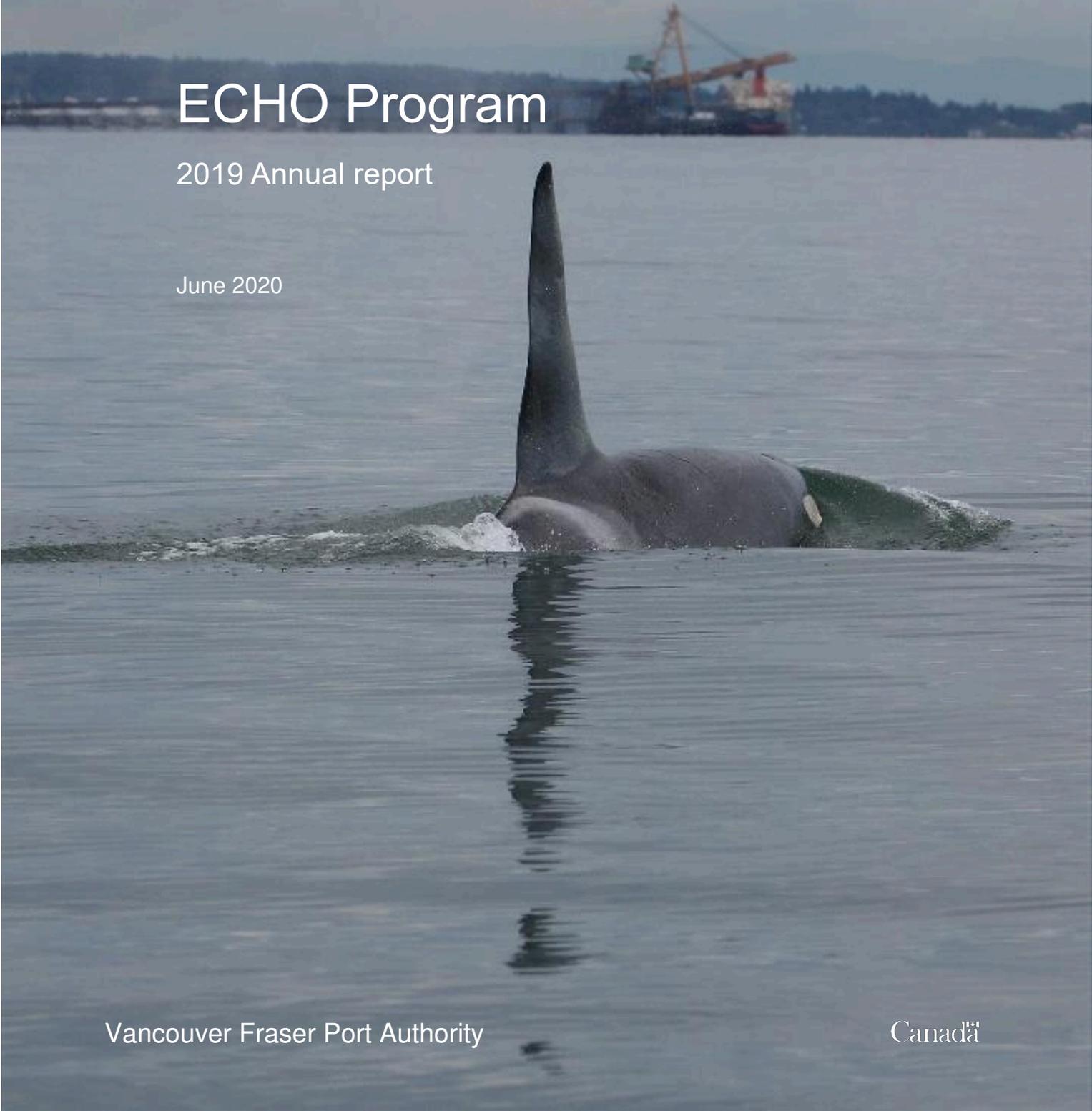




ECHO Program

2019 Annual report

June 2020



Message from the vice president, environment, community and government affairs

Sustainability has always been a part of our mandate as a Canada Port Authority, and a consistent theme driving our work to enable trade through the Port of Vancouver. To us, a sustainable port delivers economic prosperity through trade, maintains a healthy environment and enables thriving communities through collective accountability, meaningful dialogue and shared aspirations. We are guided by our mandate and these pillars of sustainability as we strive to advance our vision for the Port of Vancouver to be the world's most sustainable port.

As stewards of Canada's largest port, we develop and lead programs that help protect the lands and waters in and around the port, including the internationally-recognized Enhancing Cetacean Habitat and Observation (ECHO) Program.

In 2019, the port authority-led ECHO Program marked five years of collaboration and research that is helping our organization and the global marine industry to better understand and manage the effects of marine shipping on at-risk whales. Importantly, the ECHO Program's work is demonstrating how voluntary collaboration can deliver meaningful change to benefit the environment.

Thank you for taking the time to read about how this award-winning program is advancing our knowledge and helping improve the well-being of this region's iconic southern resident killer whales—and contributing to a healthy environment for us all.

Duncan Wilson
Vice president, environment, community and government affairs
Vancouver Fraser Port Authority

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About this report

This report covers activities of the Vancouver Fraser Port Authority-led Enhancing Cetacean Habitat and Observation Program in the 2019 calendar year, and also provides a brief overview of the year to come. Further details including project summaries, full technical project reports and past annual reports can be found on our website at portvancouver.com/echo.

About the Vancouver Fraser Port Authority and the Port of Vancouver

The Vancouver Fraser Port Authority is responsible for the stewardship of the federal lands and waters that make up the Port of Vancouver in and around Vancouver, British Columbia, Canada. The port borders 16 municipalities and intersects the asserted and established traditional territories and treaty lands of several Coast Salish peoples. As a Canada Port Authority, we are mandated under the [*Canada Marine Act*](#) to enable the nation's trade objectives, ensuring goods are moving safely, while protecting the environment and considering local communities.

The Port of Vancouver plays a vital economic role by connecting Canadians with the global marketplace, affecting the well-being of communities and businesses across the country. Guided by a vision to make the Port of Vancouver the world's most sustainable port, we work with government, industry, Indigenous peoples and local communities to shape the future of the port for the benefit of all Canadians. To us, a sustainable port delivers economic prosperity through trade, enables thriving communities and maintains a healthy environment.

About the ECHO Program

The Enhancing Cetacean Habitat and Observation (ECHO) Program is a port authority-led collaborative initiative aimed at better understanding and managing the cumulative effects of shipping activities on at-risk whales throughout the southern coast of British Columbia.

The program was developed and launched in 2014 in response to growing commercial marine activity in the region, including the movement of ships through critical southern resident killer whale habitat when calling at the Port of Vancouver. The geographic area of the ECHO Program is outlined in the map below (Figure 1).

We collaborate with government agencies, the marine transportation industry, Indigenous communities, conservation and environmental groups, scientists and others to advance ECHO Program projects beyond the Port of Vancouver, within the Salish Sea.

With tremendous support from the marine industry and our program advisors and partners, the ECHO Program has:

- Led a number of studies and coordinated large-scale voluntary actions in the southern resident killer whale critical habitat
- Built awareness among the global marine industry and government on the issue of underwater noise
- Supported the Government of Canada's ongoing efforts to advance knowledge on ways to mitigate underwater noise from ships through quiet ship design

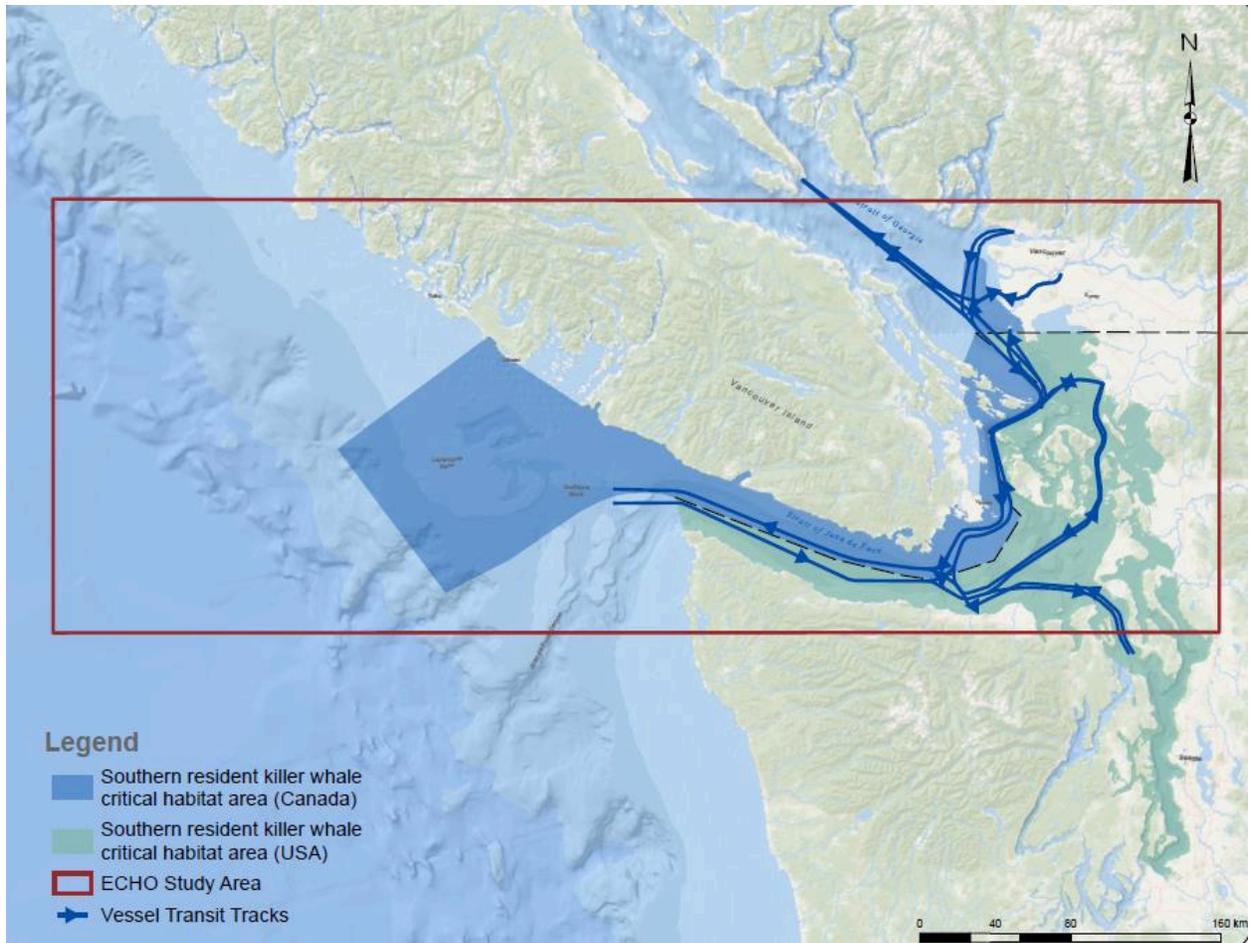


Figure 1: Geographic representation of ECHO Program focus study area, southern resident killer whale critical habitat and international shipping routes. The blue shaded area indicates Canadian critical habitat and green shaded area indicates U.S. critical habitat for southern resident killer whales. The ECHO Program focus area incorporates Canadian and portions of U.S. critical habitat for southern resident killer whales as well as offshore foraging areas for large marine mammals.

Our approach to collaboration

As we work to achieve our vision to make the Port of Vancouver the world's most sustainable port, we champion coordinated management approaches. The port authority-led ECHO Program is a regional initiative that involves over 100 organizations collaborating to find solutions to reduce the effects of marine traffic on the iconic southern resident killer whales and other at-risk whales. Below is an overview of our committees, funding partners and other program or project collaborators that have contributed to the success of the ECHO Program. A full list of members can be found on our website at portvancouver.com/echo/partners-advisors.

Advisory working group and technical committees

The ECHO Program is guided by the advice and input of a volunteer advisory working group and associated technical committees, which greatly assist the ECHO Program management team in deciding which scientific studies, educational initiatives and other projects should be advanced to best meet program objectives. The advisory working group and most technical committee meetings are independently facilitated by the [Fraser Basin Council](#).

Advisory working group

The ECHO Program advisory working group was first convened in 2014. It brings together a broad spectrum of representatives with relevant backgrounds, perspectives and interests from both Canada and the United States, who share the common goal of reducing threats to endangered whales. The role of the advisory working group is to provide the ECHO Program management team with timely input, advice and recommendations during the development and execution of the program's projects and initiatives. The advisory working group met three times in 2019.

Vessel operators committee

The vessel operators committee was established in December 2016 to help provide the ECHO Program with advice, support and guidance on how potential mitigation options may impact the shipping industry. This includes feedback on operational and economic factors that can help reduce barriers that may affect the marine industry's participation in the underwater noise reduction initiatives. The vessel operators committee met nine times in 2019.

Acoustic technical committee

First convened by the ECHO Program in 2015, the acoustic technical committee's role is to provide technical and scientific advice in the development and execution of ECHO Program research, mitigation and management projects. The committee is composed of marine mammal biologists, acousticians, naval architects and others with specific technical knowledge around the sources and effects of underwater noise. The acoustic technical committee met once in 2019.

Conservation agreement management committee

The conservation agreement management committee was created by the nine signatory parties of the conservation agreement titled [A Species at Risk Act, Section 11 Conservation Agreement to Support the Recovery of the Southern Resident Killer Whale](#), which was signed on May 20, 2019. The purpose of the committee is to oversee the implementation and effectiveness of the conservation agreement, and to provide a collaborative forum to discuss and resolve issues regarding the interpretation and implementation of the agreement, as needed. The conservation agreement management committee met once in 2019.

Federal government advisory committee

Throughout 2019, the ECHO Program met frequently with federal government departments through other committees and initiatives as described above and in the sections below. As such, convening the ECHO Program federal government advisory committee, comprising Transport Canada, Fisheries and Oceans Canada, Environment and Climate Change Canada and Vancouver Fraser Port Authority, was considered redundant and the committee was inactive in 2019.

Supporting government initiatives

Since the beginning of the ECHO Program in 2014, Fisheries and Oceans Canada and Transport Canada have participated in the ECHO Program advisory working group or other technical committees.

The federal government, including Transport Canada, Fisheries and Oceans Canada, and Environment and Climate Change Canada, announced its [Oceans Protection Plan](#) in 2016 and the [Whales Initiative](#) in 2018, and shortly thereafter convened five technical working groups to inform government measures to help protect southern resident killer whales. In 2019, the ECHO Program through the vessel operators committee provided input to the Government of Canada's process by also functioning as the technical working group for large commercial vessels.

Other program or project collaborators

The ECHO Program collaborated on two peer-reviewed scientific papers that were published in 2019. The links to these peer-reviewed papers are available below, and are also available on our website.

- Potential benefits of vessel slowdowns on endangered southern resident killer whales. 2019. Available online: [Frontiers in Marine Science](#)
- Slowing deep-sea commercial vessels reduces underwater radiated noise. 2019. Available online: [The Journal of the Acoustical Society of America Vol.146, No.1](#)

Funding partners and in-kind contributors

In 2014, the Vancouver Fraser Port Authority provided seed funding for the ECHO Program, along with support funding from government and industry partners. Other stakeholders have also made or committed direct financial support or in-kind contributions of equipment, resources and staffing at either the program level or for specific projects.

In 2019, Transport Canada, through the Marine Research and Development Innovation Centre, signed a five-year funding agreement to support the ECHO Program and its projects and initiatives to better understand and mitigate underwater vessel noise. As part of the agreement, Transport Canada will receive updates and reports on the relevant projects and initiatives conducted through the ECHO Program, and may access certain data, depending on the project and the agreed-upon conditions. Once completed, final reports for these projects and initiatives will be made publicly available on the ECHO Program website.

Top five 2019 highlights

Environmental protection is core to the port authority's mandate, and the well-being of the southern resident killer whales contributes to a healthy environment, which is also a key part of our vision to make the Port of Vancouver the world's most sustainable port. Last year, in addition to marking its five-year anniversary, the ECHO Program celebrated a number of highlights, including:

1. Coordinating an expanded ship slowdown in Haro Strait and Boundary Pass

The ECHO Program coordinated another voluntary seasonal ship slowdown initiative to help reduce underwater noise for southern resident killer whales. In 2019, the expanded geographic area almost doubled the distance to include both Haro Strait and Boundary Pass, which are important killer whale foraging areas. Results show that 82% of ships reported slowing down in this critical area, which demonstrates the marine industry's commitment to reducing the effects of marine shipping on at-risk whales.

2. Welcoming the first ship with a recognized quiet ship certificate

The first ship with a quiet ship notation—an environmental certificate for ships that demonstrate low underwater noise emission levels—called at the Port of Vancouver. The quiet ship notations were first added to the port authority's EcoAction Program in 2017, making Canada the first country in the world to encourage the use of quieter ships, which can help to quiet the waters for the at-risk whale populations in and around the Port of Vancouver and everywhere the ship may travel.

3. Signing a first-of-its-kind conservation agreement

The port authority entered into a first-of-its-kind *Species at Risk Act*, Section 11 conservation agreement with eight other partners. The agreement formalizes the port authority's commitment to continue managing the ECHO Program and working collaboratively with its advisors and partners over a five-year term to reduce acoustic and physical disturbance of large commercial ships operating in southern resident killer whale critical habitat. The signatories include the Chamber of Shipping, Council of Marine Carriers, Cruise Lines International Association – North West & Canada, Fisheries and Oceans Canada, International Ship-Owners Alliance of Canada, Pacific Pilotage Authority, Shipping Federation of Canada, Transport Canada and Vancouver Fraser Port Authority. The conservation agreement can be viewed on the [Government of Canada website](#).

4. Leading conservation efforts

The ECHO Program was recognized with the Ocean Wise Conservation Leadership in Support of Corporate Responsibility Award at the Ocean Awards in Vancouver. The award recognizes the progressive efforts of the ECHO Program and its ability to collaboratively advance meaningful ocean conservation work that is benefitting southern resident killer whales.

5. Sharing our knowledge of underwater noise effects with the international maritime industry

The ECHO Program continues to advance global understanding of the effects of underwater noise from ships on whales. Presentations were given at International Maritime Organization-led events and at several conferences focused on better understanding acoustic noise effects on the marine environment. These presentations also helped support the Government of Canada's ongoing efforts to advance knowledge on ways to mitigate underwater noise from ships through quiet ship design.

Year in review: 2019 ECHO Program key projects and initiatives

The ECHO Program leads, collaborates on, and supports a series of individual short-term projects, including scientific studies, education and regional initiatives. These projects are designed to provide a better understanding of the cumulative effects of marine shipping on whales, helping to inform the development of potential mitigation solutions.

In the early days of the ECHO Program, the advisory working group helped identify underwater noise related to marine traffic as a priority focus area for the program because of the effects to species at risk, in particular the southern resident killer whales. The ECHO Program also supports other threat-reduction projects related to reducing physical disturbances and environmental contaminants for whales in the region.

A few of the projects advanced by the ECHO Program in 2019 are highlighted below and are organized by focus area.

Focus area: Acoustic disturbance

1. 2019 expanded voluntary vessel slowdown trial in Haro Strait and Boundary Pass

In 2019, the ECHO Program—working in close collaboration with marine transportation industry, government and other partners and advisors—coordinated another voluntary ship slowdown initiative. The goals of the 2019 initiative were to maximize industry participation and underwater noise reduction levels in key feeding areas of the southern resident killer whales. In 2019, the slowdown area was expanded to include Boundary Pass for a total slowdown distance of 29.6 nautical miles, nearly double the previous slowdown distance.

Southern resident killer whales typically return to the Salish Sea to feed in the summer months, sometimes arriving as early as June. To ensure ships slowed down when whales were present, a whale monitoring period began on June 1, 2019. On July 5, the voluntary ship slowdown began when the southern resident killer whales were confirmed present within the initiative area by trusted observers and through the use of underwater microphones known as hydrophones.

In late September 2019, the ECHO Program team began another whale monitoring period to determine timing for the end of the slowdown initiative. The whales were confirmed in the area on September 29, and were not seen afterwards for a period of two weeks. On October 15, the ECHO Program and trusted observers determined the whales were unlikely to return to Haro Strait and Boundary Pass for an extended period and the initiative was called to an end.

During the slowdown period, ship operators and marine pilots were encouraged to transit Haro Strait and Boundary Pass at reduced speeds, when it was safe and operationally feasible. Vehicle carriers, cruise and container ships were encouraged to transit the area at 14.5 knots through the water or less, and bulkers, tankers, Washington State Ferries and government ships at 11.5 knots through the water or less.

Similar to the ship slowdowns in 2017 and 2018, the ECHO Program studied changes in ambient noise and monitored underwater noise levels before, during and after the slowdown using the hydrophone located at Lime Kiln State Park off San Juan Island in Washington State.

Transport Canada recognized that reducing vessel speeds and extending the distance of the slowdown could have cost implications for some vessel owners and operators, and increased pilotage fees were one possible source of increased costs. To maximize participation and reduce the financial impact of participating in the expanded voluntary slowdown, Transport Canada created a reimbursement program to cover additional pilotage costs incurred as a result of participating in the slowdown. Ships that experienced slippage or excess in their pilotage times, or that required double pilotage, were eligible for reimbursement.

Over the 15 weeks of the ship slowdown initiative, despite potentially adding between 16 to 28 minutes to their total transit time due to the reduced speeds, pilot-reported data shows 82% of ships transiting the area (1,279 of 1,551 ships) were slowed to the requested speeds in the initiative area. This added transit time can increase costs for shipping lines and affect their scheduled arrival times at port terminals, so the high participation rate demonstrates the shipping industry's commitment to protect endangered whales.

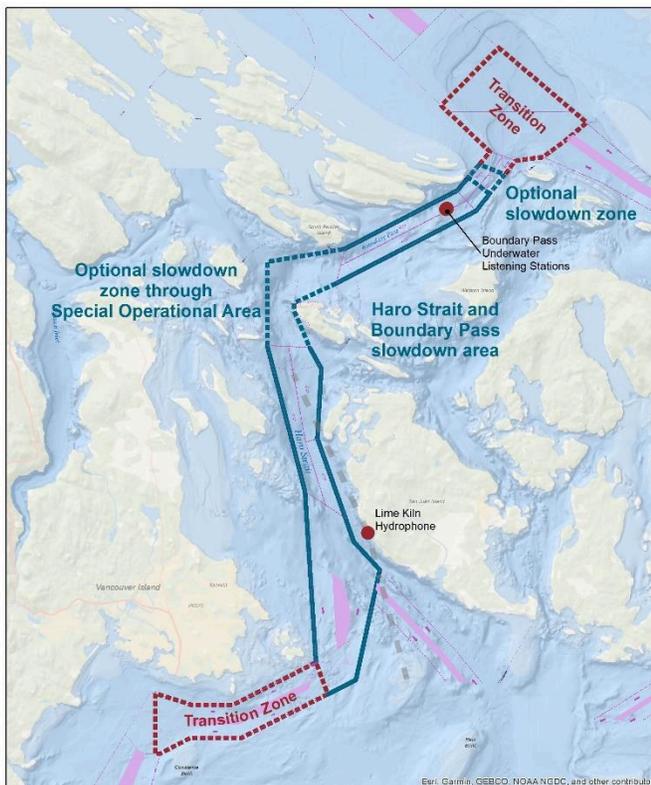


Figure 2: The vessel slowdown took place over an expanded geographic area that included both Haro Strait and Boundary Pass, a total distance of 29.6 nautical miles.

The ECHO Program team will work with partners to analyze the study data, and issue a final report in June 2020.

2. 2019 voluntary inshore lateral displacement in the Strait of Juan de Fuca

The ECHO Program, supported by Transport Canada, the Canadian and U.S. Coast Guards, Fisheries and Oceans Canada and the Canadian and U.S. marine transportation industry, conducted a voluntary inshore lateral displacement trial aimed to reduce underwater noise from tug traffic by moving vessels further away from known killer whale feeding areas along the northern side of the Strait of Juan de Fuca.

Results from the lateral displacement trial in 2018 study showed that a southward shift in tug traffic, coupled with the high rate of tug participation, resulted in a significant reduction in underwater noise, whereas laterally displacing deep sea within the outbound shipping lane yielded little noise reduction in whale habitat. For this reason, in 2019 only the tug sector was engaged to participate in another voluntary lateral displacement trial.

During the 20 week initiative, tugboat operators were asked to transit through the inshore lateral displacement area or the outbound shipping lane in the Strait of Juan de Fuca. Between June 17 and October 31, 2019, 93 of 122 tugs (77%) moved away from known whale feeding areas, for more than 50% of their transits.

The high number of participating tugboats demonstrates the industry's support for these initiatives, which are helping at-risk whales by reducing underwater noise. A final technical analysis of the lateral displacement initiative is expected to be released in June 2020.

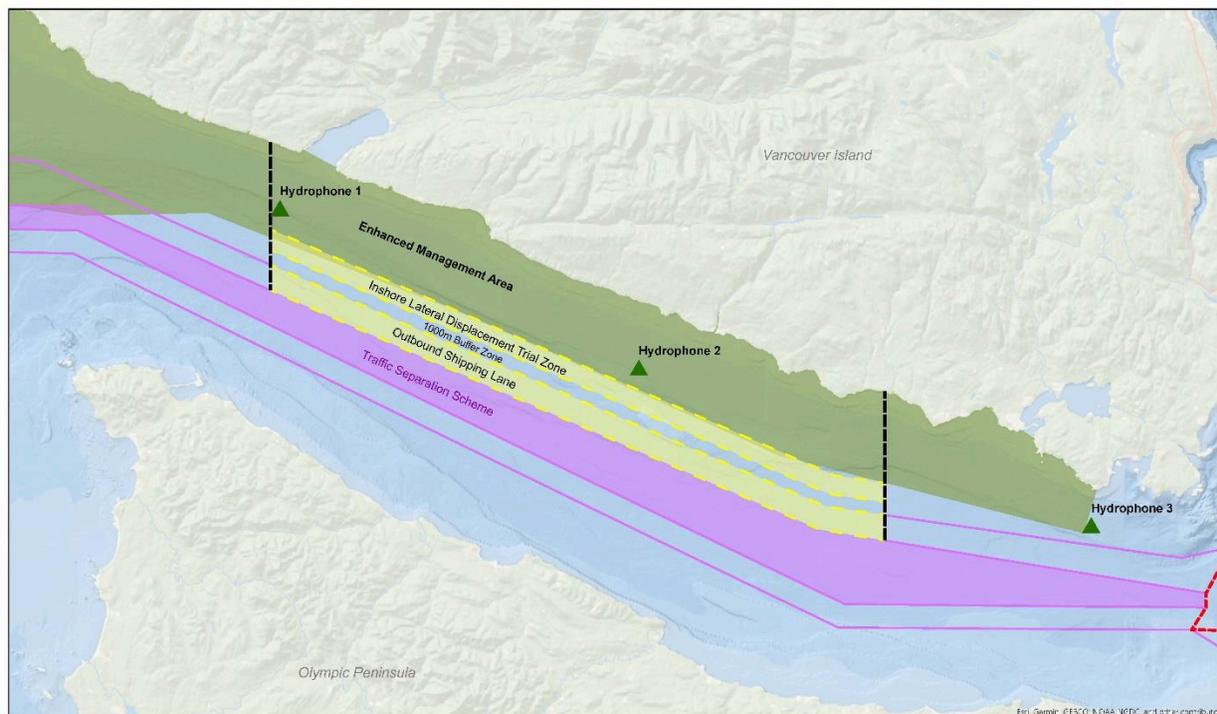


Figure 3: Map of 2019 lateral displacement initiative areas for inshore tug and barge vessels. The known southern resident killer whale feeding area is shown in green on the map above. Between June and the end of October 2019, this area was designated as a Government of Canada enhanced management area. Tugboat operators were asked to navigate through the inshore lateral displacement zone or the outbound shipping lane (yellow), while maintaining a buffer distance of 1000m from the traffic separation scheme shown in pink in the map above.

3. Ambient noise evaluation study

The long-term goal of the ECHO Program is to develop mitigation measures that will lead to reductions in regional underwater noise caused by marine shipping. In order to capture quantifiable data, the ECHO Program initiated an ambient noise evaluation study in 2016. The study measured changes in regional underwater noise conditions at three sites in the Salish Sea: Haro Strait, Boundary Pass and Strait of Georgia. Acoustic data were collected for approximately two years at these three sites.

Completed in 2019, the ambient noise evaluation study used the data from the underwater noise monitoring program to identify and evaluate key factors affecting ambient noise at the various hydrophone locations. The study evaluated changes in ambient underwater noise over time or with specific mitigations, while taking into account other environmental factors, such as large ship and small boat traffic, currents, water temperature, weather and biological components.

Results indicated that environmental and operational factors greatly influence ambient noise levels, making it difficult to identify consistent trends between the three sites. Based on this study, the ECHO Program developed a summary of recommendations to help increase the effectiveness of future ambient noise monitoring efforts. The summary is now available on the ECHO program website.

4. Burrard Inlet underwater noise monitoring project

In early 2019, a series of underwater microphones, known as hydrophones, were installed on the sea floor—four in Burrard Inlet and one in English Bay—to monitor underwater noise for a year. The concept for this underwater noise monitoring project was developed based on feedback from the ECHO Program's acoustic technical committee and through discussions with Tsleil-Waututh Nation. This pilot project will help the ECHO Program gain an understanding of underwater sound levels and presence of marine mammals in Burrard Inlet.

The hydrophone in English Bay (marked in orange on the map below) was added several months after the other hydrophones in an effort to capture a representative quiet area for comparison. In addition to the five hydrophones installed in Burrard Inlet and English Bay, two smaller hydrophones attached to floating buoys were also launched. These hydrophones operated for short periods of time in order to gather sound measurements of interest in Burrard Inlet, such as from ships using shore power, the Seabus and float planes. The project was funded by the Vancouver Fraser Port Authority and Transport Canada, with contributions from Tseil-Waututh Nation. A full report is expected to be published in summer 2020 and will be available on the ECHO Program website.



Figure 4: Approximate locations of the five longer-term hydrophones in the Burrard Inlet in 2019. The fifth hydrophone in English Bay (in orange) had a later deployment date.

Focus area: Physical disturbance

Marine traffic of all types can cause physical disturbances to whales, leading them to alter their normal behaviour, feeding and migratory movement.

1. Whales in our Waters tutorial

Launched publicly in February 2019, the Whales in our Waters tutorial was developed for mariners by the ECHO Program and BC Ferries with the support of Ocean Wise. Mariners can use it to learn tips for identifying common species, including their seasonal distribution and critical habitat areas, detection cues and whale behaviours. The tutorial also provides best practices to use when whales are in the area.

Regional mariners, particularly those operating large ships such as ferries, cargo ships or tugboats in the Salish Sea, are encouraged to complete the tutorial in advance of the summer season, when many whale species return to the area to feed. Though geared toward mariners, the tutorial is also available to the general public on the Port of Vancouver website. The tutorial was incorporated into the training programs for BC Ferries and Washington State Ferries bridge crew. As of December 31, 2019, 241 people had completed the tutorial.

2. WhaleReport Alert System

The WhaleReport Alert System (WRAS) pilot project was launched in 2018 to provide real-time notifications to select regional commercial vessel operators when whales are in their proximity. These alerts can help mariners take adaptive mitigation measures, such as slowing down or altering course, to reduce the risk of physical and acoustic disturbance to whales. This pilot project is led by Ocean Wise's BC Cetacean Sightings Network, in collaboration with the ECHO Program and the Prince Rupert Port Authority.

Throughout 2019, the ECHO Program supported the project by encouraging commercial mariners to download and use the WRAS app, particularly when transiting in southern resident killer whale critical habitat. As of December 2019, WRAS had 256 registrants from 28 Canadian and U.S. marine organizations and over 3,300 alerts sent to commercial ships operators along the Pacific west coast.

Focus area: Environmental contaminants

There are a number of chemical contaminants that can impact a whale's ability to grow and reproduce. Unfortunately, due to the small number of remaining whales, measuring contaminant levels in the bodies of killer whales or other marine mammals is challenging. Instead, scientists study contaminants in the water and sea floor sediments to understand their abundance and the possible effects they have on whales. The ECHO Program has supported projects that explore both sources and baseline of contaminants in the marine environment.

1. Ocean Wise – PollutionTracker

Since 2016, the ECHO Program has supported [PollutionTracker](#), an Ocean Wise initiative, to collect and analyze samples of sediment and mussels. This analysis helps to benchmark levels of environmental contamination and inform best practices in and around the water. The second phase of the project began in late 2018, and 10 ECHO Program-funded locations were evaluated for contaminant levels. This project ended in 2019 and a final report was received in early 2020. More information can be found at pollutiontracker.org.

Expanded port authority incentive program

Based on the ECHO Program's research, in 2019 the port authority continued to expand our [EcoAction¹ Program](#), to encourage ships that call at the Port of Vancouver to quiet the waters for at-risk whale populations along the southern coast of British Columbia. The EcoAction Program incentives are intended to recognize shipping companies that make investments to add quieter ships and underwater noise-quieting technologies to their fleets, which benefits the natural environment in and around the Port of Vancouver.

The EcoAction Program has been in place since 2007. Incentives to reduce ship noise were first added to the program in 2017, making Canada the first country in the world to encourage quieter ships.

As of January 1, 2019, the EcoAction Program accepts quiet ship notations from four different ship classification societies, a performance indicator level from an environmental certification program for the maritime industry, and five propeller technologies, all of which can help reduce underwater noise emissions. Ship classification societies are the non-governmental organizations that establish and maintain technical standards for the construction and operation of ships.

On April 17, 2019, the Vancouver Fraser Port Authority welcomed the first ship with a quiet ship notation from the ship classification society DNV-GL, which made it eligible for the gold-level (47%) discount on Port of Vancouver harbour dues. Ships with cavitation and wake flow reduction technologies are eligible for a bronze-level (23%) discount, and 5% of ships calling at the Port of Vancouver in 2019 took advantage of the bronze-level discount for underwater noise reduction technologies.

¹ The Vancouver Fraser Port Authority's use of the name 'EcoAction' refers to a program specifically intended to promote improved environmental performance within the shipping industry and is not related to the EcoAction Community Funding Program administered by Environment Canada.

Increasing global awareness of the effects of underwater noise on at-risk whales

Education outreach

The ECHO Program management team maintains regular communication with program advisors and collaborators, issues public newsletters, posts information to our [website](#), and creates educational materials to help raise awareness about the program and the issue of underwater noise.

In 2019, the ECHO Program developed an infographic for the Royal BC Museum's upcoming exhibit on orcas, to highlight the program's collaborative approach to protecting at-risk whales in the Salish Sea. Due to the COVID-19 pandemic, this exhibit has been delayed until 2021.

ECHO Program-supported educational materials can be found on our [resources webpage](#).

Presentations

In 2019, the program team and partners delivered 16 targeted presentations to a variety of audiences ranging from regional and international marine industry stakeholders, environmental groups, acoustic scientists and naval architects. These presentations are helping to advance the global marine industry's awareness of the issue of underwater noise and its effects on whales, and support regional initiatives to protect the southern resident killer whales in Canada and the United States.

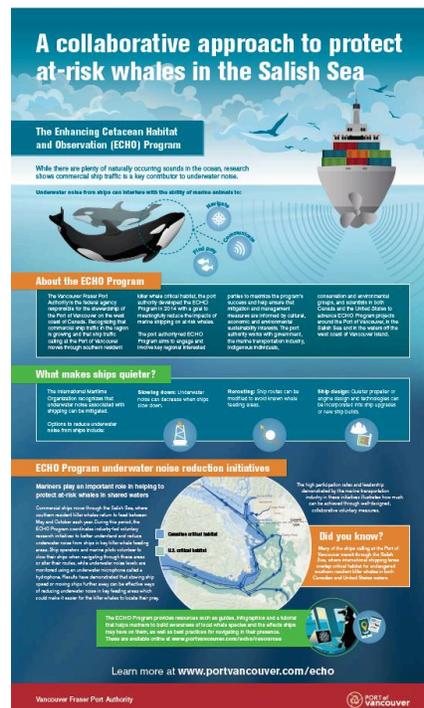
Key presentations in 2019 included:

- International Maritime Organization Scientific Group members, Science Day presentation
- OceanObs Conference, held every 10 years and focused on ocean observation networks and innovation
- Fifth annual Effects of Noise on Aquatic Life international conference
- Washington State southern resident orca task force
- International symposium on anthropogenic noise, leading experts from international organizations and scientific communities gathered to advance global discussions on underwater noise

Media releases

In 2019, the Vancouver Fraser Port Authority issued six media releases relating to the ECHO Program. These media releases can be found at [portvancouver.com](#) in our [media room](#).

1. [Vancouver Fraser Port Authority expands noise reduction criteria to encourage quieter waters for endangered whales](#) (February 2019)
2. [New tutorial available for mariners to help protect whales in B.C. waters](#) (February 2019)
3. [Port authority-led ECHO Program wins award for leadership in ocean conservation](#) (April 2019)
4. [Marine industry and government sign five-year commitment to continue voluntary measures to protect southern resident killer whales](#) (May 2019)
5. [Expanded voluntary ship slowdown through Haro Strait and Boundary Pass set to begin](#) (June 2019)
6. [World-leading science increases awareness of effects of marine shipping on at-risk whales](#) (December 2019)



Looking ahead to 2020

In 2020, we aim to build on the program's success by continuing to meet regularly with key stakeholders and advisors to share information and findings broadly and transparently. We will pursue and implement management measures and mitigation actions, as appropriate. Highlights of the 2020 ECHO Program work plan are summarized below.

Underwater noise reduction initiatives

The ECHO Program expects to coordinate another voluntary slowdown for commercial ships in Haro Strait and Boundary Pass, and another voluntary lateral displacement for tugboats in the Strait of Juan de Fuca. The program also aims to identify other possible areas within southern resident killer whale critical habitat where voluntary seasonal slowdowns of large commercial ships can be implemented in the future.

Acoustic data analysis

The ECHO Program has accumulated multiple years of valuable acoustic data from three hydrophone locations—Boundary Pass, Haro Strait and Strait of Georgia—including data from the ship slowdown initiative. The program will continue to analyze this data to identify trends and patterns to help inform future underwater noise reduction initiatives. Other acoustic projects include a vessel noise correlations study to identify which key ship characteristics cause underwater noise, and the management and analysis of data from a new long-term underwater listening station deployed by Transport Canada in Boundary Pass.

Conservation agreement reporting

The ECHO Program and other parties to the conservation agreement will continue to work toward the commitments outlined in the agreement. The program team will provide a report summarizing the first year of the conservation agreement in summer 2020, which will be made available on our website.

Thank you

We appreciate the ongoing support and engagement of our advisors, collaborators and research participants whose continued efforts are helping to reduce impacts of marine shipping on whales. A complete list of collaborators can be found on [our website](#).

Appendix A: Project list

Below is a list of the projects completed, underway or being evaluated by the ECHO Program since 2015. Where available, links to the completed studies are listed on the ECHO Program [website](#).

Projects in progress – Acoustic disturbance focus area
1. Haro Strait and Boundary Pass voluntary ship slowdown (2019)
2. Strait of Juan de Fuca lateral displacement (2019)
3. Ship noise correlation study
4. Burrard Inlet underwater noise monitoring
5. Boundary Pass long-term cabled underwater listening station
6. RPM vs speed analysis
7. Underwater noise prediction for a hybrid patrol vessel
Completed projects – Acoustic disturbance focus area
8. Regional ambient acoustic monitoring – Lime Kiln
9. Regional ocean noise contributors study
10. Ship quieting options study
11. Strait of Georgia underwater listening station
12. Summary paper on underwater noise impacts to whales
13. Killer whale behavioural response to ship noise
14. Study of humpback whale calls in the presence of ships
15. Ship noise studies with regional partners
16. Haro Strait ship slowdown (2017)
17. Haro Strait voluntary ship slowdown (2018)
18. Strait of Juan de Fuca Lateral displacement (2018)
19. Ambient noise evaluation
20. Boundary Pass temporary underwater listening station
21. Ship noise footprints
22. Whales in our Waters tutorial (acoustic and physical disturbance)
23. Educational outreach to local mariners
24. Large whale aerial survey
25. Feasibility study of underwater listening station locations in the Salish Sea
Completed projects – Physical disturbance focus area
26. Large whale ship strike risk assessment (report available through Department of Fisheries and Oceans)
27. Mariner's Guide to Whales, Dolphins, and Porpoises of Western Canada
28. Ocean Wise WhaleReport Alert System (WRAS) (physical and acoustic disturbance)
Completed projects – Environmental contaminants focus area
29. Management of contaminants during underwater hull cleaning
30. Ocean Wise PollutionTracker project