Addressing Underwater Vessel Noise

Supporting Recovery of the Southern Resident Killer Whale and Other Marine Mammals Through Innovative Solutions

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Overview

- What is underwater vessel noise?
- Why is this important?
- The Canadian context
- A role for ships and ports
- What have we learned?
- Where do we go from here?
Sources of Anthropogenic Underwater Noise

- Sonar, seismic, pile driving
- Vessel sources
  - Propeller Cavitation Noise
  - Mechanical Noise
  - Hull Hydrodynamic Noise
The science of noise makes for a complex problem

• Sound is characterized by intensity (loudness) and frequency (pitch)
• Vessel noise varies substantially depending on speed, weight, draft, engine type, hull/propeller shape, etc.
• Generated noise can differ from noise as received by whales – bathymetry, salinity, temperature, all affect attenuation
• Different species hear different ranges of noise – SRKW reacts to sounds from 75 Hz to over 100,000 Hz
• These complexities require nuanced approaches to addressing underwater noise
Why is underwater noise important?

- Underwater noise is a key threat to many marine mammals -- interferes with their ability to communicate, find food, and reproduce.
- Whales are a vital component of healthy marine ecosystems & culturally significant for many Indigenous groups and coastal areas.
- Routes to large ports can transect important marine mammal habitat.
- Marine traffic has doubled since 1960s, with an associated increase in underwater noise.
- The Southern Resident killer whale lives along the west coast of Canada and the US, and is listed as endangered under both Canadian and US laws -- only 76 whales remain.
- One of the main threats to the recovery of this species is underwater noise from vessels.
SRKW Challenge: Variety of Vessel Types
Recent Action: Advancing Understanding

Underwater listening capacity

• Support for underwater listening station in Strait of Georgia
• Feasibility study on future options for hydrophone placement in the Salish Sea
• Support for analysis of noise baseline data in the Salish Sea

Study on Anthropogenic sources of noise

• Study on anthropogenic sources of noise

Building knowledge base through engagement

• Noise metrics workshop with Coastal Ocean Research Institute to establish appropriate metrics for underwater noise management for SRKW
• Canadian Scientific Advisory Secretariat (CSAS) process to evaluate noise mitigation effectiveness in reducing shipping-related noise levels received by SRKW
• SRKW Symposium involving broad range of Indigenous groups and stakeholders (industry, academia, ENGOs) engaging on challenges, opportunities, and solutions
• Risk assessment to identify navigation safety risks of potential mitigation measures.
Developing US partnerships

- Establishment and monitoring of Salish Sea Ecosystem Indicators with US EPA
- Annual meetings on health of whales; on-going collaboration and information sharing on science and research on prey availability, underwater noise
- Agreement to work together to identify collaborative actions to mitigate noise and ensure consistency on approach across borders

Engaging the International Maritime Organization

- Leadership at the Maritime Environmental Protection Committee (MEPC)
- July 2017 MEPC 71 returned underwater noise to discussions
- April 2018 MEPC 72 Canada will highlight recent studies and seek a commitment to additional international collaboration and action
- Informal contact group established to continue discussion on measures to address underwater noise
Recent Port and Industry Initiatives

• Ports and Industry have demonstrated great leadership on this issue
• The Vancouver Fraser Port Authority’s ECHO program is a key partner for Canada
• ECHO implemented a voluntary slowdown trial in Haro Strait to test the theory that slowing ships down would make them quieter. The results are very positive:
  – Involved 70 organizations and 950 vessel transits; 60% participation rate
  – Slowdown of piloted vessels to 11 kn over approximately 16 nautical miles
  – Preliminary results show a reduction between 5.9 dB and 11.5 dB in broadband source levels depending on vessel type
  – Ambient noise in the area of the trial saw a 2.8 dB (44%) reduction in sound intensity
• Active participation in workshops, research, and testing of measures or options
• Demonstrating leadership through action (e.g. Maersk refits, BC Ferries)
Port Incentives

• Financial incentives for positive environmental practices
  – Already established by some ports: Long Beach (Green Flag, Green Ship) & Los Angeles (ESI Incentive); New York & New Jersey (Clean Vessel Incentive)

• Ports and certification bodies are expanding criteria to include underwater noise
  – Vancouver (EcoAction); Prince Rupert (Green Wave)
  – Quiet vessels certified by a classification society or certification body (e.g. Green Marine, DNV, Bureau Veritas, RINA, Lloyd’s) or utilize noise mitigating technology, e.g. propeller cap boss fins

• More ports providing environmental incentives provides a cumulative benefit to vessel owners and can affect future ship design considerations
What have we learned to date?

• Different solutions are required for different vessel types given the complexity of the issue

• Feasibility of measures must be assessed from a variety of angles, including economic, cultural, risk to navigation, environmental, etc.

• Testing of new measures allows for real-time learning and the implementation of an adaptive approach

• Refinement as data gaps are filled will help minimize economic impacts

• There are co-benefits between reducing noise and improving fuel efficiency
What have we learned to date? (cont.)

• Perhaps most importantly: Collaboration is key

• Finding solutions to the challenge of underwater noise is not something that one group, port, country or one level of government can tackle on its own

• Industry, governments, ports, NGOs and Indigenous communities have already been playing an important role in identifying, analyzing and testing potential solutions
Where do we go from here?

• “How” we can take action approach, not “whether” we will take action

• Government of Canada is committed to playing a meaningful role in solutions; recently announced $167.4M in Budget 2018 to support whale recovery

• Government of Canada is looking at results of modelling work, studies and trials, discussions with stakeholders and Indigenous partners, in order to develop mitigation options
Where do we go from here?
- What you can do

• Learn from ports that have incentive programs in place
• Introduce port incentives to reduce underwater noise
• Share creative solutions and best practices
• Be part of a growing network and help catalyze measures to reduce underwater noise
Thank you!

Questions?

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