



Enhancing Cetacean Habitat and Observation (ECHO) Program

2018 Annual Report



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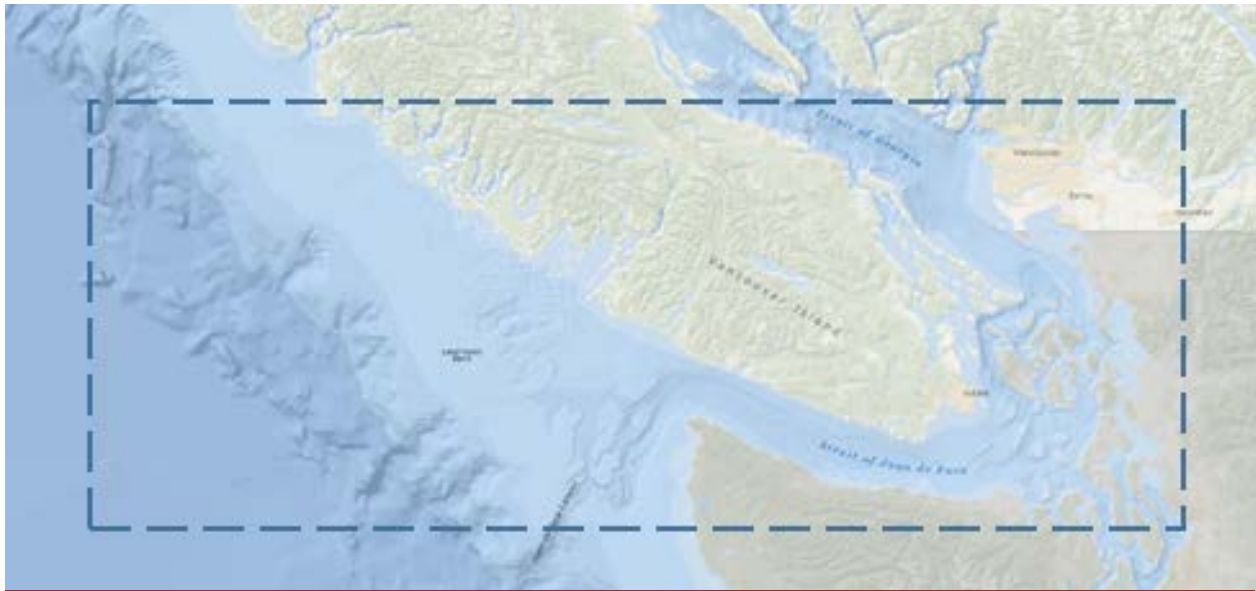
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About the Vancouver Fraser Port Authority and the Port of Vancouver

Under the *Canada Marine Act*, Canada Port Authorities are mandated to enable Canada's trade objectives, ensuring goods are moving safely, while protecting the environment and considering local communities. The Vancouver Fraser Port Authority is responsible for the stewardship of the federal port 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. 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 be the world's most sustainable port, the port authority works 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 Enhancing Cetacean Habitat and Observation (ECHO) Program

The Enhancing Cetacean Habitat and Observation (ECHO) Program is a Vancouver Fraser 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.



Geographic representation of ECHO Program focus study area. *Note: 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.*

Recognizing that commercial marine activity in the region is growing and that vessel traffic calling at the Port of Vancouver transits through southern resident killer whale critical habitat, the port authority provided seed funding in 2014 to develop the ECHO Program, with support funding from government and industry partners.

The geographic scope of the Vancouver Fraser Port Authority's jurisdiction is limited so, in order to adequately address the cumulative threats posed by commercial vessel activities in this growing international trade gateway, a larger, regional-scale collaborative approach is required.

To this end, the port authority collaborates with government agencies, marine industry, conservation and environmental groups, Indigenous individuals and scientists to advance ECHO Program projects within the Salish Sea, as well as the waters off the western coast of Vancouver Island and the entrance to the Strait of Juan de Fuca.

The long-term goal of the program is to quantifiably reduce threats from commercial marine vessel-related activities to endangered whales.

2018 ECHO Program highlights

In 2018, the population of southern resident killer whales dropped to 74 individuals, from 76 in 2017. The loss of each whale reminds us of the urgency and importance of a regional collaborative approach to better understand and address the threats affecting this iconic species and other endangered whales in the Salish Sea. The ECHO Program strives for a science-based approach to environmentally responsible and sustainable shipping while safeguarding and promoting the protection of local wildlife. The research we've done to date tells us that solutions exist to help minimize the effects of shipping on marine life.

In 2018, the ECHO Program advisory working group met three times and the vessel operators committee met eight times. We undertook two key initiatives that focused on reducing underwater noise from large commercial vessels within designated critical habitat for the endangered southern resident killer whale population. The high participation rates and leadership demonstrated by industry partners during both of these initiatives illustrates how much action can be achieved through well designed, collaborative voluntary measures.

The ECHO Program informs and engages stakeholders both locally and internationally. In 2018, the ECHO Program was featured in the port authority's "People Connected" community awareness advertising campaign. Several television, cinema, transit and digital advertisements were created and aired throughout the summer and fall of 2018, and the ad was recorded as seen up to 37 million times. Highlights of presentations delivered in 2018 include a return visit to the International Maritime Organization's Marine Environment Protection Committee in London and a presentation to the Division for Ocean Affairs and the Law of the Sea at the United Nations in New York City.

Last year, the ECHO Program received top honour in the environment category at the Lloyd's List Americas Awards. The award recognizes the institution, company or individual that has done the most to reduce the pollution of the marine environment in the Americas from maritime sources.

The world-leading science produced by the ECHO Program and its partners is helping the marine industry, port authority and the Government of Canada better understand how we can reduce the impacts of marine shipping on southern resident killer whales.

We are especially appreciative of the support, engagement and efforts of our advisors, collaborators and research participants who continue to make this work a priority.

Our approach to collaboration

The Vancouver Fraser Port Authority's vision is to be the world's most sustainable port and the organization is championing coordinated management approaches toward achieving that vision. Mutual understanding of interests is important to constructively work together to resolve shared challenges and to develop a sustainable port.

The port authority-led ECHO Program aims to engage and involve key regional interested parties to maximize the program's success and help ensure that mitigation and management measures developed through the program are informed by cultural, economic and environmental sustainability interests.

The program is guided by the advice and input of an advisory working group and associated technical committees. The guidance provided by these volunteer advisors greatly assists 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. In 2018, the advisory working group met three times.

Over the past five years, members have included representatives from the following organizations:

- BC Coast Pilots
- BC Ferries
- Canadian Coast Guard
- Chamber of Shipping
- Council of Marine Carriers
- Cruise Lines International Association - North West & Canada
- Department of National Defence and the Canadian Armed Forces
- Fisheries and Oceans Canada
- Indigenous individuals
- Hemmera
- National Oceanic and Atmospheric Administration (NOAA)
- Ocean Wise
- Pacific Pilotage Authority
- Shipping Federation of Canada
- Transport Canada
- Vancouver Fraser Port Authority
- Washington State Ferries
- WWF-Canada

Vessel operators committee

The vessel operators committee was established in December 2016 to help provide the ECHO Program with advice, support and guidance on potential mitigation options that may impact the shipping industry. In 2018, the vessel operators committee met eight times.

Over the past five years, the vessel operators committee has included industry representatives from:

- BC Coast Pilots
- BC Ferries
- Canadian Coast Guard
- Chamber of Shipping
- Council of Marine Carriers
- Cruise Lines International Association – North West & Canada
- Hapag-Lloyd (Canada) Inc.
- Holland America Group
- Pacific Merchant Shipping Association
- Pacific Northwest Ship & Cargo Services
- Pacific Pilotage Authority
- Royal Canadian Navy
- Shipping Federation of Canada
- Transport Canada
- Vancouver Fraser Port Authority
- Washington State Ferries

Acoustic technical committee

An acoustic technical committee was first convened by the ECHO Program in 2015. The role of the committee 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 2018.

Over the past five years, the acoustic technical committee has included representatives from:

- BC Ferries
- Fisheries and Oceans Canada
- Department of National Defence and the Canadian Armed Forces
- DHI Group Inc.
- DW Ship Consult
- JASCO Applied Sciences
- National Oceanic and Atmospheric Administration (NOAA)
- Oceans Networks Canada
- Ocean Wise – Coastal Ocean Research Institute (CORI)
- Ocean Wise – Coastal Ocean Research Institute (CORI)
- Robert Allan Naval Architects
- Sea Mammal Research Unit (SMRU) Consulting Canada
- Transport Canada
- University of British Columbia
- University of St. Andrews
- University of Victoria
- Washington State Department of Transportation

Federal government advisory committee

In the early days of the ECHO Program, a Canadian federal government advisory committee was developed to offer strategic advice, recommendations and guidance to the ECHO Program management team. The committee included representatives from Environment and Climate Change Canada, Fisheries and Oceans Canada, Transport Canada and Vancouver Fraser Port Authority. Since the announcement of the government's Ocean Protection Plan in 2016 and Whales Initiative in 2018, the ECHO Program and its advisors have been working in parallel with, and engaging more actively, in the Government of Canada's process.

While the federal government advisory committee did not meet in 2018, committee members or representatives from their respective agencies participated in other ECHO Program advisory working group or technical committees. As an example, to reduce redundancy, the ECHO Program's existing vessel operators committee also functions as the government's Technical Working Group 1 for large commercial vessels under the Whales Initiative technical working group process.

Other program or project collaborators

Since 2014, the ECHO Program has benefited from collaboration with other parties on specific research projects and data sharing initiatives to support the interests of the program.

These additional collaborators include:

- Achieve QUIeter Oceans (AQUO)
- Green Marine
- Nanaimo Port Authority
- Port of Seattle
- Port of Tacoma
- Scripps Institute of Oceanography
- Sea Mammal Research Unit (SMRU) Consulting Canada University of Victoria NEMES Project (Noise Exposure to the Marine Environment from Ships)

- Prince Rupert Port Authority
- Saturna Island Marine Research and Education Society
- The Whale Museum

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. Since the program's inception, contributions have also been made, or committed by other stakeholders, either by way of direct financial support or in-kind contribution of equipment, resources and staffing at either the program level or for specific projects. These funding partners include:

- Fraser River Pile & Dredge
- Fisheries and Oceans Canada
- JASCO Applied Sciences
- Ocean Networks Canada
- Trans Mountain Corporation
- Transport Canada
- Tsleil-Waututh Nation
- University of Victoria

ECHO Program journey

The ECHO Program was officially launched in November 2014 with the inaugural ECHO Program advisory working group meeting. Soon after, we developed a road map to guide our journey. The road map consists of five stages:

1. Plan
2. Execute
3. Develop
4. Implement
5. Evaluate

Throughout 2018, the ECHO Program continued to work across three key program stages of executing, developing and implementing multiple projects including an industry-led voluntary slowdown initiative aimed at implementing short-term mitigation measures.

2018 ECHO Program 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.

Acoustic disturbance, physical disturbance and environmental contaminants are three of the four key threats listed in the Fisheries and Oceans Canada recovery strategy for whales in the region. Availability of prey is identified as another key threat category for at-risk whales. While this threat category is not a focus area for the ECHO program, this threat is being addressed by the port authority through its [Habitat Enhancement Program](#).

In 2015, the ECHO Program advisory working group helped identify underwater noise related to marine traffic as a priority focus area for the program. 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 2018 are highlighted below.

Acoustic disturbance

Acoustic disturbance, or underwater noise, from vessels related to marine traffic is a priority focus area for the ECHO Program based on the effects to species at risk, in particular the southern resident killer whales.

Voluntary vessel slowdown

Following the success of the 2017 first-of-its-kind voluntary vessel slowdown trial in Haro Strait, the ECHO program coordinated an industry-led voluntary slowdown in Haro Strait from July through October 2018. The slowdown area in Haro Strait between Discovery Island and Henry Island remained unchanged from the 2017 trial slowdown area.

Results from the 2017 slowdown trial demonstrated that slowing ship speed can be an effective way of reducing the underwater noise generated by ships, thereby making it easier for whales to use sound to locate their prey.

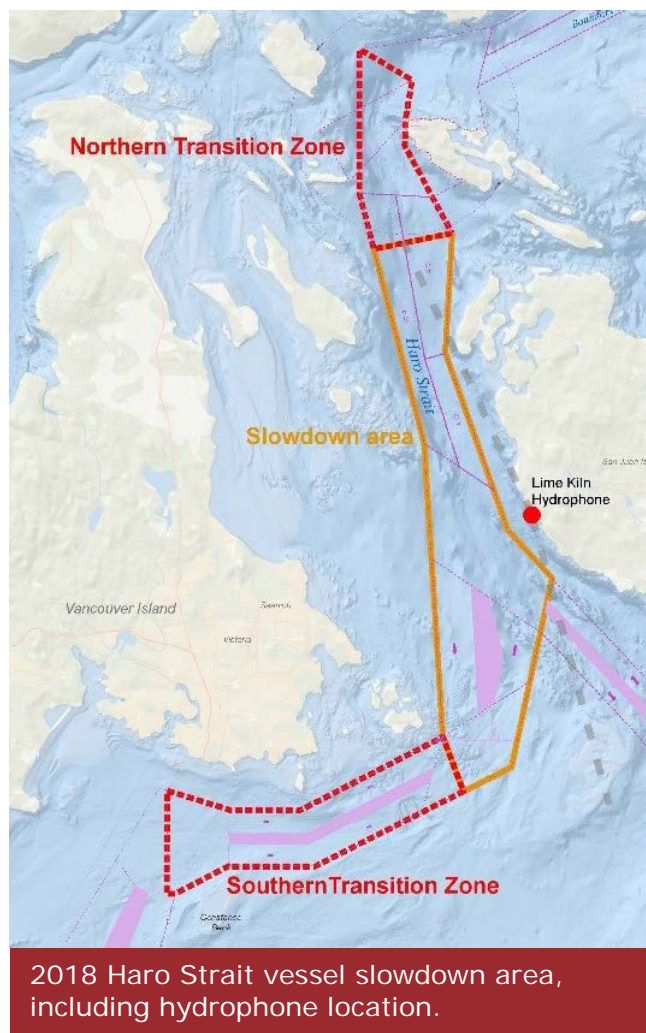
Based on analysis of 2017 information, the ECHO Program refined the approach for 2018 and enacted dynamic start and end dates for the slowdown and identified optimum speeds for different vessel types to maximize vessel participation while making an effort to continue reducing underwater noise levels in the area. The voluntary vessel slowdown initiative asked operators of cargo ships transiting Haro Strait to slow their ships when killer whales arrived in this important foraging area for the season.

Haro Strait is located in a compulsory pilotage area and commercial vessel operators are required to hire local marine pilots to guide their vessels safely through the area, which includes challenging currents and narrow channels. Vessel operators and marine pilots were asked to plan for the potential slowdown between the dates of July 1 and October 31, 2018. The slowdown began when the southern resident killer whales were confirmed as present within Haro Strait on July 12 by hydrophone data and trusted observers.

During the slowdown period, where it was safe and operationally feasible, vehicle carriers, cruise and container vessels were encouraged to transit Haro Strait at 15 knots or less, and bulkers, tankers, Washington State Ferries and government vessels at 12.5 knots or less.

Similar to 2017, 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.

Visual observations and acoustic detections were recorded at Lime Kiln before and during the slowdown period to



determine killer whale presence, which guided the start and end of the 2018 voluntary vessel slowdown initiative. A team of scientific observers collected observations of killer whale behaviour along the west coast of San Juan Islands during the slowdown period to evaluate how vessel speed and presence may be affecting the whales' behaviour. In addition, an analysis of potential benefits of the slowdown on the behaviour and foraging of killer whales was undertaken using computer models.

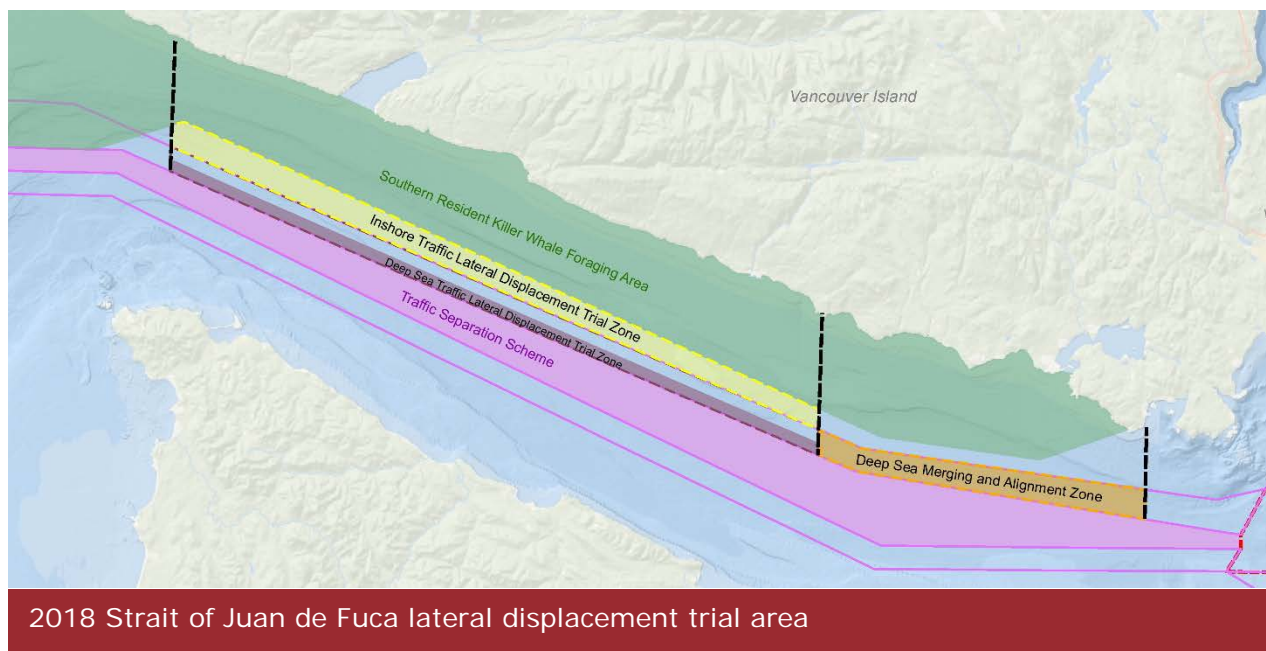
Over the 16 weeks of the 2018 voluntary vessel slowdown, 88 per cent of commercial piloted vessels reported participation by slowing their vessels in the area.

We are pleased with this result and express our sincerest gratitude to all those who supported and participated in the planning and execution of this voluntary initiative. Results from the 2018 voluntary vessel slowdown are currently being analyzed and the final report is expected to be completed in summer 2019.

Strait of Juan de Fuca lateral displacement trial

The ECHO Program and Transport Canada, supported by U.S. Coast Guard, Fisheries and Oceans Canada, the Canadian and U.S. marine transportation industry, Indigenous individuals, and environmental and conservation groups, undertook a voluntary trial in 2018 to study how laterally displacing vessels away from known southern resident killer whale feeding areas would affect the underwater noise levels in those areas. The overall purpose of the trial was to reduce vessel noise impacts in these key southern resident killer whale feeding areas. Participation was not expected to impact vessel transit time or fuel consumption rates.

The voluntary trial began on August 20, 2018 and ended on October 31, 2018.



During the trial, vessel operators were asked to move as far south as possible in the inshore area and outbound shipping lane of the Strait of Juan de Fuca to increase the distance between ships and whales and reduce underwater noise levels in known killer whale feeding areas. Vessel participation rates were monitored using satellite data from a tracking system known as automatic identification system (AIS) that uses transponders, and regular updates were provided to partners, advisors and participating organizations via the ECHO Program

newsletter. Underwater noise was measured before, during and after the slowdown using a number of Fisheries and Oceans Canada hydrophones located in key foraging areas of the Strait of Juan de Fuca.

Following the conclusion of the trial, a full analysis is being conducted by the ECHO Program to evaluate results and provide feedback to inform next steps. The final report is being compiled by multiple parties and is expected to be published in summer 2019.

Underwater listening station - testing and analysis of regional vessels

A final report on the Strait of Georgia underwater listening station project was completed in 2018. The underwater listening station was installed in September 2015 and was maintained and operated for over two and a half years, monitoring not only vessel source levels, but also marine mammal presence and total ambient underwater noise. This project was carried out by the ECHO Program in partnership with Transport Canada, Fisheries and Oceans Canada, Ocean Networks Canada and JASCO Applied Sciences.

Physical disturbance

Marine vessel traffic of all types can disrupt whales through interactions and by altering their normal behaviour and movement.

WhaleReport Alert System (WRAS)

The WhaleReport Alert System (WRAS) pilot project was launched in 2018 to help 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. 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.

Environmental contaminants

There are also a number of chemical and biological (such as invasive species) contaminants present in our oceans. Measuring contaminant levels in the bodies of killer whales or other marine mammals is challenging. Studying contaminants in the water, sediment and food sources, such as shellfish, in marine mammals' environment is one way to understand the possible effects on the whales.

Ocean Wise - Coastal Ocean Research Institute (CORI) PollutionTracker

The ECHO Program is supporting PollutionTracker, an Ocean Wise initiative, to collect and analyze samples of sediment and mussels to establish baseline levels of environmental contamination and inform best practices in and around the water.

In 2016 and 2017, Ocean Wise's Coastal Ocean Research Institute successfully sampled ten ECHO Program-funded locations in and around the Vancouver Fraser Port Authority's jurisdiction and southern resident killer whale critical habitat, as part of the first phase of the PollutionTracker project. The summary report on the first phase of the project was published to the [Ocean Wise website](#) in early 2018. A second phase began in late 2018 and will continue through 2019, where ten ECHO Program-funded locations will again be evaluated for contaminant levels.

Project list

Below is a complete 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 port authority's website at www.portvancouver.com/echo.

Projects in progress	
Project name	Focus area
1. Haro Strait voluntary vessel slowdown (2018)	Acoustic disturbance
2. Strait of Juan de Fuca Lateral displacement trial	Acoustic disturbance
3. Ambient noise evaluation	Acoustic disturbance
4. Vessel noise correlation study	Acoustic disturbance
5. Burrard Inlet underwater noise monitoring	Acoustic disturbance
6. Boundary Pass temporary underwater listening station	Acoustic disturbance
7. Vessel noise footprints	Acoustic disturbance
8. WhaleReport Alert System (WRAS) http://wildwhales.org/wras/	Physical disturbance
9. Whales in our Waters tutorial https://echolearn.portvancouver.com/	Acoustic disturbance
10. Ocean Wise PollutionTracker project http://pollutiontracker.org/	Environmental contaminants
11. Large whale aerial survey	Physical disturbance
12. Management of contaminants during underwater hull cleaning	Environmental contaminants
Completed projects	
Project name	Focus area
1. Regional ocean noise contributors study	Acoustic disturbance
2. Ship quieting options study	Acoustic disturbance
3. Summary paper on underwater noise impacts to whales	Acoustic disturbance
4. Killer whale behavioural response to vessel noise	Acoustic disturbance
5. Study of humpback whale calls in the presence of ships	Acoustic disturbance
6. Vessel noise studies with regional partners	Acoustic disturbance
7. Haro Strait vessel slowdown trial (2017)	Acoustic disturbance
8. Feasibility study of underwater listening station locations in the Salish Sea	Physical disturbance
9. Large whale vessel strike risk assessment (Report available through Department of Fisheries and Oceans)	Physical disturbance
10. Mariner's Guide to Whales, Dolphins, Porpoises of Western Canada	Physical disturbance
11. Strait of Georgia underwater listening station	Acoustic disturbance
12. Educational outreach to local mariners	Acoustic disturbance

Public awareness

Education outreach

Through collaboration, the ECHO Program aims to deliver credible, evidence-based information in a timely manner to increase awareness of the effects of shipping on marine mammals and build trust and confidence in the program. The ECHO Program management team maintains regular communication with our 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.

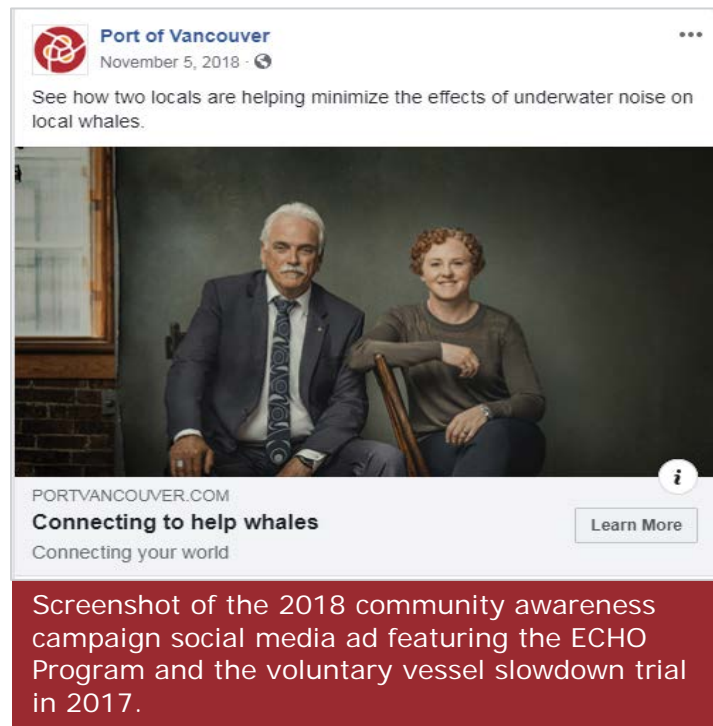
The program team delivered 48 presentations in 2018 to a variety of audiences ranging from regional and international marine industry stakeholders, environmental groups, acoustic scientists and naval architects. Highlights of presentations given in 2018 included a return visit to the International Maritime Organization's Marine Environment Protection Committee, to present at session 72 in London, England, a presentation to the United Nations in New York City at the Informal Consultative Process 19th meeting on Ocean Affairs and the Law of the Sea and several North American and international aquatic noise and industry conferences, including the Interferry Conference in Cancun, Mexico and Dry Bulk Conference in Vancouver, Canada. In 2018, presentations about the ECHO Program were also given to various Indigenous groups in the Vancouver, British Columbia area and on Vancouver Island.

In 2018, the port authority's harbour patrol crew members boarded 100 vessels calling at the Port of Vancouver to provide captains with a copy of the *Mariner's Guide to Whales, Dolphins and Porpoises of Western Canada* and other marine mammal education materials.

Community awareness campaign

In 2018, the ECHO Program was featured in the port authority's "People Connected" community awareness campaign. Filmed in early 2018, the "connecting people to protect whales" advertisement featured an ECHO Program team member and one of the participants of the voluntary vessel slowdown trial which took place in summer 2017. The advertisement helped to increase public awareness of the ECHO Program and recognized industry's active participation and contribution to the initiative.

Several television, cinema, transit and digital advertisements were created and aired throughout the summer and fall of 2018. Over the two, four-week ad campaign periods, the ad was seen up to 37 million times.



Media releases

In 2018, the Vancouver Fraser Port Authority issued three media releases relating to the ECHO Program. These media releases can be found at www.portvancouver.com in our media room.

1. The Vancouver Fraser Port Authority-led Enhancing Cetacean Habitat and Observation (ECHO) Program received top honour in the environment category at this year's Lloyd's List Americas Awards gala. The award recognizes the institution, company or individual that has done the most to reduce the pollution of the marine environment in the Americas from maritime sources. **Read the media release:** [*Vancouver-based program aimed at better understanding and managing the impact of shipping activities on at-risk whales wins Lloyd's List Environmental Award*](#)
2. Results released today by the Vancouver Fraser Port Authority-led Enhancing Cetacean Habitat and Observation (ECHO) Program's Vessel Slowdown Trial show that when vessels slow down, underwater noise that may interfere with the ability of whales to feed is reduced. **Read the media release:** [*Study reveals underwater noise is reduced when ships slow down, offering new science that could protect at-risk whales*](#)
3. The Vancouver Fraser Port Authority welcomes additional measures recently announced by government to broaden and strengthen the protection of the southern resident killer whale population. The announcement was made by Minister of Fisheries, Oceans and the Canadian Coast Guard Jonathan Wilkinson, Parliamentary Secretary to the Minister of Environment and Climate Change Sean Fraser, Minister of Transport Marc Garneau. **Read the media release:** [*Port authority supports federal government's additional measures to protect southern resident killer whales*](#)

Looking ahead to 2019

In 2019 we aim to build on the program's success by continuing to convene regular meetings with key stakeholders and advisors to share information and findings broadly, and pursue and implement management measures and mitigation actions, as appropriate.

Highlights of the 2019 ECHO Program work plan are summarized below.

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 the vessel slowdown trial data. In 2019, the program will dive deeper into these ambient noise and vessel source level datasets to analyze trends, key drivers of vessel noise and inform potential vessel noise reduction options. The acoustic technical committee will support the program team in determining the appropriate methodologies for analyzing these datasets.

The vessel operators committee will continue to inform and review the ECHO Program team's analysis of the effectiveness of the 2018 voluntary vessel slowdown and provide advice on next steps, including the expanded voluntary vessel slowdown trial and inshore lateral displacement trial in 2019.

Mapping the soundscape

In early 2019, the ECHO Program, in partnership with Tsleil-Waututh Nation and Transport Canada, installed hydrophones in Burrard Inlet to better understand the sources and level of underwater noise in the inner harbour.

Although some noise monitoring has taken place in Burrard Inlet in recent years to meet the port authority's project and environmental review permit conditions and other regulatory requirements for construction activities, ambient noise levels throughout the inlet have not been documented.



Approximate locations of the planned hydrophone in the Burrard Inlet to monitor underwater noise in 2019.

Expanded port authority incentive program

Based on the ECHO Program's research about ship quieting options, the port authority continues to expand its incentive program to encourage ships that call at the Port of Vancouver to quiet the waters for the endangered whale population along the southern coast of British Columbia. Incentives to reduce ship noise were first added to the port authority's [EcoAction¹ Program](#) in 2017, making Canada the first country in the world to encourage quieter ships.

Since 2017, vessels with a quiet notation from ship classification societies such as Bureau Veritas, DNV-GL and RINA are eligible for a gold level (47 percent) discount in harbour dues. Vessels with cavitation and wake flow reduction technologies such as Propeller Boss Cap Fins, Schneekluth duct and Becker Mewis duct are eligible for a bronze level (23 percent) discount. Thirty-seven vessels took advantage of the bronze level discount in 2018.

As of January 1, 2019, the EcoAction Program will accept quiet ship notations from four different ship classification societies (the non-governmental organizations that establish and maintain technical standards for the construction and operation of ships), 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. The ECHO Program's research and the EcoAction Program incentives are intended to encourage more shipping companies to add quieter ships and underwater noise-quieting technologies to their fleets in the future.

Mariners education outreach

A tutorial for mariners was completed in 2018 and was launched publicly in early 2019. This tutorial, called *Whales in our Waters*, was developed for mariners to build awareness of local whale species and best practices to implement when navigating ships in their presence. It was developed by the ECHO Program and BC Ferries, in partnership with Ocean Wise.

Regional mariners, particularly those operating large vessels such as ferries, cargo ships or tug boats, will be encouraged to complete the tutorial in advance of the summer season, when many whale species return to the Salish Sea to feed. Though geared towards mariners, the tutorial will also be available to the general public on the Port of Vancouver website.



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.

Formalizing our commitment

To formalize its commitment to continue managing the ECHO Program and coordinating voluntary efforts to reduce threats to southern resident killer whales from marine traffic, in early 2019, the port authority-led ECHO Program entered into a first-of-its-kind conservation agreement for marine aquatic species with the Government of Canada and representatives from the Canadian shipping industry under section 11 of the *Species at Risk Act*. This agreement complements the other commitments of the ECHO Program and the program team will continue to work collaboratively with our partners and advisors to advance the long-term goals of the program.

Thank you

We are appreciative of the ongoing support, engagement and efforts of our advisors, collaborators and research participants whose efforts are helping to reduce impacts of marine shipping on endangered whales.

Complete list of collaborators

Funding partners and in-kind contributors

Vancouver Fraser Port Authority
Fisheries and Oceans Canada
Fraser River Pile and Dredge
JASCO Applied Sciences
Oceans Networks Canada
Trans Mountain Corporation
Transport Canada
Tsleil-Waututh Nation
University of Victoria
Vancouver Aquarium

Advisory working group

BC Coast Pilots
BC Ferries
Canadian Coast Guard
Chamber of Shipping
Council of Marine Carriers
Cruise Lines International Association -
North West & Canada
Department of National Defence and the
Canadian Armed Forces
Fisheries and Oceans Canada
Indigenous individuals
Hemmera
National Oceanic and Atmospheric
Administration (NOAA)
Ocean Wise
Pacific Pilotage Authority
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Washington State Ferries
WWF-Canada

Vessel operators committee

BC Coast Pilots
BC Ferries
Canadian Coast Guard
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Council of Marine Carriers
Cruise Lines International Association –
North West & Canada
Hapag-Lloyd (Canada) Inc.
Holland America Group
Pacific Merchant Shipping Association
Pacific Northwest Ship & Cargo Services
Pacific Pilotage Authority
Royal Canadian Navy

Shipping Federation of Canada
Transport Canada
Vancouver Fraser Port Authority
Washington State Ferries

Acoustic technical committee

BC Ferries
Fisheries and Oceans Canada
Department of National Defence and the
Canadian Armed Forces
DHI Group Inc.
DW Ship Consult
JASCO Applied Sciences
National Oceanic and Atmospheric
Administration (NOAA)
Oceans Networks Canada
Ocean Wise – Coastal Ocean Research
Institute (CORI)
Robert Allan Naval Architects
Sea Mammal Research Unit (SMRU)
Consulting Canada
Transport Canada
University of British Columbia
University of St. Andrews
University of Victoria
Washington State Department of
Transportation

Federal government advisory committee

Environment Canada
Fisheries and Oceans Canada
Transport Canada
Vancouver Fraser Port Authority

Other program or project collaborators

Achieve Quieter Oceans (AQUO)
Green Marine
Nanaimo Port Authority
Port of Seattle
Port of Tacoma
Prince Rupert Port Authority
Saturna Island Marine Research and
Education Society
Scripps Institute of Oceanography
Sea Mammal Research Unit (SMRU)
Consulting Canada
The Whale Museum
University of Victoria NEMES Project (Noise
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