OCEAN NEXUS

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BLUE ECONOMY

Projecting climate-driven changes in Canada´s ocean resources for blue economy planning

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SFU SIMON FRASER UNIVERSITY



Photo by Erik Mclean: https://www.pexels.com/photo/aerial-view-of-city-near-body-of-water-4061430/



"Canada aims to accelerate ocean-based economic growth while protecting marine ecosystems through regulatory modernisation and innovation." DFO

The roadmap emphasizes the need to balance :

- Sustainable oceans
- Tech Innovation
- Economic growth
- Clean energy

Understand how climate change may reshape the ocean resources

Where, and to what extent, might climate change alter the ocean resources that support Canada's Blue Economy?

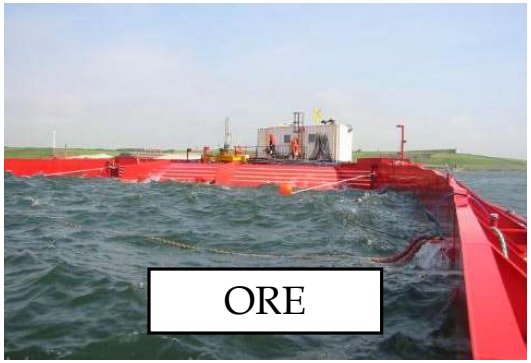
METHODS

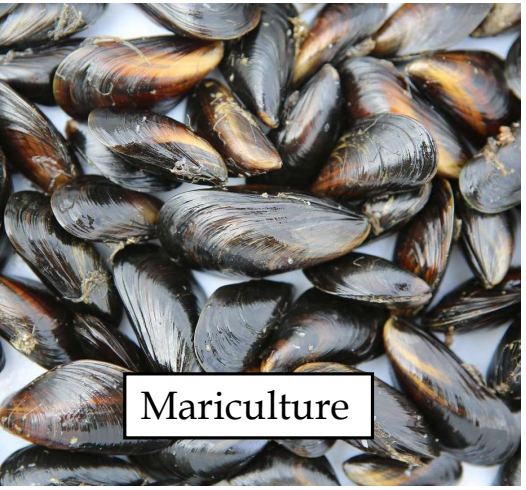
Five key sectors across Canada



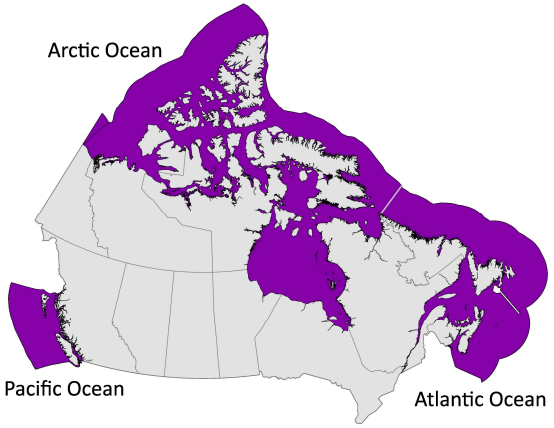
Ecotourism

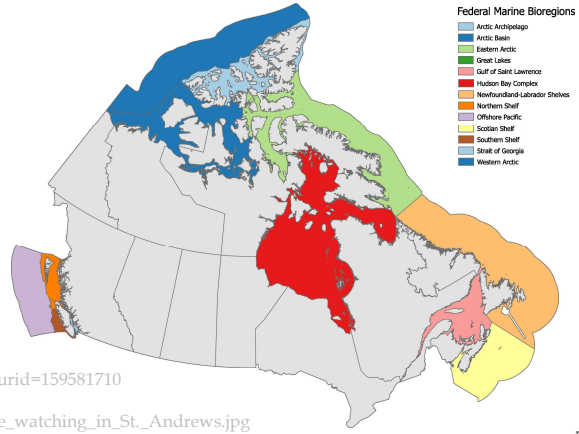

Fisheries


ORE


Mariculture


Bue Carbon





Pictures credits:
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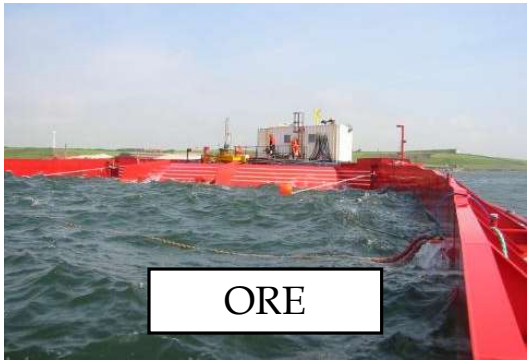
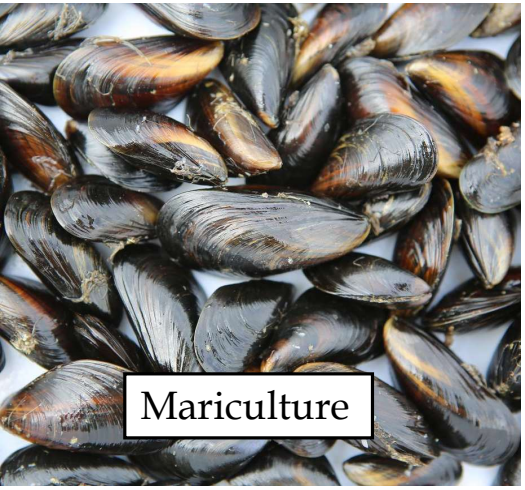
Judith Bourque – whale watching CC-BY-SA-2.0
https://commons.wikimedia.org/wiki/File:Whale_watching_in_St._Andrews.jpg
https://marinerenewables.ca/facts/wave-energy/
Pedro Gonzalez









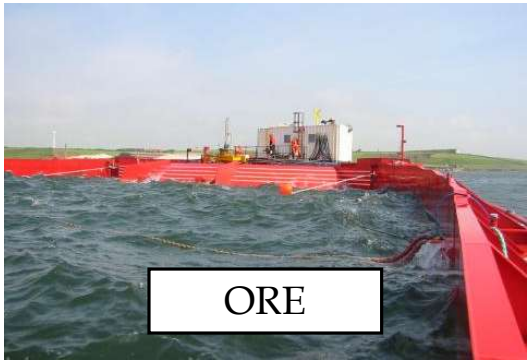


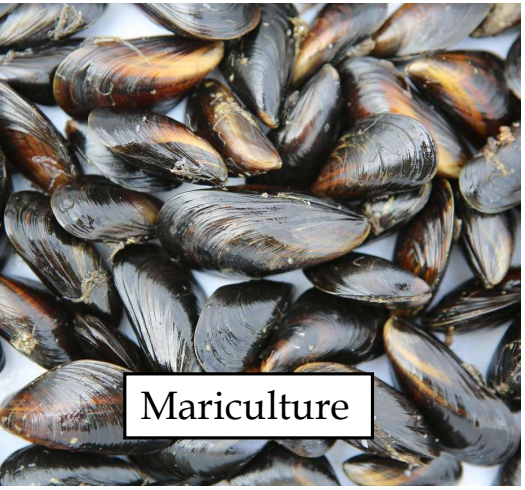
Five key sectors and indicators

Sector	Indicator
Blue Carbon	Seagrass presence Saltmarsh area
Ocean Renewable Energy (ORE)	Wind seed Current speed
Ecotourism	Ecotourism species
Fisheries	Maximum Catch Potential
Mariculture	Mariculture Species Potential











Projected individual sectors

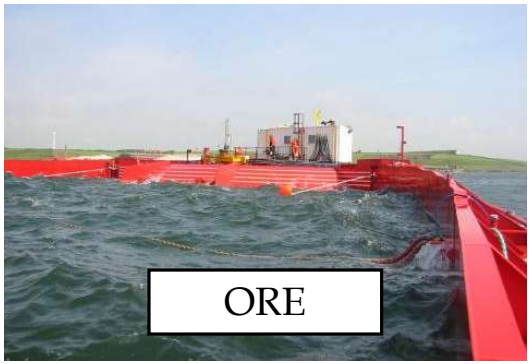
Assessment Framework:

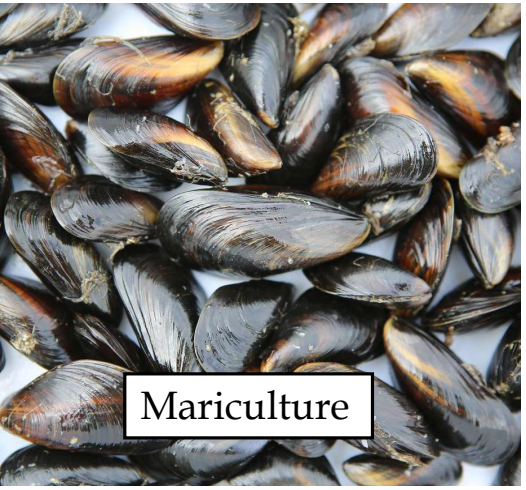
- **Time periods:** Baseline, mid-century, and end-century
- **Climate scenarios:** Low-emission and high-emission
- Datasets came primarily from peer-reviewed publications



Ecotourism


Fisheries


ORE


Mariculture


Bue Carbon

Projected individual sectors

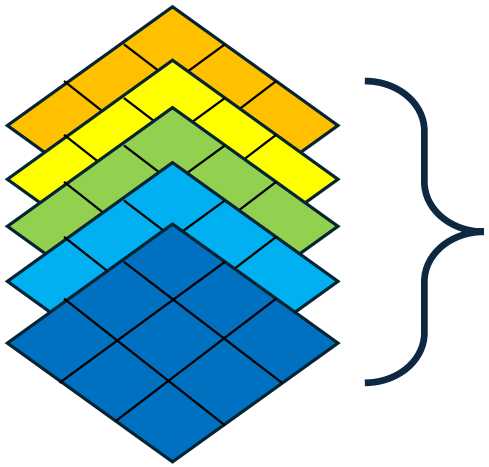
Sector	Indicator	Source
Blue Carbon	Seagrass presence	Gouvêa et al., 2024
	Saltmarsh area	Schuerch et al., 2018
Ocean Renewable Energy (ORE)	Wind seed	Dunne et al., 2020
	Current speed	Assis et al., 2024
Ecotourism	Ecotourism species	Reygondeau et al., 2025
Fisheries	Maximum Catch Potential	Cheung et al., 2019, Palacios-Abrantes et al., 2023
Mariculture	Mariculture Species Potential	Oyinlola et al., 2020

Resource Availability Index (RAI)

Baseline, 2050, 2100
(SSP1-RCP2.6 & SSP5-RCP8.5)

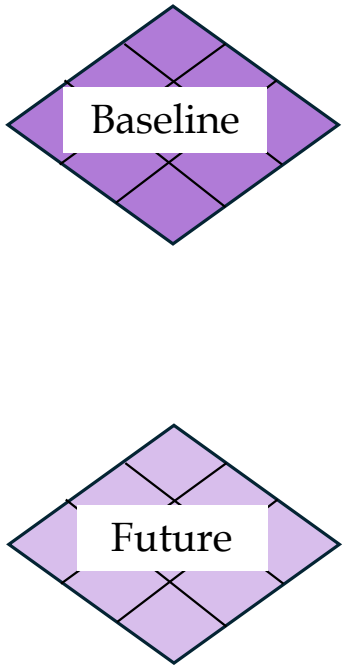
Ecotourism
Blue Carbon
ORE
Mariculture
Fisheries

Normalised & rescaled



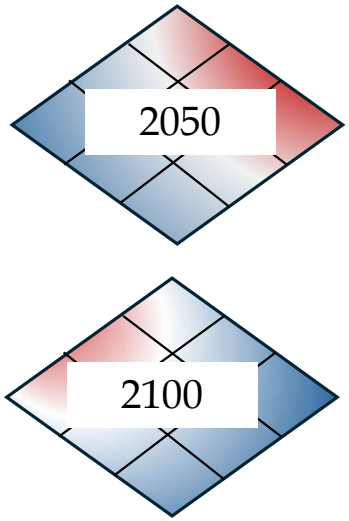
$$RAI = \sqrt[n]{X1 * X2 \ \ldots Xn}$$

RAI



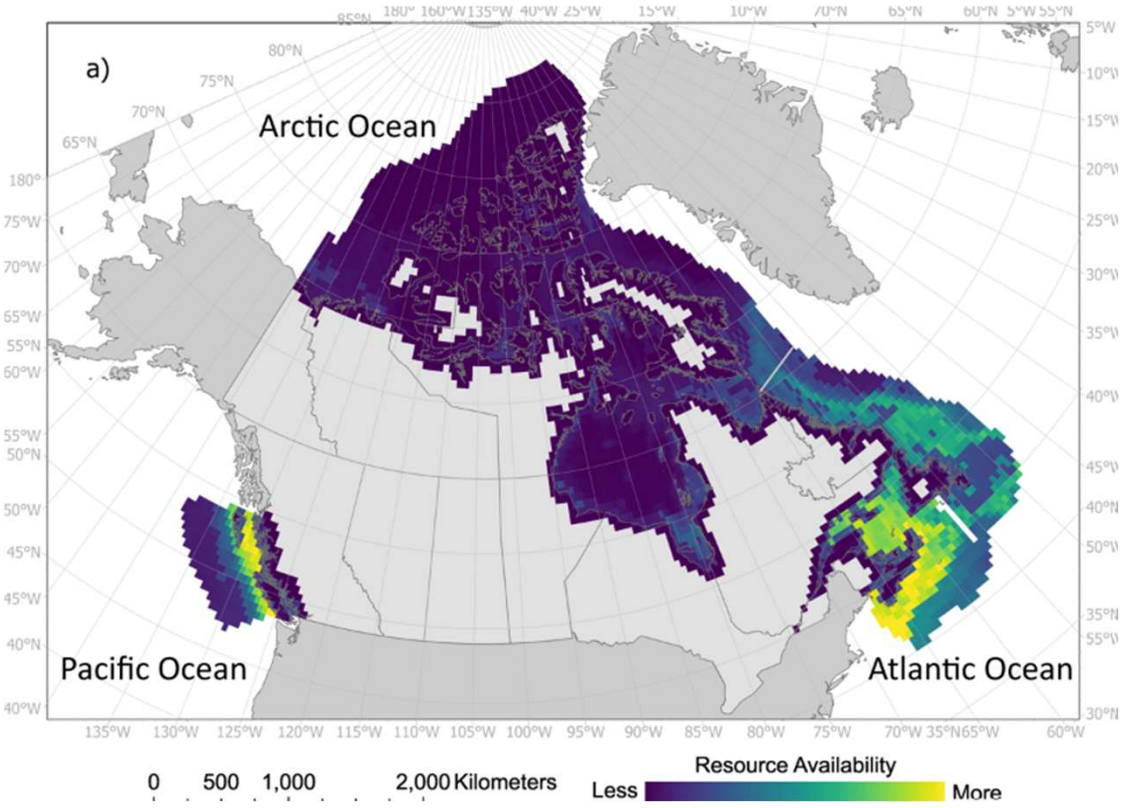
Relative Change

$$\left(\frac{Baseline - Future}{Present} * 100\right)$$



RESULTS

Baseline Marine Resource Availability Across Canada



Highest availability
- Maritimes
- West Coast

Moderate availability
- Newfoundland and Labrador
- James Bay, Hudson Bay

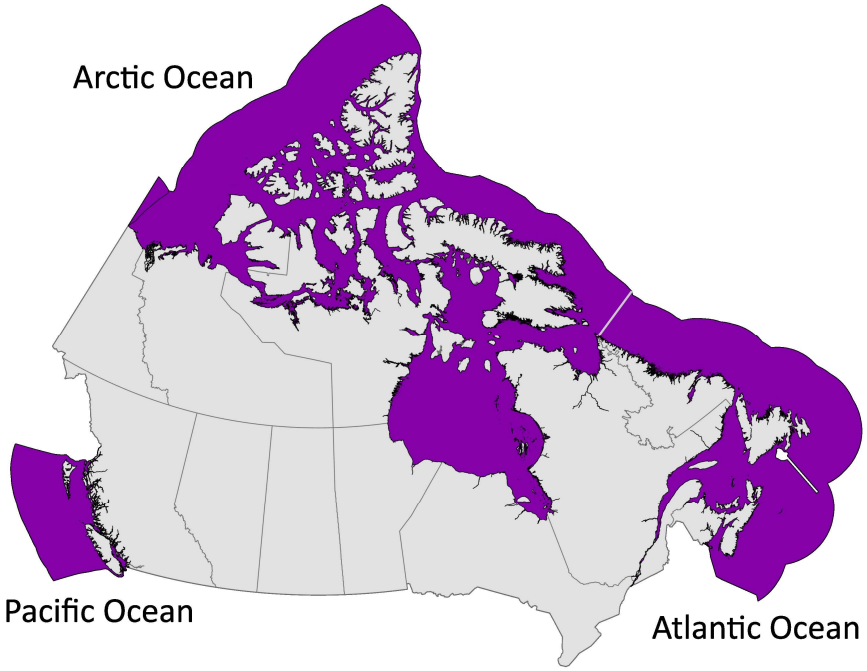
Lowest availability
- Northern Arctic regions

Relative change

National mean change by 2100:

+5.7% (SSP1–2.6)

+8.6% (SSP5–8.5)

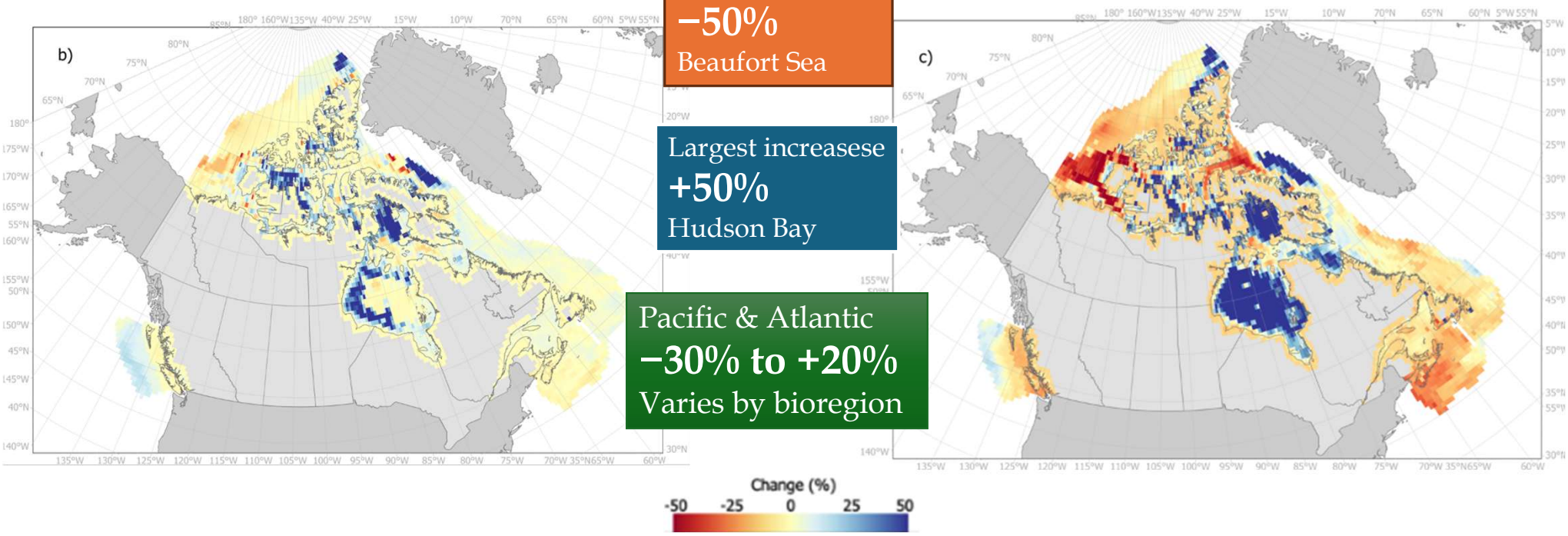


Relative change

Regional changes

2050 SSP1-RCP2.6

2100 SSP5-RCP5.8



Largest decline
−50%
Beaufort Sea

Largest increasese
+50%
Hudson Bay

Pacific & Atlantic
−30% to +20%
Varies by bioregion

Who works in Canada's blue economy?

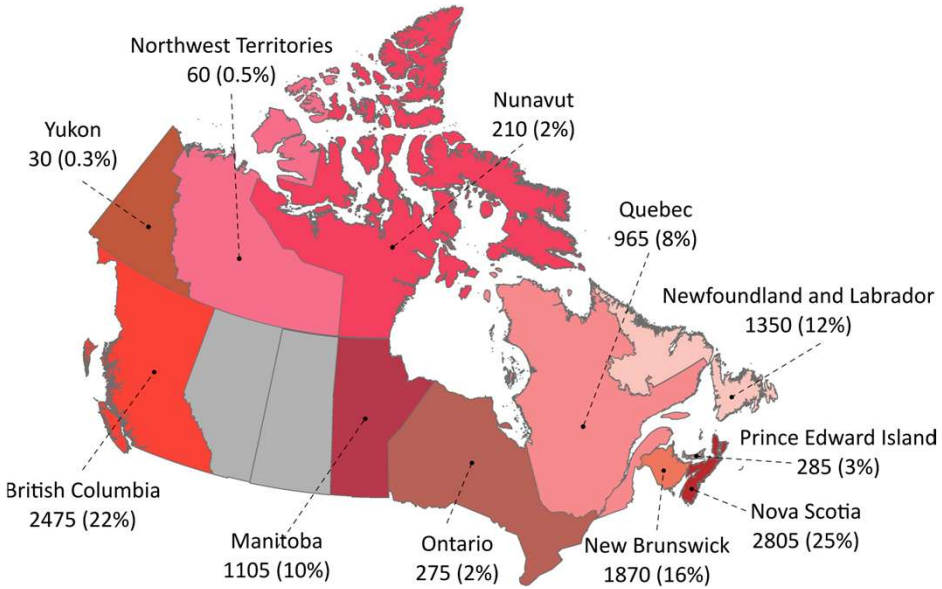
- **41,380 employment income recipients**

Sector	Employment
Fisheries	34,270
Aquaculture	4,665
Water-based scenic and sightseeing transportation	2,445
Total	41,380

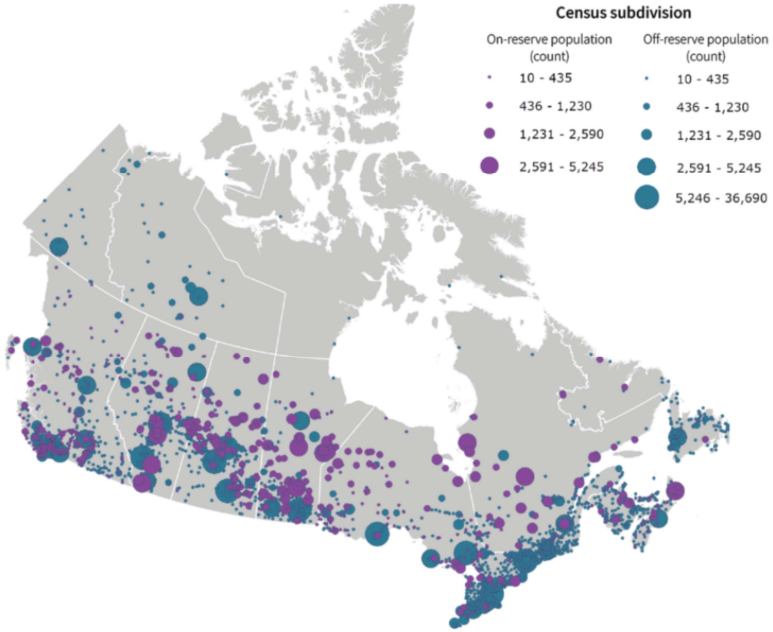
https://www12.statcan.gc.ca/census-recensement/2016

Blue economy & Indigenous peoples?

Recipients identified as Indigenous Fisheries & Mariculture



In- or out reserve



https://www12.statcan.gc.ca/census-recensement/2016

Key takeaways

- Climate change will reshape ocean resources; we must prepare for it.
- Need for tailored sector-specific policy responses.
- Who bears the risks matters as much as what changes.
- Climate-resilient blue economy policies need to reflect regional differences, support coastal communities, and promote equitable benefits and Indigenous leadership.



Photo by Putulik Jaaka: https://www.pexels.com/photo/aerial-view-of-ice-covered-arctic-landscape-38229000/

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Thank you!

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