

Connecting Science to Management, Policy And People

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PICES 2019 Annual Meeting
Victoria, BC

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Canada

Photo: M. Schwartzel

Get Outside Your Comfort Zone

- Not a Science Talk
 - Research on Coastal Human Stressors to highlight **Connections**
 - Connections By Collaborating
 - Indigenous communities
 - Connections By Dialogue
 - Management & Policy
 - Indigenous Communities
 - Connections By Outreach
 - Public
 - Indigenous Communities
- 
- A woman is riding a yellow and red inflatable tube on a boat in the ocean. She is wearing a blue and black life vest and has her feet on the tube. The tube has "HEAD" and "AIR" written on it. The background is a blue ocean with white water splashing around the tube.

Get Outside Your Comfort Zone

Connections

- Collaboration • Make your science Trusted
- Dialogue • Make your science Relevant
- Outreach • Make your science Accessible



Get Outside Your Comfort Zone

Change your role as a scientist by getting outside your comfort zone

越過你的舒適區，改變你作為科學家的角色

안락 지대를 벗어나 과학자로서의 역할 변경

科学者としてのあなたの役割を、あなたの快適ゾーンの外に出て変えてください

Расширьте свою роль ученого, выйдя за пределы зоны комфорта

Coastal Human Stressors

An aerial photograph of a rugged coastline. The ocean is a deep blue with white-capped waves crashing against a wide, sandy beach. To the right of the beach, a steep, forested cliffside rises. The background shows a vast expanse of forested land under a hazy sky.

Pacific Canada

37,000 km of shoreline

450,000 km² of ocean

87 coastal communities

59 coastal First Nations

Coastal Human Stressors

Invasive Species



Shipping



Microplastics



Sustainable Resource & Ecosystem Management

Protected Area Networks



Data Collection

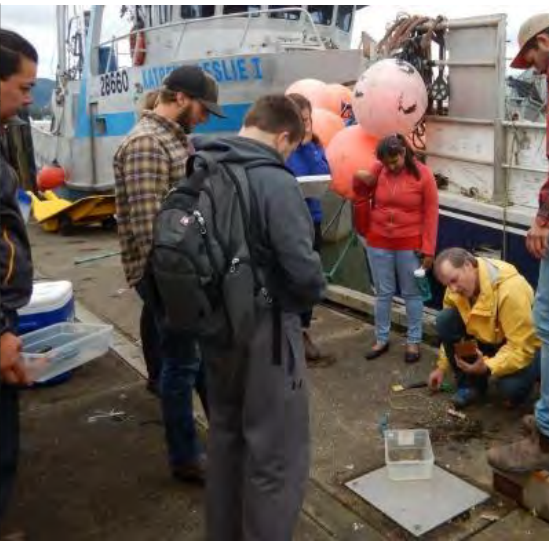


Species Conservation



Connections By Collaboration

Making Your Science Trusted



Connections By Collaboration

Invasive Species

Aquatic Invasive Species Program

- Coast-wide monitoring for introductions, distribution and impacts
 - loss of native biodiversity
 - socio-economic risks to sustainable fisheries and aquaculture
 - impacts may be exacerbated by climate change

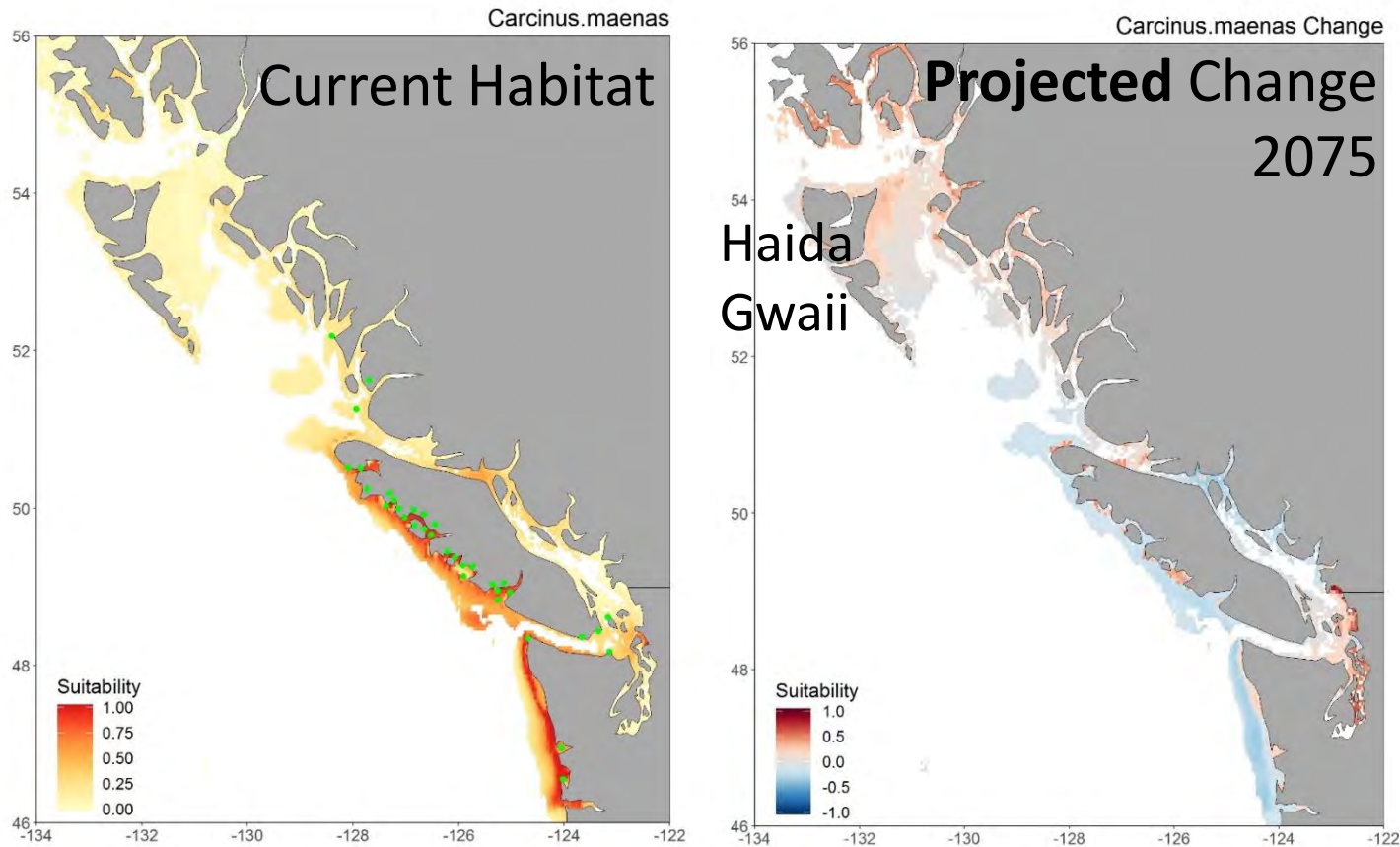


Connections By Collaboration

Invasive Species

Aquatic Invasive Species Program

European Green Crab (*Carcinus maenas*)



Lyons et al. *In prep.*



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Connections By Collaboration

Invasive Species

Aquatic Invasive Species Program

Haida Oceans Technical Team & Gwaii Haanas Partners

- monitoring local waters for early detection
- developing a management plan for prevention
- developing a rapid response plan should they be detected



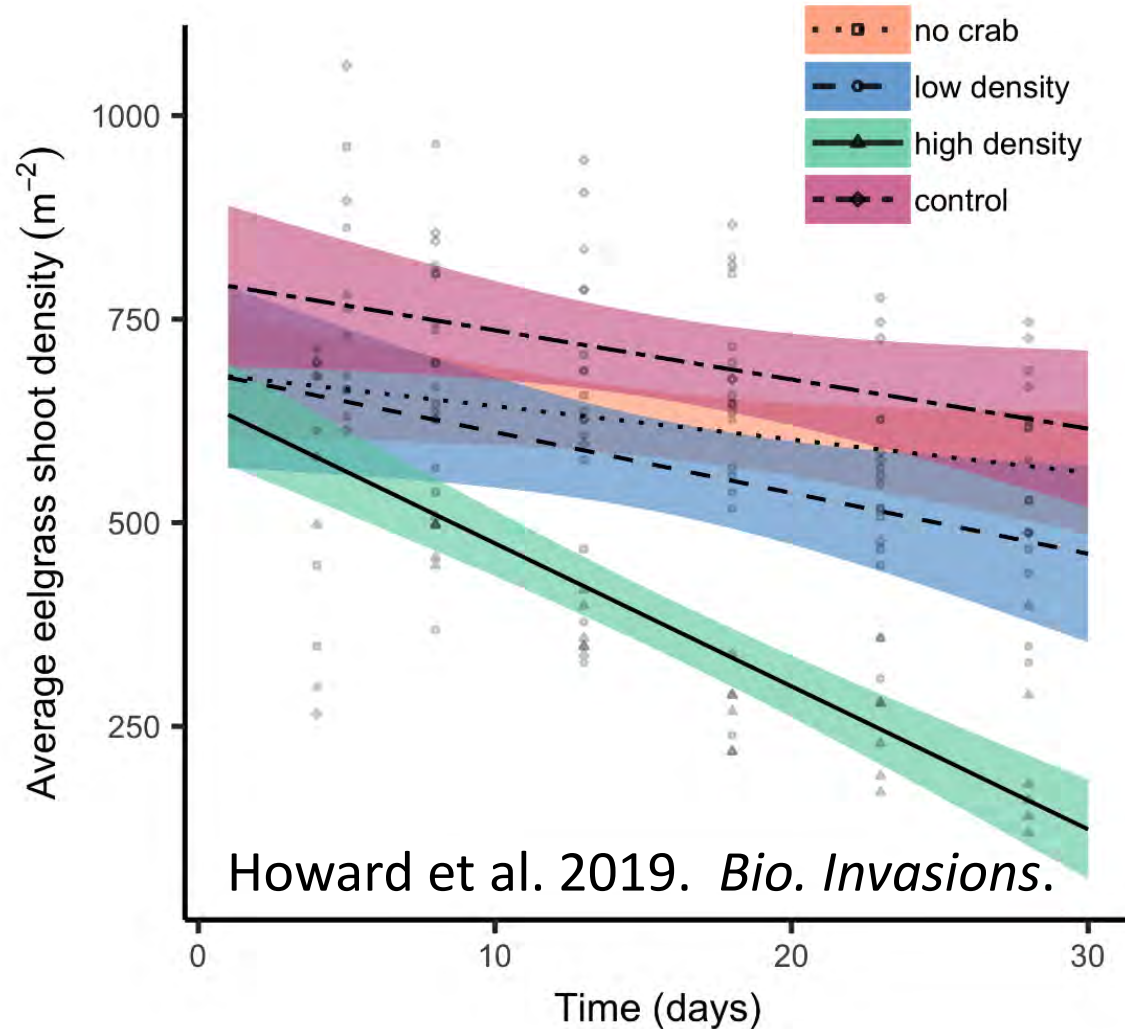
Photos: Terri Bell

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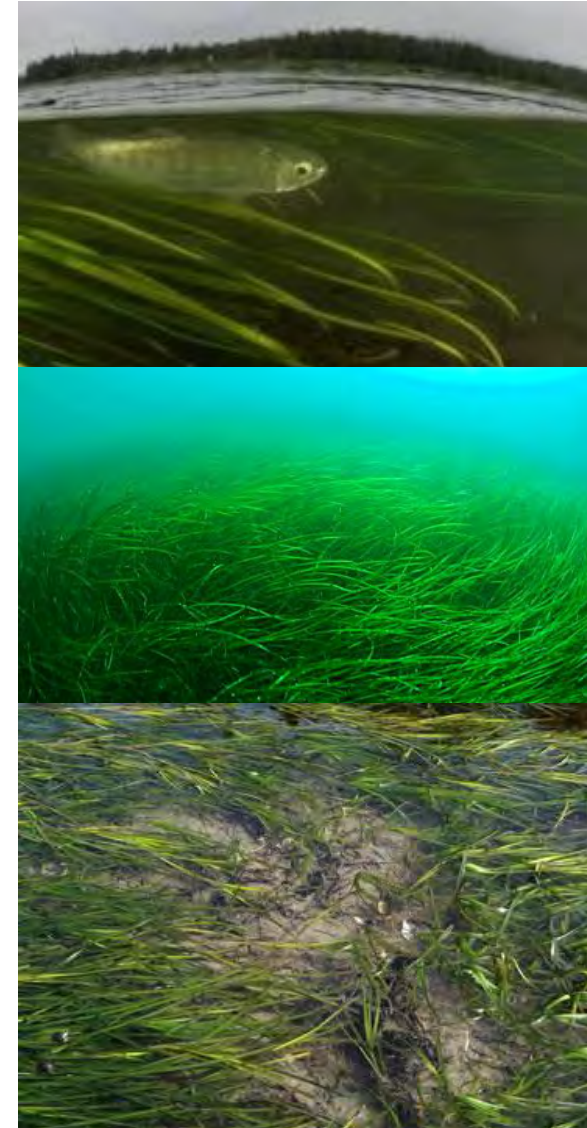
Connections By Collaboration

Invasive Species

Aquatic Invasive Species Program



In 30 days, high densities of green crabs can reduce the eelgrass density by about 70%



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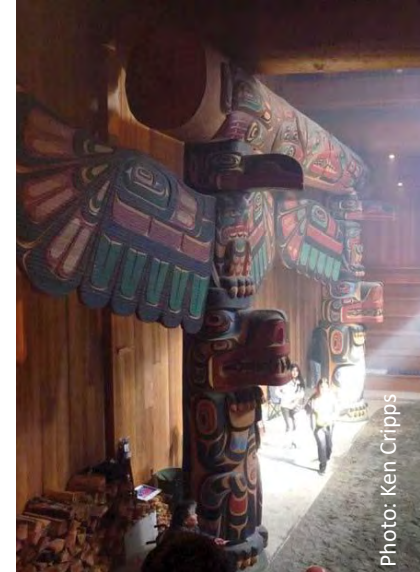
Connections By Collaboration

Protected Area Networks

Marine Protected Area Network Planning Northern Shelf Bioregion



- Governance
 - being led by the governments of 17 First Nations, of British Columbia, and of Canada
- Engagement with Stakeholders
 - Advisory Committees
 - Briefings, Sector meetings
 - Workshops, forums
 - Online Data Portal SeaSketch
 - Webinars



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Connections By Collaboration

Protected Area Networks

Marine Protected Area Network Planning

MPA Technical Team

- Full integration of Science, Policy and Traditional Knowledge
- Individuals with expertise in such fields as
 - biology
 - ecology
 - protected area management
 - economics
 - resource management
 - public engagement
 - Traditional Ecological Knowledge

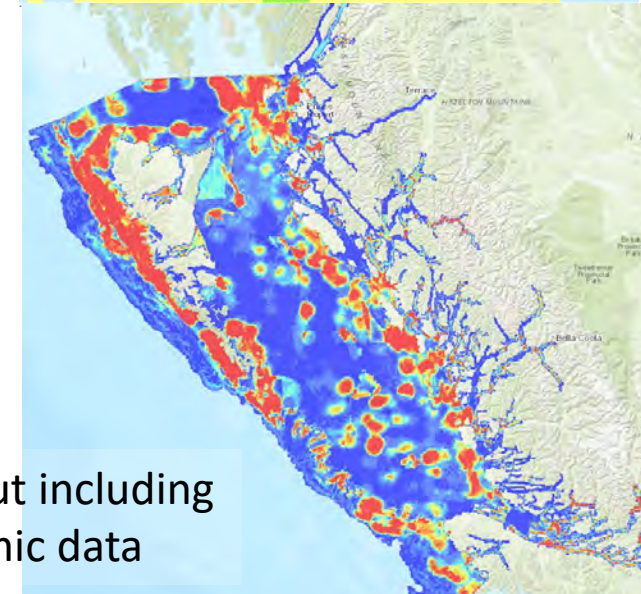
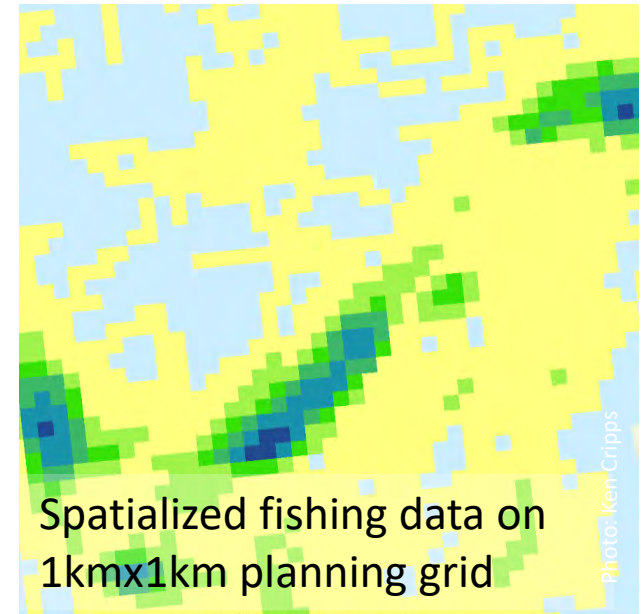
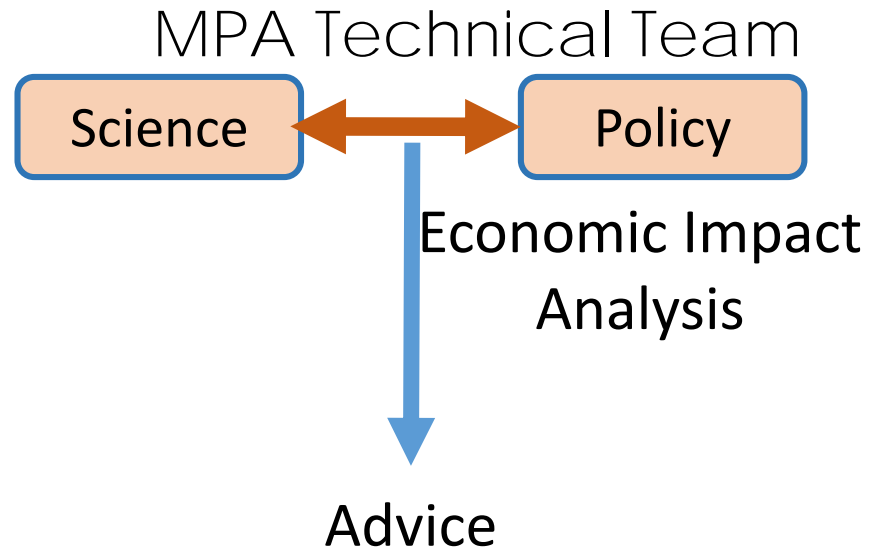
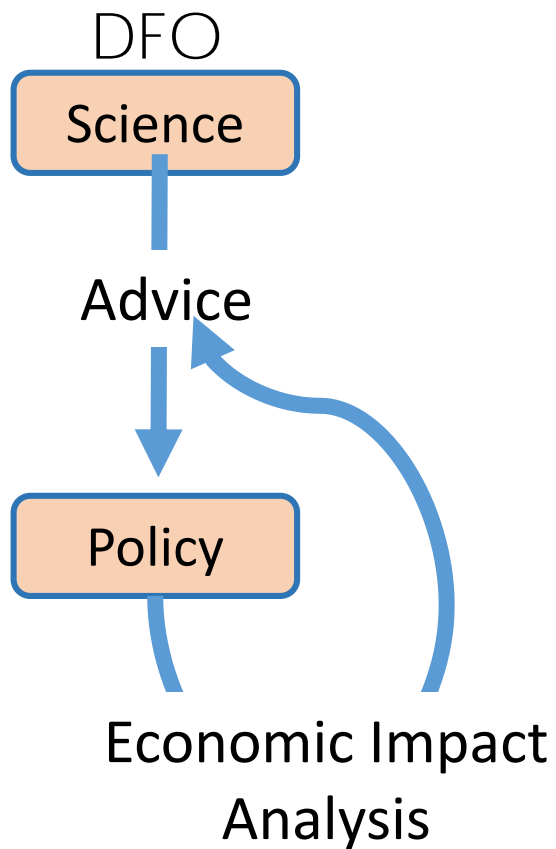
Canada – British Columbia Marine Protected Area Network Strategy



Connections By Collaboration

Protected Area Networks

Marine Protected Area Network Planning



Connections By Collaboration

CHALLENGES

- **Historic** relationships
- Engaging with **multiple** communities and groups

Strategies

- **Respect** for collaborators' perspectives and science capacity
- **Dialogue** – particularly listening

Benefits

- High-value research across **large spatial scales**
- Increased confidence from others in the science – **building trust**
- The people – creates **relationships** for future work

Connections By Dialogue

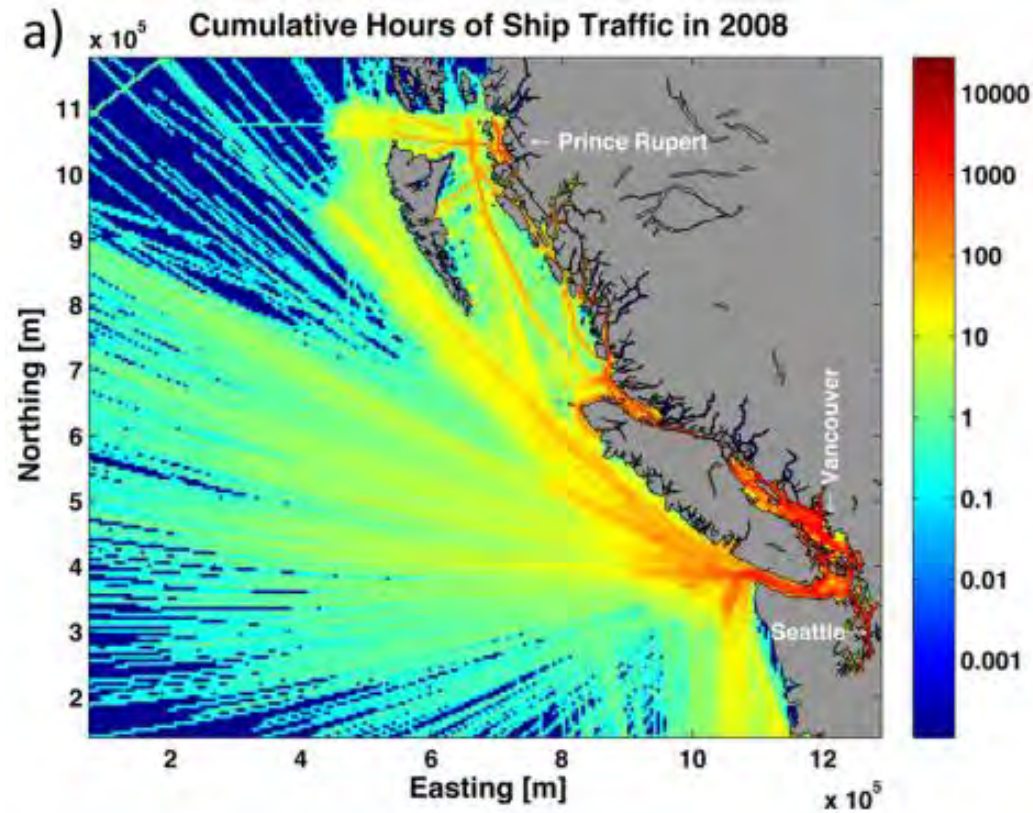
Making Your Science Relevant



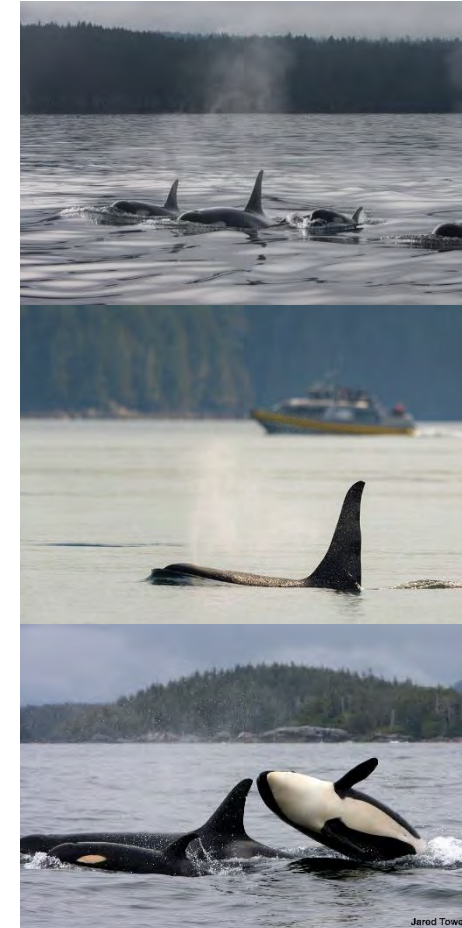
Connections By Dialogue

Shipping 

Shipping Impacts on Southern Resident Killer Whales Acoustic Disturbance



Erbe et al. 2012. J. Acoust. Soc. Am

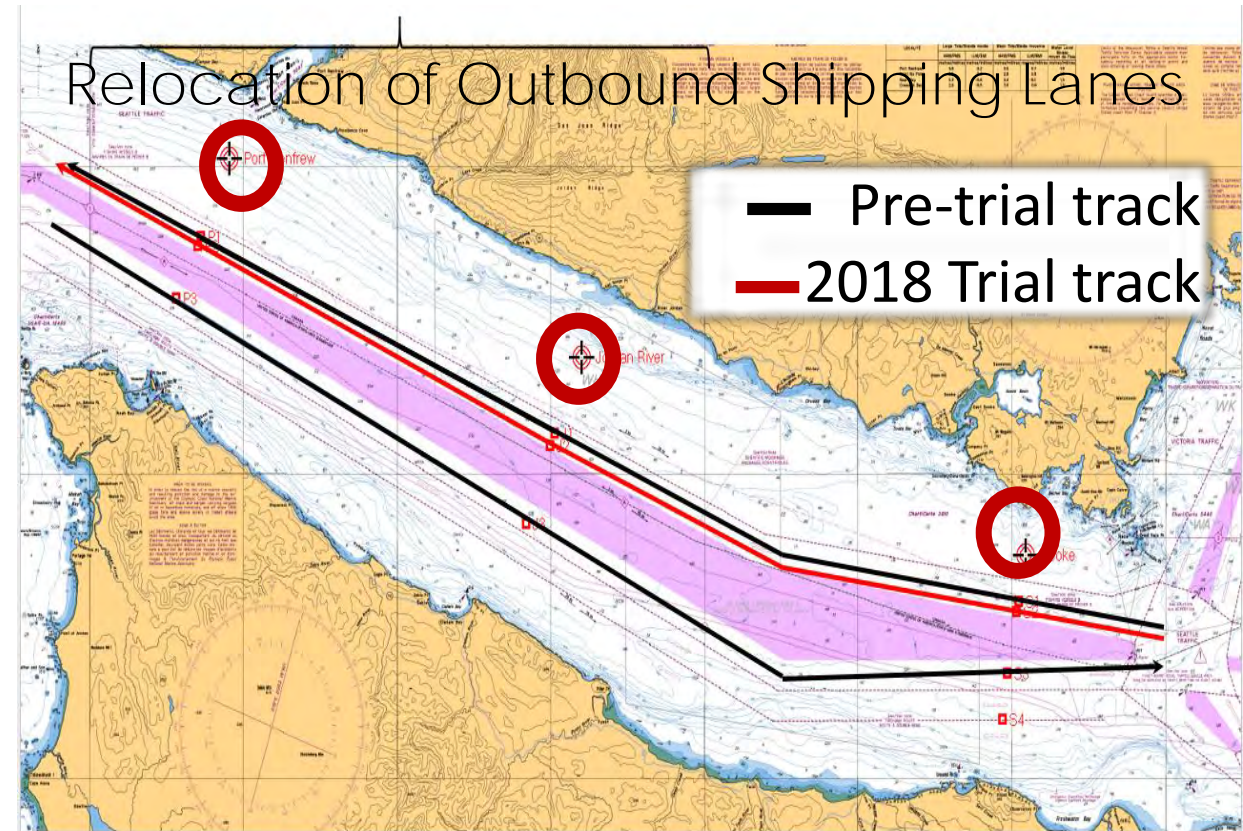
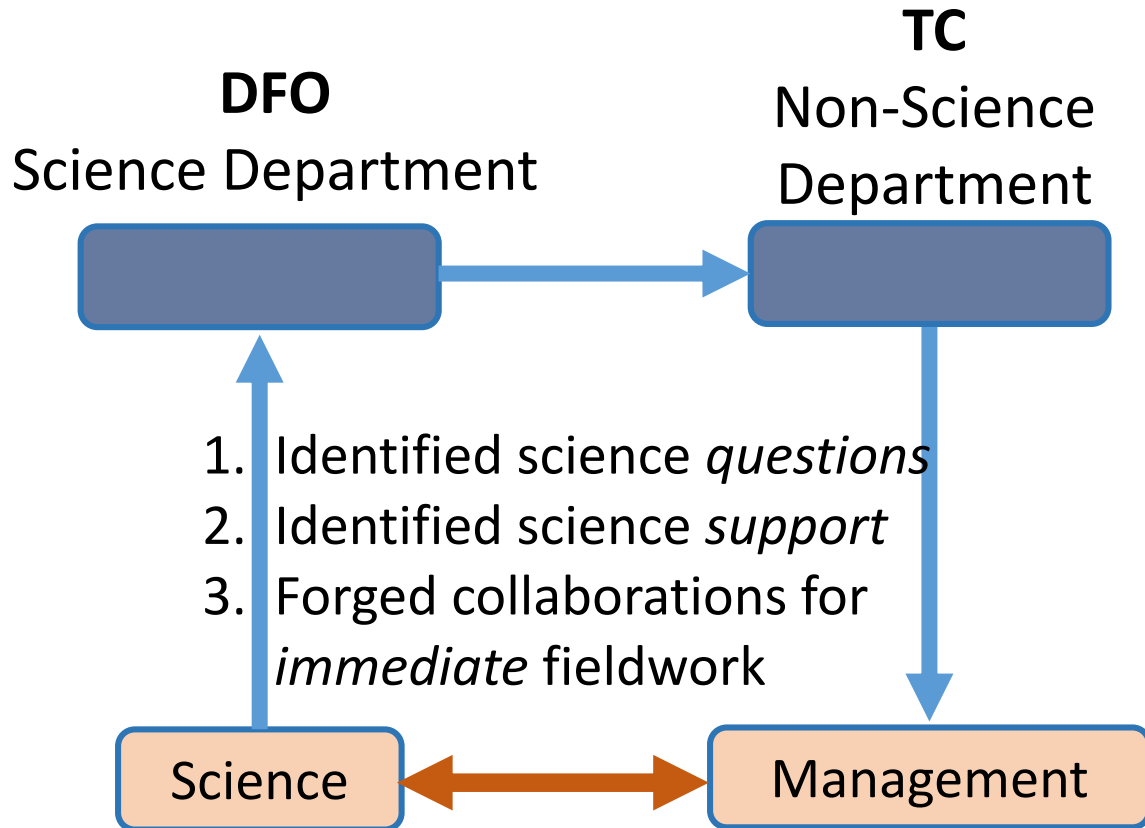


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Connections By Dialogue

Shipping

Shipping Impacts on Resident Killer Whales Suggested Mitigation by Transport Canada



Connections By Dialogue

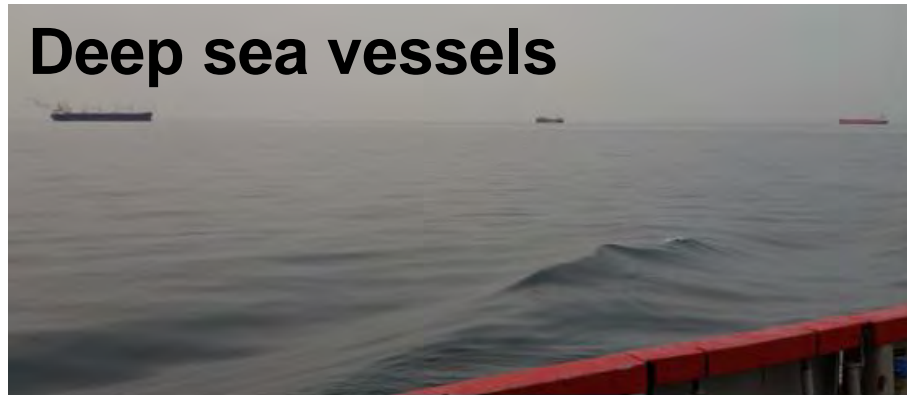
Shipping 

Shipping Impacts on Resident Killer Whales

Does laterally displacing vessels away from known SRKW feeding areas reduce the underwater noise levels in those foraging areas?



Deep sea vessels



Only a small reduction (0.6 to 1.0 dB) in broad-band (10-1000,000 Hz) noise

Tugs and tows



A significant reduction (4.3 dB) in broad-band noise

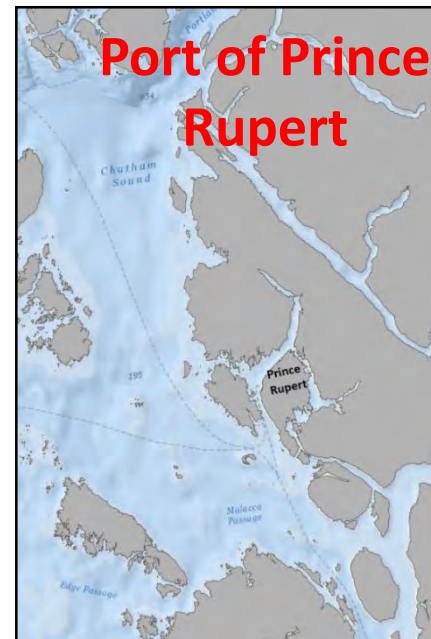
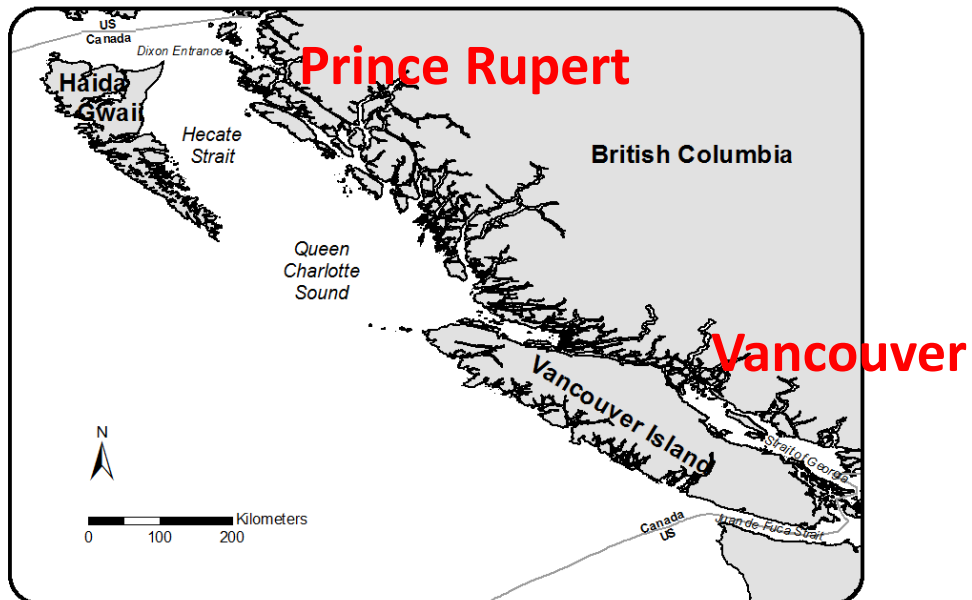
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Connections By Dialogue

Data Collection

Coastal Environmental Baseline Program (2017-2022)

- Data collection to inform *environmental assessments* and *detect changes in the environment*
 - Multiple impacts including increased Shipping traffic



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Connections By Dialogue

Data Collection

Coastal Environmental Baseline Program

- Multi-Nation Collaboration in co-planning and co-implementing baseline data collection:
 - address data gaps and/or complement existing programs/initiatives
 - Investigate *Valued Components of Interest* with First Nations



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Connections By Dialogue

Data Collection

Coastal Environmental Baseline Program

Valued Components of Interest

- e.g. in Port of Prince Rupert

Environment

Marine & Freshwater Quality
Air Quality
Aquatic habitat
Marine safety & Navigability
Marine sediments
Qualitative Experience
Underwater noise & noise pollution

Species

Herring	Dungeness Crabs
Pacific Salmon	Eulachon
Halibut	Abalone
Bivalves	Terrestrial Mammals
Eelgrass	Seabirds
Seaweed & Kelp	Marine Mammals



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Connections By Dialogue

CHALLENGES

- **Not our usual role** to provide directed science advice
- **Different** backgrounds, expectations and **perspectives**

Strategies

- **Flexibility** in acting as expert vs. traditional pathways for science publication
- **Listen, ask** questions, then **listen** some more. (Repeat as necessary).
- **Frequent meetings:** in-person, online, and teleconference

Benefits

- Builds **relationships**, generates new ideas or **opportunities**
- Your science is **more relevant** to decision-making processes

Connections By Outreach

Making Your Science Accessible

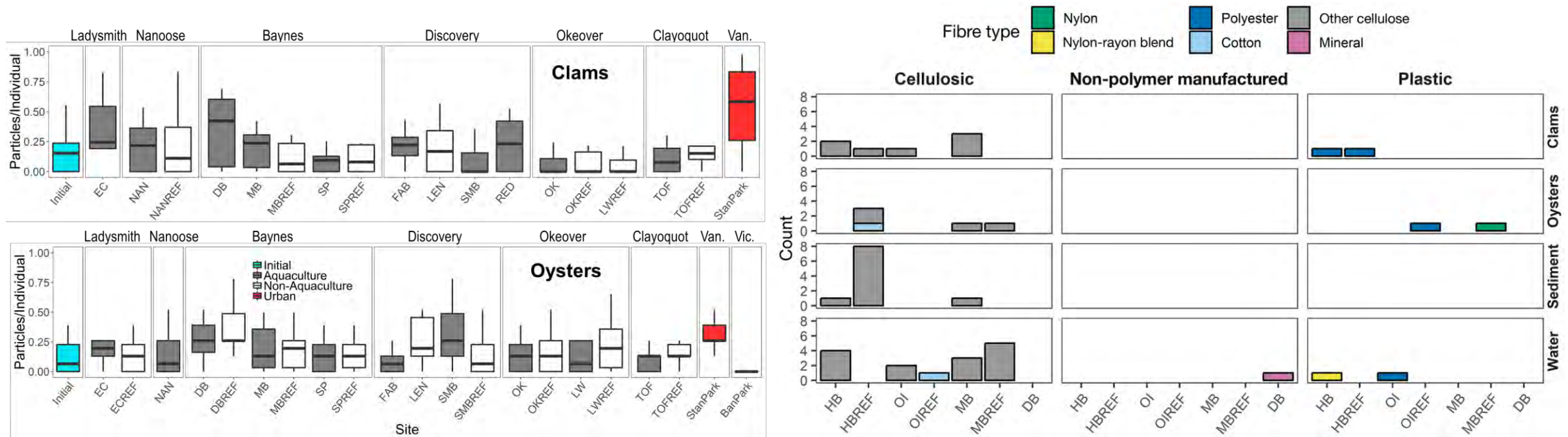


Connections By Outreach

Microplastics

Microplastics In Marine Food Webs

- Origins from textile fibres, not aquaculture gear



Covernton *et al*, 2019 *Aqu. Env. Int.*

Connections By Outreach

Microplastics

Microplastics In Marine Food Webs

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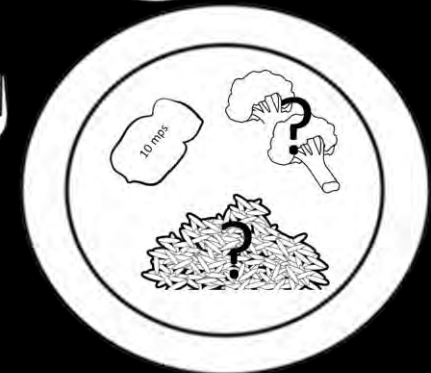
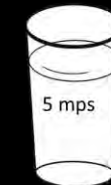
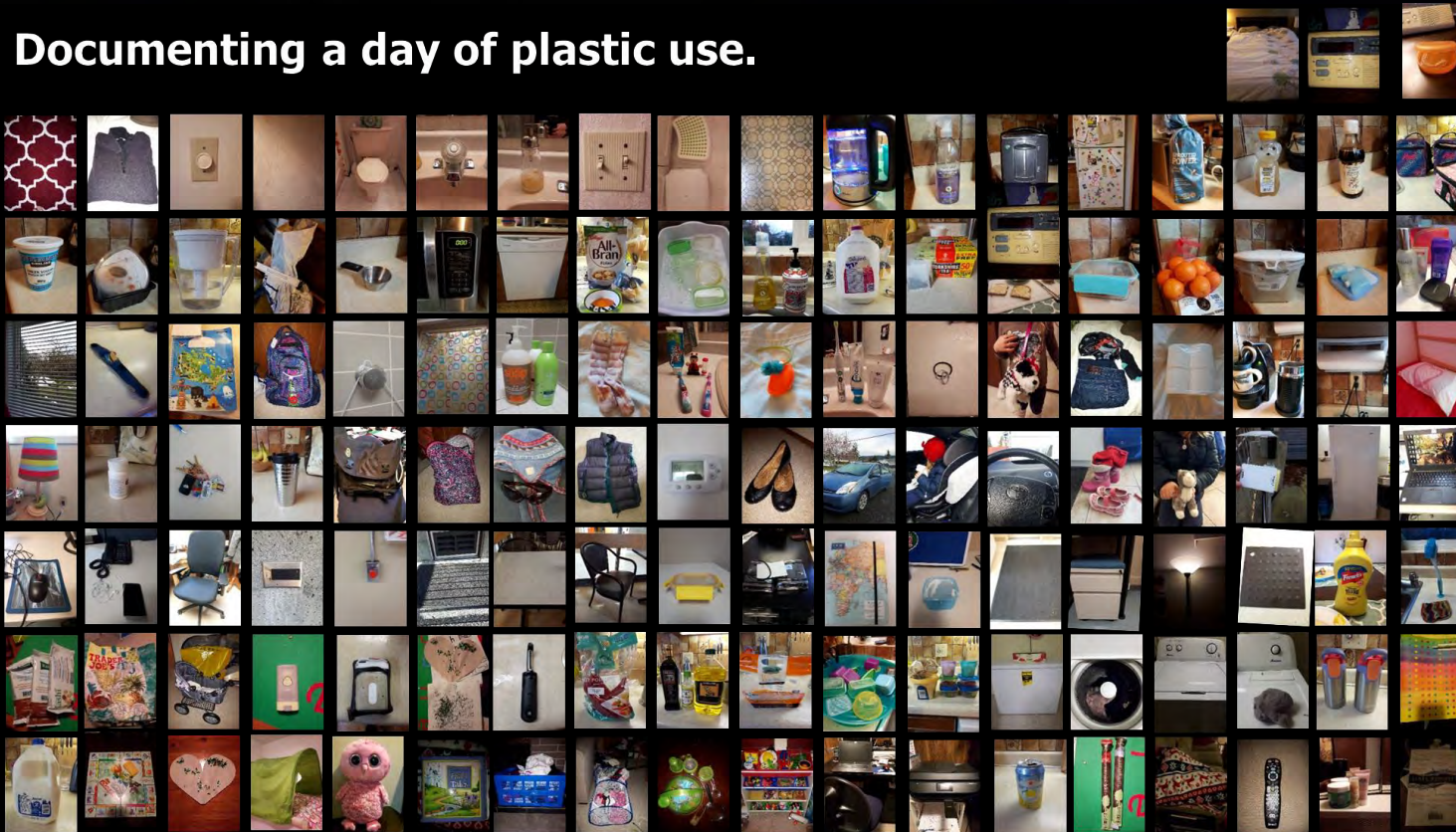
Connections By Outreach

Microplastics

Microplastics In Marine Food Webs

- Origins from textile fibres, not aquaculture gear

Documenting a day of plastic use.



Kiernan et al. 2019. Env. Sci & Tech

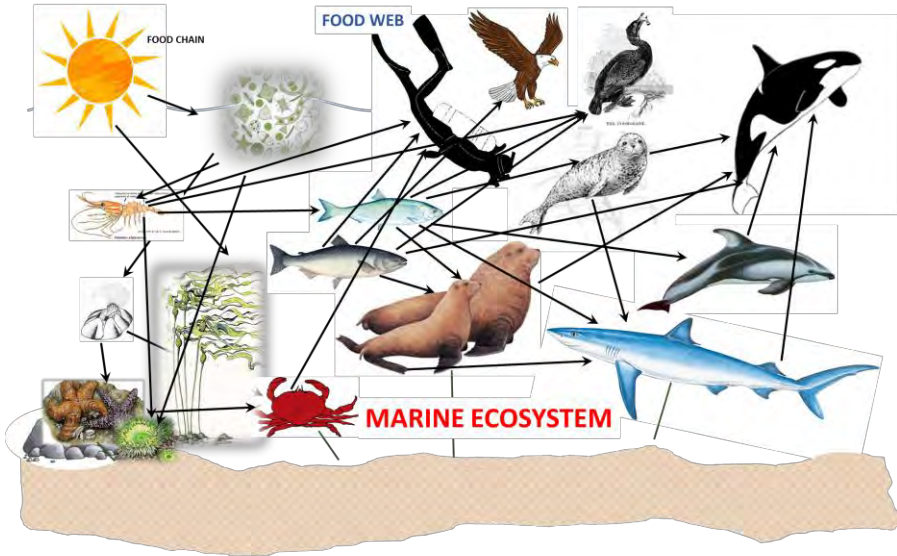
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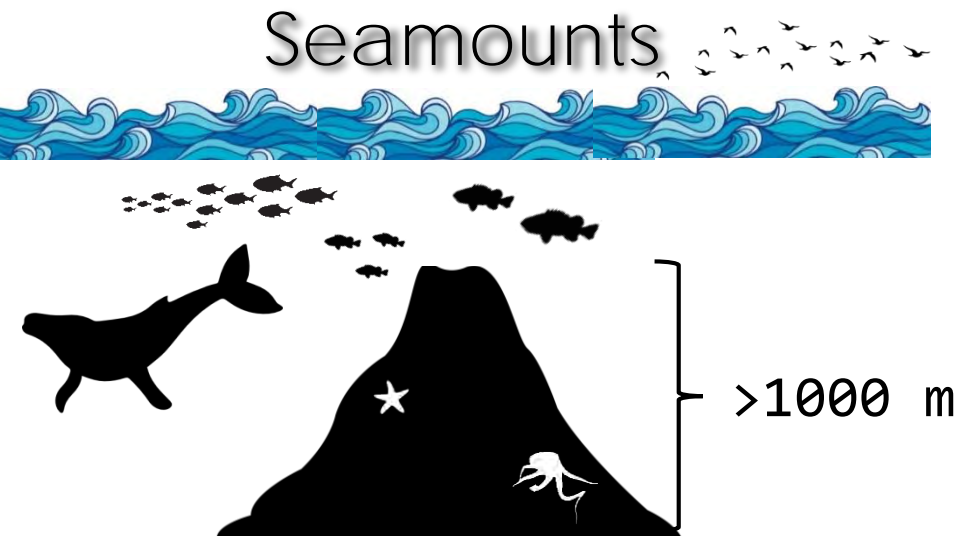
Connections By Outreach

Species Conservation

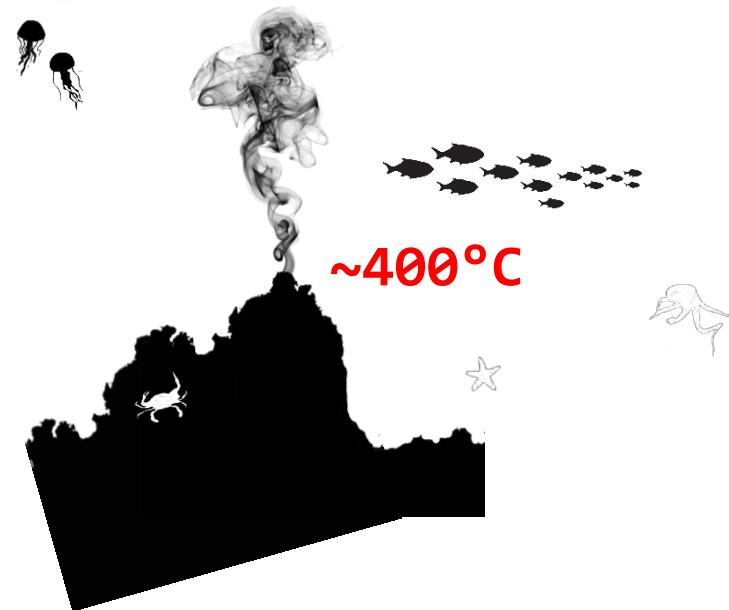
Deep Sea Ecology Program

- Essential baseline data for science-based decision making
 - Offshore Pacific Bioregion Marine Protected Area Network
 - Fisheries closures

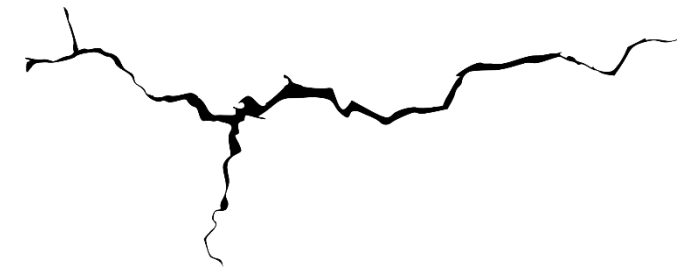
Seamounts



Hydrothermal Vents



Fjords



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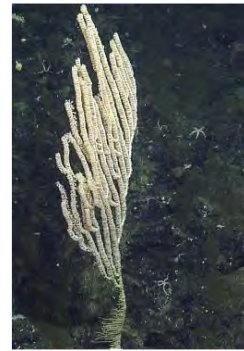
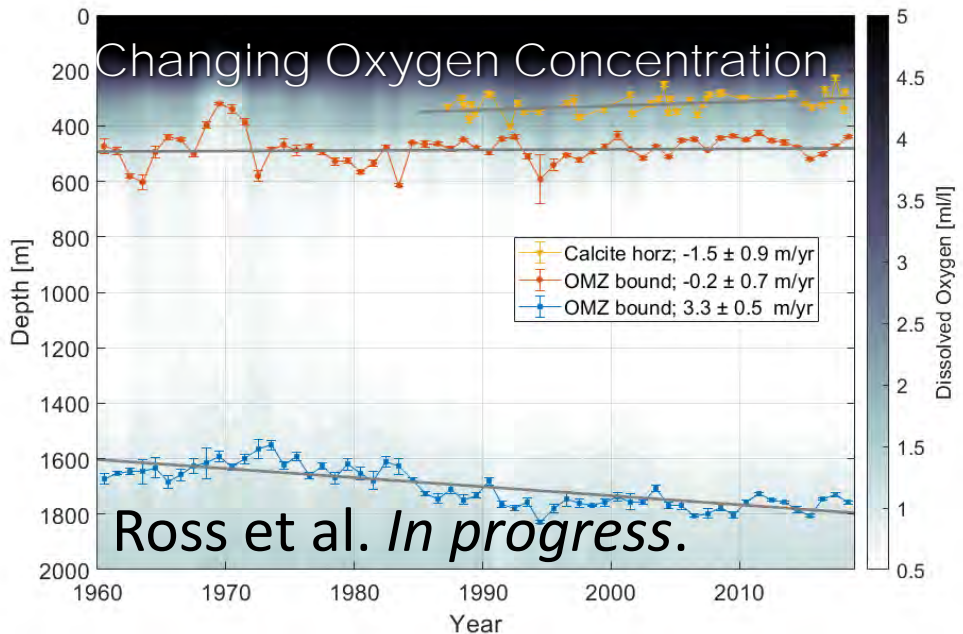
Tammy.Norgard@dfo-mpo.gc.ca

Connections By Outreach

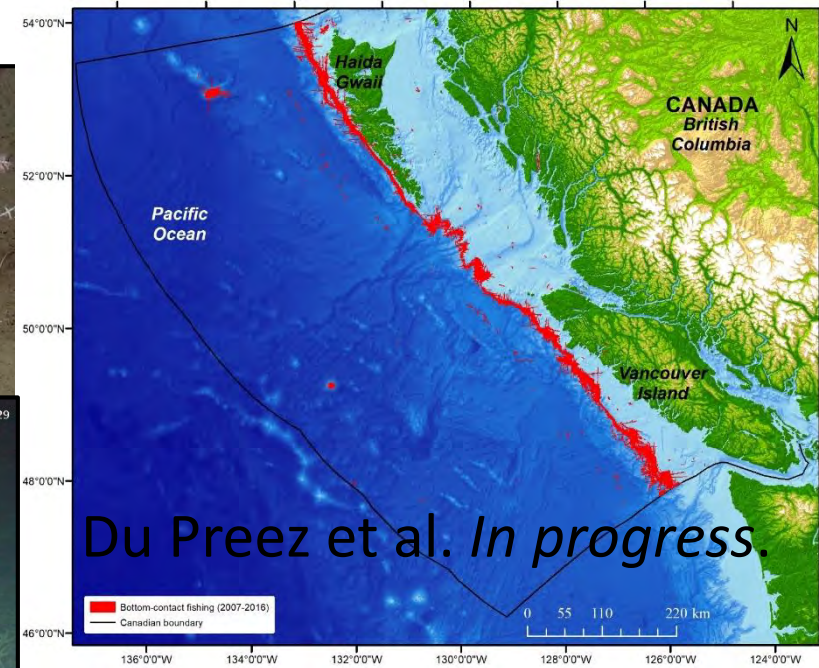
Deep Sea Ecology Program

- Essential baseline data for science-based decision making
 - Impacts of Human Stressors

Climate Change



Fishing



Connections By Outreach

Species Conservation



The ship in the narrow waterways



The submersible robot "BOOTS"



Life on the central coast



The submersible control station (on the ship)

Connections By Outreach



SOCIAL MEDIA

#LOMPA2017
#PacificSeamounts2018
#PacificSeamounts2019



📷 Photos & video used to show the natural beauty & value of these areas, informing the public & policy-makers.



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Connections By Outreach

Species Conservation

Viewing parties within the Haida communities
(video and audio live from the deep sea expedition)



IMPACTS:

231
MEDIA STORIES
GENERATED

3.7M
REACHED ON
SOCIAL MEDIA

130
COUNTRIES
WATCHED
ONLINE



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Connections By Outreach

CHALLENGES

- Communication & outreach is **not our expertise**; finding the time is difficult
- Our research is **complex** – it's hard to communicate outside our field
- It's **embarrassing**

Strategies

- Find **experts** to help you
- Package into **simple messages** & short stories – usual visuals
- Tap into **your passion** for science and tell that story

Benefits


- Interacting with different audiences helps to frame the **'so what'** of your science
- Makes science **relatable**, and the feedback can be rewarding
- Sharing knowledge can **change public opinion**


Connections By Outreach

*“In the end we will **conserve** only what we love; we will love only what we **understand**; and we will understand only what we are **taught.**”*

~ Baba Dioum


Make Science Trusted, Relevant and Accessible



 3M State of Science Index

What does the world think about science?

✓ Scroll down



Discover the primary themes of this year's State of Science Index and our methodology.

WHAT WE LEARNED ▶

Make Science Trusted, Relevant and Accessible

14,025 people surveyed globally in 14 countries

Trusted?

72% trust science – 1 in 4 do not

Relevant?

64% view science as relevant to society in general—1 in 3 see no relevance

Accessible?

12% say they know quite a bit about science overall—9 in 10 do not

Make Science Trusted, Relevant and Accessible

When I hear the word science, I feel..

State
of Science
Index

Fascinated

87%

Hopeful

92%

What does the
science?

✓ Scroll down

Bored

13%

Discouraged

8%

Get Outside Your Comfort Zone

Change your role as a scientist by getting outside your comfort zone

越過你的舒適區，改變你作為科學家的角色

안락 지대를 벗어나 과학자로서의 역할 변경

科学者としてのあなたの役割を、あなたの快適ゾーンの外に出て変えてください

Расширьте свою роль ученого, выйдя за пределы зоны комфорта

My Challenge to You

Connecting By Outreach

#PICES2019 or #PICES2019#

Post a science message you have from the PICES meeting.

Try to use photos!!

For each post you make, you get an entry into a draw to win this prize (draw made Thursday afternoon).



A scenic view of a lake with mountains in the background and a person in a canoe in the foreground. The text is overlaid on the image.

Good Luck and Thank You

祝你好运, 谢谢

頑張って、ありがとう

행운을 빈다

Удачи спасибо