Shared Japan-U.S. research & observing needs & opportunities in the Pacific Arctic

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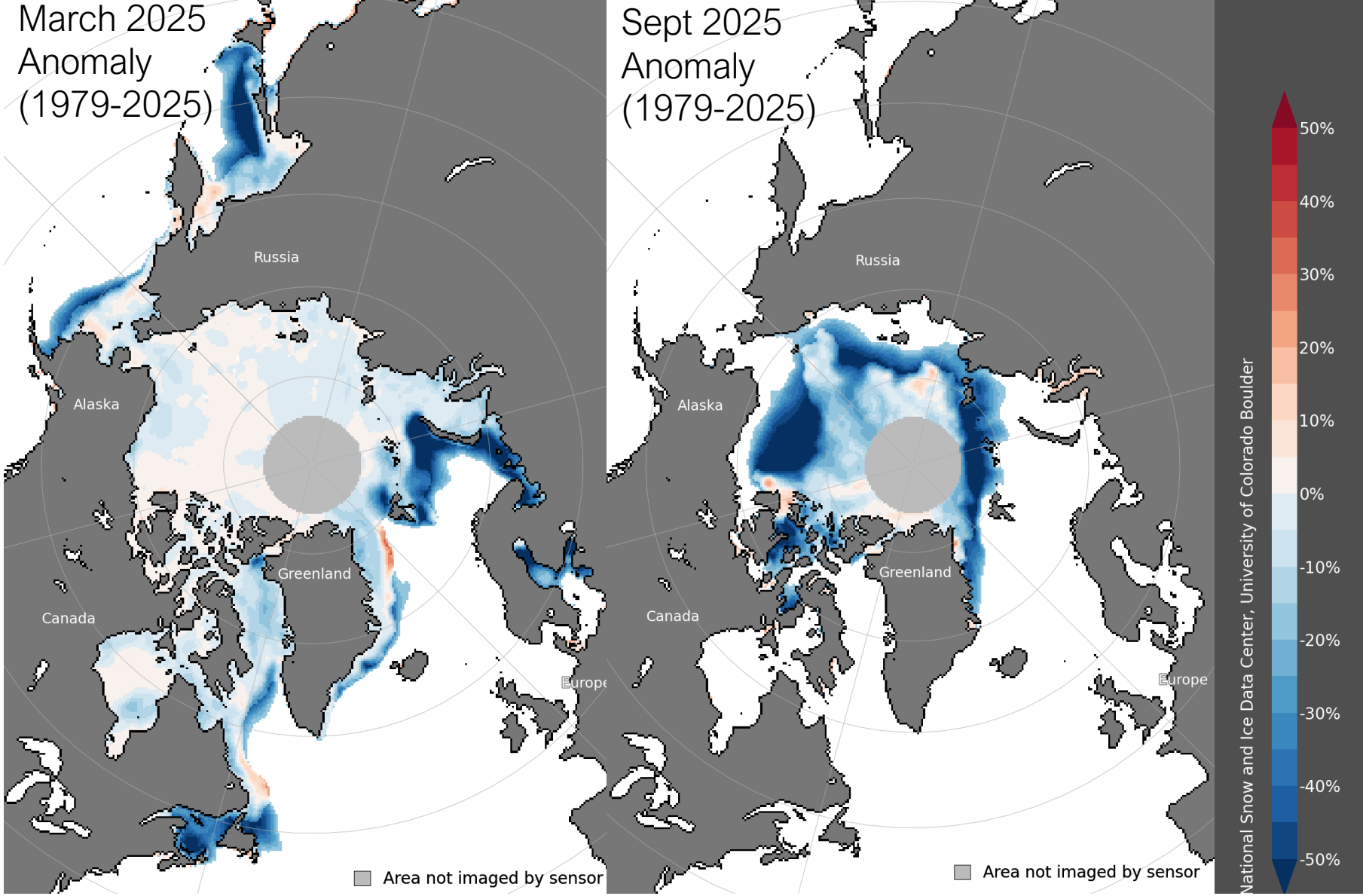
*1 International Arctic Research Center, University of Alaska Fairbanks; 2 Arctic Research Center, Hokkaido University; 3 Williams College; 4 University of California Santa Barbara; 5 Intertidal Consulting, Homer, AK; 6 Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder; *Now at: Alaska Conservation Foundation, Anchorage, AK*

Outline

1. **Need for shared initiatives**
2. Observations & predictions
3. Example: Salmon
4. Example: Extreme weather

The need for shared initiatives in the Pacific Arctic sector

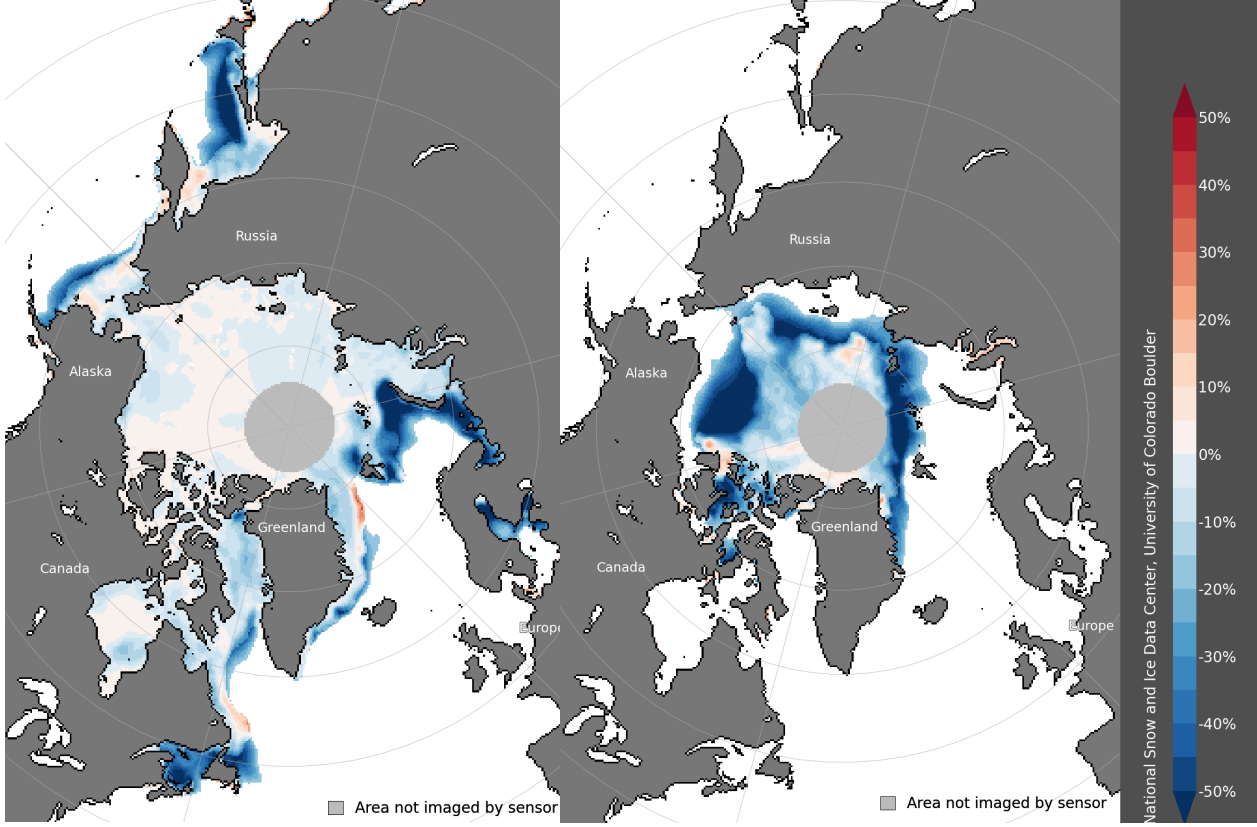
- Sea ice concentration anomalies in 2025
- Winter ice loss in Okhotsk, Bering, Kara Labrador Seas
- Summer ice loss centered on Pacific Arctic sector



National Snow and Ice Data Center (2024)

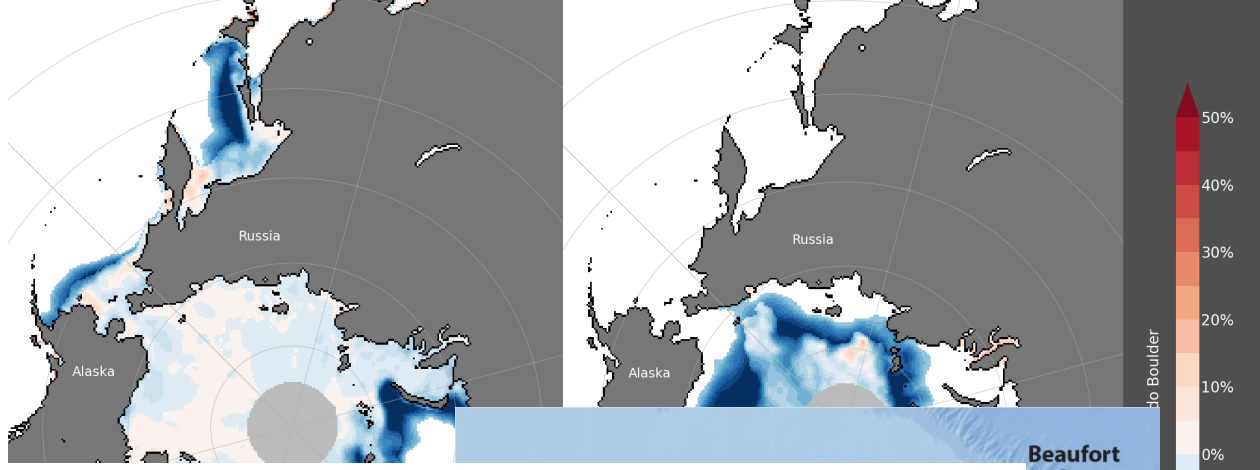
The need for shared initiatives in the Pacific Arctic sector

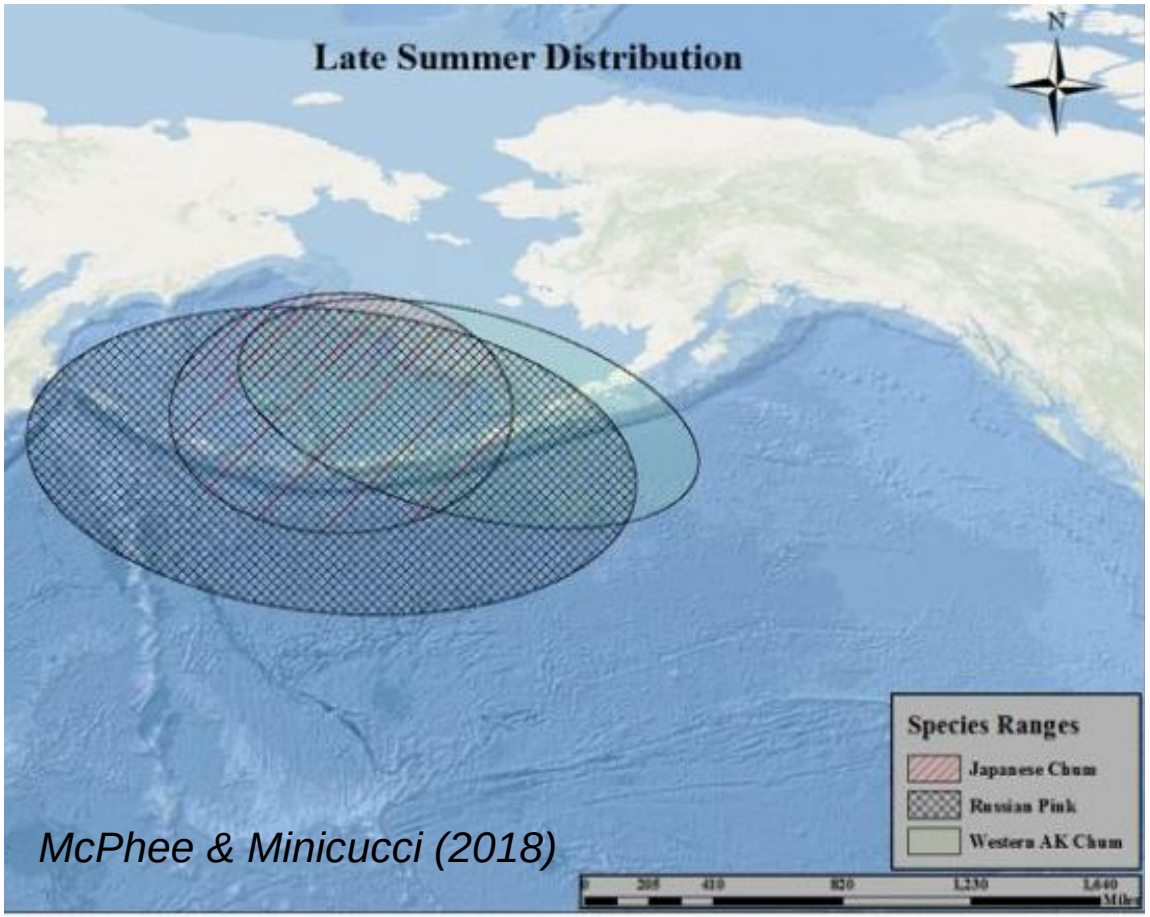
Stafford et al. (2022) Oceanography



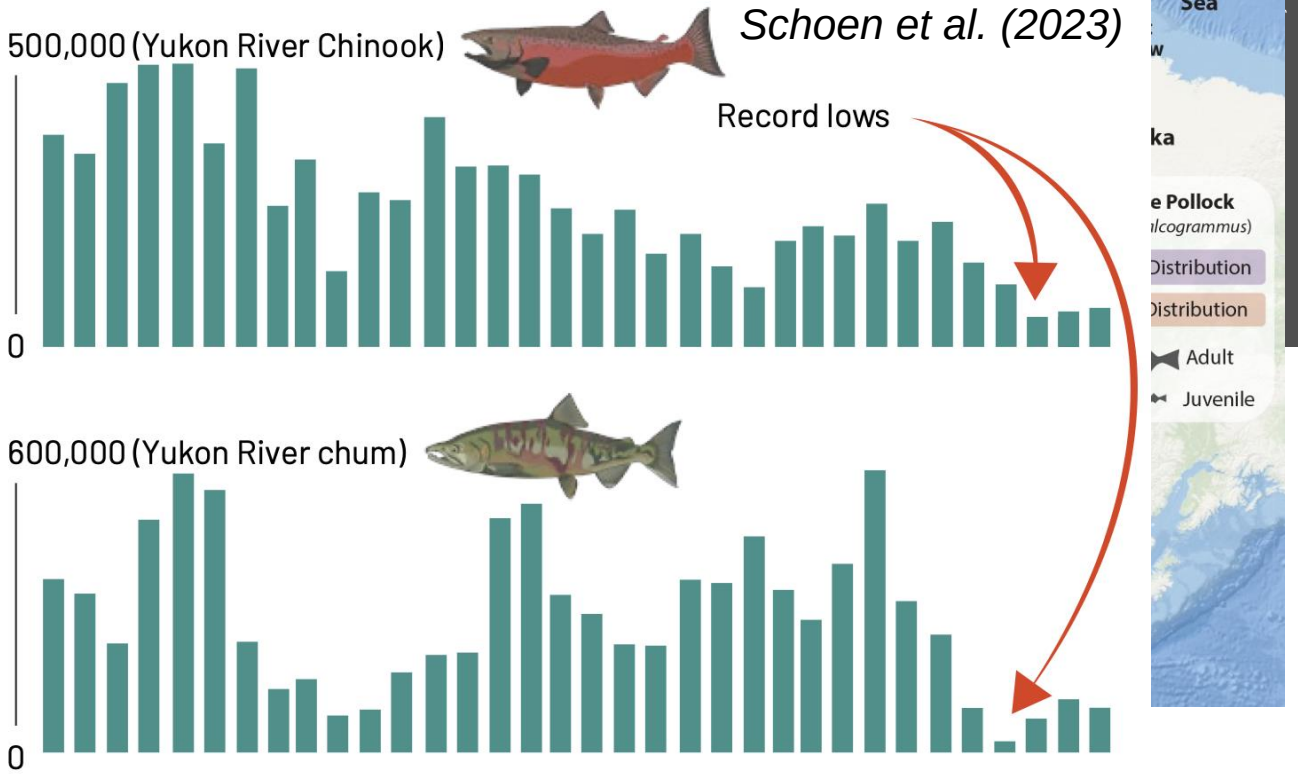
Shrinkage of Bering Sea ”cold pool”: Dispersal of fish stocks

The need for shared initiatives in the Pacific Arctic sector





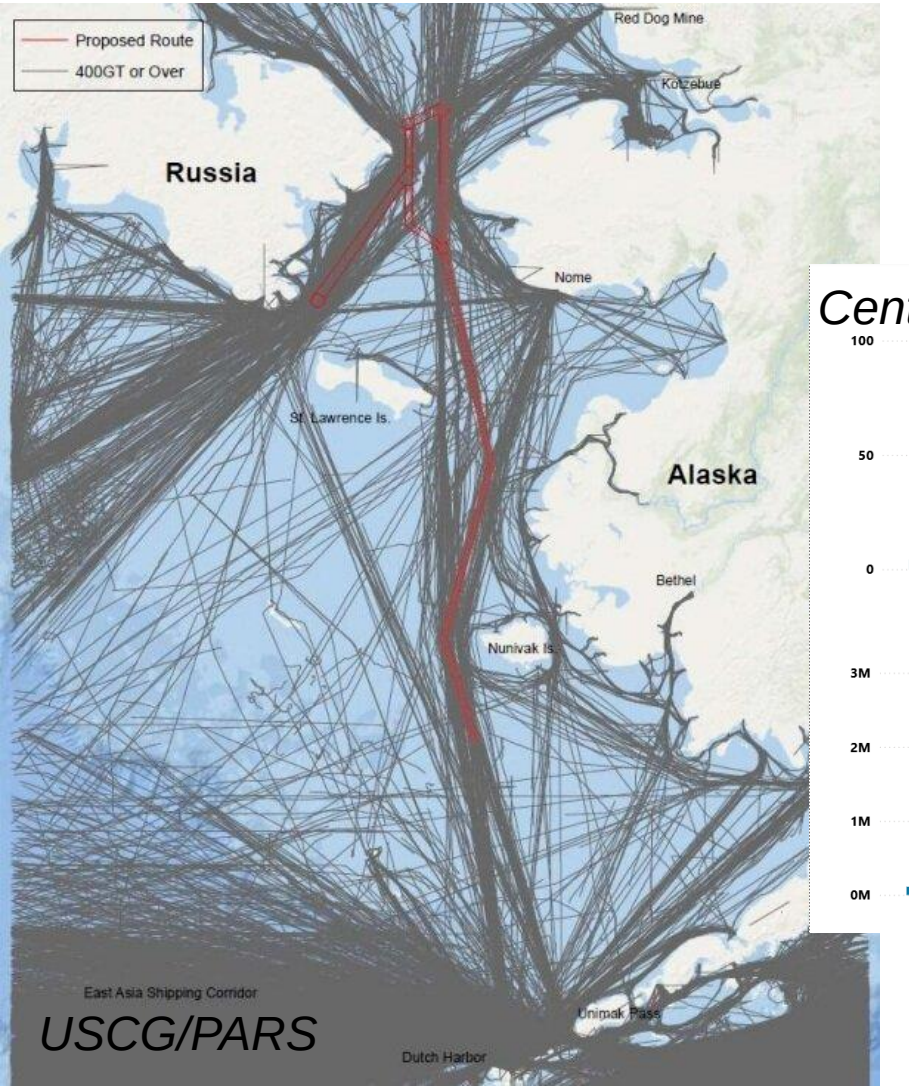
McPhee & Minicucci (2018)



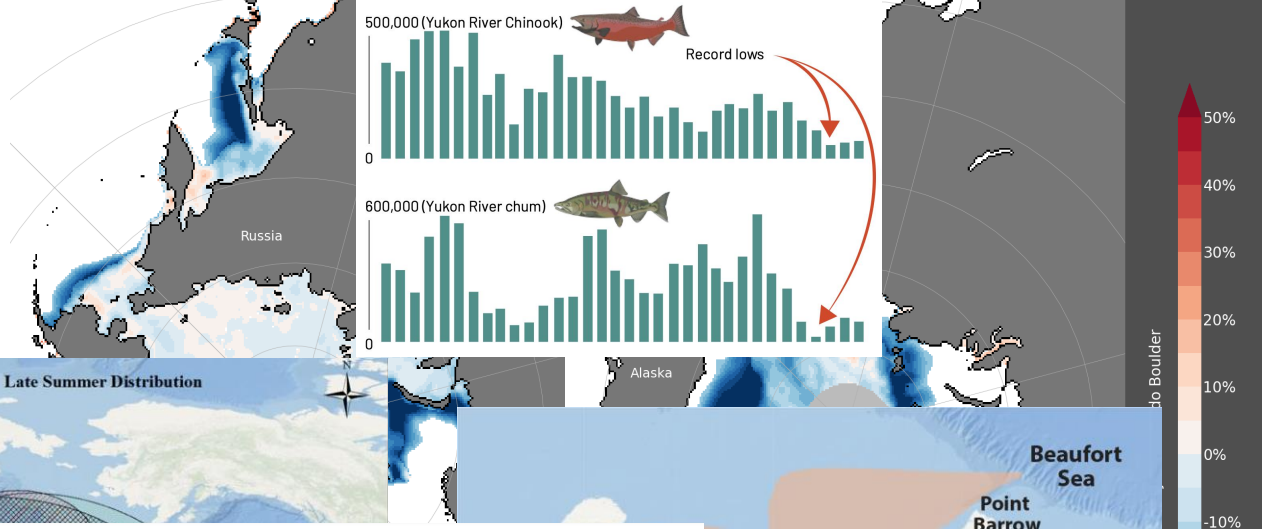
Schoen et al. (2023)

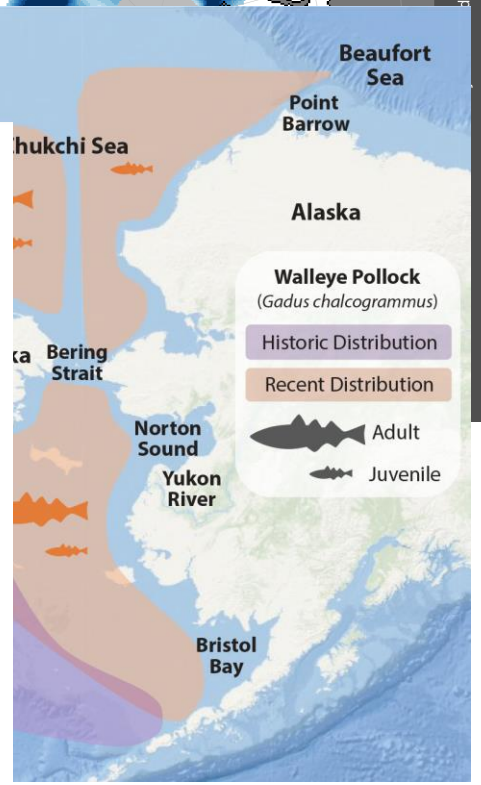
Decline of Asian & North American salmon stocks

The need for shared initiatives in the Pacific Arctic sector

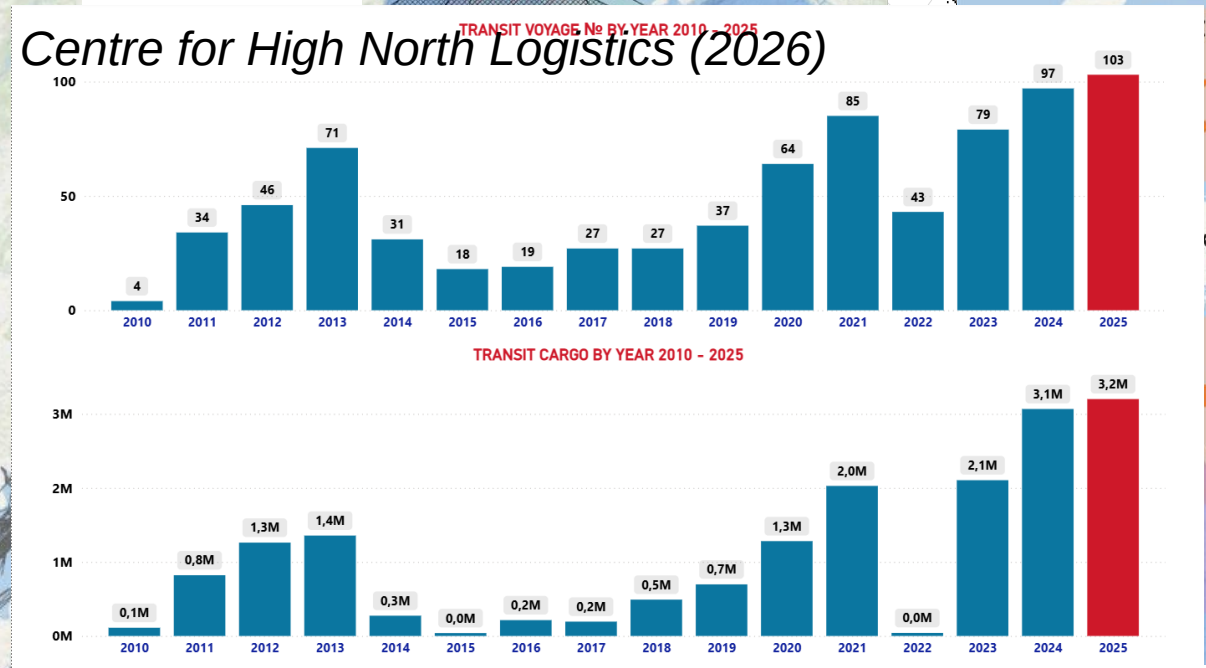


USCG/PARS



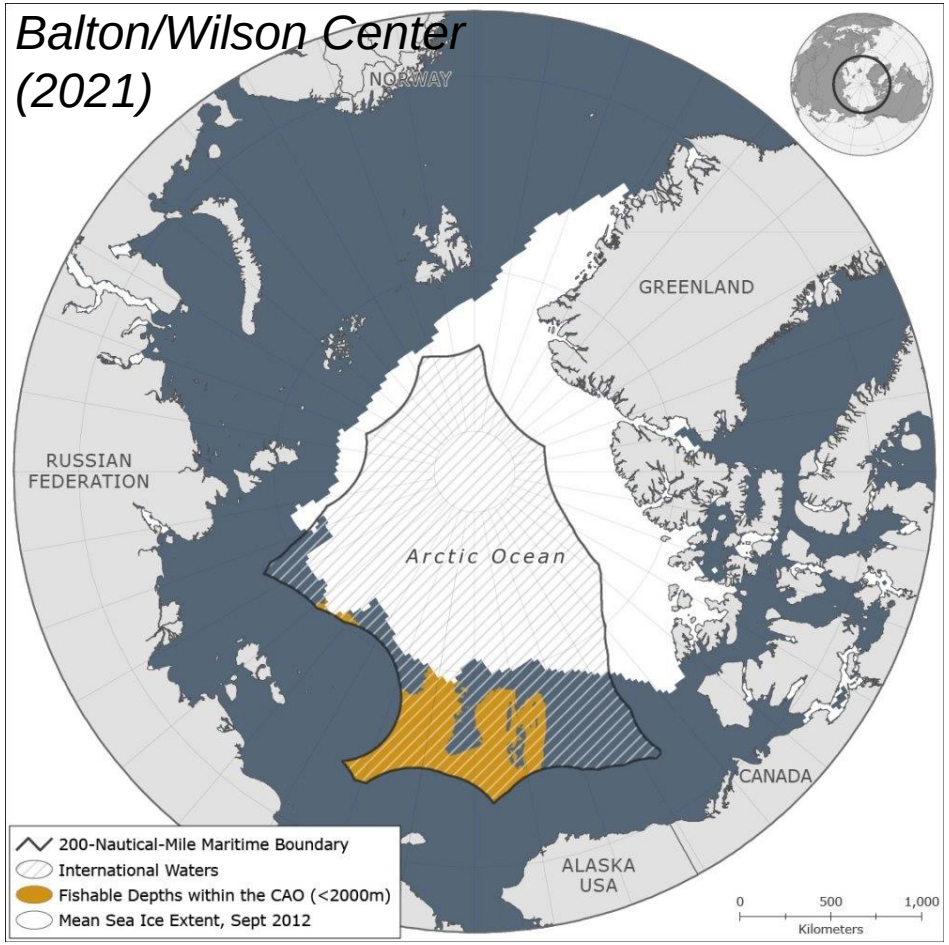


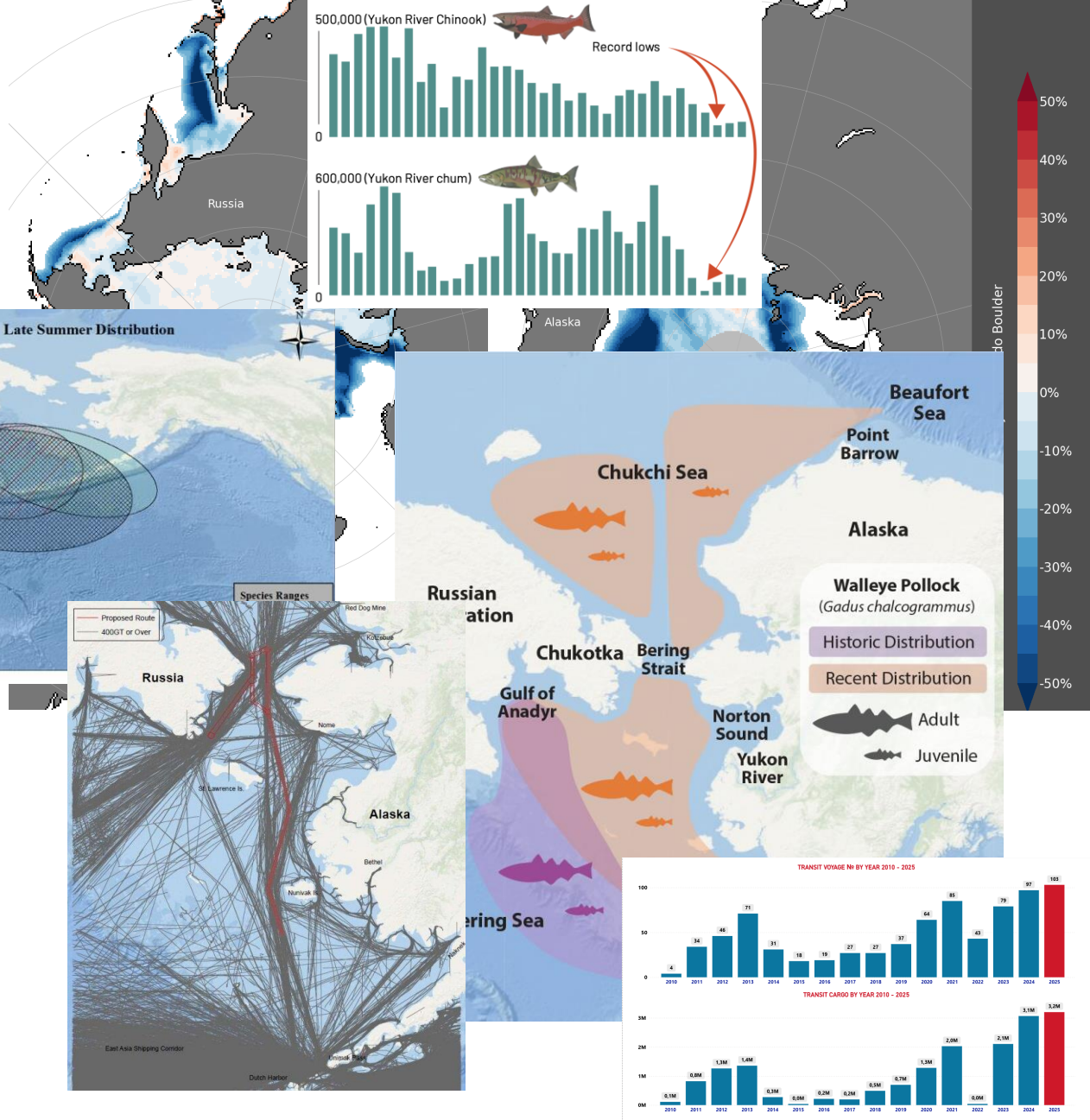
Centre for High North Logistics (2026)



Year-round increase in Bering Strait vessel transits

The need for shared initiatives in the Pacific Arctic sector





Central Arctic Ocean Fisheries Agreement (CAOFA, 2018)

Outline

1. Need for shared initiatives
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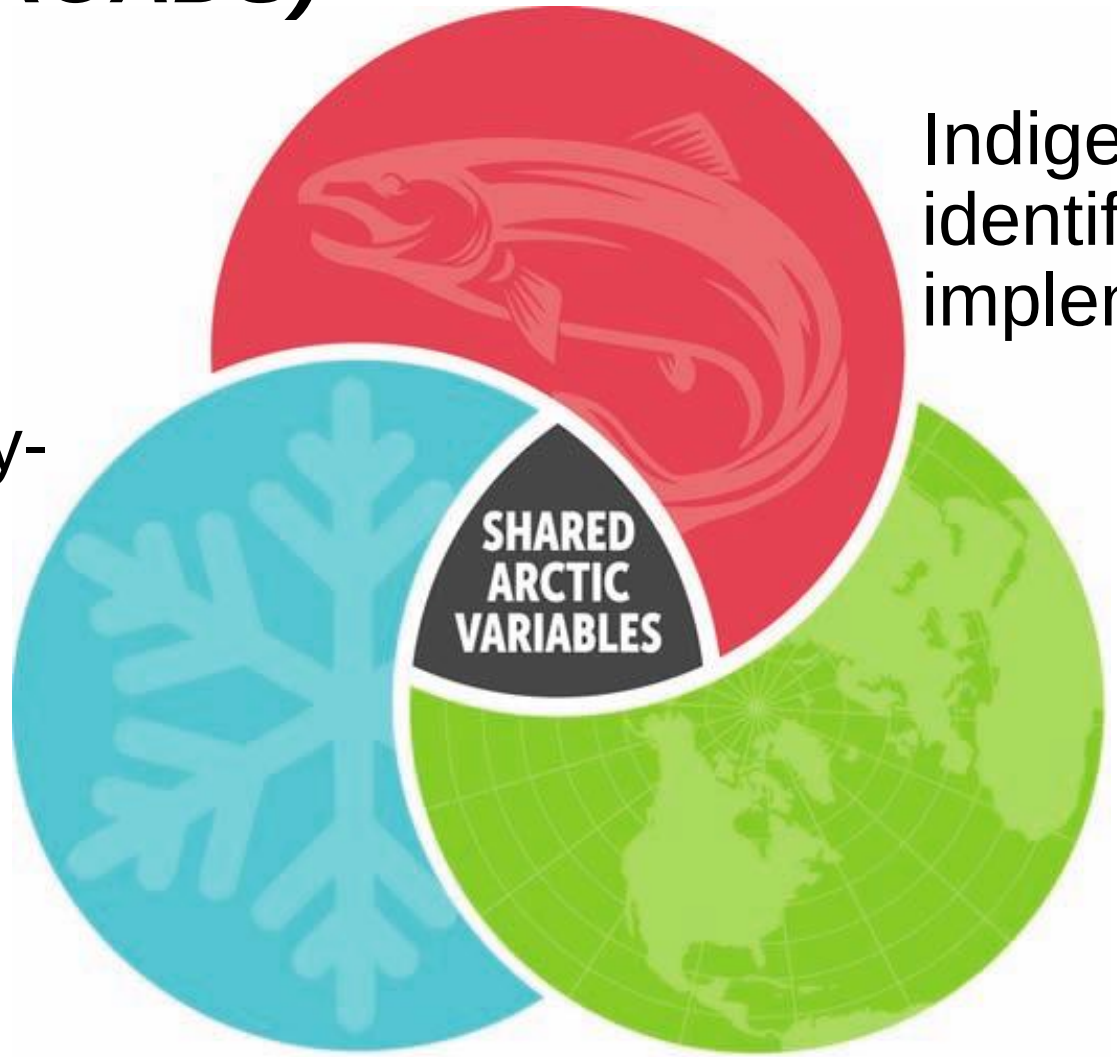
4. Example: Extreme weather events

Framing observing & prediction needs through Shared Arctic Variables: SAON's Roadmap for Arctic Observing & Data Systems (Arctic ROADS)

Indigenous-led benefit identification & system implementation

Regionally-identified science & decision-making needs



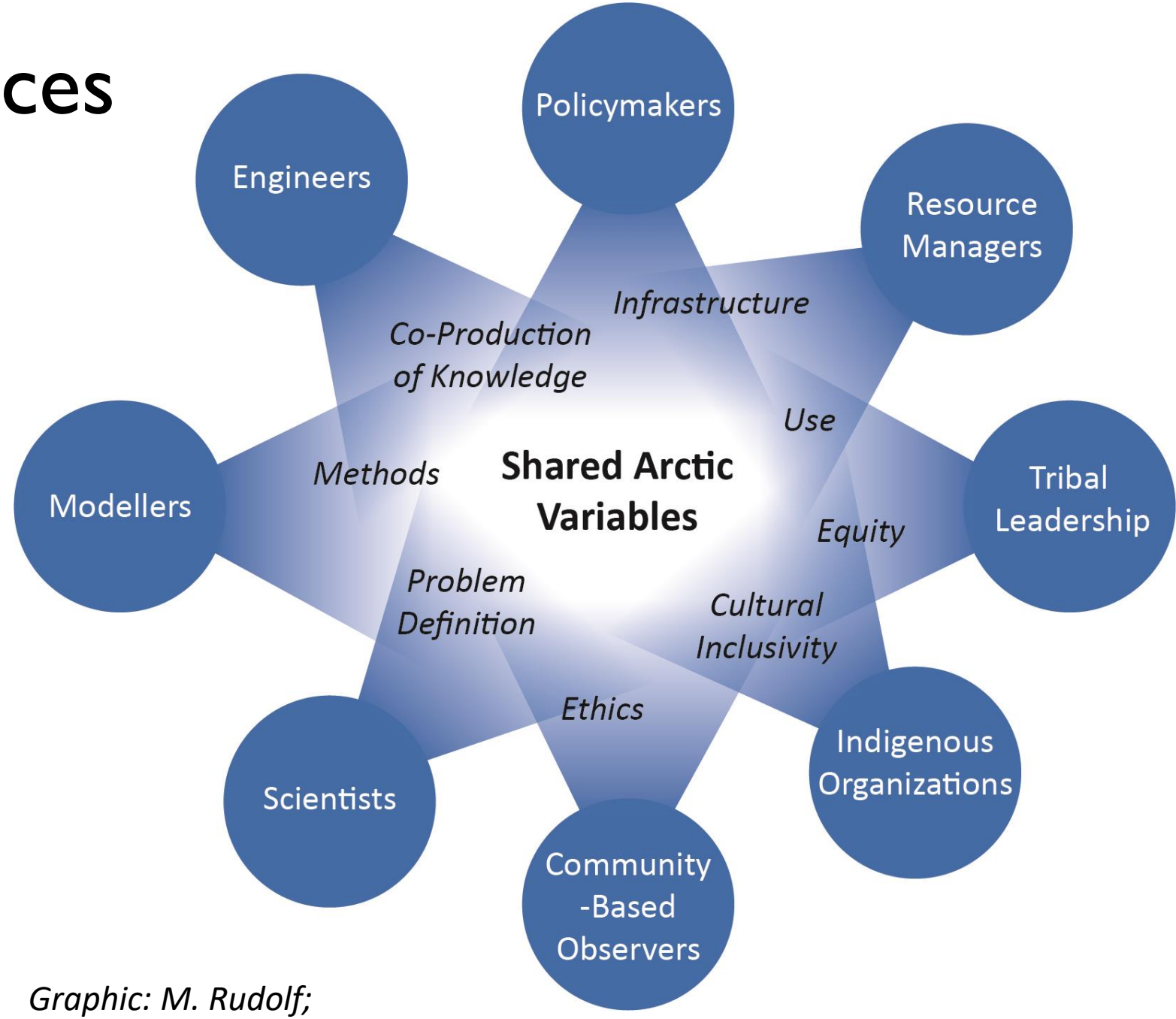
Essential variables of global networks

Starkweather et al., ARCTIC, 2021

SAON
SUSTAINING ARCTIC OBSERVING NETWORKS

Finding gathering places

- Shared Arctic Variables as gathering places to foster collaboration
  - Processes & themes
  - Regions & locations
  - Methods & approaches
- Arctic ROADS community engagement hubs – Hub in Japan?

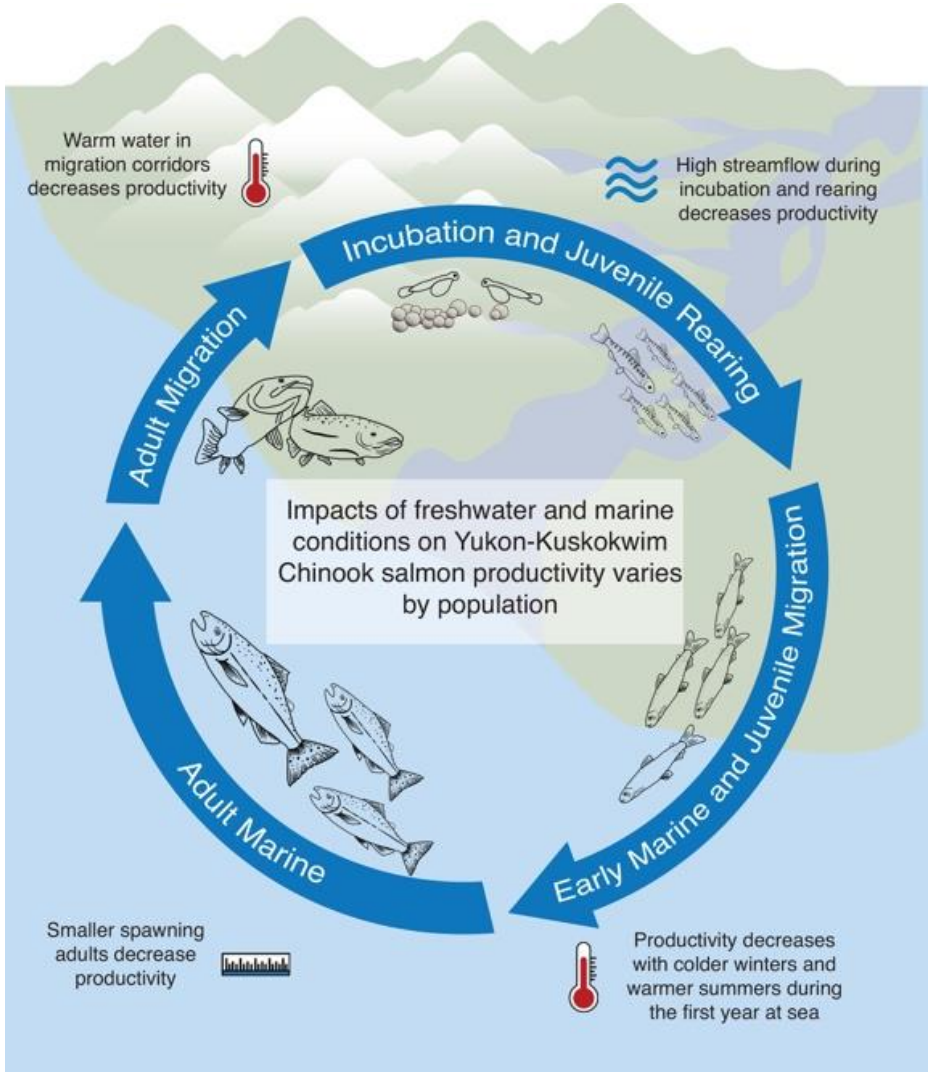


Graphic: M. Rudolf;
In: Chythlook et al., Oceanogr., 2022

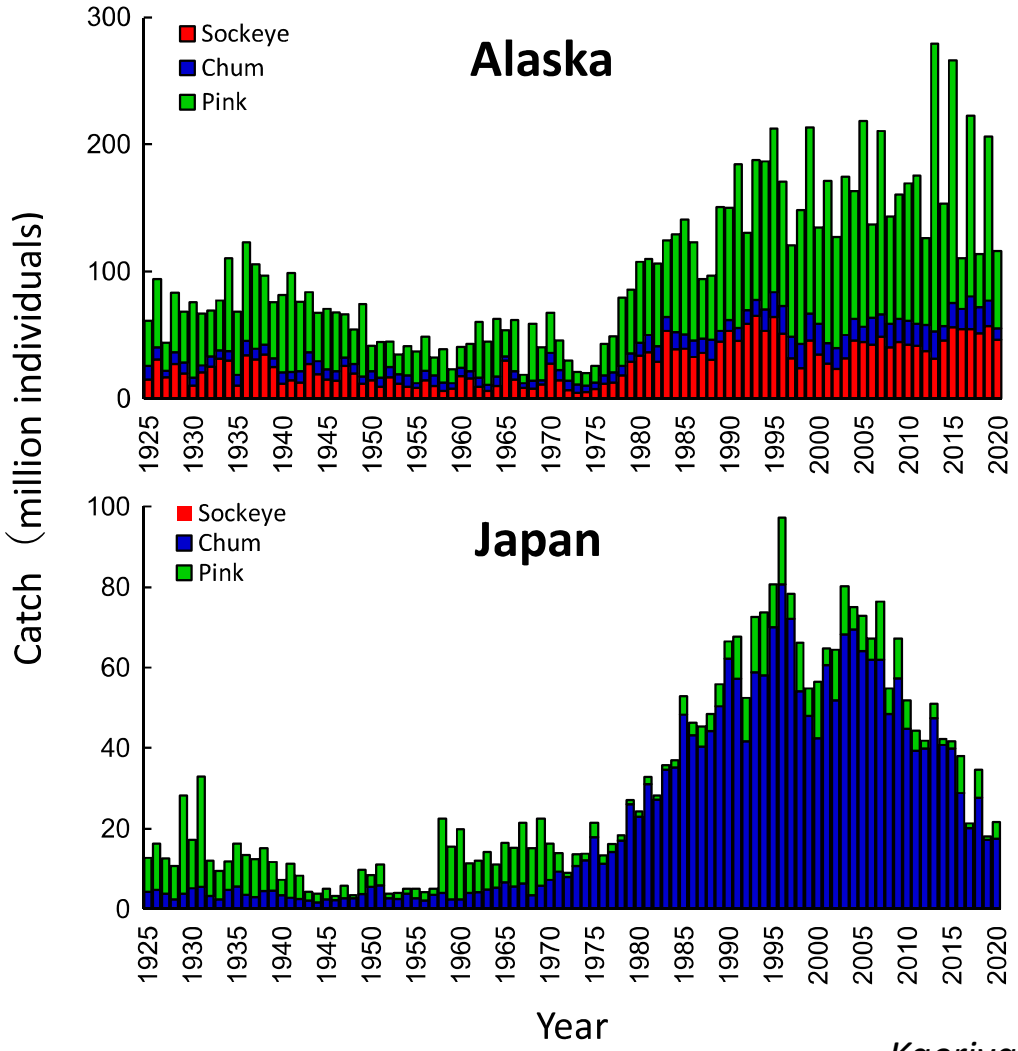
Shared Arctic Variable → Salmon

RNA CoObs » Salmon Expert Panel (Harmony Wayner, Jamie O’Connor)

Salmon returns – What is happening in the Bering Sea?
→ Long-term observing needs



Feddern et al., 2024

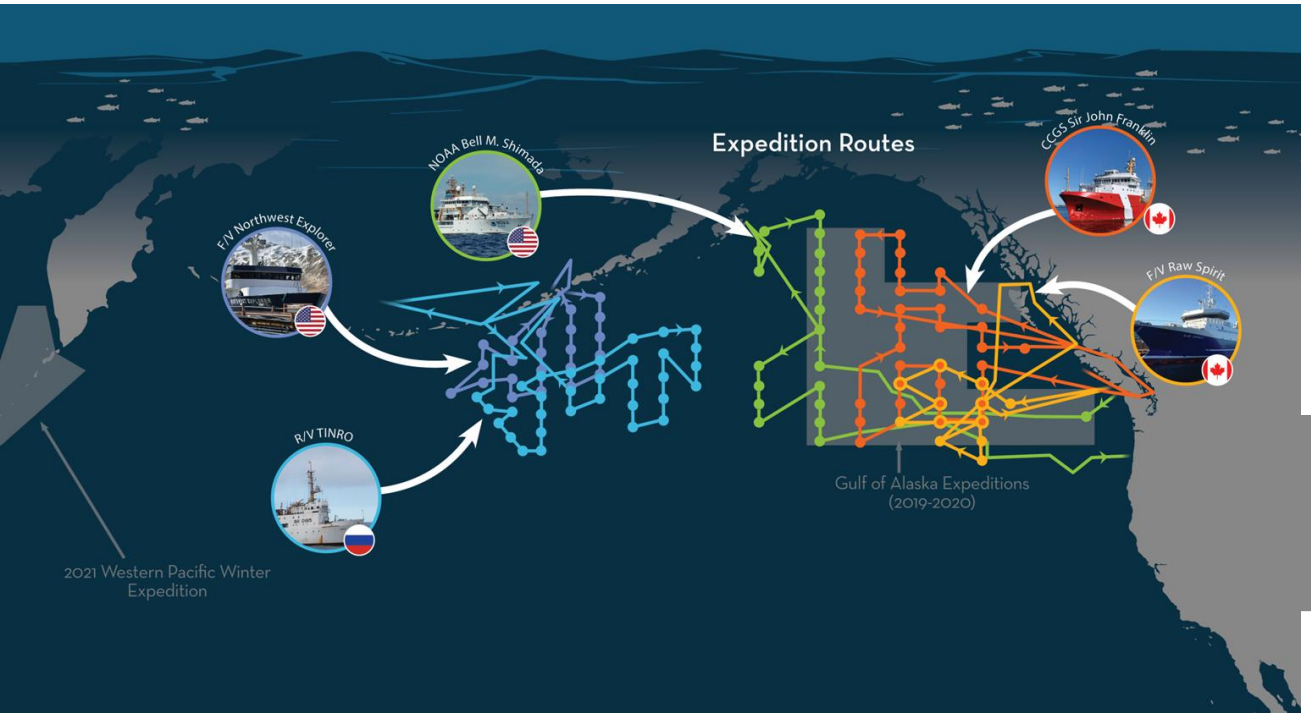


Kaeriyama, 2022

SAON ROADS Salmon Expert Panel

- **Why – What – Who – How?**
- Range of contexts for observing & coordination
  - Informing policy-making (e.g., management)
  - Supporting community response needs (e.g., climate adaptation)
- Define benefits & requirements for observing

INTERNATIONAL YEAR OF THE SALMON



IYS 2022 PAN-PACIFIC WINTER HIGH SEAS EXPEDITION

JP Japan
KR Korea
RU Russia
CA Canada
US United States

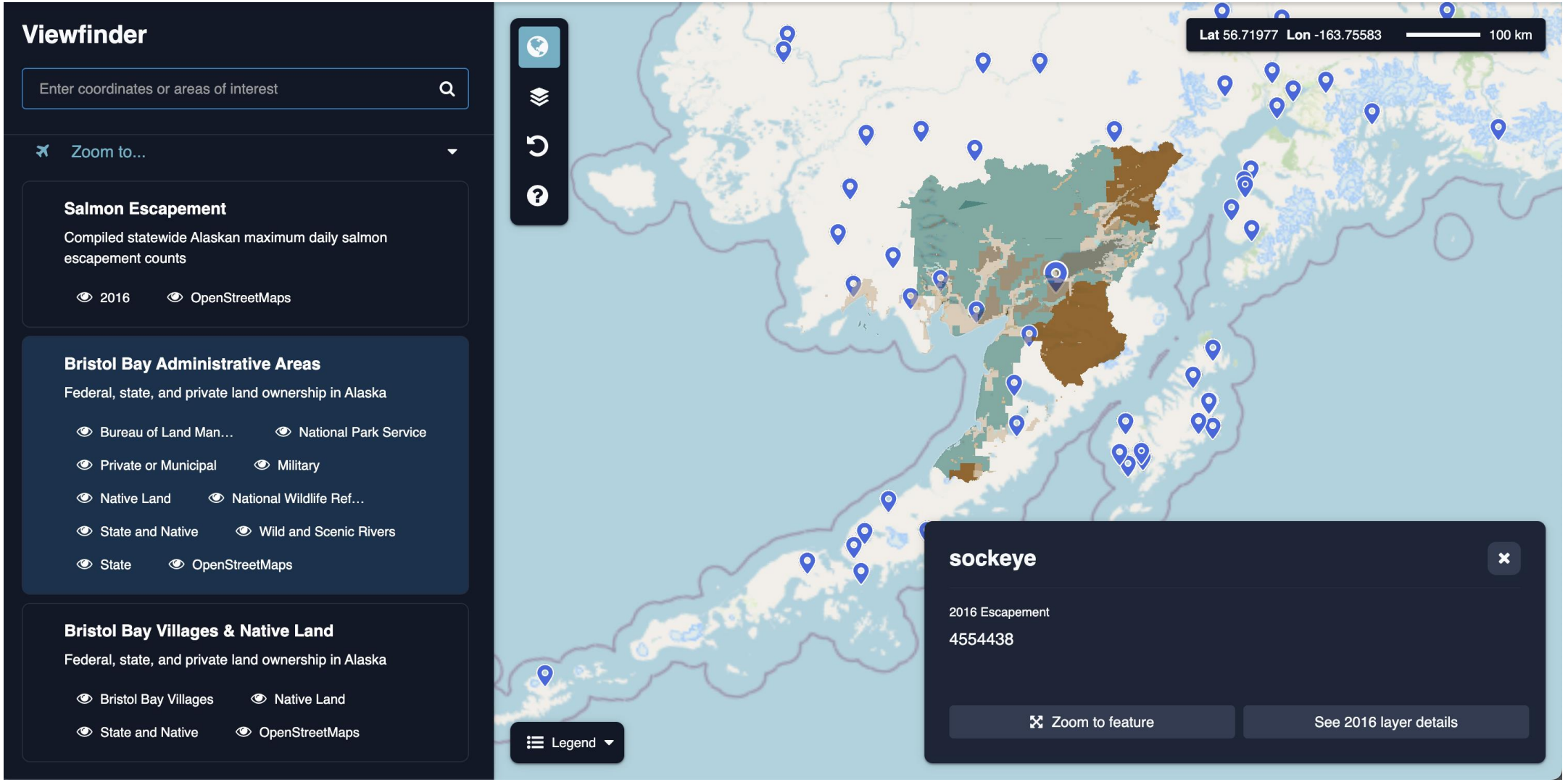
RNA CoObs » Salmon Knowledge Portal

Apr 2024
Nov 2025

Equitable Information Portal Design for Mobilizing Salmon Knowledge

Meeting Report

Shared Arctic Variable → Salmon Knowledge Portal



RNA CoObs » Information Portal Task Team (Matt Jones, Maggie Klope, NSF-ADC)

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The Arctic as disruptor & provider

MARYCAIT DOLAN/KYUK

Waves from ex-Typhoon Halong cover the Kuskokwim River waterfront in Bethel on Sunday.

Remnants of Typhoon Halong bring widespread damage to Western Alaska

By Evan Erickson, Casey Grove, Desiree Hagen, Alena Naiden, Ben Townsend and Samantha Watson
ALASKA PUBLIC RADIO NETWORK

A powerful, ongoing storm in Western Alaska has flooded communities, destroyed homes, and left some residents injured by flying debris. Officials say rescue efforts are underway after floodwaters in multiple communities swept homes off their foundations.

The remnants of Typhoon Halong tracked further east

ADALINE PETE

An overturned home in Kotlik. The National Weather Service reported a maximum wind gust of 78 mph in Kotlik Sunday morning.

Anchorage Daily News, 16 Oct 2025

Hunting maklak (bearded seal) off the ice near Toksook Bay

- Ice use as platform & habitat

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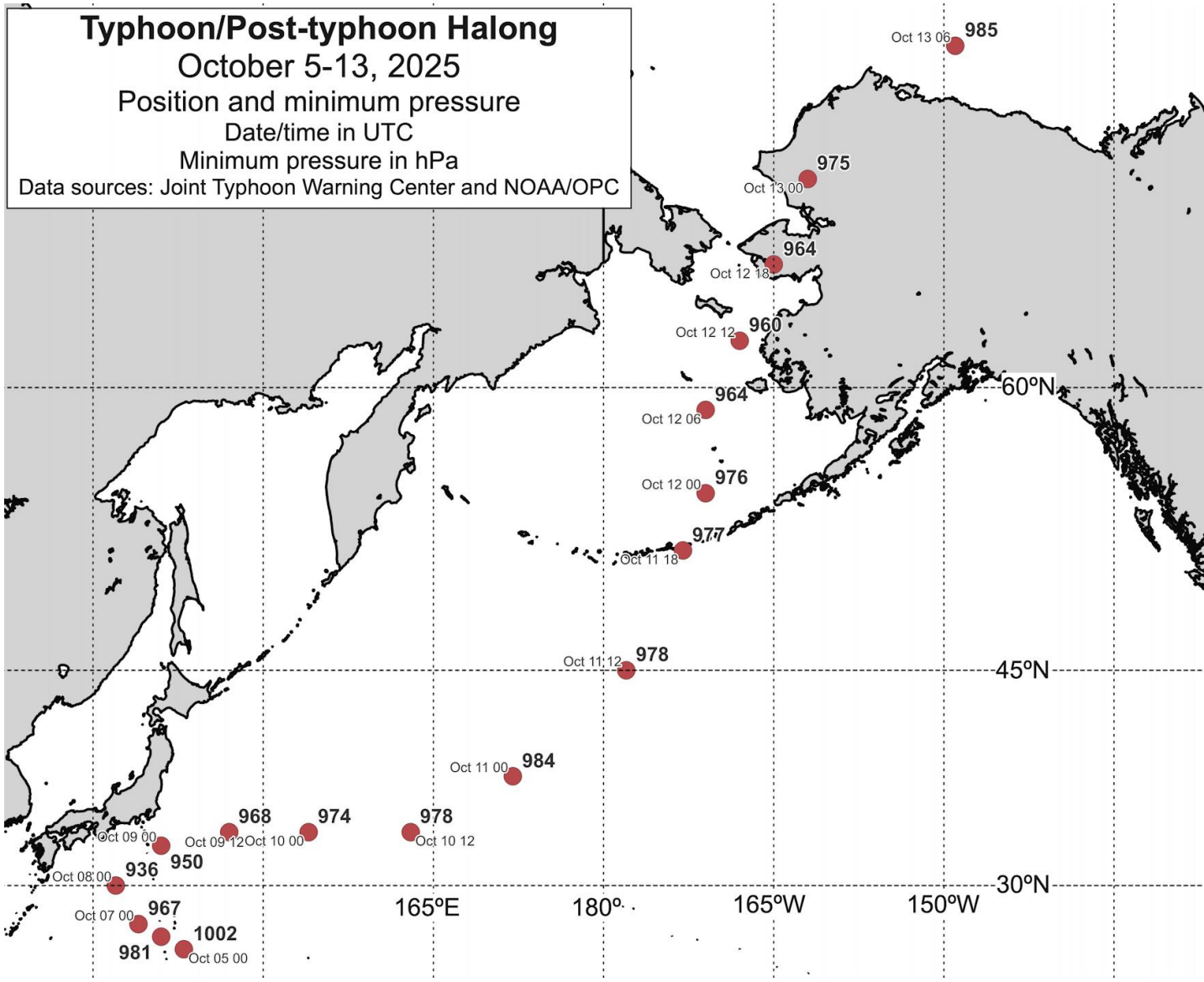

Journal of Geophysical Research: Oceans

RESEARCH ARTICLE
10.1002/2016JC012197

Special Section:
Atmosphere-Ice-Ocean-Ecosystem Processes in a Thinner Arctic Sea Ice Regime: the Norwegian Young Sea ICE Cruise 2015 (N-ICE2015)

Improved forecasts of winter weather extremes over midlatitudes with extra Arctic observations

Kazutoshi Sato[1], Jun Inoue[1,2,3], Akira Yamazaki[2], Joo-Hong Kim[4], Marion Maturilli[5], Klaus Dethloff[5], Stephen R. Hudson[6], and Mats A. Granskog[6]

[1]National Institute of Polar Research, Tachikawa, Japan, [2]Application Laboratory, Japan Agency for Marine-Earth Science and Technology, Yokohama, Japan, [3]SOKENDAI (Graduate University for Advanced Studies), Hayama, Japan, [4]Korea Polar Research Institute, Incheon, Korea, [5]Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Potsdam, Germany, [6]Norwegian Polar Institute, Tromsø, Norway

Key Points:

- Additional Arctic radiosonde observations during winter improved forecast skill of cold extremes at midlatitudes
- The trajectory of high potential vorticity is important for understanding the origin of the large uncertainties in the upper troposphere
- The uncertainty originated from the denial of extra observations over the Arctic reached midlatitude within a week

Launching ceremony at JMU Isogo Shipyard on March 19, 2025

…rica have been considered to be a …e required to reduce human and …sparse observing network over the …ight impact accuracy of prediction …e observations from the Norwegian …and stations during winter improved …itudes of the Northern Hemisphere. …015, ensemble forecast experiments …pheric reanalysis in which the … initial conditions in the upper

International Arctic Research Center

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WEBSITES

iarc.uaf.edu

https://sites.google.com/alaska.edu/rna-observations/

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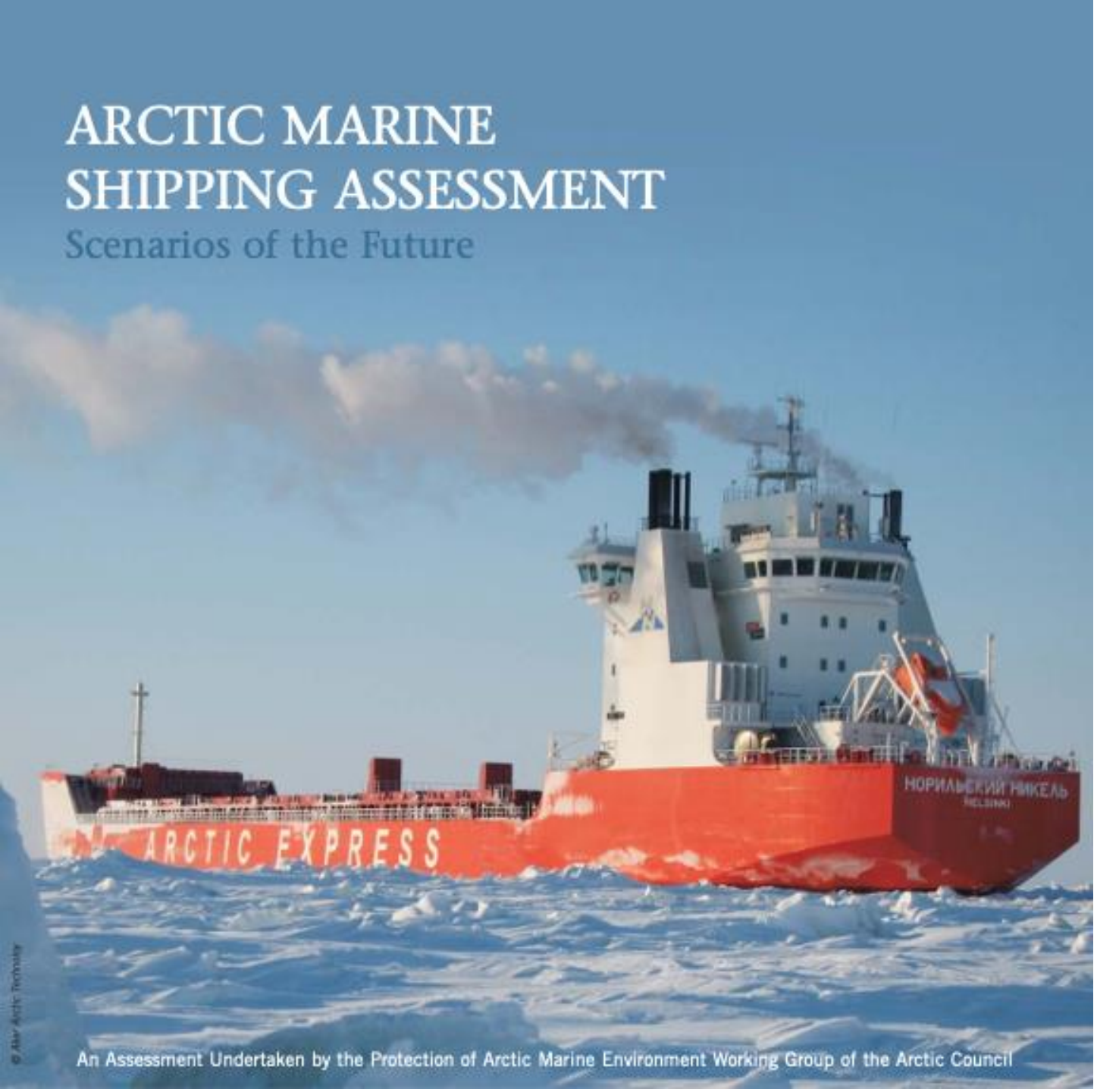
• @IARC_Alaska

ARCTIC MARINE SHIPPING ASSESSMENT

Scenarios of the Future



An Assessment Undertaken by the Protection of Arctic Marine Environment Working Group of the Arctic Council