

Collaborating to reduce the impacts of underwater ocean noise on endangered Southern Resident killer whales



Killer whales in front of a cruise ship, Juan de Fuca, BC. Credit: Dick Martin.

As apex predators, killer whales (*Orcinus orca*) are a vital part of the marine ecosystem and have cultural significance for Indigenous peoples and coastal communities in British Columbia. Southern Resident killer whales, a distinct population of killer whales that frequents the Salish Sea, have been listed as endangered under the [Species at Risk Act](#) (SARA) since 2003. The survival of this small and declining population — estimated at only 75 individuals as of July 2023¹ — is threatened by several factors: decreased availability of their primary food source, Chinook salmon (*Oncorhynchus tshawytscha*), increased health impacts from persistent organic pollutants and marine contaminants, and increased acoustic and physical disturbance from vessel noise and the risk of ship strikes.

Like all marine mammals, Southern Resident killer whales use sound to search for food (forage), socialize, and communicate with one another. Acoustic disturbance can interfere with these life functions causing changes in behaviours. For example, several studies found that when vessels were present, Southern Residents spent significantly less time foraging than when vessels were absent or further away,^{2,3,4,5} possibly lead to negative impacts on their physical health from reductions in food intake, especially where vessel presence overlaps with the whales' critical habitat and feeding grounds. In the Salish Sea, the overlap of designated Southern Resident killer whale critical habitat⁶ and **transboundary** shipping routes represents one of many challenges associated with Southern Resident killer whale recovery. Instances of overlap are most notable in the southern Strait of Georgia, Haro and Juan de Fuca Strait, La Perouse and Swiftsure Banks, as well as in recreational boating areas close to major urban centers.

To learn more

[Identification of areas for mitigation of vessel threats](#)

Transboundary waters that flow across, or span, two or more countries.

A Recovery Strategy was drafted for Northern and Southern Resident killer whales in Canada (2008, and amended in 2011 and 2018), with a supporting Action Plan (2017) which identified 98 measures to address threats to the species and monitor population recovery. In 2018, a science-based review of the effectiveness of these measures was conducted through the Oceans Protection Plan and six new measures (including ship strikes) were added for a total of 104. The Recovery Strategy also identified Northern and Southern Resident killer whale critical habitat in southern British Columbia.

Since 2018, the Government of Canada has implemented enhanced management measures to protect and further support the recovery of Southern Resident killer whales.⁷ These measures are informed by the best available information and science as well as input from the Indigenous Multi-Nation group, the Indigenous and Multi-Stakeholder Advisory Group (IMAG), and the Southern Resident killer whales Technical Working Groups (TWGs). Representatives include Indigenous groups, the government of British Columbia, the scientific community, environmental organizations, industry, and various stakeholders. Southern Resident killer whales are highly mobile and their habitat extends between Canadian and U.S. waters; as a result, many of these efforts have also involved transboundary collaboration.⁸

Annual management measures include limiting vessel-approach distances (in addition to minimum standards established under the *Fisheries Act* and the *Marine Mammal Regulations*), Interim Sanctuary (“no go”) Zones, prohibiting or reducing speeds of general vessel traffic in designated areas, monitoring compliance of vessel traffic within these designated areas by the Canadian Coast Guard’s Marine

Mammal Desk and instituting area-based fishery closures to reduce disturbance in Southern Resident killer whale foraging areas. To address knowledge gaps and inform future protection efforts, the Government of Canada has:

- evaluated the resulting noise reduction for some of the measures including in the areas where vessels were prohibited (known as Interim Sanctuary Zones),^{9,10}
- conducted research on Southern Resident killer whale summer distribution and habitat use, underwater ocean noise (hereafter “ocean noise”) levels in critical habitat, and where there is overlap,^{11,12,13,14,15} and
- created the [Southern Resident killer whale accountability framework](#) to help understand the degree to which short- and long-term management measures are supporting the recovery of Southern Resident killer whales.

Collaboration has played an essential role in effective protection for this species. For example, the [Vancouver Fraser Port Authority’s Enhancing Cetacean Habitat and Observation \(VFPA ECHO\) program](#) brings together government agencies, the marine transportation industry, Indigenous advisors, environmental organizations, and scientists in the common goal of reducing acoustic impacts on Southern Resident killer whales. Launched in 2014, the ECHO program has successfully led ocean noise-reduction initiatives aimed at reducing acoustic disturbance in Southern Resident killer whale critical habitat. Studies undertaken showed that annual voluntary vessel slowdowns which had started in 2017¹⁷ saw the highest participation during a trial period in 2022, with 93% of vessels transiting Haro Strait and Boundary Pass participating. A 48% reduction in background noise levels was recorded, compared to the levels recorded in the 60 days prior to the start of the trial.¹⁸ Another initiative begun in 2018, moved tugs away from inshore Southern Resident killer whale foraging areas in Juan de Fuca Strait. In 2022, 97% of tug transits adhered to these lateral movements, resulting in substantial reductions in noise levels in the inshore Southern Resident killer whale foraging areas during each of these tug transits.^{9,10,19,20}

In 2019, DFO entered into a five-year [Conservation Agreement](#) under Section 11 of the *Species at Risk Act* with Transport Canada, the Vancouver Fraser Port Authority, and six marine transportation industry partners to reduce acoustic and physical disturbance from large commercial vessels operating in Southern Resident killer whale critical habitat.¹⁷ All parties who signed this Conservation Agreement have renewed the agreement for another five years as of May 2024. This renewal includes commitments for advancing threat reduction efforts, such as real-time

whale presence notifications; quieter vessels; and continued participation in voluntary ship slowdowns and route alteration initiatives.

In further support of reducing ocean noise from ships, Transport Canada is funding ongoing research to test the most promising technologies, vessel designs, retrofits and operational practices to make vessels quieter. The Vancouver Fraser and Prince Rupert port authorities also initiated incentive programs that offer reduced harbour fees for quieter ships.^{21,22} The marine shipping industry’s participation has been a key factor in the success of these initiatives, demonstrating how collaboration and voluntary measures can be effective tools to support the recovery of endangered populations.

Education and outreach efforts are also important elements of effective protection and various initiatives have been undertaken to increase public awareness of

THE TRANS MOUNTAIN EXPANSION (TMX) PROJECT: MITIGATING THE EFFECTS OF MAJOR DEVELOPMENT PROJECTS

The Government of Canada is continuing to develop strategies to that the effects of ocean noise from major development projects on Southern Resident killer whales are being addressed. One such example involves ocean noise resulting from the Trans Mountain Expansion (TMX) project.

In its review of the TMX project, the Canada Energy Regulator (CER) found that ocean noise from project-related marine shipping was likely to result in significant adverse environmental impacts on Southern Resident killer whales¹⁶ and Indigenous cultural use associated with this population. As a result, the CER recommended that the Government of Canada implement a program to offset the effects of project-related shipping. To meet this recommendation, the Government of Canada is developing an Offset Program, using the ongoing work by the Fisheries and Oceans Canada (DFO) to better understand noise levels in Southern Resident killer whale critical habitat with a focus on marine shipping routes. This offset program will determine increases in ocean noise from transiting vessels related to the TMX project and will assess the effectiveness of measures to offset project-related increases in ocean noise in areas of key importance to the Southern Resident killer whale population.

Southern Resident killer whales and the threats to their small population. Successful collaborations include the [Be Whale Wise](#) partnership, the [Cetus Research and Conservation Society](#) and its [Straitwatch Program](#), and the U.S.-based [Soundwatch Boater Education Program](#).

Ensuring the effective protection and recovery of Southern Resident killer whales requires a sustained, long-term, collective effort by the Government of Canada, Indigenous governments and groups, non-Indigenous collaborators, industry stakeholders, and organizations. Initiatives and programs will continue to be adaptable and supported by the best available information, including scientific, Indigenous, and local knowledge. These ongoing collective efforts will inform decisions to better protect and conserve Southern Resident killer whales into the future.

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