

ECHO Infographic: You're making a difference for the whales

Footnotes

1. Research shows that underwater noise intensity from large vessels can be reduced by half during the slowdown periods.
 - JASCO Applied Sciences and SMRU Consulting. 2020. ECHO Program 2019 Voluntary Vessel Slowdown Hydroacoustic Studies: Final Report. Document 01994. Technical report by JASCO Applied Sciences and SMRU Consulting for Vancouver Fraser Port Authority.
2. Foraging is easier when vessels transit slowly
 - Williams R., Ashe E., Siple M., Wood J., Yruretagoyena L. 2019. Behavioural response study of Southern Resident Killer Whales to the 2018 voluntary ship slowdown in the Haro Strait. Prepared by Oceans Research and Conservation Association (ORCA) for Vancouver Fraser Port Authority.
3. SRKW use echolocation to find their food. A SRKW's echolocation space is reduced by half within 4 km of a fast-moving (20 knots) container ship, and is reduced by half within 0.5 km of a container ship that slows to 11 knots.
 - Heise K., et al. 2017. "Proposed Metrics for the Management of Underwater Noise for Southern Resident Killer Whales." In Coastal Ocean Report Series, 31. Vancouver, Canada: Report for the Coastal Ocean Research Institute. <http://wildwhales.org/wp-content/uploads/2017/09/Read-the-Report.pdf>
 - NOTE: Statement based on a car carrier ship in Haro Strait. At the "50% SRKW echolocation space reduction" threshold, masking by vessel noise will reduce the echolocation space available to an SRKW by 50%. Echolocation space is the volume of ocean within which an SRKW can use returning echolocation clicks to find prey. Echolocation space reduction is calculated inside the frequency range of echolocation for SRKW (15,000–100,000 Hz).
4. During the 2017 slowdown, SRKW foraging opportunities were improved by 22%.
 - Joy R., Tollit D., Wood J., MacGillivray A., Li Z., Trounce K. and Robinson O. 2019. Potential benefits of vessel slowdowns on endangered southern resident killer whales. *Frontiers in Marine Science* 93. <https://doi.org/10.3389/fmars.2019.00344>.
5. Participating in the ECHO Program slowdowns reduces noise overall, even though the transits take longer
 - JASCO Applied Sciences and SMRU Consulting. 2020. ECHO Program 2019 Voluntary Vessel Slowdown Hydroacoustic Studies: Final Report. Document 01994. Technical report by JASCO Applied Sciences and SMRU Consulting for Vancouver Fraser Port Authority
 - Leaper R. 2019. The Role of Slower Vessel Speeds in Reducing Greenhouse Gas Emissions, Underwater Noise and Collision Risk to Whales. *Front. Mar. Sci.* 6:505. doi: 10.3389/fmars.2019.00505
6. Slowing down reduces several threats to many marine mammals including lowered strike risk
 - Leaper R. 2019. The Role of Slower Vessel Speeds in Reducing Greenhouse Gas Emissions, Underwater Noise and Collision Risk to Whales. *Front. Mar. Sci.* 6:505. doi: 10.3389/fmars.2019.00505
7. Slowing down reduces several threats to many marine mammals including lowered physical disturbance
 - Erbe C, Marley SA, Schoeman RP, Smith JN, Trigg LE and Embling CB. 2019. The Effects of Ship Noise on Marine Mammals—A Review. *Front. Mar. Sci.* 6:606. doi: 10.3389/fmars.2019.00606
8. Slowing down reduces several threats to many marine mammals, including reduced air pollution
 - Leaper R. 2019. The Role of Slower Vessel Speeds in Reducing Greenhouse Gas Emissions, Underwater Noise and Collision Risk to Whales. *Front. Mar. Sci.* 6:505. doi: 10.3389/fmars.2019.00505