



Apr 28th, 10:15 AM - 11:45 AM

The plight of the enigmatic southern resident killer whales: Have we done all we can to recover these icons of the Salish Sea?

Orla Robinson

Regan Nelson

Dr. Lance Barrett-Lennard

Carleen Thomas

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<https://cedar.wwu.edu/ssec/2022ssec/allsessions/323>

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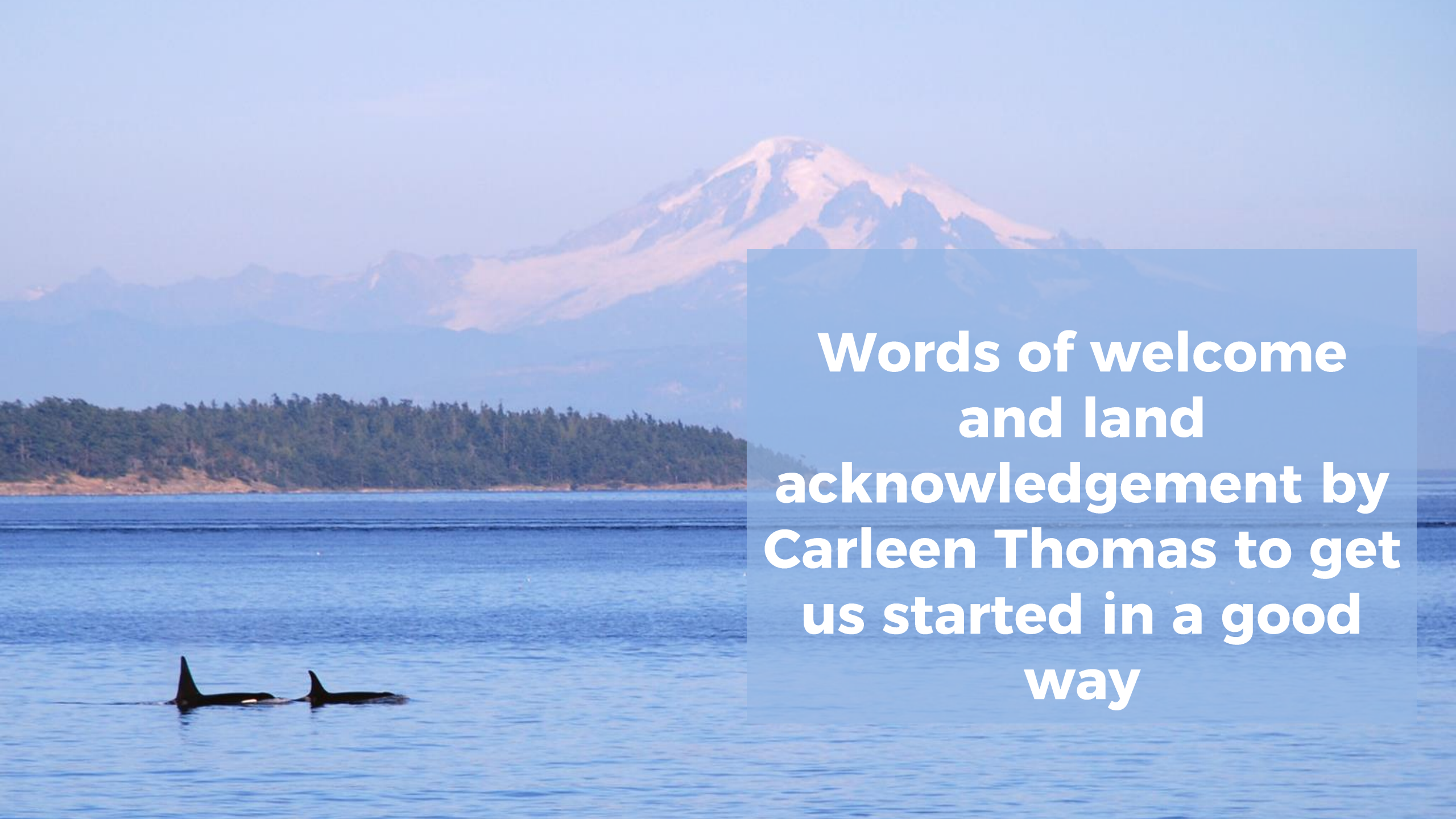


Georgia Strait Alliance

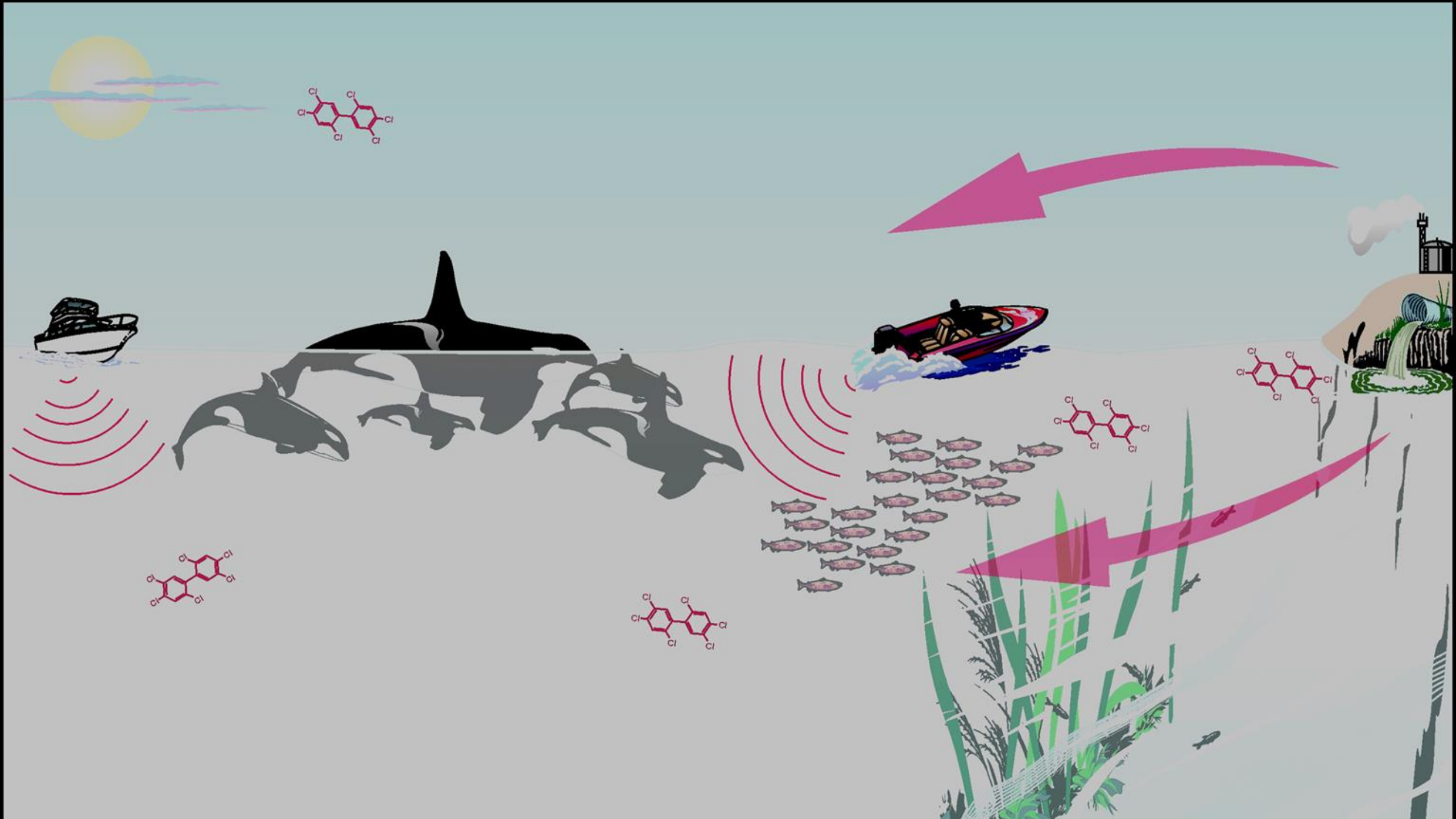


Recovering Southern Resident Killer Whales - what more can we do?

Chaired by Lucero Gonzalez and Peter S. Ross



**Words of welcome
and land
acknowledgement by
Carleen Thomas to get
us started in a good
way**



Overcoming
the challenges
that constrain
the recovery of
SR Killer
Whales

Mobile

Long-lived

High trophic level predators

Large habitat needs

Low reproductive rate

Primary prey rely on both freshwater and marine

Difficult to study (legal, logistics and ethics)

Are heavily contaminated, have a dwindling food supply, and live in a busy, noisy Salish Sea

Progress has been made

Listed in both US (2005) and in
Canada (2003)

Conservation / Action Plans in place

Researchers in both countries are
generating data, knowledge and
expertise

Indigenous Nations are actively
engaged in knowledge generation
and resource management

Communities (municipalities,
wastewater authorities, regional
governments) are increasingly engaged
in watershed activities



UNLEASH YOUR
creativity

Getting to know our speakers for today

- **Carleen Thomas**
Special Projects Manager
Tsleil-Waututh Nation
- **Lance Barrett-Lennard**
Senior Scientist, Cetacean Conservation
Research Program
Raincoast Conservation Foundation
- **Orla Robinson**
Program Advisor
The ECHO Program
- **Regan Nelson**
Senior Advocate
National Resource Defense Council





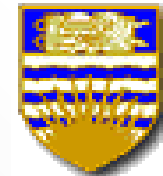
Agenda for today

- Panelists presentations ~ 40 min
- Q & A ~ 30 min
- Panel Closing ~ 5 min

Ensuring Adequate Prey for Southern Resident Killer Whales

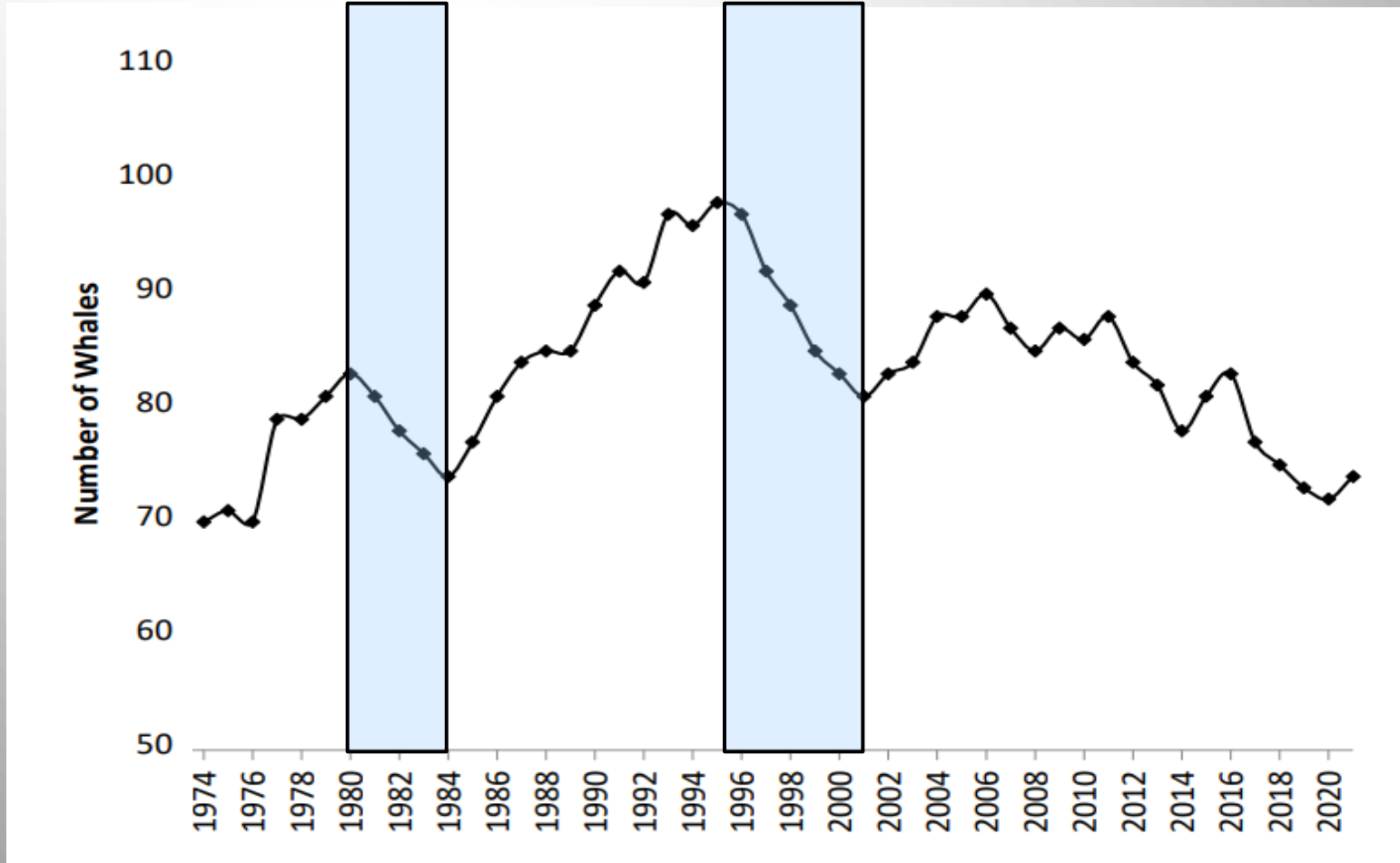


Lance Barrett-Lennard



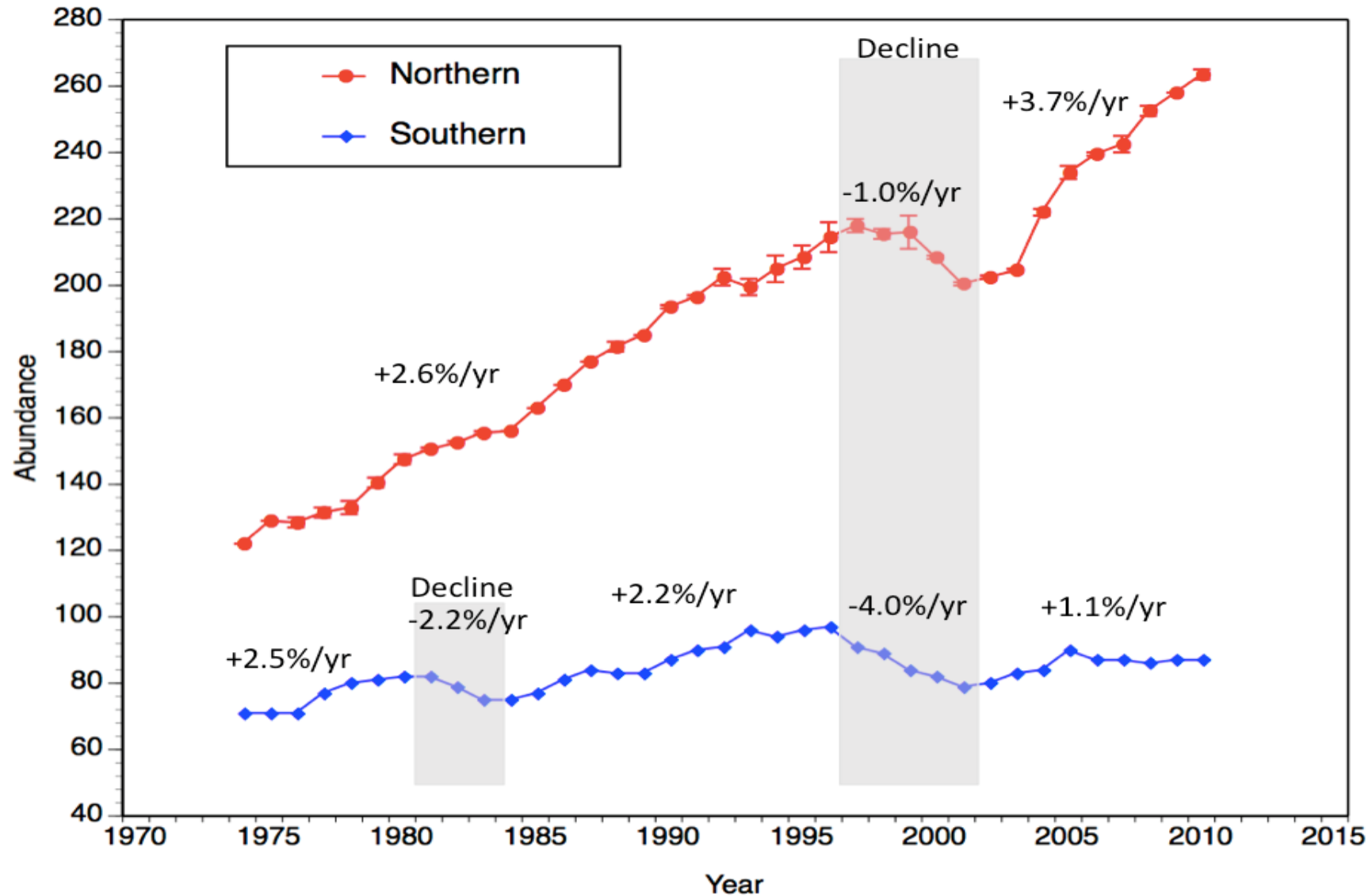
University of British
Columbia

Southern Resident Killer Whale Population Size



Source: Centre for Whale Research

Abundance trends in Southern & Northern Residents



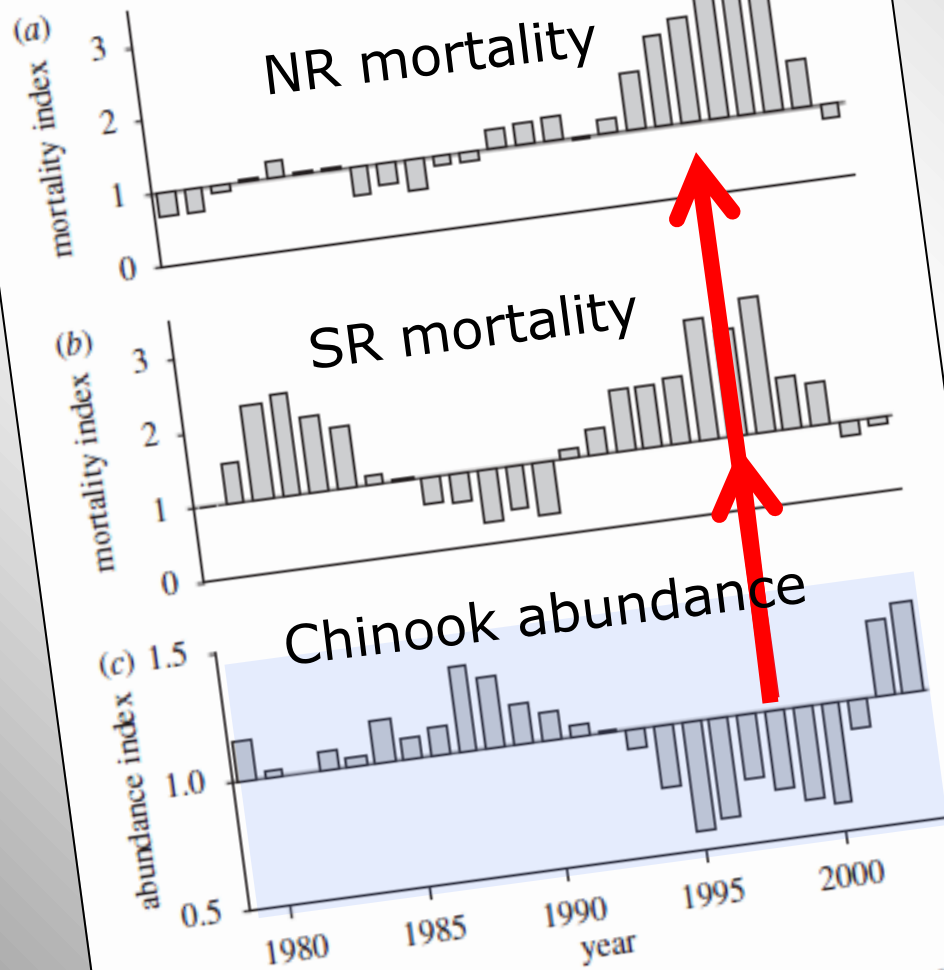


Figure 1. Annual indices of mortality of (a) northern and (b) southern resident killer whales and (c) abundance of Chinook salmon, 1979–2003. Deviations from an annual index value of 1 (a,b) indicate higher or lower than expected mortality rates. Annual abundance indices for Chinook salmon (c) reflect departures from the average abundance over the entire time series.

In years of lower-than average Chinook salmon abundance, resident killer whale mortality increases (1 yr time lag)

Ford, Ellis, Olesiuk & Balcomb 2009
Linking killer whale survival and prey abundance: food limitation in the ocean's apex predator: Biology Letters 6: 139-142.



NOAA FISHERIES SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



Fisheries and Oceans
Canada

Pêches et Océans
Canada

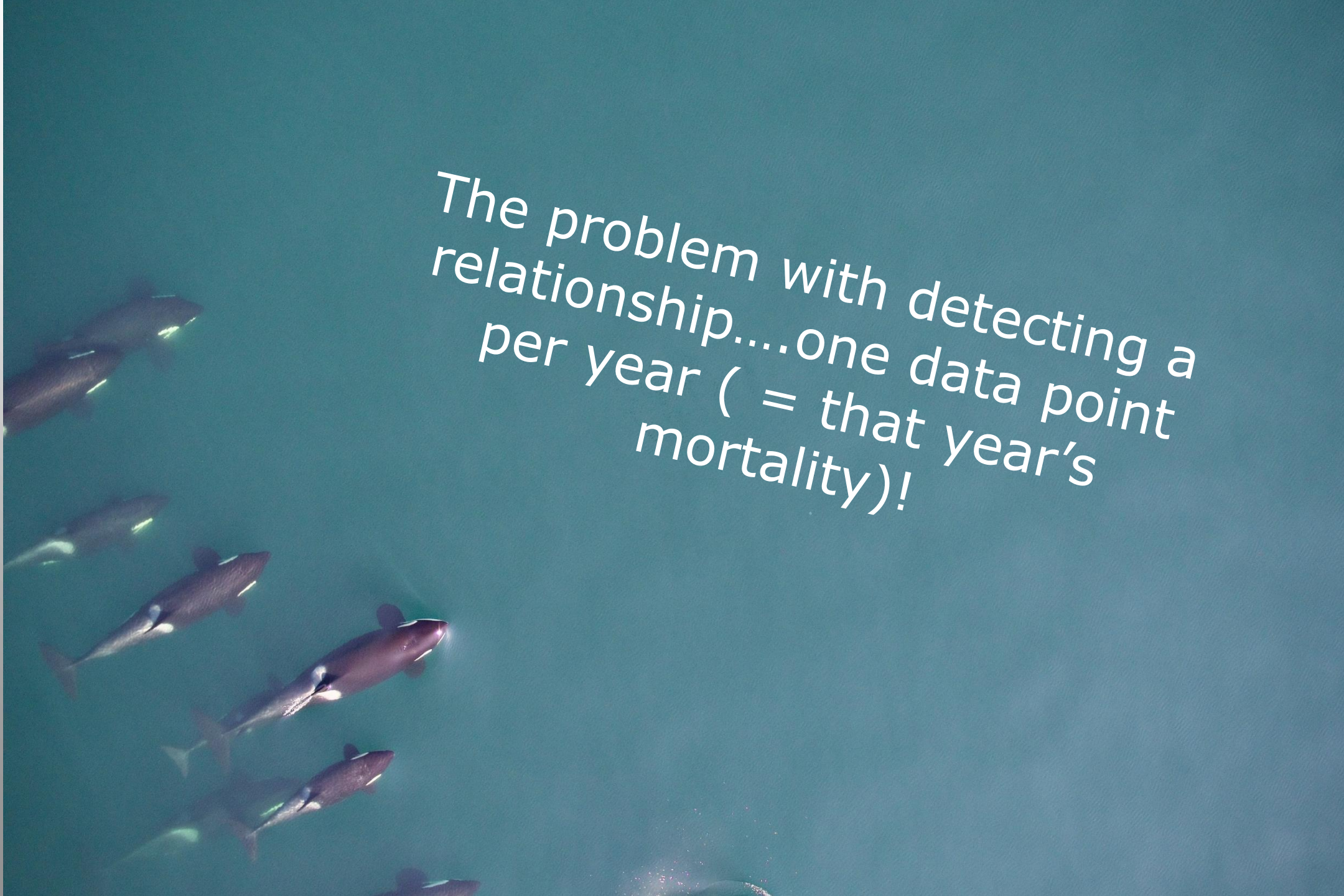
July 28, 2011

A Bilateral Scientific Workshop Process to Evaluate Effects of Salmon Fisheries on Southern Resident Killer Whales

Background and context: Southern Resident killer whales (*Orcinus orca*) are listed as an endangered species under both the U.S. Endangered Species Act (ESA) and Canada's Species at Risk Act (SARA). The National Marine Fisheries Service (NOAA Fisheries) and Fisheries and Oceans Canada (DFO) have developed and adopted recovery plans as required by their respective statutes. These recovery plans present the biological status of the population, describe threats and factors believed to be limiting recovery, establish interim recovery objectives and identify critical uncertainties. They prescribe actions to address the threats and limiting factors and call for research to address critical uncertainties and data gaps.

The Panel agreed that low Chinook salmon abundance was associated with increased mortality and lowered reproduction in southern resident killer whales, but failed to find evidence that reductions in the harvest of any specific runs of Chinook would lead to the recovery of the whales.

The Panel agreed that low Chinook salmon abundance was associated with increased mortality and lowered reproduction in southern resident killer whales, but **failed to find evidence** that reductions in the harvest of any **specific** runs of Chinook would lead to the recovery of the whales.

A school of salmon swimming in clear, blue water. The fish are arranged in a loose, diagonal line, moving from the upper left towards the lower right. The water is a deep, clear blue, and the fish have a silvery, iridescent sheen. The text is overlaid on the right side of the image, tilted to match the angle of the fish.

The problem with detecting a relationship.....one data point per year (= that year's mortality)!

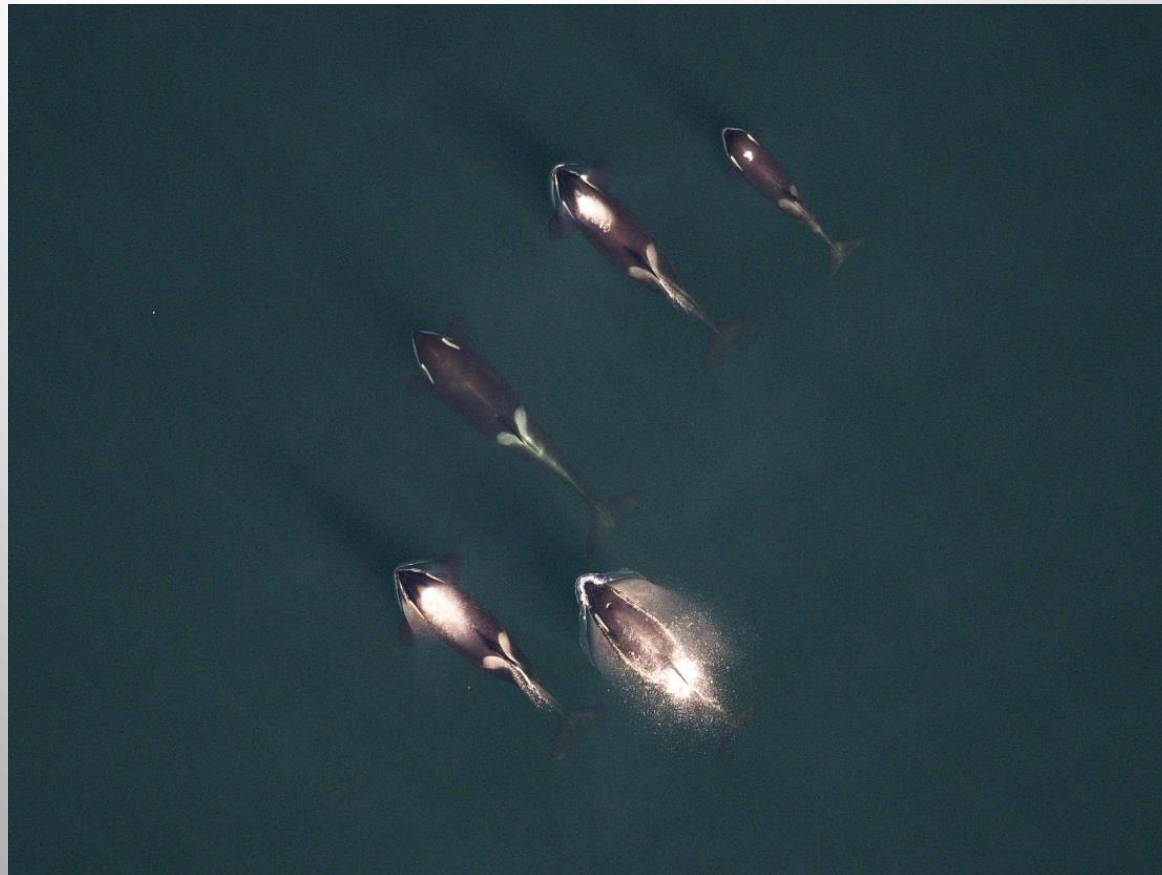
Salmon Now, or in the future?

The analyses considered at the bilateral workshops attempted to predict how reductions in fishing effort would increase salmon returns (in several years) — and benefit killer whales at that time.

They did not consider the immediate benefits of reduced competition.

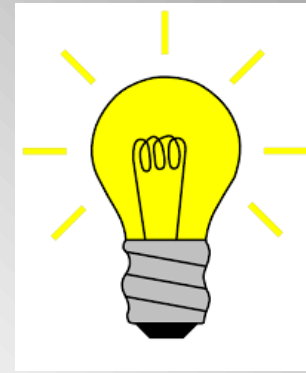
In an emergency, short-term survival — aka immediate benefits — should trump everything.

"Overall, the Independent Science Panel believes that photogrammetry to monitor seasonal and interannual changes in growth and body condition of southern resident killer whales is likely to yield the greatest number of new insights..."





Idea!



Link near real time assessments of :

a) killer whale body condition (fatness)

...with

b) Chinook abundance in SRKW critical habitat

...to create a trigger

To **trigger**, when required, in-season, area-based fisheries closures

Aerial Photogrammetry

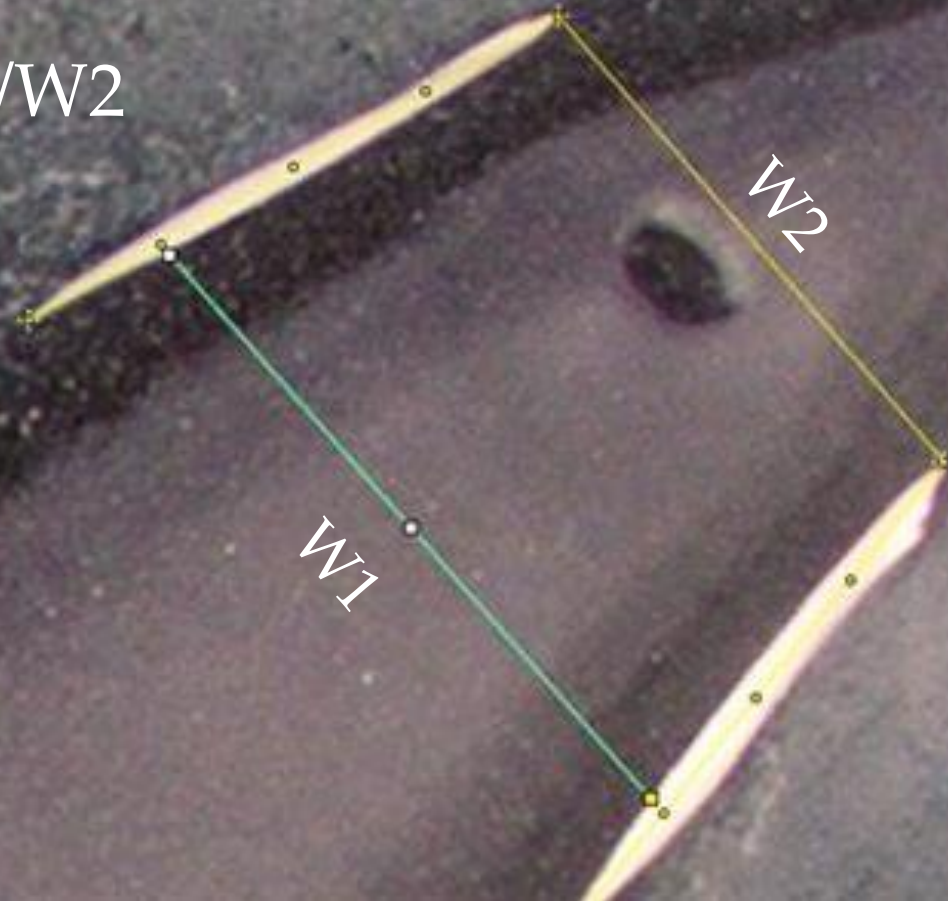






EyePatch Ratio: A Reliable Indicator of Body Condition

$$EP = W1/W2$$



Photogrammetry Papers

Durban, J.W., Fearnbach, H., Barrett-Lennard, L.G., Perryman, W.L., Leroi, D.J., 2015.

Photogrammetry of killer whales using a small hexacopter launched at sea

1. *Journal of Unmanned Vehicle Systems*, 3: 131-135.

Groskreutz, M.J., Durban, J.W., Fearnbach, H., Barrett-Lennard, L.G., Towers, J. R., &

Ford, J. K. 2019. **Decadal changes in adult size of salmon-eating killer whales in**

the eastern North Pacific. *Endangered Species Research*, 40:183-188.

Fearnbach, H., Durban, J.W., Barrett-Lennard, L.G., Ellifrit, D.K., Balcomb III, K.C.

2020. **Evaluating the power of photogrammetry for monitoring killer whale body**

condition. *Marine Mammal Science*, 36: 359-364.

Stewart, J. D., Durban, J. W., Fearnbach, H., Barrett-Lennard, L. G., *et al.* 2021.

Survival of the fattest: linking body condition to prey availability and

survivorship of killer whales. *Ecosphere*, 12, e03660.

Chinook fisheries management adjusted according to SRKW body condition is...

SMART

- S**ignificant (focused on primary threat)
- M**easurable (body condition and salmon abundance)
- A**chievable (using presently-existing methods)
- R**esponsive (analysis and imposition of measures can be done in near real time)
- T**imely (given that SRKW are critically endangered)



PORT of
vancouver

Vancouver Fraser
Port Authority

Transboundary limitations to the recovery of SRKW

The plight of the enigmatic southern resident killer whales: Have we done all we can to recover these icons of the Salish Sea?

Orla Robinson
ECHO Program Advisor

Presentation to Salish Sea Ecosystem Conference

April 28, 2022

What is the ECHO Program?

A **collaborative** regional initiative launched in 2014 by the Vancouver Fraser Port Authority to better understand and reduce the cumulative effects of shipping on at-risk whales.

Key ECHO Program actions:

- Facilitate collaboration and engagement
- Trial and implement threat reduction measures
- Advance research projects with a focus on underwater noise
- Support national and international initiatives

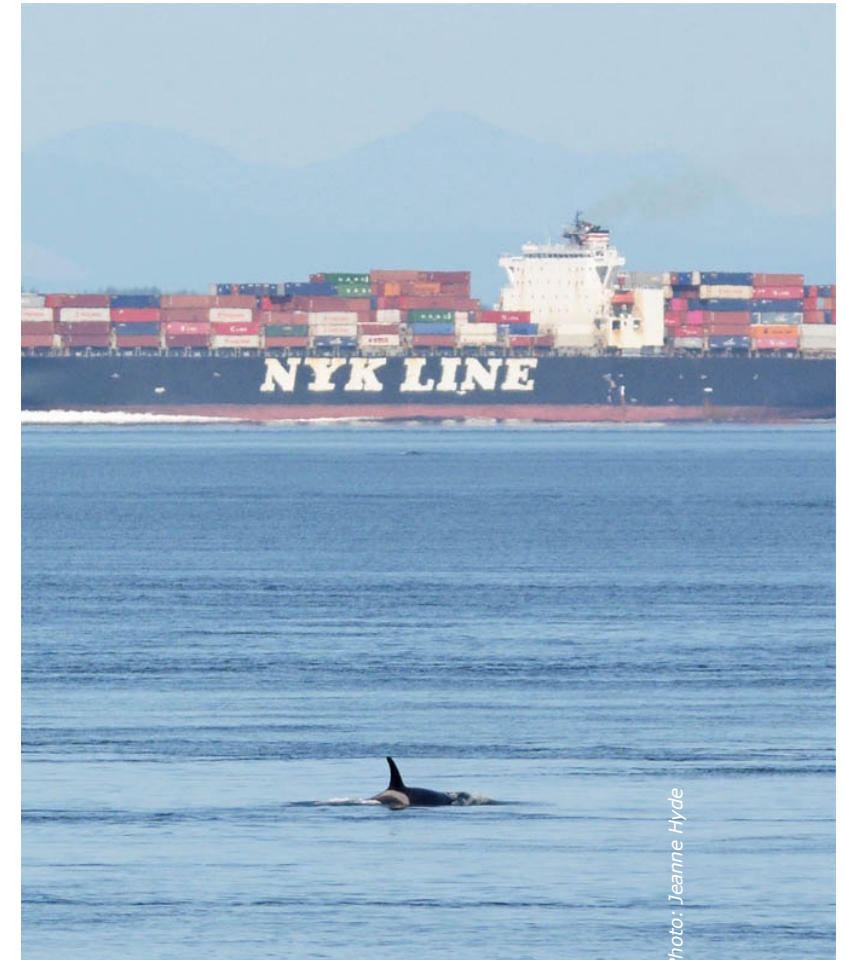


photo: Jeanne Hyde

ECHO Program success: strong voluntary collaborative model

- Clear program objectives, urgency around protecting an endangered species
- Adequate resources and time
- Diverse perspectives, high levels of engagement and commitment regionally
- Science based, informed decision making
- Shared responsibility in real world trials
- Adaptive management based on research learnings

ECHO Program challenges: shifting the needle at the international level



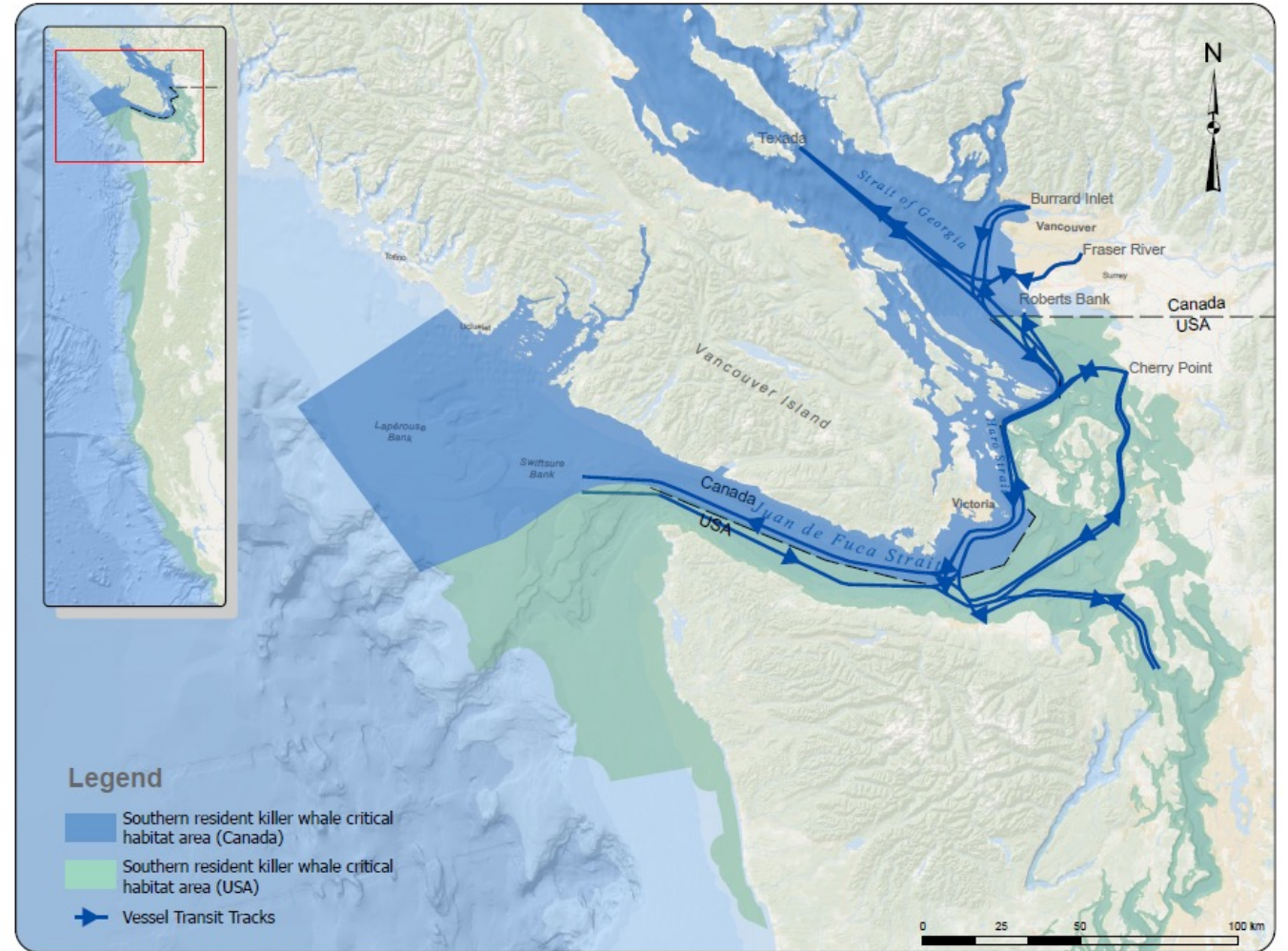
- No international regulation around underwater noise
- Necessity for ship owners to meet other regulatory requirements as a priority
- Complex ownership and decision making structures

Photo: Jeanne Hyde

Looking to the future: advancing on the recovery of SRKW

“Driving change towards a future of quieter vessels calling the west coast”

- Need for concerted engagement effort with ship owners, ship designers, ship builders, “shippers” and ports
- Opportunities to harness momentum around fleet renewal/ upgrades occurring to meet international 2030/2050 GHG emission targets
- You, the consumer, have a role to play!





Thank you

Regan Nelson

Marine Mammal
Protection Project

*Campaign to
Reduce Vessel
Noise in the
Ocean*

NRDC



Overview of NRDC priorities relevant to SRKW

Removal of the Snake River dams

Mitigating non-vessel sources of noise
(offshore wind development; naval
sonar exercises; seismic surveys)

Engagement in Quiet Sound (U.S.) and
ECHO (Canada)

Reducing vessel disturbance of SRKW
(intentional whale watching/vessel
buffer zones)

Vessel Noise 10-year vision: Quiet Ships

Large international ships
(cargo/tanker/cruise)

Ferries

Tug/Tow/Other Harborcraft

Small recreational vessels



How do we get there?

Large international ships
(cargo/tanker/cruise)

Ferries

Tug/Tow/Other Harborcraft

Small recreational vessels

- Binding regulations on quiet ship design from the International Maritime Organization (IMO)
- Green Corridors (NW/China; West Coast)
- New ferry classes are intentionally designed (and funded) to be quiet
- Funding support to assist with design/build
- Incentive programs
- “Off-the-shelf” commercial technology available for small vessels

How do we
get there?
Cont.

H.R. 6987 – Protecting our Marine Mammals Act (led by Representative Rick Larsen)

- Promotes research, development, and deployment of innovative ship quieting technologies
- Assesses available naval technologies for quieting U.S. government vessels
- Assists ports to establish programs that minimize vessel impacts on marine mammals
- Increases manager's ability to locate whales and mitigate harmful activities in real-time
- Invests in measuring and tracking underwater noise pollution

How do we
get there?
(cont'd)

Other Federal policy levers

- Infrastructure funding (Port Infrastructure Development Program)
- Compel uptake of quieting technologies using Vessel Incidental Discharge Act regulations



How much is enough?

