



PORT of
vancouver

Vancouver Fraser
Port Authority

The ECHO Program

An overview

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Presentation to North Shore Community Advisory Panel
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The Vancouver Fraser Port Authority

Enabling trade with more than 170 world economies



Enhancing Cetacean Habitat and Observation (ECHO) Program



- **What:** A collaboration with over 100 U.S. and Canadian partners and advisors from across the marine transportation industry, government, Indigenous communities, and environmental groups
- **Why:** To better understand and reduce the cumulative effects of commercial vessel traffic on at-risk whales throughout the southern coast of British Columbia
- **Key focus:**
 - Building collaborative relationships
 - Advancing globally-reaching research and education projects
 - Leading large-scale underwater noise reduction initiatives

ECHO Program structure



Advisory Working Group

Provides guidance and advice to shape the program

- Marine transportation industry
- Canadian and US government
- Indigenous representatives
- Environmental organizations

Vessel Operators Committee

Supports the planning, implementation and communication of on-water noise reduction initiatives

- Marine transportation industry
- Canadian and US Coast Guards

Acoustic Technical Committee

Provides technical and scientific advice on research projects and measurement and evaluation of URN

- Acousticians and bio acousticians
- Naval architects and engineers

At-risk whales in our region



Harbour Porpoise
(Special Concern)



Humpback
(Threatened)



Fin
(Threatened)



Sei
(Endangered)



Blue
(Endangered)



North Pacific Right whale
(Endangered)



Biggs (transient) killer whale
(Threatened)



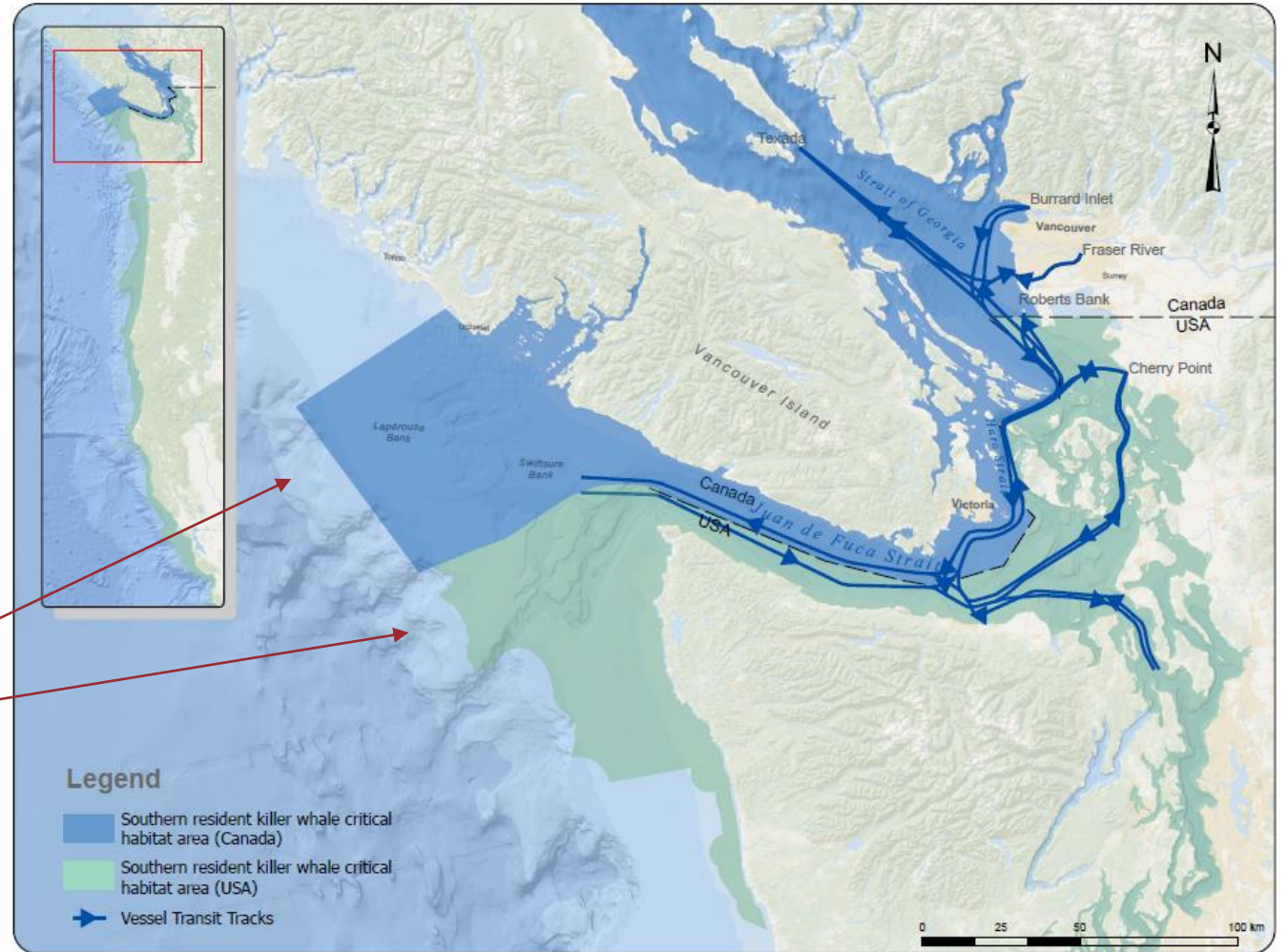
Southern resident killer whale
(Endangered)

Based on Canadian Species at Risk Act.

Shipping and Southern Resident killer whales







Critical habitat of southern resident killer whales in Canada (blue) and the U.S. (green)



Known threats to marine mammals

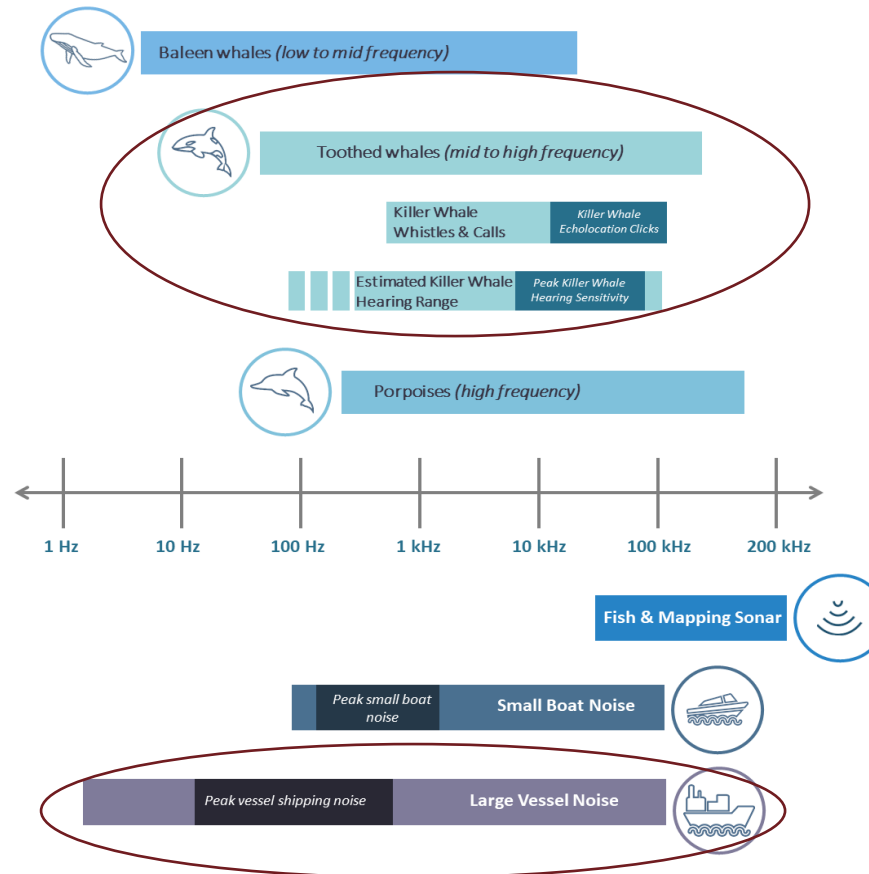


-  **Acoustic Disturbance**
-  **Physical Disturbance**
-  **Environmental Contaminants**
-  **Availability of prey**

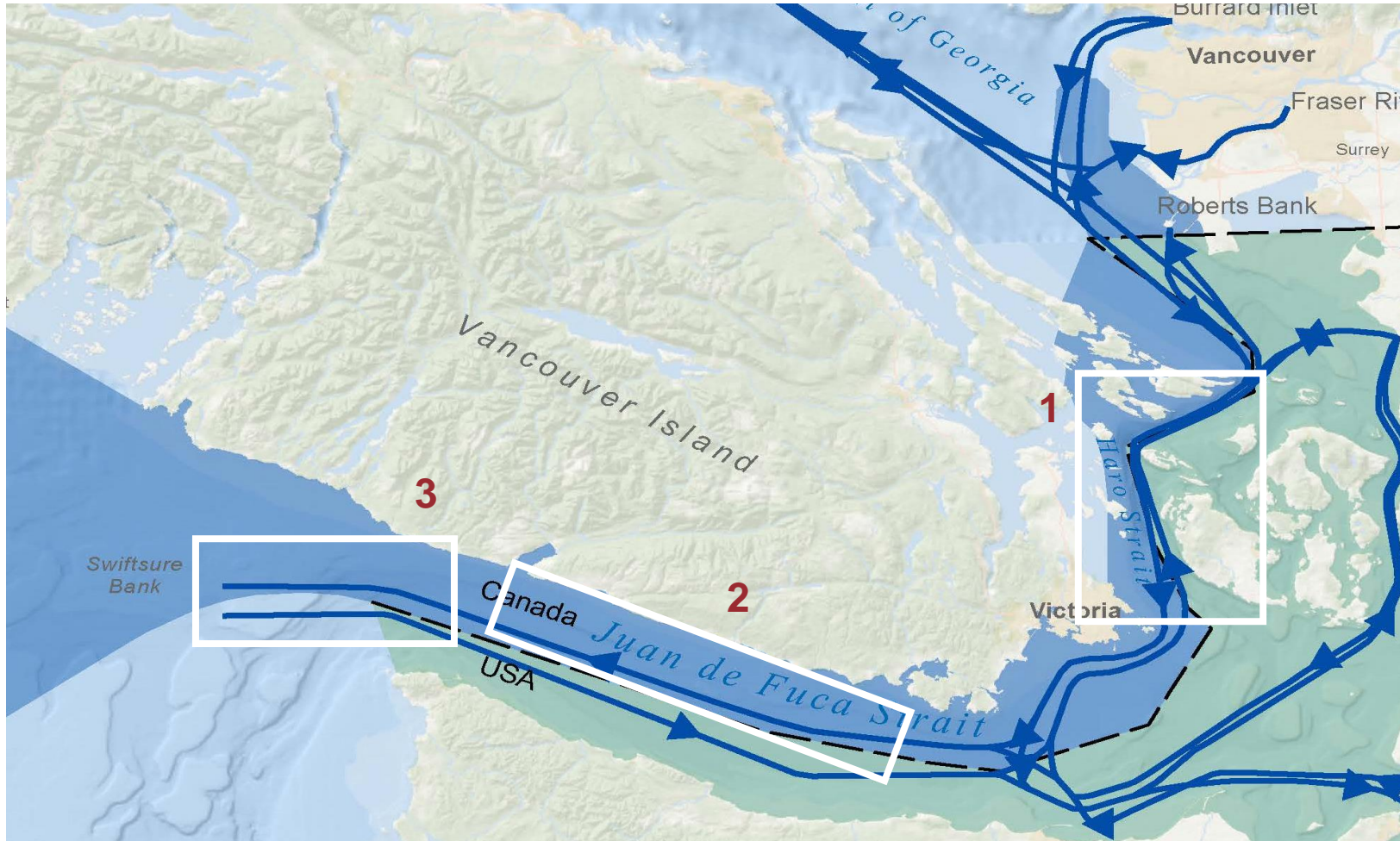
Whales, shipping and the ECHO Program

Underwater vessel noise overlaps with marine species's use of sound

- Many marine mammals, including southern resident killer whales use sound to find food, communicate and navigate
- Ship noise can disrupt their ability to communicate, socialize, rest and mask their ability to hear returning echolocation clicks when feeding
- Research indicates that approx. 130 different marine species are impacted by ship noise

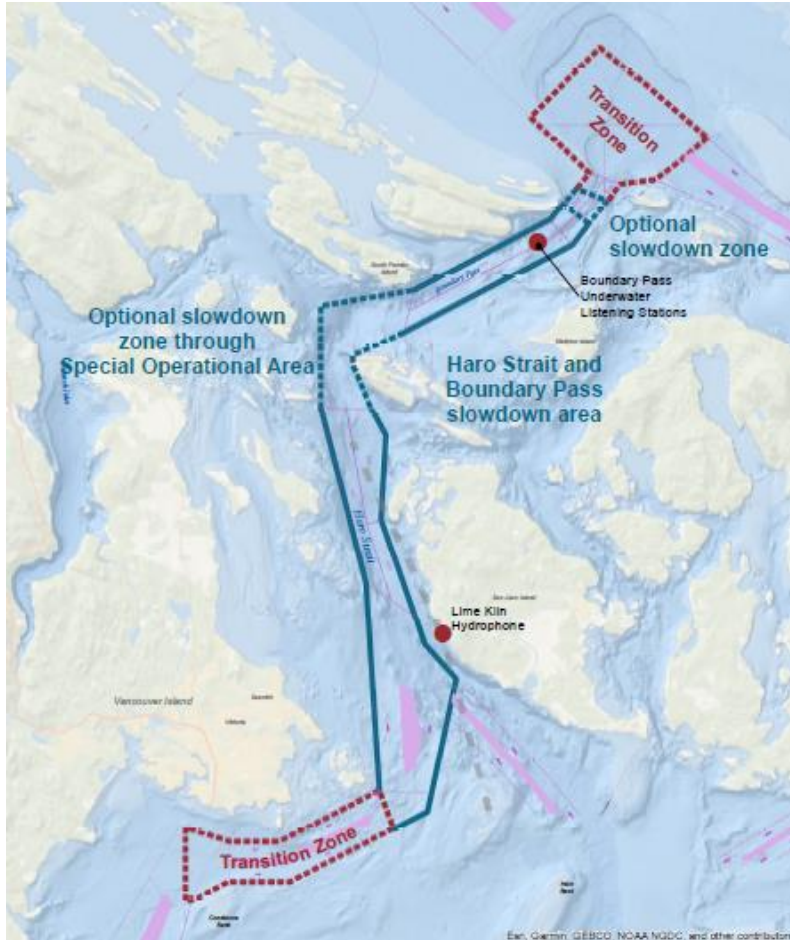


Underwater noise reduction initiatives



- 1 Haro Strait & Boundary Pass slowdown (2017 - 2021)
- 2 Strait of Juan de Fuca inshore lateral displacement (2018 - 2021)
- 3 Swiftsure Bank slowdown (2019 - 2021)

1. 2021 Haro Strait and Boundary Pass slowdown: results



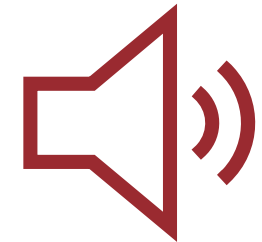
Haro Strait and Boundary Pass slowdown area



90%
of all vessel transits participated *



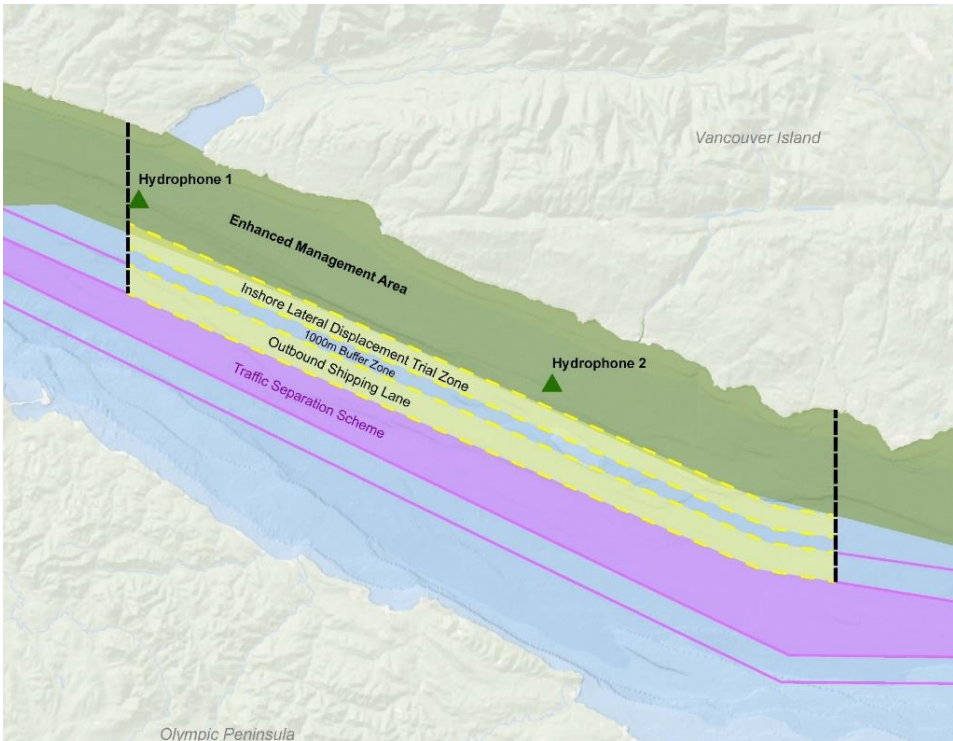
2,074
out of 2,295
vessel transits



>3dB reduction in ambient noise in 2021
~55% reduced sound intensity

*Pilot reported participation.

2. 2021 Strait of Juan de Fuca inshore lateral displacement: results



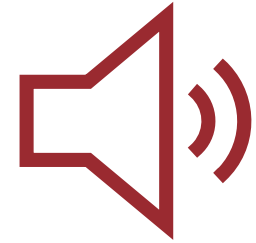
Strait of Juan de Fuca inshore lateral displacement area



88%
of all tug transits
participated *



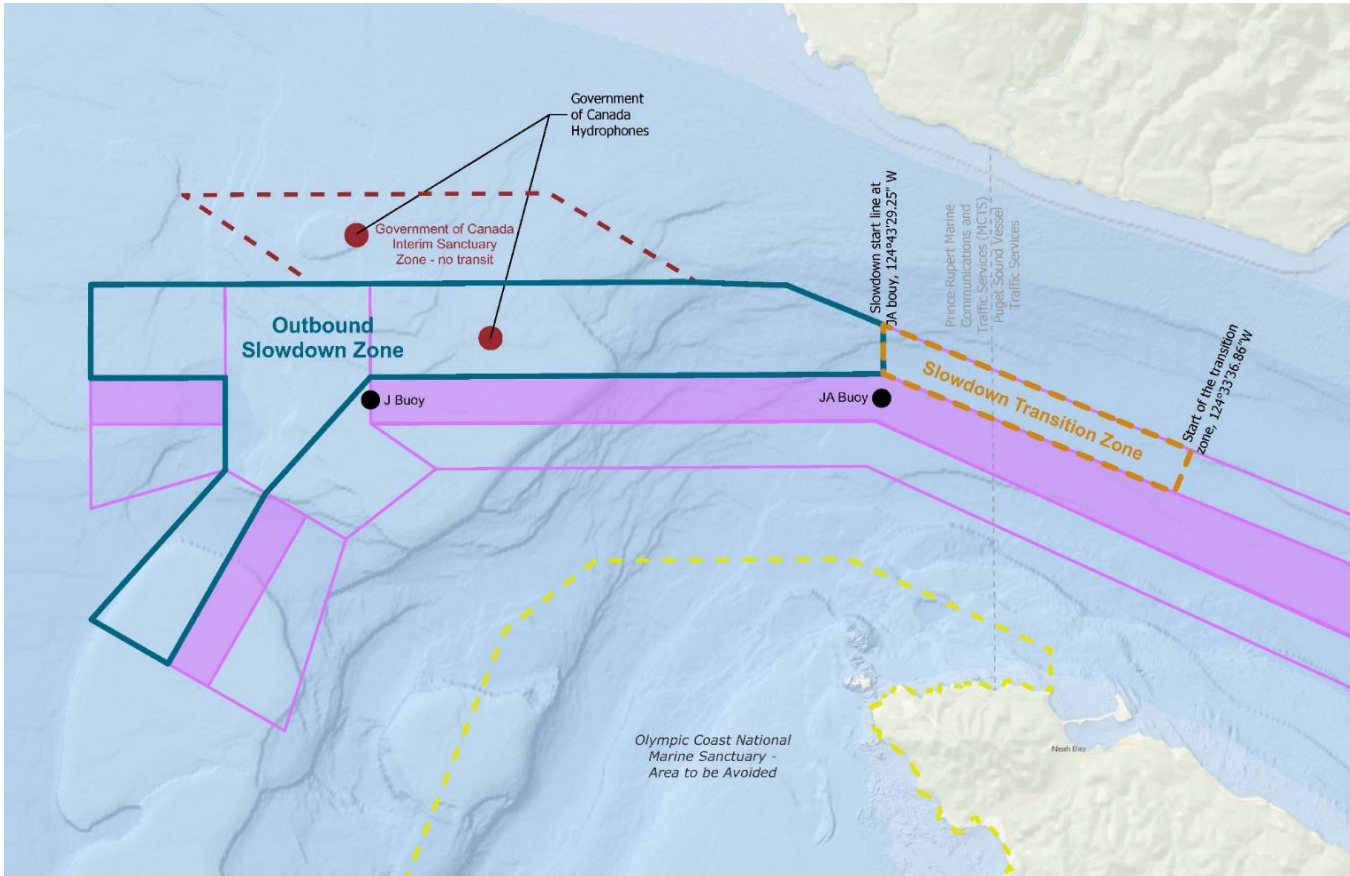
126
out of 143
tug transits



~4-7dB
reduction in
ambient underwater
noise per tug transit

~70%
reduction in underwater
sound intensity per tug
transit

3. 2021 Swiftsure Bank slowdown: results



Swiftsure Bank slowdown trial area



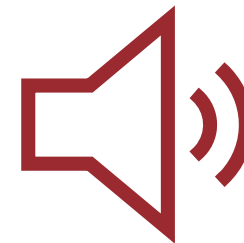
81%

of all vessel transits participated *



1624

out of 2010 vessel transits



~2dB

reduction in ambient noise in 2020 – results for 2021 pending

~37%

reduction in underwater sound intensity in 2020 – results for 2021 pending

*Achieved an average speed through water <=1 knot of the target

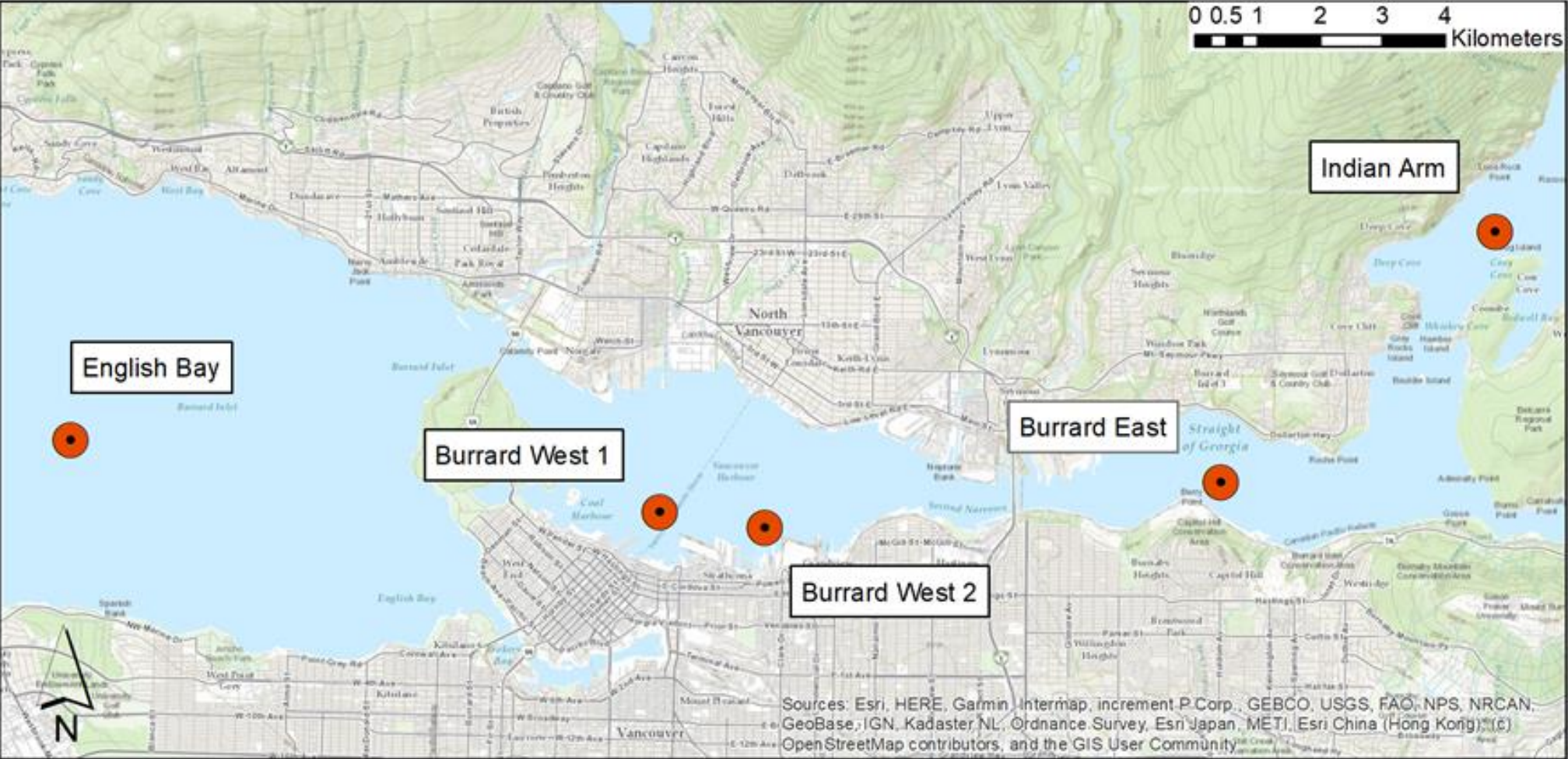
Underwater noise monitoring



- Measuring underwater noise since 2015
- Over 20,000 vessel transits recorded – one of the largest databases in the world
- Hydrophones are used to monitor and analyze underwater noise levels across key locations in the Salish Sea, including:
 - Strait of Georgia
 - Boundary Pass
 - Haro Strait
 - Burrard Inlet

Underwater noise monitoring – Burrard Inlet

Ambient noise monitoring locations



Burrard Inlet underwater noise monitoring

Ambient noise trends



Key findings of 2020 ambient noise monitoring in Burrard Inlet:

- Noise levels are higher in the summer due to recreational vessel traffic
- Noise levels are also higher during daytime in the inlet, due to Seabus traffic and other vessel activities
- Indian Arm is the quietest location overall
- English Bay has the most consistent noise levels over time

Burrard Inlet underwater noise monitoring

Marine mammal trends



Harbour porpoise

- Harbor porpoises always present, but rarely seen
- Both NRKW and SRKW visually observed
- All killer whale detections in English Bay during winters months

	# of days visually observed	# of days acoustically observed
Killer whales	9 – Biggs	3 – Biggs 2 – SRKWs
Harbor porpoise	N/A	107 days

Educational resources

THE EFFECTS OF VESSEL UNDERWATER NOISE ON WHALES AND WHAT MARINERS CAN DO ABOUT IT

SOURCES OF NOISE

While there is a plenty of naturally occurring sounds in the ocean, an increase in commercial vessel traffic, the main source of noise, may be increased in the future.

In the North Pacific Ocean, loud sounds from the propellers of large cargo ships have been recorded EVERY DECADE for the past 60 YEARS.

IMPACTS

Underwater noise can affect the ability of marine animals to find prey, avoid danger, communicate, mate and reproduce, and navigate.

WHAT YOU CAN DO

In 2014, the International Maritime Organization (IMO) recognized that underwater noise associated with shipping is a global issue. Options to reduce ship noise underwater already exist:

- SLOW DOWN**: Operate at low engine speeds (slow steaming).
- MAINTAIN**: Make hull and machinery repairs.
- OPTIMIZE**: Use air-lifted propellers and other advanced hull technologies.
- DESIGN**: Improve vessel design, including hull shape, propeller design, and engine placement.

Read the Guidelines for Vessel Noise Reduction.

HARO STRAIT VESSEL SLOWDOWN TRIAL

WHY THE TRIAL?

The trial aims to better understand the relationship between vessel speed, underwater noise and effects on killer whales.

There are only 70 southern resident killer whales. They are listed as endangered under the Species at Risk Act.

Underwater noise is one of the key threats to the recovery of the species.

ABOUT THE TRIAL

Between August 7 and October 6, 2017, all vessels are asked to slow down to 11 kn through the water.

TRIAL EVALUATION

Modelling: Pre- and post-trial acoustic and killer whale presence modeling.

Monitoring: Hydrophones to monitor ambient and vessel underwater noise and whale presence. Data to track vessel speed.

Reporting: Hydrophones to monitor ambient and vessel underwater noise and whale presence. Data to track vessel speed.

For information on how to participate or to find out more about the ECHO Program initiative, visit portvancouver.com/slowdowntrial or call our 24/7 Operations Centre.

Mariner's Guide TO WHALES, DOLPHINS, AND PORPOISES OF WESTERN CANADA

COASTAL OCEAN RESEARCH INSTITUTE

WHALES IN OUR WATERS

Trail Zone Distance: 16.8 NM inbound, 14.9 NM outbound.

Haro Strait is an important summer feeding area for the southern resident killer whale.

Start Here: Introduction

Module 1: Protection of Whales

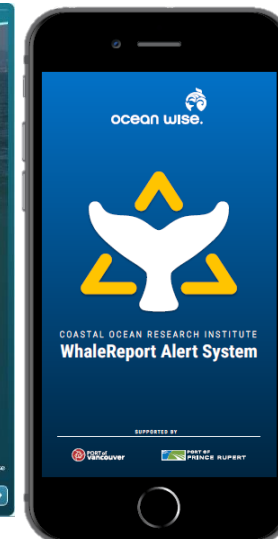
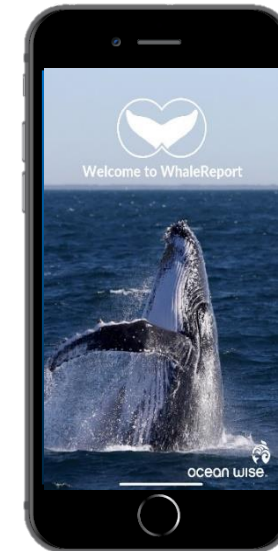
Module 2: Whale Identification

Module 3: Detection Cues & Whale Behaviour

Module 4: Best Practices & Navigational Strategies

Module 5: Reporting Best Practices

Photo Credits: Joan Lopez and Ocean Wise



Encouraging quieter ships at the Port of Vancouver

EcoAction Program

Underwater noise reduction incentive for commercial vessels, since 2017



EcoAction award levels

GOLD
Quiet ship
notation from
ship
classification
society

SILVER
Noise
reduction
performance
indicator from
Green Marine

BRONZE
Technologies
that help reduce
cavitation

International collaboration



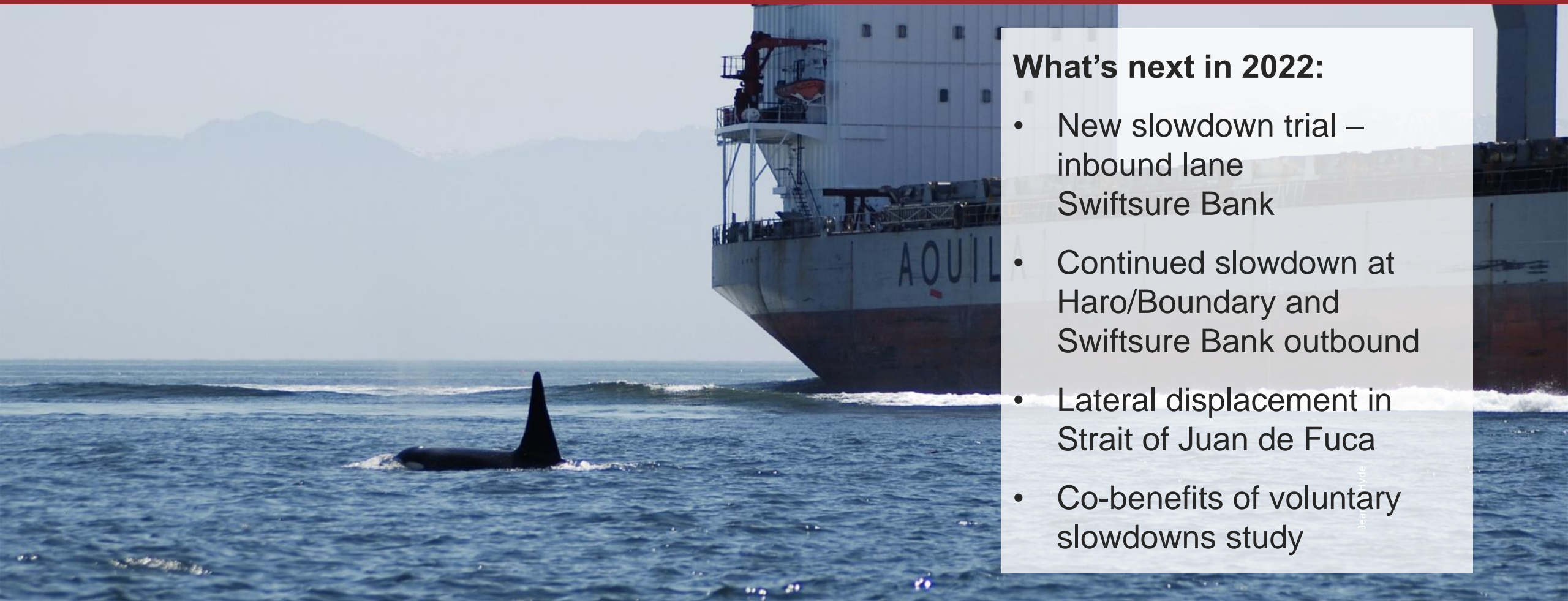
**INTERNATIONAL
MARITIME
ORGANIZATION**



- Spearheading internationally-reaching research and education on ship-generated underwater noise
- Current projects:
 - Helping to shape the International Maritime Organization on its underwater noise reduction guidelines
 - Working with international shipping classification societies to align 'quiet ship' notations
 - Providing input and research to various other international research efforts

The ECHO Program – Looking ahead

What's planned in 2022



What's next in 2022:

- New slowdown trial – inbound lane Swiftsure Bank
- Continued slowdown at Haro/Boundary and Swiftsure Bank outbound
- Lateral displacement in Strait of Juan de Fuca
- Co-benefits of voluntary slowdowns study



Thank you

To learn more:

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www.portvancouver.com/echo

Photo: Joan Lopez