Connecting Science to Management, Policy And People

Jackie King
Fisheries and Oceans Canada (DFO)

PIC ES 2019 Annual Meeting
Victoria, BC
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
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

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

анлак диаи вемуна иа аквалам асекир исе ихоол дих баран дий

超过你的舒适区，改变你作为科学家的角色

超出你的舒适区，改变你的科学家角色

Расширьте свою роль ученого, выйдя за пределы зоны комфорта.
Coastal Human Stressors

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
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

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Aquatic Invasive Species Program

European Green Crab (*Carcinus maenas*)

Current Habitat

Projected Change 2075

Haida Gwaii

Lyons et al. *In prep.*

Photo: Terri Bell

Invasive Species
Connections By Collaboration

Aquatic Invasive Species Program

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


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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

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

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Spatialized fishing data on 1kmx1km planning grid

Connections By Collaboration

Marine Protected Area Network Planning

DFO
Science
Advice
Policy

MPA Technical Team
Science
Policy
Economic Impact Analysis
Advice

MPATT (2018) Marxan output including ecological and socio-economic data
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
Shipping Impacts on Southern Resident Killer Whales

Acoustic Disturbance


Svein.Vagle@dfo-mpo.gc.ca
Shipping Impacts on Resident Killer Whales
Suggested Mitigation by Transport Canada

DFO Science Department

TC Non-Science Department

1. Identified science questions
2. Identified science support
3. Forged collaborations for immediate fieldwork

Relocation of Outbound Shipping Lanes

Pre-trial track
2018 Trial track

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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?

DFO Passive acoustic moorings in SRKW critical habitat

Deep sea vessels

Tugs and tows

- Only a small reduction (0.6 to 1.0 dB) in broad-band (10-1000,000 Hz) noise
- A significant reduction (4.3 dB) in broad-band noise

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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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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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### Coastal Environmental Baseline Program

**Valued Components of Interest**
- e.g. in Port of Prince Rupert

<table>
<thead>
<tr>
<th>Environment</th>
<th>Species</th>
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<tbody>
<tr>
<td>Marine &amp; Freshwater Quality</td>
<td>Herring</td>
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<tr>
<td>Air Quality</td>
<td>Dungeness Crabs</td>
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<tr>
<td>Aquatic habitat</td>
<td>Pacific Salmon</td>
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<tr>
<td>Marine safety &amp; Navigability</td>
<td>Eulachon</td>
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<tr>
<td>Marine sediments</td>
<td>Halibut</td>
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<tr>
<td>Qualitative Experience</td>
<td>Abalone</td>
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<tr>
<td>Underwater noise &amp; noise pollution</td>
<td>Bivalves</td>
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<td></td>
<td>Terrestrial Mammals</td>
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<tr>
<td></td>
<td>Eelgrass</td>
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<td></td>
<td>Seabirds</td>
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<td></td>
<td>Seaweed &amp; Kelp</td>
</tr>
<tr>
<td></td>
<td>Marine Mammals</td>
</tr>
</tbody>
</table>

**Data Collection**

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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
Microplastics In Marine Food Webs

• Origins from textile fibres, not aquaculture gear

Covernton et al, 2019 Aqu. Env. Int.
Microplastics In Marine Food Webs
• Origins from textile fibres, not aquaculture gear
Microplastics In Marine Food Webs

• Origins from textile fibres, not aquaculture gear

Kiernan et al. 2019. Env. Sci & Tech
Sarah.Dudas@dfo-mpo.gc.ca
Microplastics in Marine Food Webs

- Origins from textile fibres, not aquaculture gear

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Deep Sea Ecology Program

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

Seamounts

>1000 m

Hydrothermal Vents

~400°C

Fjords

Connections By Outreach

Species Conservation

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Deep Sea Ecology Program

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

Climate Change

Changing Oxygen Concentration

Ross et al. *In progress.*

Fishing

Bottom-contact impacts

Du Preez et al. *In progress.*

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Connections By Outreach

The ship in the narrow waterways

Life on the central coast

The submersible robot "BOOTS"

The submersible control station (on the ship)

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

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Connections By Outreach

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

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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
“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

What does the world think about science?

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

WHAT WE LEARNED

www.3m.com/3M/en_US/state-of-science-index-survey
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

www.3m.com/3M/en_US/state-of-science-index-survey
When I hear the word science, I feel..

- Fascinated: 87%
- Bored: 13%
- Discouraged: 8%
- Hopeful: 92%

www.3m.com/3M/en_US/state-of-science-index-survey
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して変えてください
Пасширьте 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).
Good Luck and Thank You
祝你好运，谢谢
頑張って、ありがとう
행운을 빈다
Удачи спасибо