FINAL2014SOUNDWATCH PROGRAM ANNUAL CONTRACT REPORT

Project Title: SoundwatchPublic Outreach/Boater Education Project.

Authors/ Organization: Eric P. Eisenhardt, M.Sc.
Research Curator
The WhaleMuseum
P.O. Box 945
Friday Harbor, WA98250
Email: soundwatch@whalemuseum.org

Kari Koski
Research Consultant
P. O. Box 1502
Friday Harbor, WA98250
Email: kelp@rockisland.com

Project Description and Analysis Prepared By:
Primary: Eric Eisenhardt (Soundwatch Coordinator and Research Curator)
Final Report Analysis & Preparation: Kari Koski (Former Soundwatch Director, under contract with The Whale Museum).
Assisted By: Elizabeth Seely, Kelley Watson and Robert Tison(Soundwatch Seasonal Staff: data collection);Sarah Scrivano, Megan Landis, Josie Hosker, andMariah Vane (Student Interns: data recording, data entry); Jennifer Olson (The Whale Museum Data Specialist, Stranding Coordinator, Collections Curator); John Aschoff (GIS Specialist)

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

Contract Date: Third year of multi-year contract: January 1, 2015 through December 31, 2015

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 2014 killer whale watching season and to provide a data update to the **RA-133F-12-CQ-00572013**Soundwatch Public Outreach/Boater Education Project Final Project Report characterizing general trends in vessel based whale watching activities associated with Southern Resident Killer Whales in the Haro Strait Region of Washington State and Southern Vancouver Island, British Columbia, Canada.

Executive Summary:

The goal of the Soundwatch Public Outreach/Boater Education Project was to implement The Whale Museum's Soundwatch Boater Education Program (Soundwatch) during the 2014 whale watch season and present a data update to the 2013 report on whale watching trends in the Haro Strait region to inform future management strategies.

The objectives of this 2014 project were to: 1) provide boater education services through public outreach and on-the-water stewardship activities and to collect data on vessel activities during the 2014 whale watching season; and to 2) conduct analysis on present whale watching data to provide an update to the 2013 Soundwatch Public Outreach/Boater Education Project report. For the three seasons from 2010to 2012, supplementary tasks were added to the contract to conduct additional outreach to commercial and recreational kayakers launching from the San Juan Island County Park and to conduct shore-based monitoring of kayaking activities with Southern Resident Killer Whales (SRKWs) within the voluntary no-go zone along the Westside of San Juan Island. For 2014 as in 2013, the shore-based monitoring was not funded within this contract. However, the kayak education component has continued through cooperation between the San Juan Island Kayak Association (SJIKA), San Juan County Parks, and The Whale Museum's Soundwatch Boater Education Program.

In May 2011, NOAA Fisheries implemented new vessel regulations around all killer whales in the inland waters of Washington State. The regulation included two elements: 1) a prohibition on approaching killer whales within 200 yards; and 2) a prohibition on positioning within 400 yards of the path of killer whales. In addition, Washington State updated the RCW on SRKW's in 2012 to match the federal 200 yard & 400 yard in-the-path approach distances for inland waters (east of the Bonilla-Tatoosh line). This report provides a cursory evaluation of the effectiveness of the new regulations during the first four years of implementation.

Data analyzed for this annual update report reflects data collected by The Whale Museum's Soundwatch Boater Education Program in 2014, and includes vessel incident definitions related to the U.S. federal and Washington State vessel regulations. This update report depicts general trends in vessel based whale watching activities associated with Southern Resident Killer Whales in the Haro Strait Region of Washington State and British Columbia, Canada.

The goal of the Soundwatch Program is to reduce vessel disturbance to killer whales and other marine wildlife through educating boaters on regional guidelines and regulations as well as to provide systematic monitoring of vessel activities around cetaceans. Soundwatch promotes responsible marine stewardship through the development, distribution, implementation, annual evaluation, and adjustment of guidelines and regulations for marine wildlife viewing by residents, visitors and commercial users. Soundwatch educates boaters on the current guidelines and regulations before they leave the shore; reinforces the learning experience on-the-water where disturbances take place; and provides a scientific platform to collect observational data on vessel activities around cetaceans. This annual and 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.

2014Soundwatch data collection consisted of: 1) counts of vessels within ½ mile of any cetacean by type, location and activity (vessel counts); 2) cetacean identification, location, travel direction and behavior states; 3) vessel contact information (vessel contacts); and 4) commercial and private vessel compliance with voluntary guidelines and/or regulations (vessel incidents). Whale sightings, locations, and whale behaviors are not covered in this report. All Soundwatch data on cetacean identification, location, travel direction, and selected behaviors is incorporated into The Whale Museum's Whale long-term Sightings Network database. Soundwatch data specific to SRKWs is compiled with other sightings data into the Museum's annual Orca

Master NOAA Contract Report. All Soundwatch killer whale sightings data is available through The Whale Museum's annual Whale Sightings and Orca Master data sets or upon request.

Included as an additional appendix to this report are compact discs (CDs) of the Soundwatch Program 2014 data sets in MS Excel. This update report on disposition of funds from Contract Number **RA-133F-12-CQ-0057, Tasks 6.2A & 6.3.1**, entitled Soundwatch Public Outreach/Boater Education Project fulfills reporting requirements under the NOAA Administrative Terms and Conditions of the contract.

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 2014 whale watching season and provide data analysis updates to the 2013report 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 2014 whale watch season;
2) Collect data on vessel activities during the 2014 whale watch season, especially relative to the 2011 U.S. federal and 2012 Washington State vessel regulations;
3) Conduct analysis on current whale watch activities including continued evaluation of 2011U.S.federal vessel regulations;
4) Provide 2014 data updates to the 2013 Soundwatch Public Outreach/Boater Education Project Report.

Project Results:

The contract listed several deliverables including:

Task 6.2A: Conduct estimated 50 days on-the-water Education and Monitoring Activities centered on May – September for calendar year 2014.

C.6.2A.1 Deliverables for Soundwatch Education and Monitoring Program.

Sub-Task 6.2.1.1: Summary of Soundwatch Activities, Patterns of Vessel Activities Around Whales, and Compliance with Regulations and Guidelines.

- 1) Whale Watching Trends in the Boundary Waters of Haro Strait May-September in numbers of visitors to Lime Kiln Point and number of active boats from US and Canada.
- 2) Growth of Commercial Whale Watching in the Boundary Waters of Haro Strait May-September in number of boats.
- 3) Commercial Whale Watch Platforms in the Boundary Waters of Haro Strait May-September in numbers of boats.
- 4) Average Number of Vessels with killer whales Per Month May-September in numbers of boats.

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

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

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

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

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

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

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

Sub-Task 6.3.1.2: Shore-based kayak education and monitoring program (not funded in 2013 or 2014).

Section I: Summary of Soundwatch Activities

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

The Whale Museum's Soundwatch Boater Education Program has developed standardized procedures for the training of new and seasonal staff, data collection, data entry and analysis. Soundwatch data collection procedures are designed to follow strict protocols using regionally established data parameters for SRKW's. Soundwatch staff and paid seasonal vessel drivers are required to undergo rigorous on and off the water trainings using standardized instruction, including comparison of simultaneous double-blind exercises. Soundwatch protocol is that vessel drivers observe vessel and cetacean interactions and dictate all data observations to trained Soundwatch volunteer interns who record the Soundwatch driver's observations onto standardized data collection forms. Trained Soundwatch community volunteers assist the Soundwatch interns with data recording tasks and help to hand-off educational materials to boaters. Range finding tools such as laser range finders, electronic radar and chart plotters as well as high-power binoculars are used to gauge distances. In all cases, Soundwatch drivers are instructed to make conservative estimates when determining distance and recording range encroachment. For example, if an observed vessel's distance to a whale is too difficult to ascertain, the driver does not record it; only vessels observed well within the regulatory or guideline approach distances to whales are recorded as *vessel incidents*. In 2014, Soundwatch staff, seasonal vessel drivers, interns and volunteers recorded 6-days, totaling 30-hours (approximately 7% of overall time) of on-the-water cetacean and vessel observation and data recording training activities (Figure 1).

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

During the summer months of 2014 (May-September), Soundwatch operated vessel patrols to educate and monitor boaters an average of five days per week with concentrated effort during the busiest months (July & August). Soundwatch staff and volunteer crews spent a total of 81days on-the-water between May 1, 2014, and September 27, 2014, totaling over 425 hours. Whales were present on 66 of those days, for 306 hours of vessel monitoring effort (Figure 1).Over the summer seasons (May-September) since 1998, Soundwatch has totaled more than 9,890 observational and outreach hours with vessels and whales in the Haro Strait region (Figure 2).

Figure 1: Distribution of Soundwatch On-the-Water Activities 2014.

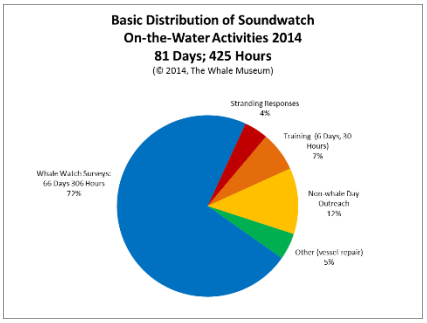
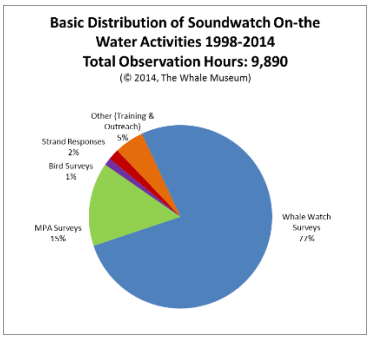
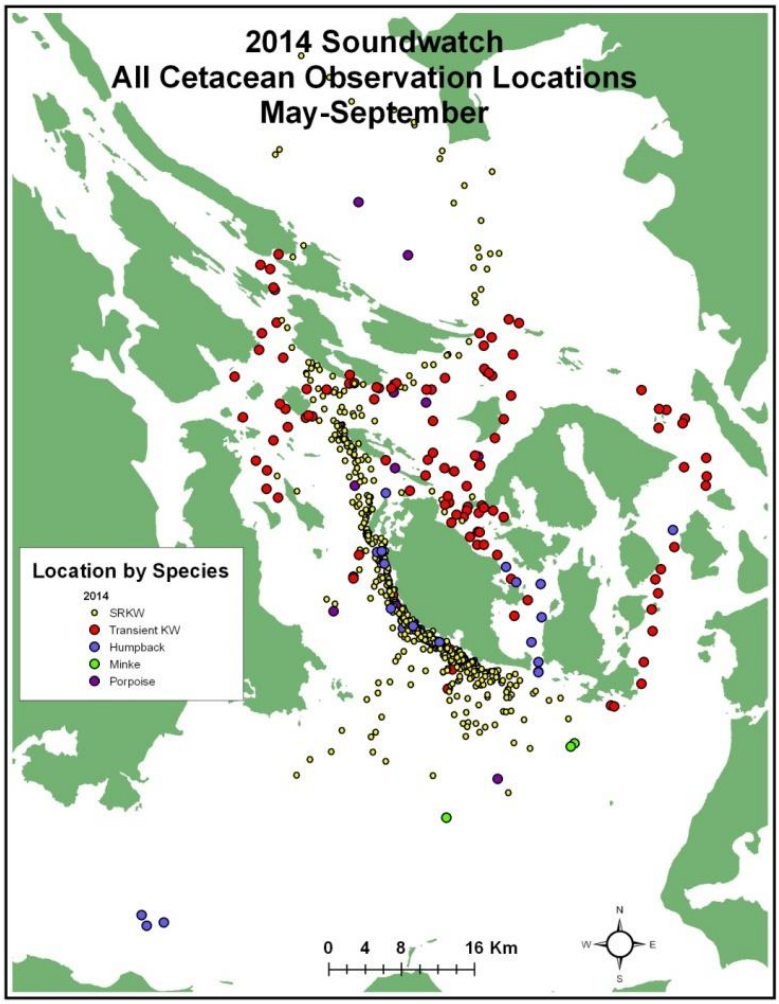


Figure 2: Distribution of Soundwatch On-the-Water Activities 1998-2014.



In 2014, 850 Vessel Count/Whale surveys were conducted with a variety of cetacean species, the majority being Southern Resident Killer Whales, in the Haro Strait Region of Washington State, U.S., and Southern Vancouver Island, British Columbia, Canada (Figure 3).

Figure 3: Soundwatch 2014,850Vessel Counts & Whale Surveys by Location and Species.



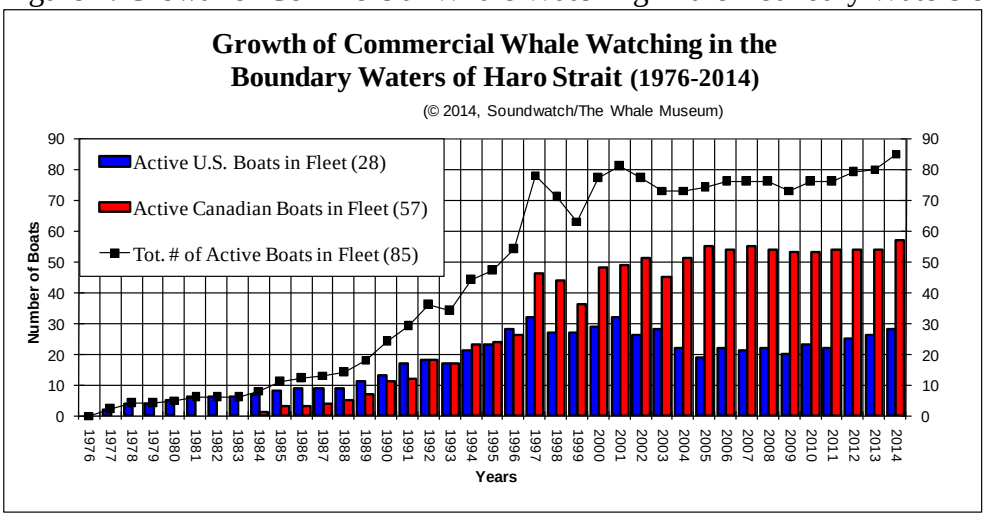
In addition to paid staff, the Soundwatch program relies on the work of dedicated volunteer interns and many community volunteers. In 2014, regular volunteers, including academic interns, provided over 1,275hours

of volunteer time participating on Soundwatch vessel patrols, distributing educational materials and assisting with data entry and photo archiving. These volunteers assisted with 1,059 hours of vessel patrols and an additional 216 hours of data entry. In 2014, paid Soundwatch Program staffing included a half-time coordinator responsible for the implementation and administration of the program (the other half-time coming from Research Curator position at The Whale Museum) along with 3seasonal, part-time seasonal vessel driver/educators.

Whale Watching Trends

Organized commercial whale watching tours began in the region in the mid 1970's and has steadily increased, reaching apeak in 1997, with 78 commercial whale watching vessels originating from ports in both the U.S. & Canada. Over the next 2 years, 1998 and 1999, the number of *active* vessels (vessels observed operating more than 1 day per week May-September) dipped to 71 and then down to 63. However, after 1999, the annul number of vessels began to rise again, nearly reaching the previous peak with 77 vessels in 2000, up to a new high of 81 in 2001 and back down to 77 vessels in 2002. Between 2003 and 2011 the number of commercial vessels hovered between 73 and 77 vessels, rising again in 2012 to 79.In 2013, 80 commercial whale watching vessels were operating in the U.S. and Canadian boundary waters of Haro Strait with a leap up to a new peak of 85 commercial vessels operating in the region in 2014 (Figure 4).

Figure 4: Growth of Commercial Whale Watching in the Boundary Waters of Haro Strait 1976-2014.



In 2014, 36*active* commercial whale watch companies offered whale watching trips from 85*active*commercial vessels in the U.S. and Canadian Haro Strait region (Figures 4-7).While the number of *active* commercial companies has remained nearly the same over the past several years (+/- 35), the number of *active* vessels each company operates has recently been increasing, with 2014 reaching a new, all-time high. There was also a slight shift seen in 2014 with19 U.S. companies outnumbering 17 Canadian companies in operation. There continues to be more Canadian vessels, totaling 57*active* vessels compared to 28 U.S. *active* vessels, (Figures 4-7). Canadian commercial vessels continue to be mostly smaller rigid hull inflatable (RHIB) style vessels, while the U.S. fleet is made up mostly of larger passenger style vessels. However, several Canadian companies have added large passenger style vessels, in addition to existing RHIB vessels, to their company fleets. Additionally, U.S. companies have added small cruiser-style vessels in addition to their existing large passenger vessels. Most new U.S. companies operate small, cruiser type vessels, many of them unmarked or minimally identified as commercial whale watching vessels. In 2014, only one U.S. company operates a RHIB style vessel. Over the past 2+ decades, the majority of both U.S. and Canadian commercial companies operating in the trans-boundary waters were members of the Pacific Whale Watch Association (formerly Whale

Watch Operators Association Northwest) as was seen again in 2014 (Figure 6).

Figure 5: 2014 Whale Watch Platforms in the Boundary Waters of HaroStrait.

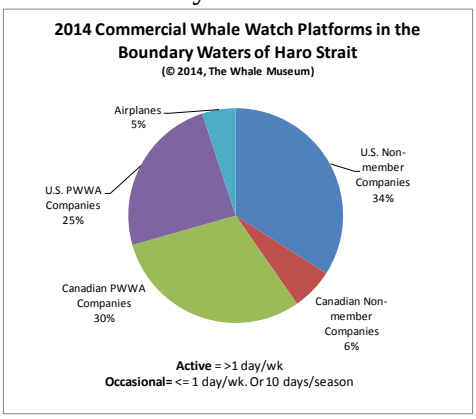
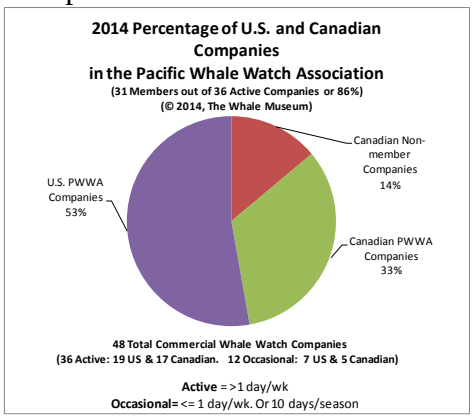


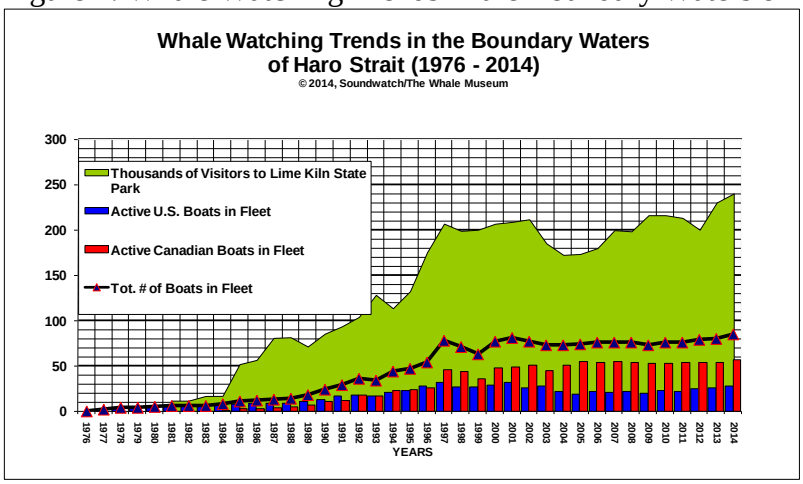
Figure 6: 2014 Percentage of U.S. and Canadian Companies in the Pacific Whale Watch Association.



Soundwatch has traditionally used a complex matrix to annually estimate the total number of vessel-based whale watch passengers. This estimate was based on total number of whale watch vessels, estimated % of daily passenger load on each vessel, an estimated number of trips per day, and number of total whale days in the region. Previous estimates hovered around 500,000 people engaging in vessel-based whale watching activities in the region. It was estimated that the number of passengers originating in the U.S. was very nearly the same as the number originating in Canada, as the smaller Canadian vessels made a greater number of trips per day, per vessel, than the one-trip-a-day, large passenger U.S. vessels. However, as the composition of the U.S. and Canadian vessel fleet has changed, as well as the number of trips per boat, per day, and with an increase in whale detections in the area, it is much harder to realistically estimate the total number of passengers engaging in whale watching in the region. As of yet, the commercial whale watch industry (majority PWWA members) does not share individual or total annual numbers of passengers engaged in whale watching in the Haro Strait region. To gain a more accurate understanding of the total number of people watching whales from vessels in the region, a targeted trans-boundary whale watching survey would need to be conducted.

Many shore-based whale watching areas have gained popularity in recent years due in part to the availability of real-time sightings reports using various social media and the efforts of groups such as The Whale Trail promoting shore-based whale watching. The Whale Trail is a partnership of non-profit and localized community groups dedicated to promoting shore-based whale watch opportunities throughout the region (http://www.thewhaletrail.org). Funding for Washington State Park employees to count the number of annual visitors to the Lime Kiln State Park/Whale Watch Park (a Whale Trail Site) has recently been cut, however, the current Park Ranger estimates that the total number of visitors to be approximately 230,000 people (Figure 7). This number, while an estimate, is the greatest number of visitors to the park reported. The increase may be due partly to an increase in social media reports (photos, tweets, etc.)of spectacular shore-based viewing opportunities at this popular whale-watch park, and is a more affordable and opportunistic way to see whales while visiting the San Juan Islands.

Figure 7: Whale Watching Trends in the Boundary Waters of Haro Strait 1976-2014.



Education & Outreach

When Soundwatch crews encounter vessels traveling in known whale or other wildlife areas, they politely contact the boater, provide marine wildlife viewing guidelines and regulations, and collect information on number of passengers. In 2014, Soundwatch distributed the current *Be Whale Wise Marine Wildlife Guidelines for Boaters, Paddlers and Viewers* (Appendix A & A1), and the *U.S. Federal Vessel Regulations for Killer Whales* (Appendix B & B1). When Soundwatch encounters kayakers that are easily approached, Soundwatch driver/educators communicate the special concerns for kayakers paddling around marine wildlife and additionally distribute the current *Kayakers Code of Conduct* brochure (Appendix C). In 2012 thru 2014, the Soundwatch *Whale Watching in the Salish Sea* Brochure, explaining the role of Soundwatch and highlighting areas in the San Juan County Marine Stewardship Area (such as the Voluntary Whale-watch Exclusion Zone along the Westside of San Juan Island) was not re-printed and its use was discontinued by the Soundwatch program. During 2014, Soundwatch delivered *Be Whale Wise* and U.S. federal vessel regulations for killer whales to 512 vessels reaching 1,430 recreational boaters. Soundwatch contacted an average of 3.24persons per vessel in 2014.

Through continuous Soundwatch monitoring, new vessels arriving on scene are observed and contacted, as are vessels that Soundwatch already contacted but require some kind of follow-up. Every time a vessel is contacted, specific contact information is recorded on a *Soundwatch Vessel Contact data sheet* (Appendix D). Soundwatch crews record the date, time, location, type of vessel contacted, the vessel activity, vessel registration, name, description, port of origin, and number of passengers on board. Soundwatch crews then determine a series of vessel operator attributes using standardized criteria while the Soundwatch driver informs them about the marine wildlife rules. Vessel operator attributes that Soundwatch records include: why the vessel was contacted; whether they took the information and, if not, why; were they aware of the information; what was their reaction to Soundwatch; whether this vessel been contacted by Soundwatch before. Additionally, Soundwatch crews record if Soundwatch re-contacted this same vessel again on the same day; if there was a Soundwatch observed vessel incident recorded with this vessel before or after contact, if so the time of the incident is recorded; if there were photos of this vessel, and any other relevant comments.

In addition to the on-the-water outreach, over 1,000 *Be Whale Wise* brochures and 50 posters as well as 1,000 new Federal Rules rack cards and 50 posters were distributed in 2014to regional federal, state, county and private parks; boating facilities; boating organizations, and at regional festivals. Brochures and posters were also made available at regional conferences and marine wildlife related workshops. The Whale Museum displayed *Be Whale Wise*, new Federal Rules for killer whales and Responsible Whale Watching exhibits and

made all brochures available to over 30,000 museum visitors and education program participants. In addition, materials were given to over 2,500 Whale Museum members and adopters through The Whale Museum's Orca Adoption Program. Soundwatch Stewardship Trainings were conducted for new and returning Soundwatch volunteers and interns, and three trainings were held for San Juan Island commercial kayak guides as part of the Soundwatch KELP kayaker education program.

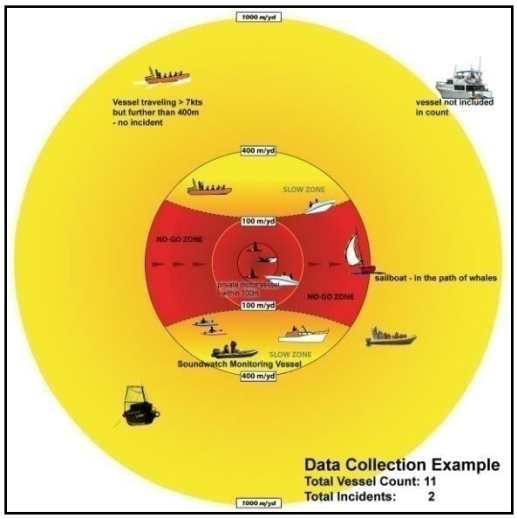
The Soundwatch Kayak Education and Leadership Program (KELP) targets outreach to recreational and commercial kayakers. In 2010, Soundwatch was contracted with San Juan County Parks to assist with planning and implementation of a new seasonal vessel launch permit, a Kayak Vessel Code of Conduct education program and to collect data on kayaker use trends at the San Juan Island County Park. In 2011, the San Juan County Park administered the permit system, implemented the outreach program and a self-reporting data collection system designed by Soundwatch based on KELP (Appendices E, F & G). In 2012, the Soundwatch KELP program provided the content and materials for an updated Vessel Code of Conduct training, an updated Kayakers Code of Conduct brochure, posters and signage for the park and conducted guide trainings for commercial kayaker operators. In 2013 and again in 2014, the Soundwatch KELP program provided kayak guide training and the County Park provided a slideshow training for private boaters to view before launching. Data collection on vessel launching from the park was done through a boater self-reporting system and is administered by the San Jan County Park staff.

Soundwatch vessel monitoring is conducted continuously by rigorously trained driver/educators to determine vessel activities around whales including commercial and private vessel compliance to the voluntary guidelines and regulations. Trained Soundwatch interns and/or volunteers record observations dictated by the Soundwatch driver/educator. Soundwatch driver/educators are paid staff and undergo substantial training to ensure uniform data collection protocols and minimize inter-observer bias. Descriptions of guidelines and regulations, along with the incident codes used to record incidents of guideline and regulation violations can be found in Appendices H & H1. Incidents are recorded opportunistically as they are observed using a *Vessel Incident datasheet* (Appendix I). Soundwatch staff are conservative in recording incidents. If there is any doubt about an incident having occurred, it is not recorded.

Vessel Monitoring

Surveys of whales and a count of vessels within one half-mile of whales are collected every half-hour using a *Soundwatch Vessel Count/Whale Survey data sheet*(Appendix J).Soundwatch staff and volunteer crews record whale and vessel data using a set of standardized vessel type and vessel activity definitions as well as whale attributes agreed upon by U.S. and Canadian cetacean researchers (2004 NOAA SRKW workshop) and used by both monitoring programs, Straitwatch of B.C., Canada, and Soundwatch (Appendix K).Vessels within one half-mile mile (880 yards) of all known whale activity are counted according to type and vessel activity (Figure 8). Range finding tools such as laser range finders, electronic radar and chart plotters as well as high-power binoculars are used to gauge distances. In all cases, Soundwatch staff are instructed to make conservative estimates when determining distances. The area of known whale activity is variable and not limited to a half-mile, but rather represents the core of individual whales or groups of whales in the immediate area and can range upwards of one mile. Often the whales are more spread out than one mile. When visibility and conditions are good, a secondary count is made for the group of vessels and whales beyond one mile that the Soundwatch staff can reliably record beyond the primary count, but that the Soundwatch vessel is not with. A count confidence level is determined by choosing it to be an 'A count' (highest confidence and usually the count the Soundwatch vessel is in) and a 'B count' still reliable enough to count, but with less confidence and usually the count that the Soundwatch vessel is not in.

Figure8: Soundwatch Vessel Patrol Count and Vessel Incident Data Collection Diagram Example.
(Figure illustration courtesy of Doug Sandilands / Straitwatch Program, B.C.)

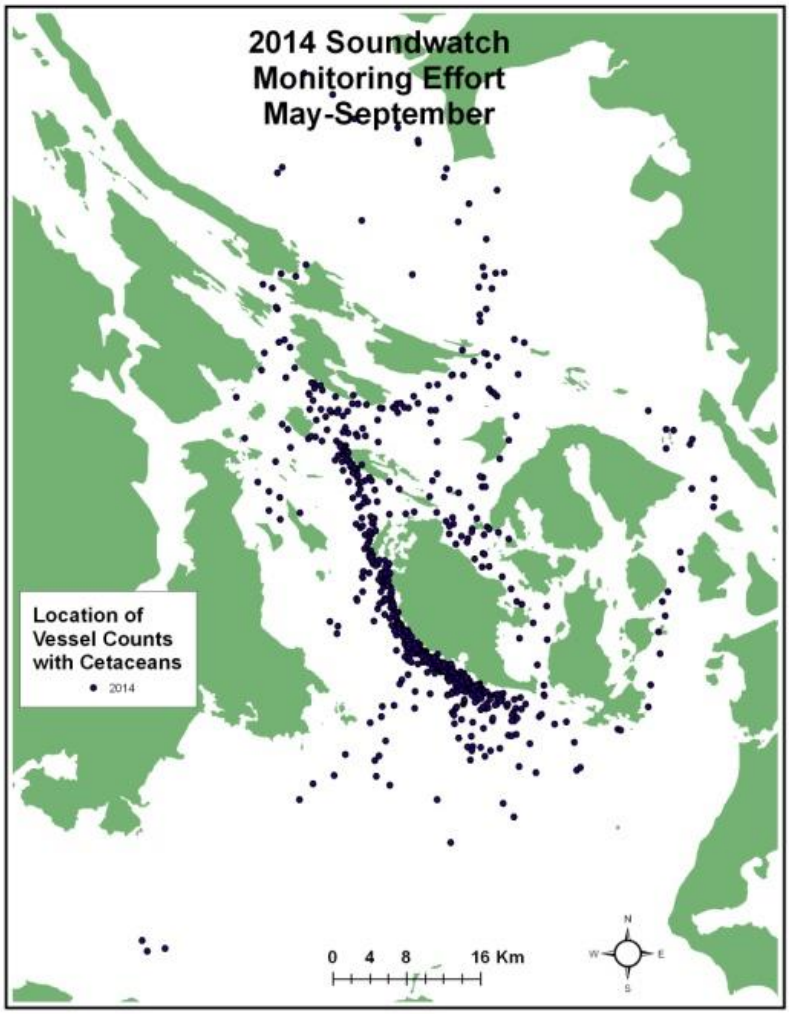


Each observed vessel within the count range is categorized according to a vessel type and a specific best-fit vessel activity to describe what the vessel was engaged in (Appendix L). Vessel activity categories include *transiting*(moving through the area within one half mile)*; whale oriented* (moving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

Soundwatch Vessel Count Trends

Plotting annual locations of Soundwatch vessel counts can be used as an overall indicator of Soundwatch effort and can be compared to annual and long term Southern Resident Killer Whale Habitat Use Maps generated by The Whale Museum's annual Orca Master Program and presented in annual NOAA Contract Reports (Appendix M). Comparing annual SRKW sightings data with Soundwatch vessel monitoring effort confirms that the Soundwatch program targets effort where the majority of SRKW sightings occur and where the largest concentrations of vessels and whales are likely to overlap (Figures 9 – 11).

Figure 9: 2014 Soundwatch All 850 Vessel Counts by Location Map.



There are obvious trends of overlap in whale habitat use and boating activities within a half mile of the whales, including whale watching, fishing, transiting as well as acoustic influence from large vessels transiting greater than a half mile from whales. The majority of vessel counts by Soundwatch in 2014, as in previous years, tended to be within a half mile nearshore along the Westside of San Juan Island (Zone 1- the 2009 NOAA proposed vessel restriction area), outside of a half mile along the Westside of San Juan Island and north into Haro Strait (Zones 2, 3, and 5) (Figure 10). The areas observed by Soundwatch with the highest density of vessels within ½ mile of whales occurred in the same areas described above and are also areas frequently used by SRKW's (Figure11).

Figure 10: 2014 Soundwatch All 850 Vessel Counts By Numbered Zone Map.

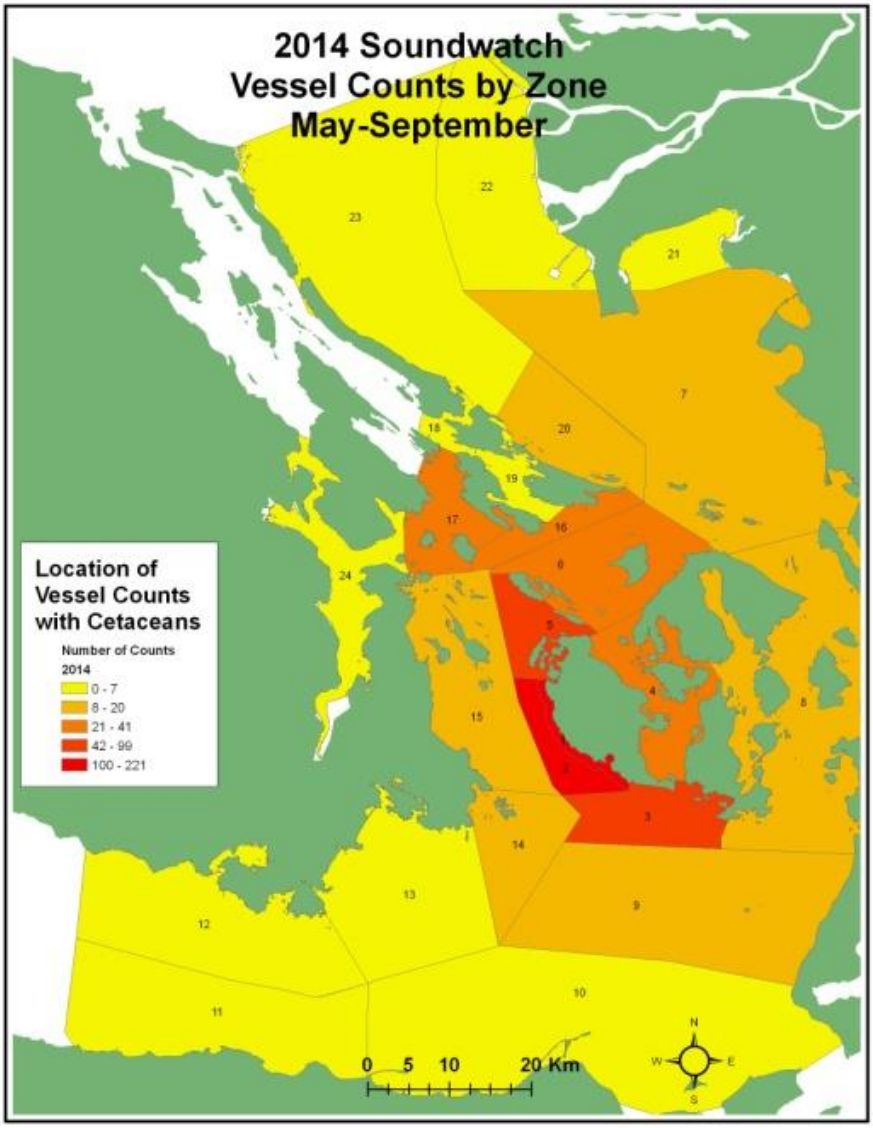
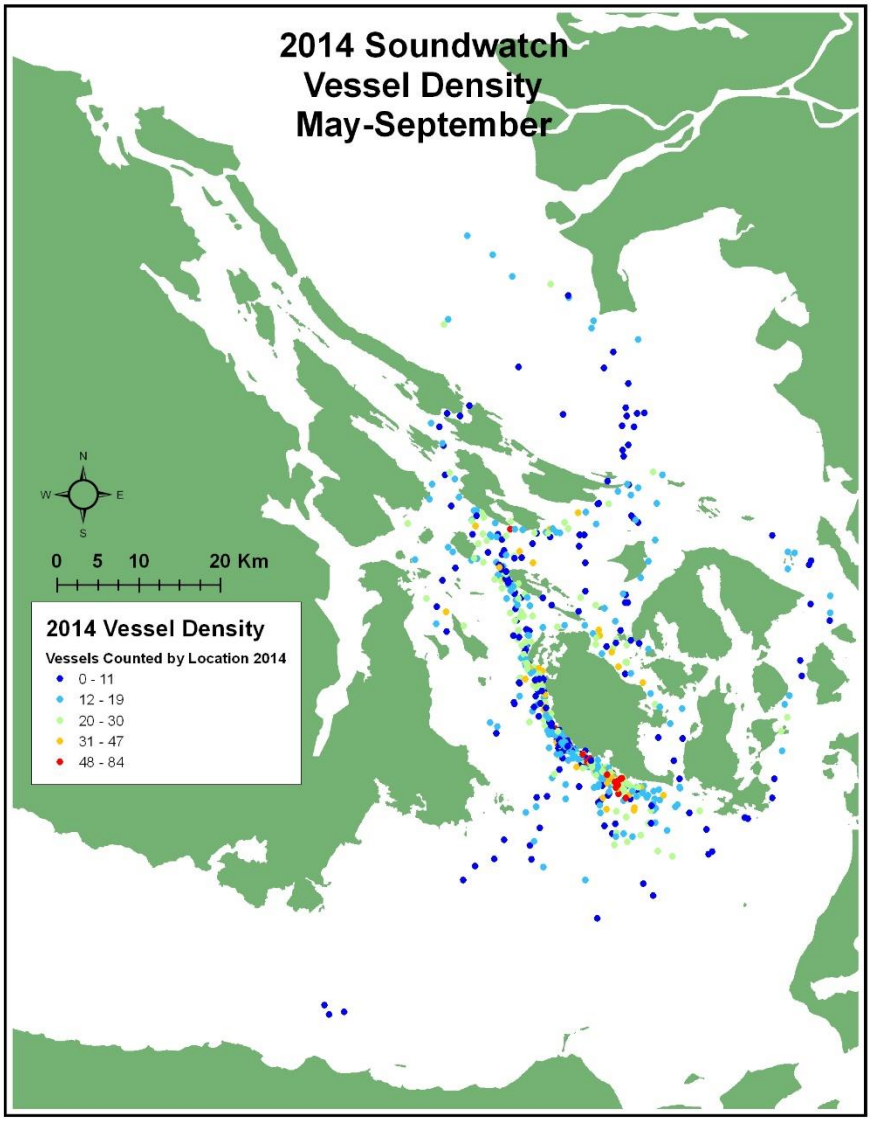


Figure 11: 2014 Soundwatch Vessel Density Map.



Section II: Patterns of Vessel Activities around Whales

Southern Resident Killer Whales have been the primary viewing target for both commercial and recreational viewers and have had an annual and monthly average of nearly17 vessels of various types within a half-mile of their location from May through September between the hours of 9 a.m. and 6 p.m., from 1998-2014, as observed by Soundwatch. In addition, there is a bi-modal vessel peak trend around 11a.m and 3p.m. evident again in the 2014 data(Figures 12-15)which reflects morning and afternoon commercial whale watching trips which often attract even larger numbers of recreational vessels during this same time period. In 2014, during May-September, the average number of boats observed within ½ mile of whales was 18. The annual average has increased over the past three years, after a previous trend of decreasing annual averages, the lowest average of 12 vessels being observed in 2011(Figures 16-18).The recent increase in average vessel numbers is more consistent with local marina numbers (as reported to the San Juan County Marine Resources Committee (MRC) by Roche Harbor and the Port of Friday Harbor on San Juan Island at various MRC committee meeting presentations) which have had consistently high vessel use during this same 5-year period, even during years of severe economic depression. The increase in vessels is also consistent with the recorded growth of U.S. and

Canadian commercial whale watch industry vessels (Figure 4). Explanations for previously low vessel averages may be that they were artifacts of reduced overall numbers of SRKW sightings days observed in inland waters during the past several years (Orca Master & Robert Otis, The Whale Museum) and did not accurately depict the actual numbers of boats with whales in the region. During those low sightings years, SRKW also spent fewer days travelling together in large groups and were more likely to be in multiple smaller groups in distinct areas (i.e. part of J pod observed along the Westside of San Juan Island and another part of J pod near the Fraser River area) thereby spreading out the number of commercial whale watch vessels and the private vessels they attract. Also potentially confounding the average annual count, is that SRKW's have spent more time in spread-out groups than in tight groups when travelling in small or large groups; this too spreads out the overall number of vessels beyond ½ mile (Soundwatch unpublished data). Presumably SRKW sightings are lowest during low salmon return years, which have been the trend over the past several years with Chinook salmon runs reaching all-time lows. The reduction in salmon returns effects opportunities for recreational fishermen and may be reflected in overall reduced numbers of fishing vessels overlapping with SRKW and thereby reducing the annual vessel averages. Another trend is that while overall SRKW sighting have been low, increased numbers of Transient killer whales, minke whales, humpback whales and large groups of pacific white-sided dolphins have frequented the inland waters also drawing more interest, in a wider variety of areas. As SRKW sightings in inland waters return to more normal trends (The Whale Museum's Orca Master), it would be expected that annual average of numbers of vessels traveling with them would return to levels seen in previous years. A further analysis focusing on annual whale sightings and vessel trends would flush out further explanations

The 2014 annual maximum number of vessels observed with whales was 84 total boats, which is greater than the maximums from the 4previous years, but closer to the normal range of the past 17 years (Figure 19). There is annual and monthly variability in the maximum and average number of boats with whales (Figures 16-23) with the maximum number of commercial whale watch vessels being 24, recorded in July, and private vessels being 62 recorded in September. The maximum number of kayaks, 30, was also recorded in July (Figure 21). The 2014 monthly average of commercial whale watch, private vessels, and kayakers remained mostly constant throughout the season, again with peaks seen in July and August (Figures 12, 20-23). Annual and monthly maximum vessel totals are often more than double the annual average vessel total, thus neither the average nor maximum number best describes the actual vessel conditions the whales routinely experience. Vessel numbers observed with whales typically decline dramatically in October both because the whales are less predictably in the area and the main commercial and recreational boating season is over. Soundwatch did not collect vessel data in October of 2014.

It should be noted for interpretation of the data presented, that the average and maximum numbers of vessels depicted in the figures are discrete observations and are therefore not totals of each vessel type. For example, in 2014 the maximum number of all vessel types recorded within a half mile of whales was 84 (Figures 21-23), with the maximum of commercial vessels observed at 24, private recreational vessels at 62, and kayakers at 30, which if totaled together would equal 116, well above the recorded maximum number of 84 vessels. However, the maximum numbers of each vessel type were not observed all at the same time, on the same day, and are therefore not totals of each other.

Figure 12: Average Number of Vessels Accompanying Orcas by Month, 1998-2014.

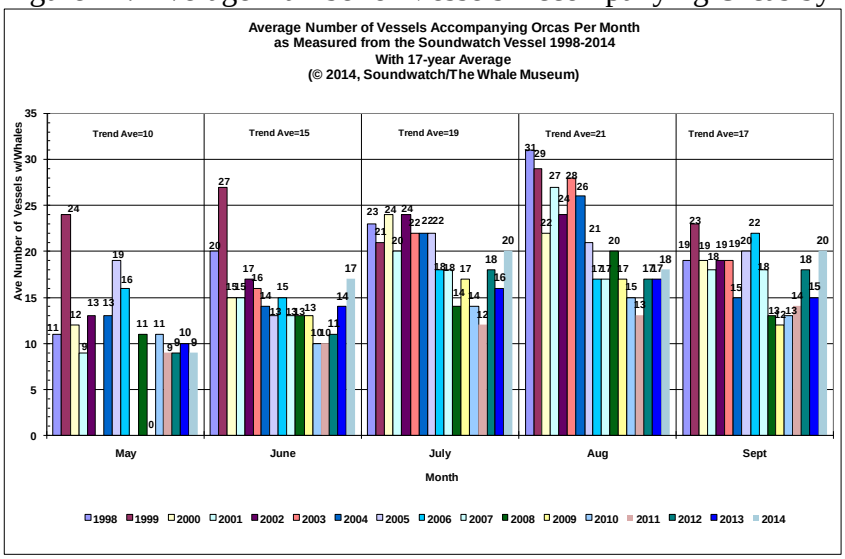


Figure 13: Annual Average Numbers of Vessels with Orcas by Time of Day, 1998-2014.

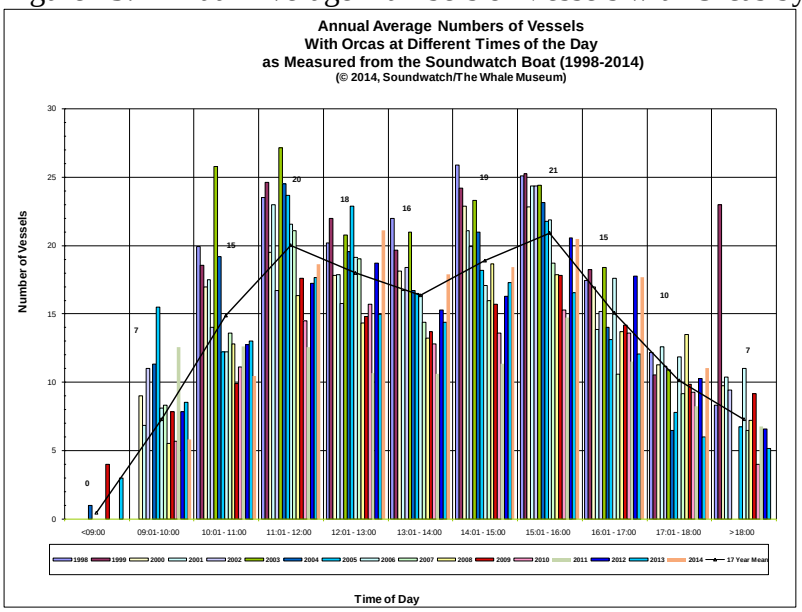


Figure 14: Monthly Number of Vessels with Whales by Time of Day, May-September 2014.

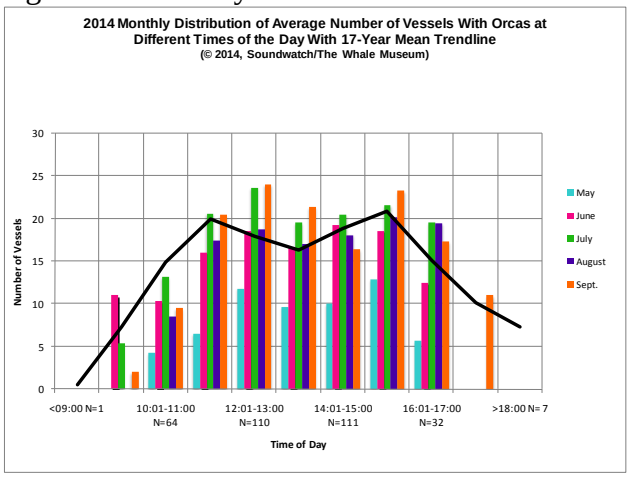


Figure 15: Average Number of Vessels with Whales by Time of Day, May-September 2014.

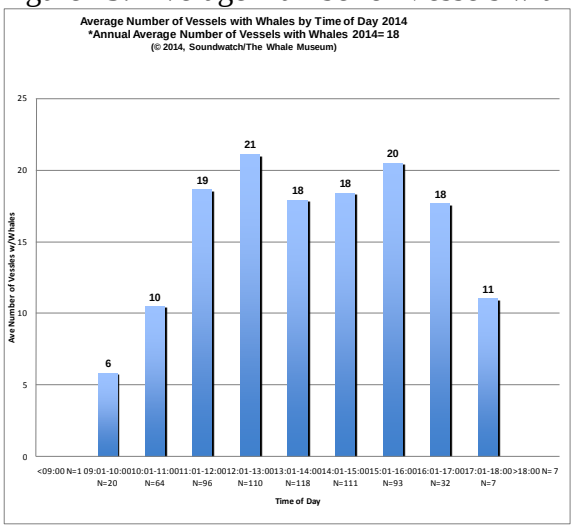


Figure16: Annual Vessel Type Averages and Maximums Accompanying Orcas in Boundary Waters, May-September, 1998-2014.

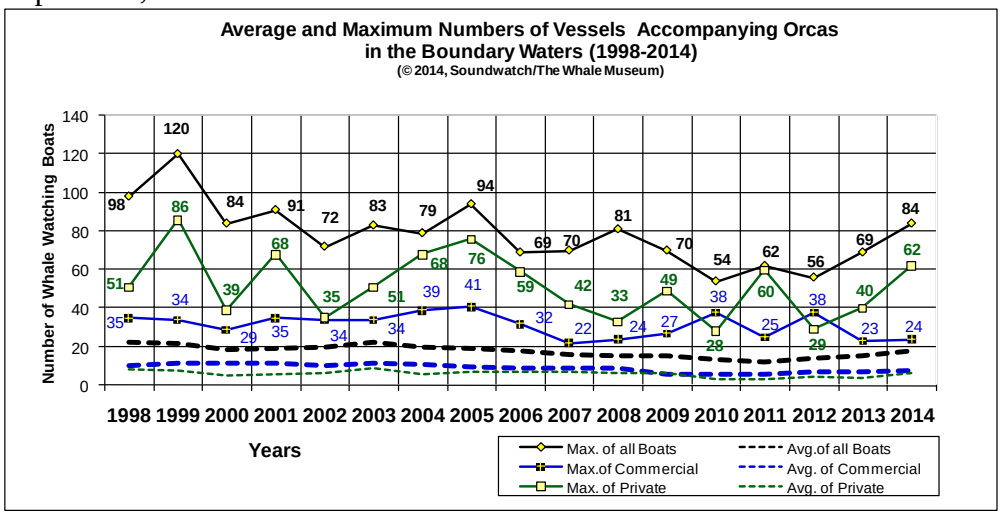


Figure 17: Annual Averages of Vessel Types Accompanying Orcas May-September, 1998-2014.

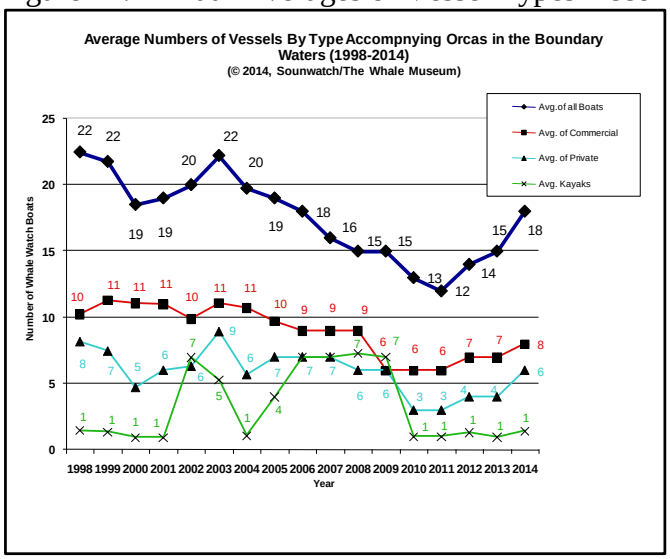


Figure 18: Mean Annual Daily Average of Number of Commercial and Private Boats with Whales in Haro Strait Region May-September 1998-2014 with Standard Deviation.

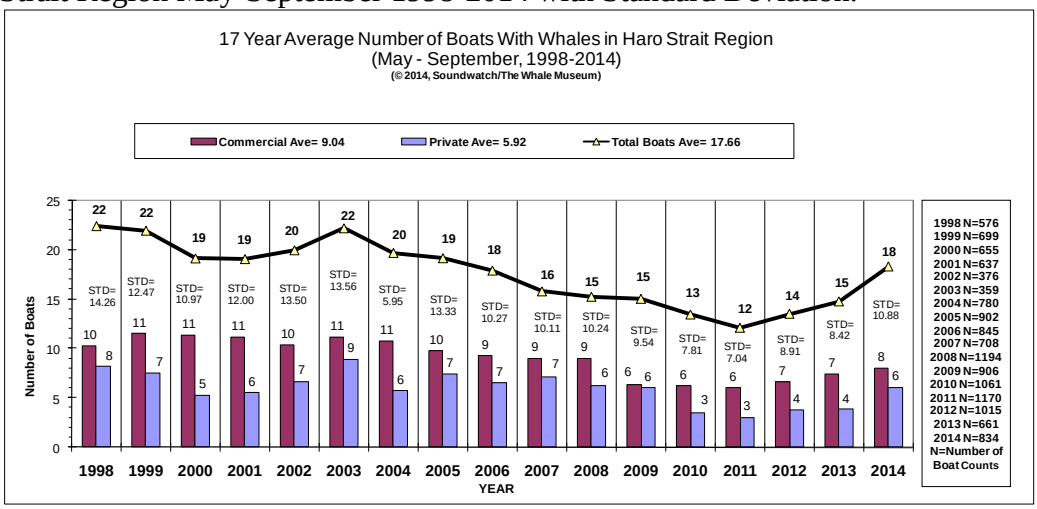


Figure 19: Annual Maximums of Vessel Types Accompanying Orcas May-September, 1998-2014.

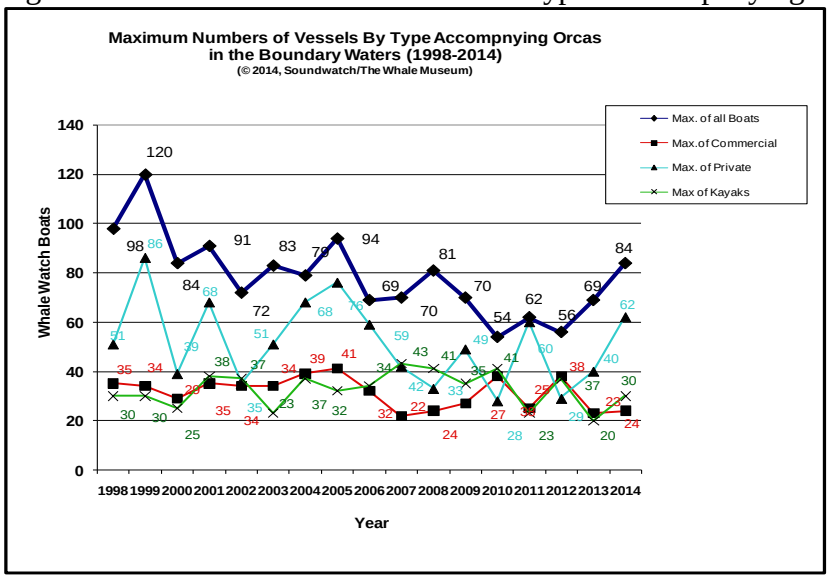


Figure 20: Monthly Average by Type of Vessels with Orcas, May-September 2014.

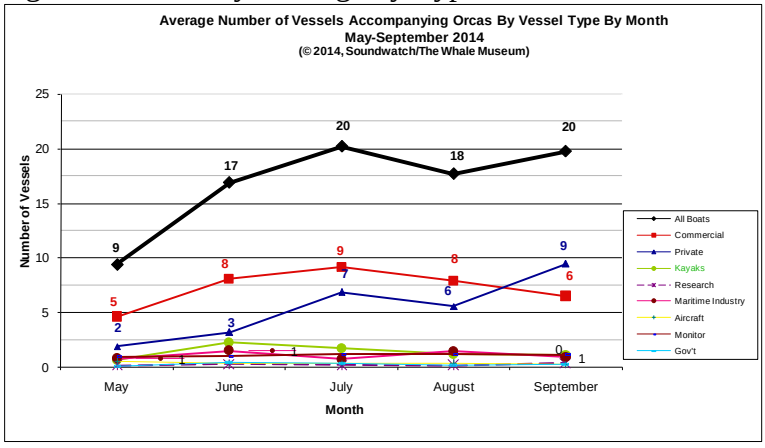


Figure 21: Monthly Maximum by Type of Vessels with Orcas, May-September 2014.

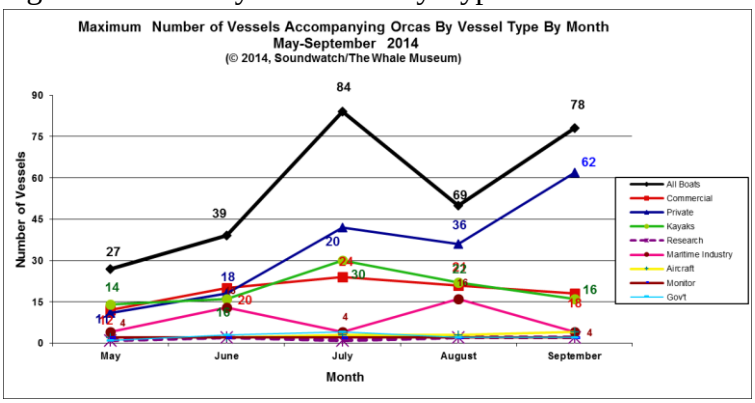


Figure 22: Average Number of Commercial Vessels with Whales by Commercial Vessel Type by Month, 2014.

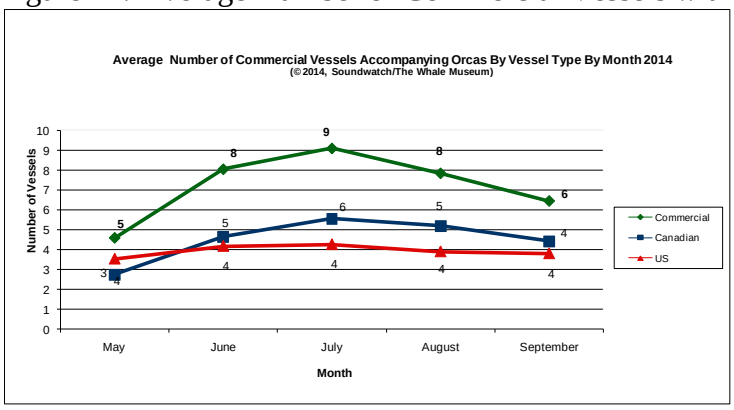
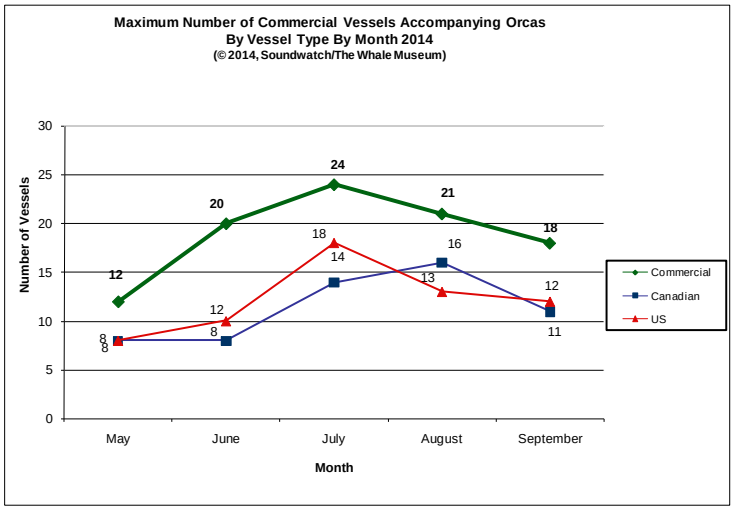


Figure 23: Maximum Number of Commercial Vessels with Whales by Commercial Vessel Type by Month, 2014.



There is a great variability in the number and types of vessels with whales (Figures 12-27). This wide variability is a factor not only of month and time of day, but also due to whale locations overlapping with vessels engaged in a variety of activities (Figures 24-27). Of the vessels seen on average with whales in 2014,49% were commercial whale watch vessels (22% U.S. and 27% Canadian), 33% private vessels, 6% marine industry (shipping/cargo and commercial fishing), 6% monitoring vessels (Soundwatch), 8% kayaks, <1% research vessels, 2% airplanes, <1% government (enforcement and military). These numbers are similar to

previous years. Throughout the season the majority (66%) of vessels observed within a half mile of whales were engaged in whale-oriented activities(Figure 25).Other vessel activities recorded within a half mile of whales included transiting at 19%, and recreational and commercial fishing activities at 10%. Fishing activities (largely recreational in 2014) increased in September, raising the average and maximum of vessels recorded as engaged in fishing to above average and maximum numbers of commercial and recreational whale oriented activities near whales (Figures 26 and 27). Soundwatch records large maritime industry vessels such as marine cargo ships, tugs with tows, cruise ships, etc., that are outside of a half mile of whales but are within known acoustic range of whales; if one of these large ships is within a half mile of whales it is recorded as transiting. In 2014, 4% of vessels recorded with whales were large ships within acoustic range of whales (Figures 24-26).

Figure 24: Distribution of Vessels by Vessel Type When Whales Present May-September 2014.

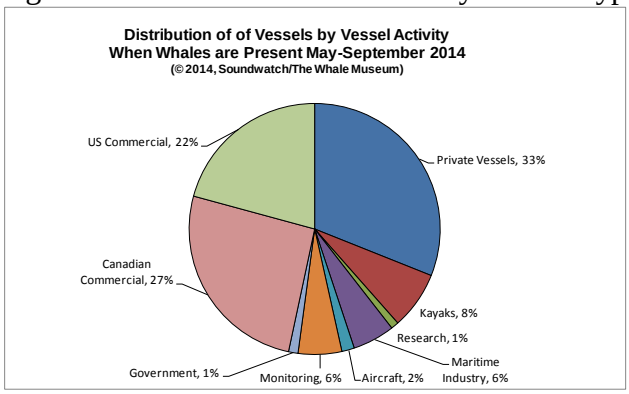


Figure 25: Distribution of Vessels by Vessel Activity When Whales Present May-September 2014.

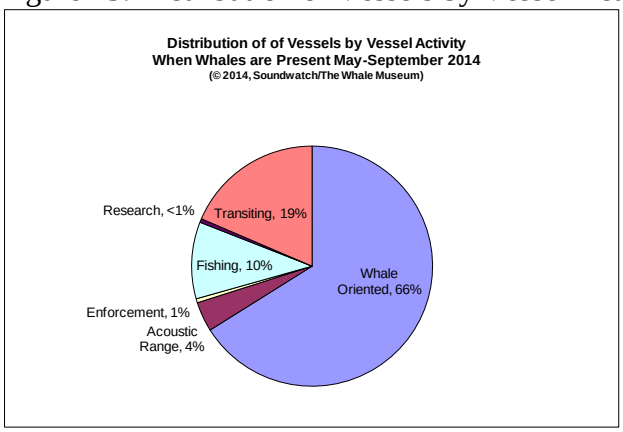


Figure 26:2014 Monthly Average Numbers of Vessels with Whales by Vessel Activity.

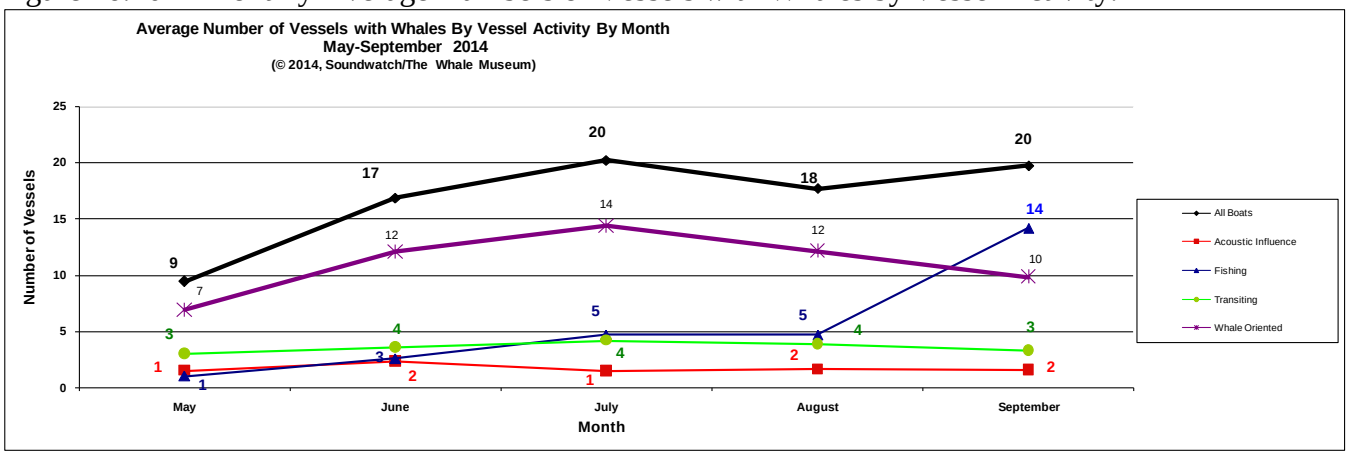
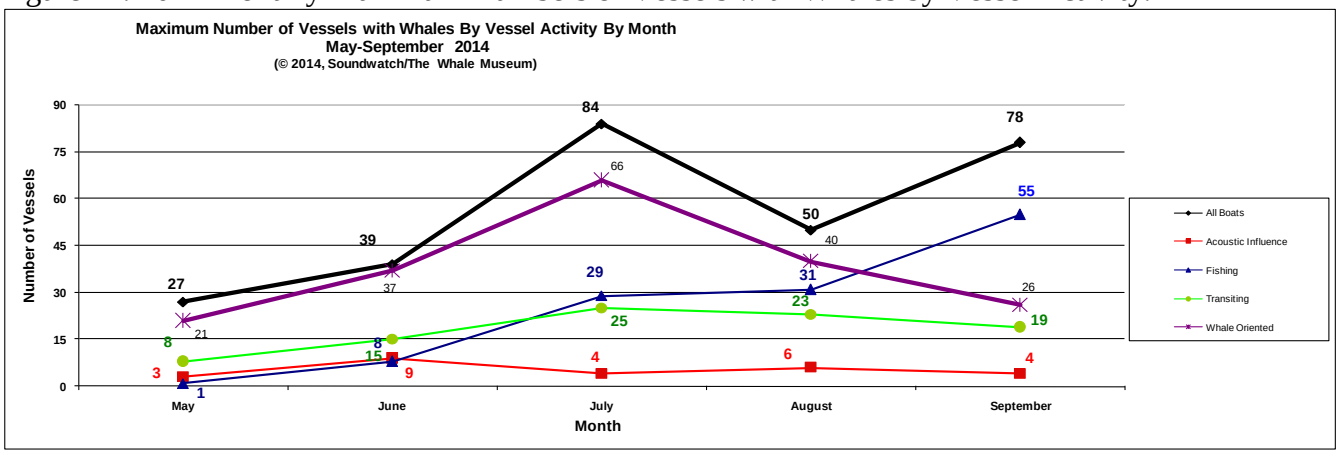


Figure 27: 2014 Monthly Maximum Numbers of Vessels with Whales by Vessel Activity.



Section III: Compliance with Regulations and Guidelines

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

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

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

Since 2012, the Soundwatch program has not provided summary *incident feedback reports* to member companies of the Pacific Whale Watch Operators Association (PWWA) as was done from 1996-2011. Instead, this annual program report is provided to the PWWA executive committee and regional enforcement agencies

(NOAA, Washington State Fish and Wildlife& the Department of Fisheries and Oceans Canada) and are posted for the public on The Whale Museum's website www.whalemuseum.org.In previous years (1996-2010) Soundwatch also provided *incident feedback reports* (weekly, monthly and annual vessel incident summaries) detailing Soundwatch-observed, vessel identified, commercial company vessel incident information to the whale watch industry and a generic (no vessel identification, vessel type included) summary to the regional law enforcement agencies. Changes were made to the Soundwatch feedback reporting process in 2011 based in part on feedback from the whale watch industry's concerns about how this potentially sensitive information may be now used in a legal context relating to new vessel regulations (previously they were guidelines) and from concern expressed by the NOAA Northwest Regional Director that Soundwatch not take on the role of law enforcement. Consequently, beginning in 2011, Soundwatch incorporated new data collection protocols to not record specific vessel identification for any vessel (commercial or private) and reduced feedback reports to the annual program reports depicting overall vessel and whale watching trends. Also after 2011, the PWWA no longer invites Soundwatch staff to present annual Soundwatch observed vessel trends to PWWA members at annual PWWA meetings. Instead, PWWA members read and discuss Soundwatch trends on their own.

Vessel Incident Trends

Soundwatch uses summary statistics to analyze annual vessel incident data. Since its inception in 1993, Soundwatch has used an *adaptive management approach (i.e. changing guidelines annually to meet changing vessel/whale conditions)*and there have been many shifts in the types and numbers of *vessel incident* categories over the years (Table 1). This makes comparing overall vessel incident numbers from year to year somewhat difficult to interpret. In 2011there was one new incident category added to reflect the new U.S. federal vessel regulations: *vessel within 100-200 yards of whales* (the second part of the new 2011 regulation, *stopped 200-400 yards in the path* was captured in a previous guideline "parked in the path" incident category). However, with the addition of this one new incident category, it is now possible to record a single vessel as having 2 simultaneous incidents when the vessel is observed within 100-yards of a whale: 1- *within 100 yards* and 2- *within 200 yards.* In previous years, an observation of this same vessel behavior would have been recorded as one single vessel incident. Thus while annual Soundwatch *vessel incident* summaries are useful tools to evaluate vessel trends, especially with the implementation of new vessel regulations, some diligence is needed to accurately interpret the year to year changes. To further complicate matters, it is difficult to measure the true effectiveness of guidelines and new regulatory measures when 1-they are not consistent on both sides of the U.S./Canadian border (which the whales and vessels frequently travel back and forth across, sometimes straddling the boarder so that different regulations apply to vessels depending on which side of the whales your vessel is on),2-guidelinesand regulations are not consistent for other regularly viewed cetacean species, and 3-there is not consistent law enforcement and monitoring presence on either side of the border.

Plotting annual locations of Soundwatch observed vessel counts and vessel incidents can be used as an overall indicator of vessel density and incident patterns within a half mile of Southern Resident Killer Whales within the designated SRKW summer core habitat (Figures 9 – 11 and 28-30). These maps 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 M). Comparing annual SRKW sightings data with Soundwatch observed vessel density locations and vessel incident density locations confirms that the areas that the SRKW use most frequently have (or attract) the highest density of vessels and result in high levels of observed vessel incidents.

Figure 28: 2014 Soundwatch All 2,509 Observed Vessel Incidents by Incident Location Map.

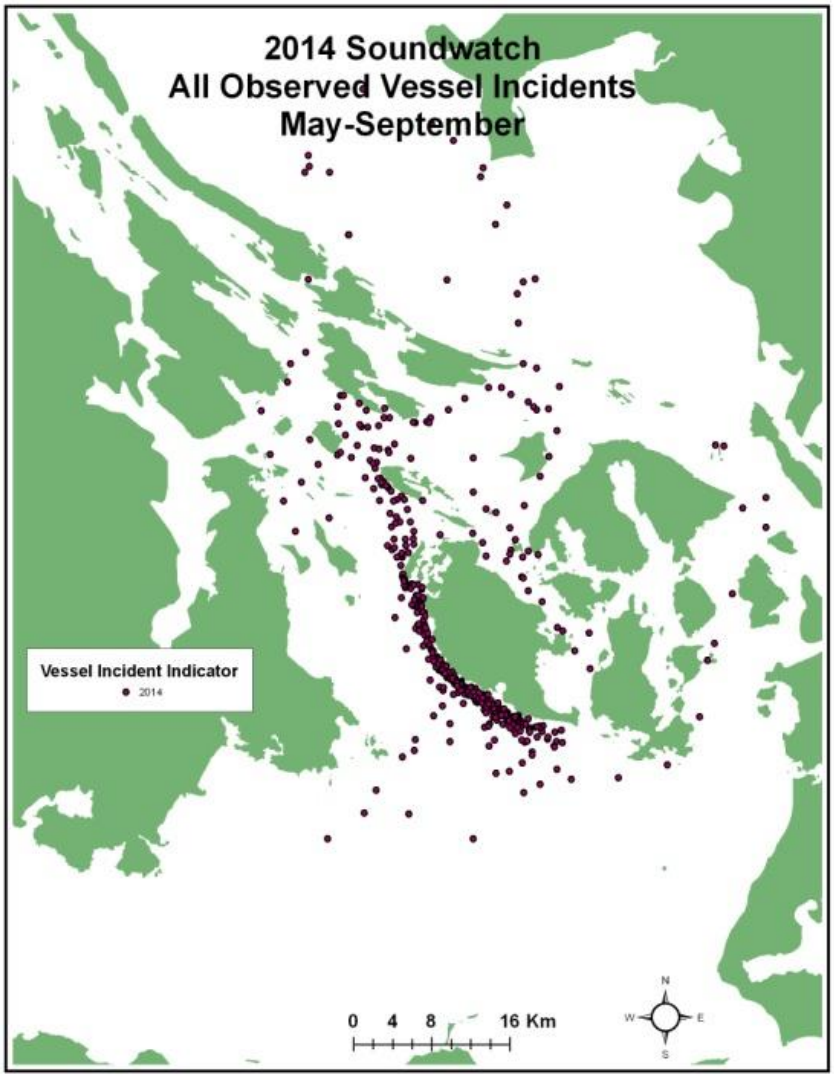
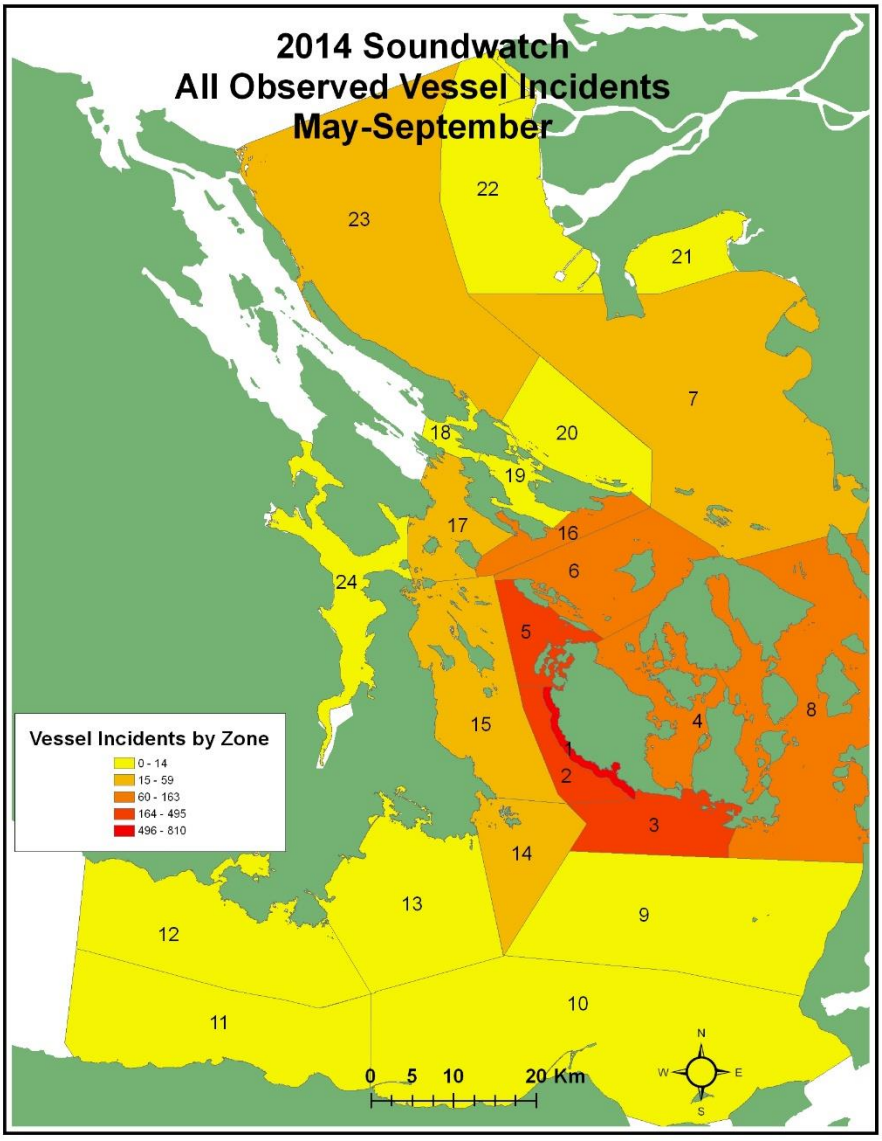
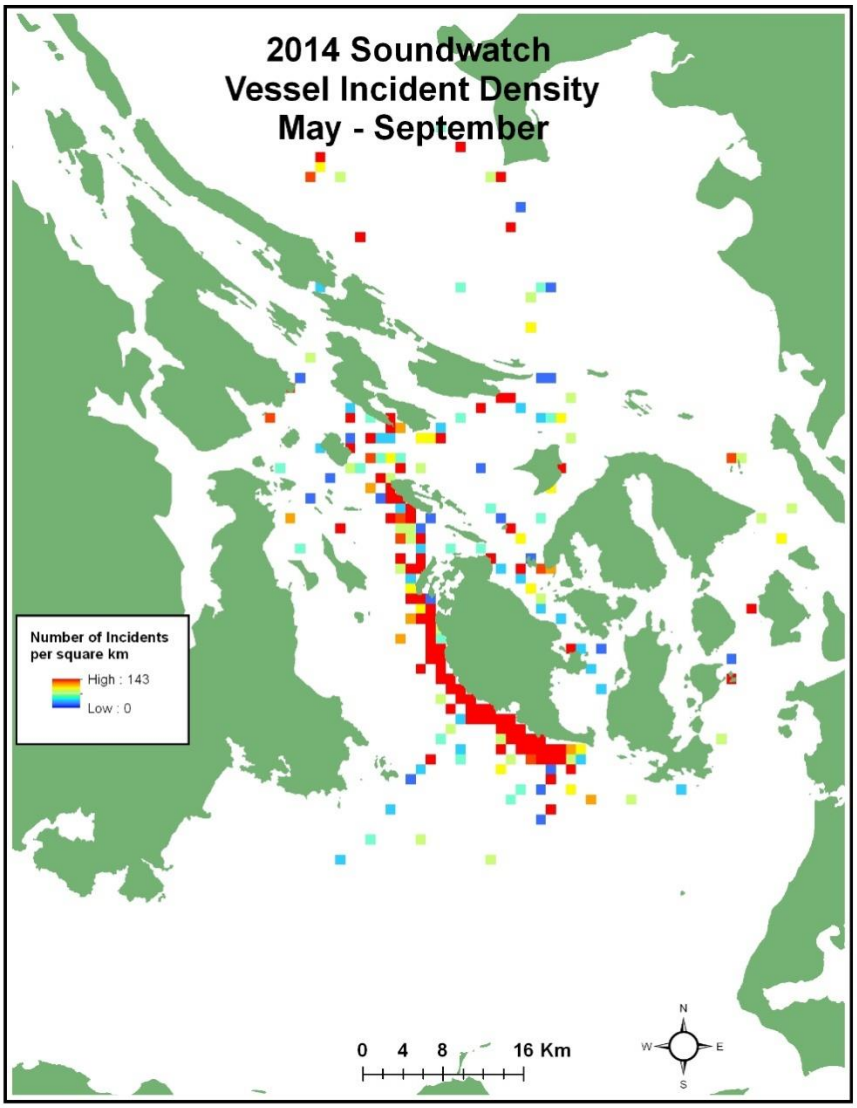


Figure 29: 2014 Soundwatch All Observed Vessel Incident Numbers by Zone Map.



There are obvious overlapping trends of whale use and boating activities within a half mile of whales including whale watching, fishing, and transiting. As in previous years, the areas with the most vessel incidents observed by Soundwatch in 2014 tended to be within a half mile near shore along the Westside of San Juan Island (Zone 1- the 2009 NOAA proposed vessel restriction area) and outside of a half mile along the Westside of San Juan Island and North and South into Haro Strait and (Zones 2, 3 and 5) (Figure 29). Not surprisingly, the areas with the highest vessel densities also tend to have the highest density of vessel incidents (Figure 30). However, some areas that are less frequented by the whales and have overall less vessel density, do occasionally have high numbers of vessel incidents (Figure 30). These incidents may occur due to poor knowledge of expected behavior from vessel operators not familiar with driving around whales, or because the whales are in vessel travel corridors with occasionally high vessel densities or perhaps because these areas have less public observation of whale watching boats and vessel operators behave differently when they are perceived as not being observed.

Figure 30: 2014 Soundwatch Observed Vessel Incident Density per Square Kilometer.



In 2014, there were a total of 2,509 vessel incidents observed and recorded by Soundwatch staff during 306 hours of observation, up from 2,234 vessel incidents observed and recorded during 331 observation hours in 2013 (Tables 1 and 2, Figures 28-33). Overall in 2014, 74% of recorded vessel incidents were potential violations of the U.S. state and federal whale watching regulations. Of this 74%, the overall regulatory category of **Vessels within 200 yards of Whales** accounted for 48% of all incidents (this category includes *Vessels Stopped within 0-100 yards* 13%*; Vessels Stopped within 100-200 yards* 14% (combined 27%)*; Vessels Motoring within 0-100 yards* 9%*; Vessels Motoring within 100-200 yards* 12% (combined 21%)) and the **Vessels in the Path of Whales** regulatory category making up the remaining 26% of the recorded vessel incidents. The third most commonly recorded incident type, **Inshore of Whales** made up 9% of incidents, followed by **Vessels Motoring Fast (>7knots) within one quarter mile (440 yards) of Whales** at 8%, both Be Whale Wise and PWWA guidelines. In 2013, 66% of recorded vessel incidents were potential violations of the U.S. state and federal whale watching regulations (38% **Vessels within 200 yards of Whales;** 28%**Vessels in the Path of Whales**) (Figure 31, Table 1).

Figure 31: 2014 Soundwatch Observed Vessel Incident Percentages.

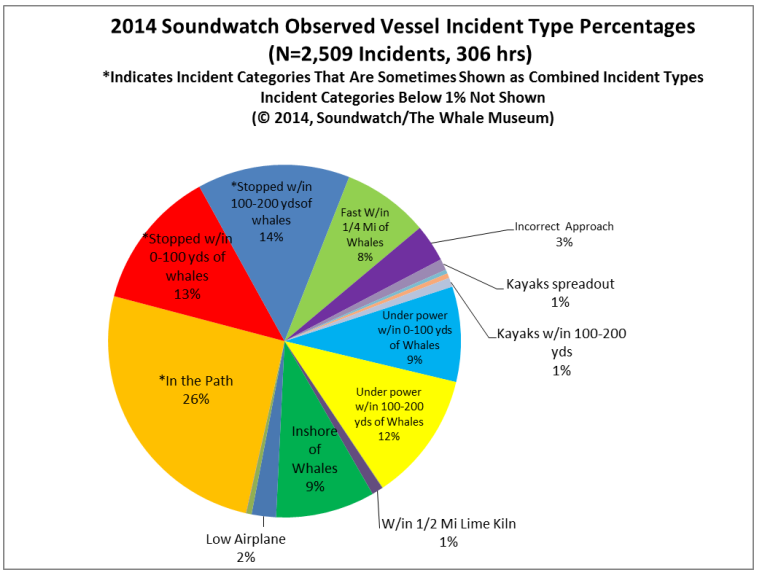


Table 1: Soundwatch 1998-2014 All Vessel, All Incident Type Percentages.

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

In 2014, private vessel operators committed 69% of all incident types (Table 2, Figures 32-34), followed by Canadian commercial operators with 14%, and U.S. commercial operators with 6% of all incidents for a combined commercial vessel incident percentage of 20% of recorded incidents (Figure 32). Kayakers were recorded with 4% of all incidents, along with monitoring (Soundwatch and Straitwatch)/research vessels at 4% of all incidents; aircraft were recorded at 2% and zero observations were recorded with commercial fishing vessels having vessel incidents. In the summer months, especially late August through September, it is not unusual to have commercial & recreational fishing openings in areas that overlap with areas frequented by the whales. In 2013, Soundwatch recorded commercial fishing vessels committing 27 incidents, or 1.2% of overall vessel incidents. In 2014, Soundwatch did not record any vessel incidents involving commercial fishing vessels,

a reflection of few opportunities for commercial fishing this season (Figure 32).

Of the broad category **Vessels within 200 yards of Whales** incidents (48% of all incidents) *Vessels Stopped within 0-100 yards (*13%) were made by 62% private vessels, 18% Canadian vessels, 11% U.S. vessels and 8% monitoring/research vessels*; Vessels Stopped within 100-200 yards (*14%) were made by 57% private vessels, 27% Canadian vessels, 9% U.S. vessels and 7% monitoring/research vessels*; Vessels Motoring within 0-100 yards* (9%) were made by 72% private vessels, 16% Canadian vessels, 9% monitoring/research vessels and 8% U.S. vessels*; Vessels Motoring within 100-200 yards (*12%) were made by 78% private vessels, 9% Canadian vessels, 8% monitoring/research vessels and 7% U.S. vessels (Figure 33). The **Vessels in the Path of Whales** regulatory category (26% of total incidents) were made by 71% private vessels, 18% Canadian vessels, 8% U.S. vessels, 3% monitoring/research vessels and 3% Other (kayak & other human powered craft) and the **Inshore of Whales** incidents (9%) were made by 84% private vessels, 9% Canadian vessels, 4% U.S. vessels, and 2% monitoring/research vessels (Figure 33).

Figure 32: 2014 Soundwatch Observed Vessel Incidents Percentages by Vessel Type.

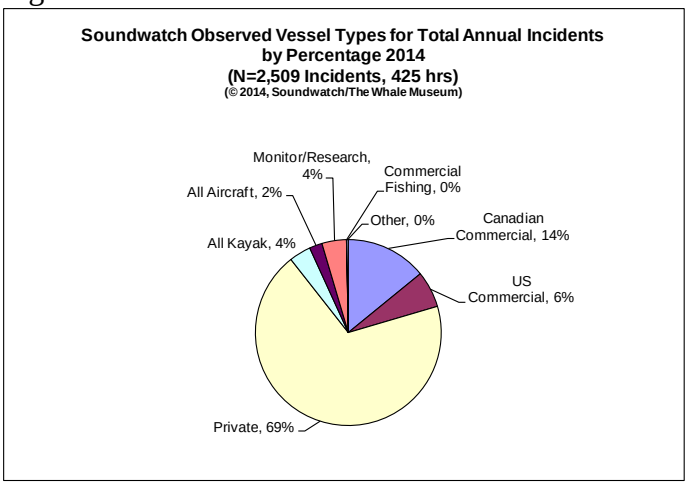


Figure33: 2014 Soundwatch Observed Top Vessel Incidents by Vessel Type.

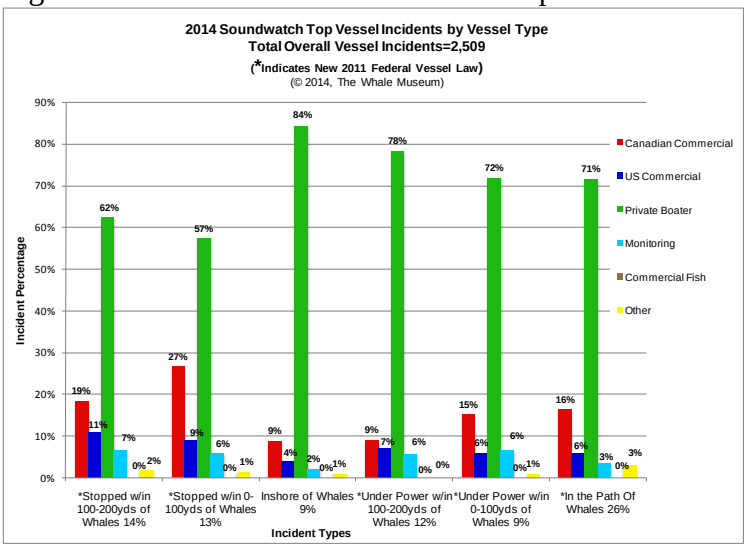


Table 2: 2014 Annual Summary of 2,509 Vessel Incidents By Incident and Vessel Type.

Soundwatch Observed Incidents Summary

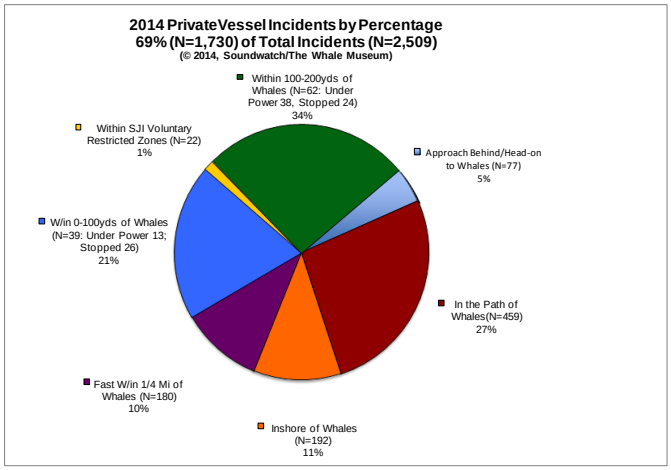
May 9 - September 27, 2014 ***Observation Hours*** *306*

	Eco Can	Eco US	Private Motor/Sail	Eco Kayak	Private Kayak	SW & StW Other	SW & StW Aircraft	SW & StW Monitor	SW & StW Research	Marine Govt	Marine Other	Marine Fishery	Marine Total	
Aircraft														
aircraft - low circling							17							17
aircraft - low flying							38			1				39
Aircraft							**55**			**1**				**56**
Approach														
non-compliant approach - head on	2		26											28
non-compliant approach from behind	4	1	51		4									60
Approach	**6**	**1**	**77**		**4**									**88**
Area Restriction														
area restriction - Lime Kiln		2	21	1				1					1	26
Area restriction - SJIVNBZ (1/4mi)			1											1
Area restriction - SJIVNBZ (1/8mi)	1													1
Area Restriction	**1**	**2**	**22**	**1**				**1**					**1**	**28**
In Path														
In path 200-400 yds	82	30	287	3	10			20	1	1				434
vessel crossed the path of whales	23	7	172		2			2		1			1	208
In Path	**105**	**37**	**459**	**3**	**12**			**22**	**1**	**2**			**1**	**642**
Inshore														
vessel inshore of whales	20	9	192		1			5	1					228
Inshore	**20**	**9**	**192**		**1**			**5**	**1**					**228**
Kayak Specific														
kayak - 100m/yds				4	7									11
kayak - offshore 1/4mile				5	4									9
kayak - spread out when whales present				9	17									26
kayak- 200y/183m				7	14									21
Kayak Specific				**25**	**42**									**67**
Speed														
speed > 7knts w/in 400m	3	3	79					1	1				1	88
speed > 7knts w/in 400m (coming on scene)	5	3	70											78
speed > 7knts w/in 400m (departing)	2		31											33
Speed	**10**	**6**	**180**					**1**	**1**				**1**	**199**
Time Limit														
vessel within 400m for longer than 1hr	1	3	6											10
Time Limit	**1**	**3**	**6**											**10**
Within 100 m/yds														
vessel within 100m - fishing			26											26
vessel within 100m - stopped	86	29	185		2			19	1	1				323
vessel within 100m - under power	33	13	131					14		1			1	193
Within 100 m/yds	**119**	**42**	**342**		**2**			**33**	**1**	**2**			**1**	**542**
Within 200m/yds														
200y/183m- fishing			26											26
200y/183m- stopped	65	38	219		5			23	1					351
200y/183m- under power	27	21	207					17						272
Within 200m/yds	**92**	**59**	**452**		**5**			**40**	**1**					**649**

	Eco Can	Eco US	Private Motor/Sail	Eco Kayak	Private Kayak	SW & StW Other	SW & StW Aircraft	SW & StW Monitor	SW & StW Research	Marine Govt	Marine Other	Marine Fishery	Marine Total	
Grand Total	**354**	**159**	**1730**	**29**	**66**	**0**	**55**	**102**	**5**	**5**	**0**	**4**	**2509**	

Tuesday, October 21, 2014

Figure 34: 2014 Soundwatch Observed Private Vessel Incident Percentages.

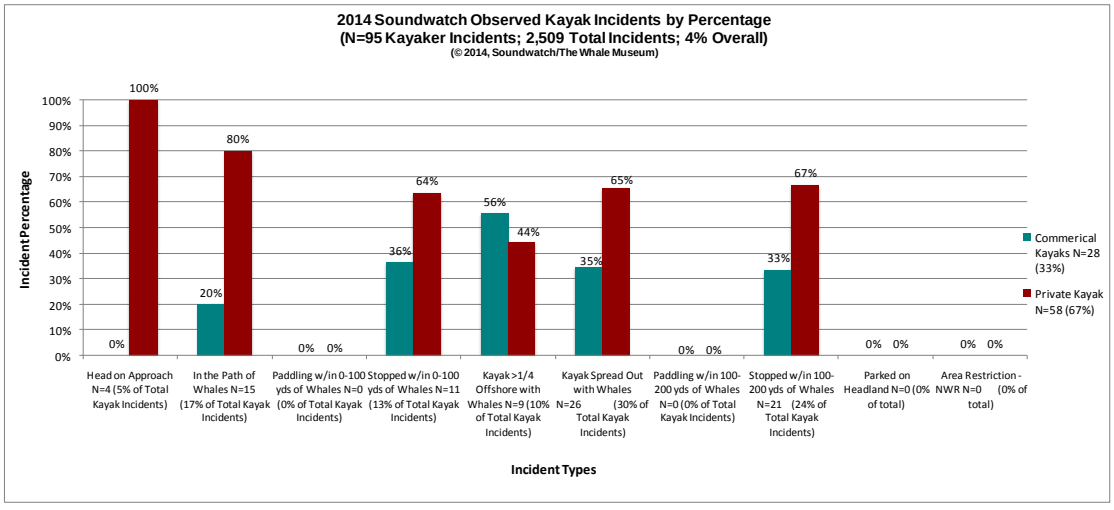


During the 2014 season, the vessel-based Soundwatch program observed kayakers making 4% of overall observed incidents (Figure 32). Private and commercial kayaker incident type percentages are shown separately

in order to provide a more specific depiction of incidents occurring from kayaker types (Figure 35). The incident categories shown include both the kayaker specific incident categories which include incidents that are guidelines (Kayakers Code Appendix C): *kayaks spread out with whales present, kayakers paddling greater than ¼ mile offshore with whales,* and *kayakers launching into the path of whales* along with other incident types (such as *kayakers paddling within 100-200 yards of whales*), including *Be Whale Wise Guidelines* (Appendix A) and/or U.S. federal vessel regulations (Appendix B) not restricted to kayaks.

In 2014, the vessel-based Soundwatch program recorded 2,509 total vessel incidents, with both commercial and private kayakers committing 95 total kayak incidents, or 4%, of all incident types (Figure 35). Commercial kayakers committed 33% of recorded incidents and private kayakers were recorded with 67% of incidents. Of the 95 incidents observed, the top incidents included **1**-*Kayakers Not Rafted (or Spread) with Whales* with 26 incidents, or 30%, with commercial kayakers making 35%, and private kayakers making 65% of incidents; **2**-*Kayakers Stopped within 100-200 yards of Whales* with 21 incidents or 24%,with commercial kayakers making 33%, and private kayakers making 67% of incidents; **3**-*Kayakers In the Path of Whales* with 15 incidents, or 17%, with commercial kayakers making 20%, and private kayakers making 80% of incidents; **4**-*Kayakers Stopped within 0-100 yards of Whales* with 11 incidents, or 13%, with commercial kayakers making 36%, and private kayakers making 64% of incidents;**5**-*Kayakers Offshore greater than ¼ Mile with Whales* with 9 incidents, or 10%, with commercial kayakers making 56%, and private kayakers making 44% of incidents.(Table 2, Figure 35). The typical kayak scene can largely be depicted as both commercial and private kayakers (private more likely than commercial groups) being Paddling and Spread Out when whales are approaching to within 400 yards; getting Grouped up and being Stopped In the Path of Whales (w/in 400 yards), remaining Grouped and Stopped at 200-100 yards of whales, and still remaining Grouped and Stopped at 100-0 yards of whales; commercial groups are more likely than private groups to paddle offshore greater than 1/4 mile to be with whales. No incidents were recorded by Soundwatch of Kayakers Paddling 0-200 yards of Whales in 2014.

Figure 35: 2014 Soundwatch Vessel-based Observed Commercial and Private Kayaker Incident Percentages.

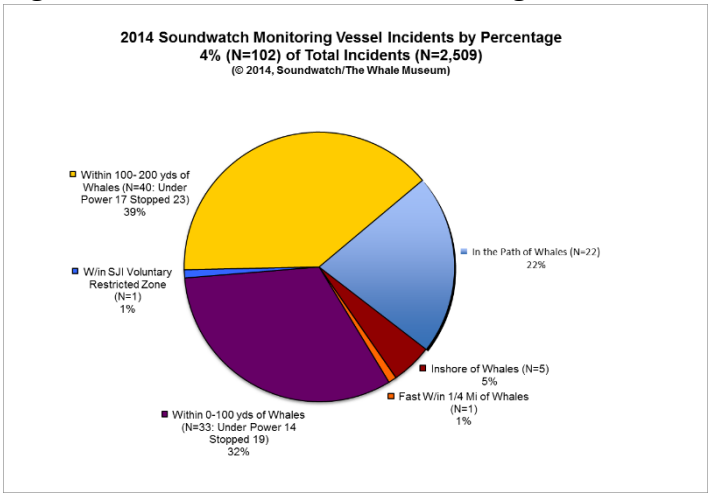


Since San Juan County vessel laws were established in 2008, Washington State vessel laws in 2009 and U.S. federal regulations in 2011, Soundwatch staff has been vigilant about recording every time that the Soundwatch vessel could have possibly been within 400-yards ahead or within 200-yards of whales. Since the new vessel regulations, Soundwatch staff has also been making a more targeted effort to reach as many boaters as possible before those boaters find themselves out of compliance with vessel regulations. These actions have sometimes led to more times when the Soundwatch vessel is caught stopped with whales as they are talking with a private vessel. The Whale Museum began operating under its own Soundwatch specific NOAA Research

permit in 2012 (Permit No. 16160). This allows for close approaches in some unavoidable circumstances and these are reported via permit conditions and annual reporting requirements. All Soundwatch educator/drivers receive thorough training on safe boating in the vicinity of whales. As part of receiving a research permit, a full review of program methods was reviewed and impacts of the activities fully analyzed under MMPA/ESA. The permit carries with it annual reporting obligations, which are illustrated above (Figure 39). The majority of the time, the Soundwatch vessel is well over 200-yardsto the side or beyond 400-yards ahead or behind whales to be in the best position to reach on-coming vessels before they encounter whales. Occasionally the Soundwatch crew finds itself nearer to whales (within 200 yards or 400 yards in the path), unexpectedly or under the course of normal operations, and the staff directs the volunteers to record the Soundwatch vessel with an incident(s) just as any other vessel observed by Soundwatch would be.

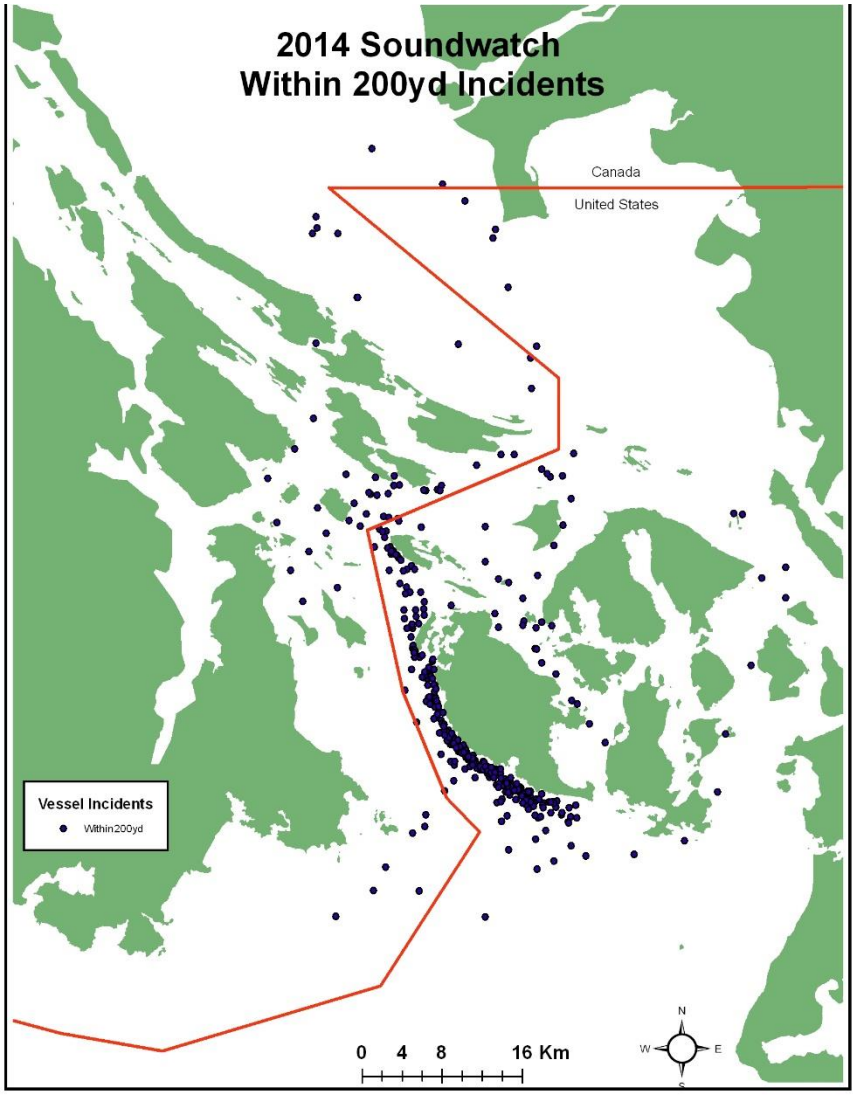
In 2014, Soundwatch recorded 102 Soundwatch Monitoring Vessel incidents making up 4% of overall vessel incidents (Figure 36). The breakdown of these incidents follows: *Within 100-200 yards of whales* with 40 incidents (under power 17, stopped 23) or 39%*; Within 0-100 yards of whales* with 33 incidents (under power 14, stopped 19) or 32%; *In the path of whales* with 22 incidents or 22%; *inshore of whales* with 5 incidents or 5%; *w/in the San Juan Islands ½ mile & ¼ Mile Voluntary No Go Zones* with 1 incident or 1%; and *Motoring fast within 400 yards of whales* with 1 incident or1% (Table 2, Figure 36).

Figure 36: 2014 Soundwatch Monitoring Vessel Incident Percentages.



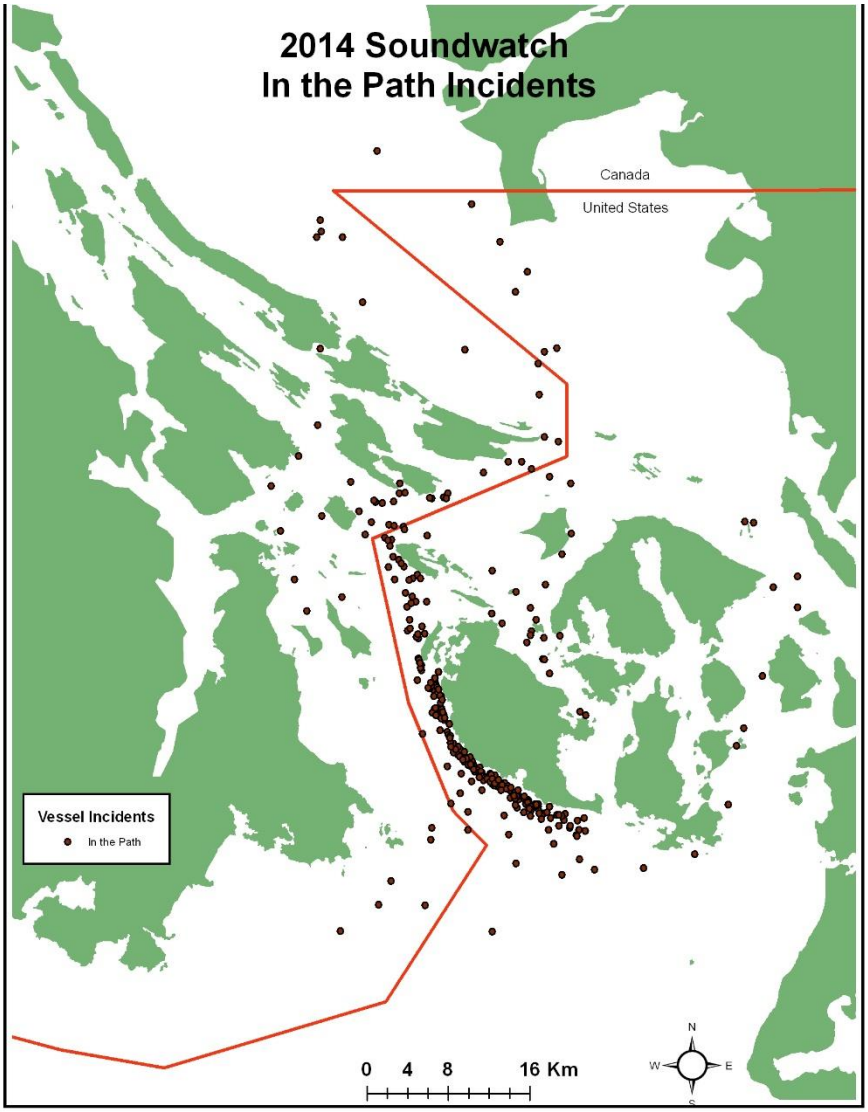
In light of 2011 U.S. federal vessel regulations for killer whales, all Soundwatch observed *vessel incidents* potentially out of compliance with the regulations (1-*Within 0-200 yards of killer whales* and 2-*In the path of killer whales*)were plotted by location (Figures 37 and 38). The U.S. federal regulations only apply to vessels in U.S. waters. However, all *vessel incidents 0-100 yards* (under power and stopped) and all *vessel incidents 100-200 yards* (under power and stopped) were combined and plotted (Figure 37)regardless of country of origin. Likewise, all incidents of *In the path of killer whales* were plotted (Figure 38), regardless of origin. Looking at the trends, most incidents *Within 0-200 yards of killer whales* and *In the path of killer whales* occurred in U.S. waters and were likely violations of the U.S. vessel laws. There is an obvious overlap with the location of these two types of vessel incidents occurring in the high density vessel areas (Figures 9-11) and high vessel incident density areas (Figures 28-30). The areas with the most U.S. federal vessel regulation incidents observed by Soundwatch tended to be along the Westside of San Juan Island (Figures 37 and 38).

Figure 37: 2014 Soundwatch Observed Vessels **Within 200-yards of Killer Whales* Incidents Location Map.



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

Figure 38: 2014Soundwatch Observed Vessels**In the Path of Killer Whales* Incidents Location Map.



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

Vessel Incident Trends

General trends in the most common incident types for 2007-2014 appear below (Figure 39).Soundwatch has consistently observed the same five or six vessel incident types as the top most frequent vessel incidents (with some variability in ranking order), which include *Vessels in the path of whales*; *Vessels motoring inshore of whales*; *Vessels motoring within 100 yards of whales; Vessels stopped within 100 yards of whales*; *Vessels motoring fast within 400 yards of whales*; and *Vessels motoring within the ¼ mile voluntary no go zone*. In 2011, a new vessel incident type was introduced: *Vessels within 200 yards of whales,* this was divided into two main categories1- *Stopped within 100-200 yards of Whales* and 2-*Motoring(under power)within 100-200-yards of Whales* in the same way that the previous *100 yard guideline incident* was divided into two categories- stopped and motoring. These new incident types are also among the most common incident types, making eight incidents of similar frequency as most common incident types since 2011. In summary, *In the Path* incidents remain high and are increasing; *Inshore of Whales* incidents remain the high, but are decreasing; incidents of

Fast within ¼ Mile and *Within the ¼ Mile No Go Zone* are decreasing. Vessel incidents *within 100-200 yards, stopped and under power*, are increasing 2011-2014 as are *incidents 0-100 yards, stopped and under power*. It may be that is it still difficult for boaters to recognize that they have to react sooner when they see whales headed towards them to both get out of the path (up to 400 yards) and move outside beyond 200 yards, thus getting caught in the path, and motoring and then stopping with 200 yards, and then getting caught again motoring and then stopped within 100-0 yards if they try to get out of the way, and then fail. It seems that more educational messaging targeting boaters to move both sooner and further out of the way of whales is still needed.

Figure 39: 2007-2014 Soundwatch Observed Top Vessel Incident Percentages by Incident Type.

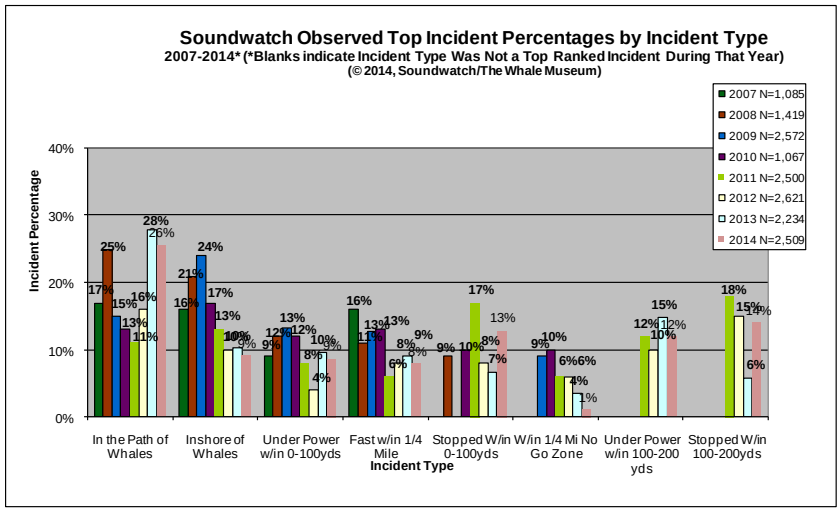
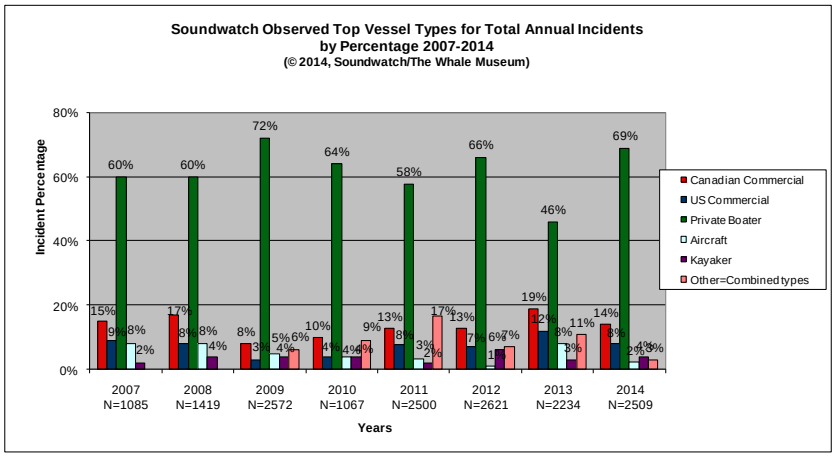


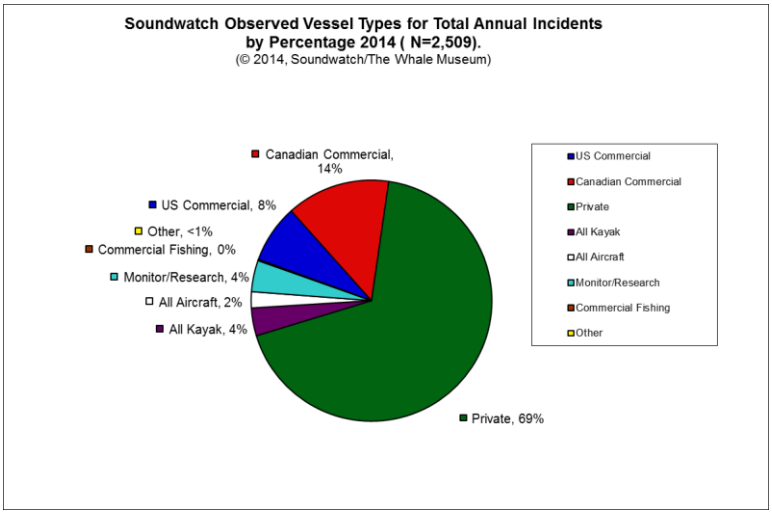
Figure 40: 2007-2014 Soundwatch Observed Vessel Incident Percentages by Top Vessel Type.



Over the past eight years 2007-2014, private vessels remain the most likely vessel type to commit all incidents with an eight year average of 55% of all incidents recorded over that period (Figures 40 and 41). In 2014, private vessels made 69% of all incidents. Commercial whale watch vessels, when combined both U.S. and Canadian vessels, have an eight year average of nearly 23% of incidents, having 22% of total incidents in 2014. The larger fleet of Canadian vessels make more incidents annually than U.S. vessels, 14% and 8% respectively in 2014. The ratio of private vessel incidents versus commercial vessel incidents in 2014 is on par with previous years, despite a dip seen in 2013. The Soundwatch monitoring program recorded itself making an increased number of incidents annually over the years 2009-2014, averaging nearly 6% of total incidents 2007-2014 and committing 4% of total incidents in 2014 while in the course of educating boaters (Figures 36 and

41).Despite the low occurrences of aircraft as a vessel type, planes and helicopters commit roughly 5% of vessel incidents annually, with 2% in 2014.

Figure 41: 2014 Percentage of Incidents by Vessel Type.



New Metric to Depict Vessel Type Incident Rates

The annual installment of this report has used annual incident percentages as above for some time. Recently a new analysis approach has been explored to try and normalize these data by dividing the annual vessel incidents by the number of hours observed to try to give an approximate rate of incidents per unit time. While this seems like it would be a more useful way to compare Soundwatch observations of individual vessel types committing incidents from year to year, there are some very real problems with analyzing Soundwatch vessel data in this manner. Soundwatch does not have standardized observation periods or units for monitoring vessel incidents and vessel counts. Vessel counts by type and activity (along with whale attribute data) are recorded every half hour, on the hour and half hour during a monitoring day. Observations and recording of vessels incidents are done continuously and opportunistically during the same time that the Soundwatch driver/educator engages with vessels to educate them on best practices and during vessel counts. The vessel count numbers and the vessels incidents are not linked to each other (therefore a rate of incidents per vessel present cannot be established) and there is no way to tease out the actual annual, monthly or hourly observation time or units spent on viewing vessel incidents. The closest number to an annual Soundwatch observation unit is the annual number of observation hours with whales, which in 2014 was recorded as 306 hours. In 2014, 850 counts of boats were conducted. The metric used in this analysis (2009-2014),to determine vessel incident rates per vessel type was: 2 x the annual number of incidents divided by the annual vessel count (for example, in 2014: 2 x 2,509/850 resulting in an annual number of 5.9 total incidents per hour). The resulting graphs, using that metric, have been plotted for 2 years before and 4 years after the 2011 U.S. regulation (Figures 42-44).

Prior to the U.S. vessel regulations in 2011 there was a long standing guideline to remain at least *100 yards from whales*, which later became a Washington State vessel regulation in 2009. Soundwatch established a *vessel incident* category to record when vessels were *within 100 yards* when it began recording vessel incidents in 1993. In 2011, when U.S. vessel regulations went into effect, a new vessel incident category was established to reflect the new U.S. federal vessel regulation: *vessel within 100-200 yards of whales* (the second part of the new 2011 regulation, *stopped 200-400 yards in the path* was captured in a previous guideline "parked in the path" incident category). With the addition of the new incident category in 2011, it is now possible to record more incident types than before.

In 2009, prior to the U.S. regulations, there appears to be nearly 6 *total vessel incidents* committed by *all vessel types* per unit time (approximated to be 1 hour) (Figure 42). *Private vessels* made nearly 4 incidents, *U.S. and Canadian commercial vessels* both made less than .5 incidents, and *Other vessel types* less than .5 as well. In 2014, *total vessel incidents* per hour by *all vessel types* remains nearly the same with 6 *total vessel incidents*, *Private* 4 incidents, *Canadian commercial vessels* with 1 incident, *U.S.*.5 incidents and *Other vessels* less than .5 incidents (Figure 42).

In 2009, prior to U.S. regulations (but with WA State regulations), there appears to be 4.5 total *Regulatory vessel incidents (100 yard regulation only)*per unit time by *all vessel types* (Figure 43). *Private vessels* had 3 incidents, and both *U.S. and Canadian commercial vessels* as well as *Other vessels* had less than .5 incidents per hour (Figure 43). In 2011, the first year after U.S. regulations and with 1 new incident category, there were 3 total *Regulatory vessel incidents(100 & 200 yard categories)*per hour by *all vessel types, Private vessels* had 3 incidents, and both *U.S. and Canadian commercial vessels* as well as *Other vessels* had less than .5 incidents per hour. In 2014, 4-years after U.S. vessel regulations, there were there were 2 total *Regulatory vessel incidents (100 & 200 yard categories)* per hour by *all vessel types*, *Private vessels* had 3 incidents, and both *U.S. and Canadian commercial vessels* as well as *Other vessels* had less than .5 incidents per hour (Figure 43).

In 2009 prior to the U.S. regulations, there appears to be nearly 4 total *Guideline vessel incidents* committed by *all vessel types* per unit time (Figure 44). Private vessels made nearly 3 *guideline* incidents, U.S. and Canadian commercial vessels and *Other vessel types* made less than .5 incidents as well. In 2014, *total Guideline vessel incidents* per hour by *all vessel types* was less with 2 overall incidents, *Private* 1 incidents, and *U.S. and Canadian commercial vessels* and *Other vessel types* made less than .5 incidents as well (Figure 44). There were increases in both 2012 & 2013 for *Guideline total vessel incidents*, but appear to be decreasing in 2014.

Figure 42: Total Incidents per hour by Vessel Type for 2009-2014.

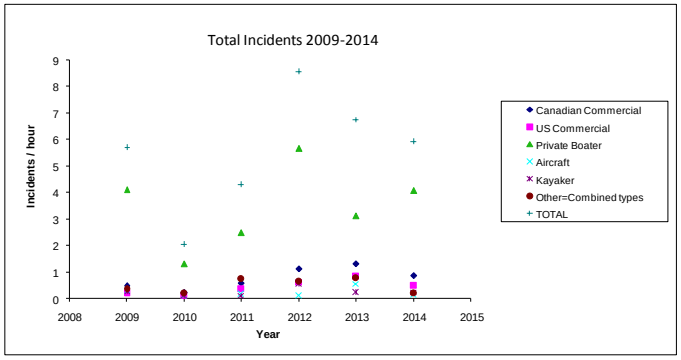


Figure 43: Regulation Incidents per hour by Vessel Type for 2009-2014.

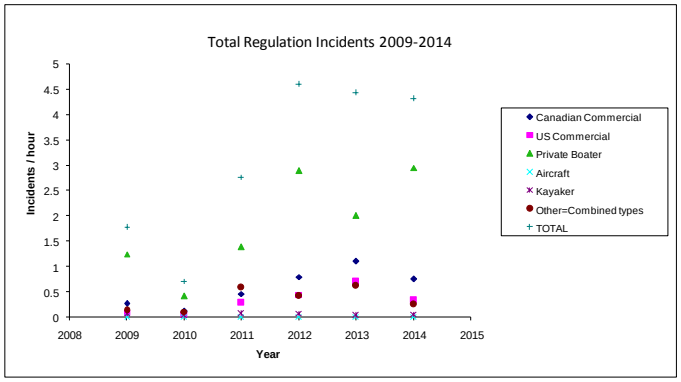
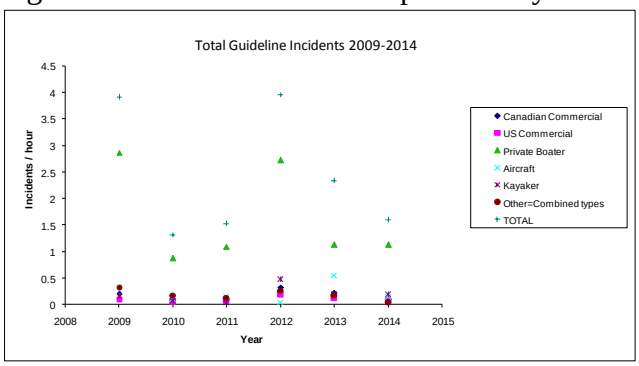


Figure 44: Guideline Incidents per hour by Vessel Type for 2009-2014.



Summary of Soundwatch Data Trends

Numbers of Vessels Observed With Whale Trends:

- The numbers of vessels observed within ½ mile of whales (May-September) varies widely by time, date and location with maximum numbers over 4 times larger than average numbers (2014 Max.84, Avg. 18)
- From 1998-2014 (17-year trend) the annual average numbers of vessels with whales was 17. From 2003-2011, there was an 8-year trend of reduced annual averages and maximum numbers of vessels with whales that has been increasing since 2011. There are various explanations that need further analysis comparing SRKW trends with vessel trends, including regional marina use data, to fully explain.
- Peak times of the day (May-September) observed with the highest number of vessels within ½ mile whales (17 year trend) usually occur between 11 a.m. and 3 p.m. during the observation hours of 9 a.m. to 6 p.m. with a dip around the 1 p.m. midday lull (associated with commercial vessel congregations which is believed to attract more recreational vessels).
- The peak month generally observed with the highest number of vessels within ½ mile whales is August. From 1998-2014 the 17-year trend of average number of vessels within ½ mile of whales per month was: May 10, June 16, July 19, Aug 21, September 17. In 2014, May had an average of 9 vessels, June 17, July 20, August 18 and September 20 vessels.
- Private vessels observed within ½ mile of whales have had higher maximum numbers than commercial vessels from 2003-2009, and again from 2011-2014 (2014: Private Max. 62 in September, Private Ave 6; Commercial Max. 24 in July, Commercial Ave 8).
- Generally, private recreational boaters spend more time with whales being ‘whale oriented’ (watching whales) than engaged in ‘fishing’ or ‘transiting’; commercial vessels are most often observed ‘whale oriented’ and less so ‘transiting’(due in part to PWWA speed & approach guidelines).
- Commercial and recreational fishing activities occur in areas that often overlap with whales as well as other vessel transit corridors. In years with large recreational and commercial fishing opportunities, vessels observed engaged in ‘fishing activities’ increase as do vessel incidents associated with recreational and commercial fishing vessels. In 2014 there were limited openings for commercial fishing and limited success for recreational fishing, resulting in fewer vessels observed engaged in ‘fishing activities’ as well as vessel incidents associated with recreational fishing. There were no observed vessel incidents associated with commercial fishing vessels in 2014.
- On average (2001-2011) Soundwatch contacted nearly 1,000 recreational vessels per year with an average of 3.3 people on board each vessel, for an overall average number of 3,300 people given educational materials on-the-water annually. In 2014, Soundwatch contacted512 boats with 1,430 people onboard.
- Soundwatch does not have consistent monitoring data on vessel trends before 9 a.m. and after 6 p.m., or during the shoulder season, October-April.

Commercial Whale Watch Industry Trends

- Commercial whale watching occurs April –October with increasing numbers of U.S. & Canadian commercial whale watch vessels going out year-round and/or starting earlier and going later into the season.
- The bulk of commercial whale watching generally occurs between 9 a.m. and 6 p.m., May-September, with the maximum numbers of commercial vessels observed within ½ mile of whales occurring in July and between 11 a.m. to 1 p.m. and again from 3 p.m. to 4 p.m.; with a reduction in numbers between 12 p.m. and 1 p.m. during trip turn-around periods.
- Commercial whale watching occurs in the evenings with several U.S. & Canadian commercial trips going out again at 5p.m.-sunset (8:30-930p.m., July-September).
- Since 2000, there have been a similar number of 30-40 active Canadian and U.S. commercial companies (Avg. # of Companies: 38: Avg. # U.S. Companies 17, Avg. # Canadian Companies 21). In 2014 there were 36 commercial companies with 19 U.S. Companies and 17 Canadian Companies (First time U.S. companies have outnumbered Canadian companies).
- Since 2000, there have been a similar number of 70-80 active commercial whale watch vessels: in 2014 there was a new peak of 85 Active commercial whale watch vessels.
- Since 1997 there have consistently been more active Canadian commercial vessels than active U.S. commercial vessels (2014: 57 Canadian, 28 U.S.).
- The majority of active Canadian and U.S. commercial companies are members of the trans-boundary Pacific Whale Watch Association (formerly the Whale Watch Operators Association Northwest). http://www.pacificwhalewatch.org/
- Canadian commercial whale watch vessels continue to be mostly the smaller rigid hull inflatable (RHIB) style of vessels while the U.S. fleet is made up of mostly larger passenger style vessels. However recent additions to both fleets have seen increased numbers of large passenger style Canadian vessels and small cruiser style U.S. vessels. In 2014, there is still only one U.S. RHIB style vessel, originating from Friday Harbor, WA.
- The total number of passengers engaging in vessel based whale watching from U.S. and Canadian commercial vessels, private vessels as well as the total number of people engaged in shore-based whale watching in the region is largely unknown and difficult to estimate.

Vessel Incident Trends

- In 2014, 74% of all vessel incidents observed and recorded by Soundwatch were U.S. Vessel Regulation incidents; **Vessels Within 200 yards of whales** were 48% and **In the Path of Whales** were 26%. In 2013, 66% of total incidents were U.S. Vessel Regulation incidents, **Vessels Within 200 yards of whales** was 38%, and **In the Path of Whales** was 28%.
- In 2014, **Vessels within 200 yards of Whales** incidents (48% of all incidents) were made up of *Vessels Stopped within 0-100 yards (*13%) made by 62% private vessels, 18% Canadian vessels, 11% U.S. vessels and 8% monitoring/research vessels*; Vessels Stopped within 100-200 yards (*14%) were made by 57% private vessels, 27% Canadian vessels, 9% U.S. vessels and 7% monitoring/research vessels*; Vessels Motoring within 0-100 yards* (9%) were made by 72% private vessels, 16% Canadian vessels, 9% monitoring/research vessels and 8% U.S. vessels*; Vessels Motoring within 100-200 yards (*12%) were made by 78% private vessels, 9% Canadian vessels, 8% monitoring/research vessels and 7% U.S. vessels.
- In 2014, **Vessels in the Path of Whales** incidents (26% of total incidents) were made by 71% private vessels, 18% Canadian vessels, 8% U.S. vessels, 3% monitoring/research vessels and 3% Other (kayak & other human powered craft).
- In 2014, 69% of all observed incidents were committed by private vessels, which make up 33% of the vessels observed within ½ mile of whales; 49% of vessels with whales are commercial vessels which committed 22% of total incidents.
- The larger fleet of Canadian vessels makes more incidents annually than U.S. vessels, 14% and 8% respectively in 2014.
- In 2014, kayakers had 4% of all incidents, the Soundwatch Program had 4% of all incidents, aircraft had 2% and commercial fishing vessels had zero incidents.

- In 2014, commercial and private kayakers committed 95 total kayak incidents, or 4%, of all incident types; commercial kayakers committed 33% of recorded incidents and private kayakers were recorded with 67% of incidents.
- Soundwatch recorded 102 Soundwatch Monitoring Vessel incidents, or 4% of overall incidents, made up of ***Within 100-200 yards of whales*** with 40 incidents (under power 17, stopped 23) or 39%*;* ***Within 0-100 yards of whales*** with 33 incidents (under power 14, stopped 19) or 32%; ***In the path of whales*** with 22 incidents or 22%; ***inshore of whales*** with 5 incidents or 5%; ***w/in the San Juan Islands ½ mile & ¼ Mile Voluntary No Go Zones*** with 1 incident or 1%; and ***Motoring fast within 400 yards of whales*** with 1 incident or 1%.
- From 2007-2014, private vessels remain the most likely vessel type to commit all incidents, 8-year year average is 55% of all incidents; U.S. & Canadian commercial whale watch vessels 8-year average is 23% of incidents.
- The ratio of private vessel incidents versus commercial vessel incidents in 2014 is on par with previous years, despite a dip seen in 2013.
- The Soundwatch monitoring program recorded itself making an increased number of incidents annually over the years 2009-2014, averaging nearly 6% of total incidents 2007-2014 .
- Despite the low occurrences of aircraft as a vessel type, planes and helicopters committed roughly 5% of vessel incidents annually from 2007-14, with 2% in 2014.
- Soundwatch has observed similar top vessel incident types (varying order each year) 2007-2014. ***In the Path*** incidents remain high and are increasing; ***Inshore of Whales*** incidents remain the high, but are decreasing; incidents of ***Fast within ¼ Mile*** and ***Within the ¼ Mile No Go Zone*** are decreasing; Vessel incidents ***within 100-200 yards, stopped and under power***, are increasing 2011-2014 as are incidents ***0-100 yards, stopped and under power.***

Spatial Trends- Vessel Numbers & Vessel Incidents

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

Recommendations

Soundwatch observed vessel trends from 1998-2014show continued boating pressures and noncompliance with best practice guidelines and vessel regulations for killer whales throughout the Salish Sea, the inland waters of Washington State and British Columbia. Long-term trends demonstrate the need for the continuation and expansion of shore and water-based boater education and outreach efforts as well as a continued increase in enforcement patrols and enforcement action on the water. Sustainable funding mechanisms for both education and enforcement efforts are critical. In addition, the development and implementation of a collaborative U.S. and Canadian effort to manage both commercial and recreational whale watching as well as other vessel traffic near whales is needed to reduce potential threats to the whales from vessel presence, behavior and underwater noise.

During both the NOAA SRKW Recovery Plan and Proposed Vessel Regulations public input processes, overwhelming support for increased enforcement effort as well as the continuation and expansion of the

Soundwatch program was expressed through written and verbal public comments. The Whale Museum and Soundwatch are chronically underfunded and strive continually to consistently collect and analyze this important annual monitoring data. The effort required to collect and analyze this data annually, as well as prevent countless disturbances to endangered whales, is under-valued and in many cases is the only data set available. Continued monitoring remains critical in order to assist in the evaluation of the effectiveness of the guidelines, regulations and enforcement efforts.

Finally, the 2013 ESA Section 6 funding provided enhanced WDFW Enforcement presence in the vicinity of killer whales around the San Juan Islands and provided a new WDFW vessel and one additional FTE officer. A small portion of this funding also supported the Soundwatch program with vessel upgrades, additional days on the water and funding for data analysis. Funding is expected to continue for one final year in 2015 to support both WDFW and Soundwatch efforts. Continuation of ESA Section 6 Funding opportunities for these programs to conduct more cooperative outreach education, monitoring and enforcement is critically needed.

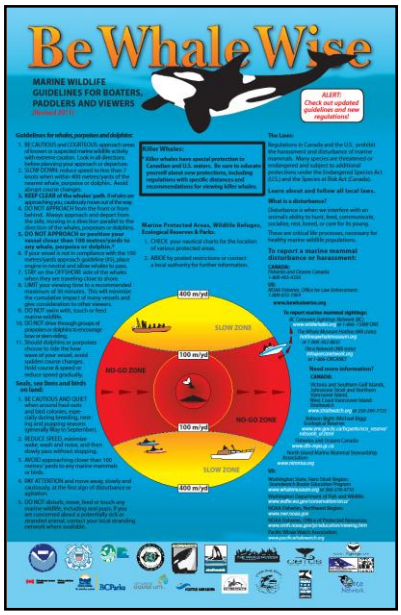
Individuals and/or Organizations that Collaborated with the Grantee and Performed the Work:

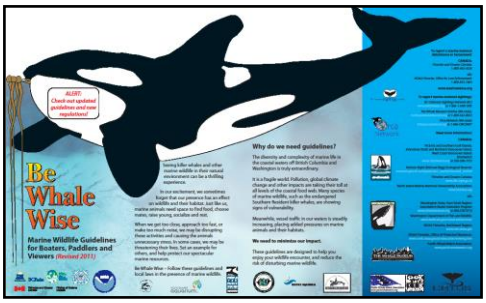
The Whale Museum staff (Executive Director Jenny Atkinson, Finance Manager Elli Gull and Research Curator &Soundwatch Coordinator Eric Eisenhardt) administered grant funds, including accounting and disbursement, from awardRA-133F-12-CQ-0057. The Soundwatch Coordinator (Eric Eisenhardt) along with seasonal Soundwatch driver/educator staff (Elizabeth Seely, Kelley Watson and Robert Tison), academic interns (Sarah Scrivano, Megan Landis, Josie Hosker, and Mariah Vane) and over 30 regular volunteers were responsible for the outreach, monitoring and data collection activities as well as data entry. Soundwatch staff, along with Research Consultant, Kari Koski, undertook the bulk of data compilation, assessment and report compilation. Other individuals who made major contribution sinclude Jennifer Olson (TWM's Database Specialist)and John Aschoff (The Whale Museum Board of Directors, President, and GIS specialist) who provided GIS mapping expertise. We could not conduct such a successful program without the staff and Board of Directors of The Whale Museum, the vision of the former Soundwatch Program Directors, Rich Osborne and Kari Koski, and the help and dedication of the more than650past and present interns and volunteers who have collectively contributed more than 65,000volunteer hours to Soundwatch activities since 1996! Special thanks also go the numerous Soundwatch supporters along with the following organizations that help support and collaborate with our efforts: NOAA Fisheries Northwest Region, Northwest Fisheries Science Center, Fisheries and Oceans Canada, Washington Department of Fish and Wildlife, San Juan County's Marine Resource Committee, San Juan County Parks, Straitwatch & Cetus Society, U.C. Davis, the Center for Whale Research, Orca Network, North Cove Technical Solutions (data-base support), Snug Harbor, Roche Harbor Marine, and the numerous, generous contributions from regional foundations, business and individuals over the years.

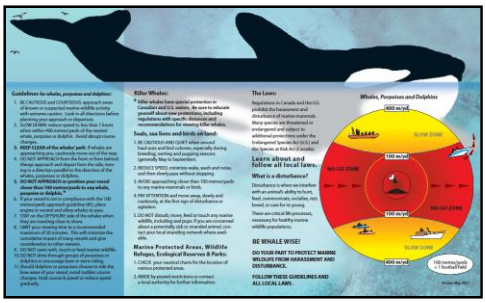
To all our partners and supporters,
THANK YOU!

***

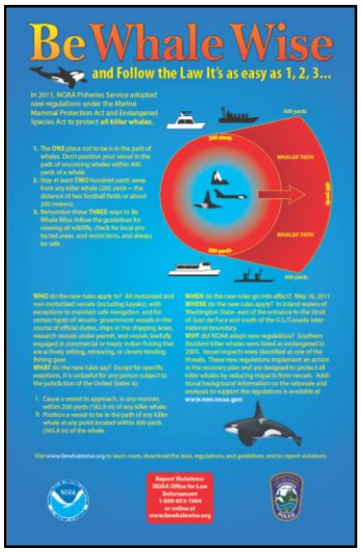
Appendix A& A1: Be Whale Wise Guidelines for Boaters, Paddlers and Viewers; Revised 2011,Poster &Double-sided Brochure Version (Available at http://www.bewhalewise.org)

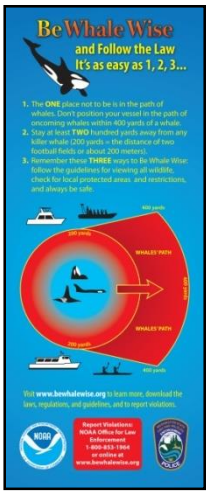




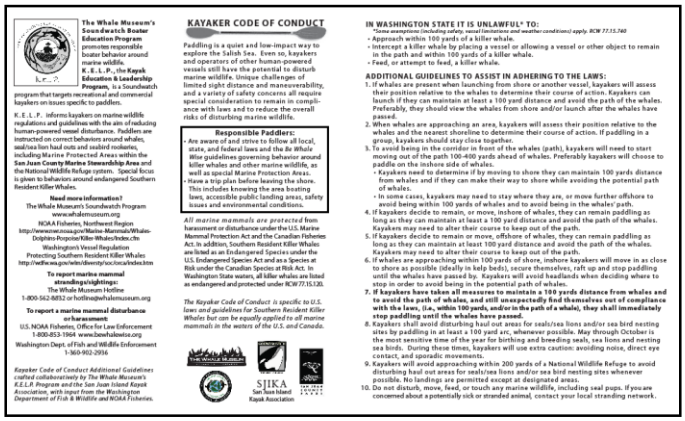


Appendix B& B1:New Federal Vessel Regulations for Killer Whales Poster &Double-sided Rack Card (Available at http://www.bewhalewise.org)





Appendix C: 2011 Kayaker Code of Conduct Brochure, Folded, Double-sided (Available at http://www.whalemuseum.org).



The Whale Museum's Soundwatch Boater Education Program promotes responsible boater behavior around marine wildlife. K.E.L.P., the Kayak Education & Leadership Program, is a Soundwatch program that targets recreational and commercial kayakers on issues specific to paddlers.

K.E.L.P. informs kayakers on marine wildlife regulations and guidelines with the aim of reducing human-powered vessel disturbance. Paddlers are instructed on correct behaviors around whales, seal/sea lion haul outs and seabird rookeries, including Marine Protected Areas within the San Juan County Marine Stewardship Area and the National Wildlife Refuge system. Special focus is given to behaviors around endangered Southern Resident Killer Whales.

Need more information?
The Whale Museum's Soundwatch Program
www.whalemuseum.org
NOAA Fisheries, Northwest Region
http://www.nwr.noaa.gov/Marine-Mammals/Whales-Dolphins-Porpoise/Killer-Whales/Index.cfm
Washington's Vessel Regulation Protecting Southern Resident Killer Whales
http://wdfw.wa.gov/wlm/diversity/soc/orca/index.htm

To report marine mammal strandings/sightings:
The Whale Museum Hotline
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 www.bowhalewise.org
Washington Dept. of Fish and Wildlife Enforcement
1-360-902-2936

Kayaker Code of Conduct Additional Guidelines crafted collaboratively by The Whale Museum's K.E.L.P. Program and the San Juan Island Kayak Association, with input from the Washington Department of Fish & Wildlife and NOAA Fisheries.

KAYAKER CODE OF CONDUCT

Paddling is a quiet and low-impact way to explore the Salish Sea. Even so, kayakers and operators of other human-powered vessels still have the potential to disturb marine wildlife. Unique challenges of limited sight distance and maneuverability, and a variety of safety concerns all require special consideration to remain in compliance with laws and to reduce the overall risks of disturbing marine wildlife.

Responsible Paddlers:
- Are aware of and strive to follow all local, state, and federal laws and the *Be Whale Wise* guidelines governing behavior around killer whales and other marine wildlife, as well as special Marine Protection Areas.
- Have a trip plan before leaving the shore. This includes knowing the area boating laws, accessible public landing areas, safety issues and environmental conditions.

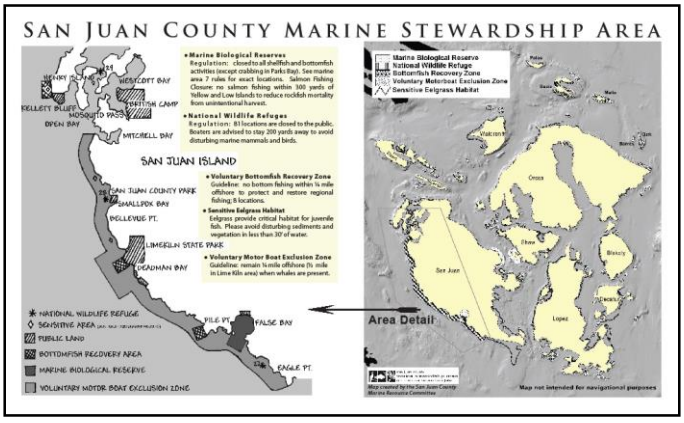
All marine mammals are protected from harassment or disturbance under the U.S. Marine Mammal Protection Act and the Canadian Fisheries Act. In addition, Southern Resident Killer Whales are listed as an Endangered Species under the U.S. Endangered Species Act and as a Species at Risk under the Canadian Species at Risk Act. In Washington State waters, all killer whales are listed as endangered and protected under RCW 77.15.120.

The Kayaker Code of Conduct is specific to U.S. laws and guidelines for Southern Resident Killer Whales but can be equally applied to all marine mammals in the waters of the U.S. and Canada.

SJIKA San Juan Island Kayak Association

IN WASHINGTON STATE IT IS UNLAWFUL* TO:
*Some exemptions (including safety, vessel limitations and weather conditions) apply. RCW 77.15.740
- Approach within 100 yards of a killer whale.
- Intercept a killer whale by placing a vessel or allowing a vessel or other object to remain in the path and within 100 yards of a killer whale.
- Feed, or attempt to feed, a killer whale.

ADDITIONAL GUIDELINES TO ASSIST IN ADHERING TO THE LAWS:
1. If whales are present when launching from shore or another vessel, kayakers will assess their position relative to the whales to determine their course of action. Kayakers can launch if they can maintain at least a 100 yard distance and avoid the path of the whales. Preferably, they should view the whales from shore and/or launch after the whales have passed.
2. When whales are approaching an area, kayakers will assess their position relative to the whales and the nearest shoreline to determine their course of action. If paddling in a group, kayakers should stay close together.
3. To avoid being in the corridor in front of the whales (path), kayakers will need to start moving out of the path 100-400 yards ahead of whales. Preferably kayakers will choose to paddle on the inshore side of whales.
   - Kayakers need to determine if by moving to shore they can maintain 100 yards distance from whales and if they can make their way to shore while avoiding the potential path of whales.
   - In some cases, kayakers may need to stay where they are, or move further offshore to avoid being within 100 yards of whales and to avoid being in the whales' path.
4. If kayakers decide to remain, or move, inshore of whales, they can remain paddling as long as they can maintain at least a 100 yard distance and avoid the path of the whales. Kayakers may need to alter their course to keep out of the path.
5. If kayakers decide to remain or move, offshore of whales, they can remain paddling as long as they can maintain at least 100 yard distance and avoid the path of the whales. Kayakers may need to alter their course to keep out of the path.
6. If whales are approaching within 100 yards of shore, inshore kayakers will move in as close to shore as possible (ideally in kelp beds), secure themselves, raft up and stop paddling until the whales have passed by. Kayakers will avoid headlands when deciding where to stop in order to avoid being in the potential path of whales.
7. **If kayakers have taken all measures to maintain a 100 yards distance from whales and to avoid the path of whales, and still unexpectedly find themselves out of compliance with the laws, (i.e., within 100 yards, and/or in the path of a whale), they shall immediately stop paddling until the whales have passed.**
8. Kayakers 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. May through October is the most sensitive time of the year for birthing and breeding seals, sea lions and nesting sea birds. During these times, kayakers will use extra caution: avoiding noise, direct eye contact, and sporadic movements.
9. Kayakers will avoid approaching within 200 yards of a National Wildlife Refuge to avoid disturbing haul out areas for seals/sea lions and/or sea bird nesting sites whenever possible. No landings are permitted except at designated areas.
10. Do not disturb, move, feed, or touch any marine wildlife, including seal pups. If you are concerned about a potentially sick or stranded animal, contact your local stranding network.

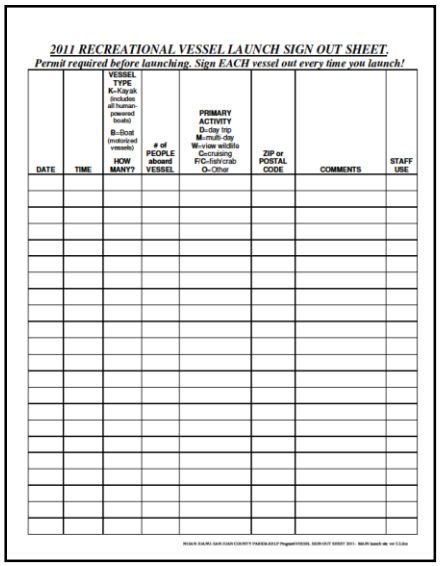


Appendix D: Soundwatch Data Sheet Vessel Contact.

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:

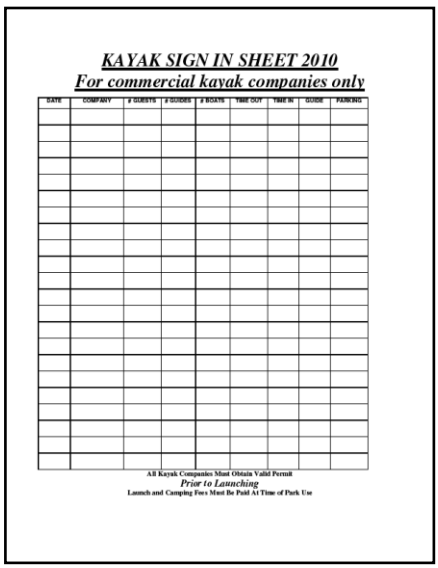
Appendix E: 2012KELP Program Recreational Boater Launch Sign-out Form.



2011 RECREATIONAL VESSEL LAUNCH SIGN OUT SHEET.
Permit required before launching. Sign EACH vessel out every time you launch!

DATE	TIME	VESSEL TYPE K–Kayak (includes all human-powered boats) B–Boat (motorized vessels) HOW MANY?	# of PEOPLE aboard VESSEL	PRIMARY ACTIVITY D–day trip M–multi-day W–view wildlife C–cruising F/C–fish/crab O–Other	ZIP or POSTAL CODE	COMMENTS	STAFF USE

Appendix F: 2010-2012 San Juan County Park Commercial Kayaker Launch Sign-out Form.



KAYAK SIGN IN SHEET 2010
For commercial kayak companies only

DATE	COMPANY	# GUESTS	# GUIDES	# BOATS	TIME OUT	TIME IN	GUIDE	PARKING

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

Appendix G: 2012San Juan County Park Recreational Boat Launch Permit 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 on back of flap)
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.

Vessel Launch Permit

(May 27-September 5, 2011)

I have attended the required Vessel Code of Conduct training and am advised of the current laws and guidelines for marine wildlife. In the presence of federally protected killer whales, I will adhere to the laws:

- **Do not approach within 200 yards**
- **Keep clear of the whales' path**
- **Stop engines if unexpectedly within 200 yards of whales**

Add'l guidelines to assist in adhering to the laws:

Human-powered craft

- Move inshore of whales; paddle near shore to keep clear of whales' path; avoid approaching within 200 yards.
- If unexpectedly approached by whales within 200 yards, stop paddling, group up and remain inshore.

Motorized & Sailing Vessels

- Move offshore of whales to keep clear of whales' path & avoid approaching within 200 yards.
- Respect the ¼ mile and ½ mile voluntary no go zones

Respect Marine Protected Areas and

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

	FAST/SPEED	
2.0	speed	vessel traveling over 7 knots w/in **400y**/366m of whales, fast w/in 1/4 mile (**440y**/402m)
2.1	speed - approaching scene	vessel traveling over 7 knots w/in **400y**/366m of whales, fast w/in 1/4 mile (**440y**/402m)
2.2	speed - departing scene	vessel traveling over 7 knots w/in **400y**/366m of whales, fast w/in 1/4 mile (**440y**/402m)
	IN PATH	**NEW 2011 LAWS**
3.1A	In path 200-400 yds	w/in **200y**/183m corridor path in front of whales between **200-400y**/183-366m ahead of whales
3.3	In path - cross	crossing path of whales, vessel traveling across expected path **(200-400yds)**whales predictable
	APPROACH	
4.1	approach - head on	vessel approaching a whale/group head on w/in **200-400y**/181-366m when whales are traveling in a relatively predictable pattern
4.2	approach - behind	vessel approaching/traveling behind a whale/group w/in **200-400y/181-366m** when whales are traveling in a relatively predictable pattern
	W/in 100 YARDS/M	
5.1	**100y/91m - stopped**	**vessel stopped w/in 100y/91m of whales**
5.2	**100y/91m - under power**	**vessel under power w/in 100y/91m of whales**
5.4	100y/91m - fishing	vessel fishing w/in **100y/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 H1: Soundwatch Marine Wildlife Guideline and Law Incident Codes for Vessel Incident Observations (Page 2).

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

Appendix I: Soundwatch Data Sheet Vessel Incidents.

Vessel Incident Log

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

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

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/DEFINE:	
Pod: J Jp K Kp L Lp T		Vessel Activity?	Whale Ornt/Mnr																		
Spp:	DIR/NON DIR: N S E W		Fish																		
Cnfg: CTC THT LOO SPRD SPRDGps=otc tht loo			Transit																		
Prmtn: FLNK LIN NONLIN		Specific Bhvrs:	Rsrch NonWhale																		
Spot: Mnls Slo Med Fst Porp			Enforce Active																		
BhvrST: Trvl Rst Mill Socl			Acoustic >1/2mi																		
Cmmnts:			Other Dscp:																		

Appendix K: Soundwatch Whale Survey & Behaviors Codes for Whale Scans.

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 residents**	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

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

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

Vessel Code	Description
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 M: The Whale Museum's 2013 Orca Master SRKW Plotted Sightings.