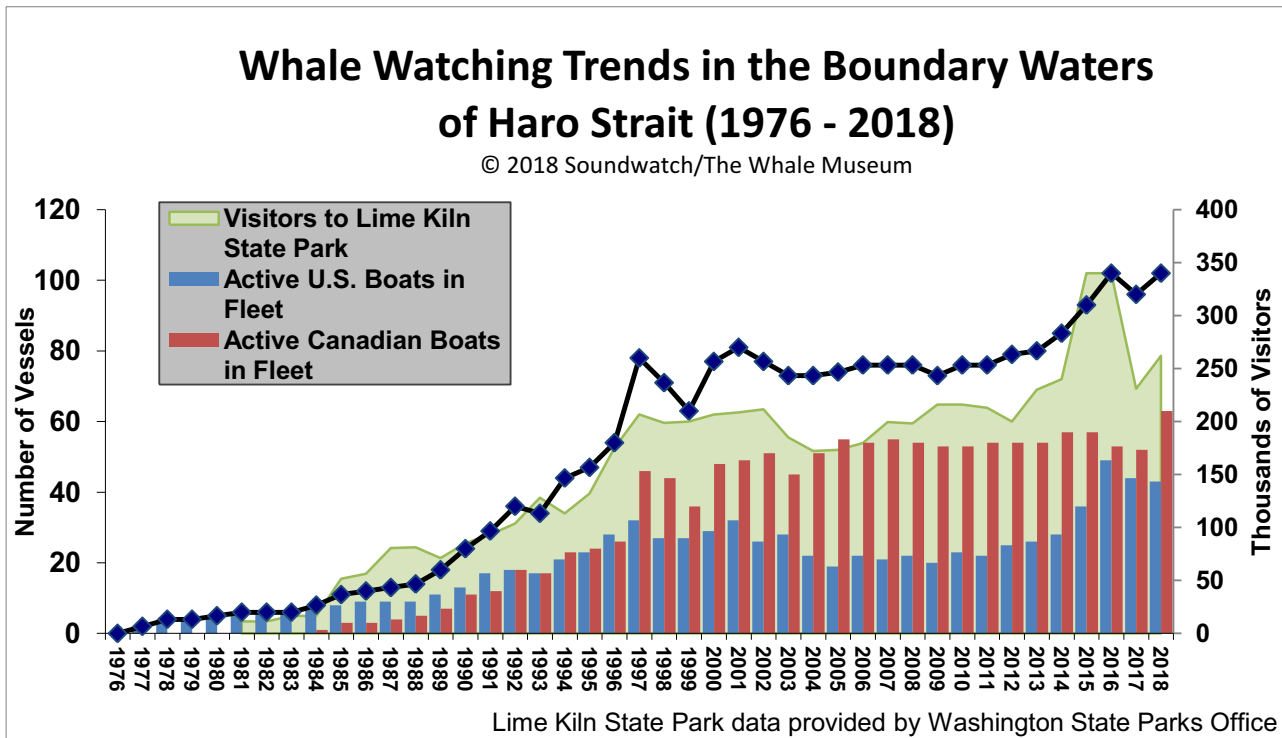


Figure 9: Growth of whale watch industry including Lime Kiln Point State Park visitors in 2018.

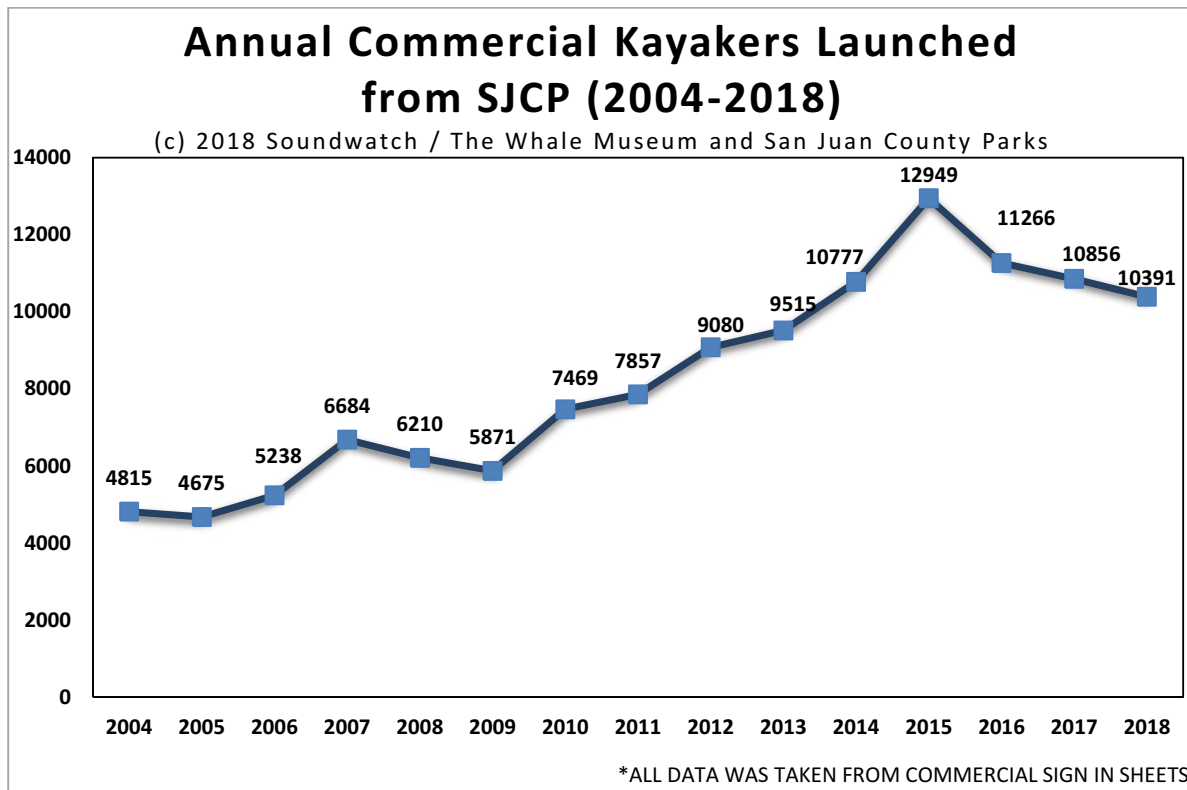


Figure 10: Number of commercial kayakers launched from San Juan County Park on the west side of San Juan Island. The total number represents individual kayakers and not the total number of kayaks launched.

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 A1 & A2). WDFW officers handed out the Washington State Law Rack Card (RCW 77.15.740) and *Be Whale Wise* brochures when educating vessels (Appendix B).

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 83,000 museum visitors and education program participants, 29,834 visitors in 2018 alone (number of visitors approximated from mid-July 2016 through December 2018). In addition, materials were given to approximately 3,028 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 10,391 kayakers launched from the park in 2018 (Figure 10). From 2013 - 2018, 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 2018 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 and D). The 2016 updated *Be Whale Wise* brochures were also distributed at San Juan County Park for recreational boaters.

When kayakers were 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 F). A *Kayakers Code of Conduct* brochure (Appendix E) was updated in 2016 and distributed to all kayakers who attended the KELP training at San Juan County Park. 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/pWMC-7G5sSM>. In 2018, 71 EcoTour guides completed the online test under guidance of Soundwatch / The Whale Museum staff. The average test score from 108 attempts was 89.2%. (Guides were allowed one re-take of the exam if they did not achieve the required score in the first attempt.)

During 2018, Soundwatch delivered *Be Whale Wise* and *U.S. federal/state vessel regulations* for killer whales to 487 recreational vessels reaching 1,551 recreational boaters (Figure 11). Soundwatch contacted an average of 3.23 persons per vessel. The decrease in recreational vessels contacted from 2017 (612 vessels and 1,893 boaters in 2017) is most likely due to the heightened awareness of the plight of Southern Resident killer whales and Soundwatch's participation in other research efforts (detailed later in this report).

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 additional *Be Whale Wise* printed materials and, if not, were they were previously aware of vessel guidelines, 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 represent the number of vessels from ports in the Salish Sea (Figure 12). Anacortes, Bellingham, Friday Harbor, and Seattle, Washington and Victoria, British Columbia ports had between 10 and 37 vessels contacted by Soundwatch in 2018. Homeports were also recorded from Washington state all the way to the state of New York (Figures 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, 36% stated they were aware of the guidelines and laws, which is an increase from 31% in 2017 (Figure 18). To increase this knowledge and compliance with guidelines, Soundwatch is partnering with many organizations to broaden our outreach message, such as the Seattle Boat Show and Whale Warning Flag, which will be discussed in detail later. Of vessels contacted 38% were transiting through the area and 59% were actively engaged or intended to engage in whale watching activities, and 3% of vessels were engaged in fishing in proximity to killer whales (Figures 15 - 17).

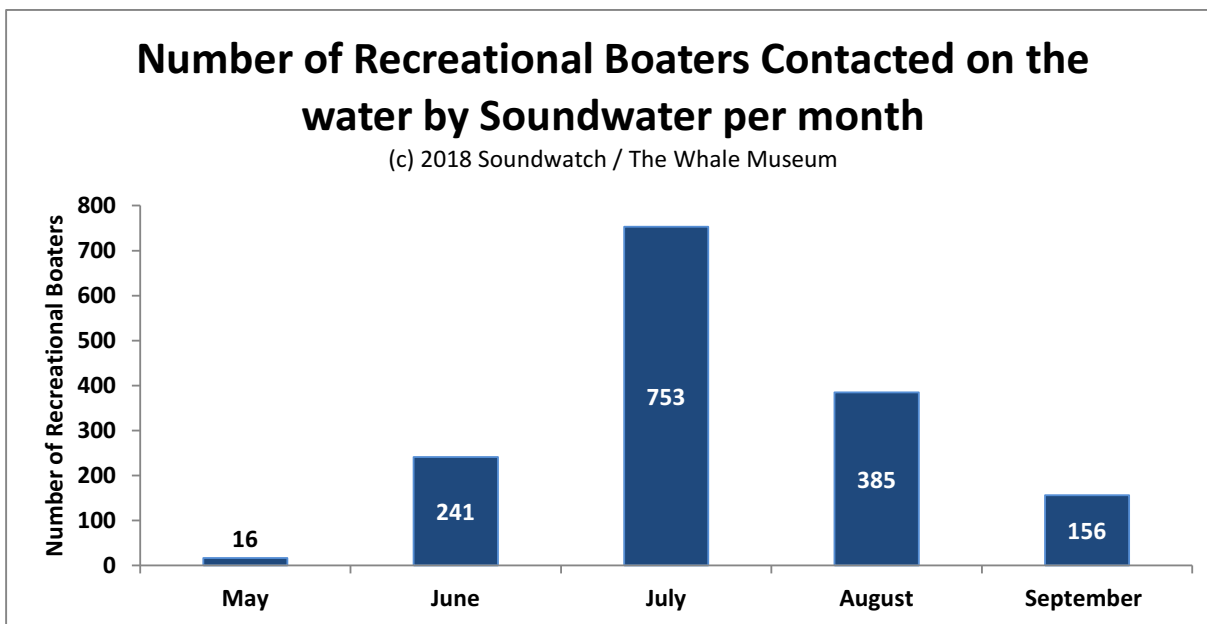


Figure 11: Number of recreational boaters (n=1,551) contacted by month on the water by Soundwatch for either prevention and/or education on vessel disturbance to killer whales in the region.

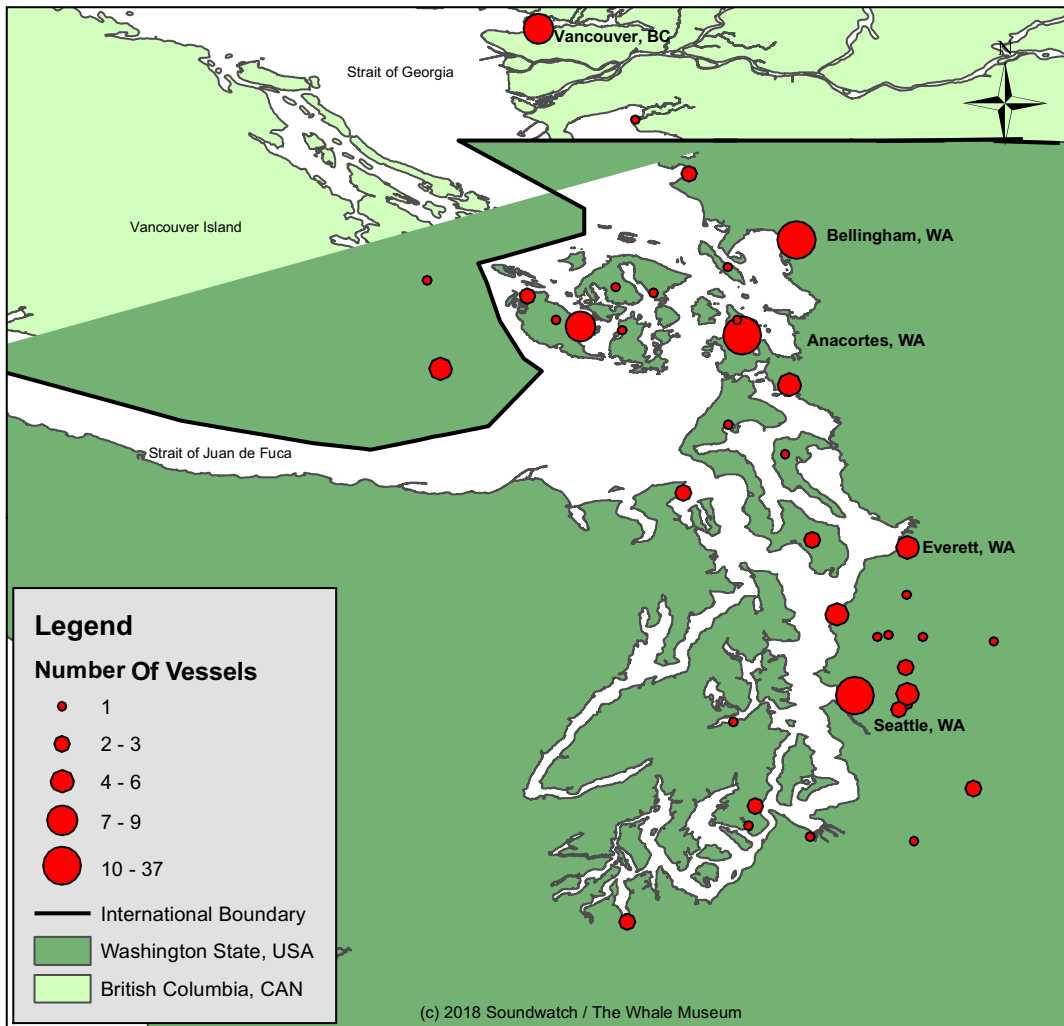


Figure 12: Recreational vessel home ports in the Salish Sea, as recorded by Soundwatch from May – September 2018.

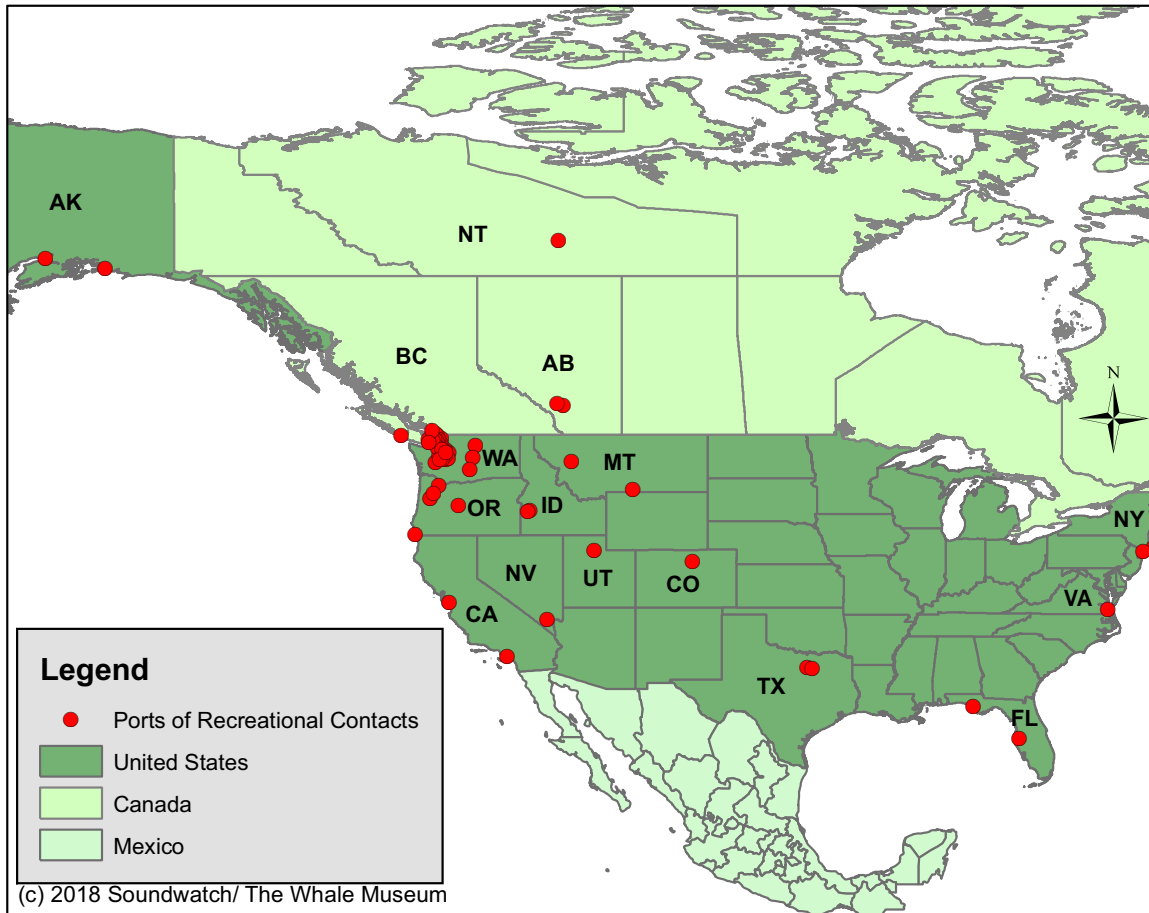


Figure 13: Recreational vessel home ports outside of the Salish Sea within North America, as recorded by Soundwatch from May – September 2018.

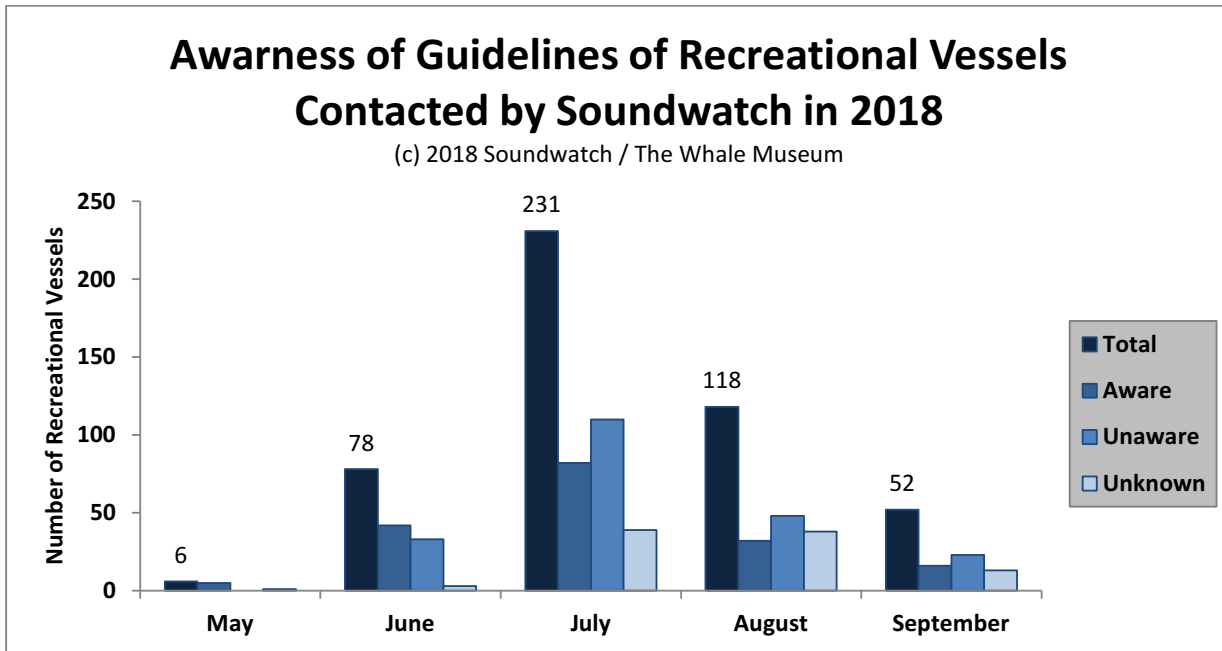


Figure 14: Number of Recreational vessels contacted and the awareness of Be Whale Wise Guidelines by month in 2018.

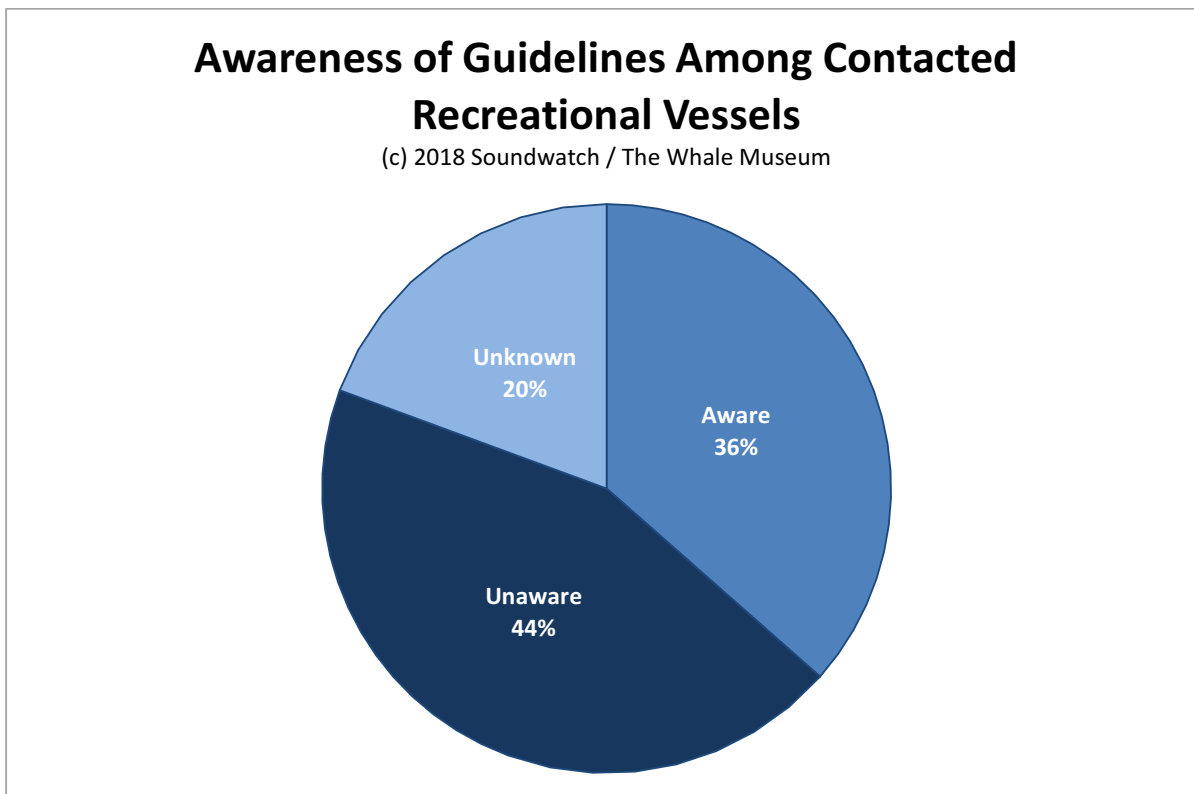


Figure 15: Awareness of guidelines among contacted recreational vessels in 2018.

Activity of Recreational Vessels Contacted

(c) 2018 Soundwatch / The Whale Museum

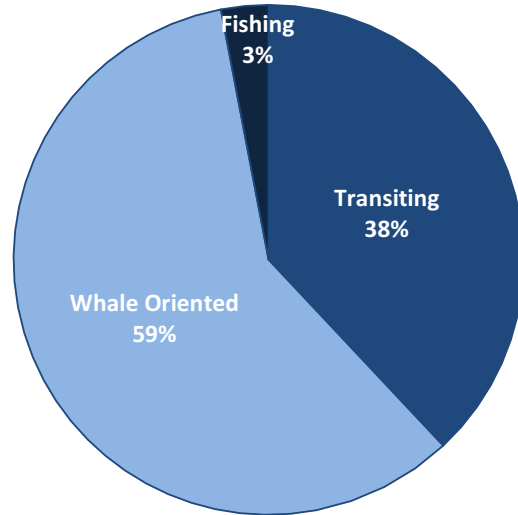


Figure 16: Observed Activity of Recreational vessels contacted by Soundwatch in 2018.

Recreational Vessels Purpose of Activity

(c) 2018 Soundwatch / The Whale Museum

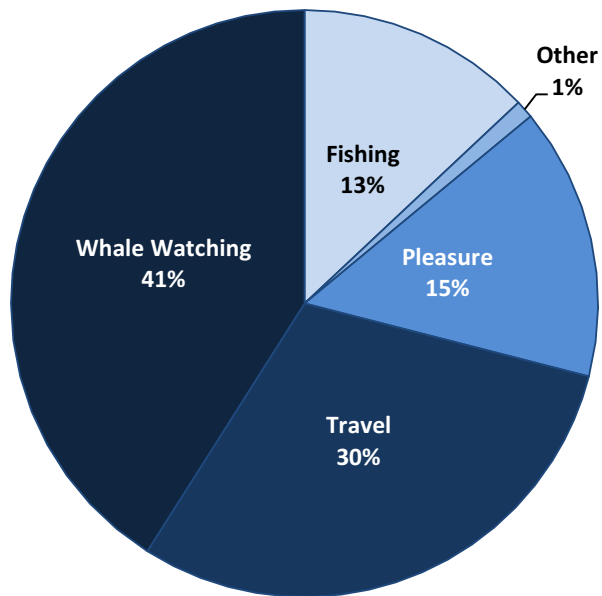


Figure 17: Soundwatch Recreational contact responses to “Reason/purpose for visiting the region?”

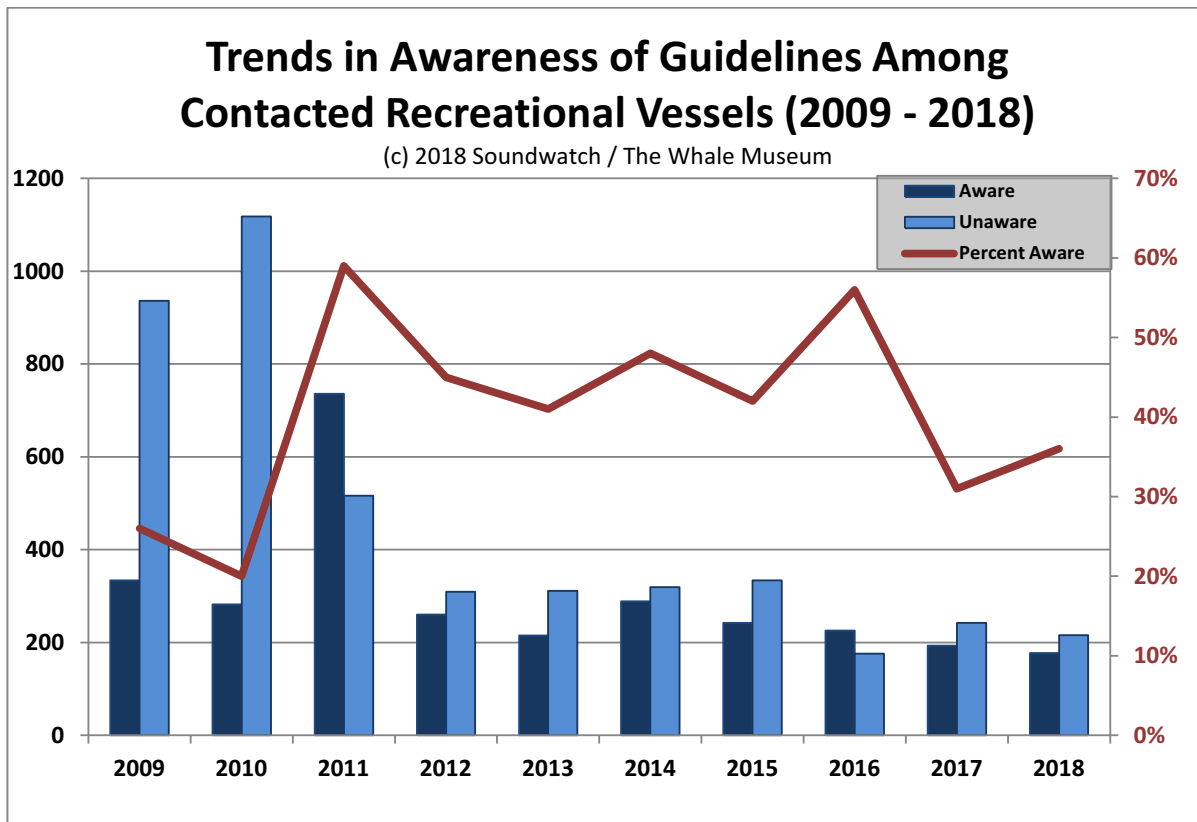


Figure 18: Trends in Recreational Vessels Awareness of Guidelines Contacted by Soundwatch from 2009 - 2018.

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 I & J). Soundwatch staff and volunteer crews record whale and vessel data using a set of standardized vessel type and vessel activity definitions as well as whale attributes agreed upon by U.S. and Canadian cetacean researchers (2004 NOAA SRKW workshop) (Appendix K1 & K2). Vessels within one half-mile (880 yards) of all known whale activity are counted according to type and vessel activity (Figure 19). 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 I). 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.).

Vessel incidents, observations of vessels operating contrary to current voluntary guidelines and regulations, are recorded using standard definitions. Descriptions of guidelines and regulations, along with the incident codes used to record incidents of regulation and guideline violations can be found in Appendices J1 & J2. Incidents are recorded opportunistically as they are observed using a *Vessel Incident datasheet* (Appendix H). Soundwatch staff are conservative in recording incidents.

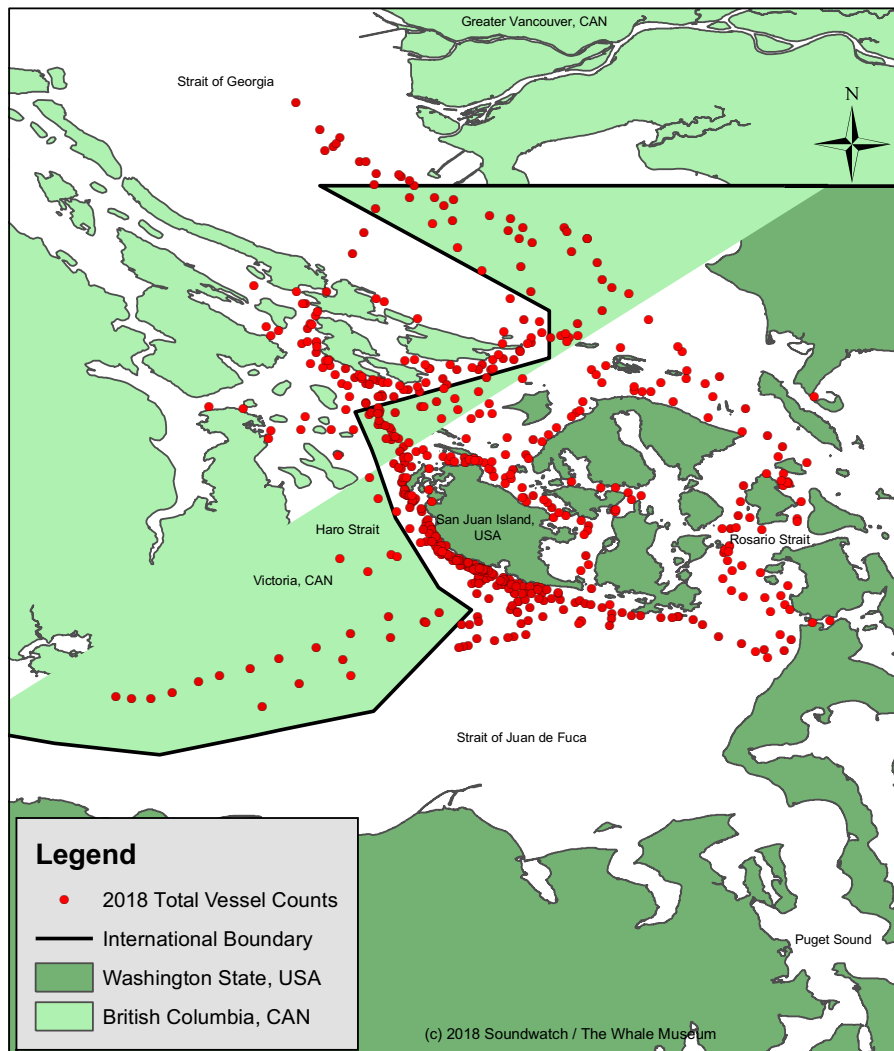


Figure 19: 2018 Soundwatch 570 Vessels Counts by location.

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 N). 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 77 vessel/whale days and 570 vessel counts. U.S. EcoTour vessels were observed 74 days and in 463 vessel counts, Recreational 74 days and 440 counts, Canadian EcoTour 71 days and 362 counts, Research 39 and 158 counts, Enforcement 43 days and 161 counts, and kayaks (ecotour and recreational) 30 days and 56 counts.

The Soundwatch study area is separated into zones based on the TWM data quadrants and marine fishing zones for the US and Canada. Soundwatch was able to concentrate surveys on locations of vessels engaged in whale watching activities (Figure 21). This year most vessel counts were taken in Haro Strait off the west Side of San Juan Island. In 2017, Haro Strait also had the highest number of vessel counts followed by Rosario Strait (n=107). Increased counts in Rosario Strait are likely due to increased sightings of Transient killer whales (Figure 20). Southern Residents were most often seen along the west side of San Juan Island in Zones 1 and 2 similar to previous years (Figure 22 and 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 2018, 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), Rosario Strait (Zone 8), and Georgia Strait (Zones 20, 22 and 23). These areas are also the areas frequently used by killer whales. In 2018, there were more days where the Southern Residents were seen in the inland waters of Washington state and British Columbia than in 2017. This was highlighted by the three high profile deaths in the Resident population this year, in which Soundwatch targeted effort to monitor the Southern Residents. During this time Transient killer whales were prolific throughout the area as well. Therefore, this data is bias towards Southern Residents and the full extent of Transient habitat use, population size and vessel behavior accompanying is not known.

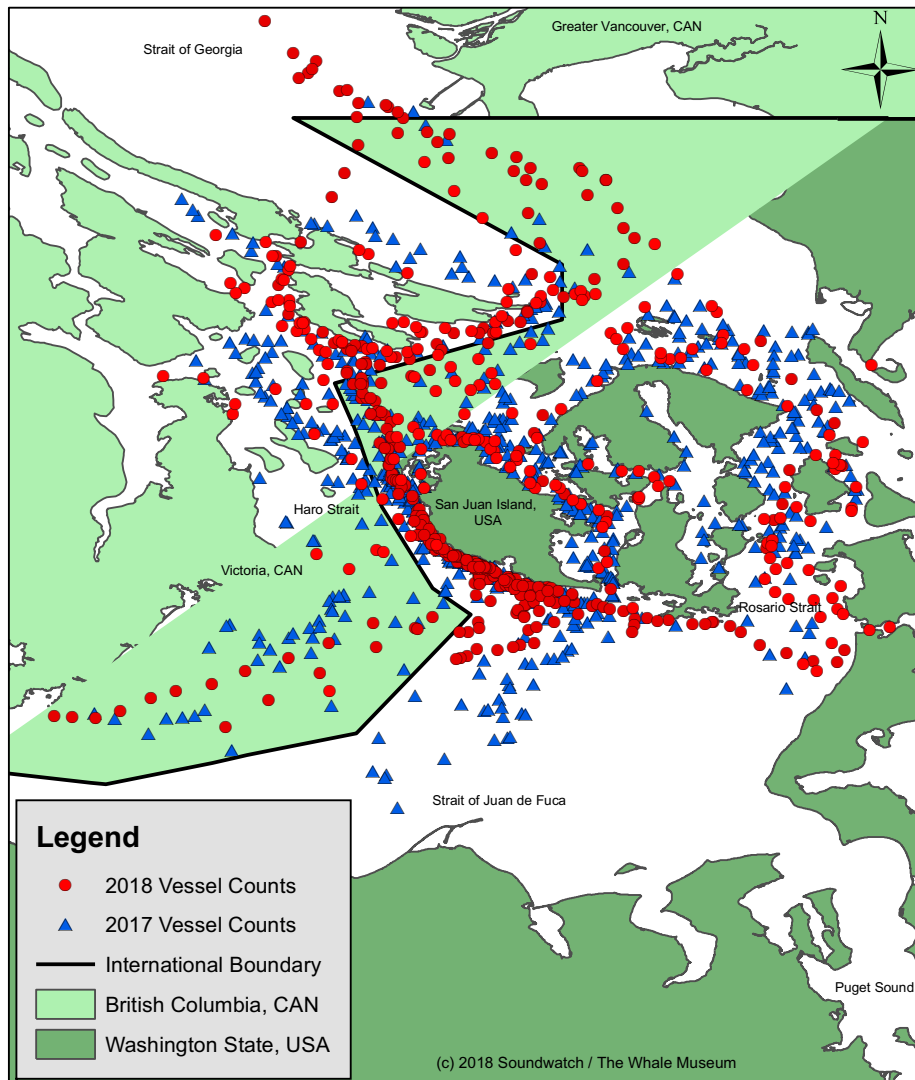


Figure 20: Total Vessel Count Locations from 2017 and 2018, displaying differences in survey locations and distributions.

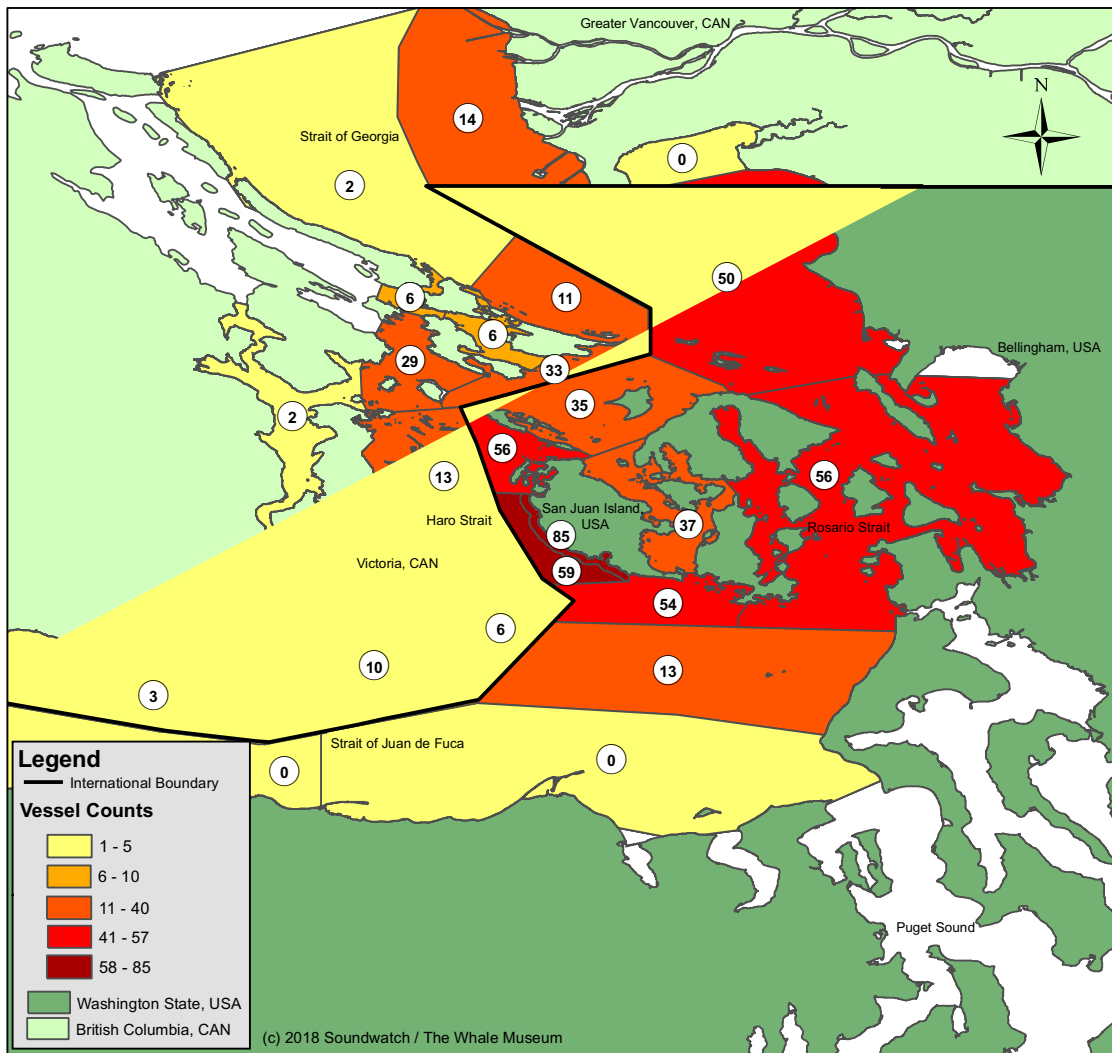


Figure 21: Density of 2018 Soundwatch Total Vessel Counts by Numbered Zone.

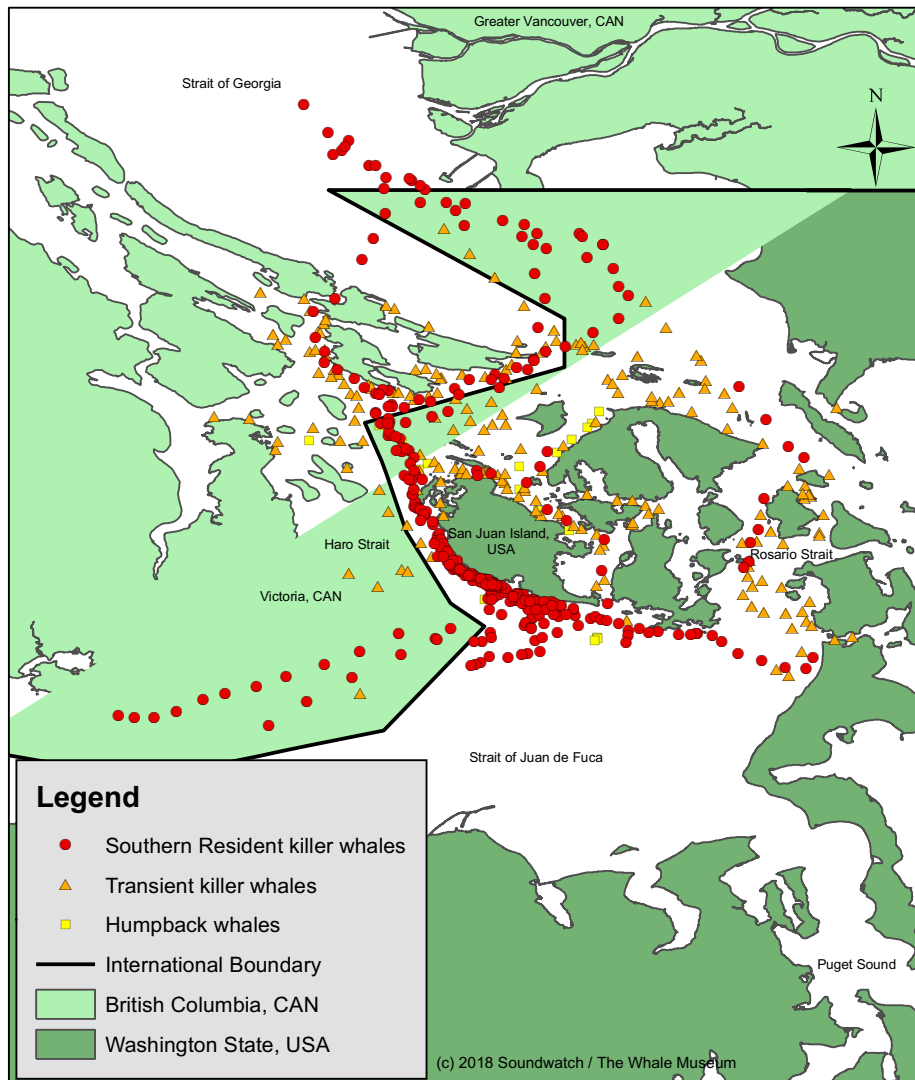


Figure 22: 2018 Vessel Counts by species of cetacean observed within the count.

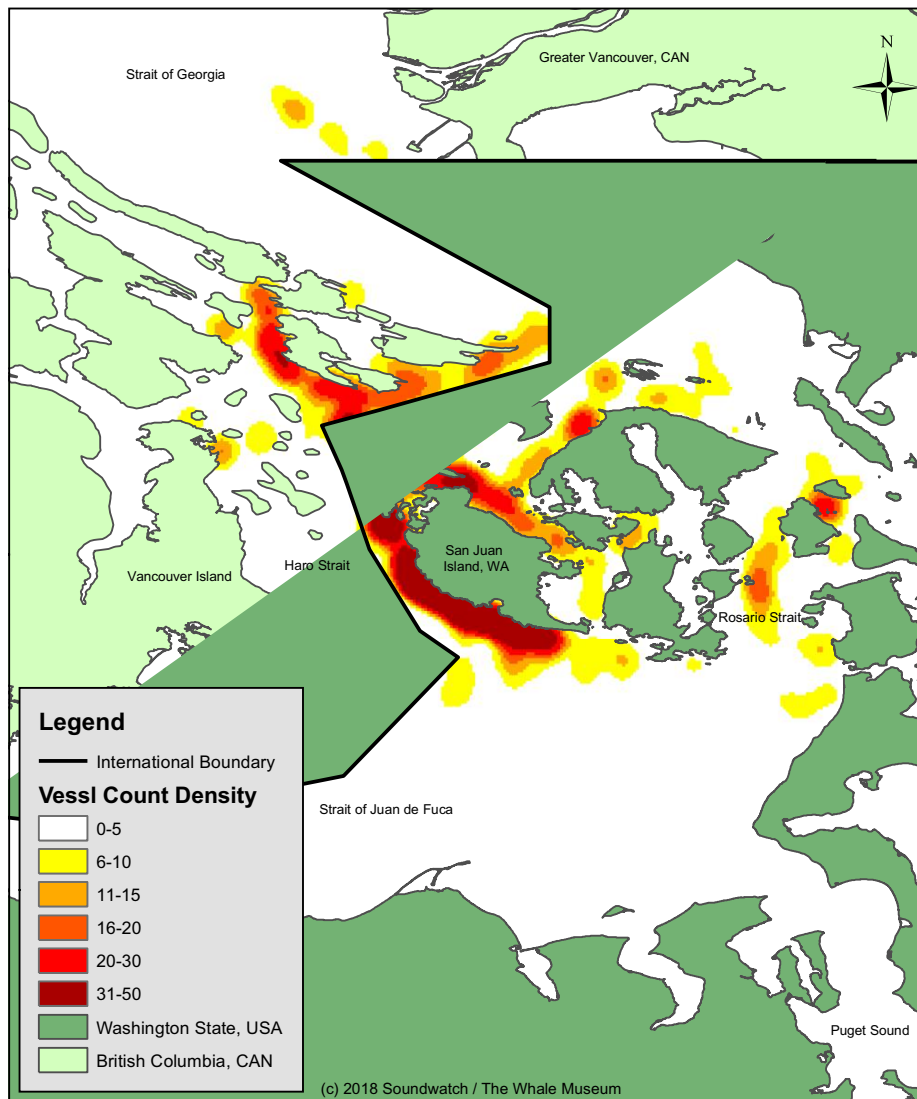


Figure 23: Vessel Count Density within half a mile of whales May – September 2018.

Section II: Patterns of Vessel Activities around Whales

Figure 24, displays the type and number of vessels around whales in 2018. 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 Canadian EcoTour vessel presence was higher than Recreational vessels. Recreational vessels had the highest presence in September. Vessel counts in July (27 monitor days/201 hours) included the largest number of vessel counts (n=259). EcoTour (Canadian and U.S. commercial wildlife tours) vessel category accounted for 48% and Recreational accounted for 22% of vessels ‘whale oriented’ in 2018 Soundwatch vessel counts (Figure 25). Soundwatch and Straitwatch accounted for the fourth highest presence (after U.S. Eco Tour, Canadian Eco Tour, and Recreational vessels) in vessel counts, an increase from 2017 showing how much effort the monitoring programs put in during

the season. Vessel presence was 65% whale oriented within one-half mile of the whales (Figure 26).

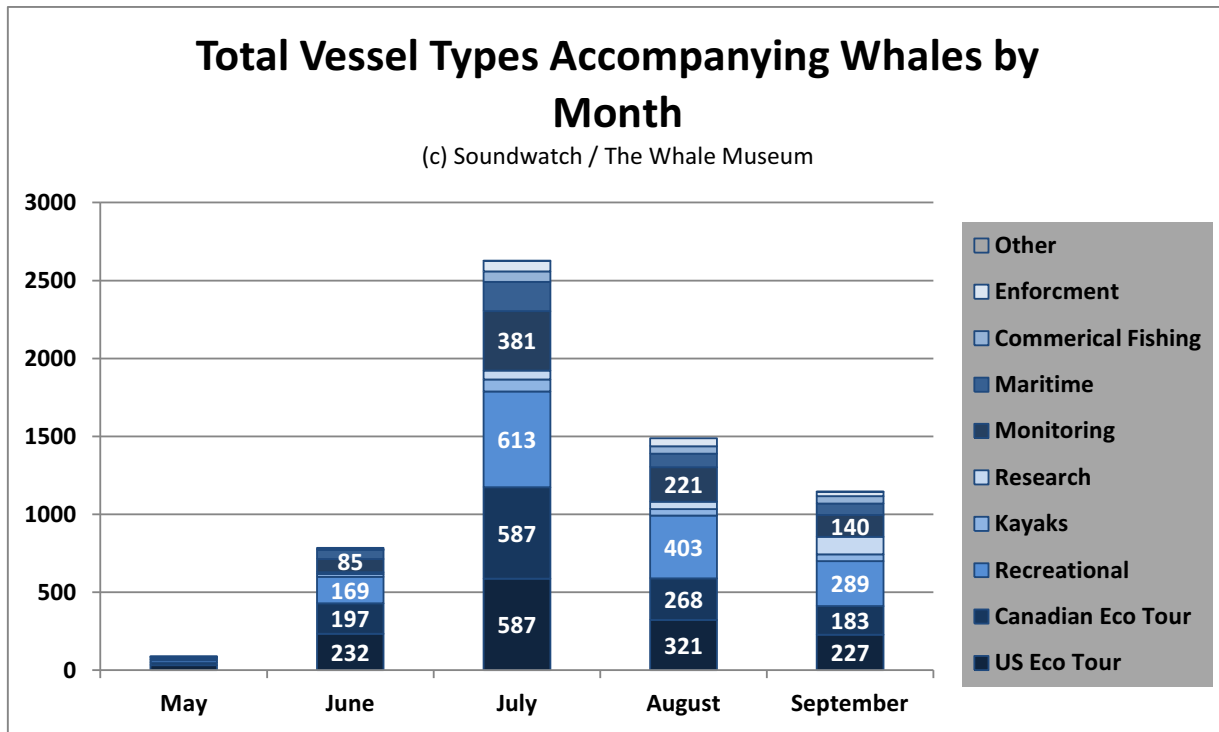


Figure 24: Total number of observed vessels by vessel type and month recorded in 2018.

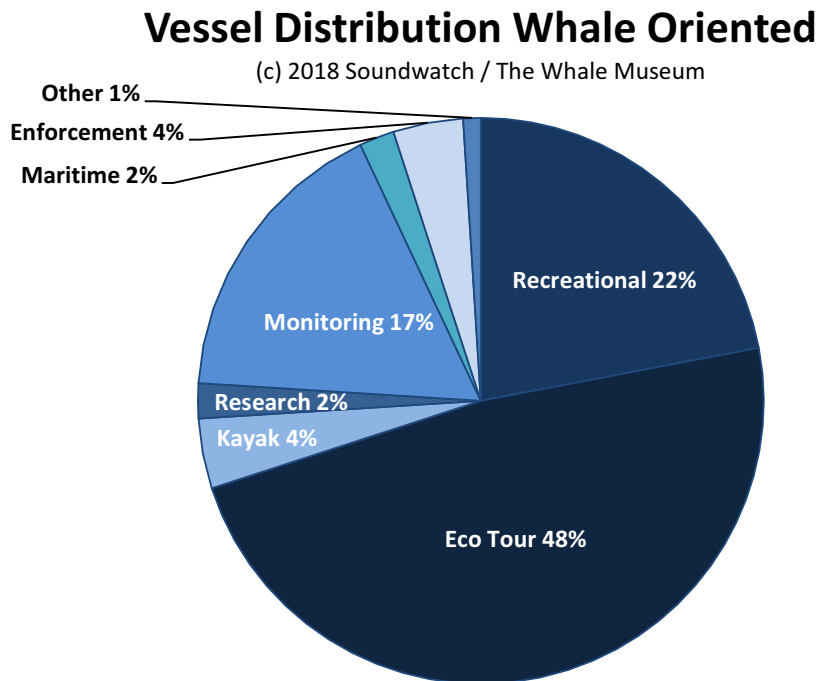


Figure 25: Percentage of vessel distribution by vessel categories and ‘whale oriented’. The ‘Other’ category includes aircraft and vessels not included within the other categories that became ‘whale oriented’.

Distribution of Vessel Activity within Half Mile of Whales

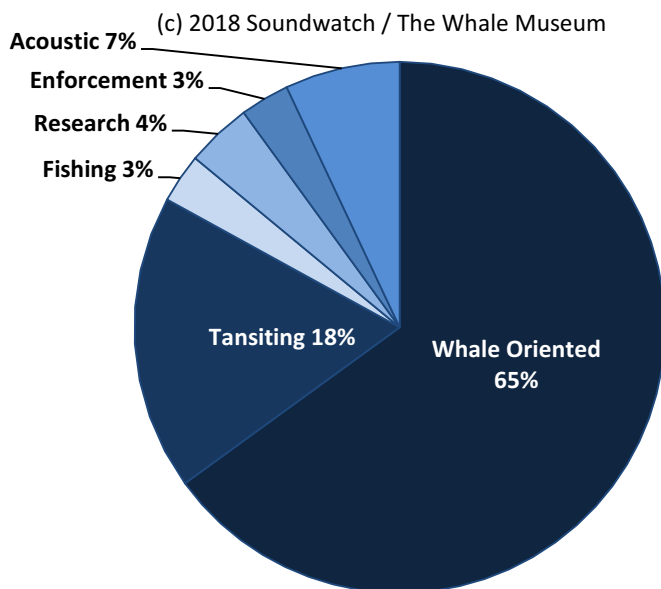


Figure 26: Distribution percentage of vessel activity within one half-mile of whales based on three minute vessel counts by Soundwatch from May – September 2018.

Number of Vessels Accompanying Killer Whales

During May-September 2018, the average number of vessels observed within one half-mile of whales was 10.2, rounded down to the whole number 10, which is the lowest ever recorded by Soundwatch (Figure 27). The observed decrease in vessel traffic around whale in the summer of 2018 can be attributed to continued dispersion of whales, heightened awareness of vessel impacts on SRKWs, and Soundwatch’s unique participation in other research efforts and monitoring of individual whales, such as J35 and J50. In addition in 2018 the PWWA updated their guidelines to limit time spent viewing when there were more than 10 PWWA vessels within 1 km of a particular group of whales. Potential effects of Soundwatch’s participation in research and monitoring is explained in greater detail below in the discussion. In 2017-18, the average number of kayaks 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). Whale watching activities, and vessels in general, had the highest average in August in 2018 of about 12 vessels within a half mile of whales and 8 of those vessels engaged in whale watching (Figure 29 & 30). Vessels engaged in whale watching activities (whale oriented) had a greater average than other vessel activities (Figure 30).

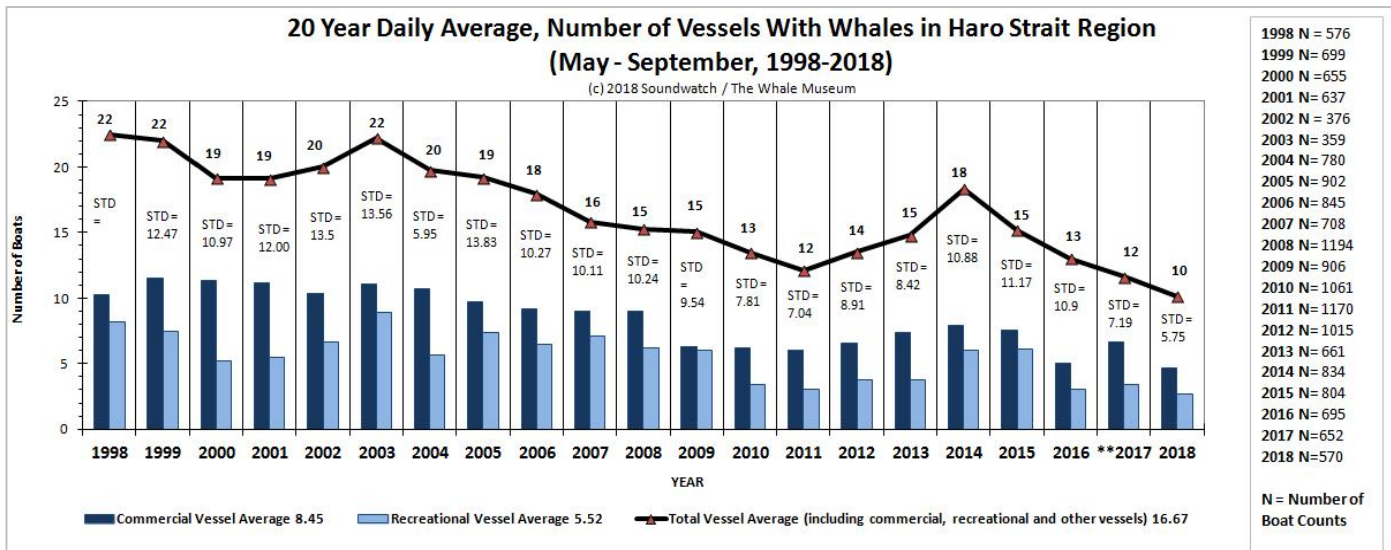


Figure 27: Average number (of recreational, EcoTour (commercial)) and a total of all vessels with killer whales in the last twenty years year in Haro Strait Region (May-September 1998-2016, 2018 and **June-September 2017)

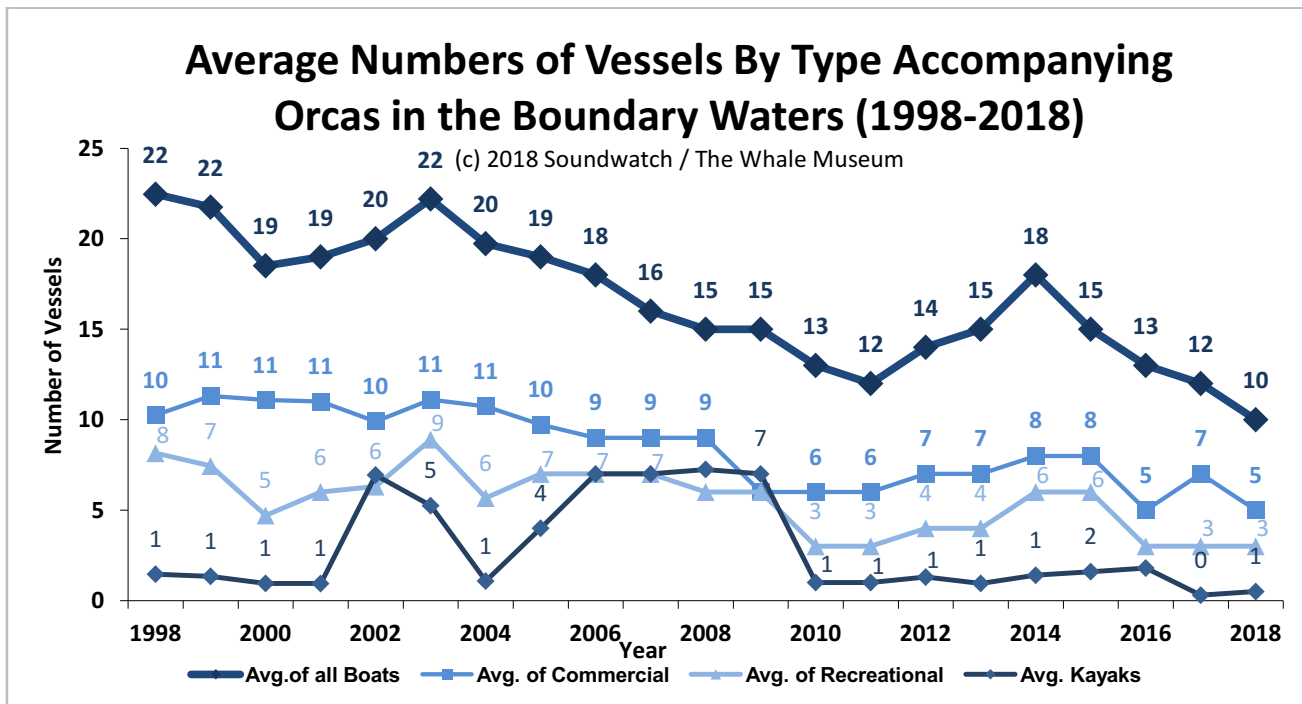


Figure 28: Average number of vessels by vessel category within one half-mile of killer whales from 1998-2018 in the Salish Sea. Average numbers have decreased in each category since 2014, following whale dispersion throughout the Salish Sea.

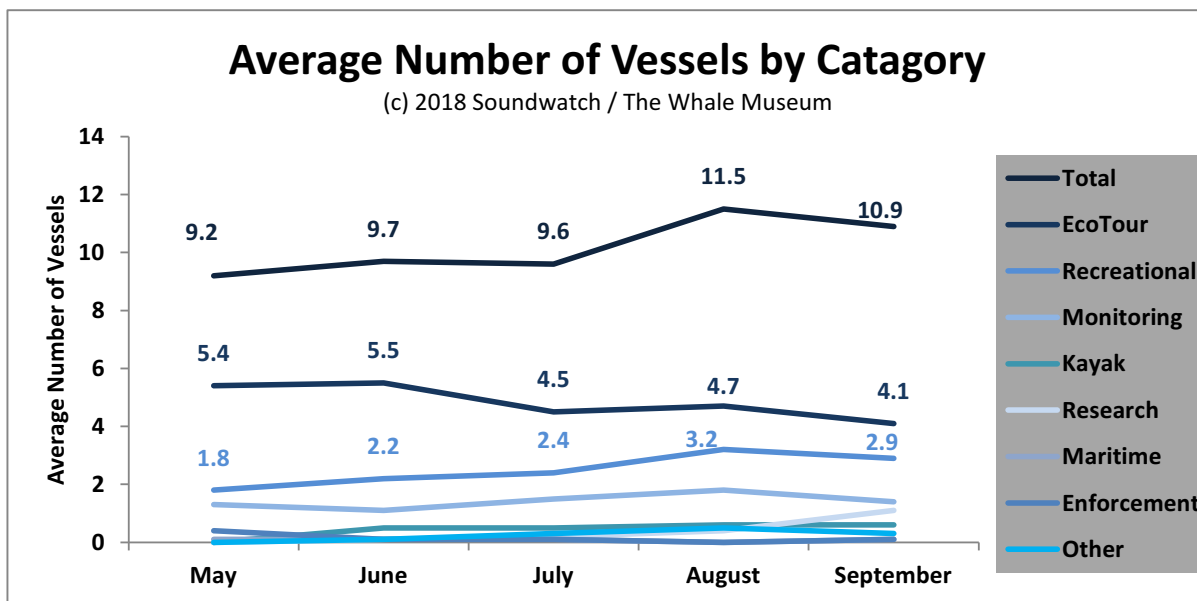


Figure 29: Average number of vessels within one half-mile radius of killer whale by vessel categories and month in 2018 Soundwatch vessel counts.

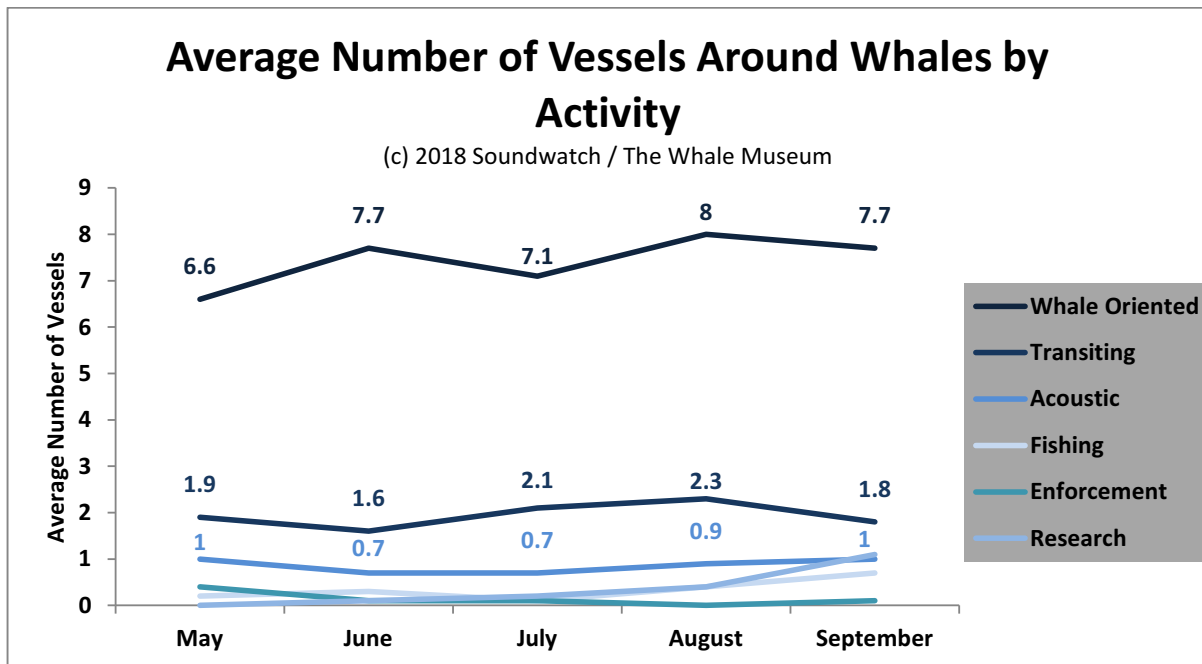


Figure 30: Average number of vessels within one half-mile radius of killer whales by vessel activity and month in Soundwatch 2018 vessel counts.

The 2018 annual maximum number of vessels observed with whales was 36. This is the lowest maximum number of vessels recorded by Soundwatch within a half mile of killer whales. This decrease in maximum vessels is believed to be attributed the recent updates to the Pacific Whale Watchers Association (PWWA) guidelines, which limit the maximum number of vessels around a single group of whales. This decrease could also be linked to increased dispersion by the whales, absence of whales during increased vessel activity, such as the September fishing season, increased sightings of Transient killer whales, and heightened awareness of the plight of the SRKW's highlighted in the summer of 2018, as well as other possibilities. The maximum monthly number of EcoTour vessels in 2018 was 18 (Figure 31), which is lower than 2017's maximum of 28.

Variations in the maximum number of recreational vessels are dependent on three variables: 1) fishing season, 2) the presence of killer whales in popular fishing locations and 3) location of the Soundwatch vessel. In 2018, data collected from May-September by Soundwatch indicates a decline in kayak presence (Figure 31 and 32) around killer whales. The appearance of a decline is likely related to the decline in killer whale days on the west side of San Juan Island, where a high percentage of kayakers launch from San Juan County Park. As well, the Whale Warning Flag was introduced to the area in 2018 by the San Juan County Marine Resources Committee; this will be discussed in greater detail in the Discussion section.

Not only is there variability in vessel averages and maximum by month and activity, but also by time of day. In 2018 (May-September), Soundwatch had the greatest number of vessel counts between 11:00 p.m. and 4:00 p.m. (Figure 33). The 'peak times of day' was between 10:00 a.m. - 11:00 a.m. and 3:00 p.m. - 4:00 p.m. Whale presence and EcoTour whale watch schedules

contribute to monthly variation. The 2018 average shows a similar, but less exaggerated, trend over the 21-year mean with ‘peak times of day’ in the morning and mid-afternoon with a mid-day lull during trip turn around times. 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. It was noted by Soundwatch during extended hours of operation during the J35 and J50 Response Efforts that there may be an increase in vessel traffic accompanying whales at dusk that has been unable to be observed by soundwatch in recent years due to lack of funding. Soundwatch recently was awarded the National Fish and Wildlife Foundation’s Killer Whale Conservation Grant in which resources will be allocated to extend Soundwatch operations into later hours of the day to fill this data gap.

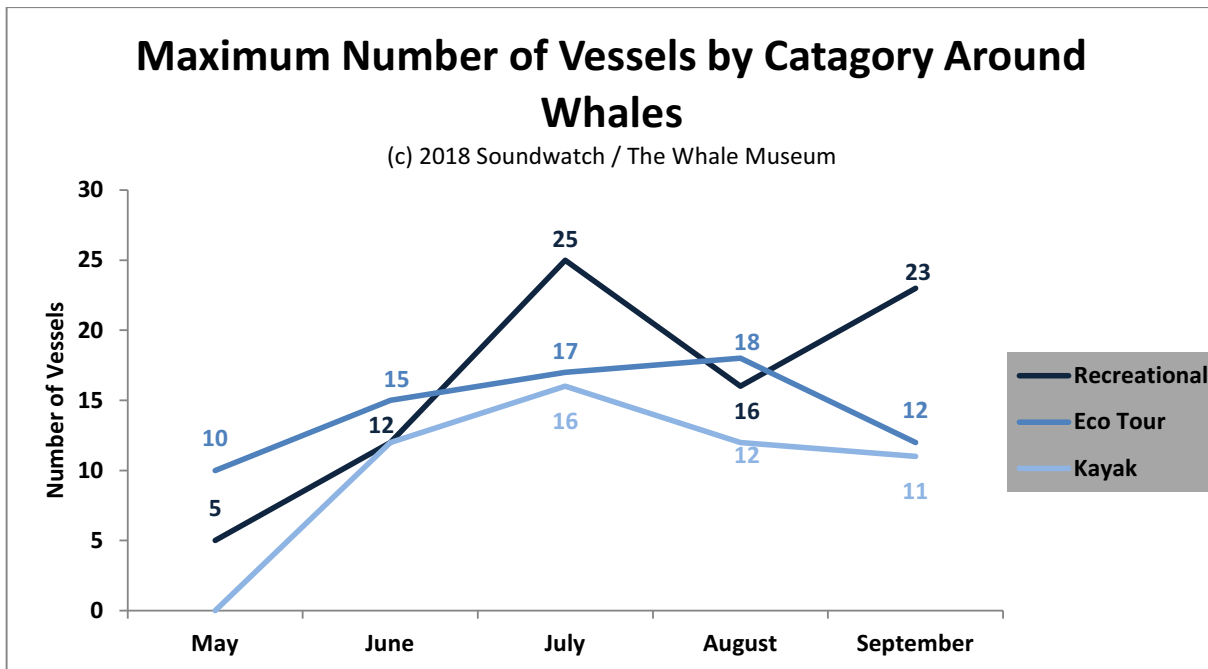


Figure 31: Maximum number of vessels by category and month around killer whales from May-September 2018.

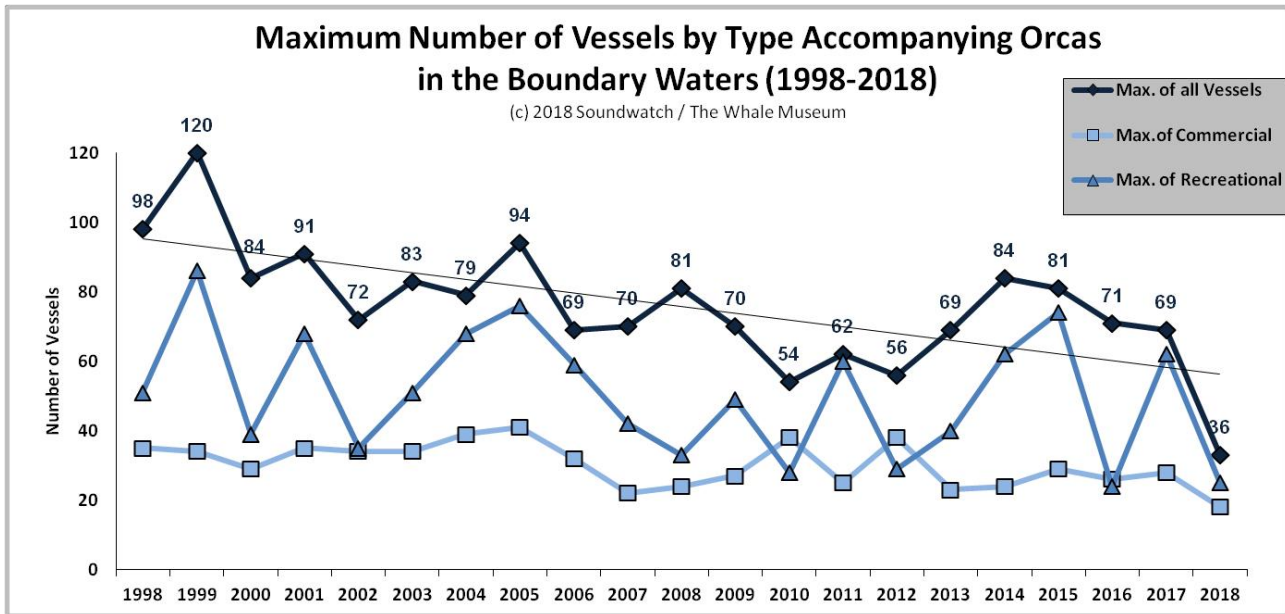


Figure 32: Maximum number of vessels within one half-mile of killer whales in the Salish Sea by vessel category from 1998-2018.

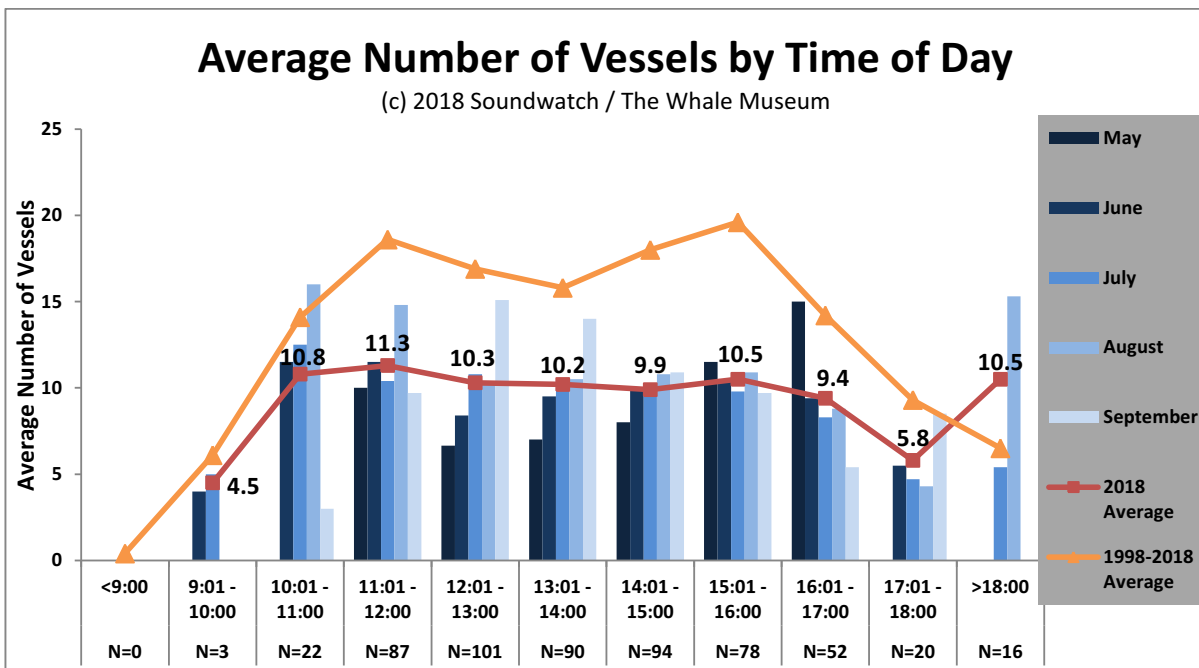


Figure 33: Average number of vessels by time of day includes all vessel categories, the average for 2018 and the 21 year average.

Compliance with Regulations and Guidelines

Soundwatch *Vessel incident* data can be utilized to characterize types of vessels, types of vessel incidents, and geographic 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 (EcoTour) 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, recreational 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 J1 & J2). 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 incident 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. Beginning in 2017, vessel incidents were recorded 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 and the greatest number of violations were by recreational or private motor vessels (Figure 35). To further complicate matters, it is difficult to measure the true effectiveness of guidelines and regulatory measures when they were not

consistent on both sides of the U.S./Canadian border (transboundary) prior to July 2018 when Canada updated their federal guidelines to coincide with the United States. Additionally, the WDFW, San Juan County, PWWA, and NOAA recognized and promoted a voluntary No-Go-Zone on the west side of San Juan Island from Mitchell Point to Cattle Point out a quarter of a mile and a half mile from the lighthouse at Lime Kiln State Park. This extended the previous voluntary No-Go-Zone from Eagle Point to Cattle Point, which includes more of the popular fishing grounds near Eagle Point. As a result there were more vessels operating within this expanded No-Go-Zone than in previous years and this may have driven the higher percent of incidents of vessels within the zone. All of the incidents recorded in the “Other” category were vessels fishing within 400 yards and 200 yards of whales.

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 2018, were within one half-mile near shore along the west side of San Juan Island (Zone 1 and 2), San Juan Channel (Zone 4), Spieden Channel (Zone 5), and Rosario Strait (Zone 8) (Figure 36-38). 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 1998-2018 (© 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	2018
*Notes Categories Not Used During All Years	37%	31%	23%	1%																	
*Leapfrogging																					
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%	2%
*Stopped within 0-100 yards of whales														17%	8%	7%	13%	11%	12%	10%	2%
*Under power within 100-200yards of whales														12%	10%	15%	12%	8%	14%	16%	9%
*Stopped within 100-200yards of whales														18%	15%	6%	14%	13%	15%	14%	7%
Within SJI No-Go-Zone	39%	26%	17%	17%	7%	13%	4%	8%	4%	5%	6%	8%	10%	6%	6%	2%	0%	2%	2%	<1%	15%
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%	<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%	<1%
Chasing/pursuing whales	3%	1%	3%	2%	<1%	4%	3%	1%	2%	3%	3%	3%	3%	1%	<1%	<1%	0%	0%	0%	0%	4%
Inshore of whales	5%	29%	24%	25%	19%	16%	22%	18%	17%	16%	21%	24%	17%	13%	10%	10%	9%	9%	4%	3%	<1%
Airplane within 1000 feet	4%	2%	4%	7%	14%	6%	6%	4%	6%	8%	8%	6%	4%	3%	<1%	8%	2%	2%	<1%	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%	<1%
*Other		1%	3%	3%	14%	5%	15%	11%	10%	3%	2%	1%	1%	0%	1%	1%	0%	0%	0%	3%	13%
*Within 220 yards of shore; whales present			4%	2%	<1%	4%	1%	2%	2%	<1%	<1%	1%	1%	2%	1%	2%	0%	0%	<1%	1%	<1%
*Repositioning within 100 yards			7%	7%																	
*In the Path (formerly Parked in the path of whales)				26%	24%	17%	19%	27%	26%	17%	25%	19%	23%	11%	16%	18%	17%	26%	23%	23%	21%
*Fast within 1/4 mile					3%	4%	9%	10%	11%	16%	11%	13%	13%	6%	8%	9%	8%	11%	6%	6%	7%
*1st Approach head on, behind, or on shore					4%	2%	1%	<1%	1%	2%	3%	2%	3%	1%	4%	1%	3%	2%	7%	5%	8%
*Kayaks spread out					<1%	3%	0%	<1%	1%	1%	1%	1%	1%	<1%	2%	1%	1%	2%	<2%	<1%	2%
*Kayaks with whales outside 1/4 SJI Zone					<1%	1%	0%	<1%	1%	<1%	1%	1%	1%	<1%	1%	<1%	0%	0%	<1%	<1%	<1%
*Kayaks paddling w/in 0-100 yds						3%	0%	<1%	1%	<1%	1%	<1%	1%	<1%	1%	<1%	0%	<1%	3%	<1%	3%
*Kayaks paddling w/in 100-200 yds														1%	1%	1%	1%	1%	3%	<1%	0%
*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%	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	1,117
Estimated Annual Observation Hours	426hr	510hr	462hr	486hr	378hr	312hr	486hr	564hr	516hr	420hr	540hr	420hr	442hr	573hr	306hr	331hr	425hr	393hr	451hr	689hr	547hr

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 1998-2018.

Incident Type	PA	CA	EC	EK	EU	GW	MF	MM	PK	PM	PS	R	Total
100 yards under power			7				1			13	3		24
200 yards under power		1	6		4	1	2			88	2	1	105
400 yards in the path			16	9	12	1	4		3	174	8	2	229
aircraft under 1000 feet	3	1											4
drone violation	1												1
fast departure within 400 yards			1							36			37
fast within quarter mile of whales			1		2		2			78			83
fishing within 100 yards										4			4
fishing within 200 yards							1			118			119
high speed within 400 yards		1	3		1		2			77	1	1	86
padding within 100 yards of whales				33					6				39
shutdown within 100 yards			6		1					14			21
shutdown within 200 yards			7		7			2		56	2		74
SJI No-Go-Zone			5		1		4		2	159	3		174
spread out kayaks with whales				27									27
traveling behind whales 100-400 yards			2					1	1	40	2		46
within eighth mile of shore			2					1		31			34
within half mile of Lime kiln Lighthouse							1			9			10
Total	4	3	56	69	28	2	17	4	12	897	21	4	1117

Figure 35: Summary of vessel incidents in 2018 by incident type and vessel involved in the incident. (PA=Private Aircraft, CA=Commercial Aircraft, EC=Eco Tour Canada, EU=Eco Tour U.S., EK=Eco Tour Kayak, GW=WDFW, MF=Commercial Fishing, MM=Monitoring, PK=Private Kayak, PM=Private Motor, PS=Private Sail, R=Research)

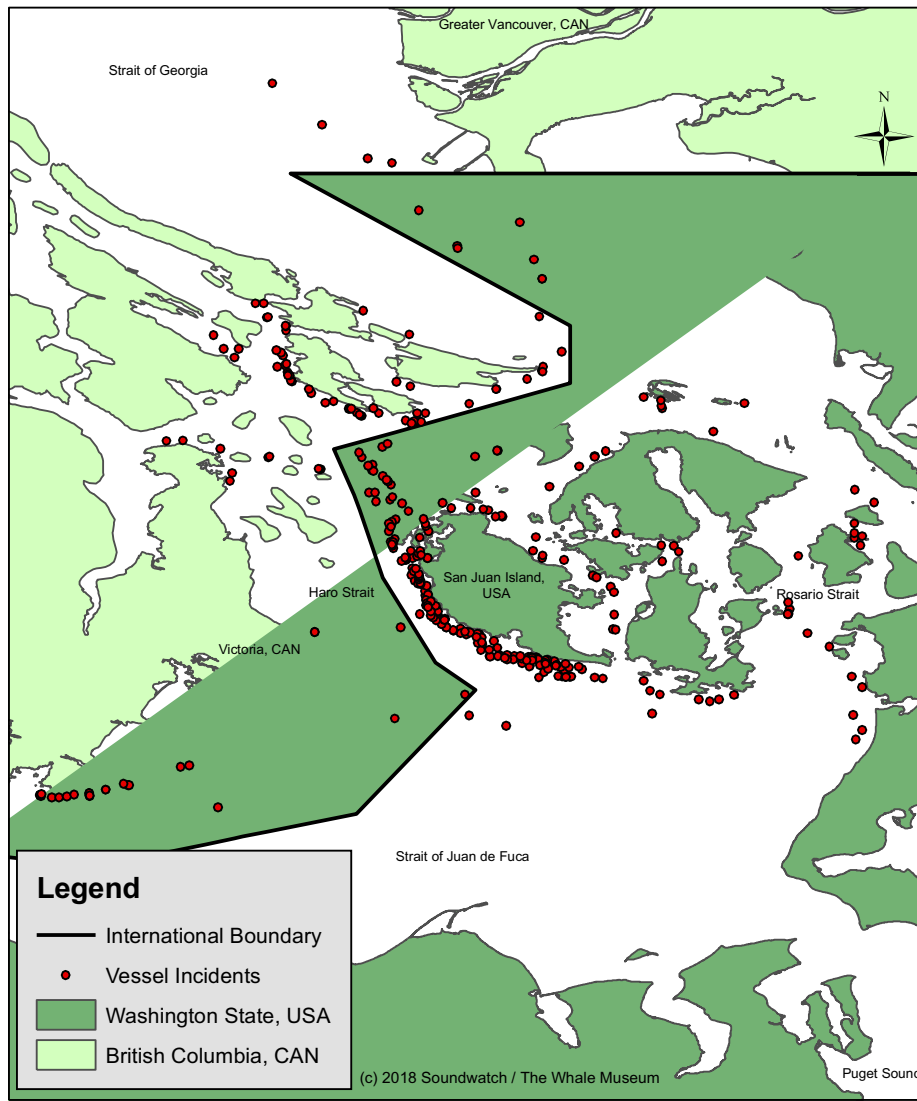


Figure 36: Total vessel incident locations observed by Soundwatch from May – September 2018. Points can be multiple incidents, $N=1,117$ incidents.

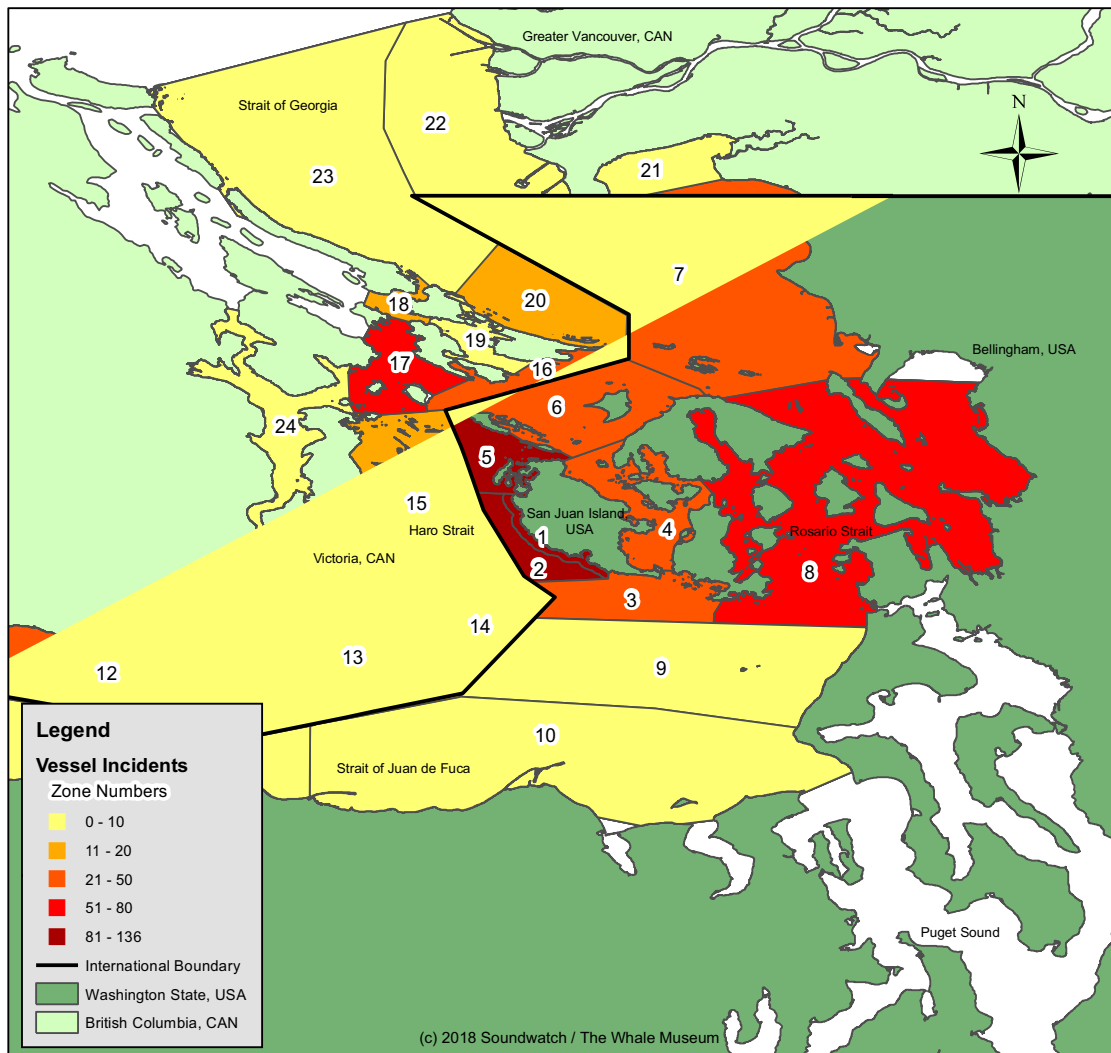


Figure 37: Vessel incidents by zones, with lighter colors having fewer total incidents than zones in darker colors. Locations can be multiple incidents, $N=1,117$ incidents.

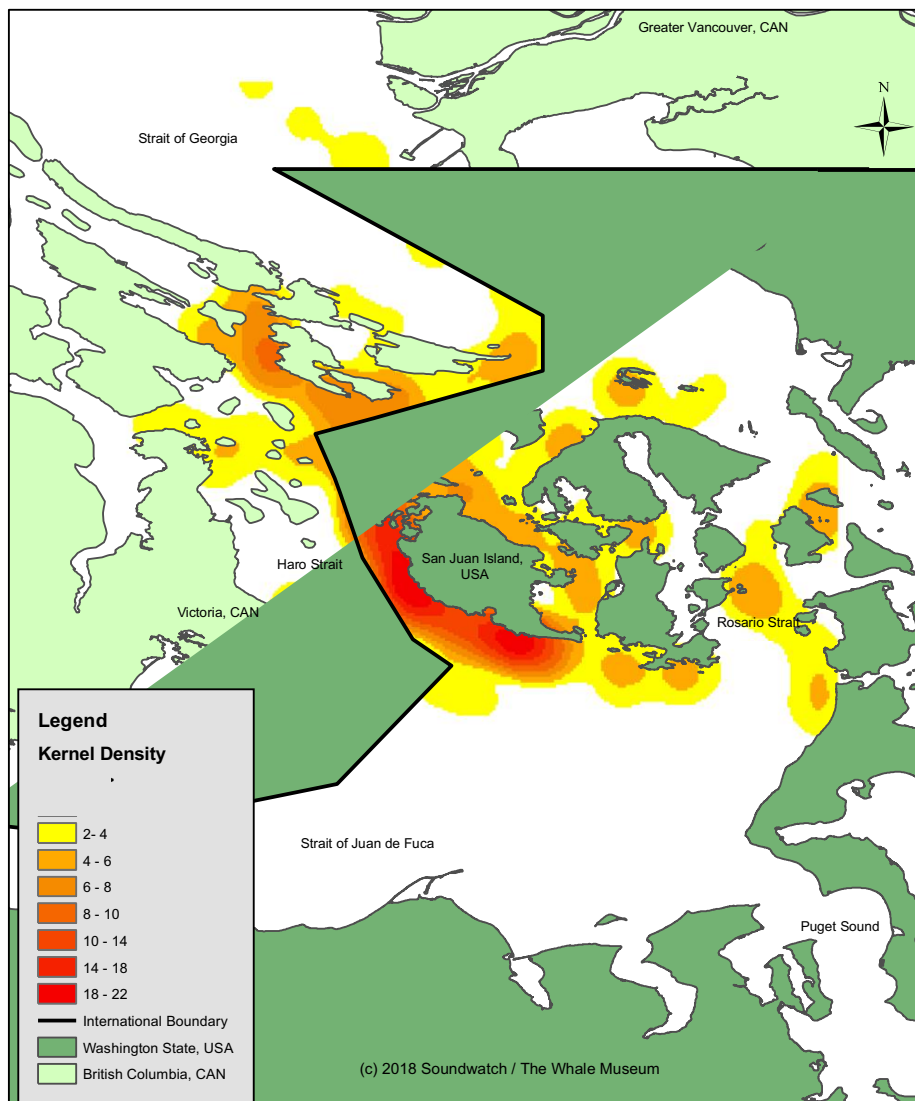


Figure 38: Density of Incidents recorded by Soundwatch May – September 2018. Incidents were recorded within one half mile of whales.

In 2018, there were a total of 1,117 vessel incidents observed and recorded by Soundwatch staff. Overall in 2018, 56% of recorded vessel incidents were potential violations of the U.S. Federal and Washington State vessel regulations. Of this 56%, the overall regulatory category of **Vessels within 200 yards of Whales** accounted for 35% of all incidents (this category includes Vessels Stopped within 0-100 yards-5%; Vessels Stopped within 100-200 yards-19% (combined 24%); Vessels Motoring within 0-100 yards-6%; Vessels Motoring within 100-200 yards 27% (combined 33%)). These percentages combined with the **Vessels in the Path of Whales** regulatory category (21%) make up the recorded 56% of regulatory vessel incidents. After these violations the next most prevalent incidents observed by Soundwatch were vessels **Within the SJI Voluntary No-Go-Zone** (15%) followed by **Fishing within 200 yards of Whales** at 11%. These two incidents commonly occur on the west side of San Juan Island where the voluntary No-Go-Zone was expanded in the spring of 2018, and increased over-lap with common fishing

grounds. Increases **Within the SJI Voluntary No-Go-Zone** type of violation are possibly due to increased presence of SRKWs on the west side of San Juan Island and increase in area of the No-Go-Zone (extended from Eagle Point south to Cattle Point). The No-Go-Zone data will be discussed in detail later. The other category of majority violations were both *Be Whale Wise* and PWWA guidelines for **Incorrect Fast Approach/Departure, High Speed Within 400 Yards of Whales, Fast Departure Within 400 yards, and Fast Within a ¼ Mile of Whales** making up 18% of all incidents.

Recreational vessel operators (motor and sail) accounted for 90% of all incident types in 2018, followed by EcoTour Kayak operators with 6%, Canadian EcoTour operators with 5%, and U.S. EcoTour operators with 3% of all incidents for a combined EcoTour vessel incident percentage of 14%. Commercial Fishing vessels were recorded with 2% of all incidents, monitoring (Soundwatch/Straitwatch) at <1% of all incidents; <1% by research vessels, and aircraft were recorded at 1%. (Figure 39).

Of the broad categories, incidents with vessels **Within 200 yards** of whales accounted for 35% of all incidents. Vessels **Stopped within 0-100 yards** of whales (5%) were made by 66% Recreational vessels, 29% Canadian EcoTour vessels, 5% U.S. EcoTour vessels. Vessels **Stopped within 100-200 yards** of whales (19%) were made by 78% Recreational vessels, 9% Canadian EcoTour vessels, 9% U.S. EcoTour vessels and 4% monitoring/research vessels. Vessels **Fishing within 100 yards** of whales (1%) were made by 100% Recreational vessels. Vessels **Fishing Within 200 yards** of whales (30%) were made by 99% Recreational vessels and 1% Commercial fishing vessels. Vessels **In the Path of Whales** regulatory category (21% of total incidents) were made by 79% Recreational vessels, 7% Canadian EcoTour vessels, 5% U.S. EcoTour vessels, and 2% Commercial fishing, and 1% research/enforcement (Figures 40). There was a decrease in overall incidents recorded by commercial EcoTour vessel in 2018 than in previous years. This is likely due to the PWWA updated guidelines, heightened awareness of the plight of the SRKWs, and societal pressure on the commercial whale watching fleet.

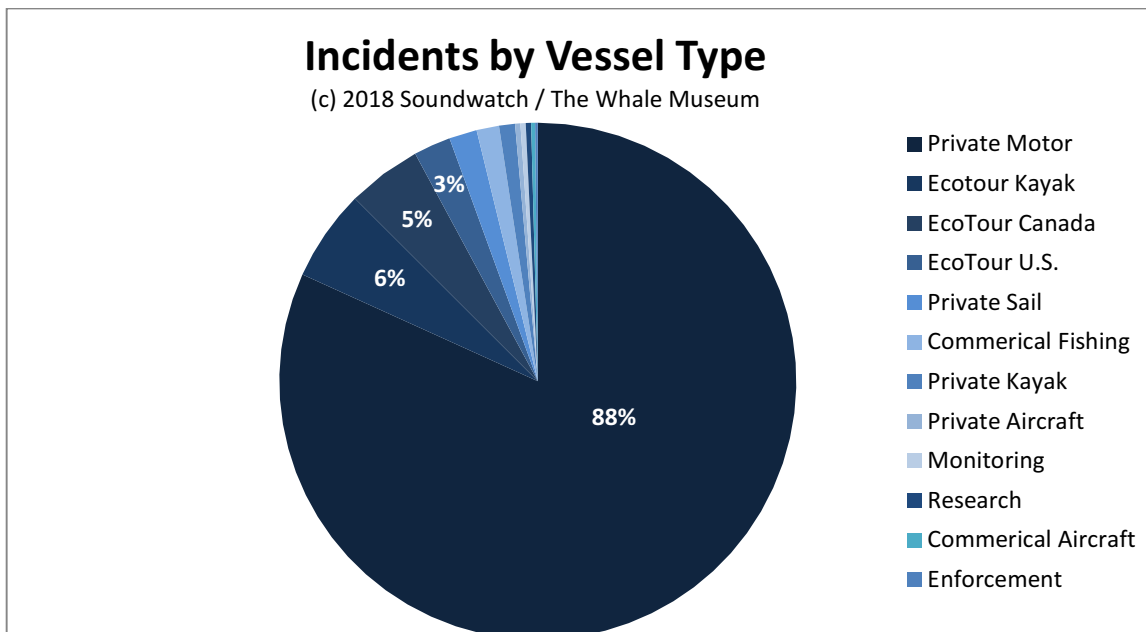


Figure 39: Percentage of all vessel incidents ($N=1,117$) recorded by Soundwatch from May – September 2018 by vessel type.

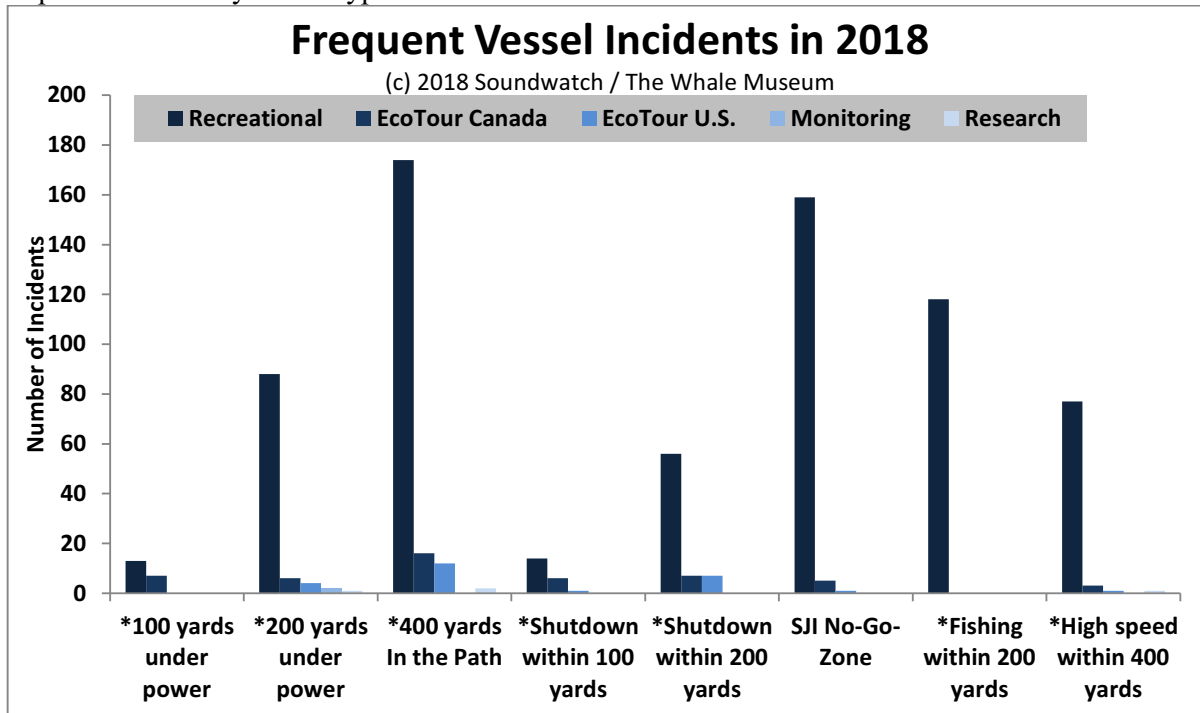


Figure 40: Most frequent vessel incidents observed by Soundwatch from May – September 2018 by incident and vessel categories. *Indicates Federal/State Vessel Regulations.

Private recreational vessels ranked the highest number of incidents in all of the frequent incident categories when comparing vessel categories. Canadian EcoTour vessels had the second highest number of incidents in Federal/State vessel regulations: **Stopped within 100 yards** (29%) and **200 yards** (9%) of killer whales, second highest in **In the Path** (7%), **200 yards under power** (6%), and **100 yards under power** (29%) of whales.

Whale watching activities (‘whale oriented’) accounted for 35% of vessel incidents when comparing vessel activities, while vessels transiting recorded more incidents (39%) around whales (Figures 41 and 42). It can be seen in the data that whale oriented vessels still committed violations, such as **Under power within 200 yards** and **High Speed within 400 yards**, within known presence of whales. These incidents are hypothesized to create the most disturbance and risk, such as vessel strike, to whales.

Variations in maximum vessel numbers and average vessels on scene are likely due to annual variation in whale presence, social cohesion, awareness, and these factors will reduce the number of incidents recorded by Soundwatch. Soundwatch operations are limited by time, resources, weather, and other research or education activities on-the-water. Therefore, incident numbers recorded by Soundwatch are not a full representation of the whale watching scene on the water over the course of the season, and lower incidents recorded does not necessarily mean improved boater behavior. Even though there are variations in the vessel numbers, many of the incident percentages are the same as previous years (Figures 43 and 44). In 2018, an overall decrease in

incidents was recorded. This could be due to heightened awareness of the plight of the SRKWs, increased outreach and enforcement, Soundwatch’s participation in other research and recovery efforts while on the water, and PWWA updated guidelines for vessel engaged in commercial whale watching.

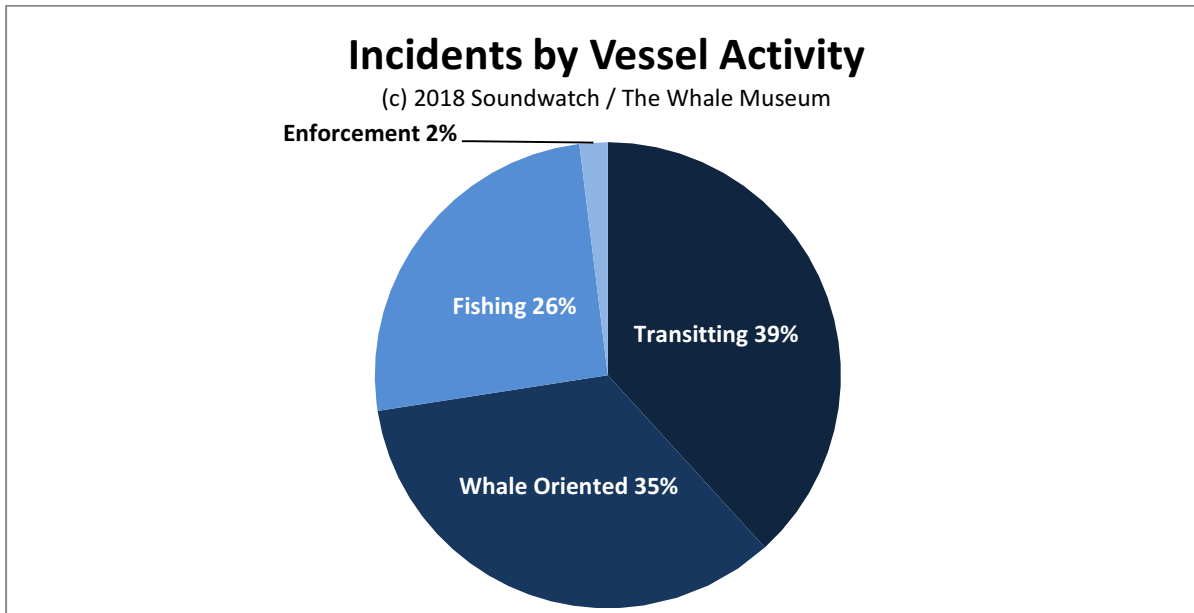


Figure 41: Percentage of all vessel incidents by vessel activity observed by Soundwatch May-September 2018.

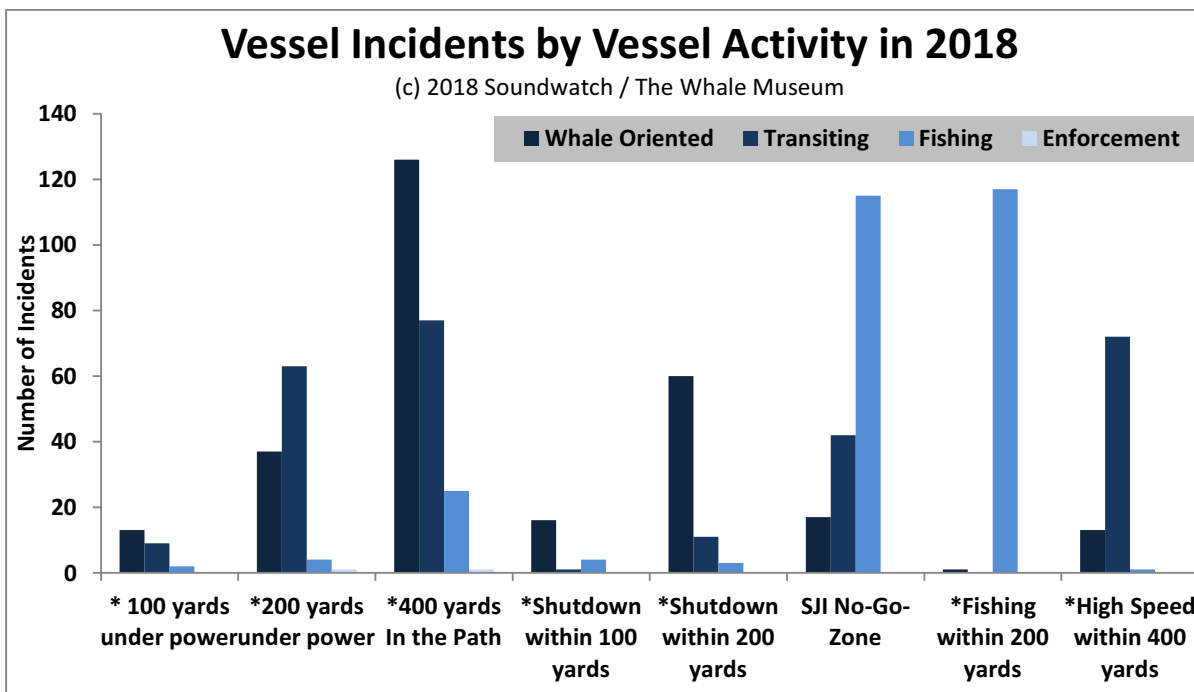


Figure 42: Most frequent vessel incidents observed by Soundwatch from May – September 2018 by incident and vessel activity. *Indicates Federal/State Vessel Regulations.

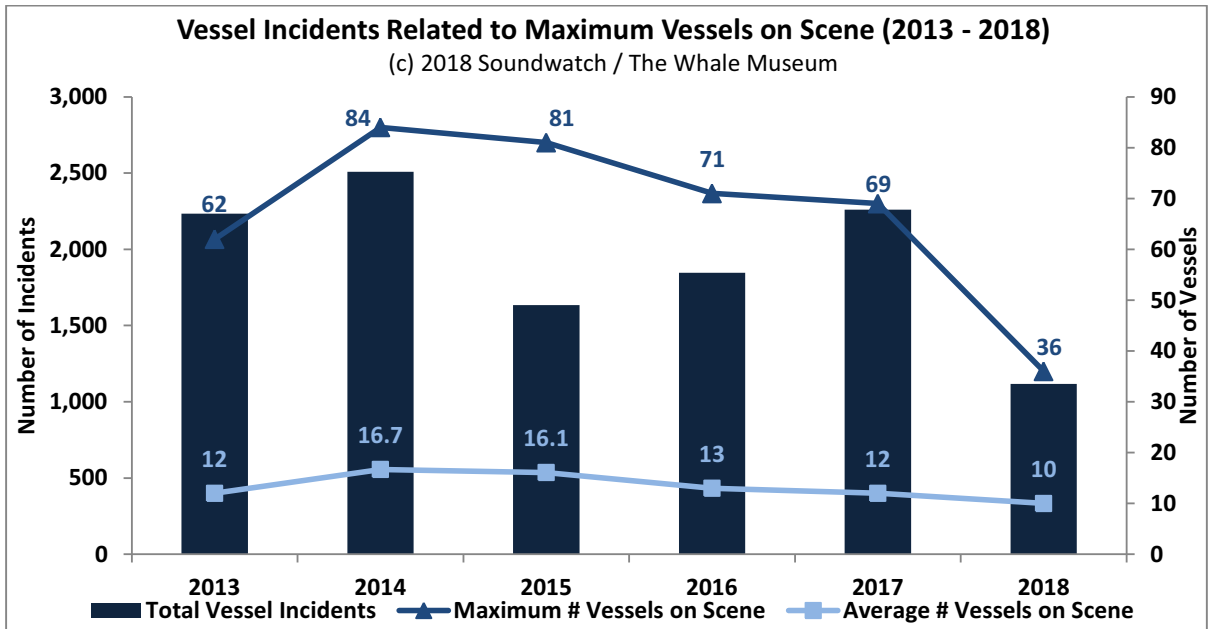


Figure 43: Average, Maximum, and Total number of vessels on scene with killer whales plotted with number of vessel incidents from May-September 2011-2018 observed in the Salish Sea by Soundwatch.

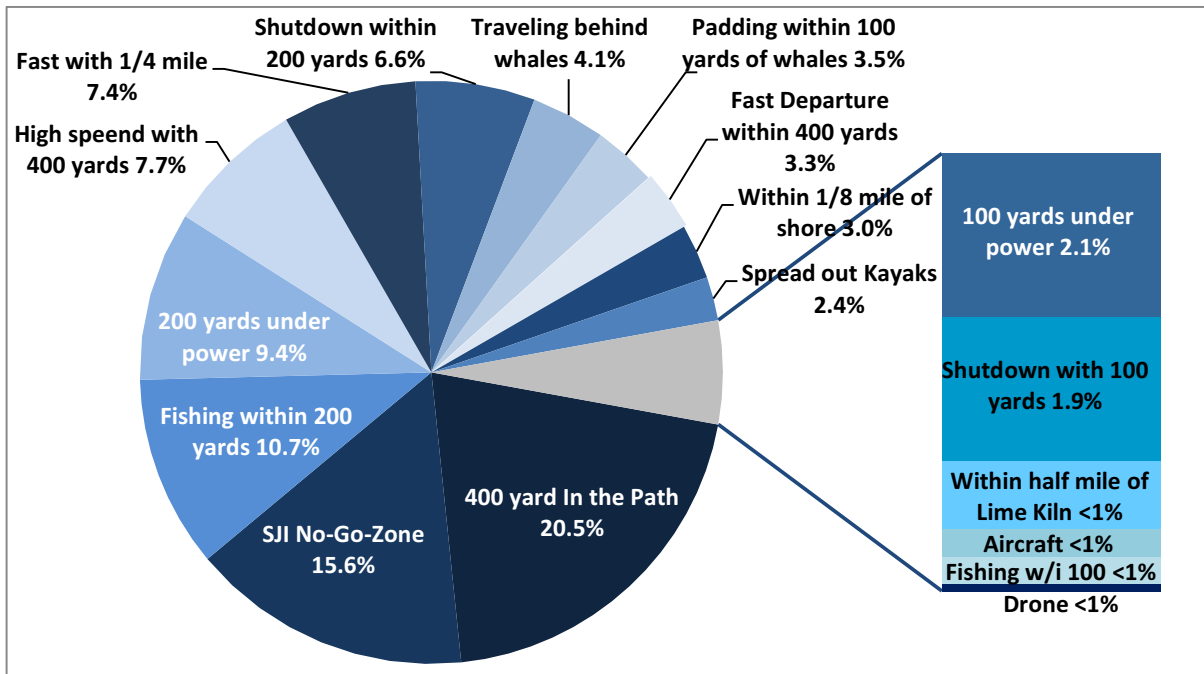


Figure 44: Percentage of all incidents in 2018.

Vessel Type Incident Rates

In 2018 data was recorded by Soundwatch for 285 hours and 570 vessel counts. Therefore, the overall 2018 incident rate is: $2 \times 1,117/570$ resulting in an annual number of 3.92 total incidents per hour (Figure 46-48). Incident rates per hour were calculated for only the top three vessel categories, Recreational, Canadian EcoTour, and U.S. EcoTour vessels. To determine vessel incident rates per vessel type: $2 \times$ the annual number of incidents per vessel category were divided by the annual number of 30 minute vessel counts in which those vessel types were recorded. Recreational incident rates significantly higher than the EcoTour rates (Figure 45).

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. In 2018, less than 200 yards shutdown or under power was also an incident with respect to Canadian regulations. In addition to the regulations, additional incident categories are based on the *Be Whale Wise Guidelines*, KELP, and the No-Go Zone. *Be Whale Wise Guidelines* are used in all locations of the Salish Sea, where monitoring is conducted unless otherwise noted.

Over the past thirteen years 2006-2018, recreational vessels remain the most likely vessel type to commit all incidents. Incident rates by hour in 2018 were as follows: Private recreational vessels had a high incident rate of 3.22, U.S. EcoTour vessels 0.1, Canadian EcoTour vessels 0.19 (Figure 47) and all other vessel types were less than 0.1 incident per unit of time in 2018.

Private recreational vessel incident rates increased throughout the season, which may be linked to fishing activities. In June of 2018, Soundwatch observed 1 vessel incident related to fishing and 81 incidents in September. Presence of SRKWs increased in the month of September in close proximity to sport fishing areas compared to June, which could also contribute to the increased incident rate. The overall reduction in incident rates in 2018 could potentially be due to the increased hours Soundwatch was on the water participating in other research and recovery efforts (J-35 and J-50) where there was limited vessel traffic, therefore reducing incidents recorded over longer time.

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 49-51). This occurs when whales change direction, possibly associated with foraging, and vessels do not have appropriate time or distance to react. Announcing over the radio is probably for the benefit of Soundwatch and law enforcement displaying the vessel operator is aware of the situation.

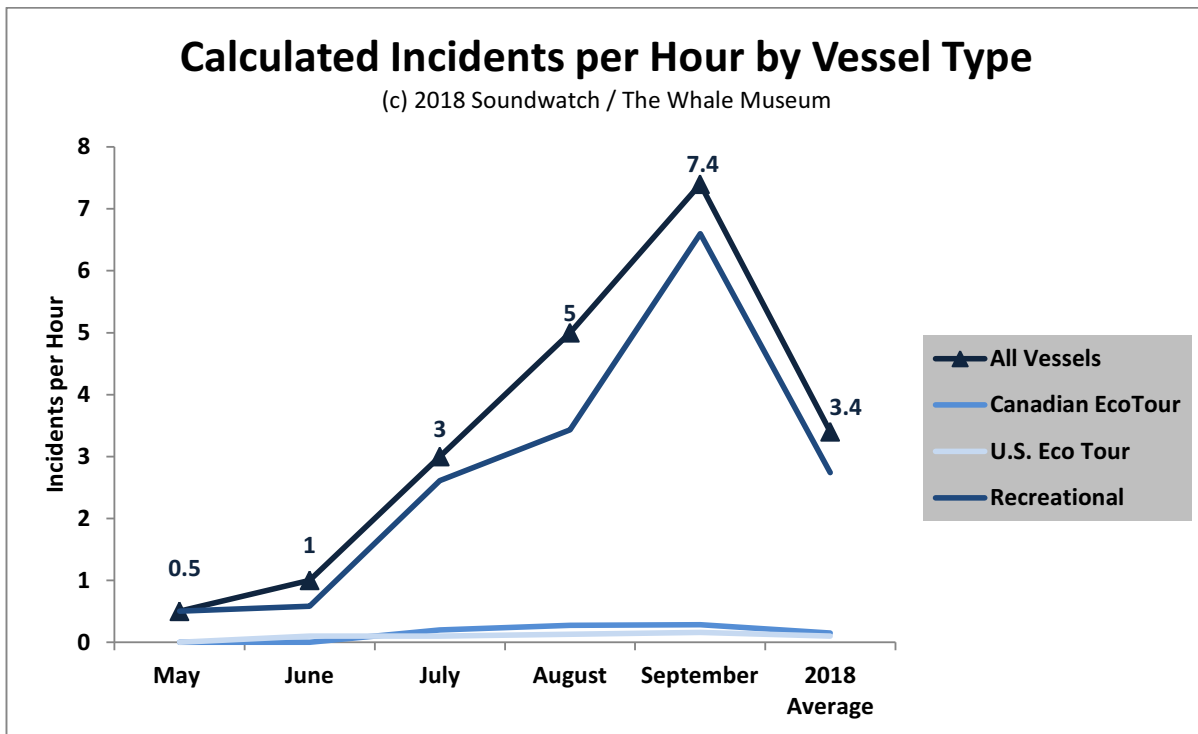


Figure 45: Calculated incident rates per hour by vessel type and month.

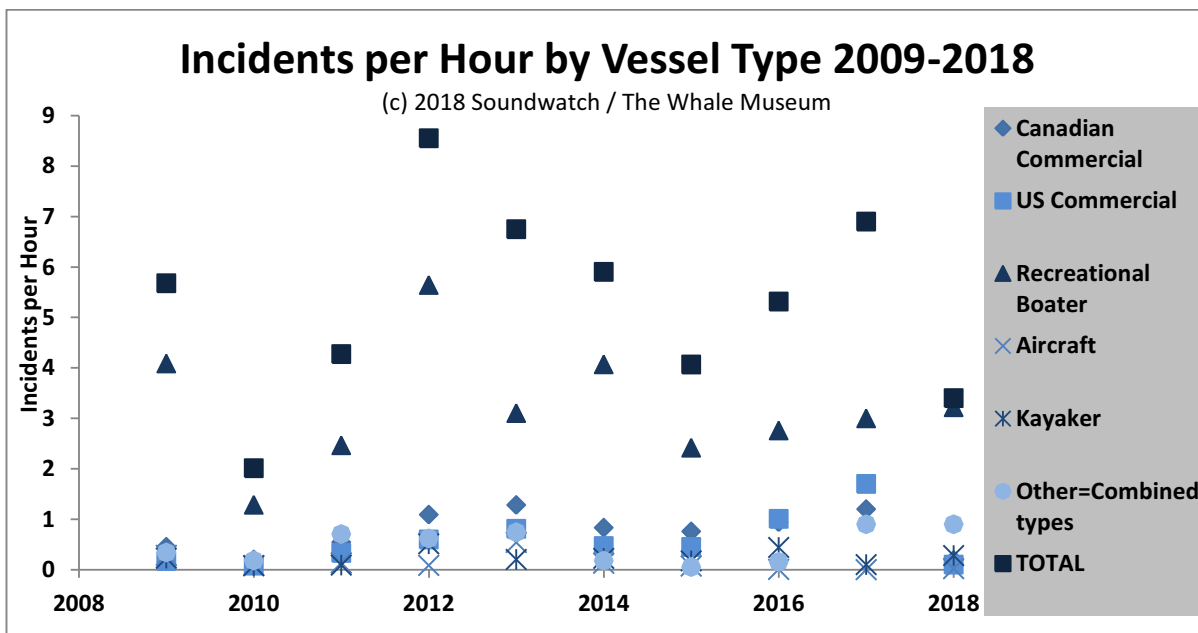


Figure 46: Trend from 2009 – 2018 Guideline and Regulation vessel incidents by type.

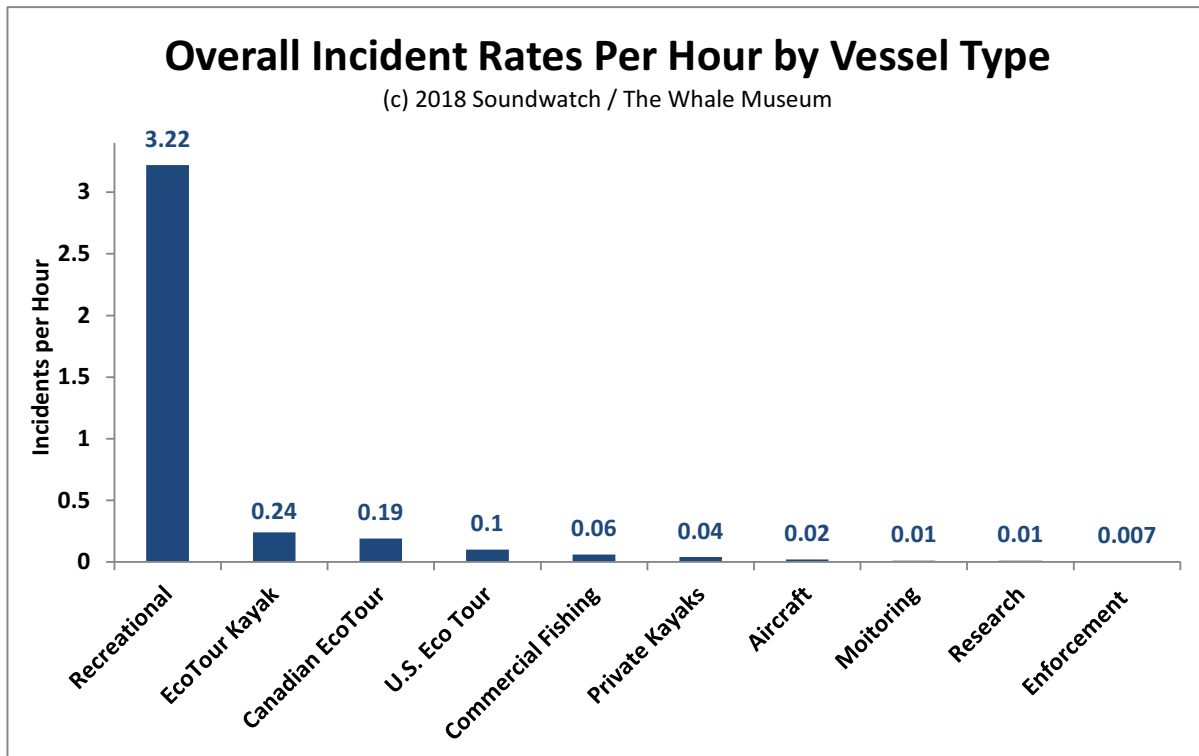


Figure 47: 2018 vessel incidents per hour by all vessel types.

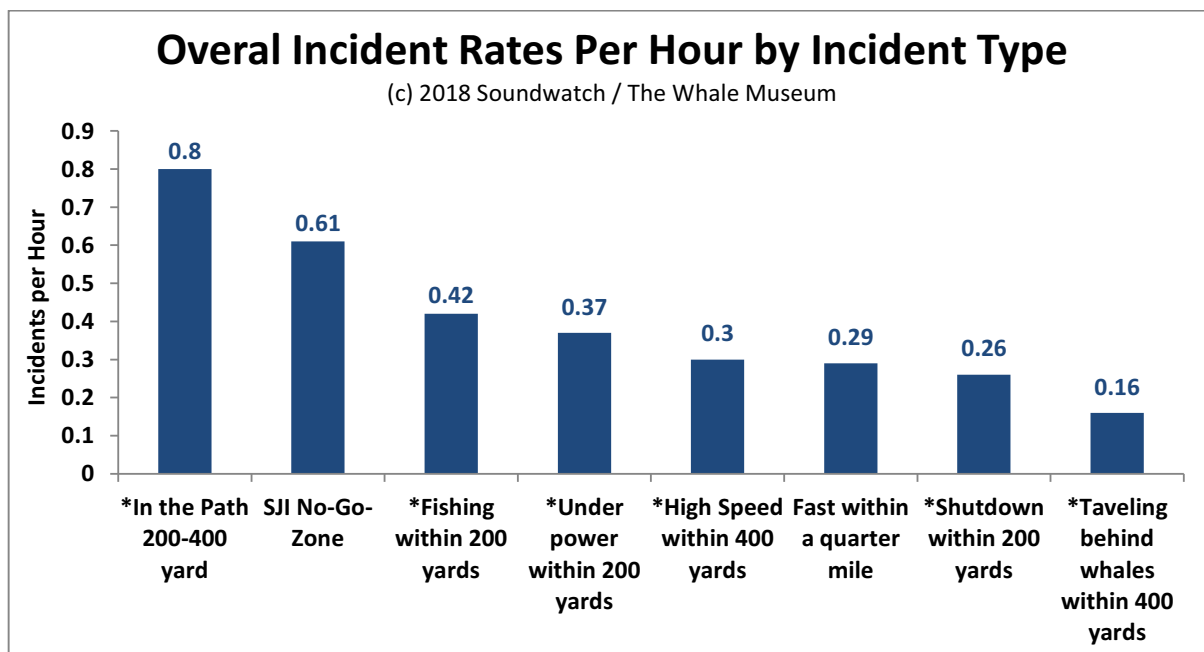


Figure 48: 2018 vessel incident rates per hour by incident type. **Indicates Federal/State Vessel Regulations.*

In 2018, WDFW Law Enforcement was present during 129 of the 570 U.S. vessel counts (within one half-mile radius of whales) over 33 days in U.S. waters only due to state jurisdiction. Figure 49 and 50 display a greater level of compliance when law enforcement was monitoring ‘whale oriented’ activities. Figure 49 is a simple ratio of all incidents with WDFW on scene or off scene. Figure 50 is time corrected since WDFW was only present for 23% of vessel counts. Incident rates were calculated using number of incidents by hours WDFW was present or not in the top three vessel categories per Soundwatch vessel count. Department of Fisheries and Oceans Canada were present in 13 Soundwatch vessel counts in 2018, as well as some presence by NOAA Office of Law Enforcement, United States Coast Guard, and San Juan County Sheriff.

Across all vessel categories, vessel incidents were reduced with the presence of WDFW. When corrected for time (Figure 50) the difference is much smaller for recreational vessels, but similar disparity for Eco Tour vessels. This suggests that the effect of WDFW enforcement is not as effective at reducing incidents by recreational vessels. The higher incidents and rates for EcoTour vessels without enforcement expose the potential effect of Soundwatch presence on incidents and rates when not on scene.

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 was 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.

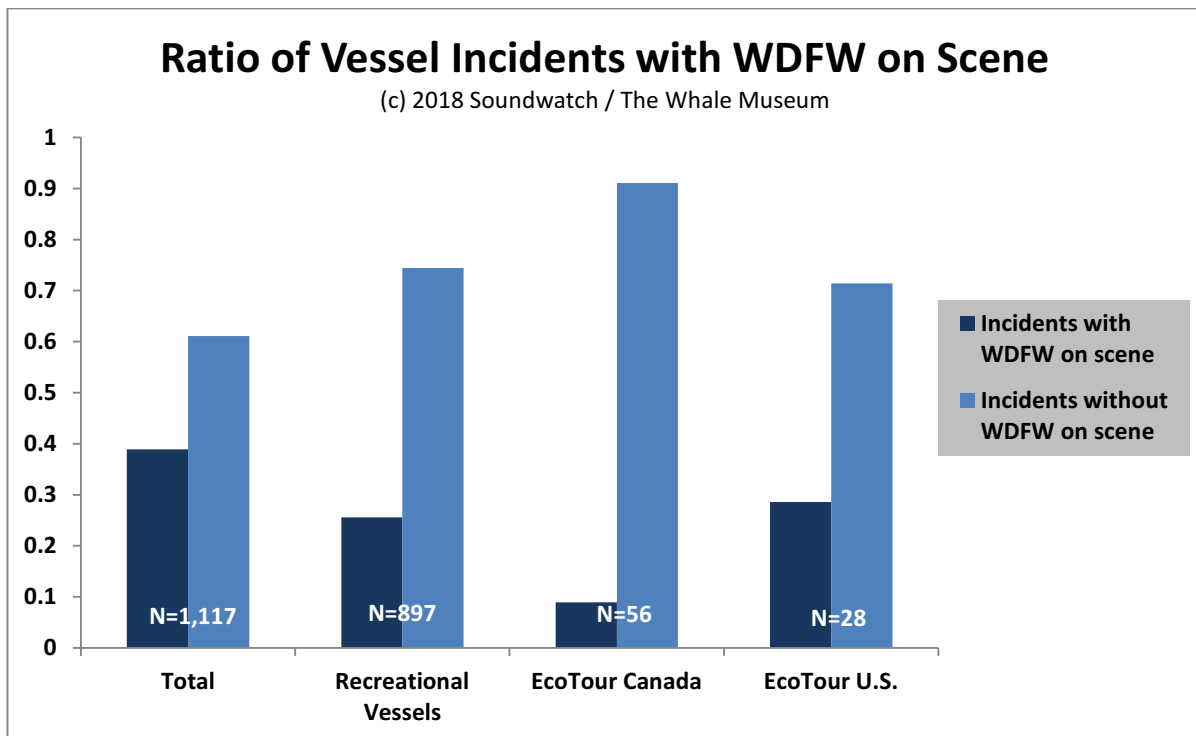


Figure 49: Ratio of incidents recorded with WDFW Enforcement on scene verse WDFW not on scene.

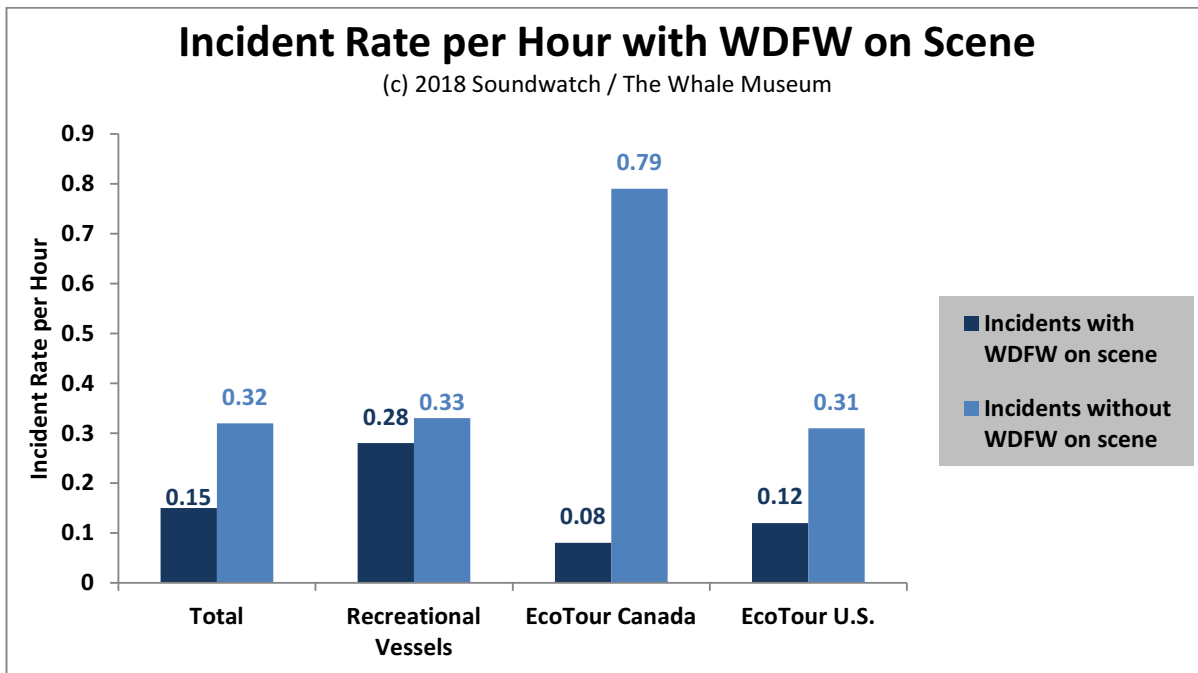


Figure 50: Incident rates per hour by vessel types with WDFW on scene and with WDFW not on scene with whales.

Killer Whale Attribute Data

Soundwatch collected killer whale behavior on the hour and half hour, totaling 285.5 hours or 571 whale behavior counts. Behavioral categories (Appendix K1 & K2) were Modified Rest, Traditional 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 SRKW and Transient killer whales from May-September 2018. One can see that positive foraging events were only seen a few times in Southern Residents and Transients. As well, traditional resting behavior was observed only a limited number of times where as Modified Rest was seen by both ecotypes in all months, beside May when the Southern Residents were not present in the Salish Sea. Figure 52 displays a map of the Salish Sea where the Foraging and Milling behaviors of killer whales were observed by Soundwatch . 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. Pinniped haul-outs were determined by...

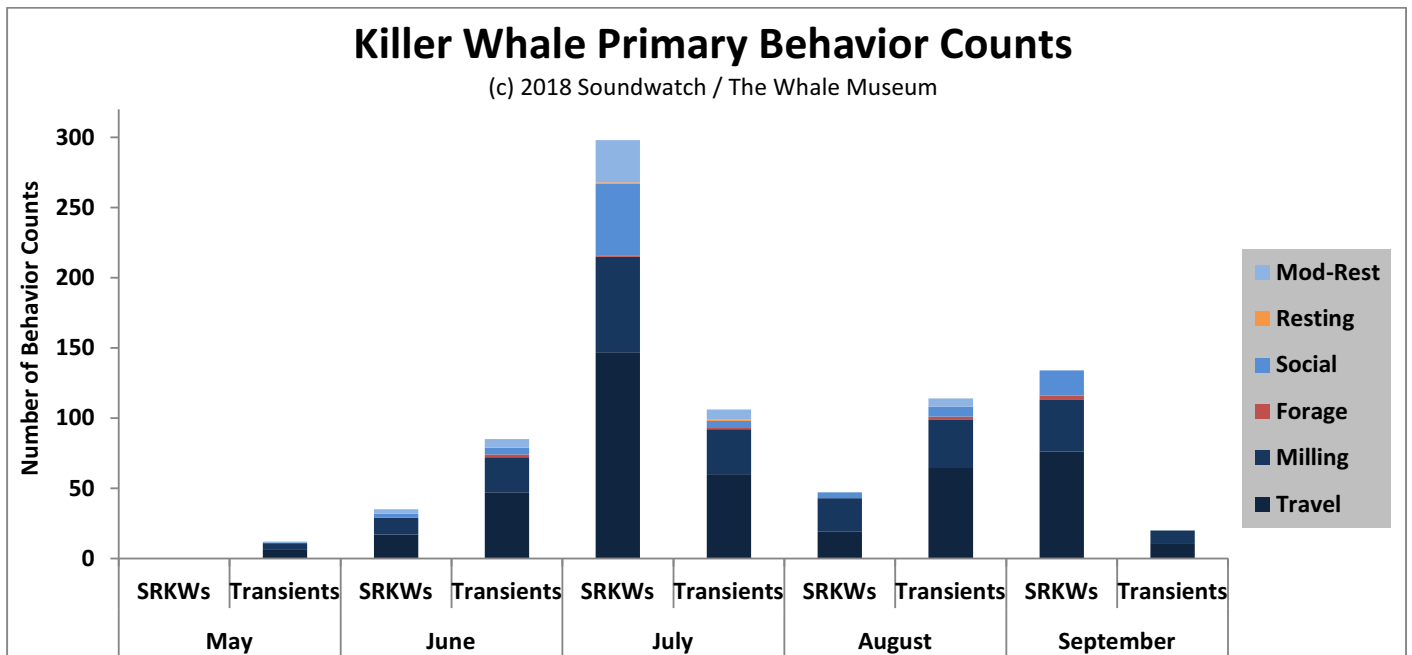


Figure 51: Southern Resident and Transient killer whale behavior counts from May – September 2018 conducted near the hours and half hour by Soundwatch.

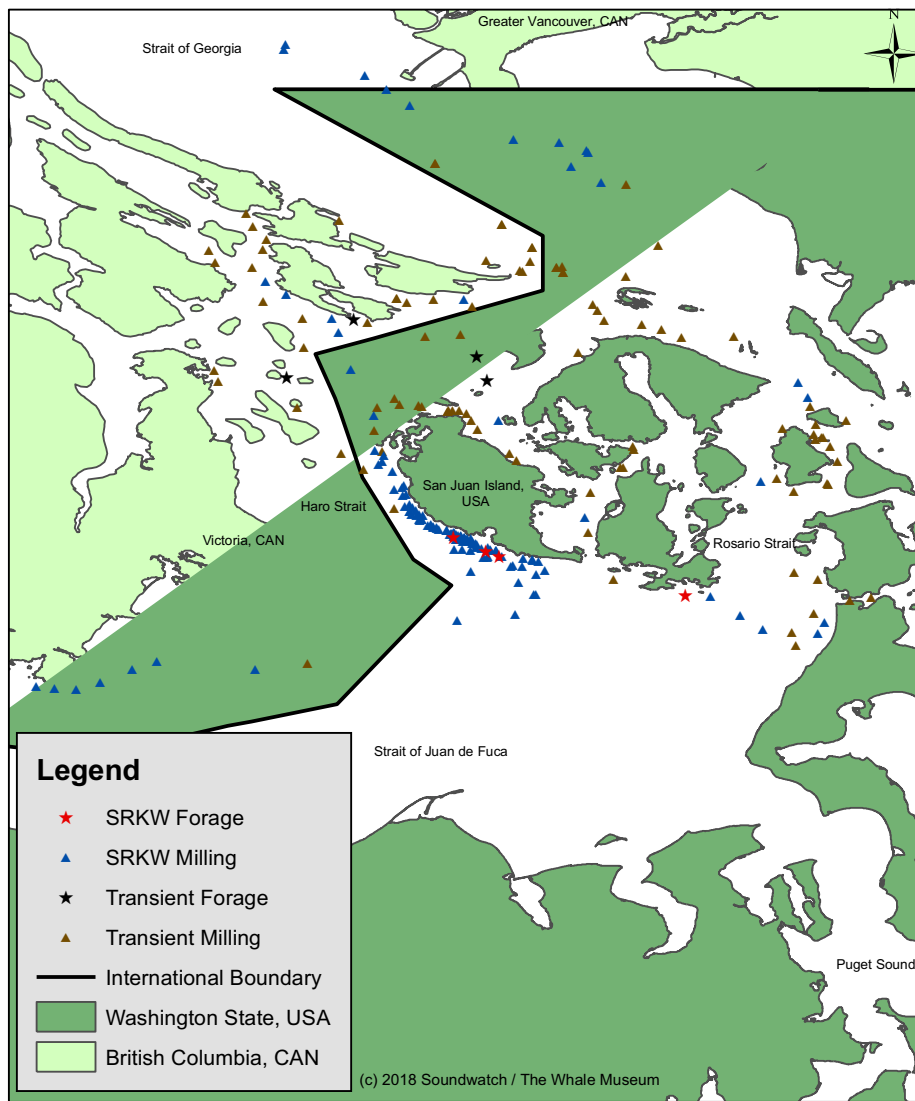


Figure 52: Map of killer whales Foraging and Milling behavior as observed by Soundwatch in 2018.

Discussion and Recommendations

Whale Warning Flag

The Whale Warning Flag program is a pilot study initiated by the San Juan County Marine Resources Committee in 2018. The study is due to run through 2019 also. The program introduced a flag used in British Columbia as part of the ‘See a Blow Go Slow’ campaign to warn boaters to the presence of humpback whales. Using the same flag design ensures a consistent educational message throughout BC and WA waters (Figure 53). The MRC distributed ~250 flags over the 2018 boating season (June – September). Recipients included enforcement vessels, Soundwatch, Straitwatch, research vessels, commercial whale watch vessels, county boats and private recreational boaters. In addition larger flags were utilized at

landbased sites including Lime Kiln Point State Park, San Juan County Park, and Eagle Point. The flag at Lime Kiln was used on a consistent basis during operational hours 8am-5pm. Volunteers reported that the flag was effective at causing boats to slow down, though these reports are only anecdotal at present.

Use of the flag by boaters was less consistent. Land based survey teams collecting data for the Port of Vancouver's shipping slow down trial between July 12 and September 24, 2018 recorded vessels flying the Whale Warning Flag in 88 scans of 2970 scans, about 3% of the observed vessel traffic within 1000m of Southern Residents. Scan samples were collected every 5 min, so this includes multiple scans of the same vessel, but there's no reason to think that the sample was biased with respect to whether the boats were flying flags. Soundwatch assisted in the outreach, distribution, and data collection of the pilot project. During the season, Soundwatch only recorded 9 vessels with the Whale Warning Flag displayed. Due to this low sample size analysis of the data was inconclusive on the effect of the Whale warning Flag. Soundwatch is working closely with San Juan County to help distribute more flags for the 2019 season, including a coordinated effort at the Seattle Boat Show in early 2019.

Deployment methods for the flag appeared to one of the challenges faced by flag recipients. Many commercial operators were either slow to utilize their flags or did not utilize their flags because they reported issues with flying the flag. Others did not encounter whales. Another factor was the late dispersal of the flags. Additional flags are being made available for the 2019 season, including medium sized flags for purchase and all commercial operators will be required to fly the flags in the presence of whales.

Based solely on observations and conversations with boaters the flag seemed to be wanted and well received by the boaters. One concern is that the flag will act as a means to attract vessels to the whales. However, Soundwatch did not observe this behavior and got the sense that vessels that want to see whales will find the whales and vessels that are transiting will see the flag and avoid the area to continue on. Transiting vessels at high speeds and close ranges are the vessels that have the greatest impact and threat to the whales. These vessels can also benefit the most from the Whale warning Flag program.



Figure 53: Image of Soundwatch vessel flying Whale Warning Flag while contacting a boater. Photo by Jeanne Hyde of The Whale Museum.

No-Go-Zone

In March 2018, Washington Gov. Jay Inslee signed an executive order putting greater priority on protection for the SRKWs and their prey, Chinook salmon. The executive order also created a Task Force to prioritize and support long-term action plans for recovery of the SRKWs. In response, WDFW formally extended and acknowledged a Voluntary No-Go-Zone on the west side of San Juan Island. The zone runs along the west side of San Juan Island from Mitchell Point south to Eagle Point extending a quarter mile seaward and a half mile around Lime Kiln Lighthouse. In 2018, the zone was extended the length of the island to Cattle Point. This zone has for a long time been recognized by San Juan County as a Marine Stewardship Area, and was once considered by NOAA as a Marine Protected Area. The commercial whale watch industry (PWWA) has maintained as a guideline to remain out of this area when SRKWs are present. For more information visit:

https://www.westcoast.fisheries.noaa.gov/stories/2018/25_05252018_whale_watching_regs.html

In 2018, 15% of all vessel incidents were vessels within this zone; a total of 174 vessels occurred within the Voluntary No-Go-Zone with 57 occurring within the newly established section between Eagle Point and Cattle Point in the presence of SRKWs. Of these incidents 162 were private/recreational vessels (159 motor vessel and 3 sailing vessels), most of these vessels were small private fishing vessels. A total of 5 EcoTour Canada vessels were recorded within the zone, as well as 4 commercial fishing vessels.

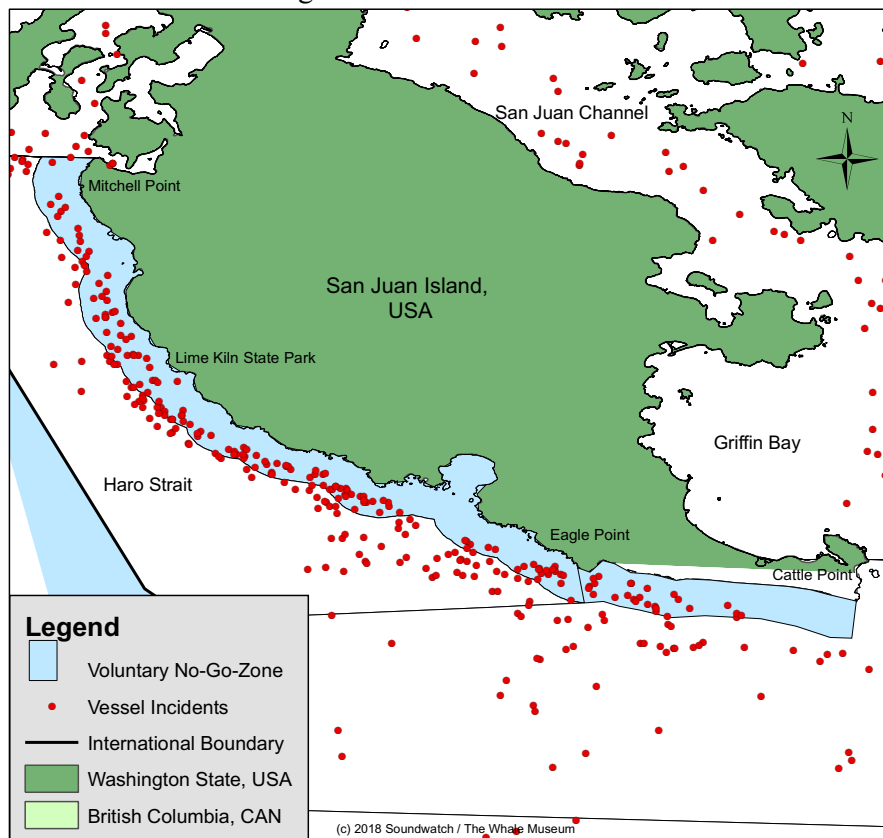


Figure 54: Vessel Incidents within the Voluntary No-Go-Zone on the west side of San Juan Island. Incident points can represent multiple vessels or incidents.

General Discussion

In May of 2018, Soundwatch hired a new Program Coordinator, which led to on-the-water efforts starting a little later than usual, which led to fewer total hours on-the-water over the season for Soundwatch. Less time on-the-water, and other on-the-water activities by Soundwatch, may explain the lower than expected overall number of incidents recorded in 2018. These lower numbers may not be related to improved boater behavior. However, the PWWA updated their guidelines to limit viewing times and number of vessels on scene, which could explain the reduced number of EcoTour incidents recorded. Soundwatch commends the PWWA for updating their guidelines and efforts to reduce vessel disturbance. We hope the association continues this trend.

The summer of 2018 also provided unique situations in which Soundwatch and crew could utilize our platform, skills, and experience to enhance the response to two unusual Southern Resident killer whale crises. J-Pod suffered two high-profile mortalities, J-35's female calf (not given an alpha-numeric), and J-50, a three and a half year old female. Soundwatch directly monitored J35 for 88.8 hours over 605.6 nautical miles. Soundwatch monitored J-35's condition, behavior and location as well as educating boaters throughout the area of the unique circumstance. During this time Soundwatch still recorded vessel counts and incidents. Therefore, with this heightened awareness of the vulnerability of individual whales it was thought that the overall average of vessel presence and incidents would be decreased. Average number of vessels around J35 was reduced from 10.2 to 7.9. Incident rate decreased from the overall average of 3.92 per hour to 2.66 per hour around J35. Some of this reduction can be attributed to the willingness and cooperation of the PWWA to work with Soundwatch to monitor and protect J35. Removing data collections around J35 from the total data collections reduced the average number of vessels from 10.2 to 10.0, and incident rates from 3.92 to 3.78. Therefore, there was a potential reduction in vessel disturbance to J35 whilst she was carrying her deceased calf.

Soundwatch built new partnerships with researchers and media outlets, and strengthened working relationships with partners throughout this period. During this time, Soundwatch was in direct contact with Kristin Wilkinson (Regional Stranding Coordinator) and Lynne Barre (Branch Chief), from NOAA, and were directed to operate within the bounds of Soundwatch's issued permit 21114 and Teri Rowles' Marine Mammal Health and Stranding Response permit 18786-03 as appropriate. Details and data from Soundwatch's monitoring of J-35 will be published at a later time in peer reviewed literature, which will be available for the public.

Soundwatch also served as a critical member of the Core Response Team in the Recovery Efforts of J-50, the three and a half year old emaciated female. Soundwatch provided on the water expertise in conducting presence/absence, monitoring, and communication of J-50's condition. Soundwatch confirmed the presence of J-50 on September 3th after she had been unseen for three days, and assisted in the coordination of the response team. Once J-50 was confirmed missing on September 12th, Soundwatch spent three days, in coordination with the agency and the San Juan County Marine Mammal Stranding Network, searching shorelines and areas where her body could have been located. Soundwatch collected data during monitoring of J50, but there was no significant change in the analysis due to less time spent with J50 than J35, and the fact that J35 traveled alone for most of her ordeal while J50 continued to travel closely with her

family and pod. Our expertise and experience contributed greatly to this effort and will continue to contribute in future efforts as directed by the agency.

Along with these two high profile animals being covered in the media, the ongoing efforts of the Governors Orca Recovery Task Force shed light on the plight of the Southern Resident killer whales, possibly educating a broader population of the Salish Sea. The summer of 2018 was also interesting in that Soundwatch recorded decreases in average and maximum number of vessels around killer whales, reductions in overall incidents, and incident rates per hour. The decreases noted by Soundwatch were greater than the decreasing trend over the past four years. We attribute this reduction in vessel traffic accompanying the Southern Residents to: 1) continued dispersion of the whales; 2) heightened awareness of the plight of the Southern Residents in the summer of 2018; 3) the events and education surrounding J-35 (*Tahlequah*) and J-50 (*Scarlet*); and 4) the Pacific Whale Watchers Association's updated guidelines in the spring of 2018 reducing total number of vessels around whales and limiting viewing times. As well, Canada updated their federal vessel regulations in July 2018 to mirror those of the United States, limiting vessels to 200 meters. Canada took additional actions by closing zones in the Gulf Islands and near the Fraser River to salmon fishing in efforts to protect the Southern Residents. There was no significant change in vessel incidents or rates due to this rule change. The PWWA, as a guideline, operated in Canada under the greater distance of 200 yards around the Southern Residents even before the rule change went into effect.

Lack of the whales' social cohesion and multiple matrilineal groups within the Salish Sea 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 was awarded part of the National Fish and Wildlife Foundation's Killer Whale Conservation Grant in the fall of 2018. Resources from this grant are being allocated to operate both Soundwatch vessels simultaneously during the 2019 season.

Soundwatch observed vessel trends from 1998-2018 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) of on-the-water effort may not take the extended hours into consideration, suggesting there are data gaps in incidents and vessel trends beyond Soundwatch's operational hours. This is an area in which Soundwatch will be allocating resources in the 2019 season. 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 BWV 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, and by the Orca Recovery Task Force throughout 2018.

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 2018 Soundwatch Data

Vessels

- Soundwatch conducted 570 vessel counts within ½ mile (0.8 km) of whales; 341 with Southern Resident killer whales, 207 with Transients (aka Bigg's) killer whales, and 22 with Humpback whales (Figure 3).
- The numbers of vessels observed within ½ mile (0.8 km) of whales (May-September) varies widely by time, date and location with maximum numbers almost three times larger than average numbers (2018 Max.35, Avg. 12).
- Peak times of the day (May-September) observed with the highest number of vessels within ½ mile whales (21 year trend) usually occur between 11 a.m. and 3 p.m. during the observation hours of 9 a.m. to 5 p.m. with a dip around the 1 p.m. midday lull (associated with commercial vessel congregations which is believed to attract more recreational vessels).
- On days when Soundwatch extended operations on the water for J35 and J50 efforts, another peak of vessel activity was recorded between 5 p.m. and 8 p.m. On one particular evening, 5 commercial vessels were still on scene within ½ mile (0.8 km) of Soundwatch at 8 p.m., with more vessels within acoustic and visual range, but outside of the ½ mile

vessel count. This peak is hypothesized to be due to commercial vessels operating sunset tours in the summer months when daylight is extended to around 9 p.m. Soundwatch has been awarded funds through the National Fish & Wildlife Foundations Killer Whales Grant to extend monitoring operations into early morning and evenings to match the extended operations of the commercial fleet, and document this activity around whales.

- The highest average vessel count was recorded in August with the max number of vessels observed in September; May average 9.7 max 15, June average 10.5 max 24, July average 11.4 max 33, August average 13.5 max 30, September average 13 max 35.
- Recreational (private) vessels observed within ½ mile (0.8 km) of whales have had higher maximum numbers than commercial vessels, but commercial vessels had an overall higher average of vessels within ½ of whales; Recreational vessels average 2.7 max 25 and Commercial vessels average 4.7 max 18.
- Soundwatch contacted 487 vessels with 1558 people on board, averaging 3.2 people per vessel, around whales for education and prevention purposes.
- An average of 37% of recreational vessels contacted for educational purposes were correctly aware of the guidelines and laws for boating around killer whales. Therefore, 63% of contacted boaters stated they were unaware or misinformed about the guidelines and laws for boating around marine mammals in the Salish Sea.

Commercial Whale Watch Industry

- The commercial whale watching season occurs April –October with increasing numbers of U.S. & Canadian commercial whale watch vessels going out year-round and/or starting earlier and going later into the season.
- The bulk of commercial whale watching generally occurs between 9 a.m. and 6 p.m., May-September, with the maximum numbers of commercial vessels observed within ½ mile of whales occurring in August and between 11 a.m. to 1 p.m. and again from 3 p.m. to 4 p.m.; with a reduction in numbers between 12 p.m. and 1 p.m. during trip turn-around periods.
- Commercial whale watching occurs in the evenings with several U.S. & Canadian commercial trips going out again at 5p.m.-Sunset (8:30-9:30 p.m., July-September).
- The majority of *active* Canadian and U.S. commercial companies are members of the trans-boundary Pacific Whale Watch Association (PWWA)
<http://www.pacificwhalewatchassociation.org/>
- There are approximately 102 vessels within the PWWA departing from 28 locations in the Salish Sea (vessel count does not include the total number of active kayaks from the PWWA kayak company). These numbers are based on on-the-water observation and online research.
- Canadian commercial whale watch vessels continue to be mostly the smaller rigid hull inflatable (RHIB) style of vessels while the U.S. fleet is made up of mostly larger passenger style vessels. However, recent additions to both fleets have seen increased numbers of large passenger style Canadian vessels and small cruiser style U.S. vessels. One Canadian company already plans to add a 95 passenger high speed catamaran vessel

to the fleet in Spring 2019.

Vessel Incidents

- In 2018, a total of 1117 vessel incidents were recorded by Soundwatch (Figure 4). Total vessel counts for 2018 are lower than average due to the unique season Soundwatch had with staff turnover, J35 and J50 responses, and vessel maintenance.
- Of the incidents recorded 56% were U.S. Vessel Regulation incidents; **Vessels Within 200 Yards of Whales** were 35% and **In the Path of Whales** were 21%.
- In 2018, **Vessels within 200 Yards of Whales** incidents (35% of all incidents) were broken down by; Vessels Stopped within 0-100 yards (5%) were made by 66% recreational vessels, 29% Canadian commercial vessels, and 5% U.S. commercial vessels. Vessels Stopped 100-200 Yards (19%) were made by 78% recreational vessels, 9% Canadian commercial vessels, 9% U.S. commercial vessels, and 4% monitoring vessels. Vessels Under Power Within 100 Yards (6%) were made by 67% recreational vessels, 29% Canadian commercial vessels, and 4% commercial fishing vessels. Vessels Under Power Within 200 Yards (27%) were made by 86% recreational vessels, 6% Canadian commercial vessels, 4% U.S. commercial vessels, 2% commercial fishing vessels, <1% commercial aircraft, <1% enforcement vessels, <1% research vessels. Fishing Within 100 Yards (1%) were made by 100% recreational vessels. Fishing Within 200 Yards (30%) were made by <1% commercial fishing vessels and 99% recreational vessels. Under Power Following Whales Within 400 Yards (12%) were made by 92% recreational vessels, 4% Canadian commercial vessels, 2% monitoring vessels, 2% private kayaks.
- In 2018, **In the Path of Whales** incidents (21% of all incidents) were made by 79% recreational vessels, 7% Canadian commercial vessels, 5% U.S. commercial vessels, 4% commercial kayaks, 2% commercial fishing vessels, 1% recreational kayaks, <1% enforcement vessels, and <1% research vessels.
- In 2018, 88% of all incidents were committed by private/recreational motor vessels (90% including private/recreational sailing vessels) and 14% by commercial eco-tour vessels (including kayaks).
- The changes in ratios of incidents committed by recreational vessels and commercial vessels, and the lower overall number of incidents recorded by Soundwatch, can be attributed to the unique season and heightened awareness and concern over the Southern Resident killer whales. Soundwatch spent 8 days dedicated to monitoring J35 as she carried her deceased calf, and 6 days dedicated to the Recovery Efforts of J50. During these times Soundwatch acted as liaison between researchers, enforcement, and the whale watch fleet to request extra space and limited viewing of these compromised individuals. Another contributing factor to reduced incidents by commercial vessels could be the PWWA updated industry guidelines and pressure from the public in light of heightened awareness of the plight of the Southern Residents.

Direct Takes by Soundwatch under Permit # 2114

- In 2018, Soundwatch made 5 close approaches (closer than regulations and guidelines) as authorized under National Marine Fisheries Service Research Permit #21114.
- All takes were directed for prevention and educational purposes due to vessels breaking

U.S. Vessel Regulations and not responding to other means of communication. All takes were conducted under discretion of professional vessel drivers to mitigate risk away from whales and maintain safety of vessels and whales.

- Total directed close approaches included 3 with Transient (aka Bigg's) killer whales, 1 with Humpback whales, and 1 with members of J pod of the Southern Resident killer whales. In 3 of the direct takes the whales in question approached the research vessel, and the research vessel responded by shutting down and letting the whales pass safely.

Spatial Trends

- There are spatial trends indicating that the whales are seen most often along the west side of San Juan Island than other areas in the ESA designated SRKW Core Summer Critical Habitat Areas.
- There are spatial trends indicating that the highest concentrations of all vessel types are along the west side of San Juan Island (Figure 6).
- In July 2018, Canada updated guidelines for viewing killer whales in the wild to coincide with the U.S. Federal and State Laws, Within 200 meters/yards of Whales was recorded as an incident throughout the transboundary Salish Sea. This consistency increased ease of education and monitoring efforts throughout the Salish Sea. There was no effect on incidents or incident rates for the 2018 season, likely due to the rule change occurring in July 2018 and the PWWA guideline of maintaining 200 yards/meters on either side of the boarder before the rule change.
- A large number of vessel types, engaged in a variety of activities, routinely commit a multitude and variety of incident types, with the majority of incident types being contrary to U.S. federal vessel laws throughout the ESA designated SRKW Core Summer Critical Habitat Areas, especially along the near-shore corridor on the west side of San Juan Island.

Education Materials/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 E & F).
- In 2018, 71 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/pWMC-7G5sSM>.
- 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 108 times by kayak guides, company owners, San Juan County Park staff, TWM interns, and TWM staff.
- In 2018, Soundwatch Dock Talks reached 687 guests visiting Roche and Friday Harbor Marinas on San Juan Island, Washington.
- The BWV exhibit at TWM, installed in 2016, has reached over 83,000 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: Taylor Shedd) administered grant funds, including accounting and disbursement, from award RA-133F-12-CQ-0057. The Soundwatch Coordinator (Taylor Shedd) along with seasonal Soundwatch driver/educator staff (Allison Northey), academic interns (Delaney Adams and Lisa Yuodelis) 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 842 past and present interns and volunteers who have collectively contributed more than 70,000 volunteer hours to Soundwatch activities since Soundwatch 1996. Special thanks also go to 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, 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:

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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.

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.



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

- 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.
- 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.
- LOOK** in all directions, before planning your approach or departure from viewing wildlife.
- 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.
- 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.
- PLACE ENGINE IN NEUTRAL** and allow animals to pass if your vessel is not in compliance with the approach regulation or guideline (#1).
- PAY ATTENTION** and move away, slowly and cautiously, at the first sign of disturbance or agitation.


- STAY** on the **OFFSHORE** side of whales when they are traveling close to shore.
- ALWAYS** avoid going through groups of porpoises or dolphins and hold course and reduce speed gradually to discourage bow or stern-riding.
- LIMIT** your viewing time to 30 minutes or less. This will reduce the cumulative impact of all vessels and give consideration to other viewers.
- 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/drone) 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:

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



U.S. LAW: KEEP PATH CLEAR TO 400 M/YD

NO GO ZONE

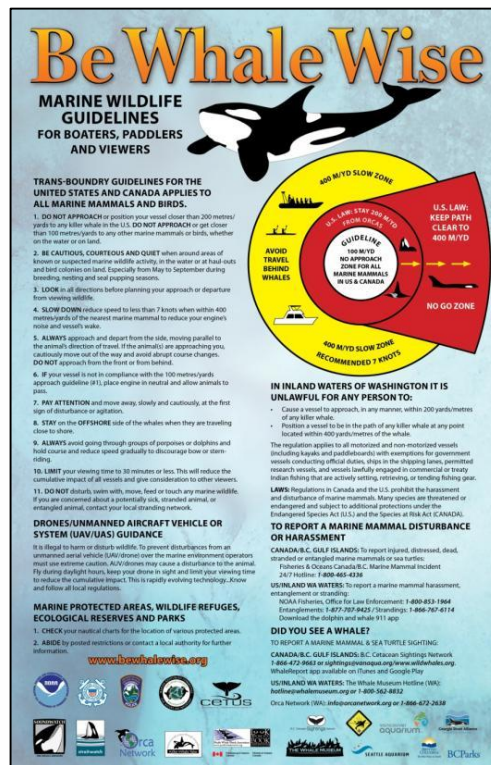
GUIDELINE 100 M/YD NO APPROACH ZONE FOR ALL MARINE MAMMALS IN US & CANADA

400 M/YD SLOW ZONE

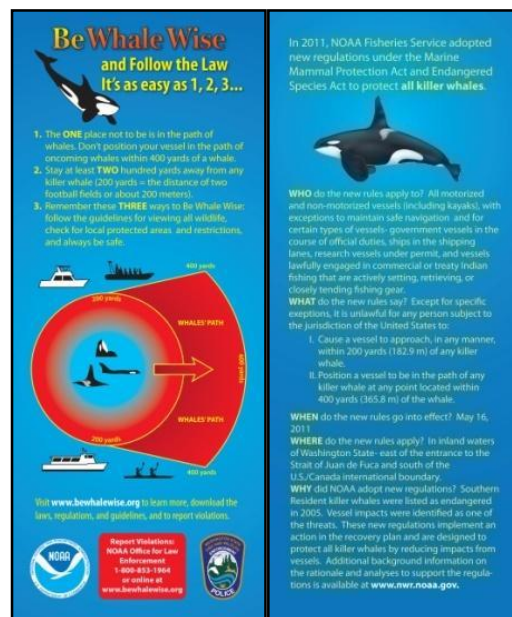
800 M/YD SLOW APPROACH ZONE

100 METRES/YARDS = 1 FOOTBALL FIELD

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



Appendix A2: Be Whale Wise Guidelines and Federal/State Regulations Poster for Boaters, Paddlers and Viewers; Revised 2016 (Available at <http://www.bewhalewise.org>).



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

2015 RECREATIONAL VESSEL LAUNCH SIGN OUT SHEET
 Permit required before launching. Sign EACH vessel out every time you launch!

DATE	TIME	VESEL TYPE K-Kayak (includes all human-powered boats) B-Boat (motorized vessels)	# of PEOPLE aboard VESSEL	PRIMARY ACTIVITY D-day trip M-multi-day W-view wildlife C-cruising FIC-fish/crab O-Other	ZIP or POSTAL CODE	COMMENTS	STAFF USE
9/12	11:00	K	2	D	98250	South	
9/12	11:00	K	3	D	98221	South Back Bay	
9/12	12:50	K	2	D	98250	"	
9/17	2:15	K	2	D	98127	North	
9/17	7:20	K	2	D	98250	North	
9/17	1:30	K	2	D	98250	South	
9/18	4:45	K	1	D	98155	South	
9/25		K	2	D	98117	South	
9/25	17:45	K	1	D	98117	South	
9/26	2:10	K	1	D	98117	South	
9/26	11:15	K	2	D	98117	South	
9/28	12:15	K	2	D	98250	South	
9/28	12:50	K	2	D	98250	South	
9/28	12:50	K	2	D	98250	South	
10/2	11:00	K	2	D	98117	South	
10/4	1:30	K	2	D	98250	Weather permit	
10/8	3:30	K	1	F/O	98250	Skodum	
10/8	4:15	K	3	W	98260		

Appendix C: 2015 KELP Program Park Recreational Boater Launch Sign-out Sign-out Form

KAYAK SIGN IN SHEET 2015
 For commercial kayak companies only

DATE	COMPANY	# GUESTS	# GUIDES	# BOATS	TIME OUT	TIME IN	GUIDE	PARKING
3/4	DSK	2	1	2	1:30	4:00	KMY	No
3/6	DSK	2	1	2	12:30	3:00	KMY	No
3/7	DSK	3	1	2	12:00	4:15	KMY	No
3/7	SQ	2	2	2	12:15	4:20	MUS	Yes
3/7	DSK	2	1	2	12:30	2:45	CM	No
3/21	DSK	2	2	3	2:30	4:45	KMY	NO
3/22	DSK	8	1	5	9:45	11:45	CM	NO
3/23	SQ	10	1	6	11:00	5:00	MUS	Yes
3/23	DSK	2	1	2	2:00	4:45	CM	NO
3/24	DSK	2	1	2	2:00	4:45	CM	NO
3/24	SQ	7	3	3	11:00	5:00	MUS	Yes
3/26	DSK	5	3	3	12:30	3:00	CM	NO
3/27	DSK	2	1	2	12:30	3:00	CM	NO
3/28	SQ	5	1	3	12:45	4:45	MUS	Yes
3/28	DSK	4	1	3	2:15	5:00	CM	NO
3/29	DSK	2	1	2	9:00	11:45	M	N
3/29	SQ	5	1	4	2:00	5:00	JP	Y
3/30	DSK	2	2	2	2:00	3:30	CM	NO TM
4/1	DSK	2	1	1	10:00	2:00	M	N
4/2	DSK	4	1	3	12:00	4:00	Kelly	No
4/2	SQ	6	1	3	12:00	5:00	JP	Y
4/4	DSK	4	1	3	1:00	4:30	CM	NO

All Kayak Companies Must Obtain Valid Permit
 Prior to Launching
 Launch and Camping Fees Must Be Paid At Time of Park Use

Appendix C2: 2015 San Juan County Commercial Kayaker Launch 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



Appendix D: 2013 - 2018 San Juan County Park Recreational Boat Launch Permit Form.

ADDITIONAL K.E.L.P. GUIDELINES
All paddlers please to check for 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 leeward 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 turning 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 should move into shore as close as possible (ideally in help boats), lift up, secure themselves, and stop paddling until the whales have passed by.
Paddlers will avoid beaching.
- 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 sea otter resting 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 seals, sea lions, and nesting birds.*
- Paddlers will maintain a 200 yard distance from any National Wildlife Refuge. No landings are permitted except at designated areas.

**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 ensure compliance with federal laws and to reduce the overall risk 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 paddleboards.

Some exceptions apply, including vessel safety, vessel activity fishing, commercially engaged vessels traveling in established shipping lanes, and government or permitted access vessels.

SAN JUAN ISLAND



MAP INDEX

- NATIONAL WILDLIFE REFUGE
- SENSITIVE AREA
- PRIVATE LANDS
- BOTTOMFISH RECOVERY AREA
- MARINE RESERVES
- 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 K.E.L.P. voluntary Guidelines governing behavior around killer whales, other marine wildlife, and in Marine Protected Areas (see map).
- Have a trip plan before leaving shore. This includes knowing the area's boating laws, accessible public landing areas, safety issues, and environmental conditions.

Map Index Description

Marine Reserves
Regulations: Closed to all shellfish & bottomfish harvest. See WDFW Marine Area 7 rules for exact locations. Salmon Fishing Closure: No salmon fishing within 300 yards of follow 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
Minimum 1/4 mile offshore when whales are present. 1/2 mile "No Go Zone" in Liana Kids Point State Park area when whales are present.

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

Appendix E: 2018 Kayaker Code of Conduct Brochure, Folded, 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 area specific guidelines meant to be used along with regional Be Whale Wise Marine Wildlife guidelines and current Federal Vessel Laws.

- Do not launch from shore if you are unable to maintain 200 yards from the whales.
- Paddle to shore of further offshore to maintain 200 yards to the side and 400 yards out of their path.
- If within 400 yards of whales, kayakers should paddle toward shore, raft up in kelp 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
Guideline: 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 Kln 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 F: 2016 - 2018 Kayaker Code of Conduct Rack Card, Double-sided (Available at <http://www.whalemuseum.org>)

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

Appendix G: Soundwatch Data Sheet Vessel Contact.

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 H: Soundwatch Data Sheet Vessel Incidents.

DATE:	Time	Lat	Location Name:	Dir:	Distance:	Total Count:	Total Eco:	Total Priv:	Total: Kayak	Count: A B												
Weekend <input type="checkbox"/>	Sea St.	Long	Quad:	Weather:	Visibility:	EU	EC	PM	PS	EK	PK	CA	PA	MM	RP	GW	GN	GD	MW	MX	MY	OTHER/DEFINE:
Weekday <input type="checkbox"/>	Pod:	J Jp K Kp L Lp T	Vessel Activity?	Whale Cmt/Mnt																		
Holiday <input type="checkbox"/>	Spoc:	DIR/NON DIR: N S E W	Fish																			
Boating	Crnt:	CTC THT LOO SPRD SPRDGps: dlc tht loo	Transit																			
	Frmto:	FLNK LIN NONLIN	Specific Rhvs:	Rsrch NonWhale																		
	Spoc:	Mnt S lo Mad Fst Porp		Enforce Active																		
	RhrST:	Tvl Rst Mill Sod		Acoustic > 1/2mi																		
	Ommsis:			Other Dscp:																		

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

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 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		
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)
INSHORE		
7.0		vessel on the inshore side of whales, when whales are traveling close to shore (within 1/2 mile)
AREA RESTRICTION		
40.1	area restriction - SJVNBZ 1	vessel w/in 1/4mile (440y/402m) of the SJI 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 Refuse (NWR) site
40.4	area restriction - RREH	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 - SJI Slow Zone	vessel > 7 knots w/in 1/2mile (880y/808m) SJI with whales present **WDFW PROPOSED New Guidelines**
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 1).

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 J2: Soundwatch Marine Wildlife Guideline and Law Incident Codes for Vessel Incident Observations (Page 2).

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
syar	ancient murrelet	Synthliboramphus antiquus
arhe	Pacific great blue heron	Ardea herodias fannini

Common Behaviors		
Spy Hop	Aerial scan	Breach
Half breach	Bellytop	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 1).

Species code	Species Name	Latin Name
oror (SR)	killer whale - southern residents	Orcinus orca
DOOSE 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 novaeangiae
beac	minke whale	Balaenoptera acutorostrata
phvi	harbour seal	Phoca vitulina richardsi

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

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

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

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

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

Direction of travel	
Directionality: 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 K2: Soundwatch Whale Survey & Behaviors Codes for Whale Scans (Page 2).

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

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

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

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

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

Watching Whales in the Wild

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

Southern Resident orcas were listed as an Endangered Species in 2005

The three main threats to Southern Resident orcas are:

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





Vessel Disturbance Research

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

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

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


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

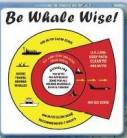
Watching Whales on San Juan Island

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

Stellar Wildlife Spots!



Be Whale Wise!



Stewardship Practices:

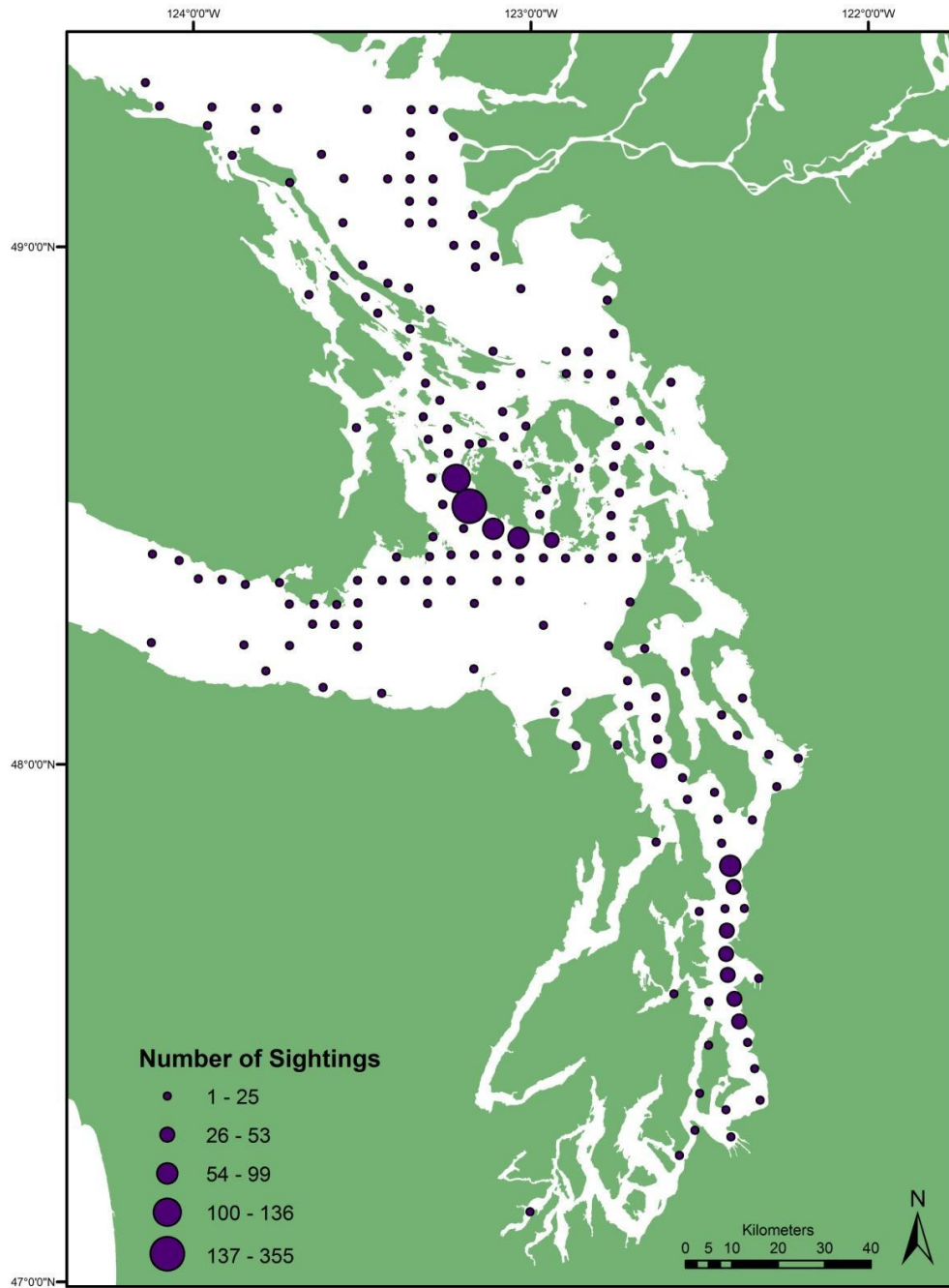
1. Follow Be Whale Wise Guidelines and Laws for Washington State and Canada. These apply to all types of vessels.
2. Drones (UAV): Is your drone registered? Did you know that it is illegal to fly a drone within a state or national park? The WA State killer whale law applies to drones.
3. Keep an eye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

How you can help:

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

BeWhaleWise.org

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



Appendix N: Map depicting the number of SRKW sightings reported by area in 2017. Its size is proportional to the number of reports in 2017.