



Educating



Mariners

Whales in our Waters Tutorial

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British Columbia's productive coastal ecosystem sustains numerous populations of whales, dolphins, porpoises (known collectively as cetaceans), and sea turtles. It is also home to Port of Vancouver, enabling trade to more than 170 world economies.

Marine traffic along the west coast of Canada is growing, and expected to continue to grow, due to increased population and trade. In recognition of the potential for increased effects of marine shipping on whales, BC Ferries and the Vancouver Fraser Port Authority-led Enhancing Cetacean Habitat and Observation (ECHO) Program, in partnership with Ocean Wise, developed a tutorial for commercial mariners called *Whales in our Waters*. The tutorial helps build awareness of local whale species and how to identify them, and provides navigational strategies to reduce potential interactions between ships and whales in B.C. waters. This initiative complements other measures already in place in the region to reduce threats to at-risk whale populations.

Marine Mammals of British Columbia: Conserving and Protecting our Most Iconic Animals

More than 20 species of marine mammals – from sea otters to mighty blue whales – call the B.C. coast home. Many of these species are listed as threatened or endangered under Canada's *Species at Risk Act* (SARA), but active conservation efforts, including mariner education, are helping to support their recovery.

The health and safety of wildlife populations is essential to a fully functioning marine ecosystem. Impacted by vessel-related and other anthropogenic threats, 12 of the 27 species of cetaceans (and sea turtles) found in B.C. waters are listed "at-risk" under Canada's SARA. As projected trade and population growth on Canada's west coast are anticipated to increase numbers and movements of all types of vessels, there is an urgent need to protect B.C.'s vulnerable cetacean populations. Potential vessel-related threats to cetaceans in B.C. include vessel strike, physical

disturbance, underwater noise, and pollution. The importance of reducing vessel-associated impacts is highlighted in the SARA Recovery Strategies and Management Plans for all 12 at-risk cetacean species.

Since the mid-1980s, the Marine Mammal Research Program at Ocean Wise's Coastal Ocean Research Institute (CORI) in British Columbia has conducted conservation-oriented research on killer whales, belugas, and other marine mammals. The program focuses on long-term studies of marine mammal populations in B.C. and develops strategies to mitigate the threats faced by these at-risk populations. Specific program expertise includes cetacean distribution and abundance, acoustic behaviour, population genetics, and photogrammetric monitoring of the health and condition of killer whales and humpback whales.

Organizations such as CORI have been working to support mariners by providing tools they can use to affect conservation efforts for at-risk cetacean species, including B.C.'s endangered population of southern resident killer whales. One such example is the *Whales in our Waters* tutorial which effectively delivers conservation-related information to mariners so that they can take action to support cetacean recovery while transiting through southern resident killer whale critical habitat and other sensitive areas along the B.C. coast (Figure 1).

Collaboration to Develop Successful Solutions to Help the Whales

Developed in 2014, the Vancouver Fraser Port Authority-led ECHO Program is guided by the advice and input of an advisory working group and associated technical committees to collaboratively advance cutting-edge science. The ECHO Program also coordinates voluntary actions to reduce the cumulative effects of marine traffic on at-risk whales along the southern coast of British Columbia. The advisory working group and technical committee members consist of marine industry



Figure 1: The *Whales in our Waters* tutorial delivers conservation-related information to mariners so that they can take action to support cetacean recovery while transiting through southern resident killer whale critical habitat and other sensitive areas along the B.C. coast.

users, government agencies, Indigenous individuals, environmental and conservation organizations, and scientific experts that meet regularly to provide advice and guidance to the ECHO Program team. Representatives from CORI and BC Ferries are active participants in the ECHO Program’s advisory groups.

The regional, collaborative approach of the ECHO Program has been successful in better understanding and addressing the effects of marine traffic on killer whales. The ECHO Program team recently supported several collaborations that would eventually support the development of the *Whales in our Waters* tutorial. These collaborations included:

- The *Mariner’s Guide to Whales, Dolphins, and Porpoises of Western Canada*, which was developed in 2017 to inform commercial mariners about the potential impacts of their vessels on cetaceans, and to provide mitigation strategies to minimize the risk of disturbance and collision (Figure 2). It is in book form and includes detailed descriptions of frequently encountered cetaceans, maps highlighting locations along the coast where cetacean densities are highest and simple measures mariners can take to greatly reduce their

risk of disturbing or striking a cetacean. The guide was produced by CORI in partnership with the Vancouver Fraser Port Authority-led ECHO Program and the Prince Rupert Port Authority.

- The WhaleReport Alert System (WRAS), which alerts mariners of whales in their vicinity so that they can take mitigation measures – such as slowing down or altering course in the presence of cetaceans – to reduce the risk of collision and disturbance. The WRAS is led by Ocean Wise’s B.C. Cetacean Sightings Network, in collaboration with the Vancouver Fraser Port Authority-led ECHO Program and the Prince Rupert Port Authority. The WRAS is accessible only to shipmasters, pilots of large commercial vessels, and marine operations centres.

Setting the Stage: An Industry Recognizes the Need to Better Understand and Raise Awareness of Whales and Vessel-related Threats

Marine transportation organizations such as BC Ferries have been an early and active participant in efforts to build awareness of whales and vessel-related threats, and mitigate the effects of underwater radiated





Figure 2: The Mariner's Guide to Whales, Dolphins, and Porpoises of Western Canada includes detailed descriptions of frequently encountered cetaceans, maps highlighting locations along the coast where cetacean densities are highest, and simple measures mariners can take to greatly reduce their risk of disturbing or striking a cetacean.



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Figure 3: BC Ferries conducts training on techniques and procedures to share the ocean space and minimize vessel-associated impacts on killer whales, for example.

noise within their organization. BC Ferries is one of the largest ferry operators in the world and carries 22 million passengers, 8.7 million vehicles, and more than \$8 billion of cargo in coastal B.C. on more than 174,000 sailings each year.

Marine transportation, or carriage of goods and people by water, has played a significant role in developing Canada's west coast over the centuries. Commercial vessel movements remain an essential part of life on the west coast today, serving both Canadian import and export markets, and transportation and economic needs of British Columbia's many island and coastal communities.

Not only does reliable marine transportation

support B.C.'s and Canada's economies, and move British Columbians safely and efficiently, it remains the most carbon-efficient mode of transportation. It produces fewer air emissions for each ton of goods transported per kilometre, compared to air, road, or rail transport. Nevertheless, because of the scale of marine transportation activities regionally and globally, the industry continuously seeks opportunities to improve sustainability and environmental performance and reduce potential environmental impacts.

As professional mariners, BC Ferries' marine crew observes marine wildlife every day and feels a responsibility to ensure their vessels' presence in B.C. waters does not impact any

species' ability to survive. Since 2014, BC Ferries has been active in trying to mitigate the impacts of its operations on marine mammals. In 2015, BC Ferries developed a policy on how to operate vessels in the presence of marine mammals and began installing hydrophones for cetacean detection to support Fisheries and Oceans Canada's Whale Tracking Network. BC Ferries has gathered an acoustic baseline for the fleet and contributed to the development of the underwater radiated noise performance indicator for Green Marine, and most recently developed an underwater radiated noise long-term strategy for the organization's fleet.

In addition to supporting cetacean conservation through policy and research, BC Ferries conducts training on techniques and procedures to share the ocean space and minimize vessel-associated impacts on whales (Figure 3). In 2017, BC Ferries also developed training material for its staff to better understand and raise awareness of whales and vessel-related threats.

For subject matter expertise on reducing threats to whales from marine shipping and support to help develop the training program eventually known as the *Whales in our Waters* tutorial, the BC Ferries team turned to the Port Authority-led ECHO Program and Ocean Wise.

Whales in our Waters

Informed by recent projects, the ECHO Program team pulled together a comprehensive list of potential collaborators and data sets that would form the basis of the *Whales in our Waters* tutorial.

With an ambitious plan in place, BC Ferries and the Port Authority-led ECHO Program, in partnership with Ocean Wise's CORI team, began developing the *Whales in our Waters* tutorial. Over the course of 10 months, the teams reached out to a range of experts to obtain the latest scientific knowledge, navigational expertise, and regulatory

context, along with photographs, videos, and illustrations to convey the necessary information as clearly and simply as possible.

They also ran workshops with industry partners and vessel captains in order to develop instructional animations that would best communicate navigational best practices.

The tutorial is targeted toward mariners and covers a range of topics including the need to protect local whale species, tips for identifying and reporting them, and best practices to implement when navigating ships in their presence. The modules break down the approximately 1½ hours of training into 15-to-20-minute segments that can be completed at different times (Figure 4).

The tutorial contains five modules:

- 1. Protection of whales:** This module explores the need for the protection of at-risk whale species. Mariners will learn about legislation and designations to protect the different cetacean species and be able to identify critical habitat and important areas designated for killer whales and humpback whales in the Pacific Northwest coast waters. By completing this module, mariners will also have an opportunity to learn about how vessels may be affecting whales.
- 2. Whale identification:** This module provides tips to identify different whale species and increases awareness of where each species may be encountered.
- 3. Detection cues and whale behaviour:** This module shows scanning techniques to detect whales and also shows different types of commonly observed whale behaviour such as blows and splashes. Whales can surface unpredictably in front of vessels and it is helpful to identify whale species and determine behaviour as early as possible. This allows time to decide which navigational strategy should be implemented to avoid disturbance or collision.



Figure 4: The *Whales in our Waters* tutorial covers a range of topics including the need to protect local whale species, tips for identifying and reporting them, and best practices to implement when navigating ships in their presence. The modules break down into 15-to-20-minute segments that can be completed at different times.

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4. **Best practices and navigational strategies:** This module explores navigational tactics to consider while in the presence of whales to help reduce potential disturbance. Two key principles are reviewed: how to minimize impact on the natural environment for whales and how to avoid vessel collision with whales.
5. **Reporting best practices:** This module introduces the WhaleReport Alert System (WRAS) and provides an understanding of the type of information needed to report a whale sighting as well as the various methods available to report the sighting or mammals in distress. Reporting whale sightings to the B.C. Cetacean Sightings Network aids in future recovery and management plans for species at risk.

The tutorial has received accolades from both educators and mariners for the breadth of information and easy-to-use format. Within a month of the program's launch in mid-February, there were over 200 registered users with 77 having completed the tutorial.

Regional mariners, particularly those operating large vessels such as ferries, cargo ships or tug boats, are encouraged to complete the *Whales in our Waters* tutorial in advance of the 2019 summer season, when many whale species return to the Salish Sea to feed. Though geared towards mariners, the tutorial is also available to the general public on the Port of Vancouver web site. The development team also hopes to see the tutorial become a part of the required training at companies

operating in these waters, as well as the colleges teaching future mariners.

BC Ferries has already integrated the tutorial into its Standardized Education Assessment (SEA) program to determine a new mariner's competence, as well as many current employees. The tutorial was first introduced to deck hands, followed by navigators, chief officers, engineering and terminal personnel, and finally to masters. The tutorial was also made available on a USB memory stick for crews with limited Wi-Fi access so they could complete the modules offline and then upload their information when they had an Internet connection.

The training platform used for the *Whales in our Waters* certificate program is available to BC Ferries' internal staff through the BC Ferries SEA learning management system web site. This format will allow the mariners to access interactive online content and review subject matter at their own pace. Mariners who successfully complete the *Whales in our Waters* tutorial can print a certificate for their own records and for the organization's records.

Feedback and notes from those who take the tutorial are being recorded and a review is scheduled in two to three years' time, when updated research information is available.

Conclusion

The recovery and protection of at-risk whales is a goal shared by many individuals and organizations on the west coast. The *Whales in our Waters* tutorial is just one more resource to help mariners better understand the marine ecosystem and reduce the risk of striking or disturbing a whale on their watch. Whether it be commercial vessel captains, coastal pilots, recreational boaters, fishers, or whale watchers, the tutorial can help all mariners safely enjoy these shared waters.

The ECHO Program, BC Ferries, and Ocean Wise would like to thank all who helped

in the development of the *Whales in our Waters* tutorial. Other contributors to the tutorial include the National Oceanic and Atmospheric Administration, Fisheries and Oceans Canada, Seaspans Marine, Seaspans Ferries, Marine Education and Research Society, Canadian Coast Guard, and Prince Rupert Port Authority. ~

Further Reading

echolearn.portvancouver.com
bcferries.com
portvancouver.com
research.ocean.org/research/cori
wildwhales.org
portvancouver.com/wp-content/uploads/2017/07/Mariners-Guide-to-Whales-Dolphins-Porpoises-of-Western-Canada.pdf
wildwhales.org/wras



Orla Robinson has been working with the Vancouver Fraser Port Authority since 2013. She holds bachelor and master degrees in the field of earth sciences and has over 20 years of experience working in the field of environmental management. She has led the development and management of numerous collaborative science based initiatives bringing multiple interests together to better understand and find solutions to complex environmental challenges. Her current role is Program Manager for the port authority's Enhancing Cetacean Habitat and Observation (ECHO) program.



Leslie James is the Manager of Environment Sustainability for BC Ferries; the largest ferry operator in North America. She has over 15 years of experience in the marine and science fields and in 2018 received the Conservation Leadership in Support of Corporate Responsibility Award from Ocean Wise. Her career has been divided between Canada and the United States. In Canada, she worked in the private sector as well as two federal departments. During her time with the federal government as an environment officer, she developed and implemented a national compliance monitoring program. In the U.S. she worked with two state universities and the United States Geological Survey-Biological Resource Division in eel grass ecosystem research.



Jan Brockhausen has worked in the marine industry for over 35 years and joined BC Ferries in 1997. He is currently the Director of Nautical Standards at BC Ferries. Captain Brockhausen has held a number of key roles in setting navigational standards at BC Ferries, including leading a team which has standardized bridge designs throughout the fleet. Prior to his appointment as a Director of Nautical Standards, he managed marine operations, overseeing the major routes between Vancouver and the south coast of Vancouver Island. He has sailed as Senior Master aboard the Spirit of British Columbia, a ship that trades in the critical habitat areas of the Southern Resident Killer Whales. It is this experience that inspired him to collaborate with partners from the Port Metro Vancouver, Ocean Wise, and the ECHO team to create a mariners' tool to help limit industries' impact on the whales called *Whales in our Waters*.



Brittany Visona joined the Marine Mammal Research team in 2017 as a research assistant and the coordinator of the Wild Killer Whale Adoption Program before moving into her current role as a research biologist. Her

responsibilities involve aiding in drone-based field research on killer whales and humpback whales, and analyzing aerial-photogrammetry images taken from the field. She holds a master's degree in Marine and Fisheries Ecology from the University of Aberdeen. Ms. Visona has worked as a cetacean field assistant in Scotland and Italy, a naturalist on whale watching vessels in the Salish Sea, and a fisheries observer in Scotland and Canada.



Jessica Scott joined the Coastal Ocean Research Institute as the Coordinator of the B.C. Cetacean Sightings Network in 2017. Her work is focused on addressing vessel-associated impacts on sensitive cetacean populations in

British Columbia. She is currently the project manager for the WhaleReport Alert System, a conservation tool that uses real-time sightings from a network of citizen scientists to alert large commercial vessels of whales in their vicinity. She has worked at aquariums, wildlife rehabilitation centres, and veterinary clinics throughout Canada and the United States. She holds a bachelor of science from the University of Victoria and a master's degree in marine and fisheries ecology from the University of Aberdeen.



Sarah Patton is a Research Biologist with Ocean Wise's Coastal Ocean Research Institute, and Coordinator of its Southern Vancouver Island Cetacean Research Initiative. She has worked on research and conservation initiatives within governments in Canada, Australia, and the USA, with several Canadian and international non-profits, and within academia. She holds a master's degree in marine conservation biology from James Cook University in Australia, and a diploma in adult education.



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