SOUNDWATCH PROGRAM

ANNUAL CONTRACT REPORT

2022

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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 2022 killer whale watching season and to provide a data update to **RA-133F-12-CQ-0057** and **1305M138DNFFP0011.** 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 2021 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 2022 project were to: provide boater education services through public outreach and on-the-water stewardship activities, 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 over five 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 2022, there were 73 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.

Vessel regulations were again updated at the beginning of the 2019 season with Washington State revising regulations (RCW 77.15.740) to increase vessel approach distances to 300 and 400 yards and requiring vessels to maintain less than 7 knots within a half mile of SRKWs in Washington State waters. This update was put forward as a recommendation by the Orca

Recovery Task Force, which was established by Washington State Governor Jay Inslee in March 2018, and was signed May 8th becoming effective July 28, 2019. Similarly, Canada established Interim Sanctuary Zones (ISZs) and increased vessel approach distances from 200 meters to 400 meters of all killer whales through a Transport Canada interim order effective June 1, 2019 – October 31, 2020. The interim order was renewed for the 2020 season with few changes. The ISZs were in effect from June 1, 2020–November 31, 2020, whereas the 400 meter approach distance measure was in place until May 31, 2020, effectively making it a year-round requirement. This order was again renewed in April 2021 with the same time periods for ISZs and the 400 meter approach distance. The interim order was renewed once more in April 2022 with some changes, including: (1) removal of Swiftsure Bank as an ISZ; (2) expansion of the ECHO Program voluntary seasonal slowdown zone at Swiftsure Bank; and (3) additional fisheries closures around Fraser River, Swiftsure Bank, and Strait of Juan de Fuca (Transport Canada 2022). In addition to the Canadian interim order, most commercial whale watching companies signed the "Sustainable Whale Watchers Agreement" (SWWA), permitting authorized vessels (AV) to approach Bigg's Transient killer whales to 200 meters in exchange for not approaching Southern Resident killer whales or advertising sightings of Southern Residents when promoting or offering their excursions.

Washington Department of Fish and Wildlife certified the Commercial Whale Watching License Program (CWWLP) on December 7, 2021. The CWWLP establishes rules for commercial viewing of Southern Resident killer whales and requires commercial whale watching businesses including motorized, sailing, and sea kayak operations to obtain a license in order to conduct operations within the inland waters of Washington State. CWWLP rules permit commercial viewing of Southern Residents during the time periods of 10:00am-12:00pm and 3:00pm-5:00pm from July 1 through September 30 (WDFW, 2020). These actions played a direct role in the education and research efforts of Soundwatch and will be referenced throughout this report.

The 2022 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. As in 2021, Soundwatch suspended the on-water volunteer program in an effort to reduce unnecessary exposure of the Soundwatch crew to the COVID-19 virus.

Data analyzed for this annual update report reflects data collected by The Whale Museum's Soundwatch Boater Education Program in 2022 and includes vessel incidents, behaviors that are inconsistent with current guidelines and regulations, definitions related to the *Be Whale Wise* guidelines and the U.S. Federal, Washington State and Canadian vessel regulations. This updated 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** & Amendment* **1305M138DNFFP0011,** ***Tasks*** **C.2.2.2a & C.6.2**, *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 2022 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 2022 whale watching season and provide data analysis updates to the 2021 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 2022 whale watch season
2) Collect data on vessel activities during the 2022 whale watch season, especially relative to the 2011 U.S. Federal, 2019 Washington State vessel regulations and 2022 Transport Canada Interim Order
3) Conduct analysis on current whale watch activities including continued evaluation of 2011 U.S. Federal vessel regulations
4) Provide 2022 data updates to the 2021 Soundwatch Public Outreach/Boater Education Project Report

Project Deliverables:

The contract listed several deliverables including:

1305M138DNFFP0011

C.2.2.2a The vendor shall provide a written report summarizing the Soundwatch program activities, patterns of vessel activities around the whales, and compliance with guidelines and regulations. Data will be compiled into an annual data set following standardized protocols to allow for comparison between years which include the following information:

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

C.6.2 Deliverables: For each task or subtask deliverables shall be provided in the form of reports and data to the NWFSC by 15 February for draft reports and data and final reports and data will be due 1 March of each year of the contract for data collected in the previous year.
RA-133F-12-CQ-0057

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

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. 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.

Methods

Soundwatch Operations

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. Soundwatch data consist of: 1) counts of vessels within 0.8 km (one half mile) of any cetacean by type, location and activity (vessel counts); 2) cetacean identification, location, travel direction and behavior states (cetacean behavior); 3) vessel contact information (vessel contacts); 4) commercial and recreational vessel compliance with voluntary guidelines and/or regulations (vessel incidents); and 5) general non-target species (species sightings). Vessel counts and cetacean behavior states are recorded every 30 minutes on the hour and half-hour. In the event that Soundwatch arrives on scene between the hour and half-hour marks, an initial assessment is recorded and data collection resumes as normal on the prescribed hour/half hour marks. Vessel contacts, vessel incidents, and species sightings are recorded as they occur. 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.

Summary of Soundwatch Activities

From May – September 2022, Soundwatch operated vessel patrols to educate and monitor boaters under National Marine Fisheries Service (NMFS) research issued permit number 26285. Soundwatch staff and volunteers totaled *139* days of effort, and *101* days on-the-water between May 13 and September 25, 2022, totaling *645* hours of effort on the water traveling *3,560* nautical miles trans-boundary throughout the Salish Sea (Figure 1). Whales were present on *74* of these days, *35* days (*289* data counts) directly monitoring Southern Residents, *25* days (*145* data counts) with Transient (aka Bigg's) killer whales, *16* days (*61* data counts) opportunistically with Humpback whales, and *3* days (*8* data counts) opportunistically with Minke whales (Figure 2). This effort totaled *492.0* hours on scene collecting data with marine mammals averaging *6.32* hours per day of on-the-water effort. There were *5* days in which Soundwatch monitored multiple species of cetaceans. Over the summer seasons (typically May – October) since 1998, Soundwatch has totaled more than *14,315* observational and outreach hours with vessels and whales in the Salish Sea.

Soundwatch crew included: one full-time paid program coordinator, two seasonal part-time vessel drivers/educators, one part-time data technician, and three full-time summer interns. Over the season, *2,231* hours of volunteer time were 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 drivers, and program interns totaled *192* hours of off-the-water outreach and education during "Dock Talk' events (Figure 3). Additional off- water training and 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 2022 consisted of a *17'* American Eagle rigid hulled vessel, *R/V Raydiance* fully equipped with safety equipment, VHF radio, and chart plotter. *R/V Raydiance* is not equipped with a radar, but does have a Raymarine GPS unit. During 2022, Soundwatch was permitted limited access to the PWWA sightings app for the purpose of SRKW monitoring. This access proved valuable throughout the season, particularly during the Aleutian Isle Oil Spill event discussed further on page 54.

Soundwatch and Washington Department of Fish and Wildlife (WDFW) received a Section 6 ESA Grant that helped provide funding through June 2022, enabling both programs to maintain vessels and operate on the water on a more consistent basis. Soundwatch received a WDFW Aquatic Lands Enhancement Account (ALEA) Grant to help provide funding through June 2023.

In 2020, the San Juan County Kayak Education Leadership Program (K.E.L.P.) requirement was temporarily lifted due to the novel coronavirus COVID-19. EcoTour kayaking suspended operations until after the 2020 season began, at which point they resumed tours using only kayak guides who had previously been educated through K.E.L.P. In 2021, WDFW established the Commercial Whale Watching License Program (CWWLP), which required EcoTour kayak companies to participate in training in order to receive a license to conduct whale watching. The CWWLP rules will be discussed further in the Vessel Activity and Trends Around Whales section.

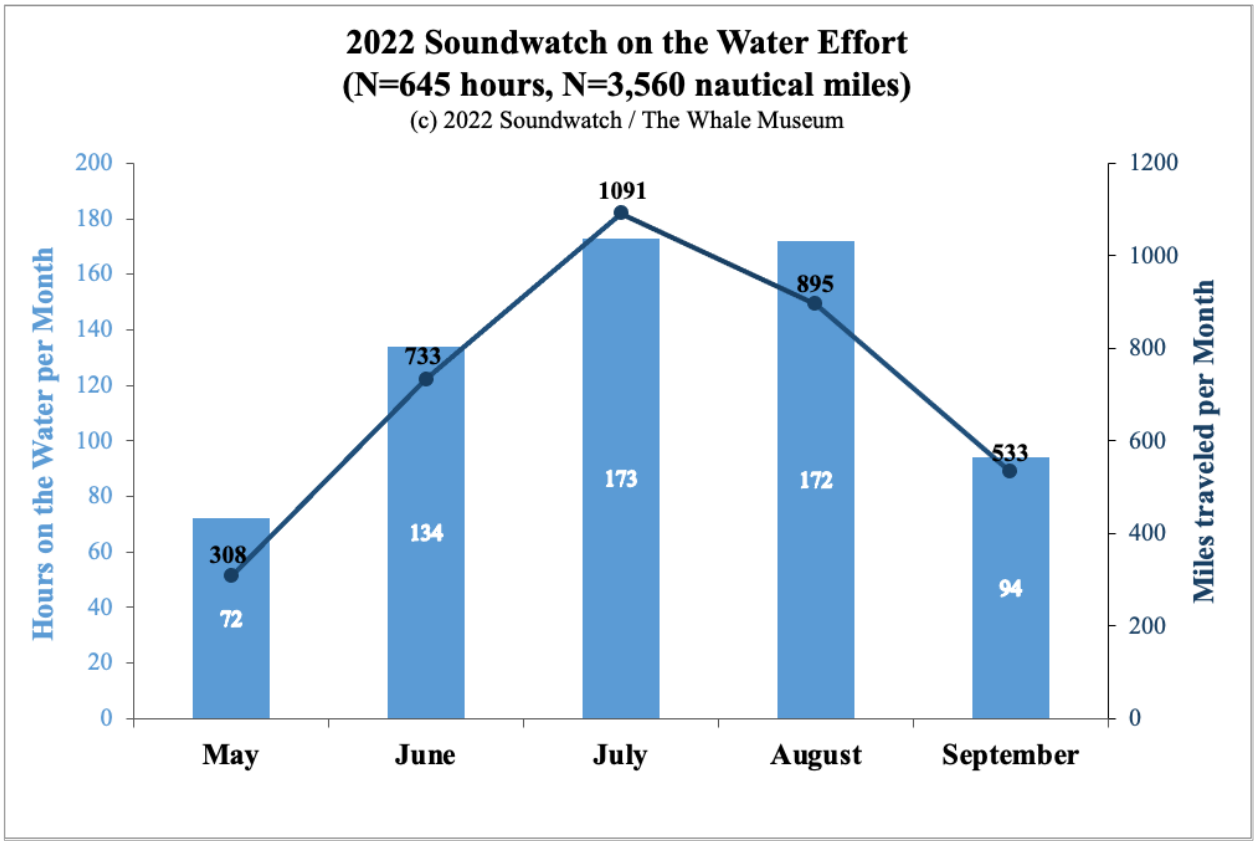


Figure 1: Distribution of Soundwatch vessel hours and miles by month for 2022.

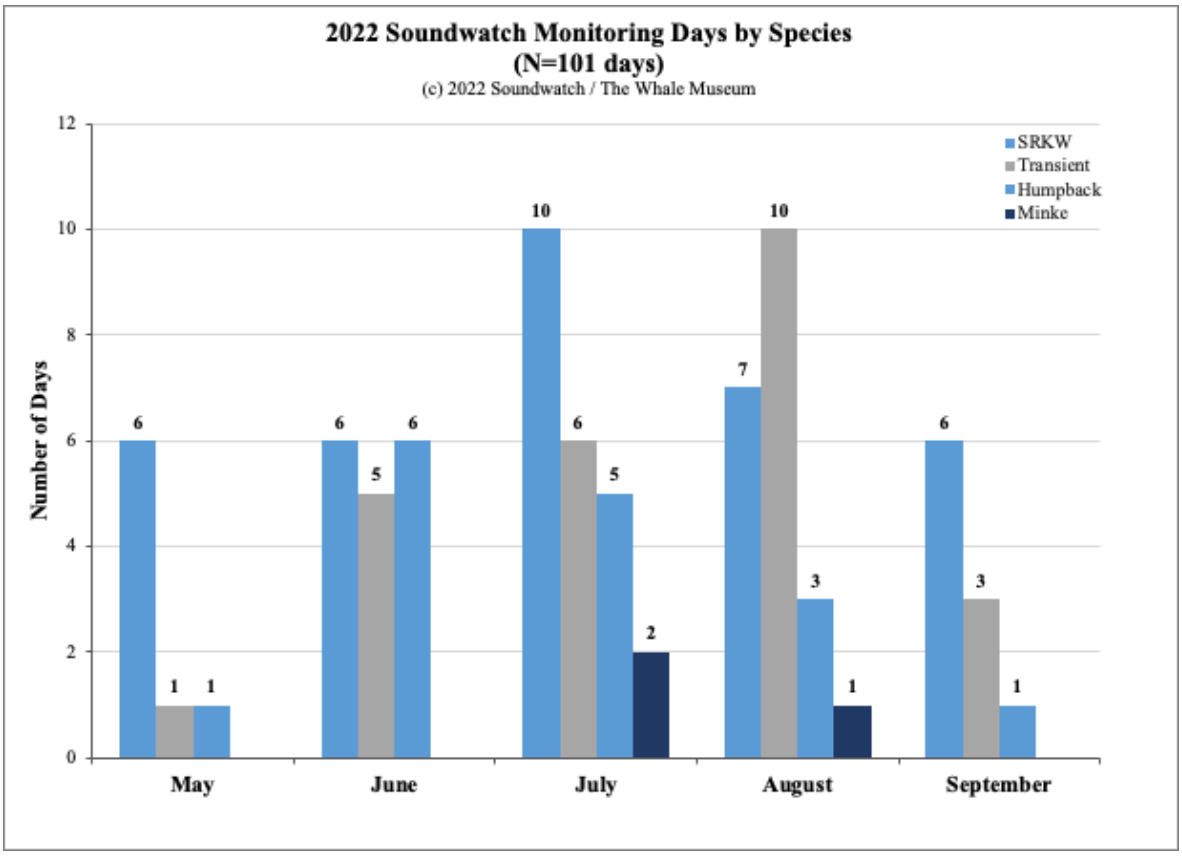


Figure 2: Distribution of Soundwatch monitoring days by species in the summer 2022 season.

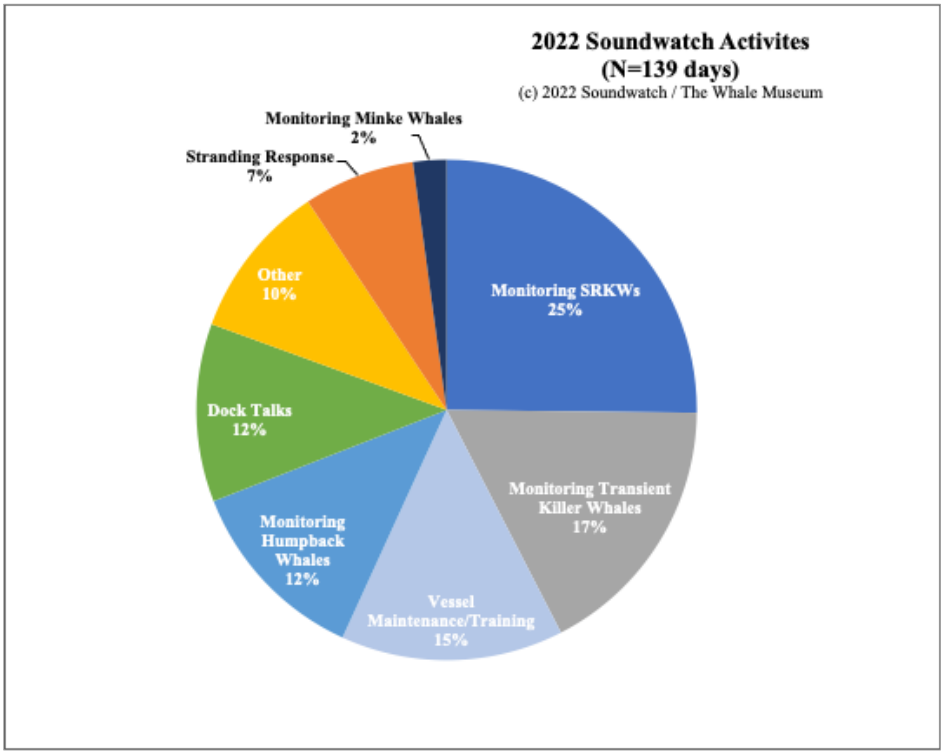


Figure 3: Distribution of Soundwatch activities during the 2022 season.

Whale Watching Trends in the Salish Sea

Soundwatch maintained a vessel catalog with the number of Eco Tour companies, vessels, trip frequency, and homeports engaged in whale watching activities based on underway observations during the 2022 field season (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' or greater than one day per week from May-September; 'occasional' or less than one day a week from May-September; and 'rare' or equal to or less than once a month from May-September. For simplicity, all companies that were not in operation ('inactive') were not included in total company/vessel counts.

During the 2022 season within Soundwatch's survey region, *39* total EcoTour whale watch companies operated May–September, offering whale watching trips from *50* 'active' whale watch vessels in the U.S. and Canadian Haro Strait region, with *13* 'occasional' vessels and *36* 'rare' vessels for a potential combined total of *99* whale watch vessels operating on-the-water at a given time (Figure 4). Of the active EcoTour companies, *87%* of U.S. companies and *88%* of Canadian companies are listed members of the Pacific Whale Watch Association (PWWA) (Figure 5). Canadian Cetus Research & Conservation Society's Straitwatch stewardship program recorded *30* active EcoTour companies (including PWWA and non-PWWA members) operating *38* U.S. vessels and *52* Canadian vessels (Cetus 2023).

Established whale watch companies that were previously inactive resumed or increased operations in 2022, resulting in an increase of total active boats in the fleet (Figure 6b). EcoTour companies with multiple vessels were counted as active as long as one of their vessels was considered active, occasional, or rare. There was one observed addition to the US whale watch fleet during the 2022 season in terms of both new vessels or new companies. PWWA members are generally based in the areas surrounding the San Juans, Gulf Islands, Victoria, Vancouver, and Puget Sound, although some can be found further (Figure 7). These more distant companies do not typically overlap with Soundwatch's primary area of study.

Shore-based whale watching areas such as Lime Kiln State Park offer whale watching opportunities that are relatively accessible and typically less cost-prohibitive. Visitation to Lime Kiln State Park fell dramatically in the 2020 season, estimating approximately 114,000 visitors compared to 244,000 in 2019. This decline in visitorship was likely a result of COVID-19 restrictions, as any non-essential travel was discouraged. Visitation increased during the 2021 season, but fell once more during 2022. Visitor numbers have not yet recovered to pre-pandemic counts (Figure 6a). Attendance data for Lime Kiln was provided by Washington State Parks Office in Olympia, Washington.

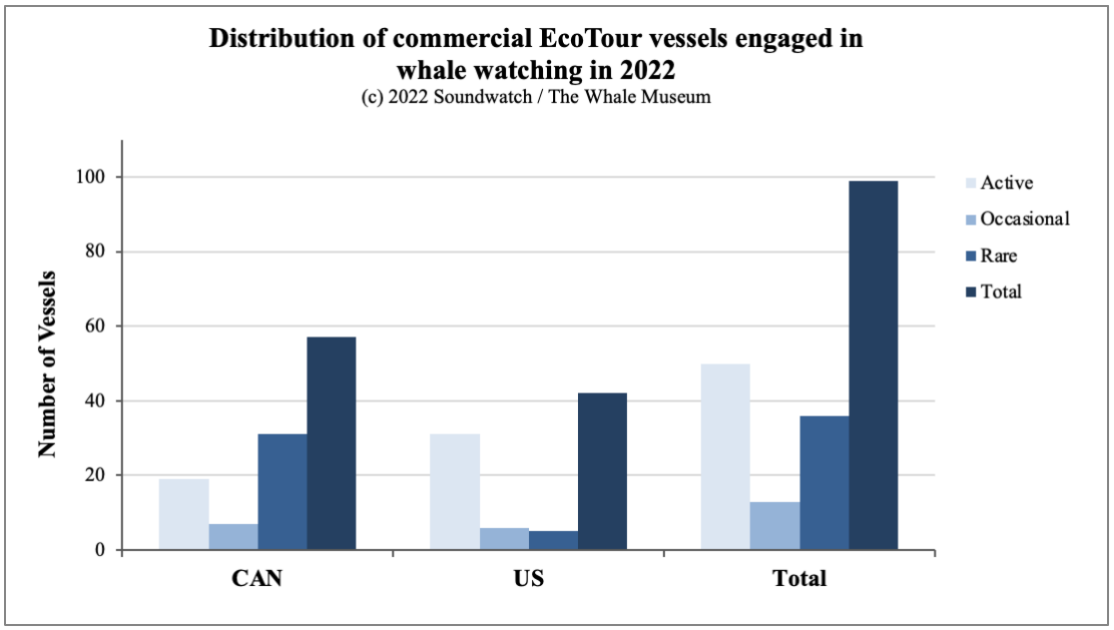


Figure 4: Distribution of total commercial vessels (N=99) engaged in whale watching in 2022.

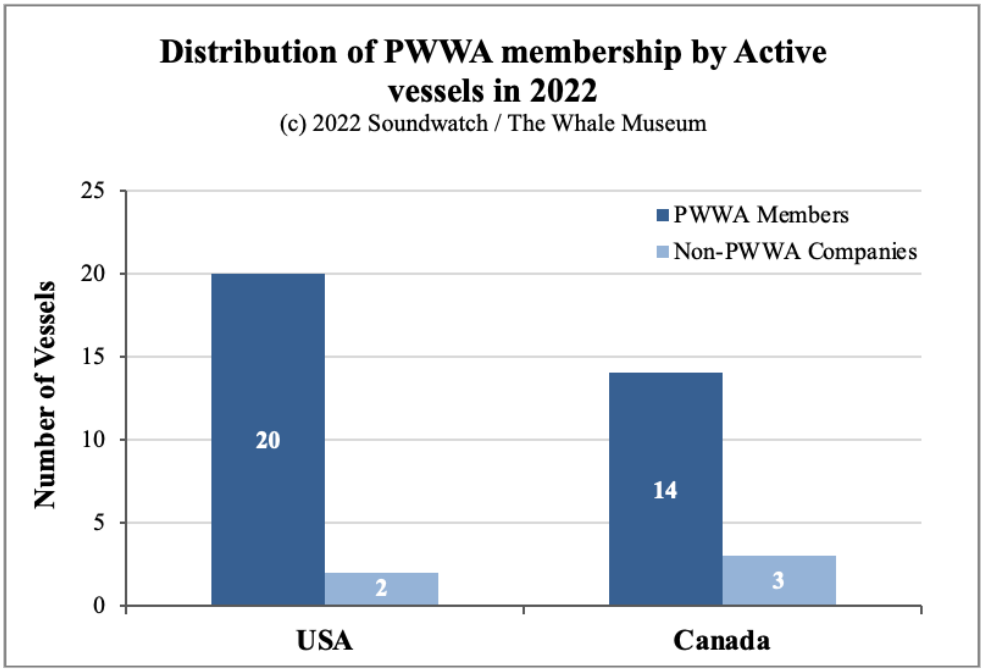


Figure 5: Distribution of active whale watch companies by Pacific Whale Watch Association membership in 2022.

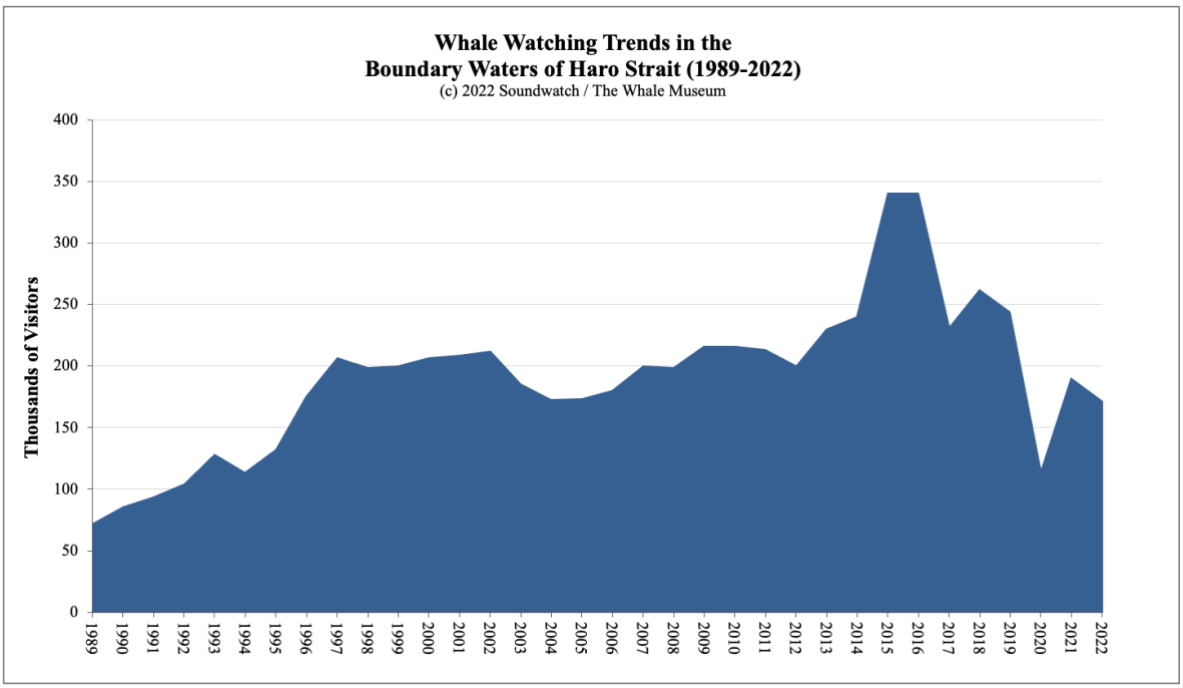


Figure 6a: Land-based whale watching trends at Lime Kiln State Park from 1989 to present. Lime Kiln State Park visitation numbers provided by Washington State Parks Department.

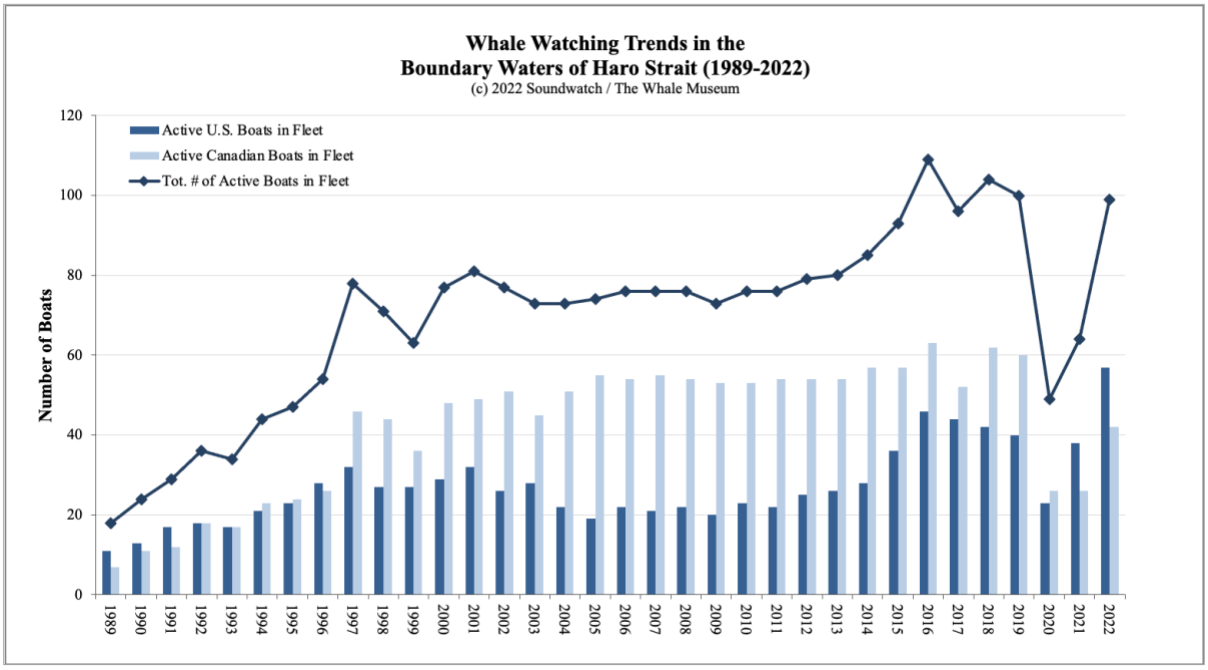


Figure 6b: Whale watching trends in the boundary waters of Haro Strait from 1989 to present.

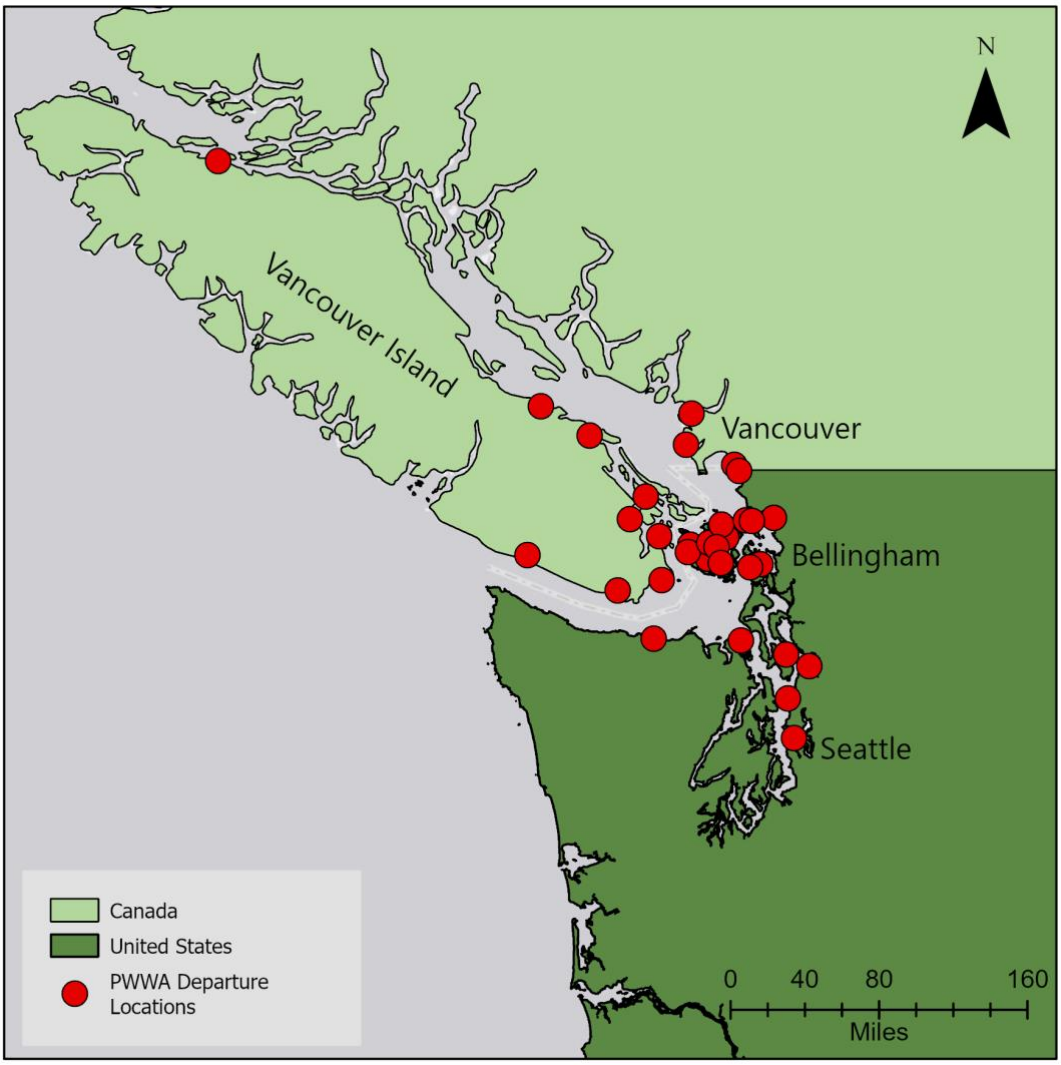


Figure 7: PWWA member vessel departure locations in 2022.

EcoTour kayak companies were also observed by Soundwatch during the 2022 season. Commercial kayak companies generally launched from San Juan County Park or Snug Harbor, primarily operating on the west side of San Juan Island in Haro Strait and Spieden Channel, north of Roche Harbor. Since Soundwatch vessel count data is conducted in the presence of whales, collection of kayak data is dependent on whether or not the Soundwatch vessel was monitoring cetaceans in the same area (within ½ nautical mile) as kayaks were operating at the time of vessel count collection.

All *7* EcoTour kayak companies observed operating in the San Juans are members of the PWWA. Commercial kayaks were present for *22* vessel counts over *11* days in Soundwatch vessel counts from May-September 2022. Kayak company activity frequency was updated in the vessel catalog based on San Juan County Park sign-in sheets, company websites, and PWWA 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, with the historic lowest number of launches recorded during the 2020 season. Although the number of kayaks being launched recovered slightly in 2021, the 2022 season saw launch numbers decline again (Figure 8). This is

likely a result of the Aleutian Isle Oil Spill incident on August 13, 2022. The Aleutian Isle spill occurred on the west side of San Juan Island in close proximity to County Park, and is further reviewed on page 54 in the discussion of this report.

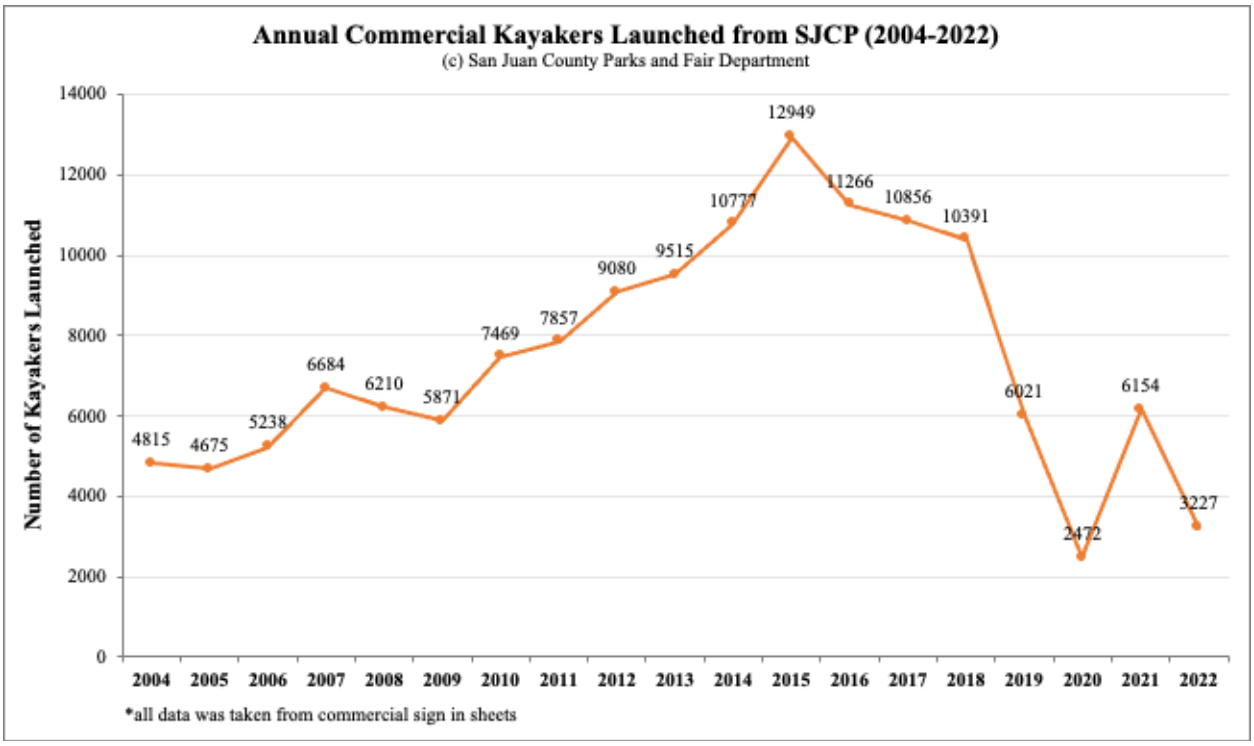


Figure 8: Number of commercial kayakers launched from San Juan County Park on the west side of San Juan Island. The total number represents individual kayakers and not the total number of kayaks launched.

Vessel Activity and Trends Around Whales

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). 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. 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 spread greater than one mile. When visibility and conditions are good, a secondary count may be made for a group of vessels and whales beyond one mile from the Soundwatch vessel, provided crew can reliably record beyond the primary count. 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.

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 where the majority of SRKW sightings occur and where the largest concentrations of vessels and SRKW are likely to be found.

Soundwatch totaled *74* vessel/whale days (*5* days of monitoring multiple species) and *503* vessel counts. Recreational vessels were observed *74* days and *380* counts, U.S. EcoTour vessels *55* days and in *230* vessel counts, Canadian EcoTour *36* days and *141* counts, Research *32* and *140* counts, Monitoring/Enforcement (excluding Soundwatch, including Straitwatch presence) *47* days and *198* counts, and kayaks (ecotour and recreational) *21* days and *43* counts.

The Soundwatch study area is separated into zones based on the TWM data quadrants and marine fishing zones for the US and Canada (Appendix Q). Soundwatch concentrates surveys in locations of vessels engaged in whale watching activities. Vessel counts during the 2022 season were concentrated around San Juan Island and Boundary Pass north into the Strait of Georgia (Figure 9). Soundwatch's area of operations was similar as compared to 2021 with the exception of increased activity within Canadian waters including the Gulf Islands, Strait of Georgia, and Strait of Juan de Fuca during the 2022 season (Figure 10). This is a result of SRKW presence detection in these areas (Figure 11).

There are obvious trends of overlap in overall SRKW 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 2022 were concentrated around San Juan Island (Zones 1, 2, 3, and 5) and the waters north of the San Juan Islands (Zones 6 and 7) (Figure 10). Haro Strait and the west side of San Juan Island are historically foraging grounds for SRKW during the summer months, and Soundwatch did monitor and record their presence in these areas. Soundwatch also observed SRKW presence at Pt. Roberts (Zone 7) and Race Rocks (Zones 12 and 13).

Soundwatch collects vessel count/whale survey data on all large cetacean species encountered in the Salish Sea in addition to Southern Resident and Bigg's Transient killer whales, most commonly including the humpback whale (*Megaptera novaeangliae*) and minke whale (*Balaenoptera acutorostrata*). After significant changes to federal and state regulations pertaining to killer whales specifically, it has become important to identify and assess potential impacts on other cetaceans in the region. Whales such as the humpback and minke are protected under the Marine Mammal Protection Act (MMPA), which prohibits take or harassment of marine mammals, and current guidelines recommend a minimum viewing distance of 100 yards (Appendix A1-A3). Since regulations surrounding killer whales, and particularly SRKWs under the CWWLP, are more prohibitive in terms of distance it may be expected that commercial and recreational whale watch vessels might shift to observing cetacean species such as the humpback and minke with greater regularity and/or frequency. Additionally, increasing awareness of the critically endangered status of SRKWs may further shift preference to watching less threatened cetaceans. Attributes of humpback and minke whales can be more challenging to characterize using Soundwatch data since the primary target species of research is the killer whale. However, vessel counts and activity around these other large cetaceans will be a valuable resource for comparison moving forward.

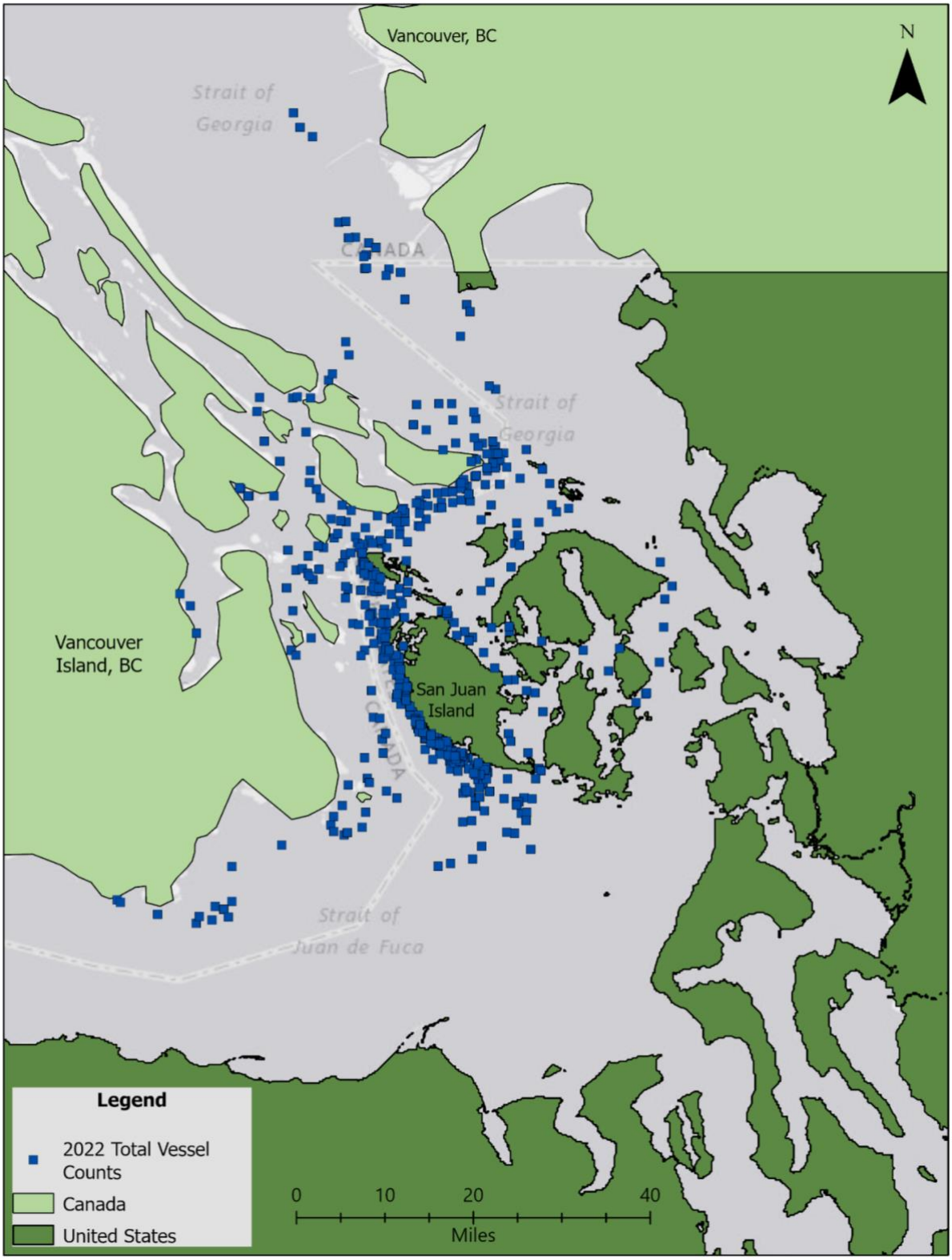


Figure 9: 2022 Soundwatch *503* Vessel Counts by location.

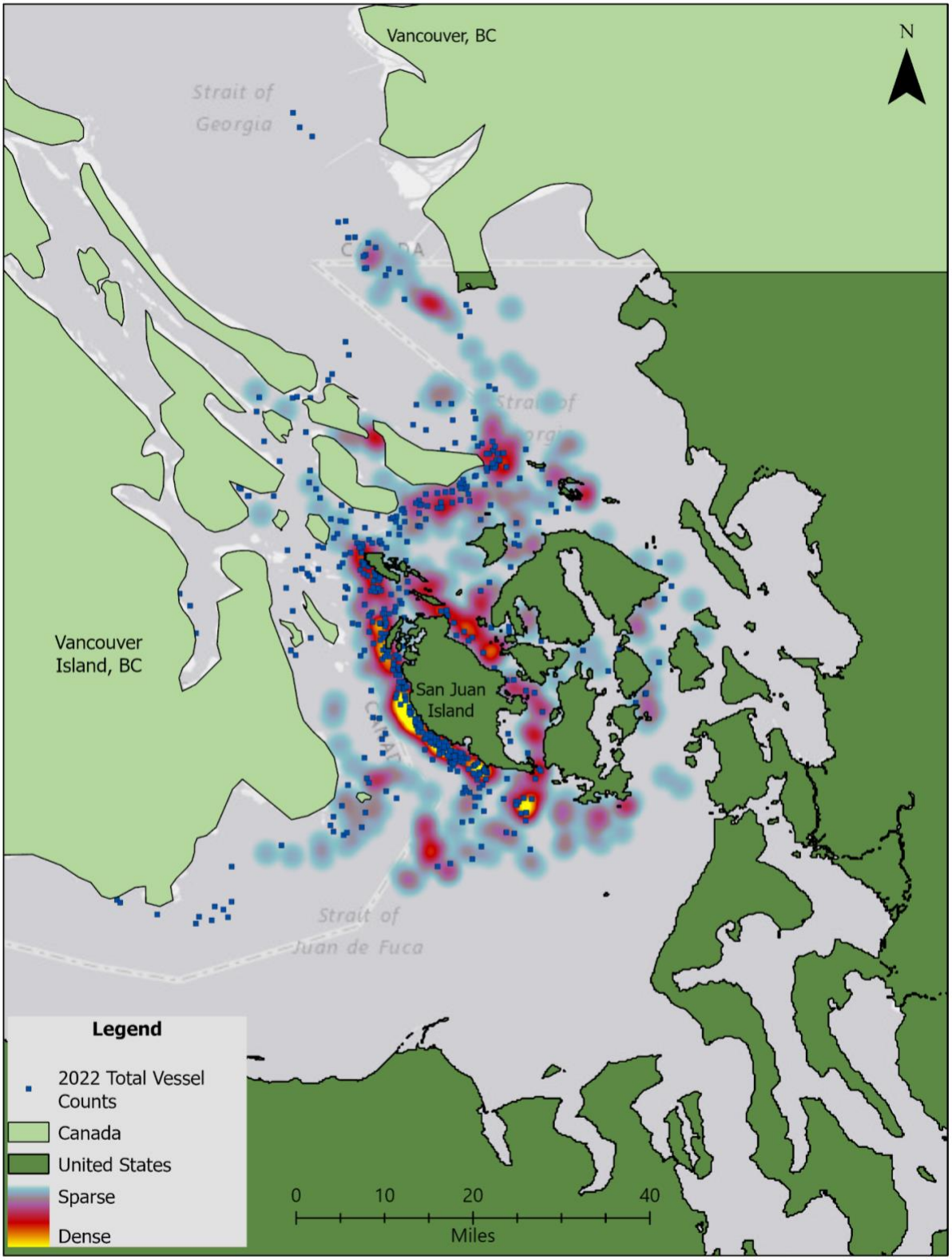


Figure 10: Total Vessel Count Locations from 2022 displayed over 2021 total vessel count locations heat map, comparing survey locations and distributions.

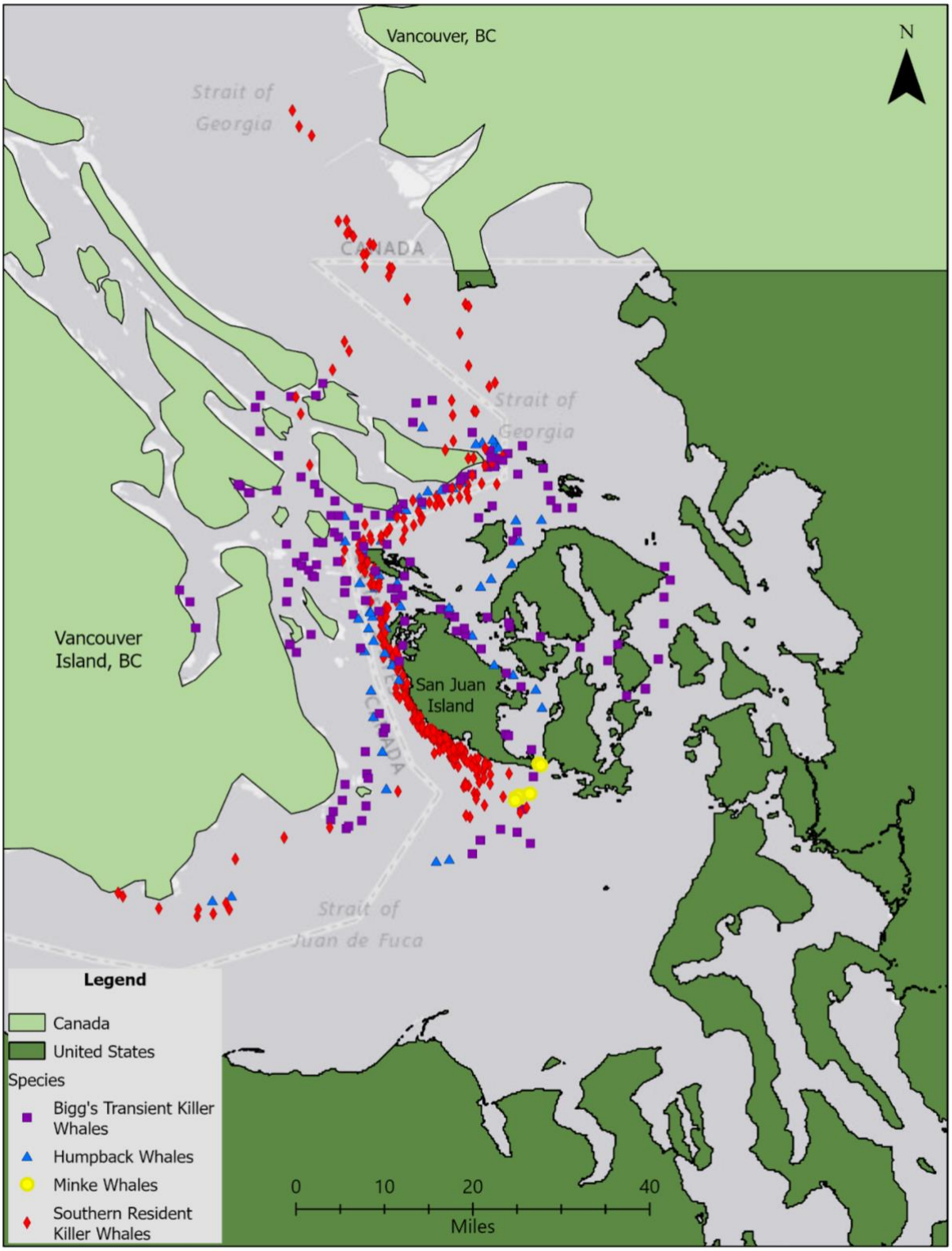


Figure 11: 2022 Vessel Counts by species of cetacean observed within the count.

Vessel Activities Around Whales

Figure 12 displays the type and number of vessels around all whales in 2022. Recreational vessels had the greatest presence around whales across all months. Overall vessel activity around whales increased until peaking in July/August, dropping off again during September.

The majority of vessels recorded in the vicinity of all whales during the 2022 season were engaged in whale watching (Figure 13). US and CAN EcoTour vessels accounted for the highest percentage of whale-oriented activity in the vicinity of whales, followed by Monitoring/Enforcement vessels and Recreational vessels (Figure 14). Monitoring/Enforcement vessel percentage includes Soundwatch vessels and reflects the effort of Monitoring/Enforcement vessels as well as the nature of Soundwatch data collection.

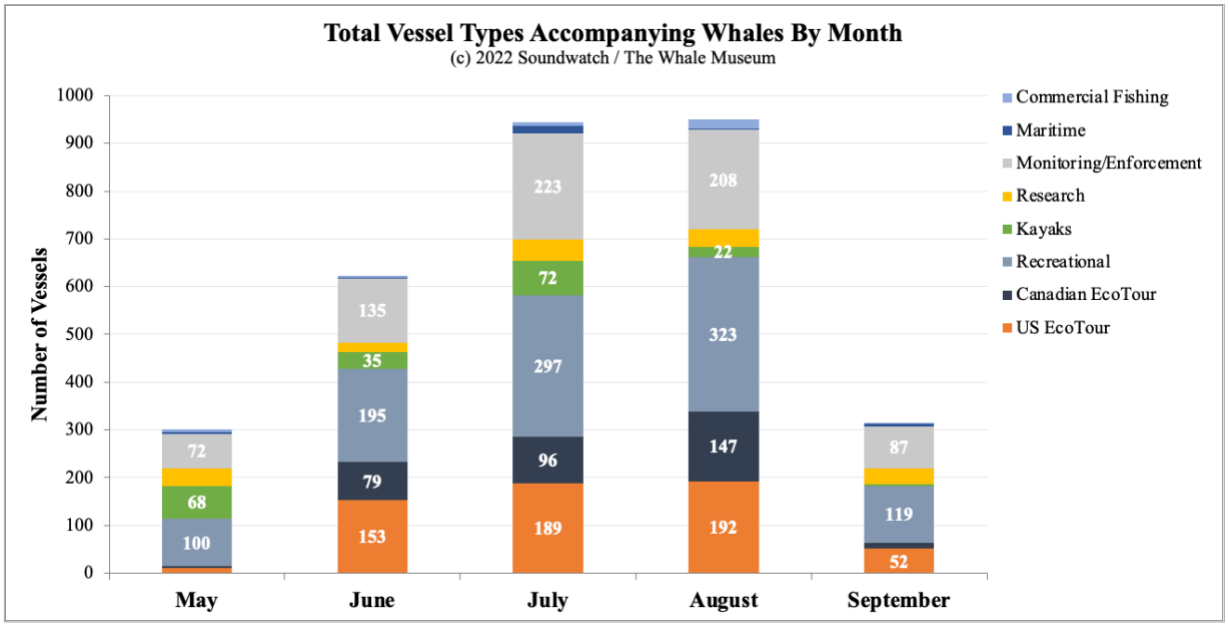


Figure 12: Total number of observed vessels by vessel type and month recorded in 2022.

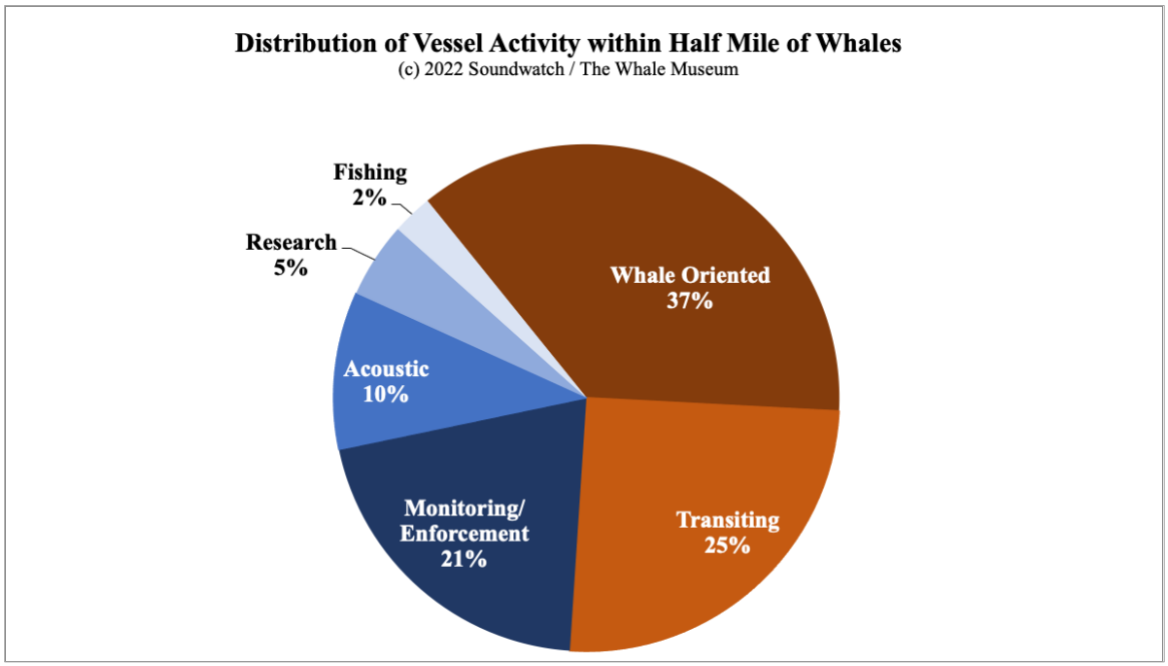


Figure 13: Distribution of vessel activity within half nautical mile of all whales during the 2022 field season.

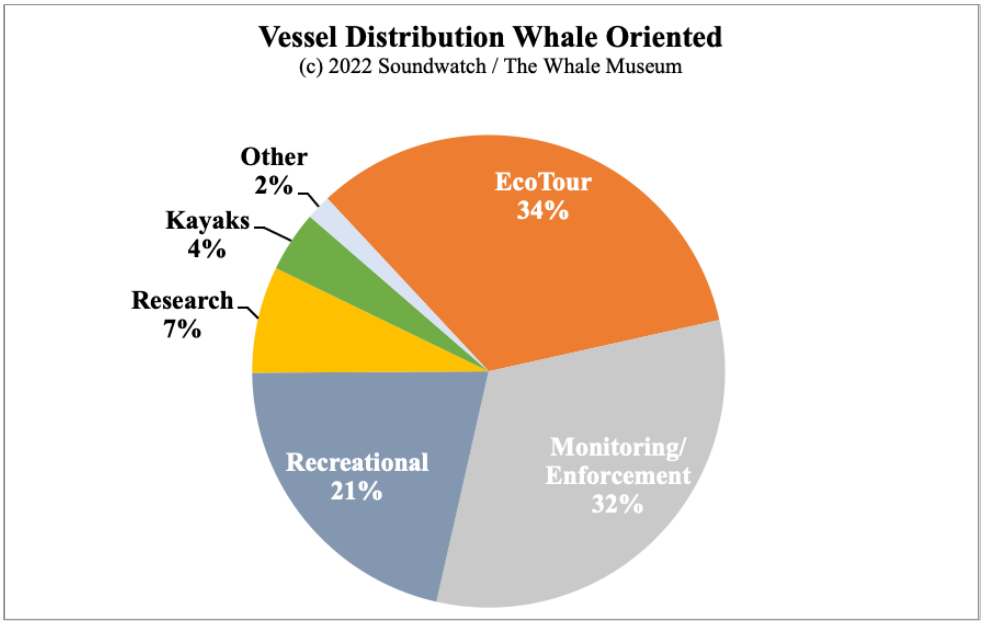


Figure 14: Percentage of 'whale oriented' vessel distribution by vessel categories during the 2022 season. 'Ecotour' includes both US and Canadian Ecotour vessels. 'Other' includes maritime and commercial fishing vessels.

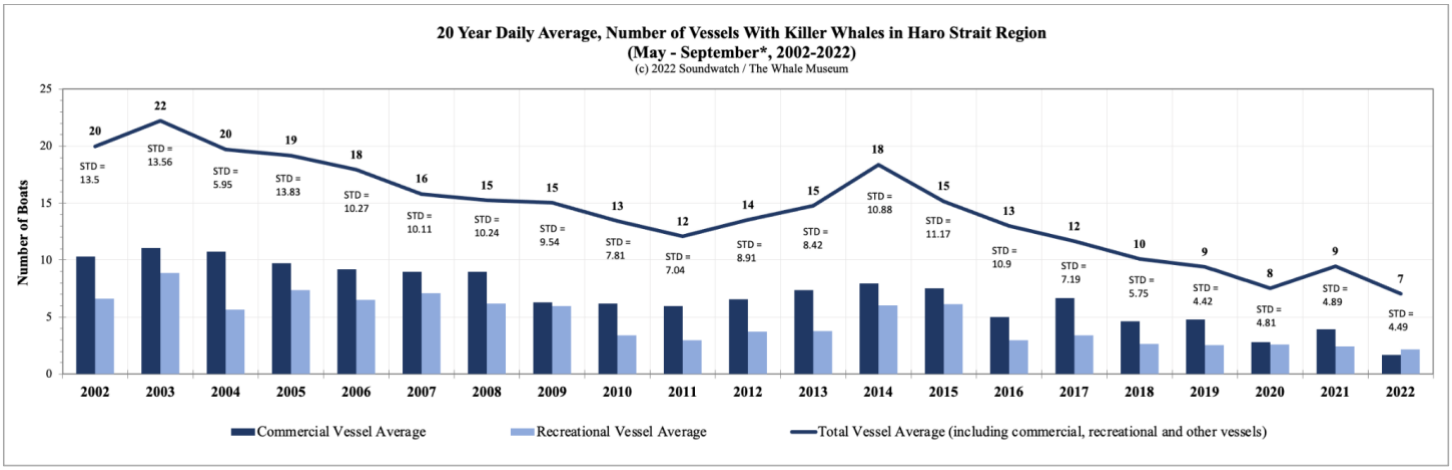


Figure 15: Average number of recreational, EcoTour (commercial), and total vessels with killer whales in the last twenty years in Haro Strait Region (May-September 1998-2016, 2018-2022 and *June-September 2017 and June-October 2020).

Number of Vessels Accompanying Whales

During May-September 2022, the total average number of vessels observed within one half-mile of killer whales was *7*, a 20-year low for vessels around killer whales. The average number of both EcoTour vessels and recreational vessels fell to the lowest recorded to date (Figure 15).

In January 2021, WDFW's Commercial Whale Watch Licensing Program (CWWLP) codified rules permitting a maximum of *3* EcoTour vessels within one-half nautical miles of a group of SRKW. The 2022 season saw a decrease in the total average number of vessels accompanying killer whales (Figure 16a). During the 2022 field season, there was a notable increase in presence of SRKW within the study area in comparison to 2021. Soundwatch prioritizes SRKW monitoring over other ecotypes and species, which is reflected by the sample size for SRKW and Bigg's in 2022 compared to 2021. When compared by ecotype, the average number of EcoTour vessels accompanying SRKWs never exceeds 3; in fact, EcoTour vessels average less than 1, suggesting that commercial operators abided by CWWLP rules in the presence of the Soundwatch vessel (Figure 16b). This may be a result of commercial vessels opting to view Bigg's killer whales and other species without CWWLP and/or vulnerable designation instead of SRKWs. In collaboration with Sealife Response, Rehabilitation, and Recovery (SR3), during the 2022 season WDFW designated a number of individual SRKW as vulnerable whales. Vulnerable status is determined by age class (calves younger than one year old) or condition (illness, late-stage pregnancy, poor body condition). Motorized commercial whale watching vessels are not to approach (within 1/2 nautical mile) a group of SRKW containing a calf under the age of one or a whale that the department has deemed sick or vulnerable (WDFW 2023).

Total average vessel activity in the vicinity of killer whales peaked during the month of August (May *5.4*, June *6.2*, July *7.5*, August *8.4*, September *6.2*). Average vessel activity was primarily characterized by EcoTour and recreational vessels (Figure 17). Whale-oriented activity was the most observed activity within one-half mile of killer whales (Figure 18).

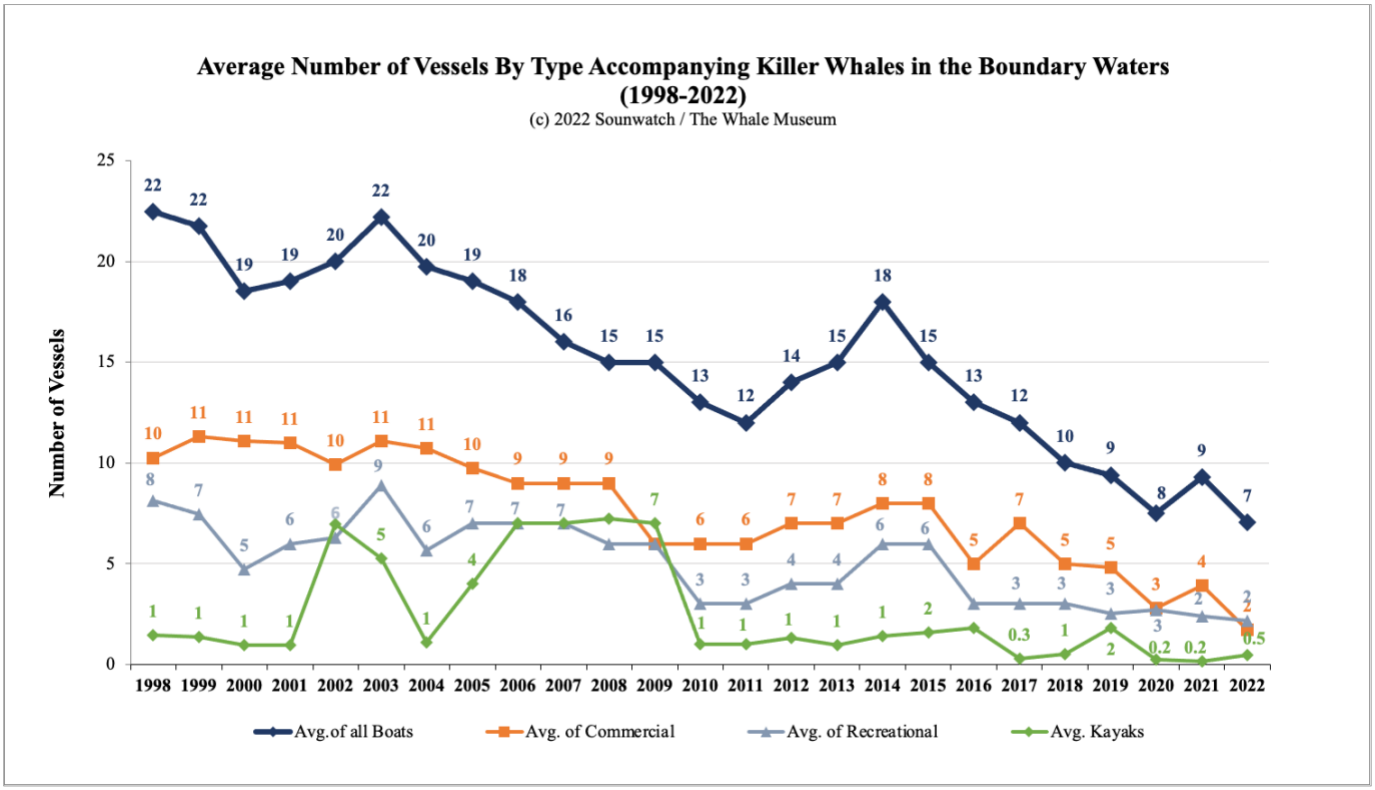


Figure 16a: Average number of vessels by vessel category within one half-mile of killer whales from 1998-2021 in the Salish Sea.

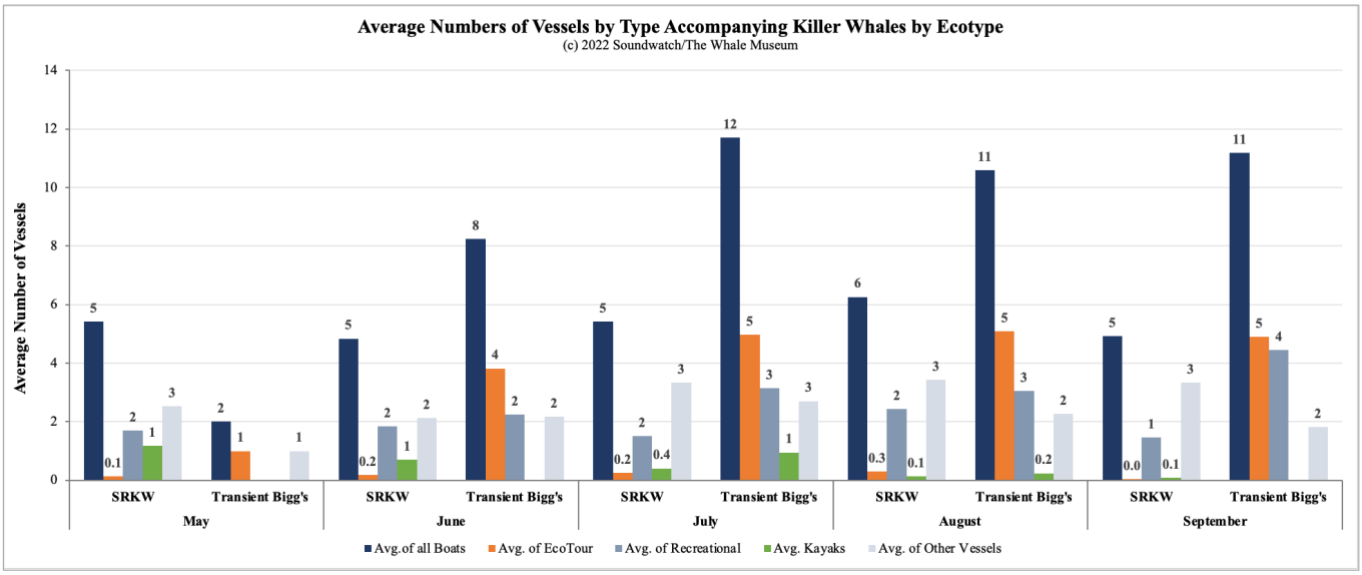


Figure 16b: Average number of vessels by type accompanying killer whales by ecotype. “Other Vessels” includes commercial fishing, ferries and cargo ships, research, monitoring and enforcement.

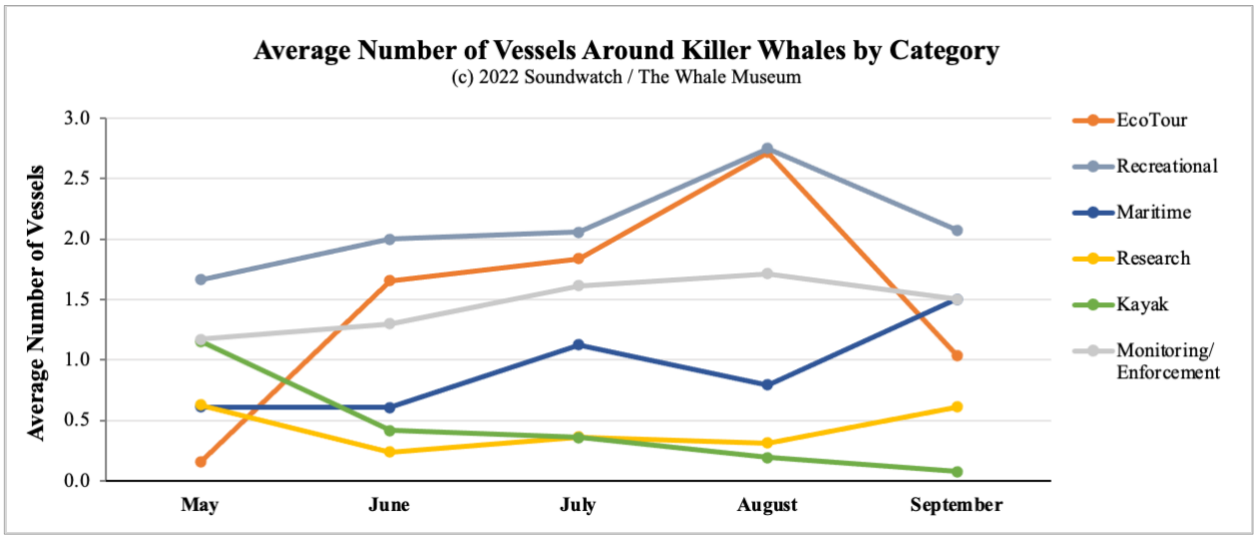


Figure 17: Average number of vessels within one half-mile radius of killer whales by vessel categories and month in 2022 Soundwatch vessel counts.

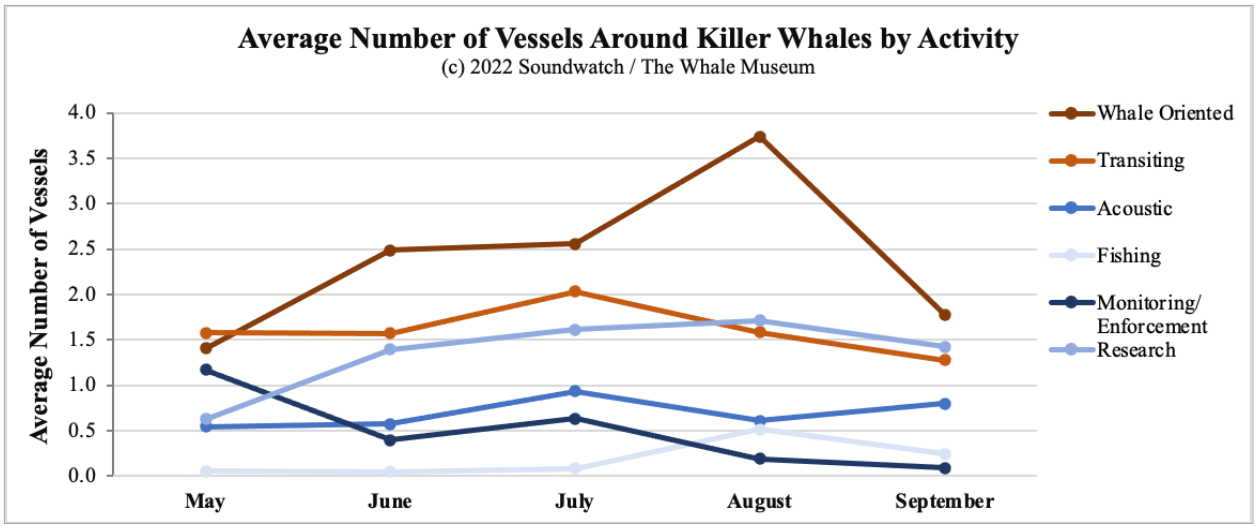


Figure 18: Average number of vessels within one half-mile radius of killer whales by vessel activity and month in Soundwatch 2022 vessel counts.

The 2022 annual maximum number of total vessels observed with killer whales was *27* (Figure 20). Maximum EcoTour vessel numbers remain fairly consistent throughout the summer months, while maximum recreational numbers show an atypical increase during August and September (Figure 19). Recreational vessel numbers may have been affected by record-high fuel prices (Figure 22b). Maximum kayak numbers decline swiftly after July, likely an impact of the Aleutian Isle Oil Spill in mid-August (Figure 19).

The 2022 average number of vessels by time of day peaked at *8.7* vessels during the hour of 1101-1200 and generally declined from there. This pattern continues to disagree with the historical trend of 'peak times of day' in the morning and mid-afternoon with a midday lull during trip turn-around times, shown by the 21-year average (Figure 21). CWWLP rules dictate that viewing of SRKWs by authorized vessels may only occur between the hours of 10:00am-12:00pm and 3:00pm-5:00pm. The 2022 average does not particularly align with these time

restrictions, likely a result of minimal EcoTour vessel presence around SRKW (Figure 16b). Both whale presence and EcoTour whale watch schedules contribute to monthly variation. It is possible that daily whale watching tours have become more frequent and flexible to account for the unpredictable nature of whale presence as well as the demand of whale watch customers. It is also possible that as whale sightings reporting methods advance, vessels of any type seeking whales may be able to ascertain their location and engage in whale watching. Vessel averages by time of day also reflect Soundwatch's operations effort (Figure 21).

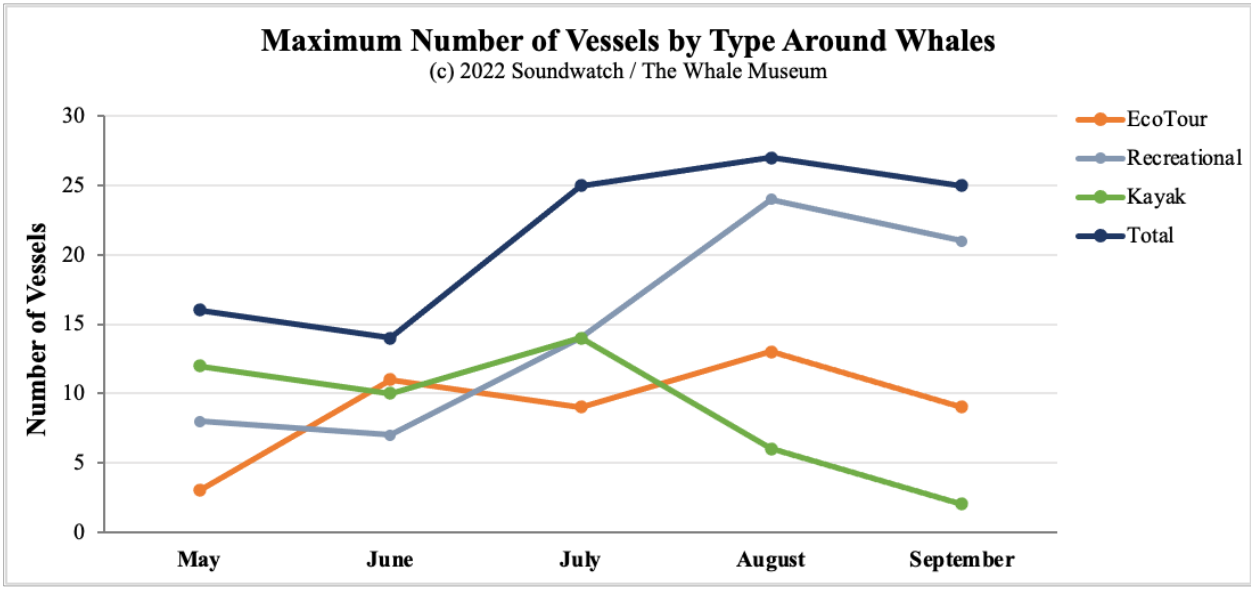


Figure 19: Maximum number of vessels by category and month around killer whales from May-September 2021.

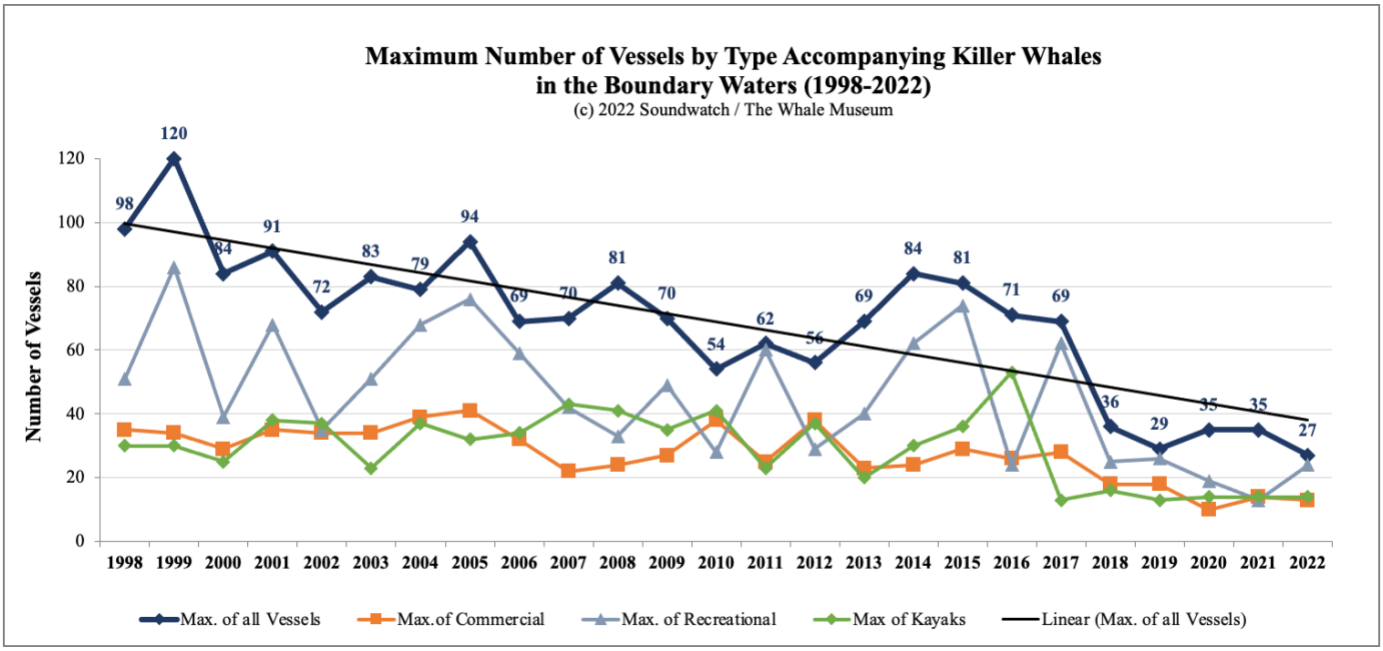


Figure 20: Maximum number of vessels within one half-mile of killer whales in the Salish Sea by vessel category from 1998-2022.

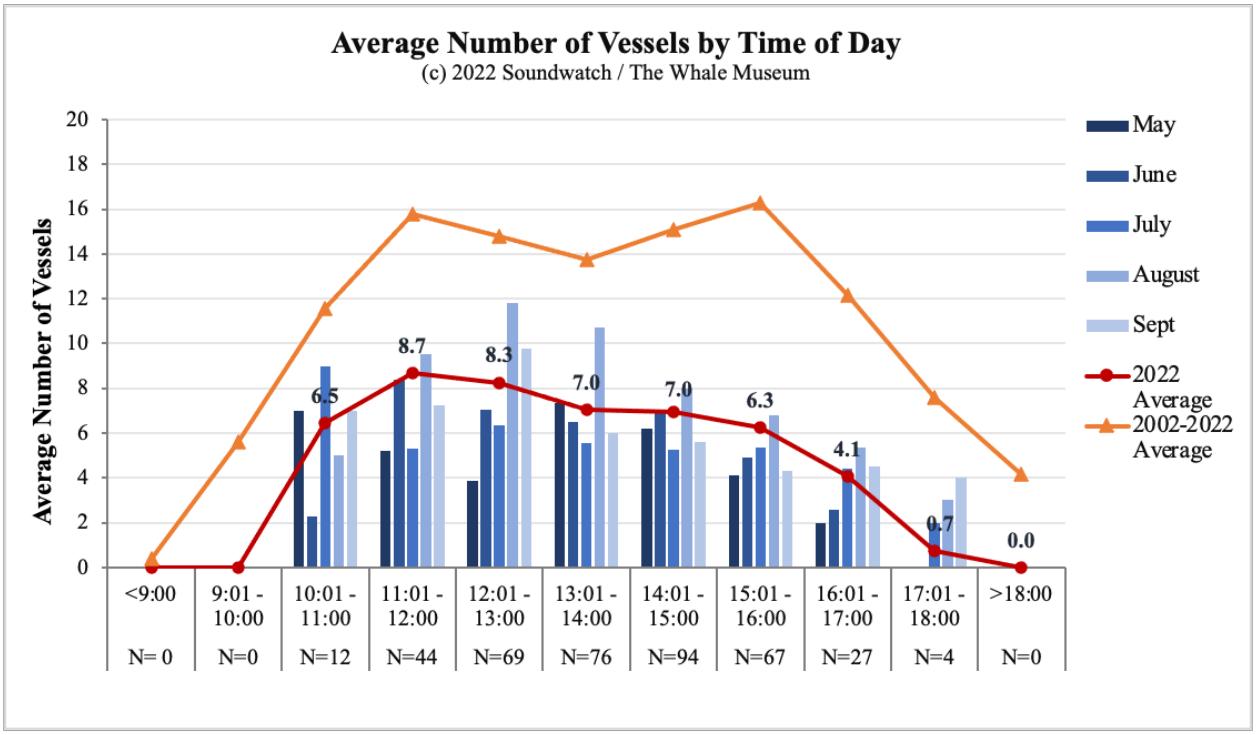


Figure 21: Average number of vessels by time of day includes all vessel categories, the average for 2022 and the 21-year average.

Outreach and Education

The Soundwatch Boater Education Program includes an outreach and education component that is primarily achieved by (1) on-water vessel contacts; (2) off-water contacts via "Dock Talks" and The Whale Museum; (3) the Kayak Education and Leadership Program (KELP); and (4) an increasing presence on social media.

On-Water Education

Soundwatch regularly encounters recreational vessels in the vicinity of marine wildlife and/or wildlife habitats. Contact is made with these vessels either by VHF radio or alongside approach. It is Soundwatch's intention to contact every vessel possible in the vicinity of whales, regardless of whether the vessel is violating regulations. Upon contacting, Soundwatch vessel operators inform the boaters of *Be Whale Wise Marine Wildlife Guidelines for Boaters, Paddlers and Viewers* and the *U.S. federal/state vessel regulations* for killer whales, and distribute *Be Whale Wise* brochures if possible (Appendix A3). Due to COVID-19 precautions, Soundwatch suspended on-water distribution of materials.

During the 2022 season, Soundwatch contacted *518* recreational vessels for a total of *1,380* boater contacts, averaging *2.67* boaters per vessel. The 2022 season saw a change in peak season in comparison to 2021, with fewer contacts during June and July (Figure 22a). One potential cause for a shift in activity and therefore number of contacted boaters may have been the unusual and unprecedented spike in fuel costs during the 2022 season, and particularly in June and July (Figure 22b). Soundwatch personnel anecdotally noted fewer recreational vessels on the water

for most of the season than typically expected, especially considering the generally fair weather conditions throughout the summer months.

Outreach and education efforts during 2022 from Soundwatch and other *Be Whale Wise* partners and Salish Sea stakeholders were significant and included increased social media presence and information broadcasted throughout the Salish Sea on both sides of the international border. At the state level, WDFW increased outreach efforts through informational materials, educational videos, press releases, and CWWLP-provisioned protocol for notices of vulnerable SRKW including calves and potentially unhealthy individuals not only to license-holders but to the general public as well. When contacted by Soundwatch, boaters were asked if they were familiar with *Be Whale Wise* and *U.S. federal/state vessel regulations* for killer whales. Of the vessels contacted, *67%* were deemed to be correctly aware of the guidelines and laws (Figure 23). The greatest discrepancy between aware and unaware boaters occurred in July 2022. July was also the highest overall number of recreational contacts, suggesting that July may have been a peak season for recreation on the water in the study area (Figure 24). The 2022 season saw a continued trend of increased awareness (Figure 25). It is important to note here that boaters may have self-identified as aware despite potentially being unaware of current regulations, although Soundwatch made efforts to determine actual awareness. Comparable data from Cetus Research and Conservation Society's Straitwatch stewardship program reflected *31%* awareness of vessels contacted during the 2022 season (Cetus 2023).

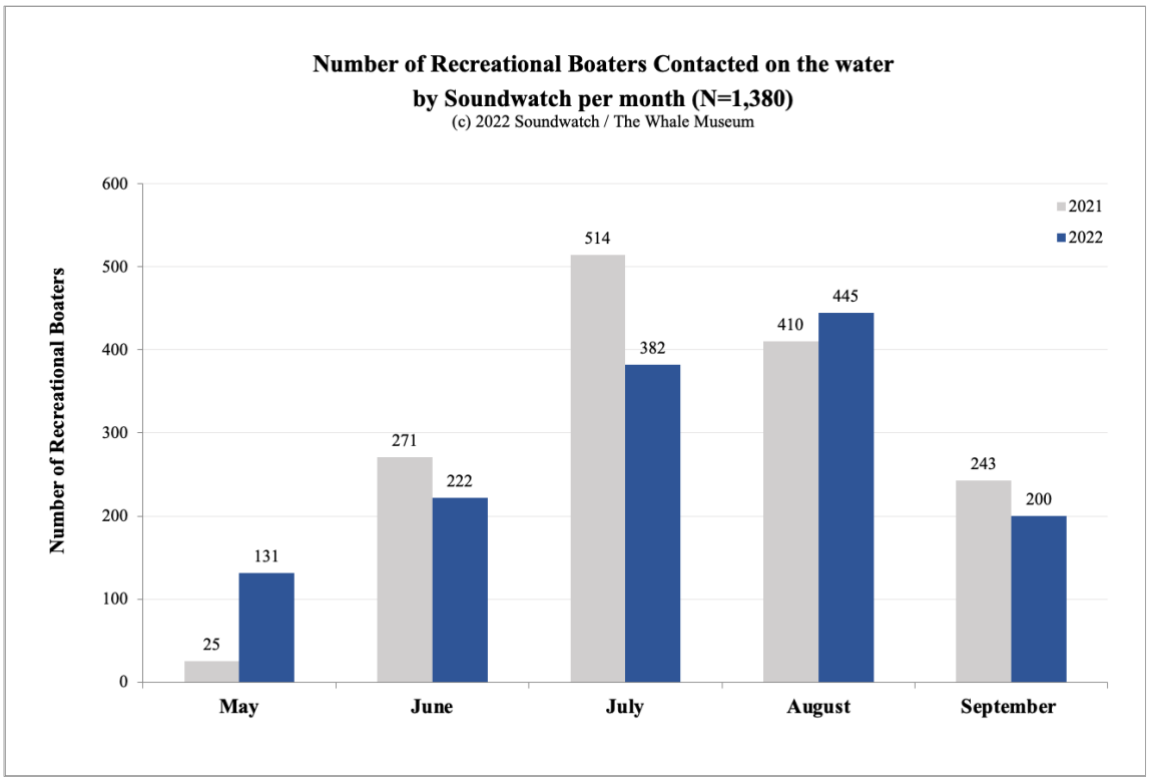


Figure 22a: Number of recreational boaters contacted by month on the water by Soundwatch for either prevention and/or education on vessel disturbance to killer whales in the region during the 2022 season (N=1,380) compared to the 2021 season (N=1,463).

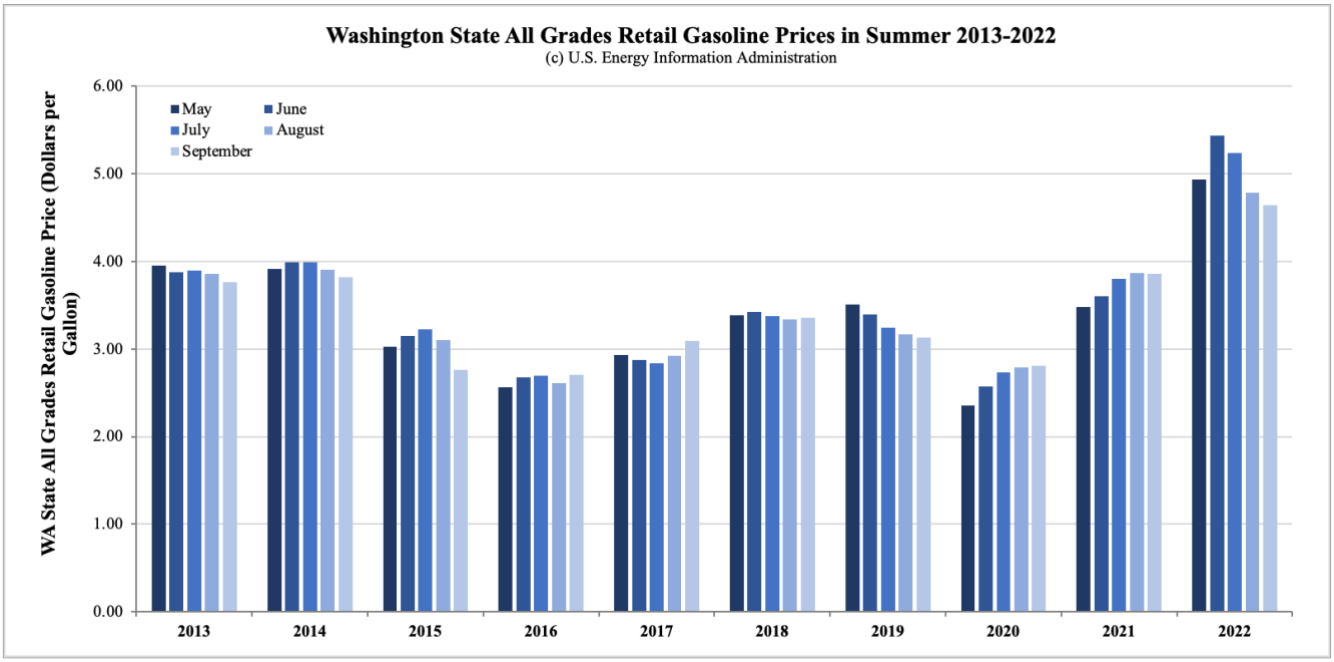


Figure 22b: Washington state all grades retail gasoline prices in summer months (May-September) from 2013-2022 (U.S. Energy Information Administration). All data presented in the figure were compiled from publicly available U.S. Energy Information Administration data. Fuel prices reach a 10-year high across all months in 2022, peaking in June.

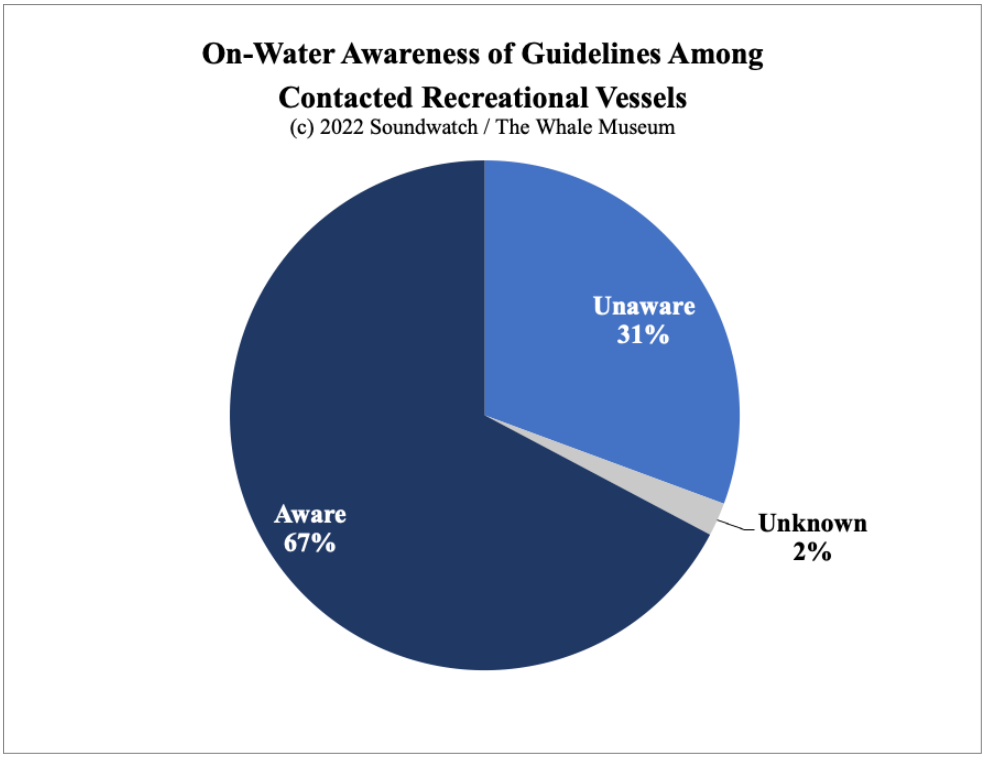


Figure 23: Awareness of Be Whale Wise Guidelines among contacted recreational vessels in 2022.

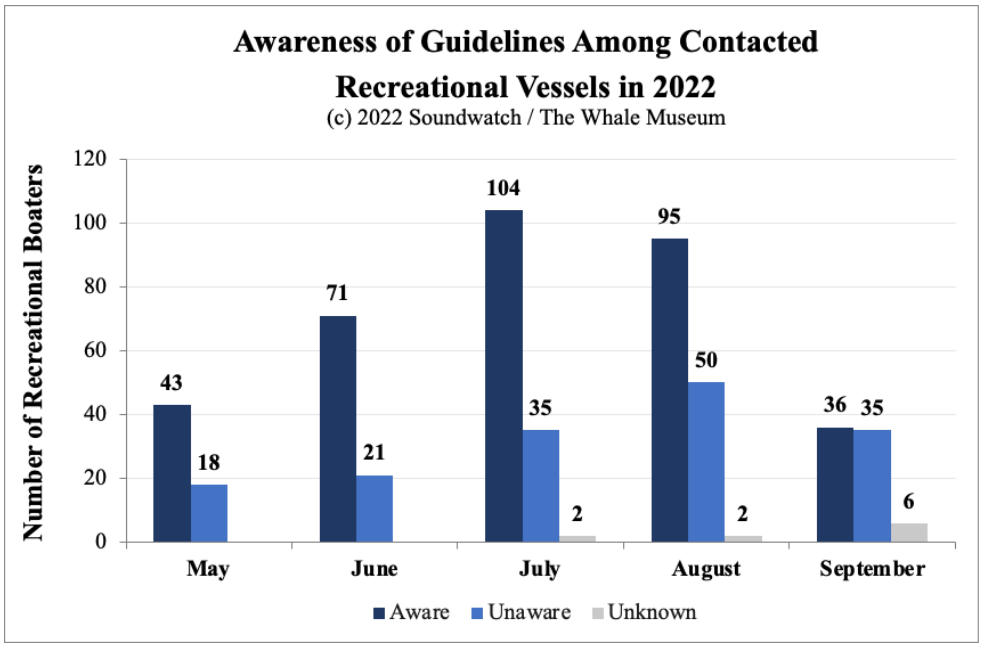


Figure 24: Number of recreational vessels contacted and the awareness of Be Whale Wise Guidelines by month in 2022.

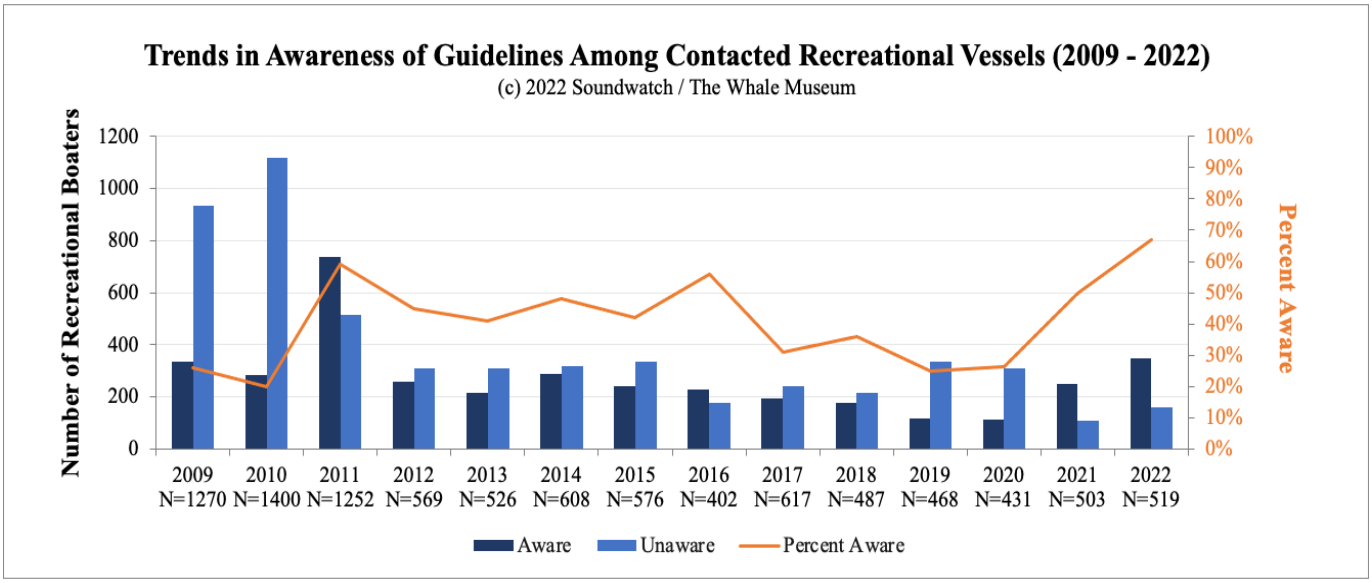


Figure 25: Trends in Recreational Vessels Awareness of Guidelines Contacted by Soundwatch from 2009 – 2022.

Soundwatch crew recorded the registered homeports of contacted vessels when available. Registered ports most commonly contacted in 2022 were Anacortes, Bellingham, Lopez Island, San Juan Island, and Seattle, Washington as well as Vancouver and Victoria, British Columbia (Figure 26). Homeports outside of the Salish Sea region were also recorded, including as far as Chesapeake, Virginia and Japan (Figure 27).

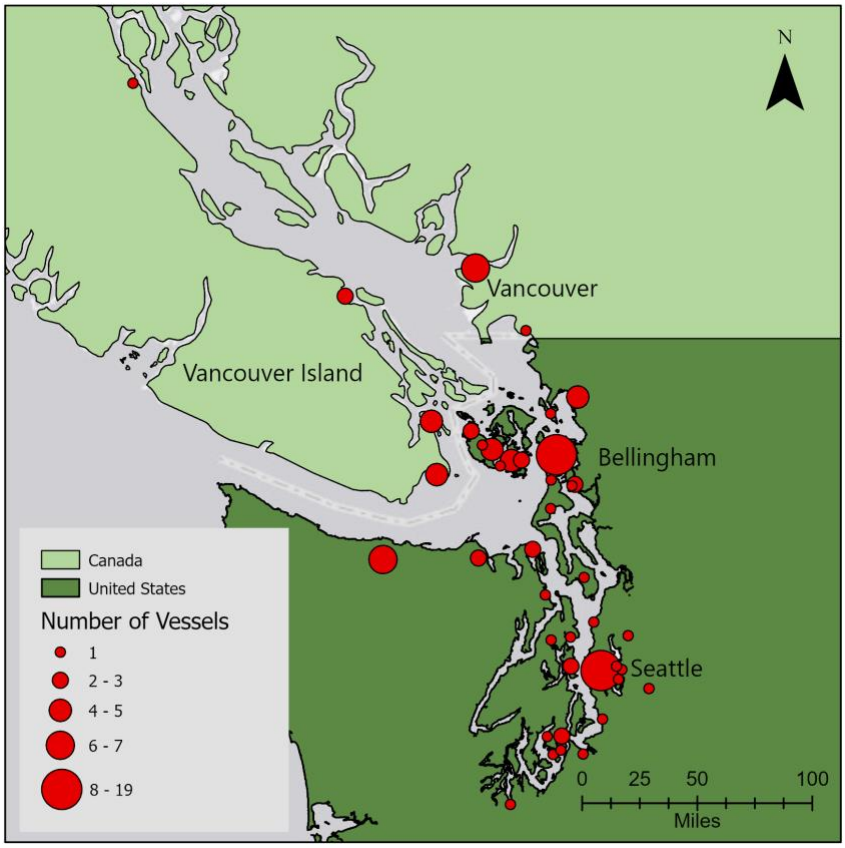


Figure 26: Recreational vessel home ports in the Salish Sea, as recorded by Soundwatch from May – September 2022.

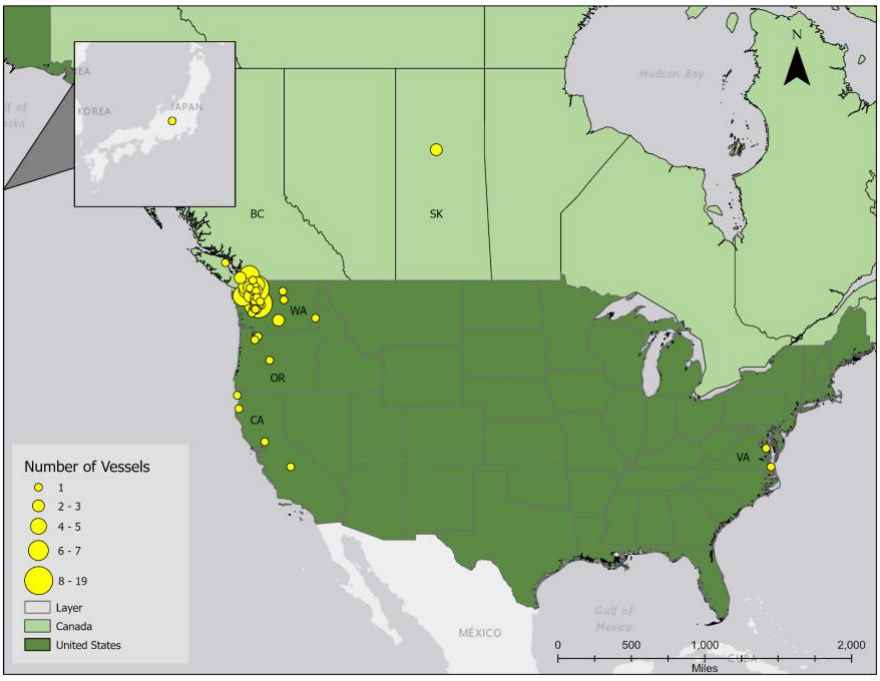
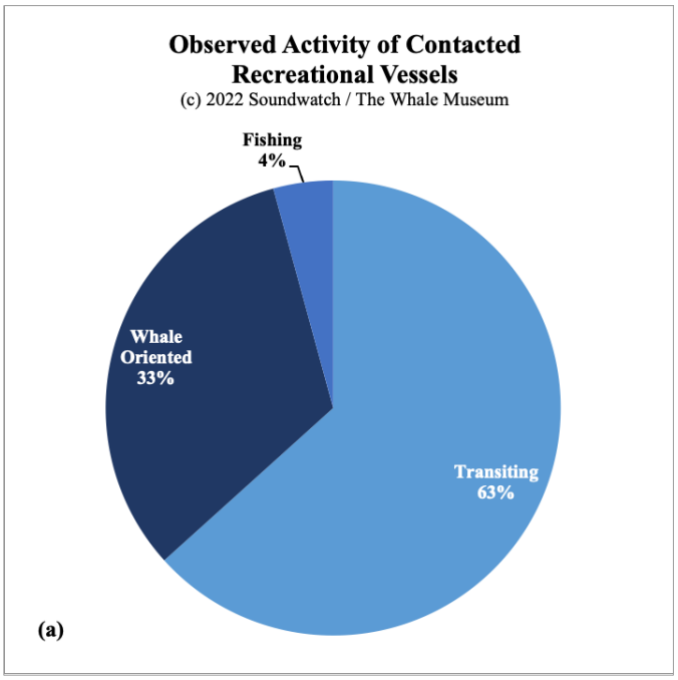


Figure 27: Recreational vessel home ports outside of the Salish Sea as recorded by Soundwatch from May – September 2022.

Of vessels contacted, *63%* were transiting through the area, *33%* were actively engaged or intended to engage in whale watching activities, and *4%* of vessels were engaged in fishing in proximity to killer whales (Figure 28a). This breakdown of activity of vessels suggests a continued increase in transiting activity compared to whale-oriented change from previous years (*38%*, *48%*, *58%* transiting in 2019, 2020, and 2021 respectively). When contacting recreational boaters, Soundwatch crews found that observed transiting activity was supported by the vessel's stated purpose of activity. However, when Soundwatch approached vessels observed to be engaged in whale watching, the vessel's stated purpose of activity did not match as closely (Figure 28b). This may be due to a lack of awareness or compliance of regulations, perception of Soundwatch as an enforcement entity, and consequent reluctance of the contacted vessel to share their intentions.



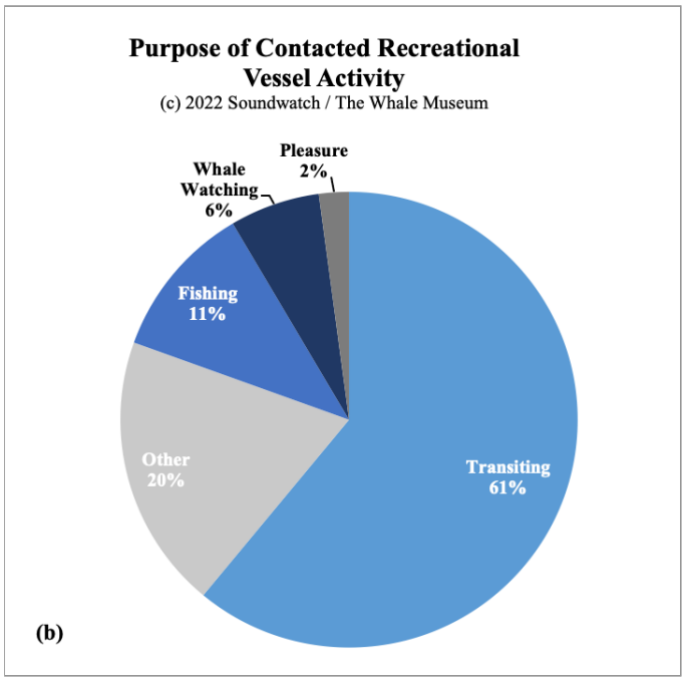


Figure 28a: Observed Activity of Recreational vessels contacted by Soundwatch in 2022.
Figure 28b: Recreational vessel contact responses to "Reason/purpose for visiting the region?" in 2022. "Other/Unknown" responses include individual contacts who did not disclose their purpose of activity.

In order to characterize the whale-oriented recreational vessel audience, Soundwatch asked boaters how they had located the whales they were watching that day. Out of *518* contacts, Soundwatch received *199* responses. These responses were compiled into categories shown in Figure 29. "Observing Whale Watch Vessels" includes such responses as following whale watch vessels to the present location, monitoring whale watch vessels on Automatic Identification System (AIS) or spotting a group of whale watch vessels not making way. "Social Media" includes responses related to platforms such as Facebook or Instagram, while "Word of Mouth" includes such responses as direct contact with friends or individuals who may have sighted the whales. Most boaters stated that they found whales "By Chance" distantly followed by "Observing Whale Watch Vessels" (Figure 29). This shift compared to 2021 agrees with generally reduced CWW presence in the vicinity of SRKW in 2022.

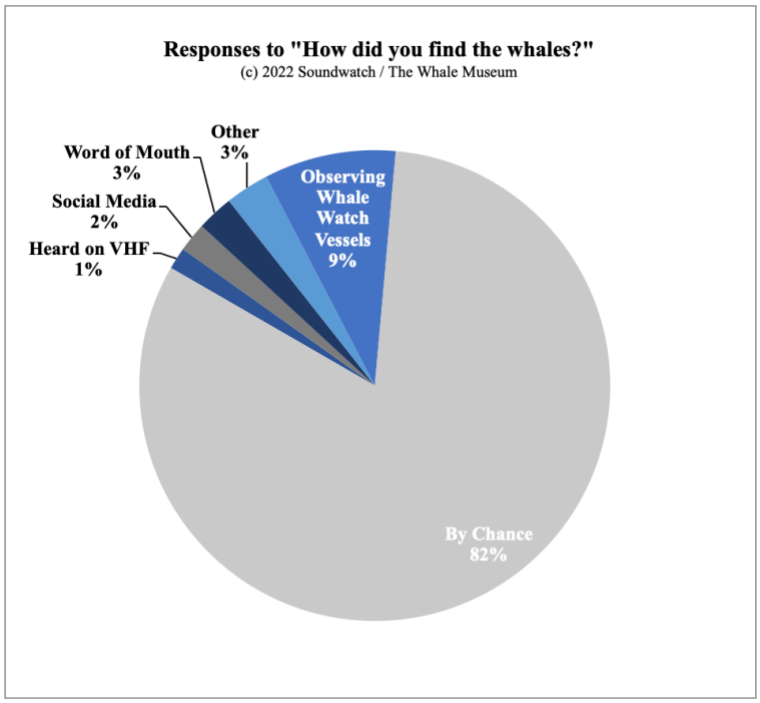


Figure 29: Recreational boater responses to "How did you find the whales?" during May-September 2022. This figure includes responses for all whale species including SRKW.

Off-Water Public Education

Soundwatch personnel conducted *16* "Dock Talks," an off-water public education platform with visual aids and outreach materials for distribution. During Dock Talks, Soundwatch and San Juan County Marine Mammal Stranding Network (SJCMMSN) contacted *616* individuals; of these contacts, *59%* were deemed to be correctly aware of the guidelines and laws (Figure 30). Dock Talks were typically held at the Port of Friday Harbor and Roche Harbor on a weekly basis.

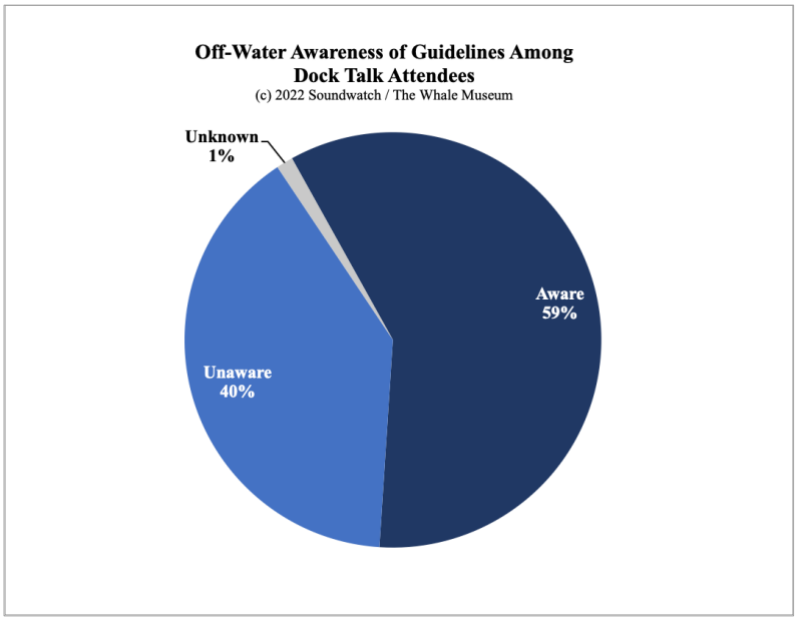


Figure 30: Off-water awareness of guidelines among Dock Talk attendees (n=616).

The Whale Museum

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 *178,421* museum visitors and education program participants, with *23,327* visitors in 2022. Materials were also given to approximately *2,150* people through either The Whale Museum's Memberships and/or Orca Adoption Program.

Kayak Education and Leadership 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). However, during the 2020 season the San Juan County Park suspended requirements to participate in KELP due to initial concerns over COVID-19 and social distancing measures. Most commercial kayak companies suspended or delayed operations until later in the 2020 season, using returning kayak guides with previous KELP proficiency. 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).

In January 2021, WDFW's CWWLP established training and rules for EcoTour kayak companies. This training was developed in collaboration with Soundwatch.

Social Media

The 2022 season saw continued growth of the Soundwatch Instagram page @soundwatch_twm. Soundwatch increased followership by an additional *106%* from 2021 to 2022, reaching local and international audiences. Ongoing effort is necessary to continue vital growth and establish a social media presence that will support Soundwatch education and outreach objectives.

Be Whale Wise Website

Soundwatch maintained the *Be Whale Wise* Outreach Toolkit along with other partners and stakeholders. The objective of the toolkit is to provide education and outreach resources to the public while encouraging engagement and comprehension of the regulations and guidelines. The toolkit is available to the public and can be accessed at https://www.bewhalewise.org/outreach-toolkit/

Whale Behavior

Killer Whale Attribute Data

Soundwatch collected killer whale behavior on the hour and half hour, totaling *434* killer whale behavior counts for the 2022 season. Behavioral categories were Modified Rest, Traditional Rest, Milling, Socializing (surface active), Traveling, and Foraging (Appendix K1 & K2). Evidence of prey was necessary to classify 'foraging' behavior. In the event that both SRKWs and Bigg's/Transient killer whales were within range of Soundwatch on the same day, preference was given to monitoring SRKWs.

Travel was the predominant behavior in all months and across both ecotypes (Figure 31a). SRKW were present in Soundwatch's study area with much greater frequency than in 2021 (Figures 31b, 31c). During the 2021 season, SRKW were observed by Soundwatch only during the months of July and September for a total of *13* days (Frayne, 2022). In comparison, Soundwatch observed SRKW, primarily J Pod, during all months of the 2022 field season for a total of *35* days, more than double the previous year's count (Figure 31c).

When SRKW were present, they utilized the same general areas within the Salish Sea, with the notable inclusion of traveling southeast down Tumbo Channel, a specific waterway between Saturna and Tumbo Islands not used in recent years, on more than one occasion. Soundwatch observed SRKW, particularly J Pod, grouping in flank-to-flank orientation while traveling south down the Strait of Georgia from the Fraser River/Tsawwassen. After reaching East Point on Saturna Island, the whales would typically spread out into Boundary Pass before gathering into smaller spread groups at Turn Point, Stuart Island.

As in previous seasons, SRKW continued to typically display wide spreading between individuals in foraging areas. However, Soundwatch observed and recorded more instances of flank grouping and traditional resting lines than in previous years. This behavior was primarily observed while traveling inbound in the Strait of Juan de Fuca and on the west side of San Juan Island near False Bay.

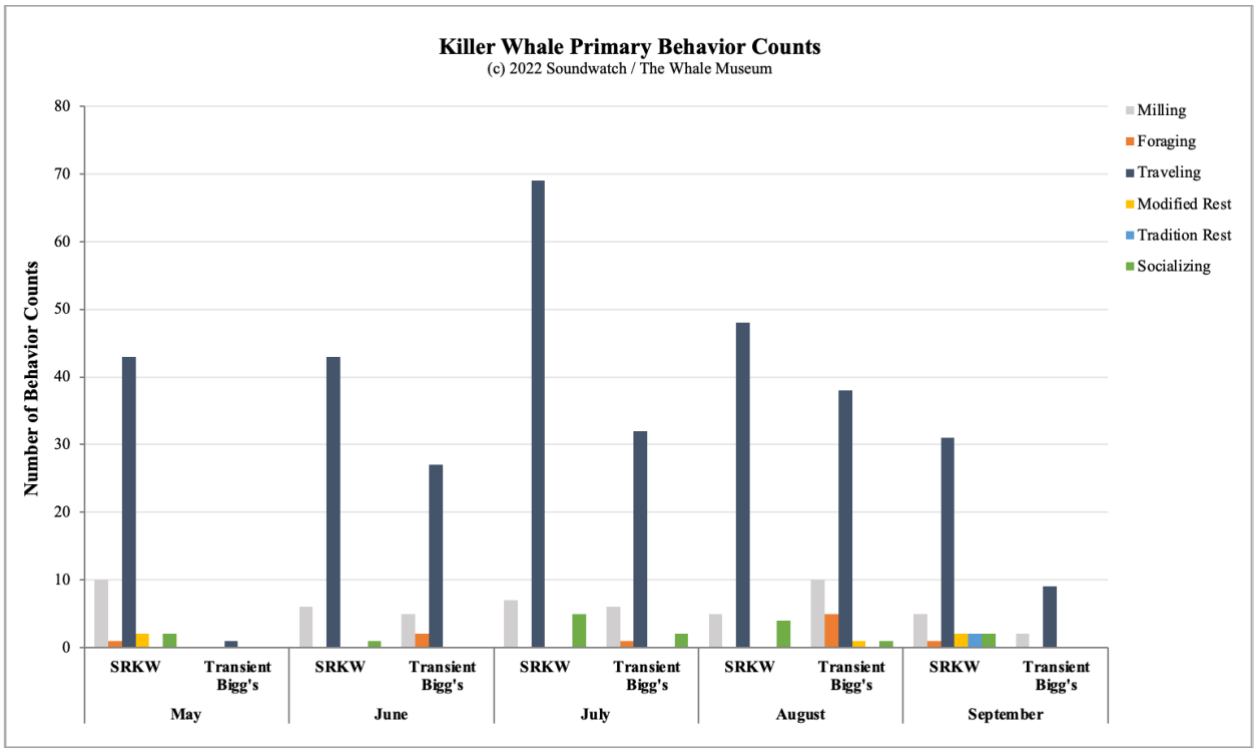


Figure 31a: Southern Resident and Transient killer whale behavior counts from May-September 2022 conducted near the hour and half hour by Soundwatch.

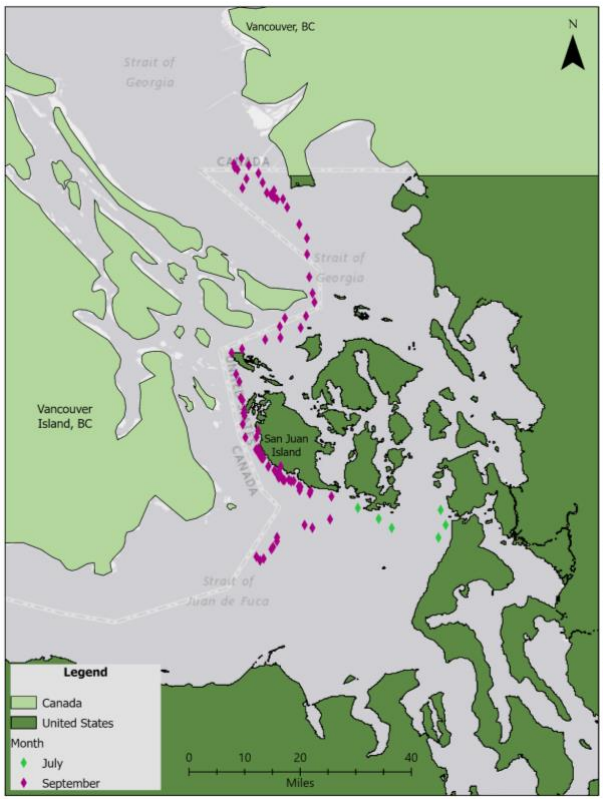


Figure 31b: SRKW presence by month in 2021.

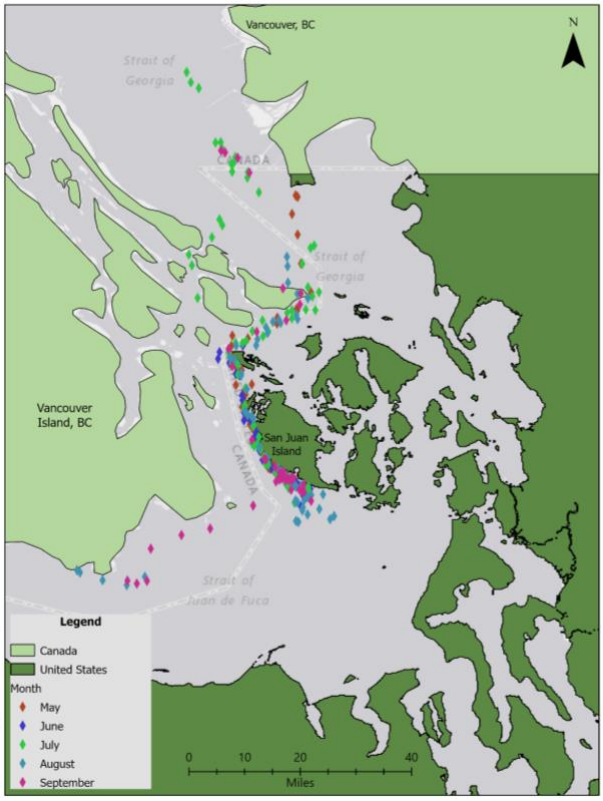


Figure 31c: SRKW presence by month in 2022.

Other Large Cetacean Attribute Data

Soundwatch recorded whale behavior data for all large cetaceans encountered during the 2022 season; *17* days (*61* data counts) opportunistically with Humpback whales and *3* days (*8* data counts) opportunistically with Minke whales. Figure 32 shows Humpback whale primary behaviors recorded by Soundwatch from May-September 2022. The most common primary behavior across all months was traveling. Foraging behavior would only be recorded if there was evidence of prey or obvious foraging behavior. Minke whale and gray whale data have been excluded due to low/no sample size for whale behavior.

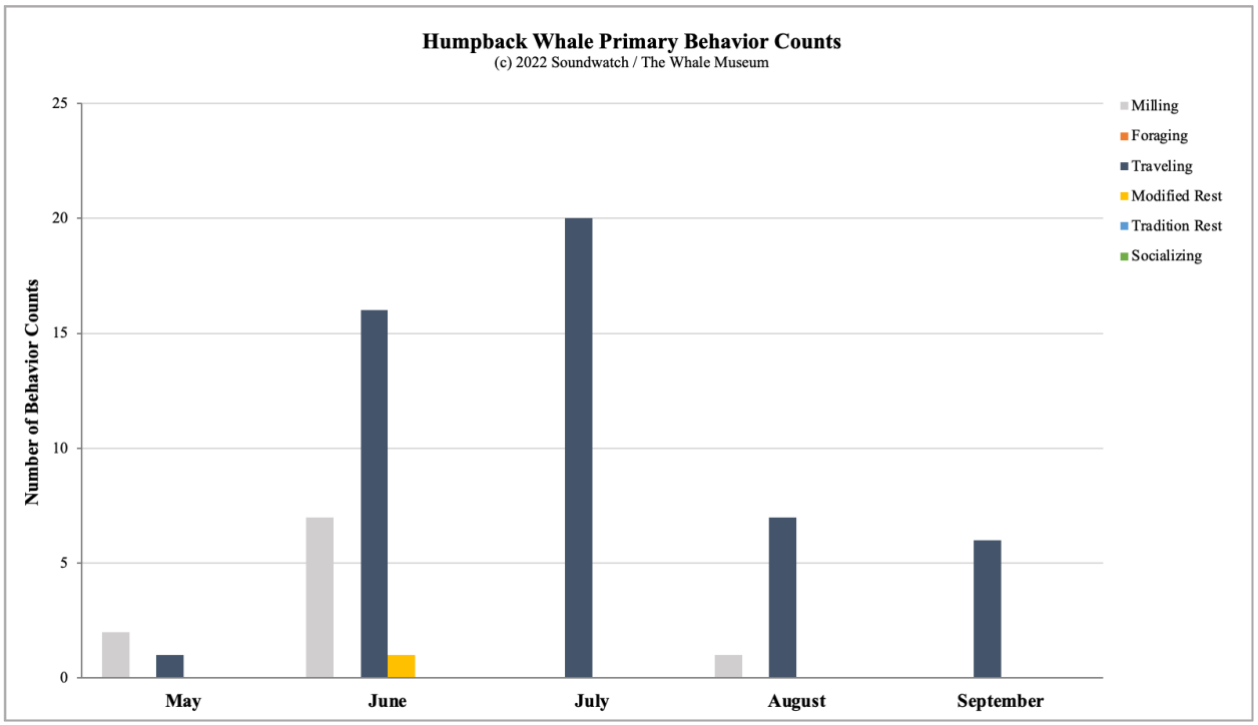


Figure 32: Humpback whale behavior counts from May-September 2021 conducted near the hours and half hour by Soundwatch.

Compliance and Incidents

Vessel Incident Data

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. A *vessel incident* is specifically defined as a driver of an EcoTour (commercial) 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. Incidents are recorded opportunistically as they are observed using a *Vessel Incident datasheet* (Appendix H). Soundwatch staff are conservative in recording incidents.

Soundwatch uses summary statistics to analyze annual vessel incident data (Table 1); while useful, there are some obstacles when comparing historical data due to adaptive management of regulations and guidelines. For example, in 2016 a vessel between 200-300 yards abeam of SRKWs would not be considered in violation, but the same action in 2020 would be recorded as an incident. Similarly, in 2019 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, now including more of the popular fishing grounds near Eagle Point. As a result, there are 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. 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 (trans-boundary) prior to July 2018 when Canada updated their federal guidelines to better coincide with the United States. However, today there are still discrepancies across the border in terms of cohesive regulations and guidelines.

During the 2022 field season, Soundwatch recorded *516* incidents for a total of *877* violations (Table 2). Supplementary incident numbers for EcoTour vessels are provided by Soundwatch's Canadian sister program, Straitwatch, for a total of *8* Canadian EcoTour incidents and *17* US EcoTour incidents in their area of response during the 2022 season (Cetus 2023).

Recreational private motors were responsible for *81%* of total recorded incidents, most frequently violating the 7kt speed limit when within one-half mile of whales (Figure 33). Sister program Straitwatch's incident data also agrees that recreational private motors commit the majority of incidents with the speed limit most frequently violated (Cetus 2023).

Soundwatch Observed All Vessel Behaviors Contrary to Guidelines and/or Regulations 1998-2022 (© 2022 Soundwatch/The Whale Museum)																									
Behavior Category	Yearly Incident Percentages																								
•Note Categories Not Used During All Years	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Leapfrogging	37%	31%	23%	1%																					
Under power within 0-100 yards of whales	6%	4%	5%	4%	5%	12%	9%	10%	12%	15%	12%	13%	12%	8%	4%	10%	9%	7%	9%	9%	2%	5%	9%	6%	3%
Stopped within 0-100 yards of whales														17%	8%	7%	13%	11%	12%	10%	2%	1%	0%	1%	1%
Under power within 100-200yards of whales														12%	10%	15%	12%	8%	14%	16%	9%	9%	9%	17%	4%
Stopped within 100-200yards of whales														18%	15%	6%	14%	13%	15%	14%	7%	1%	1%	3%	4%
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%	1%	7%	2%	1%	7%
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%	1%	<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%	0%	0%	<1%	<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%	2%	4%	3%	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%	7%	7%	8%	7%
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%	<1%	0%	5%	2%
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%	1%	0%	<1%	<1%
Other	1%	3%	3%	3%	14%	5%	15%	11%	10%	3%	2%	1%	1%	0%	1%	1%	0%	0%	0%	3%	13%	3%	0%	0%	2%
Within 220 yards of shore; whales present	4%	4%	4%	7%	2%	<1%	4%	1%	2%	2%	<1%	<1%	1%	1%	2%	1%	0%	0%	<1%	1%	<1%	0%	3%	0%	0%
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%	12%	11%	8%	11%	
Fast within 1/2 mile			3%	4%	9%	10%	10%	11%	16%	11%	13%	13%	6%	8%	9%	8%	11%	6%	6%	7%	35%	44%	44%	44%	
1st Approach head on, behind, or on shore			4%	2%	1%	<1%	1%	1%	2%	3%	2%	3%	1%	4%	1%	3%	2%	7%	5%	8%	0%	0%	0%	0%	
Kayaks spread out			<1%	3%	0%	<1%	1%	1%	1%	1%	1%	1%	<1%	2%	1%	1%	2%	<2%	<1%	2%	1%	0%	0%	0%	<1%
Kayaks with whales outside 1/4 SJI Zone			<1%	1%	0%	<1%	1%	1%	1%	1%	1%	1%	<1%	1%	<1%	<1%	0%	0%	<1%	<1%	<1%	0%	0%	0%	<1%
Kayaks paddling w/in 0-100 yds			3%	0%	0%	<1%	<1%	1%	1%	<1%	1%	1%	1%	1%	<1%	0%	<1%	1%	3%	<1%	3%	3%	<1%	1%	<1%
Kayaks paddling w/in 100-200 yds													1%	1%	1%	1%	1%	1%	3%	<1%	0%	0%	0%	0%	<1%
Kayaks parked on headland														<1%	<1%	0%	0%	0%		0%	0%	0%	0%	0%	0%
Within 300 yards of SRKWs (Washington 2019)																						2%	<1%	<1%	3%
Within 400 yards of killer whales (Canada interim order 2022)																						10%	9%	4%	6%
Total %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	<1%	3%
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	749	365	414	517
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	290hr	498hr	490hr	492hr

Table 1: Summary of vessel incidents as defined by *Be Whale Wise* Guidelines and federal/state vessel guidelines in the U.S. and Washington State from 1998-2022.

Incident Type	EC	EU	EK	PK	PM	PS	PA	CA	R	GC	GD	MC	MF	MM	MW	MX	MY	O	Total
100 yards under power				1	22														23
200 yards under power	3	3		1	25	3													35
300 yards under power (SRKW WA)		5		1	39	4							2						51
400 yards under power (CAN)		1		2	16	3							1	1			1		25
400 yards in the path	2	6	1	2	68	9						2	1		1	1	1		94
traveling behind whales 100-400 yards		6		1	25	3													35
shutdown within 100 yards	1	0			10													1	12
shutdown within 200 yards	7	9			18	1												1	36
shutdown within 300 yards		2			8														10
shutdown within 400 yards		1			3	2													6
inshore of whales	2	5			52	2												1	62
within eighth mile of shore																			0
aircraft under 1000 feet							4	11		1									16
drone violation																			0
fast approach within 400 yards	4	6			17														27
fast departure within 400 yards	3	2			18													1	24
over 7kts within 1/2 nm (1km) of whales	13	15			272	2			2	4	1	6	7	1	1	1	2	3	330
fast within 1/4 nm of whales					1														1
high speed within 1/8 nm of whales																			0
fishing within 100 yards					1														1
fishing within 200 yards					9														9
within SJI No-Go Zone (WA)		4			49	7													60
paddling within 100 yards of whales			3	7															10
kayaks outside No-Go Zone (WA)				1															1
spread out kayaks with whales			3																3
within half mile of Lime Kiln Lighthouse					3														3
within interim sanctuary zone (CAN)					1														1
within 200 yards NWR			1		1														2
Total	35	65	8	16	658	36	4	11	2	5	1	8	11	2	2	2	4	7	877

Table 2: Summary of vessel incidents in 2022 by incident type and vessel involved in the incident. See Appendix L for Vessel Codes.

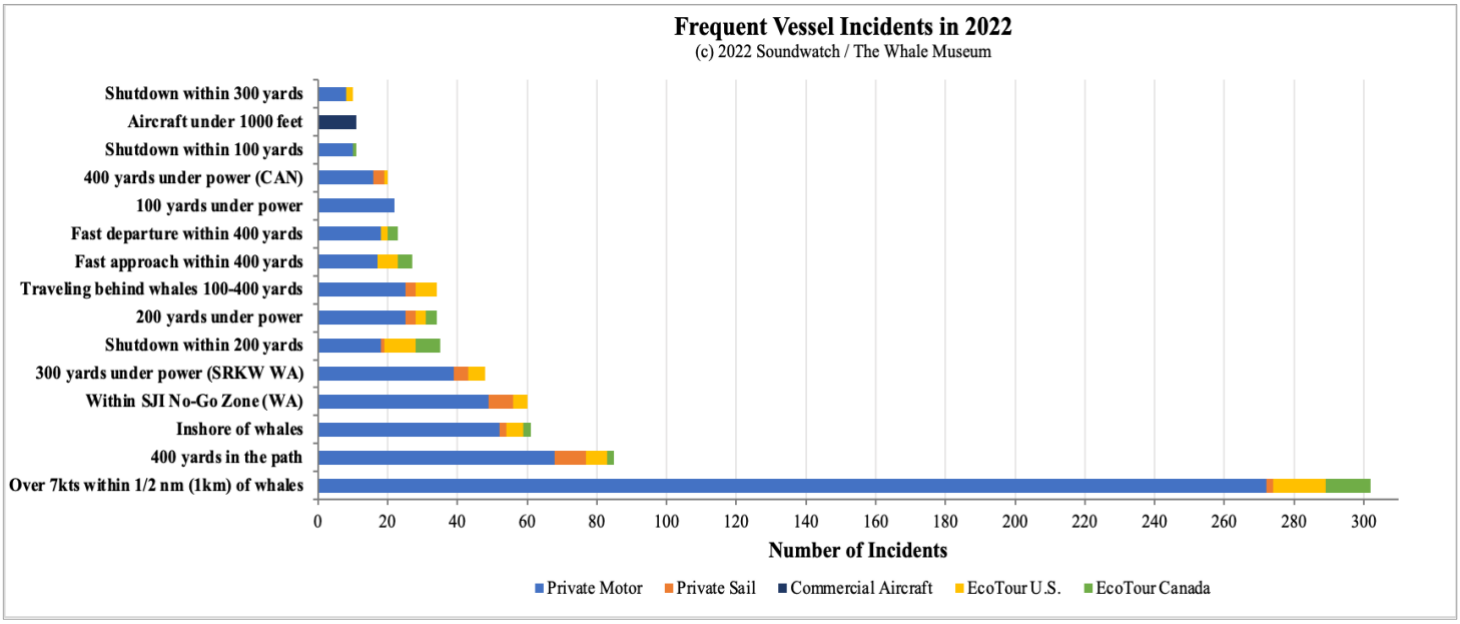


Figure 33: Most frequent vessel incidents observed by Soundwatch from May-September 2022 by incident and vessel categories.

Areas with high incident density overlap with areas of whale habitat, boating activity, and Soundwatch presence to opportunistically record incidents while conducting research (Figure 34). Vessel activity during incidents was observed and categorized as transiting, whale oriented, or fishing. Of the *517* vessels, *49%* were transiting, *48%* whale oriented, and *3%* actively fishing (Figure 35). The volume and activity of transiting vessels likely contributed to the number of speed-related incidents reported, particularly the 7kt speed limit. Transiting vessels often appeared to be unaware of their vicinity to whales, and either unequipped with a VHF radio or unwilling to respond to attempted contact.

The area with the most vessel incidents observed by Soundwatch in 2022 was along the west side of San Juan Island (Zones 1,2, and 3) (Figure 36). This was likely a result of SRKW presence concentrated near False Bay, overlapping with an area of historically heavy vessel traffic (recreational and commercial) and high potential for incidents. The 2022 incident map depicts a pattern more closely related to 2020 and earlier, suggesting that lack of SRKW presence and increased Bigg's killer whale presence during the 2021 season was a primary driver of atypical incident density recorded in San Juan Channel (Frayne, 2022).

Of the incidents recorded, *62%* were U.S. Vessel Regulation violations; **Vessels Within 200 Yards of Whales** were *13%* and **In the Path of Whales** were *11%*. The greatest number of incidents recorded was under the Washington State Law of **Under 7 knots within a half mile of SRKWs** at *38%*.

In 2022, **Vessels within 200 Yards of Whales** incidents (*13%* of all incidents) were broken down by;

- Vessels Stopped within 0-100 yards (*1.4%*) and Vessels Stopped 100-200 Yards (*4.1%*) were committed by *60%* recreational vessels, 17*%* Canadian EcoTour commercial vessels, and *19%* U.S. EcoTour commercial vessels.
- Vessels Under Power Within 100 Yards (*2.6%*) and Vessels Under Power Within 200 Yards (*4.0%*) were made by *90%* recreational vessels, *5%* Canadian EcoTour commercial vessels, and *5%* U.S. EcoTour commercial vessels.
- Fishing Within 100 Yards (*<1%*) and Fishing Within 200 Yards (*1%*) were committed by recreational vessels (*100%*).

Under Power Following Whales Within 400 Yards (*4%*) was committed by recreational vessels (*83%*).

In 2022, **In the Path of Whales** incidents (*11%* of all incidents) were *84%* recreational vessels and *6%* U.S. commercial vessels. **Over 7 knots within a half mile of whales** incidents (*38%* of all incidents) were committed by recreational vessels (*83%*), maritime cargo/ferries (*5%*), U.S. EcoTour vessels (*5%*), and Canadian EcoTour vessels (*4%*).

As in previous years, private recreational vessels committed the majority of incidents (81*%*), distantly followed by U.S. commercial vessels (*7%*), Canadian commercial vessels (*4%*), commercial aircraft (*1%*), commercial fishing vessels (*1%*), maritime cargo/ferries (*<1%*), enforcement (*<1%*), private aircraft *(<1%*) and research vessels (*<1%*) (Figure 33).

Whale watching activities ('whale oriented') accounted for *48%* of vessel incidents when comparing vessel activities, while vessels transiting ('transiting') accounted for *49%* of incidents

around whales (Figure 35). Whale oriented vessels still committed both speed and distance violations (Figure 37). Variations in maximum vessel numbers and average vessels on scene are likely due to annual variation in whale presence, social cohesion, and awareness. These factors will reduce the number of incidents recorded by Soundwatch (Figure 38). 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 low incident counts do not necessarily mean improved boater behavior.

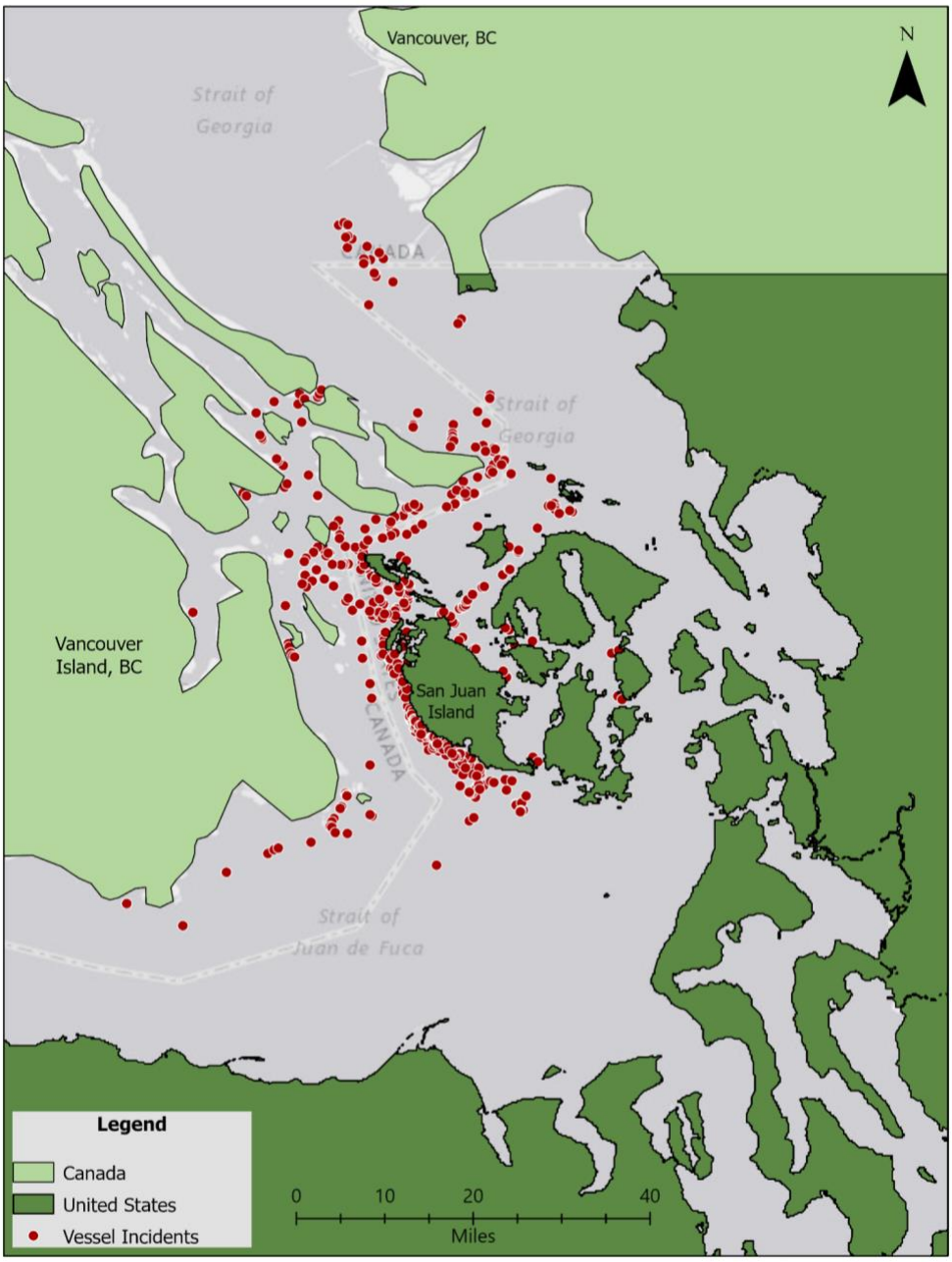


Figure 34: Total vessel incident locations observed by Soundwatch from May – September 2022. Single points can represent multiple violations, *N=516*.

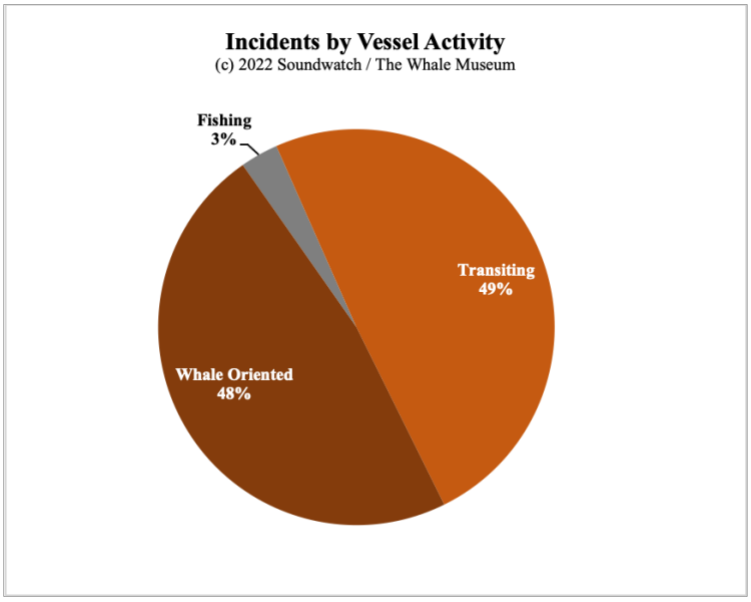


Figure 35: Percentage of all vessel incidents by vessel activity observed by Soundwatch May-September 2022.

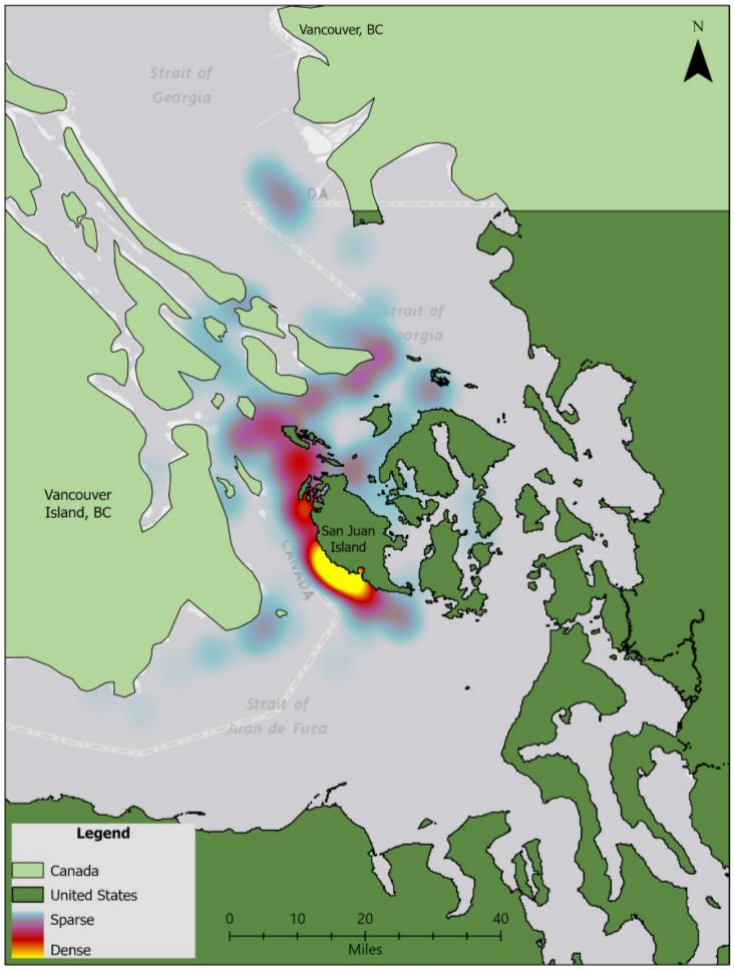


Figure 36: 2022 Vessel incident heat map, with blue colors having fewer total incidents than yellow colors. *N=516 incidents*.

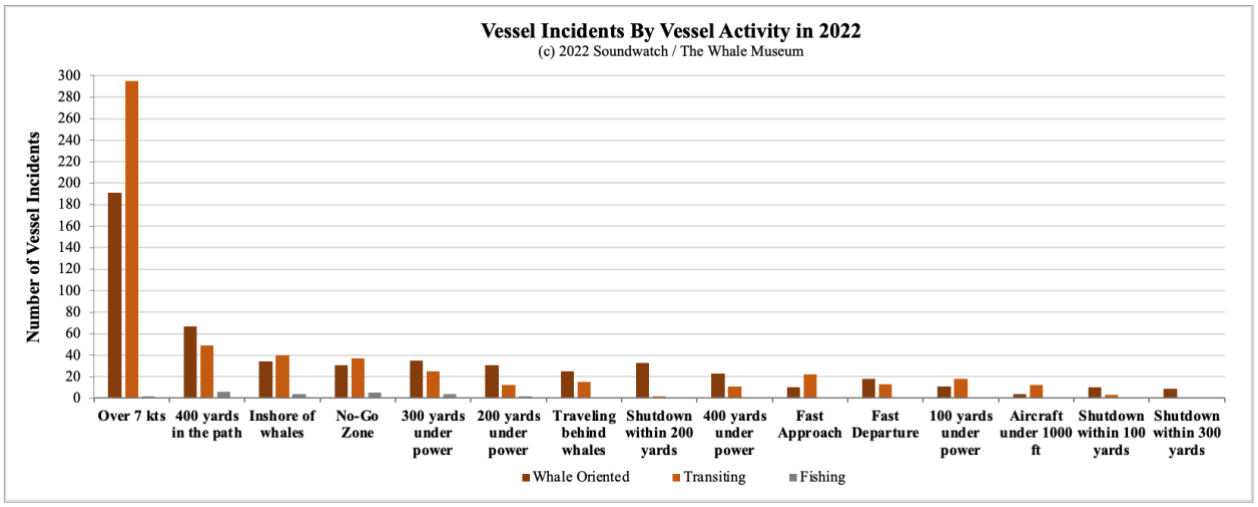


Figure 37: Most frequent vessel incidents observed by Soundwatch from May-September 2022 by incident type and vessel activity.

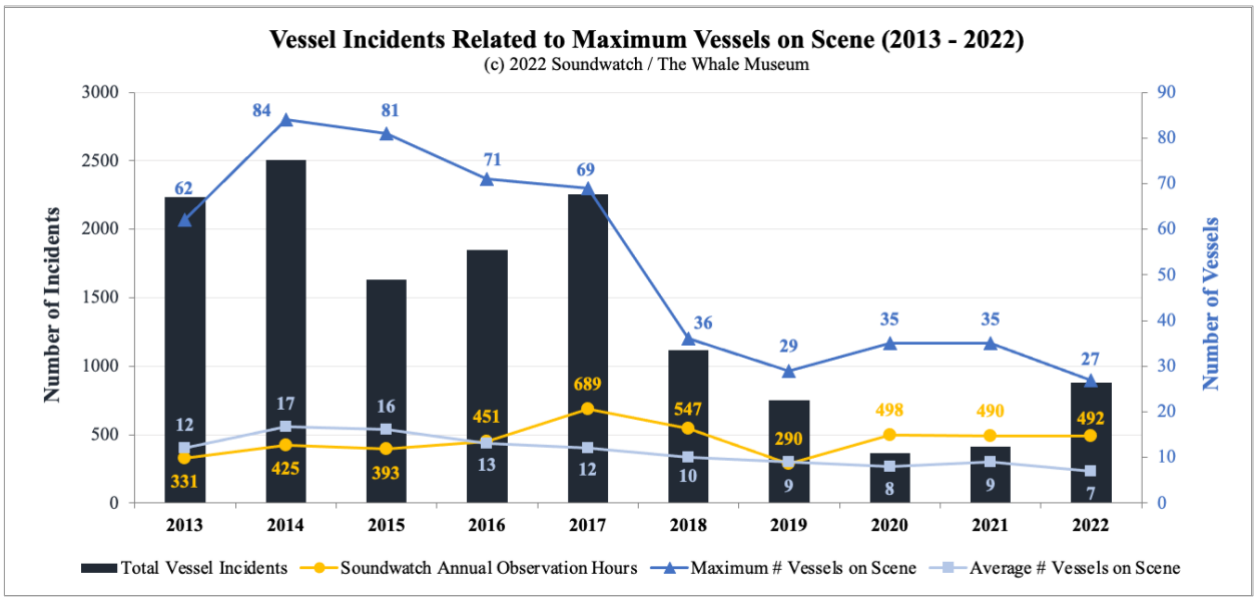


Figure 38: Average, Maximum, and Total number of vessels on scene with killer whales in the Salish Sea plotted with number of vessel incidents and Soundwatch annual observation hours from 2013-2022.

Vessel Incident Trends

Vessel Type Incident Rates

Incident data was recorded by Soundwatch for *503* vessel counts with *877* incidents. Therefore, the overall incident rate is: 2 x 877/503 resulting in *3.48* total incidents per hour for the 2022 season (Figure 39-41). Soundwatch collects this data on the half-hour, and therefore it is necessary to multiply by 2 in order to convert to an hour rate. To determine vessel incident rates per vessel type: 2 x 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. From 2009 to present, recreational vessels remain the most likely vessel type to commit all incidents (Figure 39). Recreational incident rates were also significantly higher than incident rates of any other

vessel type (Figure 40). As in previous years, the speed regulation (less than 7 knots within one half nautical mile) remains the most frequently violated (Figure 41a).

Incident data specific to SRKWs was recorded by Soundwatch for *285* vessel counts (excluding *4* initial on-scene assessment counts outside 30-minute marks) with *560* incidents, yielding *3.93* SRKW-related incidents per hour during the 2022 season. SRKW-specific incident rates by type also differed from overall incident rates by type, although the speed violation remains the violation with highest rate of incident (Figure 41b).

Incident data specific to Bigg's Transient killer whales was also analyzed, for *145* vessel counts with *216* incidents, yielding *2.98* Bigg's-related incidents per hour during the 2022 season. Speed-related violations remain the highest of incident rates for Bigg's killer whales as well, followed by distance violations specifically for 200 yards (Figure 41c). As of 2022, U.S. federal regulations for both Bigg's killer whales and SRKW require boaters to maintain a minimum distance of 200 yards, as compared to the Washington state requirement of 300/400 yards for SRKW. Therefore, a recreational vessel within 400 yards of a Bigg's killer whale while in U.S. waters would not be considered a violation. However, if that same recreational vessel observed Bigg's killer whales within 400 meters in Canadian waters, they would be considered in violation of Canadian regulations. It is worth noting here that many boaters are not able to confidently identify different killer whale ecotypes, and so it must be encouraged to treat any unknown killer whale as an endangered whale.

Cetus Research & Conservation Society's Straitwatch stewardship program also records incidents. Straitwatch incident methods prescribe a 20-minute scan every 2 hours. During the 2022 season, Straitwatch recorded an overall incident rate of *6.57*, a notable decrease when compared to the overall incident rate of *13.23* in 2021 (Cetus 2023) This may be a result of (1) CWWLP rules, (2) monitoring SRKW in areas with typically fewer recreational vessels (e.g., Strait of Georgia), and (3) concentrated monitoring efforts for SRKW over other large cetaceans due to increased SRKW presence in 2022. Straitwatch recorded an incident rate of *7.6* for SRKW and *6.8* for Bigg's killer whales (Cetus 2023).

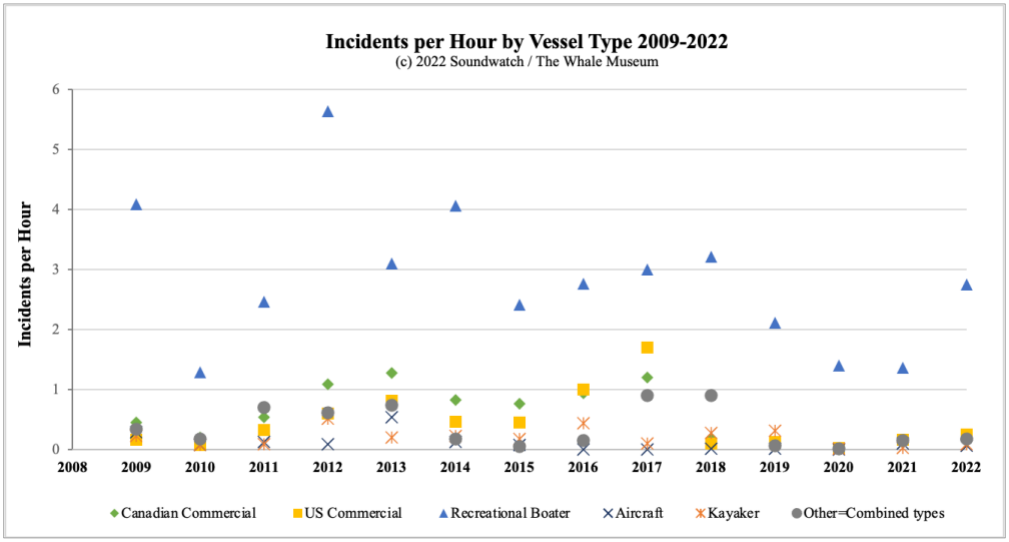


Figure 39: Trend from 2009 – 2022 Guideline and Regulation incidents per hour by vessel type.

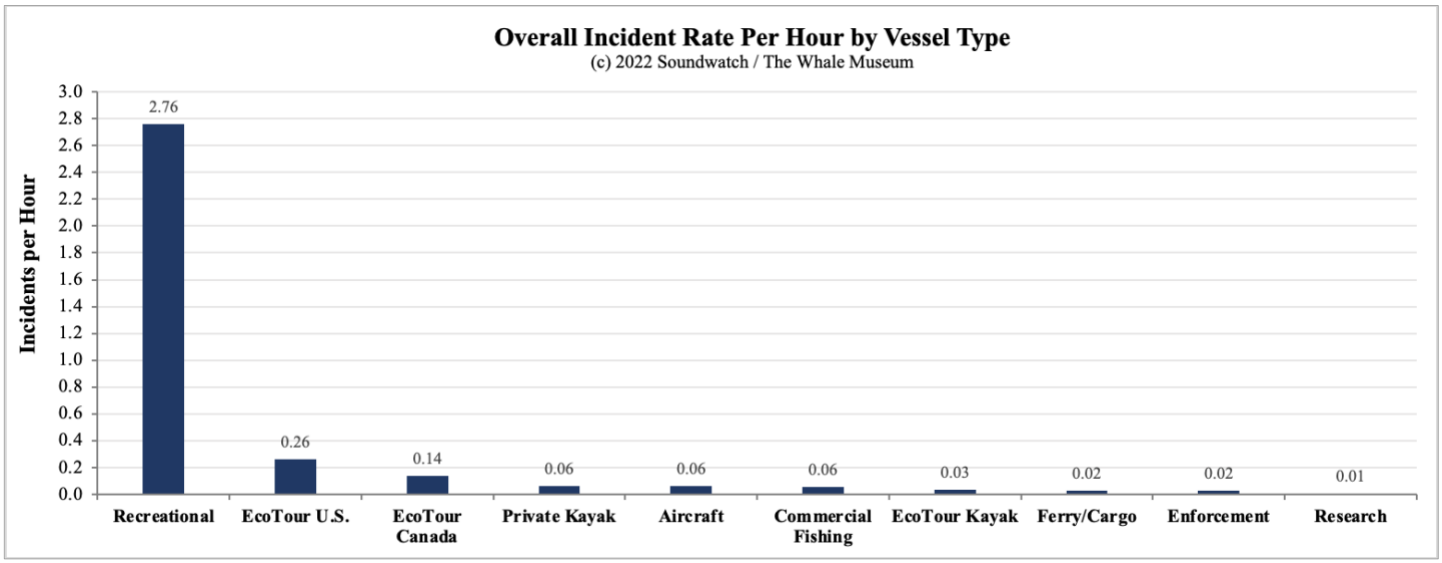


Figure 40: 2022 vessel incidents per hour by all vessel types.

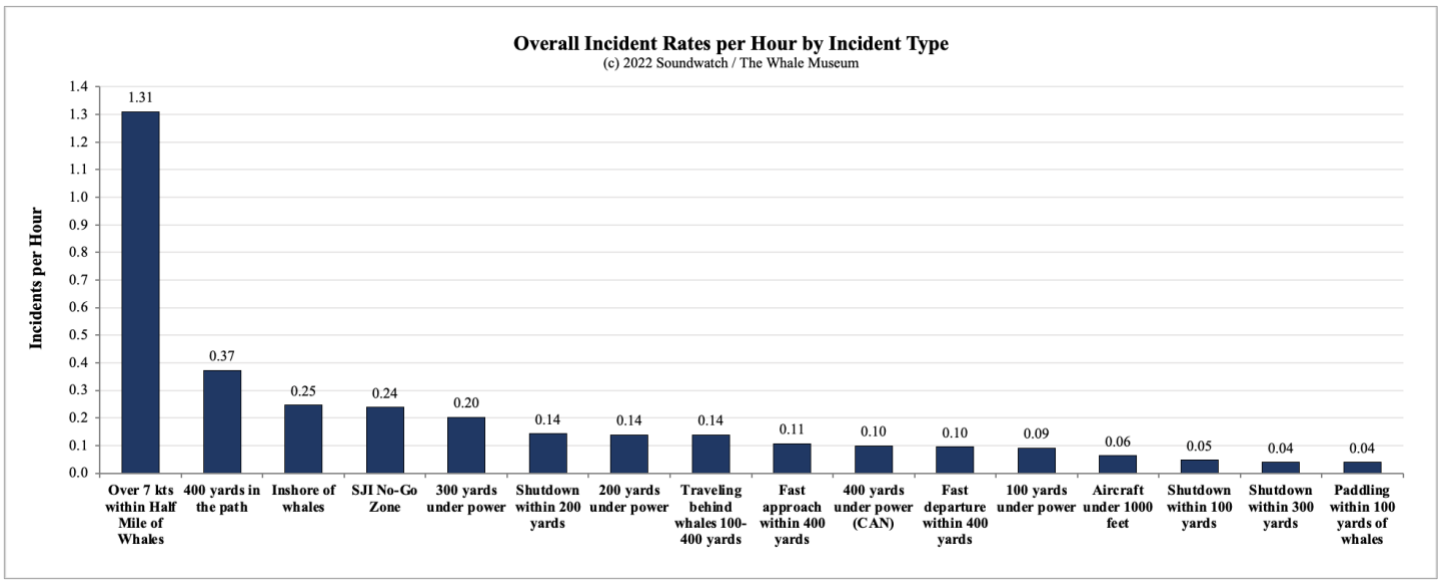


Figure 41a: 2022 vessel incident rates per hour by incident type.

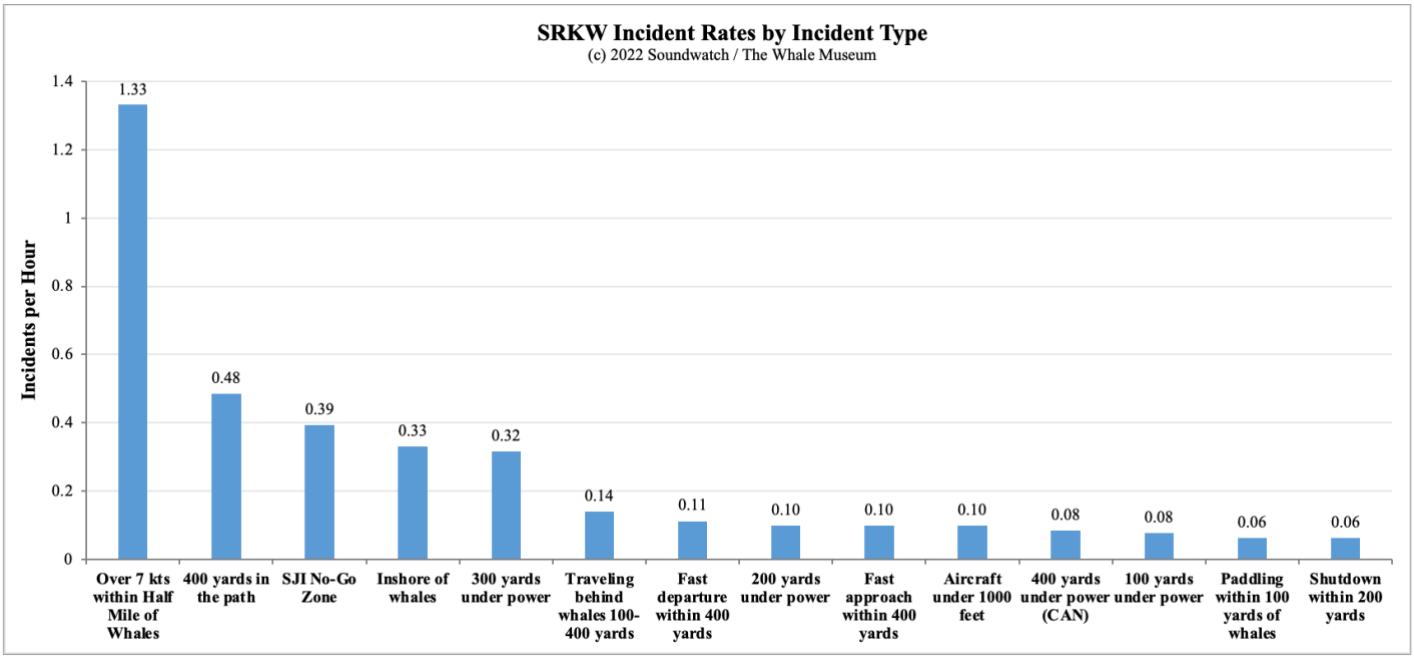


Figure 41b: 2022 SRKW-specific vessel incident rates per hour by incident type.

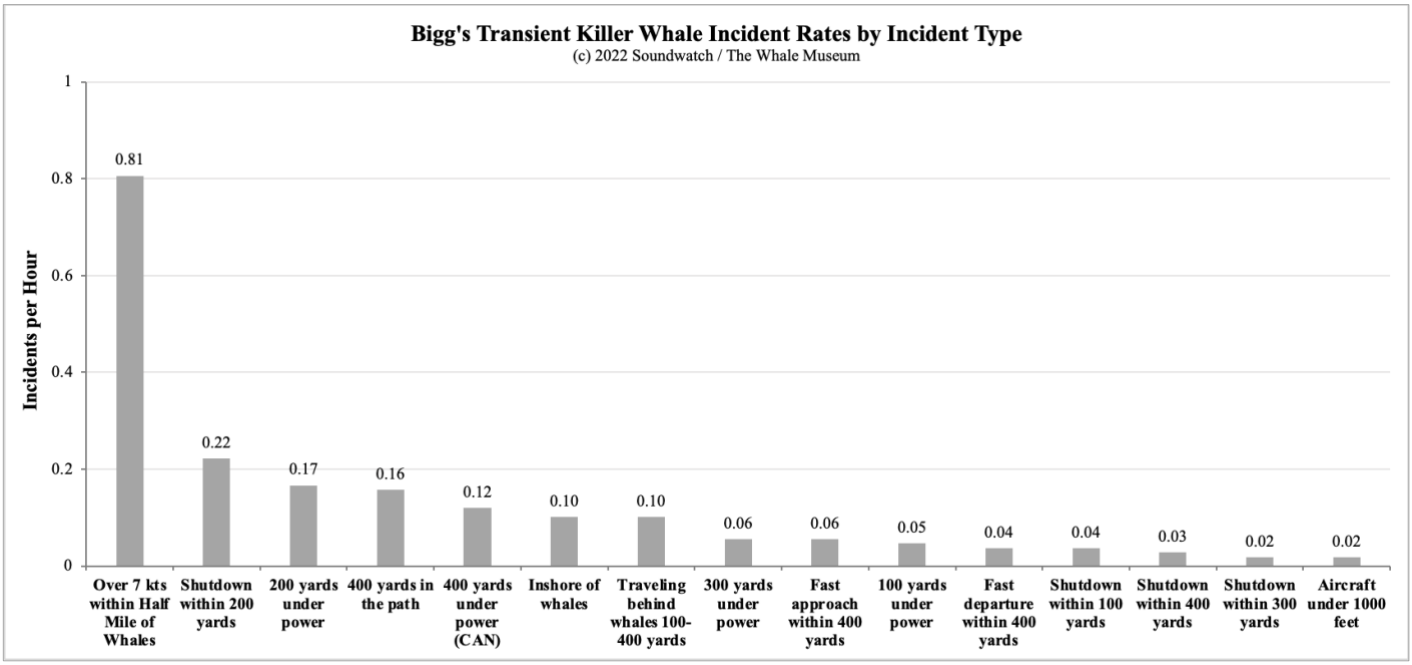


Figure 41c: 2022 Bigg's (Transient) killer whale-specific incident rates per hour by incident type.

Enforcement

Soundwatch vessel count data recorded *29.5* hours over *22* days with maritime law enforcement agencies on scene, *3* days of which multiple agencies were present; *0.5* hours with Canadian Coast Guard, *1* hour with USCG, *1* hour with San Juan County Sheriff, *4* hours with Canadian Department of Fisheries and Oceans, *5* hours with NOAA Enforcement, and *18* hours with WDFW.

As in previous years, Figure 42 displays a greater level of compliance when law enforcement was monitoring the vicinity (half-mile) of whales. Figure 42 is a simple ratio of all incidents per hour when enforcement agencies were present or absent, across all Soundwatch data counts. However, enforcement was only present for *~11%* of total Soundwatch vessel counts. A time-corrected total incident rate was calculated using the number of vessel counts when enforcement was present (*n=56*) and number and type of incidents (*n=385*) that occurred specifically during those counts for improved comparison (Figure 43). Across all vessel categories, vessel incidents increased with the presence of enforcement. This relationship is one of correlation, not causation. It is important to note the following factors influencing this data: Soundwatch data sampling, enforcement mission, and coordination of effort. Soundwatch usually encountered and recorded enforcement presence while monitoring whales in areas of high vessel traffic overlapping with core whale habitat, such as the west side of San Juan Island where incidents were most frequently observed. The role of enforcement in the context of SRKW recovery is typically to respond in areas and times of greatest need – generally regions with high potential for incident violations. Additionally, enforcement was present with whales more than is reflected by Soundwatch data. Due to coordination between Soundwatch and WDFW, enforcement and monitoring vessels were intentionally spread out to increase education and interception of vessels near multiple or widespread groups of whales. Soundwatch and WDFW frequently communicate to avoid being in the same place with the same whales in the interest of covering a wider range with limited resources.

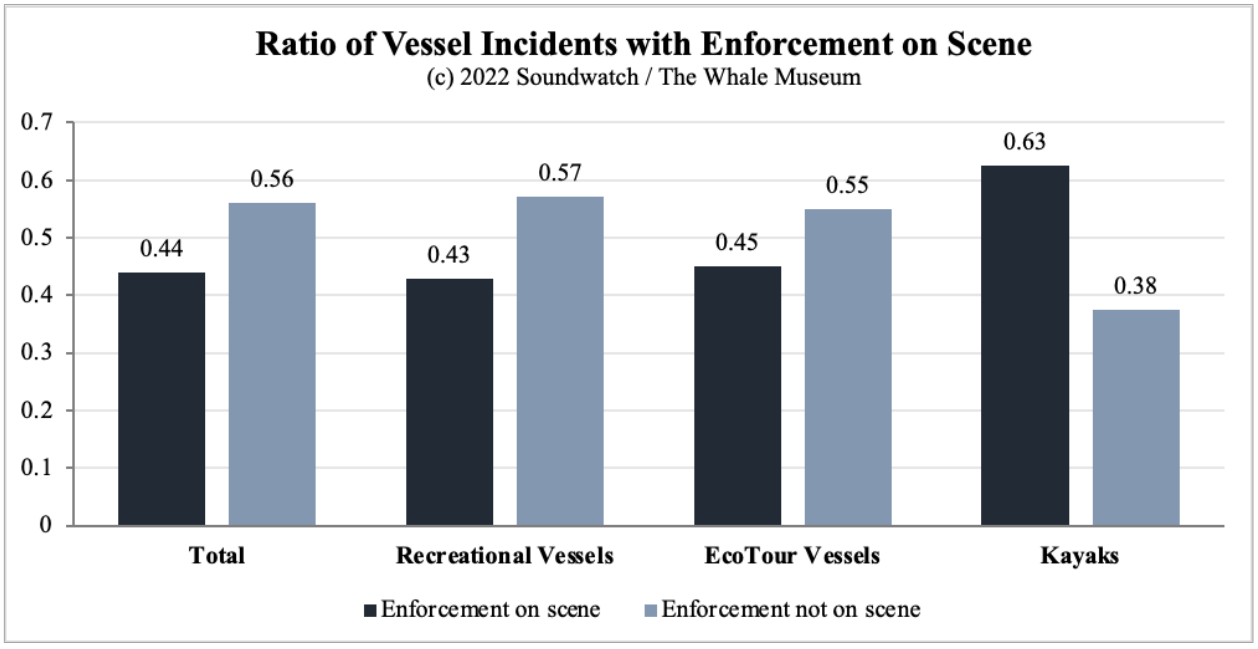


Figure 42: Ratio of incidents recorded with Enforcement on scene vs Enforcement not on scene.

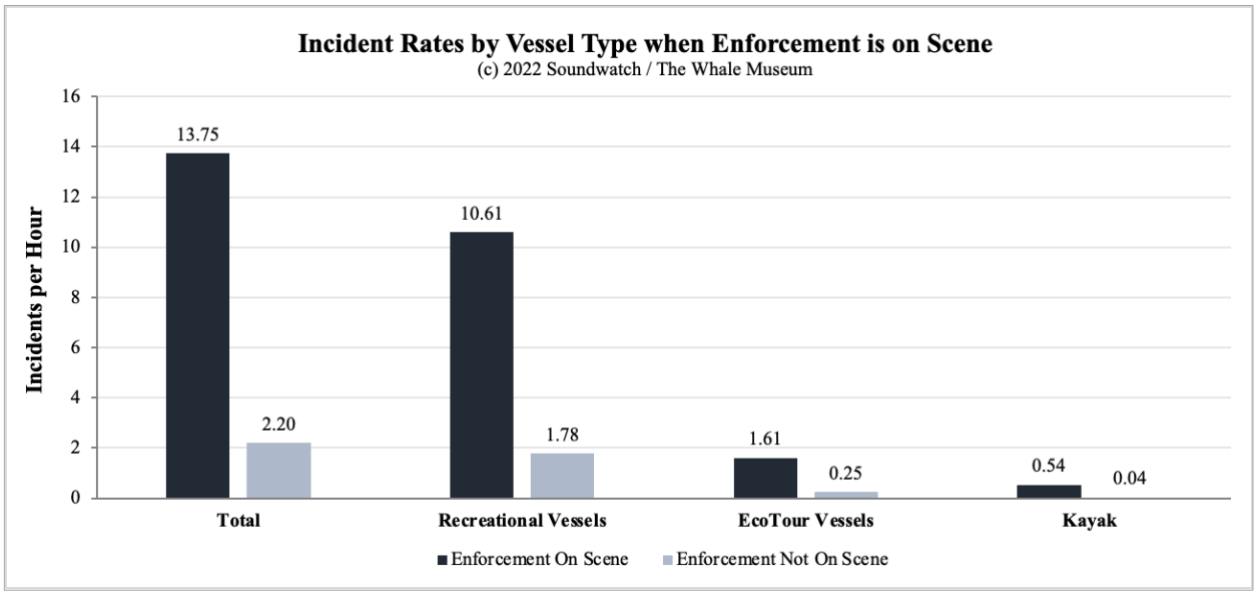


Figure 43: Incident rates by vessel types with Enforcement on scene and with Enforcement not on scene with whales when time-corrected for enforcement presence. Although it appears that incident rates increase in the presence of enforcement, this data is a result of enforcement response in the context of SRKW recovery; to focus presence in areas and times of greatest need – generally regions with high numbers of vessels and high potential for incident violations.

Whale Warning Flag

The Whale Warning Flag was introduced by the San Juan County Marine Resources Committee in 2018. One frequently expressed concern is that the whale warning flag may act as a means to attract vessels to the whales; however, data suggests that the Whale Warning Flag does not act as an attractant to recreational vessels to draw them to the presence of whales, as there has not been a significant increase in the average number of vessels observed with whales since the flag's introduction (Figure 16a).

In 2022, the average number of whale warning flags within a half mile of all whale species was *2.13* flags with a max of *8* flags. EcoTour (Canadian and U.S. commercial wildlife vessels) had an average of *0.64* flags and a maximum of *6* flags within a half mile of all whale species, a decrease from an average of *1.43* flags and a maximum of *7* flags in 2021. Recreational vessels flew an average of *0.04* flags and a max of *3* flags, a slight increase from an average of *0.03* flags and max of *2* flags flown by recreational boats in 2021. Other vessels had the highest average of *1.44* flags and a max of *6* flags within half a mile of all whale species (Figure 44).

Other vessels include Soundwatch, which always flew a whale warning flag and research permit flag when on scene with whales, and other monitoring and research vessels. In *37%* of boat counts Soundwatch was the only vessel flying a whale warning flag (Figure 45).

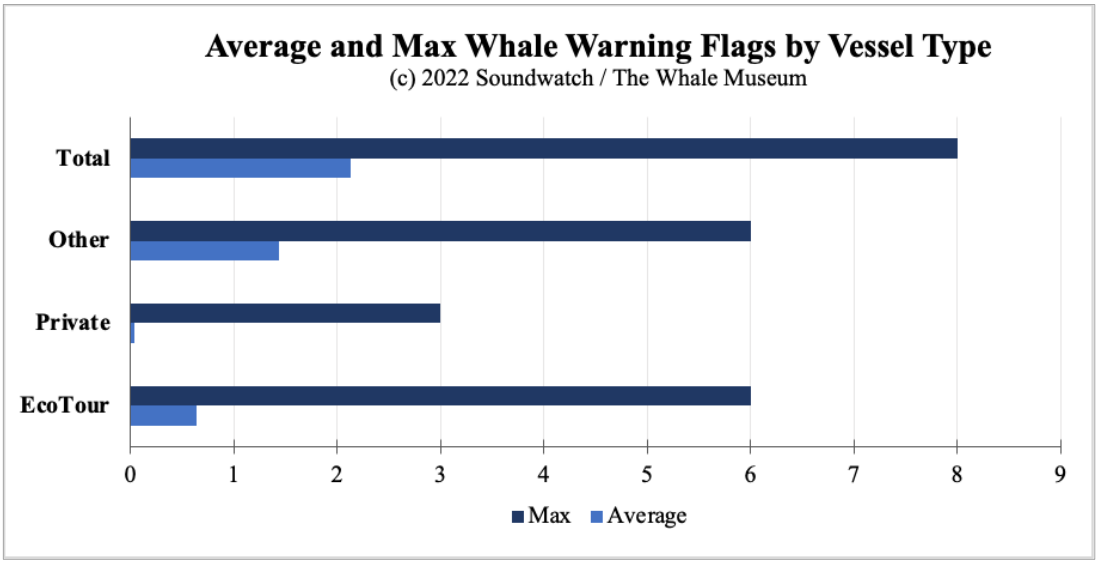


Figure 44: Average and max of Whale Warning Flags within a half mile of whales by vessel type in 2022.

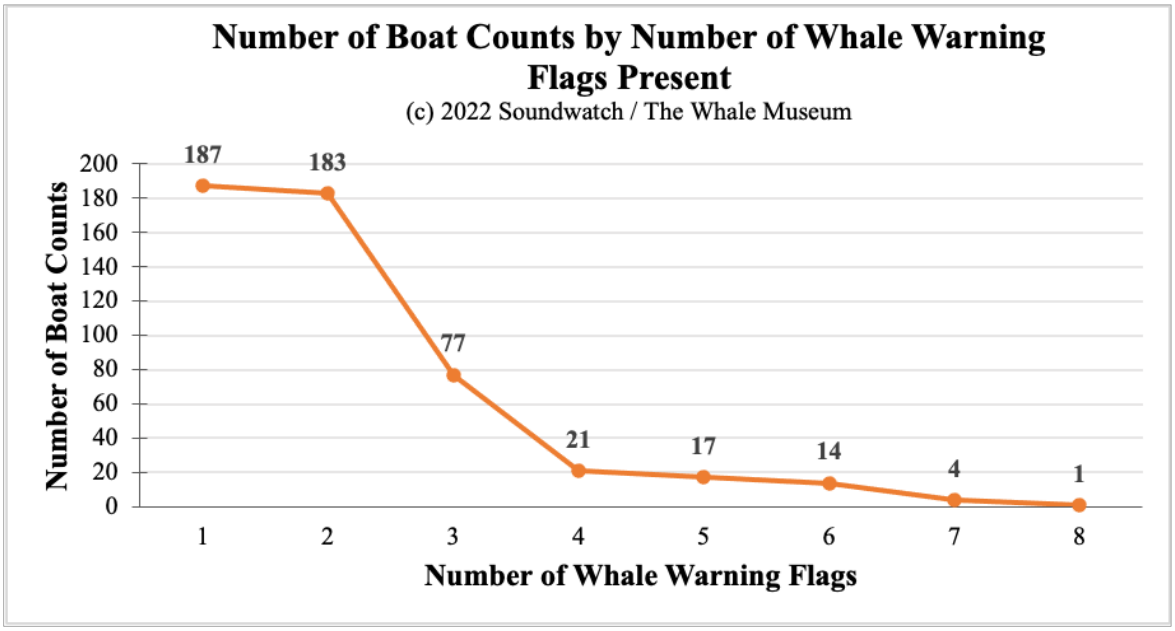


Figure 45: Number of Boat Count with number of Whale Warning Flags present in 2022.

As stated earlier, Soundwatch recorded *517* vessel incidents for a total of *877* violations during the 2022 season. Since Soundwatch always flew a whale warning flag when present with whales, all incidents recorded were with at least one flag present. There were *559* (*64%*) incidents recorded when there was at least one other flag besides Soundwatch flown. When vessel incidents are displayed graphically against the number of Whale Warning Flags present one might assume that fewer incidents would be observed in the presence of more flags. This may be true, but when compared to boat counts by number of flags present the trend is very similar in that there are fewer vessel incidents when there are more flags due to the fact there were fewer boat counts with higher numbers of flags (Figure 47). When plotted, the negative relationship between number of vessel counts and vessel incidents is comparable with negative slopes and

strong trends (R=0.78 and R=0.73) (Figure 46). This further suggests that the reduction in vessel incidents as the number of Whale Warning Flags increase is due to the smaller sample size of boat counts with >7 Whale Warning Flags present. However, when there were greater than 7 flags present no incidents were recorded. This could be due to higher recognition and awareness of whales' presence by boaters due to the sheer number of vessels present. It could also be due to the high proportion of EcoTour vessels present in these scenarios, which may also serve as an indication of whales in the vicinity (Figure 29).

Incident rates generally decreased from 2017 through 2020 but have increased since 2021 (Figure 38). These rates are calculated by vessel incidents recorded per hour, but are also impacted by factors including the number of hours on scene with killer whales, presence of Southern Residents, and location of killer whale sightings.

Commercial whale watch vessels are responsible for fewer incidents and are generally more likely to fly Whale Warning Flags than recreational vessels. Out of the *517* incidents recorded by Soundwatch, *74* were committed by EcoTour vessels, and of those, *22* were observed flying the Whale Warning Flag. There were only *2* cases in which a private vessel flying a Whale Warning Flag was observed in violation.

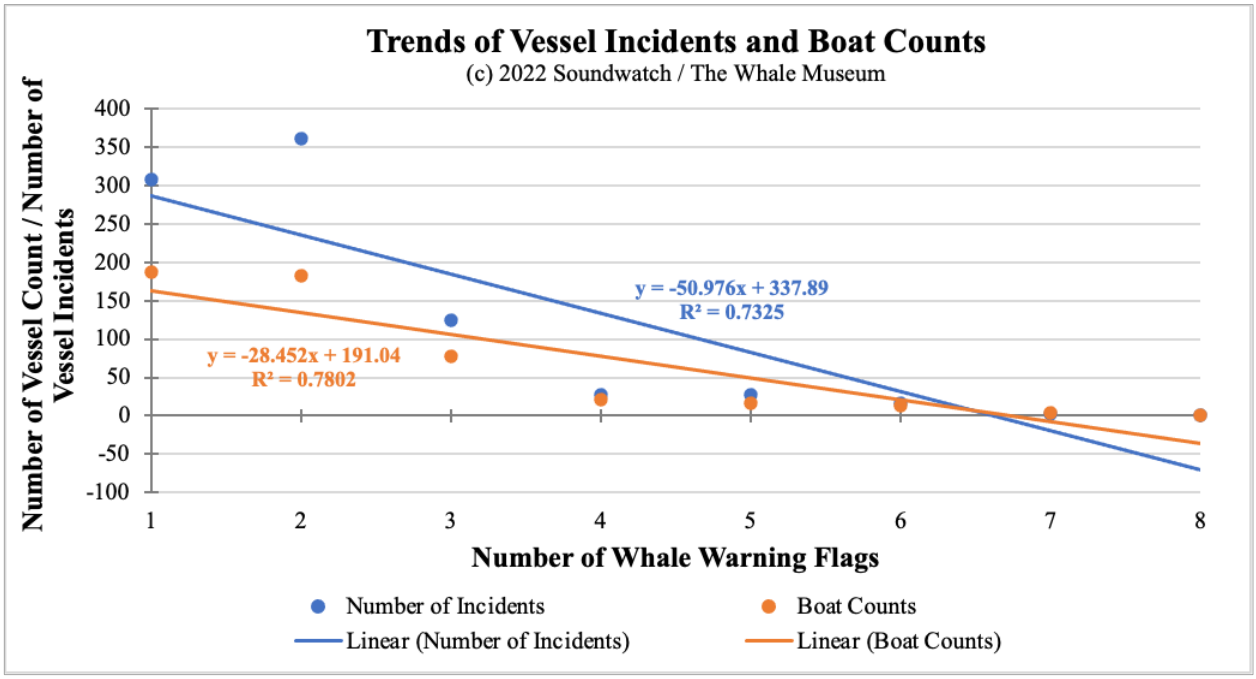


Figure 46: Displays the negative trends of vessel incidents and boat counts as related to number of Whale Warning Flags present.

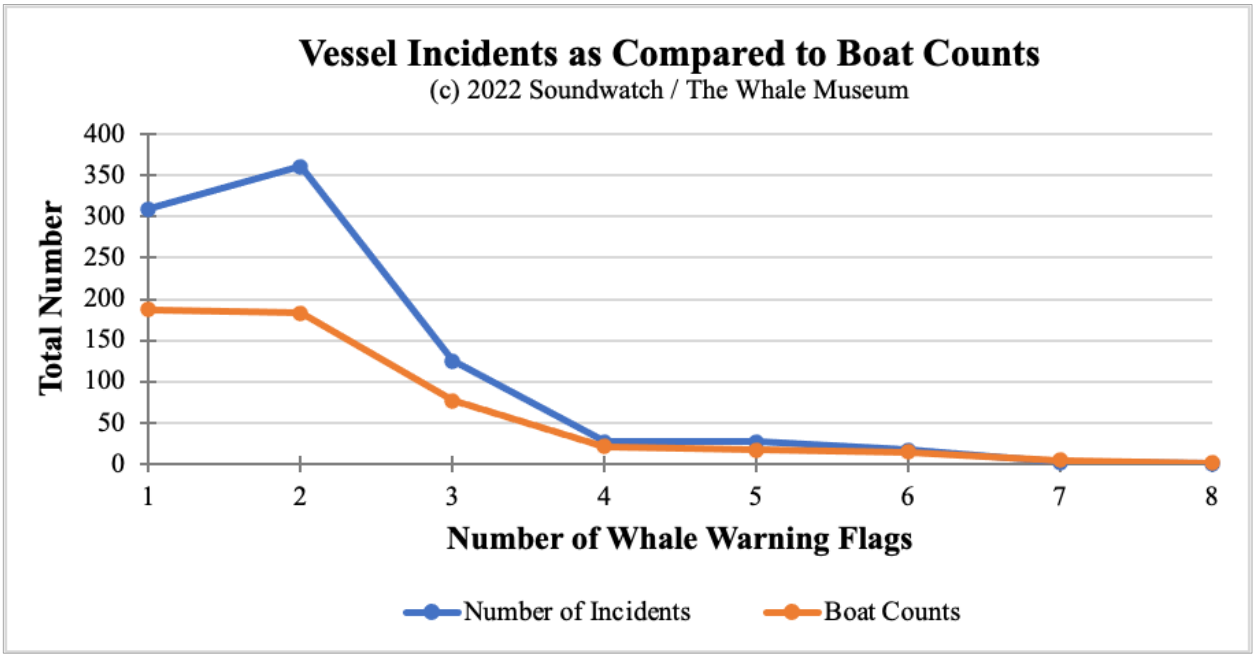


Figure 47: Number of Vessel Incidents and Boat Count by number of WWFs present.

In 2018 when the flag was first introduced, Soundwatch did not record any usable data due to the lack of presence of the flag out on the water. Deployment methods for the flag appeared to be one of the challenges faced by flag recipients at first. Many commercial operators were either slow to utilize their flags or did not utilize their flags due to logistical difficulties. While not required to fly a Whale Warning Flag, Pacific Whale Watch Association (PWWA) and Transport Canada Sustainable Whale Watch Agreement members are encouraged to use their flags when observing whales. This resulted in an increase in the use of whale warning flags since 2019; however, Soundwatch observed a decrease in use of whale warning flags by commercial operators in 2022. In a recent collaboration, Washington State Parks Boating Program partnered with San Juan County's Marine Resources Committee to provide whale warning flags to the boating public in an effort to raise awareness of the flag and its purpose.

Discussion

Recommendations for SRKW Protection and Recovery

Soundwatch data from 1998-2022 shows 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. Ongoing noncompliance demonstrates the continued need for the continuation and expansion of shore- and water-based boater education and outreach efforts. Increased efforts and funding for additional enforcement patrols and enforcement action are vital to the success of Southern Resident killer whale protection and recovery. Sustainable funding for education, monitoring and enforcement may become a critical issue due to economic impacts of COVID-19.

Continued lack of SRKW social cohesion within the Salish Sea can complicate monitoring activities; as the whales spread out, so do vessels engaged in whale watching activities. Thus,

one Soundwatch vessel and/or one WDFW enforcement vessel were often left to monitor several groupings of vessels over a greater geographic area instead of just one group in a concentrated area. The long-term Soundwatch database is very effective in tracking vessel and whale behavior trends over many years. However, with changes in SRKW presence and distribution throughout the Salish Sea, Soundwatch's standardized data collection procedures and operations are limiting factors for the utilization of the dataset to answer specific questions, such as impacts of law enforcement presence and the sentinel role vs. magnet effect of EcoTour companies. In 2021, Soundwatch included an additional query ("How did you find the whales?") to the Recreational Contact survey, and an additional category of incidents (CWWLP violations) for EcoTour vessels. The 2019-2022 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 2020 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.

Interestingly, in 2022 Soundwatch did record more days with SRKW, along with more instances of once-typical grouped behavior including traditional rest, as compared to recent monitoring seasons. This report does not analyze the status of other threats to SRKW recovery including prey availability and pollutants, but total maximum and average numbers of vessels around killer whales hit an all-time low during the 2022 season (Figure 16a, 20).

The issue of recreational boaters requires further assessment and effort. Recreational vessels commit the highest overall number of incidents as well as overall highest rate of incidents across the board. Recommendations to address recreational vessel activity and noncompliance include increase federal distance buffer around all killer whales in order to lessen vessel disturbance; increase monitoring and enforcement efforts on and off water; amend BWW guidelines to include recommendation for boaters to monitor VHF channel 16; and distribute BWW information with vessel registration and tabs. Per requirements established by RCW 77.65.620, WDFW submitted a report to Washington state legislature assessing the CWWLP and recommending that distance regulations for Southern Resident killer whales increase to 1,000 yards for all vessels (WDFW, 2022).

2020 recommendations included the implementation of Local Notice to Mariners broadcasts to alert boats of whales in their vicinity, and the addition of regulations and guidelines to Washington State Boater Education course. During the 2021 and 2022 season, the United States Coast Guard broadcasted Local Notice to Mariners in order to alert boaters to the presence of killer whales as well as remind them of the federal regulations. Washington State and Puget Sound Partnership collaborated to include marine mammal regulations in the Boater Education course. Similar efforts to require education at the boater licensing level are underway in Canada through Marine Education & Research Society (MERS).

The trans-boundary nature of the Salish Sea highlights the need for consistent and simplified regulations and guidelines between the U.S. and Canada. Different regulations across the border poses a challenge to education efforts on both sides. Updated federal regulations are recommended in order to establish better protections for SRKW as well as improve education and outreach effectiveness.

Real-Time Sightings Reports and Education Context

The continued growth of real-time sightings reports through various social media platforms provides visitors with live updates to whale sightings from land as well as on the water. While a valuable resource, particularly for would-be viewers visiting whale watching locales for a limited duration of time, there is growing concern over considerations including sustainable land use and proper education. Lack of proper environmental education has been identified as a potential issue within the international ecotourism industry (Mondino & Beery, 2019). There are currently no requirements for local real-time reporting or live updating channels to include information such as applicable regulations and guidelines, which may lead to uneducated boaters approaching whales, or uninformed land-based viewers visiting sensitive natural sites. To mitigate these possible adverse effects, it is recommended that real-time sightings platforms (1) include education on regulations and guidelines pertaining to wildlife and the marine or terrestrial environment, (2) establish an educational query/disclaimer for new users joining the sightings group, and (3) provide their users with access to comprehensive regulatory alerts and reporting mechanisms with sightings updates.

Aleutian Isle Oil Spill Response

On August 13, 2022, the fishing vessel Aleutian Isle sank off the west side of San Juan Island in an unprecedented oil spill event. Aleutian Isle sank containing approximately 2,500 gallons of diesel fuel and oil, creating an immediate risk to marine wildlife in the area surrounding the accident site. Following this event, Soundwatch became involved in response efforts.

Soundwatch participated in the Whale Deterrence team established by NOAA and WDFW in response to the spill. If killer whales or other marine mammals entered into the vicinity of oil sheen originating from the Aleutian Isle site, Whale Deterrence units were mobilized to perform acoustic deterrence. Soundwatch and SJCMMSN worked in collaboration with the US Coast Guard, NOAA, WDFW, DFO, Wild Orca, and The Seadoc Society as a part of this team. Soundwatch and SJCMMSN crew were trained in the use of oikomi pipes (acoustic deterrence tools used to drive killer whales away from oil spills) and took part in deterrence drills in preparation for possible team deployment.

Between 13 August 2022 and 22 September 2022, when the Aleutian Isle was successfully lifted from the water, Soundwatch personnel participated in drills, provided SRKW monitoring updates, and stood on-call in preparation for marine mammal deterrence. During this period, units with the marine mammal deterrence team including Sea Doc Society's *Molly B* and DFO's *Marine Mammal Rescue* were deployed twice in order to deter Bigg's Transient killer whales near the Aleutian Isle site.

Summary of 2022 Soundwatch Data

Vessels

- Soundwatch conducted *503* vessel counts within ½ mile (0.8 km) of whales; *35* days (*289* data counts) directly monitoring Southern Residents, *25* days (*145* data counts) with Transient (aka Bigg's) killer whales, *16* days (*61* data counts) opportunistically with Humpback whales, and *3* days (*8* data counts) opportunistically with Minke whales (Figure 2).
- The number of vessels observed within ½ mile of whales (May-September) varies widely by time, date and location with maximum number nearly four times larger than average number (2022 Max. 27, Avg. 7).
- The highest average and max vessel counts were recorded in August; May average *5.4* max *16*, June average *6.4* max *14*, July average *7.4* max *25*, August average *8.1* max *27*, September average *6.0* max *25*.
- Recreational (private) vessels observed within ½ mile of whales had higher maximum numbers and higher average numbers than commercial vessels within ½ of whales; Recreational vessels average *2.2* max *24*, Commercial vessels average *1.7* max *13*.
- Soundwatch contacted *518* vessels with *1,380* people on board, averaging *2.67* people per vessel, around whales for education and prevention purposes.
- An average of *67%* of recreational vessels contacted for educational purposes were correctly aware of the guidelines and laws for boating around killer whales. Therefore, 33% of contacted boaters were unaware or misinformed about the guidelines and laws for boating around marine mammals in the Salish Sea. This is an increase in awareness as compared to 2021 (*49%* awareness).

Commercial Whale Watch Industry

- The commercial whale watching season typically occurs April–October with many U.S. & Canadian commercial whale watch vessels going out year-round and/or starting earlier and going later into the season.
- *39* total EcoTour whale watch companies operated May–September, offering whale watching trips from *50* 'active' whale watch vessels in the U.S. and Canadian Haro Strait region, with *13* 'occasional' vessels and *36* 'rare' vessels for a potential combined total of *99* whale watch vessels operating on-the-water at a given time.
- There was one observed addition to the whale watch fleet during the 2022 season in terms of new vessels/companies; while EcoTour companies were as active in 2022 as in 2021 (PWWA personnel pers comm.), Soundwatch data likely reflects Ecotour effort in avoiding SRKW as a result of CWWLP rules.
- *87%* of U.S. companies and *88%* of Canadian companies are listed members of the Pacific Whale Watch Association (PWWA). https://www.pacificwhalewatchassociation.com/
- Canadian commercial whale watch vessels continue to be mostly smaller rigid hull inflatable (RHIB) style vessels while the U.S. fleet is made up of mostly larger passenger style vessels.

Vessel Incidents

- Soundwatch totaled *74* vessel/whale days and *503* vessel counts. Recreational *74* days and *380* counts, U.S. EcoTour vessels were observed *55* days and in *230* vessel counts, Monitoring/Enforcement (excluding Soundwatch, including Straitwatch presence) *47* days and *198* counts, Canadian EcoTour *36* days and *141* counts, Research *32* and *140* counts, and kayaks (ecotour and recreational) *21* days and *43* counts.
- A total of *517* incidents were recorded by Soundwatch in 2022, committing a total of *877* violations.
- Vessel activity during incidents was observed and categorized as transiting, whale oriented, or fishing. Of the *517* vessels, *49%* were transiting, *48%* whale oriented, and *3%* actively fishing (Figure 35).
- Of the incidents recorded, *62%* were U.S. Vessel Regulation violations; **Vessels Within 200 Yards of Whales** were *13%* and **In the Path of Whales** were *11%*. The greatest number of incidents recorded was under the Washington State Law of **Under 7 knots within a half mile of SRKWs** at *38%*.
- **Vessels within 200 Yards of Whales** incidents (*13%* of all incidents) were broken down by;
    - Vessels Stopped within 0-100 yards (*1.4%*) Vessels Stopped 100-200 Yards (*4.1%*) were committed by *60%* recreational vessels, 17% Canadian EcoTour commercial vessels, and *19%* U.S. EcoTour commercial vessels.
    - Vessels Under Power Within 100 Yards (*2.6%*) Vessels Under Power Within 200 Yards (*4.0%*) were made by *90%* recreational vessels, *5%* Canadian EcoTour commercial vessels, and *5%* U.S. EcoTour commercial vessels.
    - Fishing Within 100 Yards (*<1%*) and Fishing Within 200 Yards (*1%*) were committed by recreational vessels (*100%*).
    - Under Power Following Whales Within 400 Yards (*4%*) was committed by recreational vessels (*83%*).

- **In the Path of Whales** incidents (*11%* of all incidents) were *84%* recreational vessels and *6%* U.S. commercial vessels. **Over 7 knots within a half mile of whales** incidents (*38%* of all incidents) were committed by recreational vessels (*83%*), maritime cargo/ferries (*5%*), U.S. EcoTour vessels (*5%*), and Canadian EcoTour vessels (*4%*).
- Private recreational vessels committed the majority of incidents (81%), followed by U.S. commercial vessels (*7%*), Canadian commercial vessels (*4%*), commercial aircraft (*1%*), commercial fishing vessels (*1%*), maritime cargo/ferries (*<1%*), enforcement (*<1%*), private aircraft *(<1%*) and research vessels (*<1%*) (Figure 33).
- Whale watching activities ('whale oriented') accounted for *48%* of vessel incidents when comparing vessel activities, while vessels transiting ('transiting') accounted for *49%* of incidents around whales (Figure 35). Whale oriented vessels still committed both speed and distance violations (Figure 38).

Direct Takes by Soundwatch under NOAA/NMFS Permit #26285

- In 2022, Soundwatch made *2* close approaches (closer than regulations and guidelines) as authorized under National Marine Fisheries Service Research Permit #26285. Neither

close approach resulted in change in behavior of the animal.

- Any takes are directed for prevention and educational purposes due to a vessel breaking U.S. Vessel Regulations and not responding to other means of communication. Any takes are conducted under discretion of professional vessel drivers to mitigate risk away from whales and maintain safety of vessels, crew, and whales.

Spatial Trends

- While SRKWs display continued trend of dispersal/lack of social cohesion throughout the 2022 season, there were more instances of traditional rest and close flank orientation than in previous years.
- SRKWs were sighted in Soundwatch's area of response for *35* days during all months of the field season (May, June, July, August, and September).
- SRKWs continue to utilize their core habitat, although time and duration of use has varied throughout previous years.
- A variety 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 in the vicinity of the west side of San Juan Island.

Education Materials/Onshore Education

- In 2022, Soundwatch Dock Talks reached *616* guests visiting Port of Friday Harbor and Roche Harbor on San Juan Island, Washington. *59%* were aware of guidelines and regulations.
- Soundwatch aided in the development of the *Be Whale Wise* Outreach Toolkit, which continues to be updated as of 2022.
- Soundwatch increased outreach on social media platform Instagram (@soundwatch_twm) by *106%.*
- The BWW exhibit at TWM, installed in 2016, has reached over 178,421 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: Alla Abato and Soundwatch Coordinator: Alanna Frayne) administered grant funds, including accounting and disbursement, from award RA-133F-12-CQ-0057. The Soundwatch Coordinator (Alanna Frayne) along with seasonal Soundwatch driver/educator staff (Erin Casellas, Jessica Newley), academic interns (Casey Madill, Clare Ogle, Madeline Brooks, Madisyn Simpson) were responsible for the outreach, monitoring and data collection activities as well as data entry. Thank you to The Sighting Network Coordinator Alexis Morrigan for the data analysis support. Thank you to The San Juan County Marine Mammal Stranding Network Program Coordinator Jessica Farrer for operations 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 and Grace Ferrara from NOAA Fisheries West Coast Region, the help of Alan Myers, Taylor Kimball and Washington Department of Fish and Wildlife Law Enforcement Officers, the help of Dr. Julie Watson and Jessica Stocking of Washington Department of Fish and Wildlife, and the assistance and the dedication of the more than 849 past and present interns and volunteers who have

collectively contributed more than 70,000 volunteer hours to Soundwatch activities since 1996. Special thanks also go the numerous supporters along with the following organizations that help support and collaborate with our efforts: NOAA Fisheries West Coast Region, Northwest Fisheries Science Center, Fisheries and Oceans Canada, Transport 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, Wild Orca, Sea Doc Society, Snug Harbor, Port of Friday 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!

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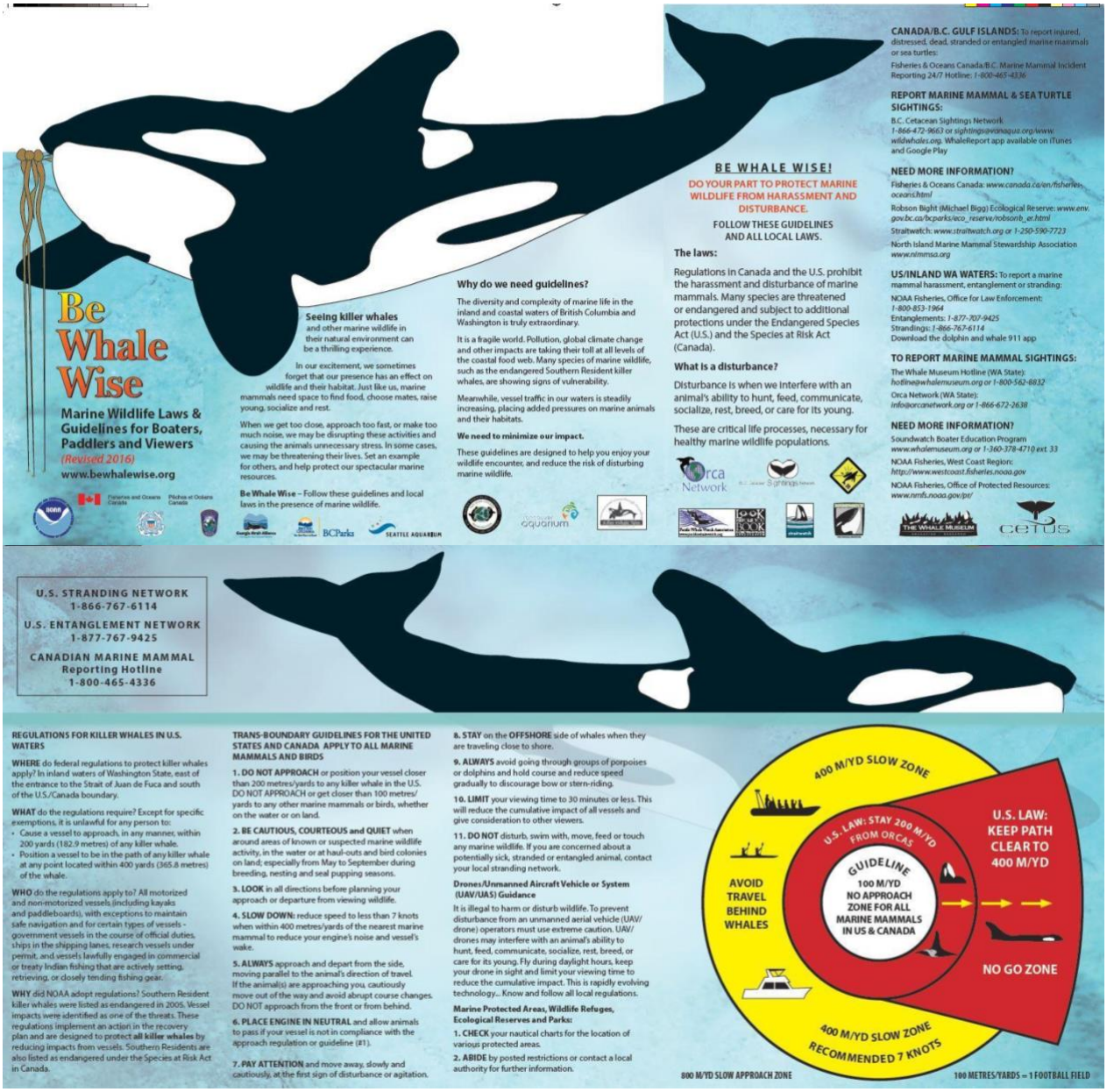
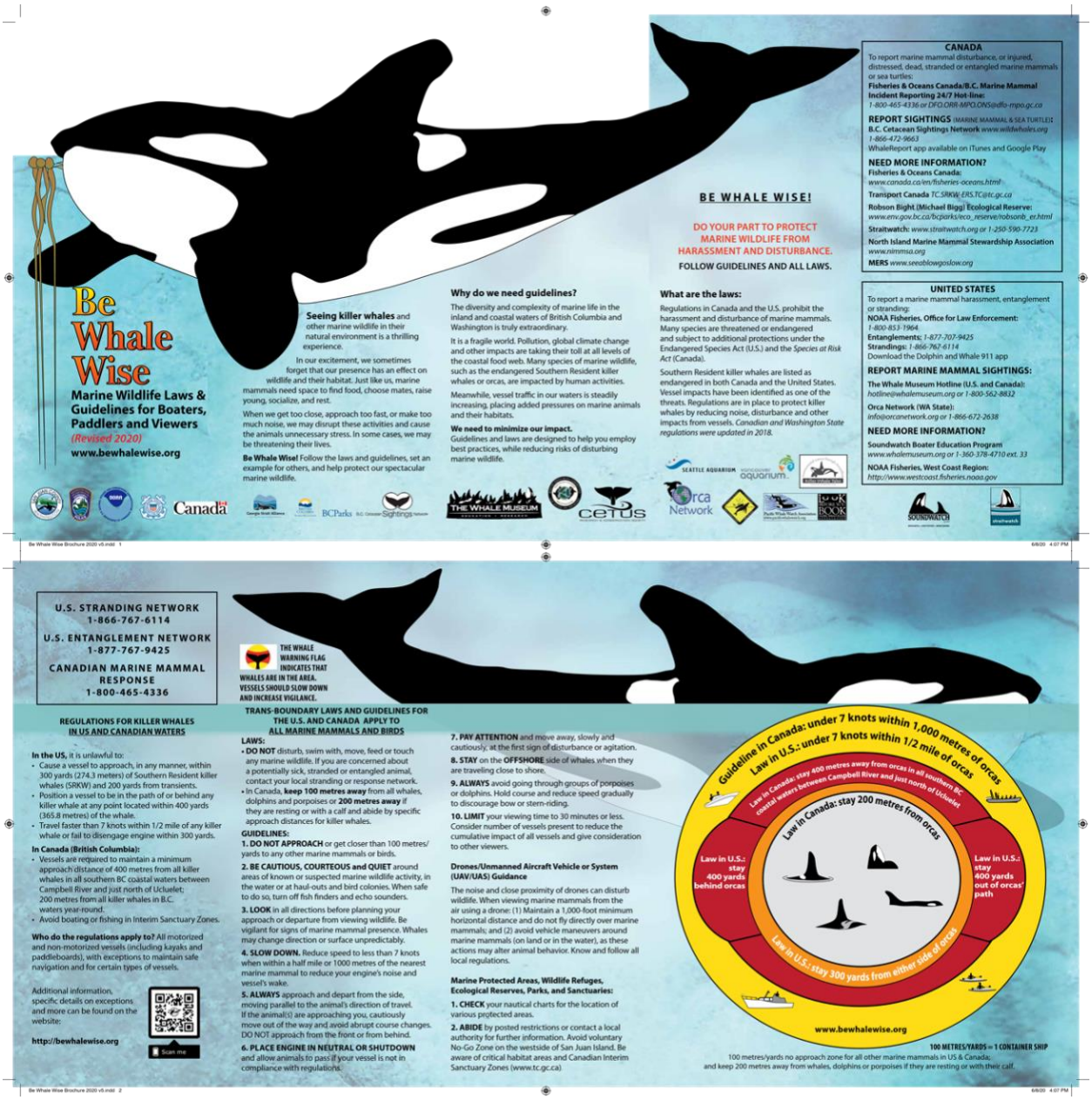
Appendices

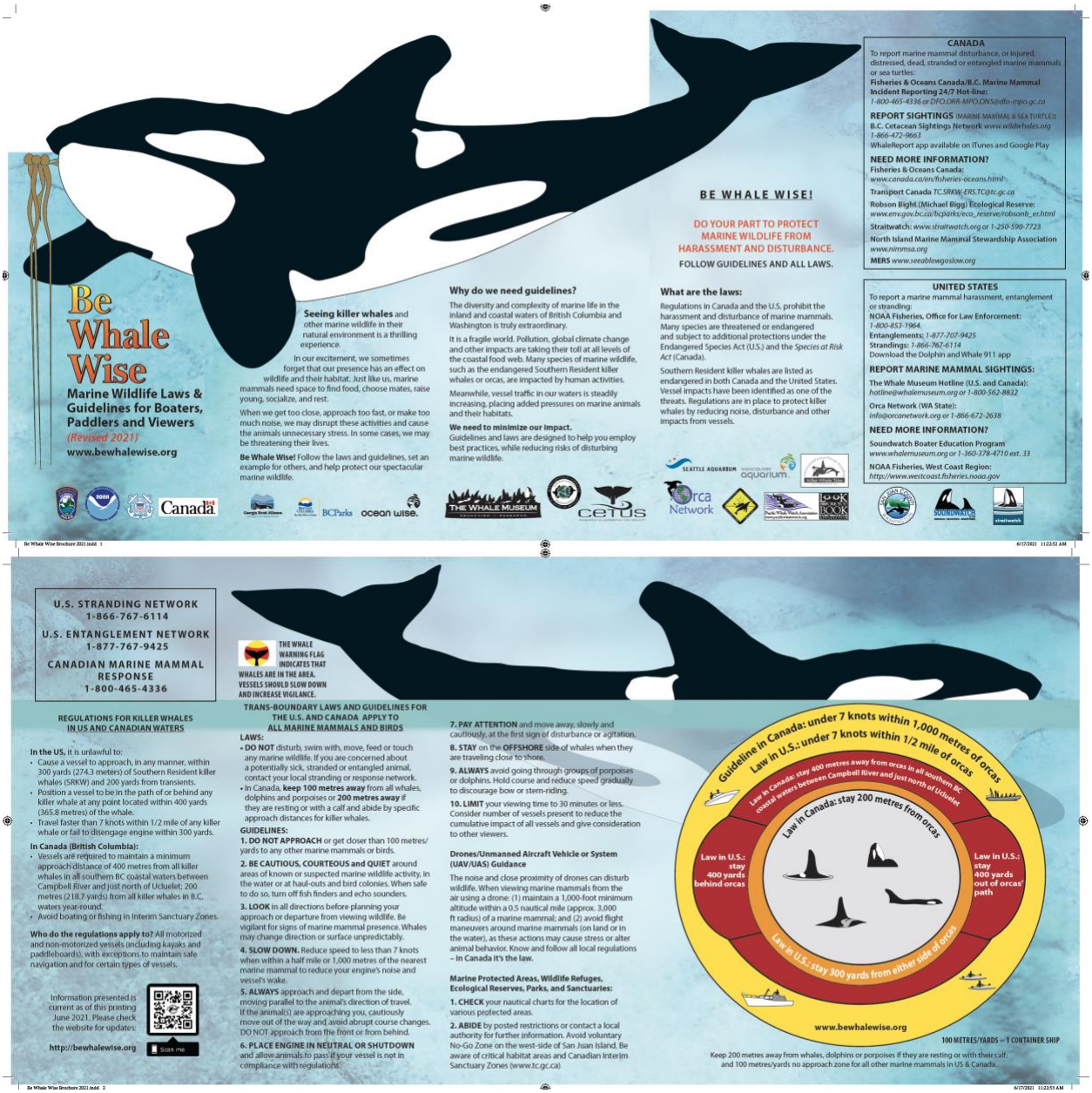


Appendix A1: Be Whale Wise Guidelines and Federal/State Regulations for Boaters, Paddlers and Viewers; Revised 2016.

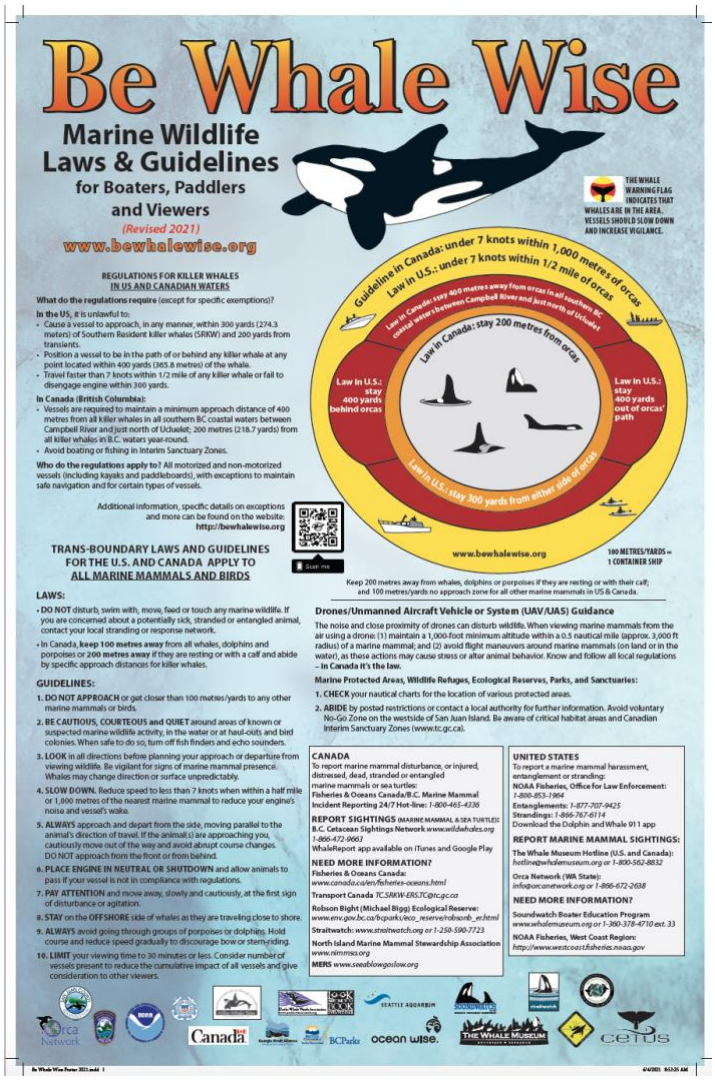
Appendix A2: Be Whale Wise Guidelines and Federal/State Regulations Poster for Boaters, Paddlers and Viewers; Revised 2016.



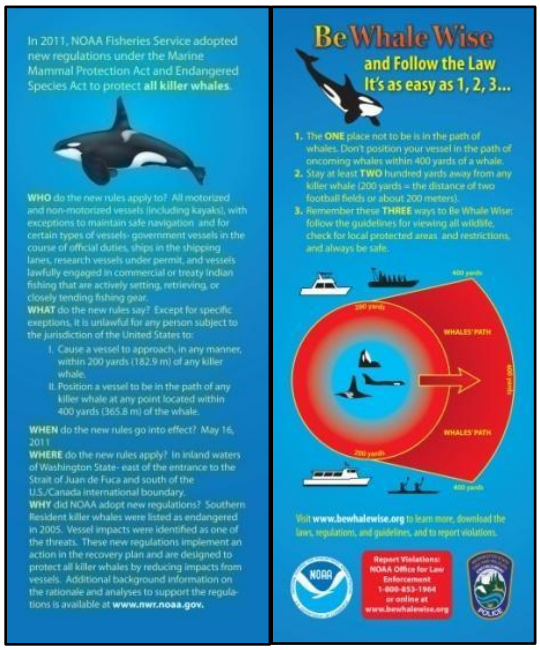
Appendix A3: Be Whale Wise Guidelines and Federal/State Regulations for Boaters, Paddlers and Viewers; Revised 2020, Double-sided Brochure Version.



Appendix A4: Be Whale Wise Guidelines and Federal/State Regulations for Boaters, Paddlers and Viewers; Revised 2021, Double-sided Brochure Version (Available at http://www.bewhalewise.org).

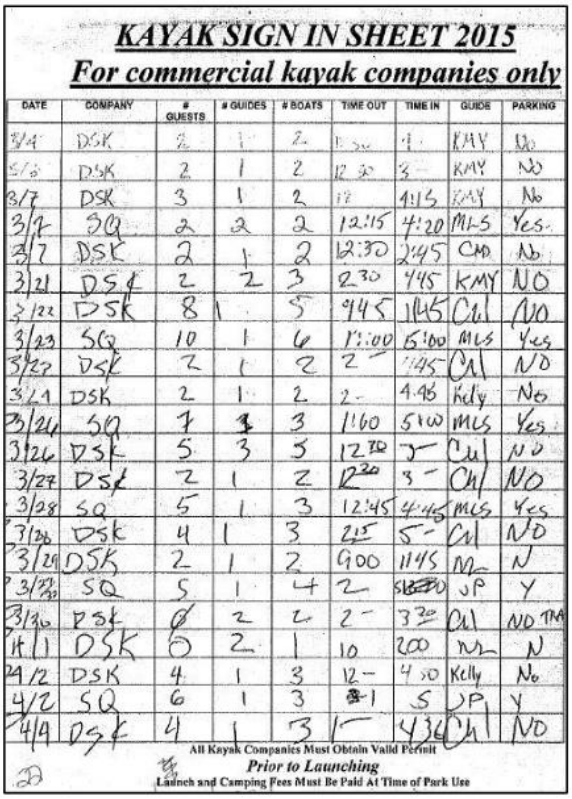


Appendix A5: Be Whale Wise Guidelines and Federal/State Regulations Poster for Boaters, Paddlers and Viewers; Revised 2021 (Available at http://www.bewhalewise.org).



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

Appendix B2: Federal and State Vessel Regulations for Killer Whales used by WDFW in 2022.



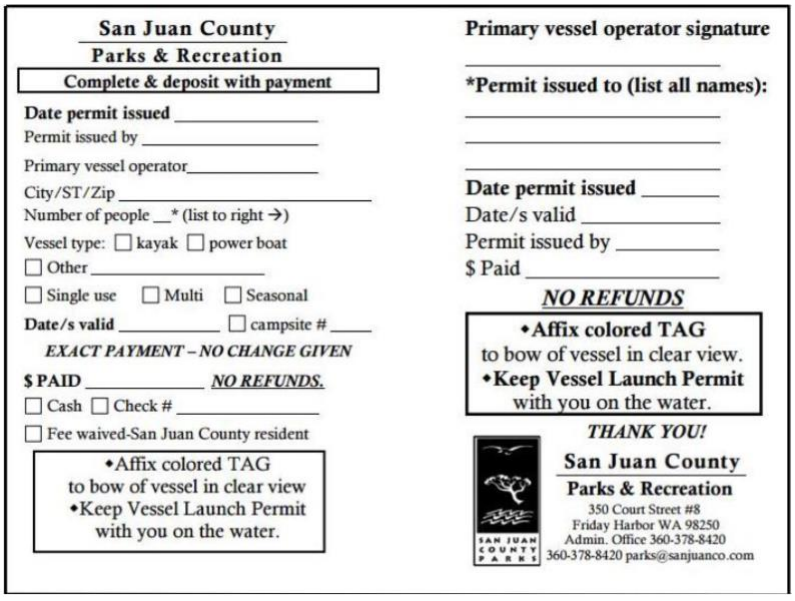
KAYAK SIGN IN SHEET 2015

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	KMY	No
3/6	DSK	2	1	2	12:30	3	KMY	No
3/7	DSK	3	1	2	12	4:15	KMY	No
3/7	SQ	2	2	2	12:15	4:20	MLS	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	1:45	Chl	NO
3/23	SQ	10	1	6	11:00	5:00	MLS	Yes
3/27	DSK	2	1	2	2	1:45	Chl	NO
3/27	DSK	2	1	2	2	4:45	Kelly	No
3/24	SQ	7	1	3	1:60	5:00	MLS	Yes
3/26	DSK	5	3	5	12:30	3	Chl	NO
3/27	DSK	2	1	2	12:30	3	Chl	NO
3/28	SQ	5	1	3	12:45	4:45	MLS	Yes
3/26	DSK	4	1	3	2:15	5	Chl	NO
3/29	DSK	2	1	2	9:00	11:45	MC	N
3/27	SQ	5	1	4	2	5:30	JP	Y
3/30	DSK	0	2	2	2	3:30	Chl	NO TM
4/1	DSK	5	2	1	10	2:00	MC	N
4/2	DSK	4	1	3	12	4:30	Kelly	No
4/2	SQ	6	1	3	1	5	JP	Y
4/9	DSK	4	1	3	1	4:30	Chl	NO

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

Appendix C: 2015 San Juan County Commercial Kayaker Launch Form.



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 _____

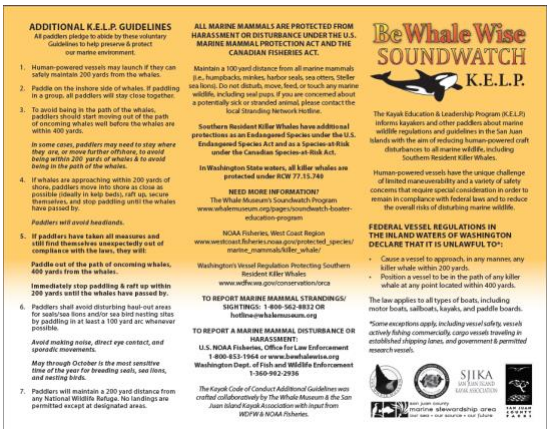
NO REFUNDS

•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 pledge to abide by these voluntary Guidelines to help preserve & protect our marine environment.

1. Human-powered vessels may launch if they can safely maintain 200 yards from the whales.
2. Paddle on the inshore side of whales. If paddling in a group, all paddlers will stay close together.
3. To avoid being in the path of the whales, paddlers should start moving out of the path of oncoming whales well before the whales are within 400 yards.

   In some cases, paddlers may need to stay where they are, or move further offshore, to avoid being within 200 yards of whales & to avoid being in the path of the whales.
4. If whales are approaching within 200 yards of shore, paddlers move into shore as close as possible (ideally in kelp beds), raft up, secure themselves, and stop paddling until the whales have passed by.

   Paddlers will avoid headlands.
5. **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.
6. Paddlers shall avoid disturbing haul-out areas for seals/sea lions and/or sea bird nesting sites by paddling in at least a 100 yard arc whenever possible.

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

   May through October is the most sensitive time of the year for breeding seals, sea lions, and nesting birds.
7. Paddlers will maintain a 200 yard distance from any National Wildlife Refuge. No landings are permitted except at designated areas.

ALL MARINE MAMMALS ARE PROTECTED FROM HARASSMENT OR DISTURBANCE UNDER THE U.S. MARINE MAMMAL PROTECTION ACT AND THE CANADIAN FISHERIES ACT.

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

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

In Washington State waters, all killer whales are protected under RCW 77.15.740

NEED MORE INFORMATION?

The Whale Museum's Soundwatch Program
www.whalemuseum.org/pages/soundwatch-boater-education-program

NOAA Fisheries, West Coast Region
www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/

Washington's Vessel Regulation Protecting Southern Resident Killer Whales
www.wdfw.wa.gov/conservation/orca

TO REPORT MARINE MAMMAL STRANDINGS/SIGHTINGS: 1-800-562-8832 OR hotline@whalemuseum.org

TO REPORT A MARINE MAMMAL DISTURBANCE OR HARASSMENT:

U.S. NOAA Fisheries, Office for Law Enforcement 1-800-853-1964 or www.bewhalewise.org

Washington Dept. of Fish and Wildlife Enforcement 1-360-902-2936

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

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

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

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

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

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

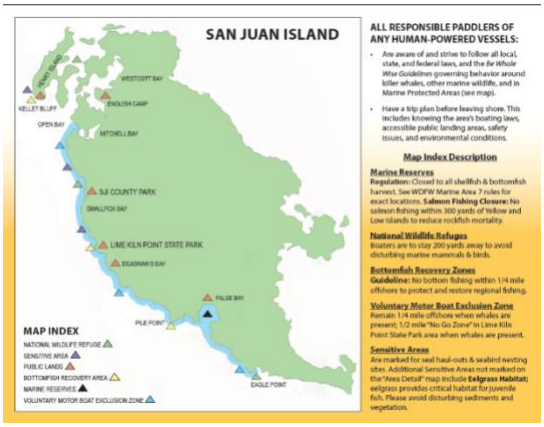
The law applies to all types of boats, including motor boats, sailboats, kayaks, and paddle boards.

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

SJIKA SAN JUAN ISLAND KAYAK ASSOCIATION

san juan county marine stewardship area

SAN JUAN COUNTY PARKS



ALL RESPONSIBLE PADDLERS OF ANY HUMAN-POWERED VESSELS:

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

Map Index Description

Marine Reserves
Regulation: 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 Yellow and Low Islands to reduce rockfish mortality.

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

Bottomfish Recovery Zones
Guideline: No bottom fishing within 1/4 mile offshore to protect and restore regional fishing.

Voluntary Motor Boat Exclusion Zone
Remain 1/4 mile offshore when whales are present; 1/2 mile "No Go Zone" in Lime Kiln Point State Park area when whales are present.

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

Appendix 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 orca specific guidelines meant to be used along with regional Be Whale Wise Marine Wildlife guidelines and current Federal Vessel Laws.

- Do not launch from shore if you are unable to maintain 200 yards from the whales.
- Paddle to shore of further offshore to maintain 200 yards to the side and 400 yards out of their path.
- If within 400 yards of whales, kayakers should paddle toward shore, raft up in 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.

SJIKA SAN JUAN ISLAND KAYAK ASSOCIATION

Marine Preserves
Regulation: 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.

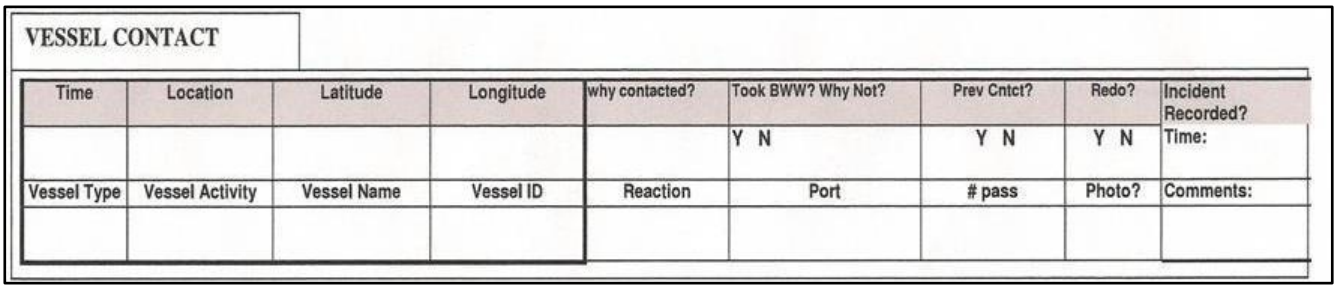
National Wildlife Refuges
Boaters are advised to stay 200 yards away to avoid disturbing marine mammals & birds.

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

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

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

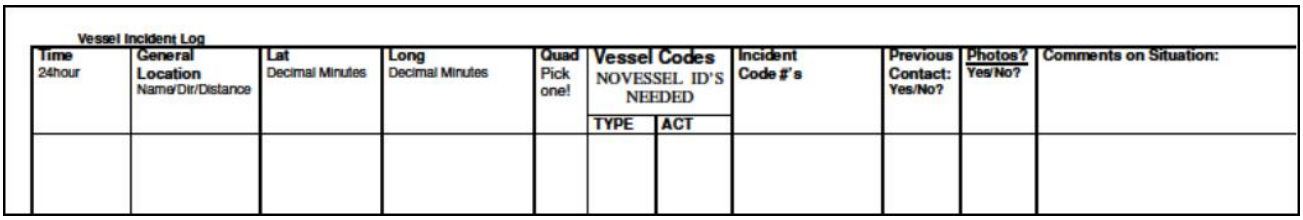
Appendix F: 2016 - 2018 Kayaker Code of Conduct Rack Card, Double-sided (Available at http://www.whalemuseum.org)



VESSEL CONTACT

Time	Location	Latitude	Longitude	why contacted?	Took BWW? 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:

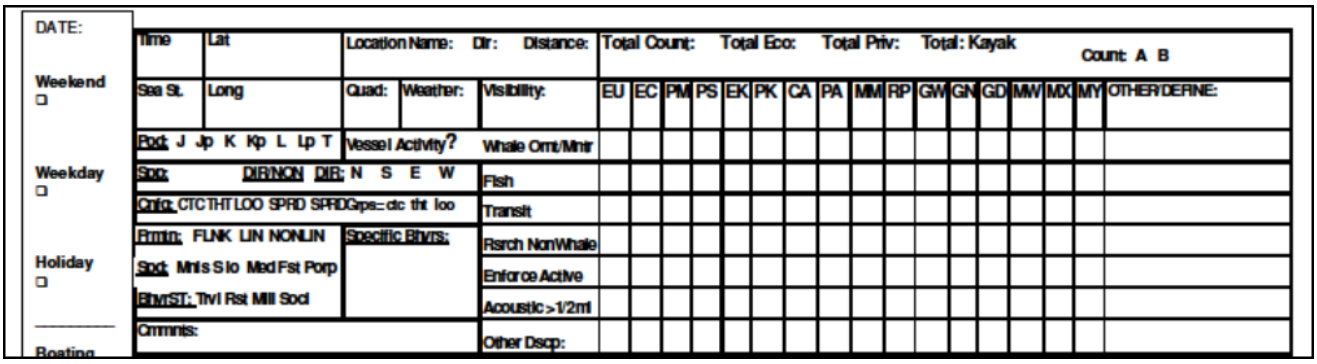
Appendix G: Soundwatch Data Sheet Vessel Contact.



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 TYPE	ACT	Incident Code #'s	Previous Contact: Yes/No?	Photos? Yes/No?	Comments on Situation:

Appendix H: Soundwatch Data Sheet Vessel Incidents.



DATE:

Weekend ☐

Weekday ☐

Holiday ☐

Boating

Time	Lat	Location Name: Dir: Distance:	Total Count: Total Eco: Total Priv: Total: Kayak Count: A B																	
Sea St.	Long	Quad: Weather: Visibility:	EU	EC	PM	PS	EK	PK	CA	PA	MM	RP	GW	GN	GD	MW	MX	MY	OTHER/DERNE:	
Pod: J Jp K Kp L Lp T		Vessel Activity?	Whale Cnt/Mnt																	
Spp:	DIR/NON DIR: N S E W		Fish																	
Cnfg: CTC THT LOO SPRD SPRDGps:: clc tht loo			Transit																	
Pmtn: FLNK LIN NONLIN		Specific Bhvrs:	Rsrch NonWhale																	
Spd: Mnls Slo Med Fst Porp			Enforce Active																	
BhvrST: Trvl Rst Mill Socl			Acoustic >1/2mi																	
Cmmnts:			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	**NEW 2011 LAWS**
3.1A	In path 200-400 yds	w/in **200y**/183m corridor path in front of whales between **200-400y**/183-366m ahead of whales
3.3	In path - cross	crossing path of whales, vessel traveling across expected path (**200-400yds**)whales predictable
	APPROACH	
4.1	approach - head on	vessel approaching a whale/group head on w/in **200-400y**/181-366m when whales are traveling in a relatively predictable pattern
4.2	approach - behind	vessel approaching/traveling behind a whale/group w/in **200-400y/181-366m** when whales are traveling in a relatively predictable pattern
	W/in 100 YARDS/M	
5.1	**100y/91m - stopped**	**vessel stopped w/in 100y/91m of whales**
5.2	**100y/91m - under power**	**vessel under power w/in 100y/91m of whales**
5.4	100y/91m - fishing	vessel fishing w/in **100y/91**m of whales (did not attempt to move out of path of whales)
	W/in 200 YARDS/M	**NEW 2011 LAWS**
6.1	**200y/183m - stopped**	**vessel stopped w/in 200y**/183m **of whales**
6.2	**200y/183m - under power**	**vessel under power w/in 200y**/183m **of whales**
6.4	200y/183m - fishing	vessel fishing w/in **200y**/183m of whales (did not attempt to move out of path of whales)
7.0	**INSHORE**	vessel on the inshore side of whales, when whales are traveling close to shore (within 1/2 mile)
	AREA RESTRICTION	**"Placeholder for WDFW Proposed New SLOW ZONE Guideline: NOT IN EFFECT as of June 2011"**
40.1	area restriction - SJIVNBZ 1	vessel w/in **1/4mile** (**440y**/402m) of the 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 - RRER	vessel w/in **100y**/91m of any Race Rocks Ecological Reserve shoreline
40.6	area restriction - SJIVNBZ 2	vessel w/in **1/8mile** (**220y**/201m) of ANY shoreline with whales present
40.7	area restriction -SJI Slow Zone	vessel > 7 knots w/in **1/2mile** (880y/808m)SJIVNBZ with whales present **"WDFW PROPOSED New Guideline"**
	AIRCRAFT	
50.1	aircraft - low flying	aircraft flying lower than 1000feet (**333y**/305m)
50.2	aircraft - low circling	aircraft circling lower than 1000 feet (**333y**/305m)

Appendix 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	Lagenorhyncus obliquidens
phvi	harbour seal	Phoca vitulina richardsi
euju	Stellar's sea lion	Eumatopius jubatus
enlu	sea otter	Enhydra lutris
brma	marbled murrelet	Brachyramphus marmoratus
syan	ancient murrelet	Synthliboramphus antiquus
arhe	Pacific great blue heron	Ardea herodias fannini

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

Common Behaviors		
Spy Hop	Aerial scan	Breach
Half breach	Bellyflop	Pec slap
Pec wave	Inverted pec slap	Tail wave
Tail Slap	Inverted tail slap	Tail lift-headstant
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

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

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

Sea State	Effect of Combined Wind And Currents on Sea State
0	like a mirror (flat)
1	ripples form with the appearance of scales, but without foam crests
2	small wavelets, crests appear glassy, no breaking
3	larger wavelets begin to break, glassy foam, scattered white caps
4	small waves predominant but fairly frequent white caps
5	moderate waves, distinctly elongated, many white horses, chance of spray
6	long waves with extensive white foam breaking crests begin to form, spray likely
7	sea heaps up, white foam breaking waves start to be blown in streaks
8+	WHY THE HELL ARE BOATS STILL OUT THERE?

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

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

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

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

Weather & 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 apperance of scales, but w/out foam crests
2	light breeze	4-6	small wavelets, crests appear glassy, no breaking
3	gentle breeze	7-10	larger wavelets begin to break, glassy foam, scattered white caps
4	moderate breeze	11-16	small waves predominant but fairly frequent white caps
5	fresh breeze	17-21	moderate waves, distinctly elongated, many white horses, chance of spray
6	strong breeze	22-27	long waves with extensive white foam breaking crests begin to form, spray likely
7	moderate gale	28-33	sea heaps up, white foam breaking waves start to be blown in streaks, beginning of spindrift
8	fresh gale	34-40	
9	strong gale	41-47	
10	white gale	48-55	
11	storm	56-66	
12	hurricane	above 66	

Vessel Code	Description
CA	Commercial Aircraft
EA	Ecotour aircraft
EC	Ecotour Canadian
EK	Ecotour Kayak
EU	Ecotour US
PA	Private Aircraft
PK	Private Kayak/Paddle
PM	Private Motor
PS	Private Sail
MC	Marine Charter
MF	Marine Fishing
ML	Marine Tug with log barge
MM	Marine Monitoring
MQ	Marine Cruiseship
MW	Marine Tug with tow
MX	Marine Shipping
MY	Marine Ferry
GA	Government aircraft
GB	Government BC Parks
GC	Government Coast Guard
GD	Government DFO
GL	Government military
GN	Government NOAA
GO	Government
GW	Government WDFW
RP	Permitted Research

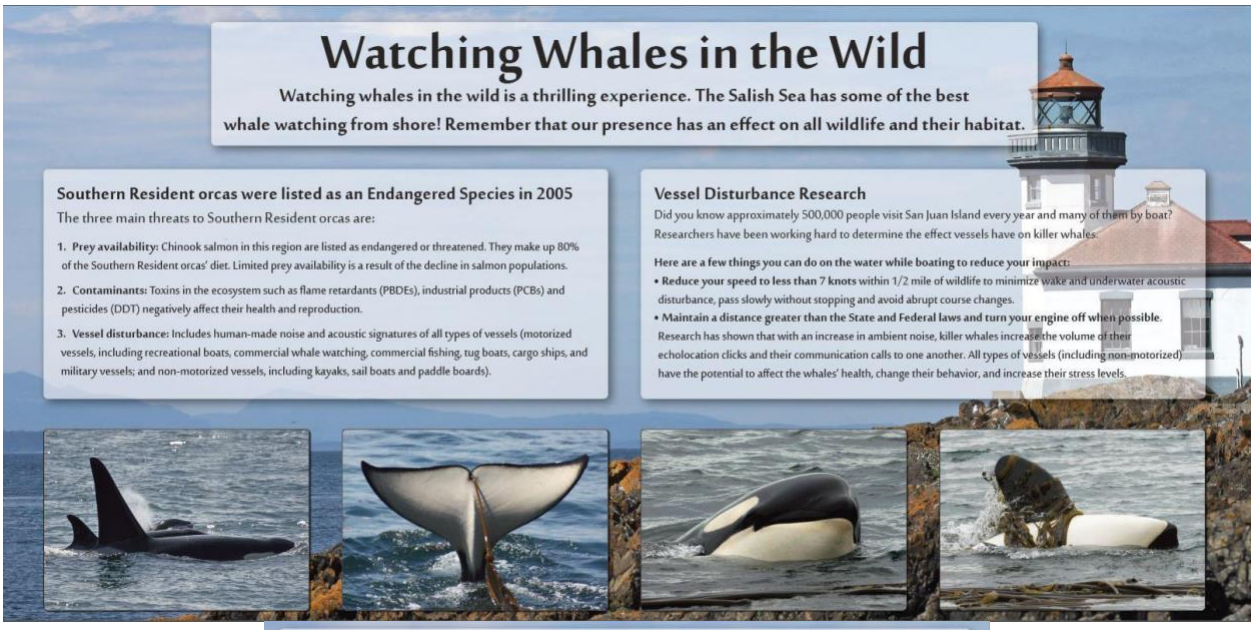
Visibility
none
poor
fair
good
excel

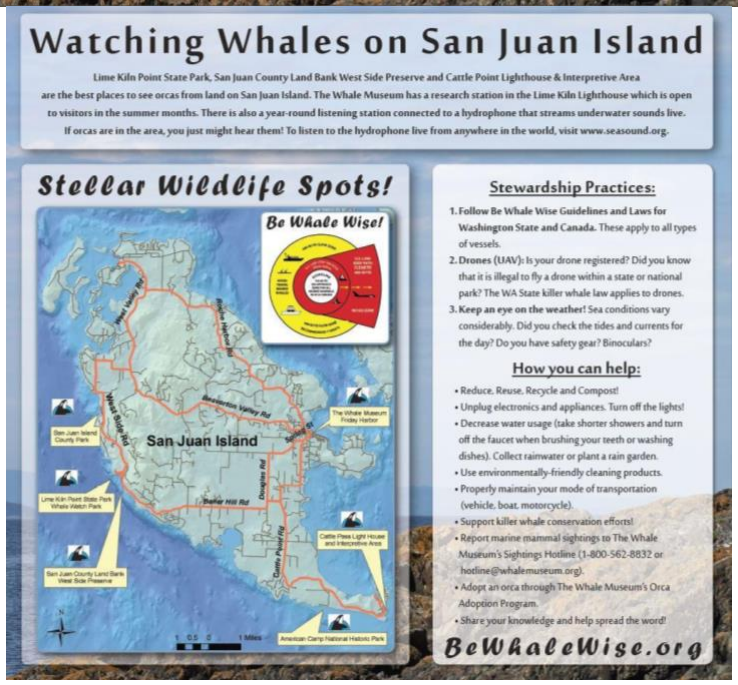
Weather
sunny
sunny w/ partial clouds
overcast - high
overcast
foggy
rain - light
rain - heavy

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

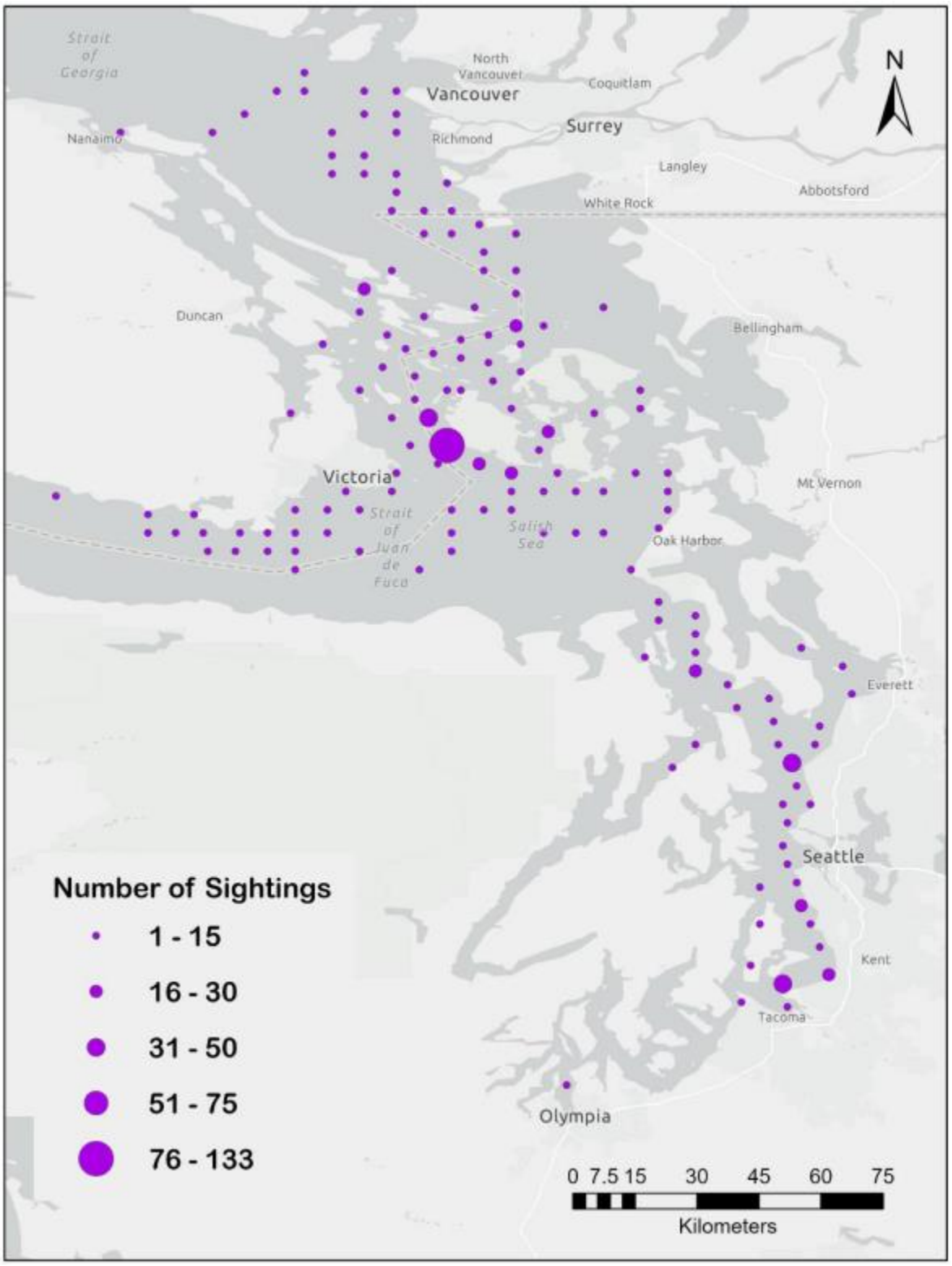
	Vessel activity
W	Whale Oriented
F	Fishing
T	Transiting
R	Research (whale oriented)
E	Enforcement
A	Acoustic Range
O	Other with description

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

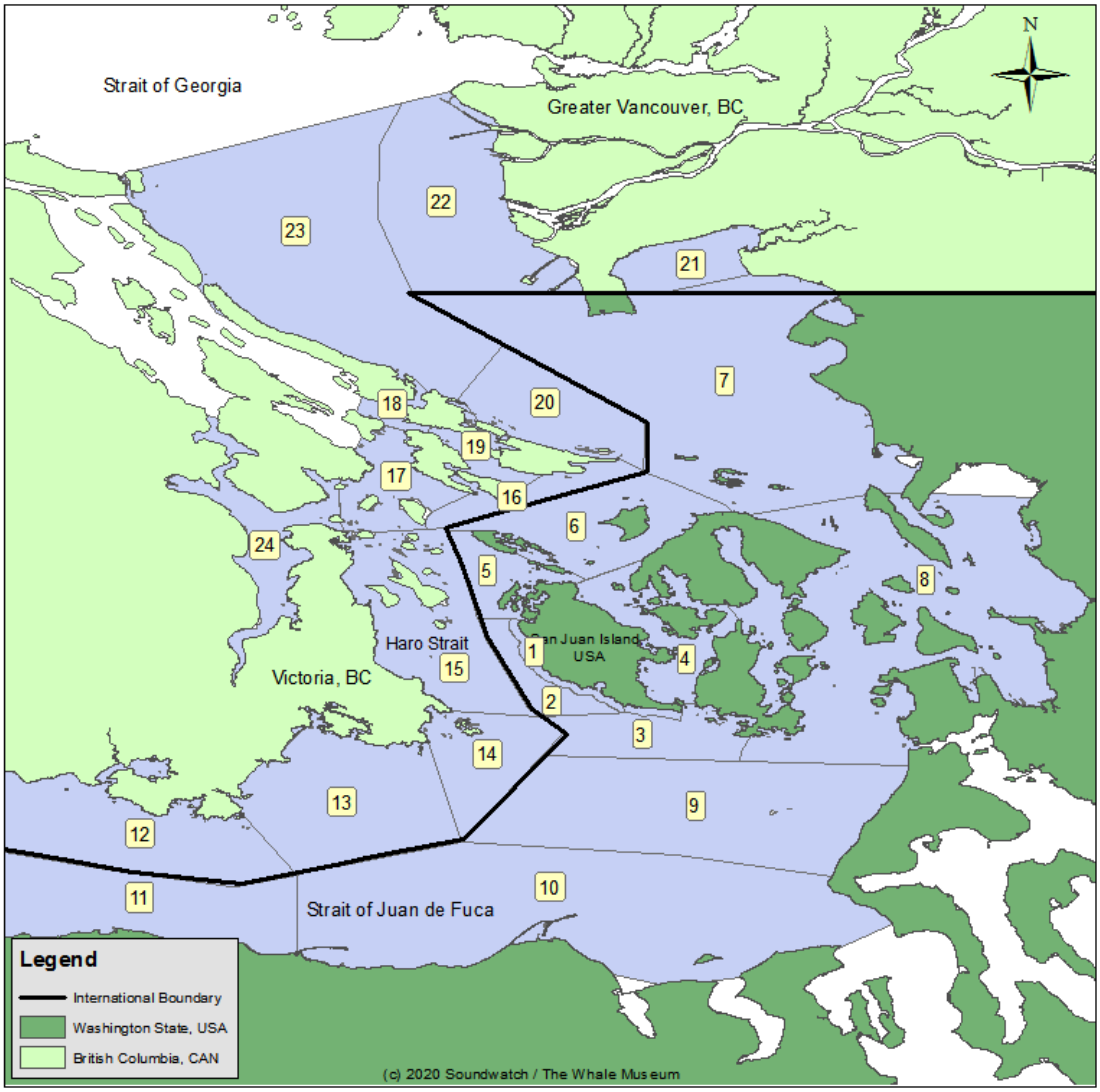




Appendix M: The Whale Museum Watching Whales in the Wild Exhibit Hall Panels.



Appendix N: Map depicting the number of SRKW sightings reported by area in 2021. Each circle's size is proportional to the number of reports in 2021.



Appendix Q: Soundwatch study area numbered zones based on the TWM data quadrants and marine fishing zones for the US and Canada.