The Need for Ocean Acoustics Data in Arctic Canada

Planning and monitoring ship traffic, offshore development and co-management of marine living resources

Maribeth Murray, Arctic Institute of North America, University of Calgary

UAK Research School

December 2018

The Council of Canadian Academies Report - 2012

40 Priority Research Questions for Ocean Science in Canada

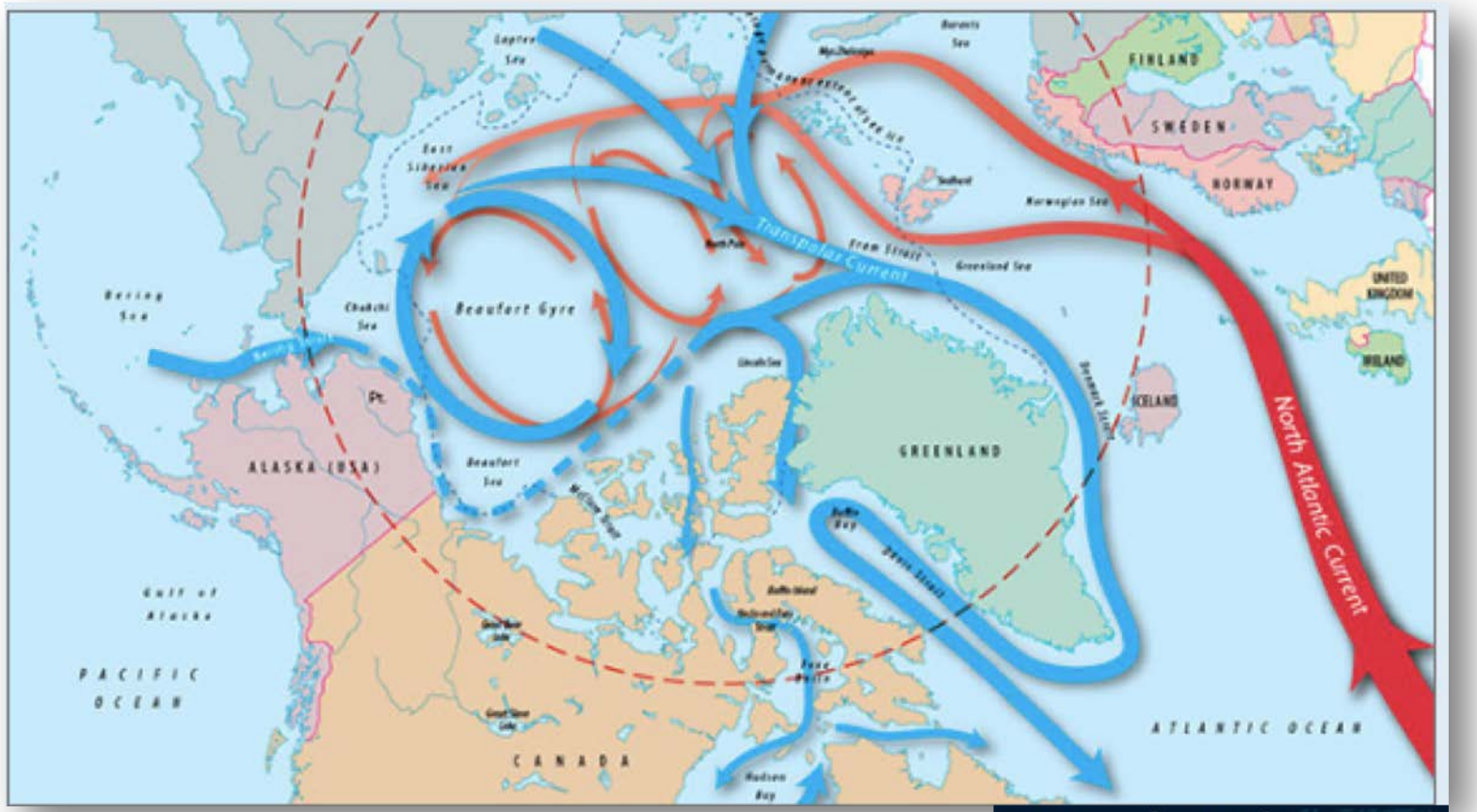
Identifies research priorities and emerging issues in science and policy to define a set of questions that, if answered, would have the greatest impact on oceans understanding and management relevant to Canada.

Four clusters of research areas as follows:

- Improving fundamental scientific understanding
- Monitoring, data, and information management
- Understanding impacts of human activities
- Informing management and governance

Key Research Issues Structuring International Frameworks on Oceans Management

- The ocean is affected by global environmental change through its impacts on ocean processes and marine ecosystems
- The rate of change is accelerating in the ocean
- The Arctic is of particular importance to Canada
- The world's oceans are interconnected
- Socio-economic systems and ecosystem management must be better integrated.



Woods Hole Oceanographic Institution

Infrastructure Capacity

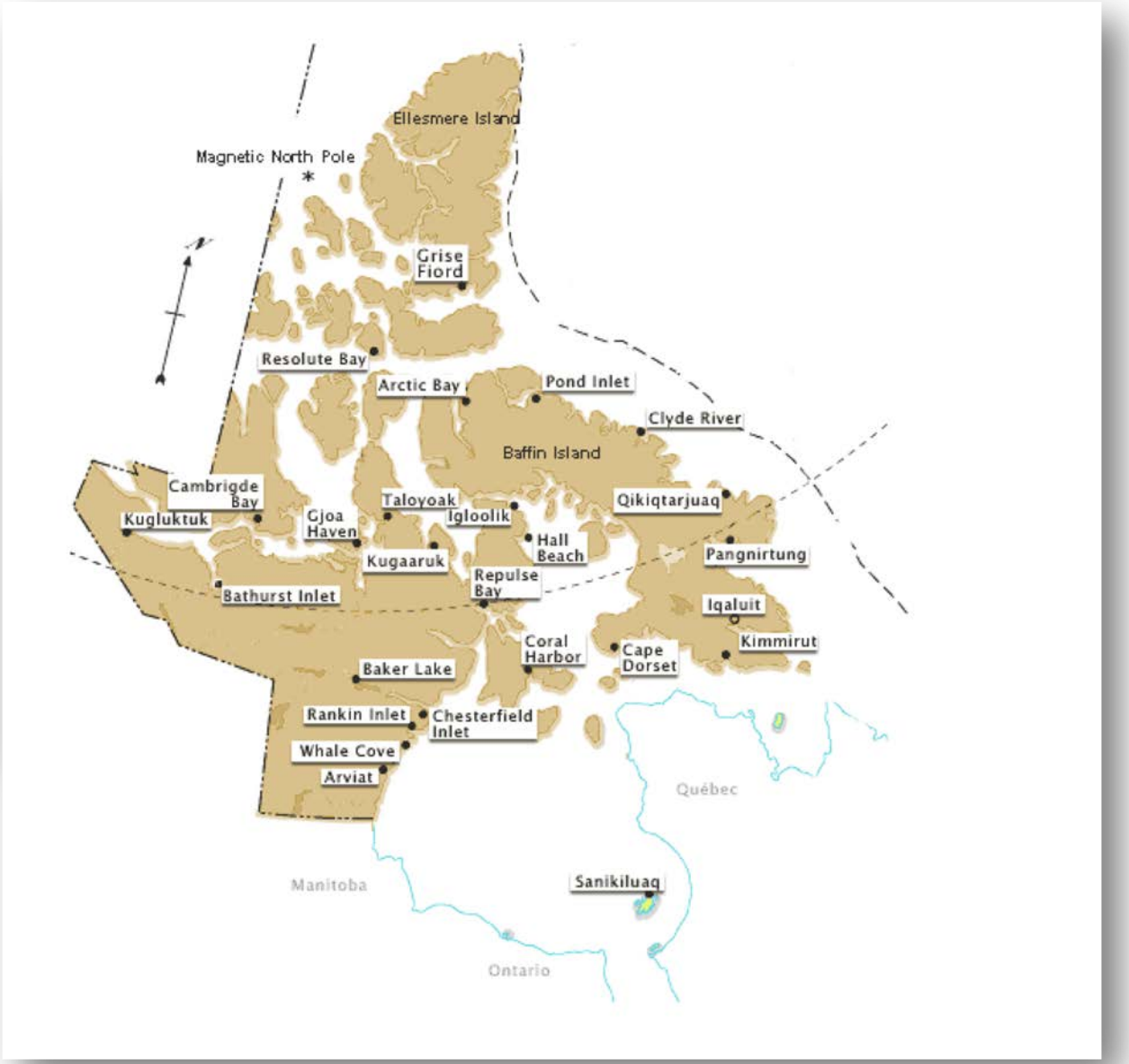
Three of the infrastructure capacity questions included in the Council's report are:

23. How can autonomous and networked platform infrastructures and sensors be developed to deliver comparable ocean data and data products for observation, monitoring, analysis, and decision-making?"

24. How can a network of Canadian ocean observations be established, operated, and maintained to identify environmental change and its impacts?"

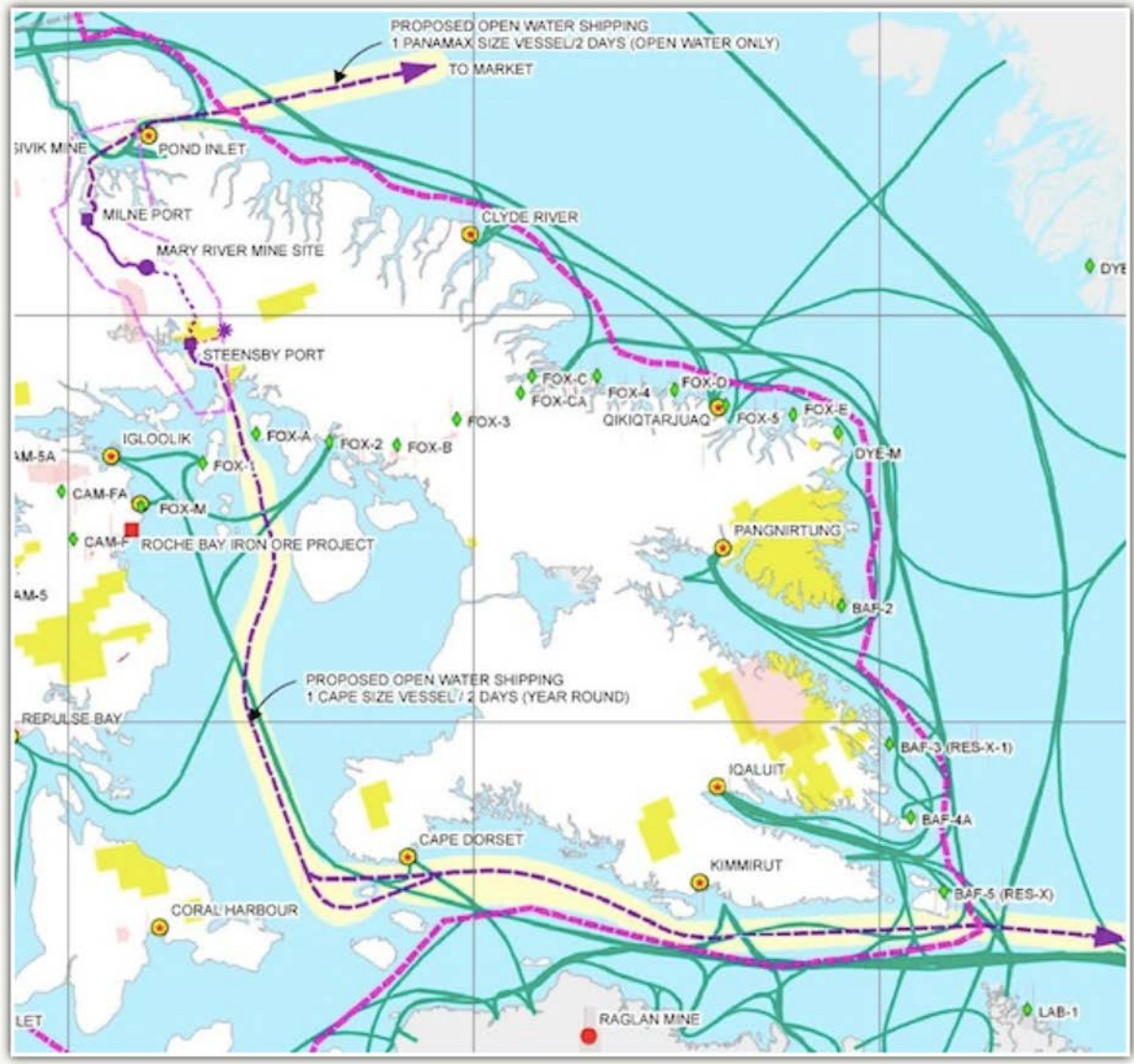
25. What indicators are available to assess the state of the ocean, what is the significance of changes observed in those indicators, and what additional indicators need to be developed?"

Nunavut Communities



Anthropogenic Sources of Stress

- Mining development and associated shipping
- General shipping (sealift, etc.)
- Tourist transport
- Offshore development
  - Exploration
  - Drilling
  - Transport



This map from the draft Environmental Impact Statement for the Mary River iron mine shows how shipping routes around Baffin Island may look in the future when the mine starts operations.

Chapter 3: What does the National Energy Board regulate in the Canadian Arctic?

The National Energy Board is the federal body responsible for regulating offshore drilling activities in the Canadian Arctic. Our responsibilities stretch for the entire life of the well, from the application stage, through exploration and production activities, and even after the well is eventually abandoned.

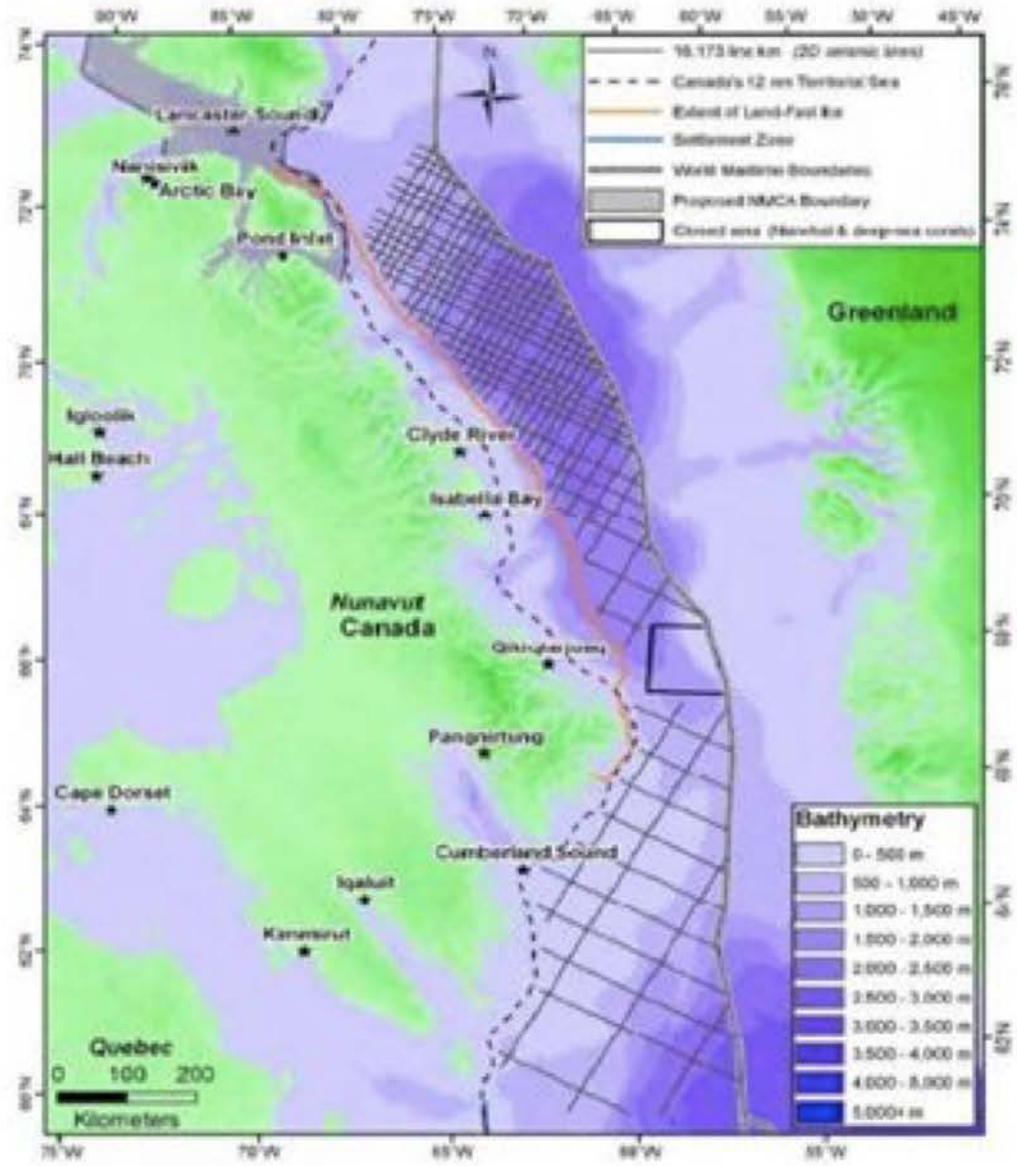
Our role includes a number of specific responsibilities such as overseeing:

- geophysical surveys (for example, seismic surveys);
- exploration wells to see if oil or gas is present;
- delineation wells to confirm the size of a potential oil or gas field;
- development wells for producing oil and gas;
- building and operating production facilities and facilities for transporting oil and gas; and
- abandoning wells and facilities.

Abandoning a well or related facilities means that the operator must prepare the well so that it can be left indefinitely. The operator must make sure that the well will not leak and damage water supplies or other potential oil and gas reservoirs. The operator is still responsible for the well even after it has been abandoned.

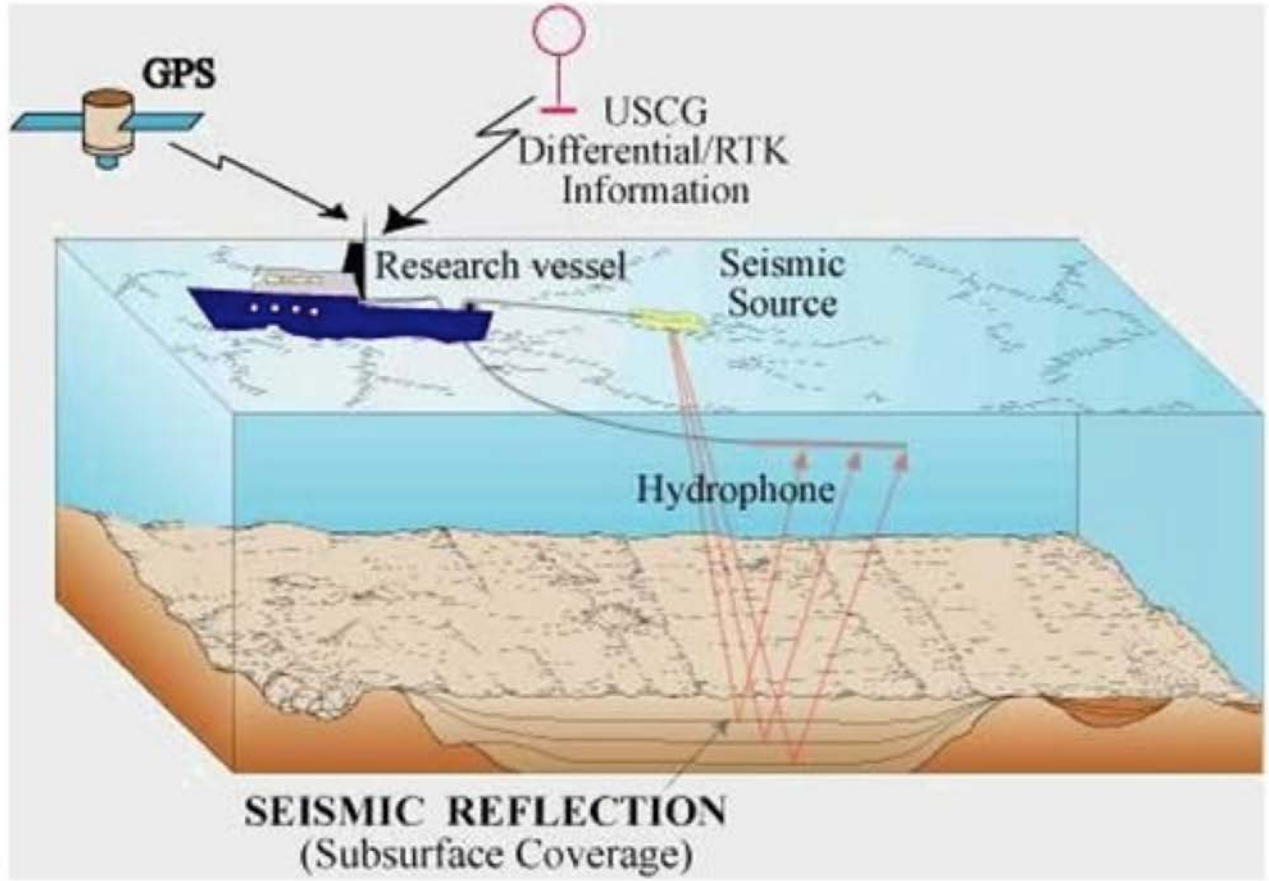
We do not regulate offshore activities off the coasts of either Nova Scotia or Newfoundland and Labrador. The Canada-

> "... if we are satisfied that the well should proceed we may authorize it and we may authorize any conditions that we find are necessary to promote safety and the protection of the environment and protection of the community. We also have the legal authority to say no, to deny the application because it doesn't meet our requirements ... So as they say, the buck stops here ..."
>
> Gaétan Caron,
> National Energy Board Chair



Canada's National Energy Board approved the seismic testing plan in the cross-hatched area just outside the 12 nautical mile coastal area off Baffin Island, © Environmental Assessment Report for the NORTHEASTERN CANADA 2D SEISMIC SURVEY (Baffin Bay/Davis Strait)

The project details given to the National Energy Board say the underwater air blasts of 230 decibels at a distance of one metre away, would occur every 13-15 seconds 24 hours a day.



Sonic cannon send loud blasts through the water. The sound reflects at different rates off the underlying layers of the ocean floor, the reflected sound is picked up by a towed hydrophone and sent to special equipment where it is analyzed to indicate presence of oil or gas reserves under the ocean floor with GPS records indicating exact location. © USGS Woods Hole Institute

The shock waves penetrate the ocean floor and reflect back at differing rates to indicate various layers and materials beneath such as pockets of oil or gas.

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Seasonal Trends in Acoustic Detection of Marine Mammals in Baffin Bay and Melville Bay, Northwest Greenland

Héloïse Frouin-Mouy,[1,2] Katie Kowarski,[1] Bruce Martin[3] and Koen Bröker[4]

(Received 20 October 2015; accepted in revised form 8 August 2016)

Hooded Seal | NOAA Fisheries
fisheries.noaa.gov

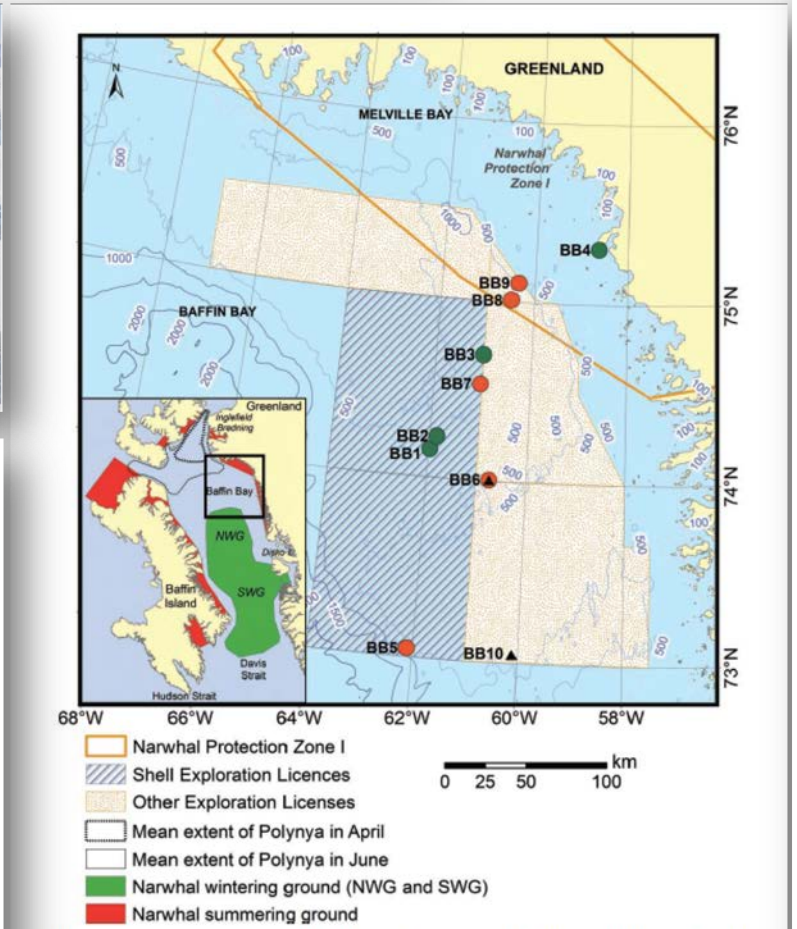
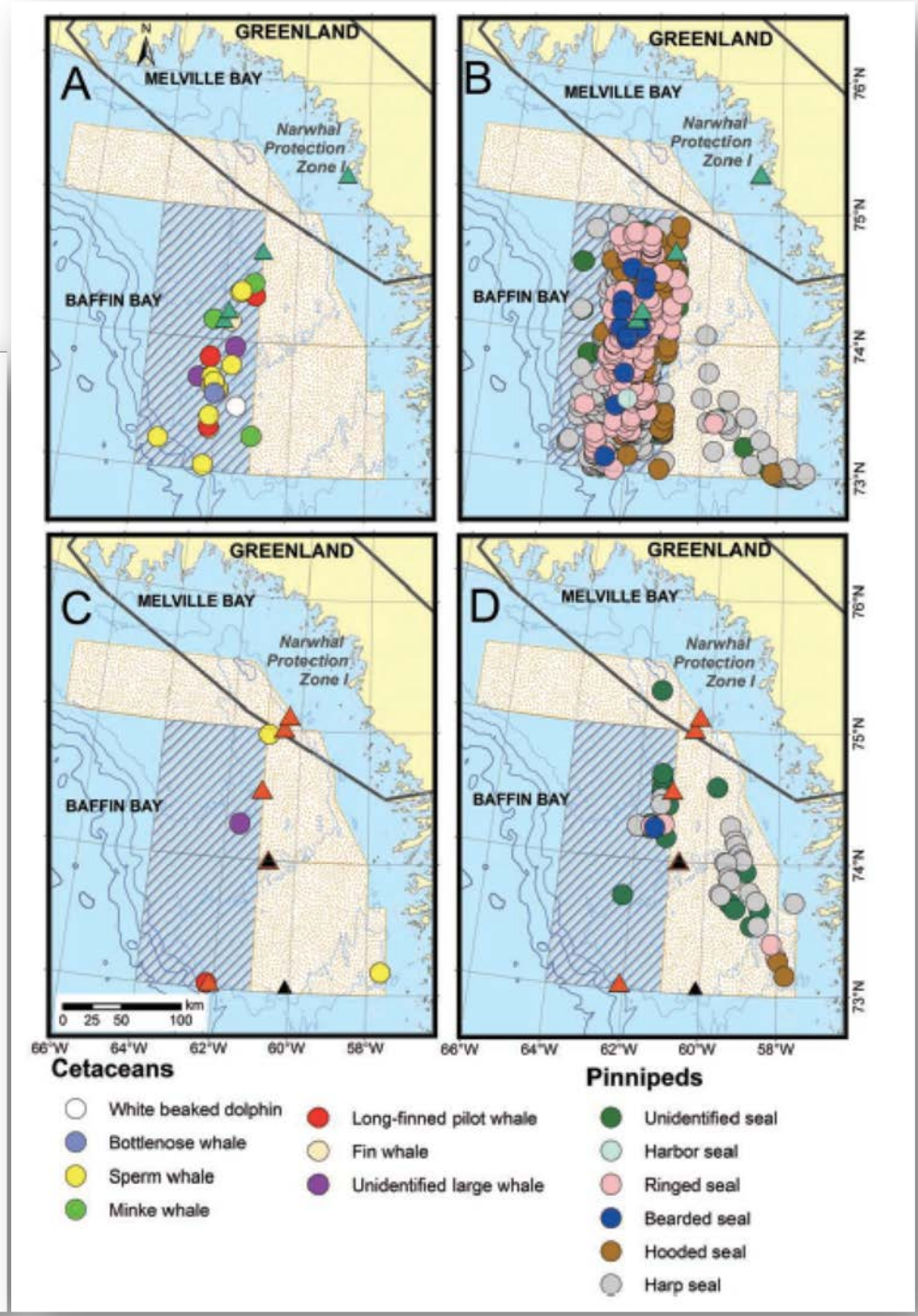


FIG. 1. Map of recording station locations for deployments in Baffin Bay for summer 2012 (green circles: BB1–BB4), summer 2013 (orange circles: BB5–BB9), and overwinter 2013–14 (black triangles: BB6 and BB10). Inset shows approximate summer (red) and winter (green) distributions of the narwhal subpopulation summering in West Greenland and overwintering in Baffin Bay, Davis Strait, or Disko Bay (data from Laidre and Heide-Jørgensen, 2005a, b). NWG = northern overwintering ground and SWG = southern overwintering ground. Mean extents of the polynya in April and June are derived from Dunbar (1969).



CBC | MENU

news Ottawa greenlights Arctic offshore seismic tests over Inuit objections

Ottawa greenlights Arctic offshore seismic tests over Inuit objections

Qikiqtani Inuit Association says it may consider legal action

The Canadian Press · Posted: Jun 25, 2014 8:45 PM CT | Last Updated: June 26, 2014

Seismic tests off the coast of Baffin Island in Canada's Arctic are set to begin later this summer. (The Canadian Press)

NEWS PROVIDED BY
Minister of Intergovernmental and Northern Affairs and Internal Trade
Oct 04, 2018, 09:15 ET

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OTTAWA, Oct. 4, 2018 /CNW/ - The Government of Canada is committed to working and consulting with territorial governments, industry, and Indigenous governments and communities in the North on future decisions on offshore oil and gas development.

Today, the Honourable Dominic LeBlanc, Minister of Intergovernmental and Northern Affairs and Internal Trade, and the Honourable Amarjeet Sohi, Minister of Natural Resources, announced Canada's next steps on future Arctic offshore oil and gas development for current licence holders.

Specifically, the Government of Canada will:

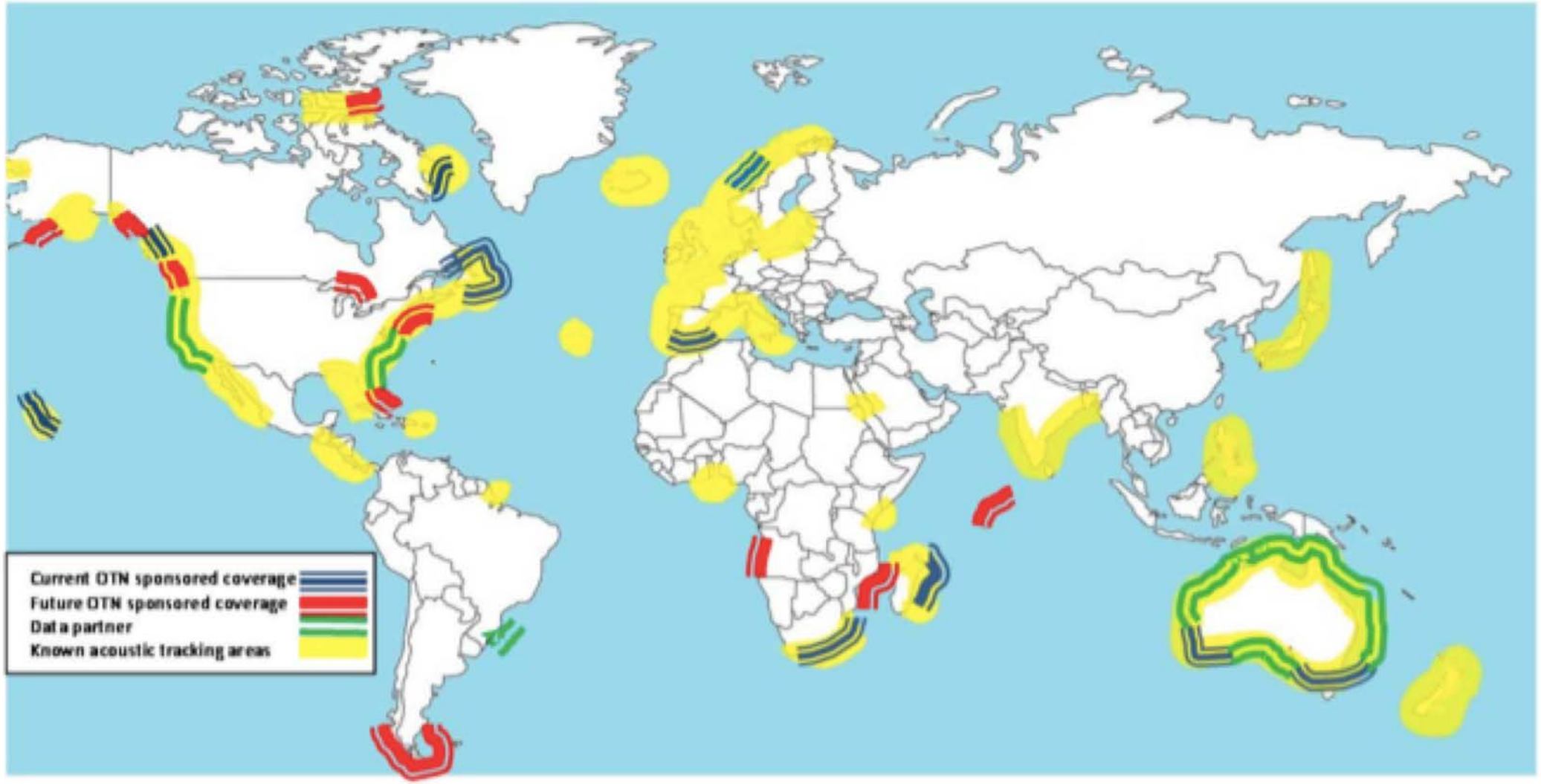
- Freeze the terms of the existing licences in the Arctic offshore to preserve existing rights, remit the balance of any financial deposit related to licences to affected licence holders and suspend any oil and gas activities for the duration of the moratorium;
- Work with Northern partners to co-develop the scope and governance framework for a science-based, life-cycle impact assessment review every five years that takes into account marine and climate change science; and,
- Negotiate a Beaufort Sea oil and gas co-management and revenue-sharing agreement with the governments of the Northwest Territories and Yukon, and the Inuvialuit Regional Corporation.

THE NEW REPUBLIC

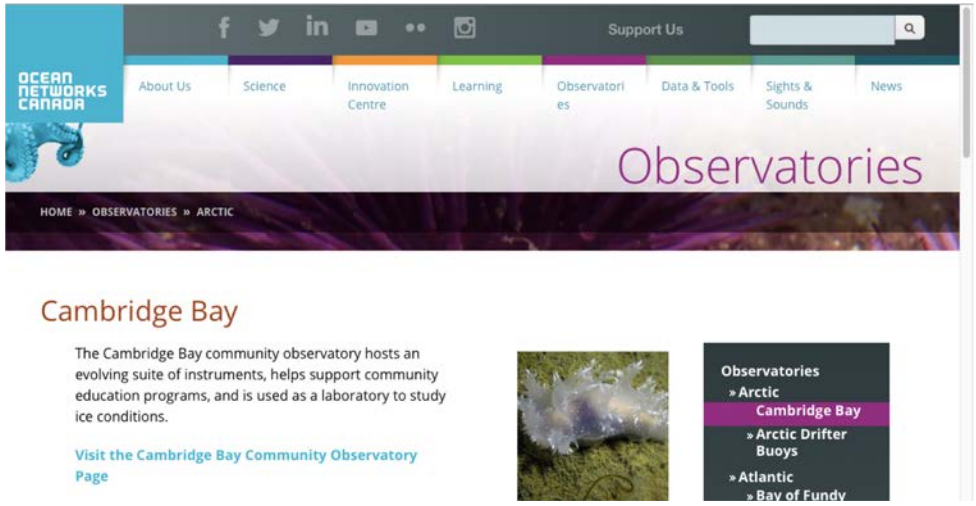
Hunters from Clyde River speed out on the Arctic Ocean

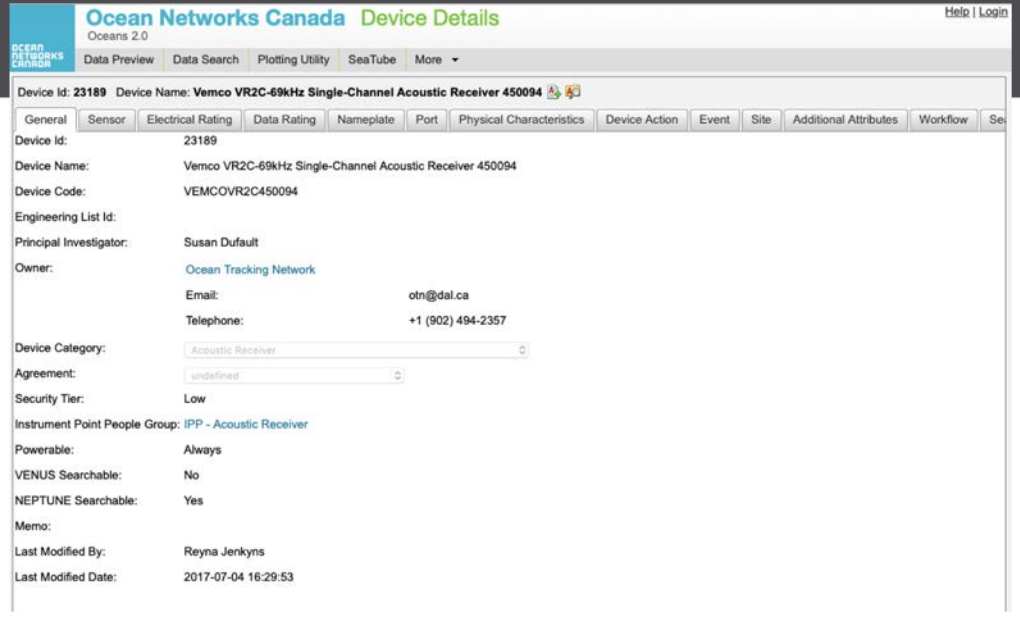
How One Inuit Community Won Against Big Oil

... and what it means for other environmental efforts.



The Ocean Tracking Network's current and proposed deployments (from *Building the knowledge base for ocean resource management – a global challenge The Ocean Tracking Network Strategic Plan 2013-2018,* https://www.innovation.ca/sites/default/files/Rome2013/files/Ocean_Tracking_Network_Strategic_Plan_2012_12_23.pdf)





The underwater instrument platform hosts:

- an HD video underwater camera
- underwater microphone
- a suite of sensors to measure seawater properties

instrument to measure ice thickness

On land:

- a second camera monitors surface ice formation
- a small weather station provides information on current atmospheric conditions

http://www.oceannetworks.ca/learning/ocean-sense/community-observatories/cambridge-bay

Acoustic Monitoring Observatories in Arctic Canada

- Documenting local to global scale movements and survival of marine mammals
- Provide day-to day decision support for DFO and other agencies
- Assist in meeting Canada's international commitments
- Inform long-term strategic planning
- Support community- and regional-scale decisions

Examples

- The *Oceans Act:* entrusts the Minister with leading integrated oceans management and providing Coast Guard and hydrographic services.
- The *Fisheries Act:* gives the Minister responsibility for the management of fisheries, habitat, and aquaculture.
- The *Species at Risk Act:* gives the Minister responsibilities associated with the management of aquatic species at risk.
- Agreement on the Conservation of Polar Bears
- Conservation of Arctic Flora and Fauna
- https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-organizations/participation-international-environmental-agreements.html

https://www.pewtrusts.org/en/research-and-analysis/articles/2016/04/05/a-comprehensive-proposal-for-shipping-corridors-in-canadas-arctic

PEW

TOPICS PROJECTS FEATURES ABOUT GET INVOLVED

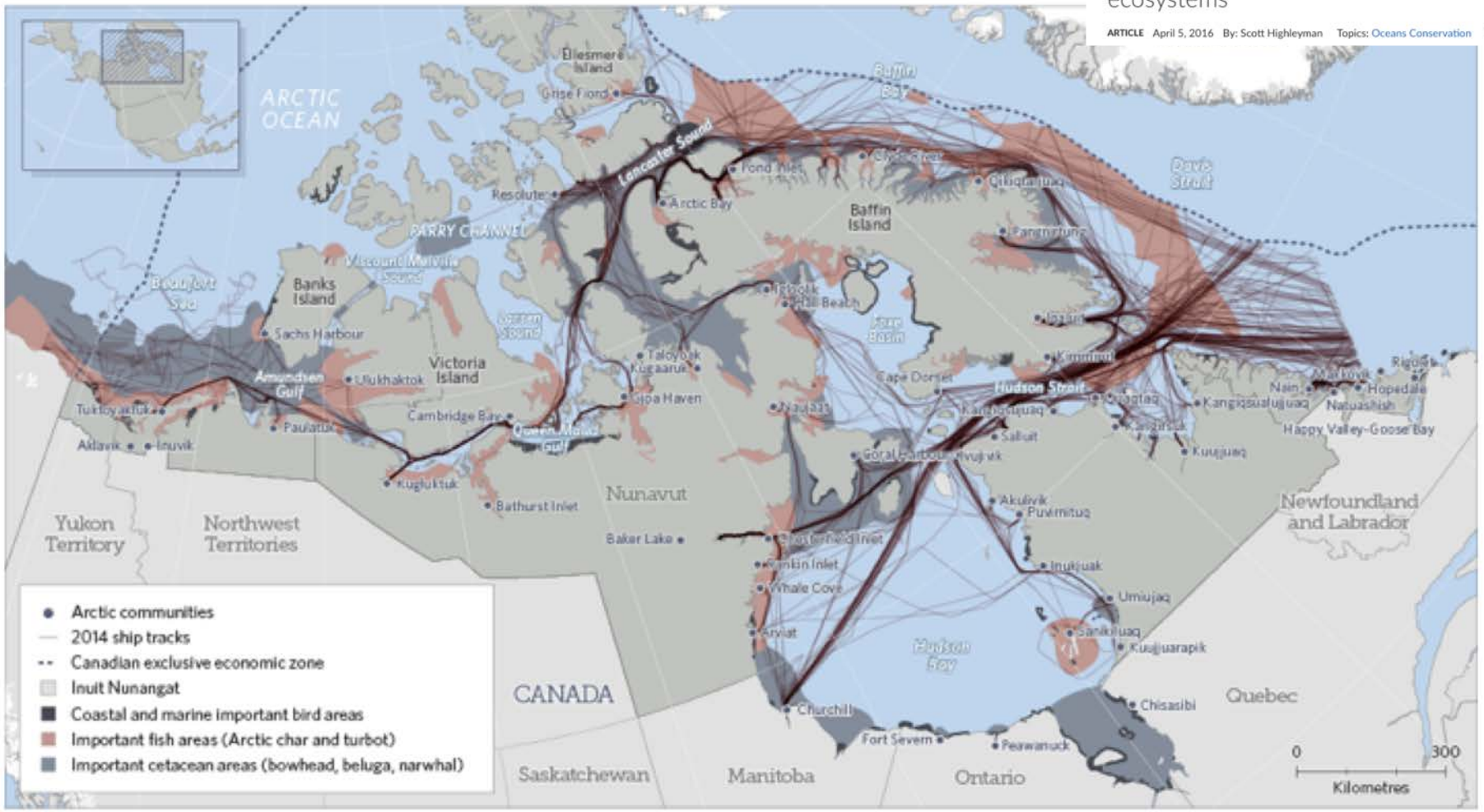
A Comprehensive Proposal for Shipping Corridors in Canada's Arctic

Science-based routes would protect vessel safety and ocean ecosystems

ARTICLE April 5, 2016 By: Scott Highleyman Topics: Oceans Conservation Projects: Arctic Canada Read time: 2 min

Canada's Arctic Passageways Are Shared by Ships and Wildlife

Vessel, whale, fish, and bird movements



Sources: Important Bird Areas Canada, http://www.ibacanada.ca/explore_how.jsp?lang=EN; Fisheries and Oceans Canada, 2010 Arctic Marine Workshop, http://www.dfo-mpo.gc.ca/Library/341178.pdf; Bureau of Ocean Energy Management, *Satellite Tracking of Bowhead Whales* (2013), http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5343.pdf; exactAIS Archive, Satellite AIS Data—Arctic, http://www.exactearth.com; Flanders Marine Institute, VLIZ Maritime Boundaries Geodatabase, accessed Sept. 4, 2015, http://www.marineregions.org

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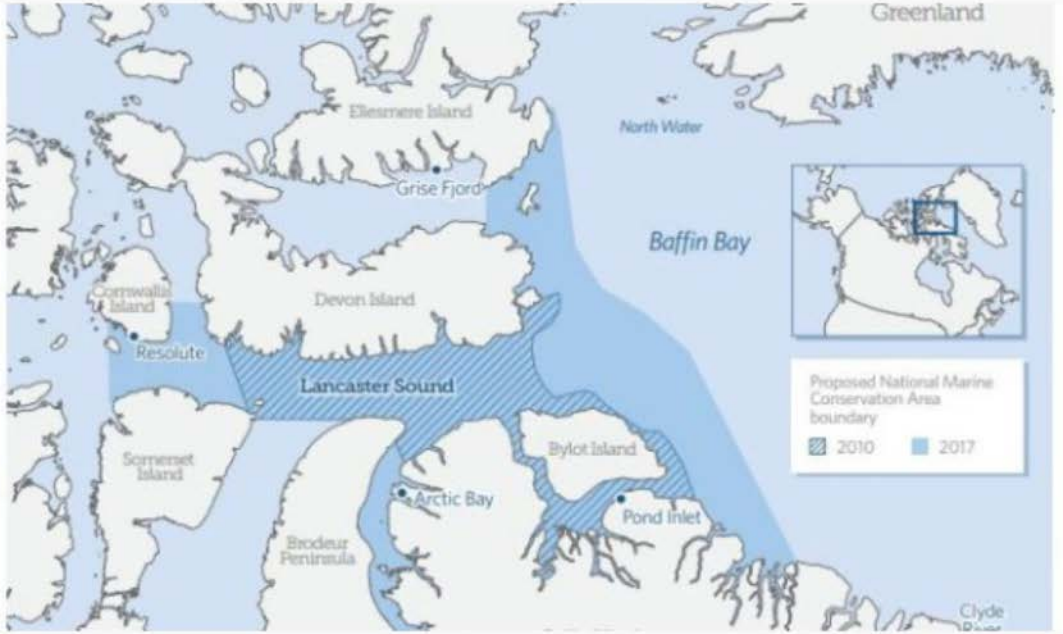
The Coast Guard icebreaker Terry Fox sits in the waters of Lancaster Sound, Nunavut at the eastern gates of the Northwest Passage in August 2006. (Bob Weber/CP)

Inuit and Ottawa reach agreement in principle on Arctic marine conservation area

By Levon Sevunts, Radio Canada International | english@rcinet.ca
Tuesday 4 December, 2018 , 0 Comments ↓

The federal government and the Inuit have reached another milestone in creating Canada's largest marine conservation area in the northeastern part of the fabled Northwest Passage, officials announced Tuesday.

Canada's largest marine conservation area



Once the Inuit Impact and Benefit Agreement is finalized and an Interim Management Plan is completed, Tallurutiup Imanga National Marine Conservation Area will be the largest protected area in Canada at approximately 109,000 square kilometres. (Oceans North)