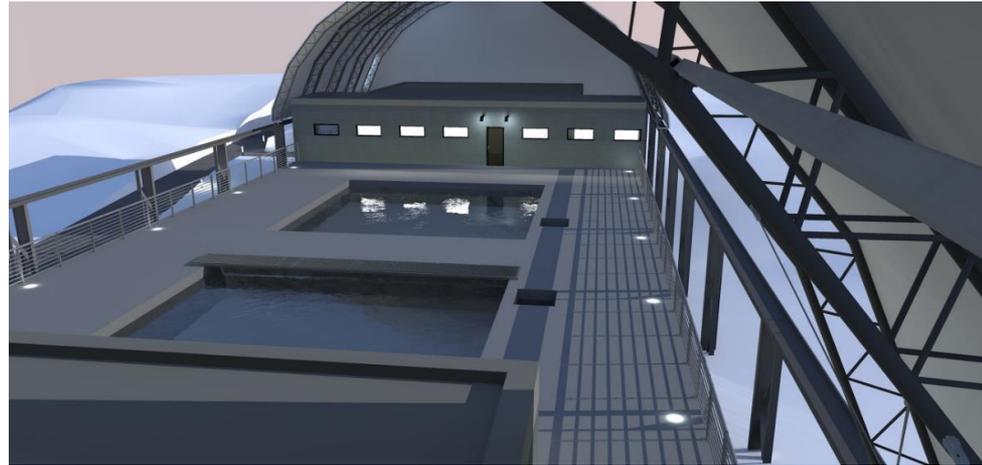
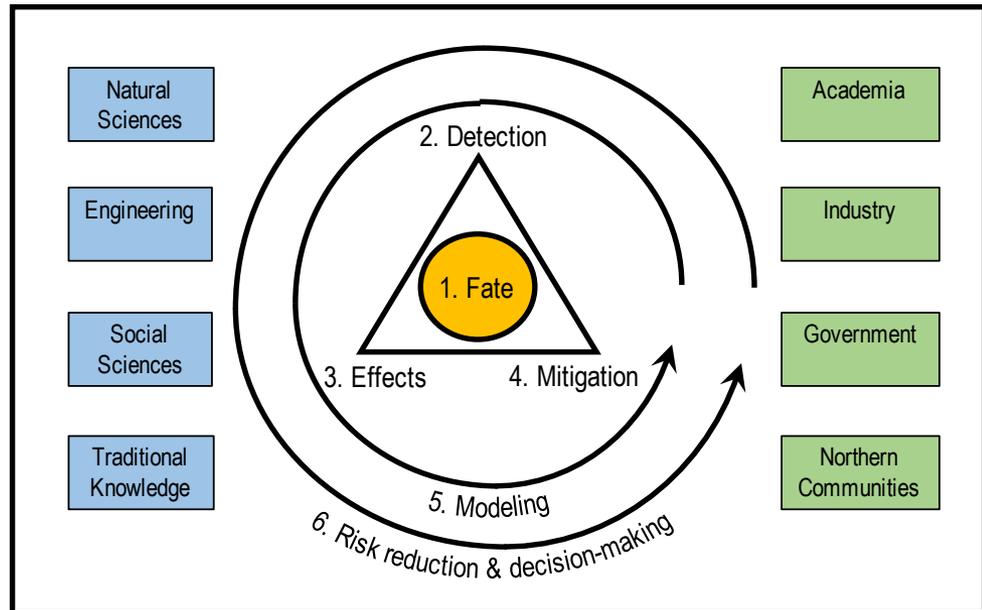


The Churchill Marine Observatory (CMO) & OSICA (Oil-Spills-in-Ice-Covered-Arctic-waters) Network

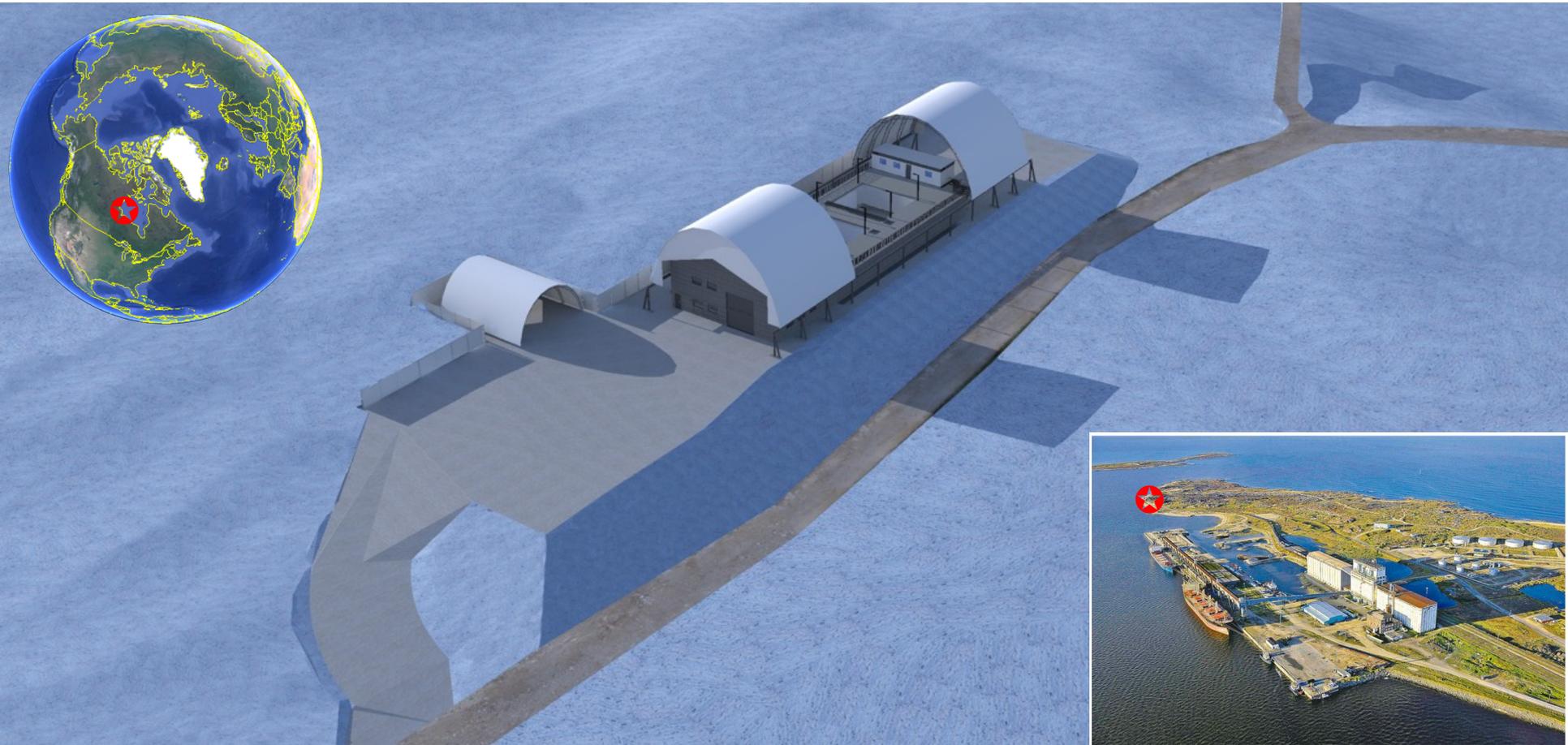
Feiyue (Fei) Wang
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UNIVERSITY
OF MANITOBA



Welcome to the Churchill Marine Observatory (CMO) (~\$44M)



INNOVATION.CA
CANADA FOUNDATION
FOR INNOVATION | FONDATION CANADIENNE
POUR L'INNOVATION



Polar Knowledge
Canada

Savoir polaire
Canada

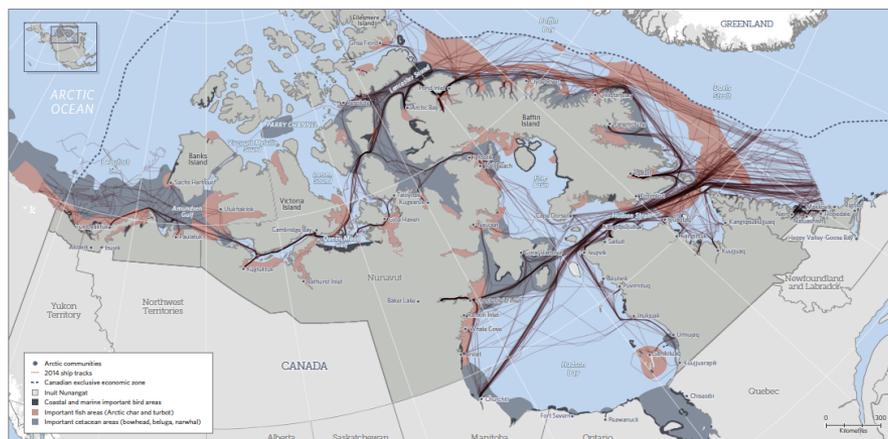
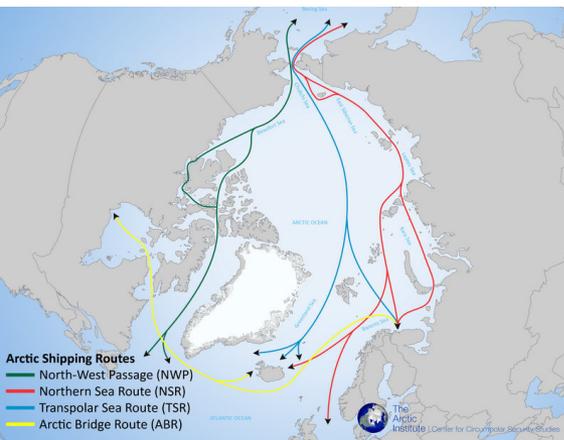


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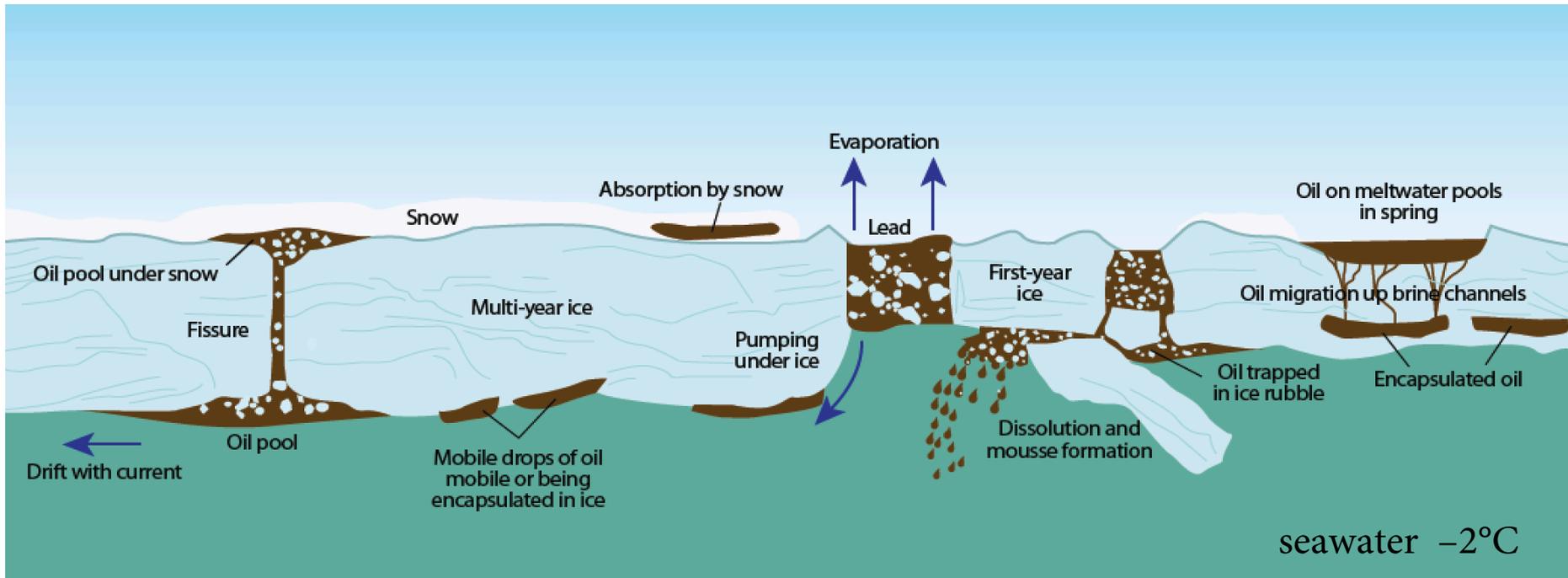


CMO – Motivations

- The Arctic Ocean is becoming increasingly accessible
- Activities related to **marine shipping** and **oil and gas development** have been increasing rapidly
- So are the risks of oil spills to the vulnerable Arctic marine ecosystems and indigenous cultures.
- Controlled, mesocosm-scale studies are needed to address critical knowledge and technology gaps



Much remains unknown about oil-ice interactions and risk reduction of oil spills in Arctic waters



AMAP, 2007

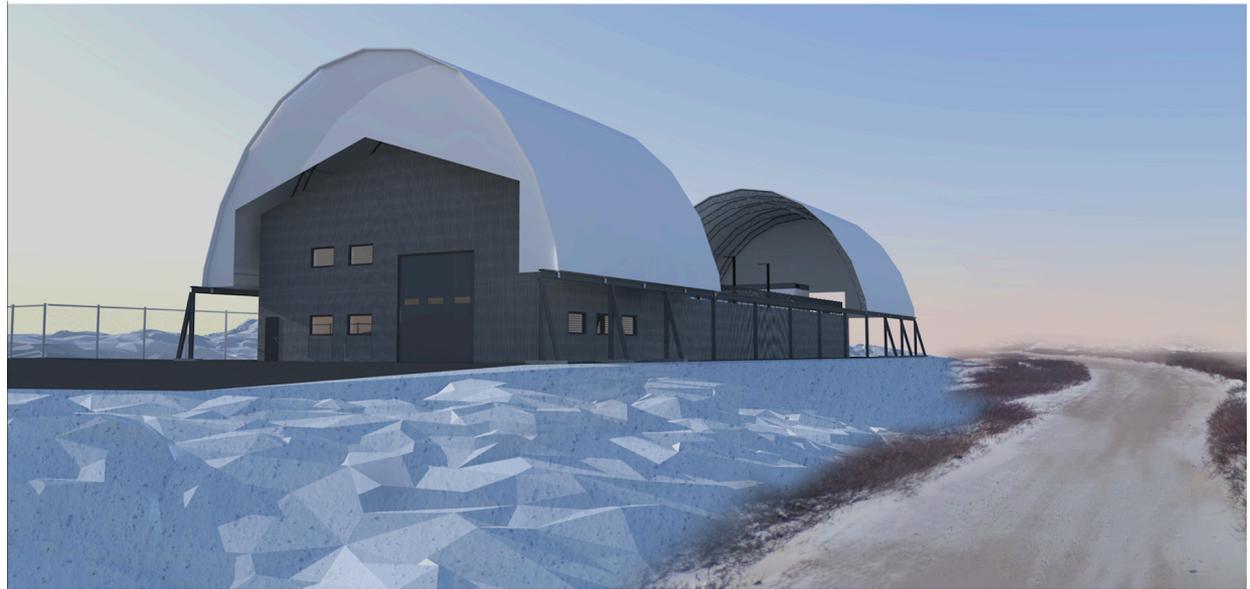


“The need for expanded testing of oil-ice interactions and oil behaviour in Arctic conditions merits special attention... This is a time-sensitive knowledge gap, as increased shipping and the possibility of offshore drilling in Arctic waters could impact Canadian Arctic shorelines and sea beds.”

CMO – Objectives

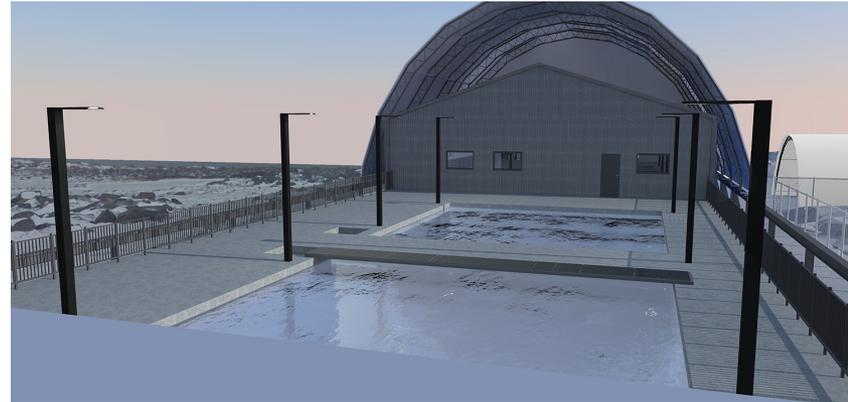
Controlled, meso-cosm scale testing of the ocean and sea ice system response to oil, LNG, and associated contaminants, to address three key scientific questions related to oil spills in ice-covered Arctic waters:

- **Detection**
- **Fate and impacts**
- **Mitigation**

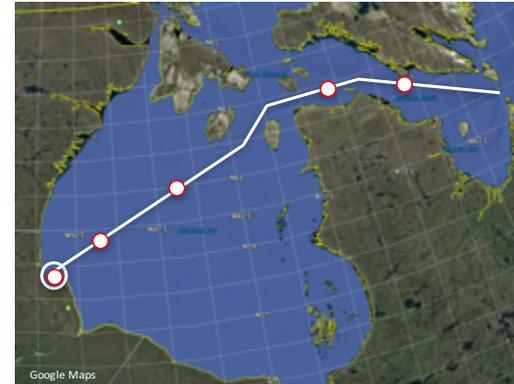


CMO – Components and Capacities

- **Oil-in-Sea-Ice-Mesocosm (OSIM)**, in Churchill, to allow controlled studies of oil spills in sea ice-covered waters



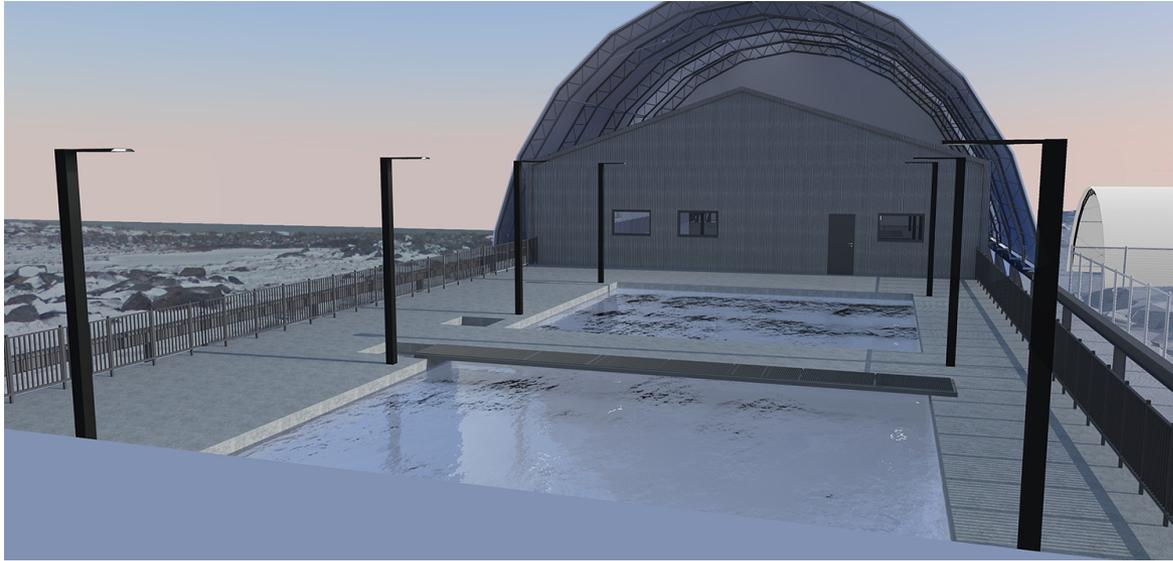
- **Environmental Observatory (EO)**, in Churchill and along the main shipping lane in Hudson Bay, to scale OSIM results to Hudson Bay and beyond



- **A Coastal Vessel (*White Diamond*)** to allow for field studies across Hudson Bay

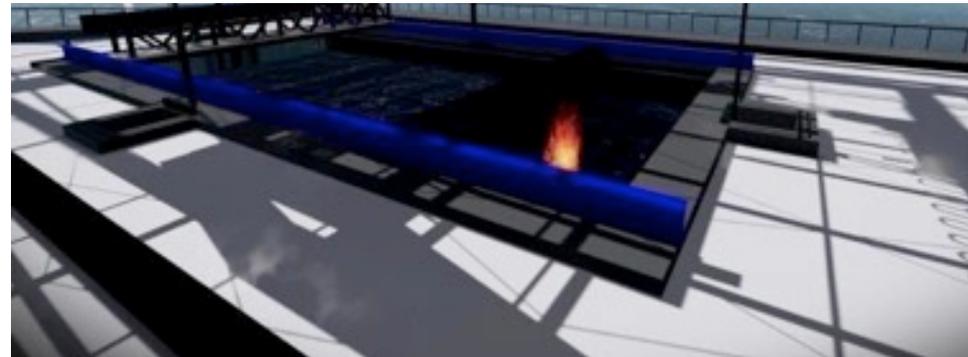


CMO – OSIM



- Two pools, one for control study, and the other oil contaminated study
- The pools are fully equipped with real-time geophysical/chemical sensors

- Different water circulation patterns
- Capacity for in-situ burning experiments
- With heating to melt the ice for multiple experiments in the winter
- On site laboratories



Petroleum Environmental Research Laboratory (PETRL)



➤ GC-MS

Agilent 7890B

➤ GCxGC TOF-MS

Pegasus GC-HRT

➤ UPLC-IMS-MS-MS

Synapt G2-Si



CMO – Partners

- Town of Churchill
- Churchill Northern Studies Centre
- Parks Canada
- Aboriginal Affairs & Northern Development;
Canadian High Arctic Research Station
(CHARS)
- Fisheries and Oceans Canada
- Environment Canada; Canadian Ice Service
- Transport Canada
- Province of Manitoba
- Province of Alberta
- Province of British Columbia
- Government of Nunavut
- KGS Group Consulting Engineers
- Stantec
- Arctic Research Foundation
- University of Calgary
- University of Victoria
- Université Laval
- Dalhousie University
- Université du Québec à Rimouski
- University of Washington
- University of Alaska Fairbanks
- Aarhus University, Denmark
- Greenland Institute of Natural Resources
- European Space Agency (ESA)
- National Aeronautics and Space
Administration (NASA)
- Multiple oil and gas companies
- ~170 investigators from 6 countries

CMO– Construction Update

- June 2015: Funding announced
- December 2016: Design finalized
- May 2017: Site blasting completed
- December 2018: Operational



CMO– Construction Update

- June 2015: Funding announced
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Putting CMO to work: NSERC OSICA Network Proposal

➤ Objective:

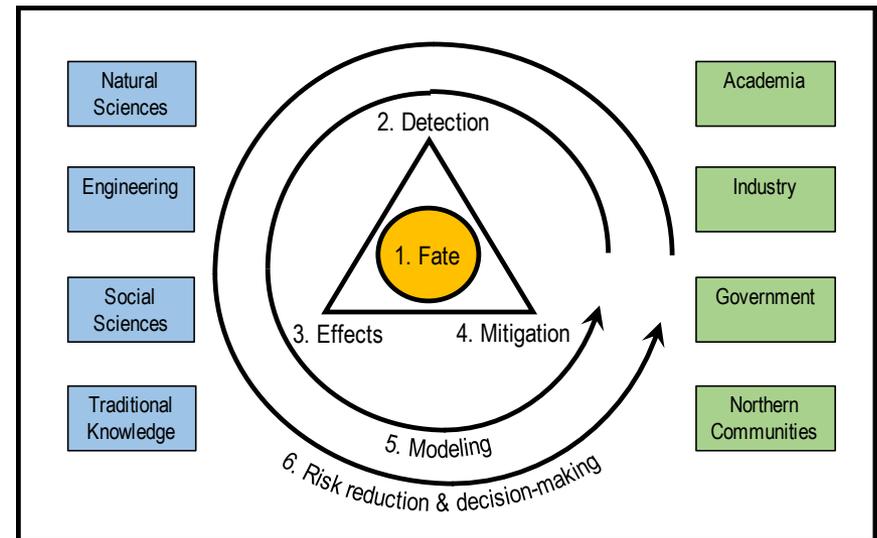
To generate scientific knowledge, develop effective technologies, and support decision-making for evidence-based policy to respond to oil spills in ice-covered Arctic waters.

➤ Multidisciplinary:

Natural sciences
Engineering
Social sciences
Traditional Knowledge

➤ Multi-sectoral:

Academia
Government
Industry
Northern Indigenous communities



*\$5.5M NSERC + ~\$4.5M partners
over five years (2018–2023)*

NSERC OSICA Network Proposal – Timeline

- March 2017: Workshop @ U of M and establishment of OSICA

Consortium

- March 31, 2017: Pre-application submitted to NSERC

- June 28, 2017: Pre-application successful

Invited by NSERC to submit full proposal

- **NOW: Full proposal development!!!**

- February 15, 2018: Full proposal is due to NSERC

- March 2018: Site visit

- June 2018: Funding decision

A multi-disciplinary + multi-sectoral team: “Arctic/sea ice camp” + “oil camp” + stakeholders

➤ 10 universities:



➤ 8 Federal Departments/Agencies



DFO, ECCC, TC, CCG, NRC, NEB, Genome Canada, **INAC**

➤ 1 Provincial Ministry



A multi-disciplinary + multi-sectoral team: “Arctic/sea ice camp” + “oil camp” + stakeholders

➤ 5 industries



➤ 3 Indigenous communities/organizations:



➤ 2 non-profit organizations:

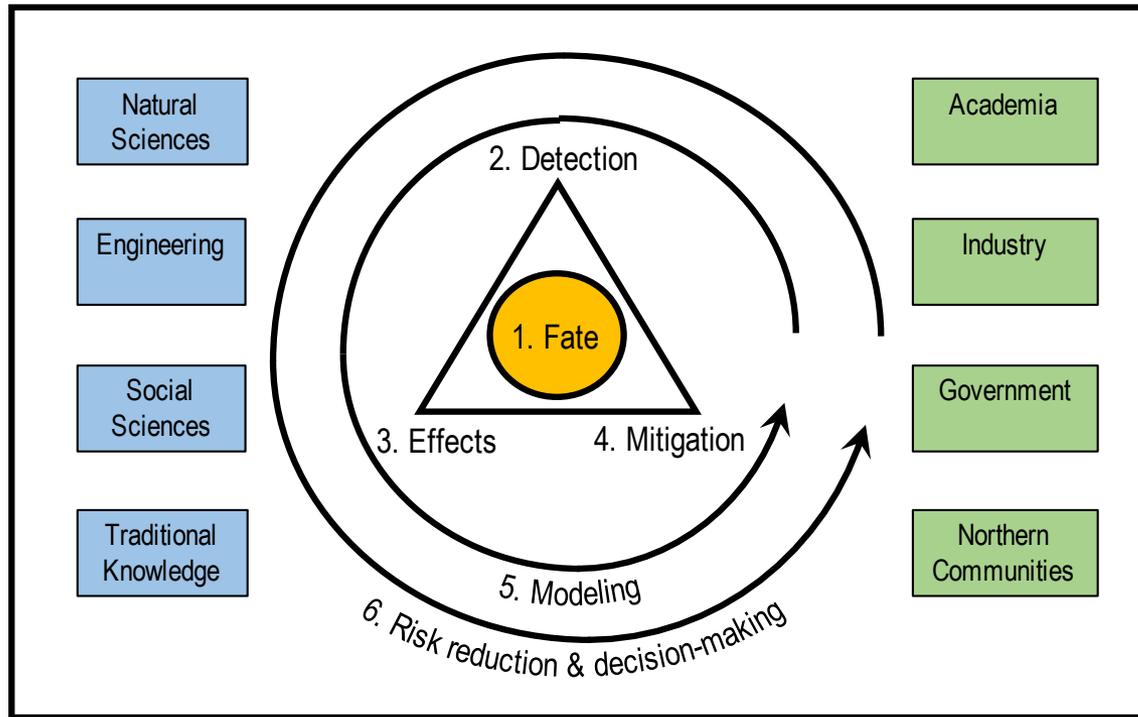


➤ 5 international collaborating organizations:



NSERC OSICA Network: Themes

Six Interrelated Research Themes:



1 - G. Stern



2 - D. Isleifson



3 - R. St-Louis



4 - B. Chen

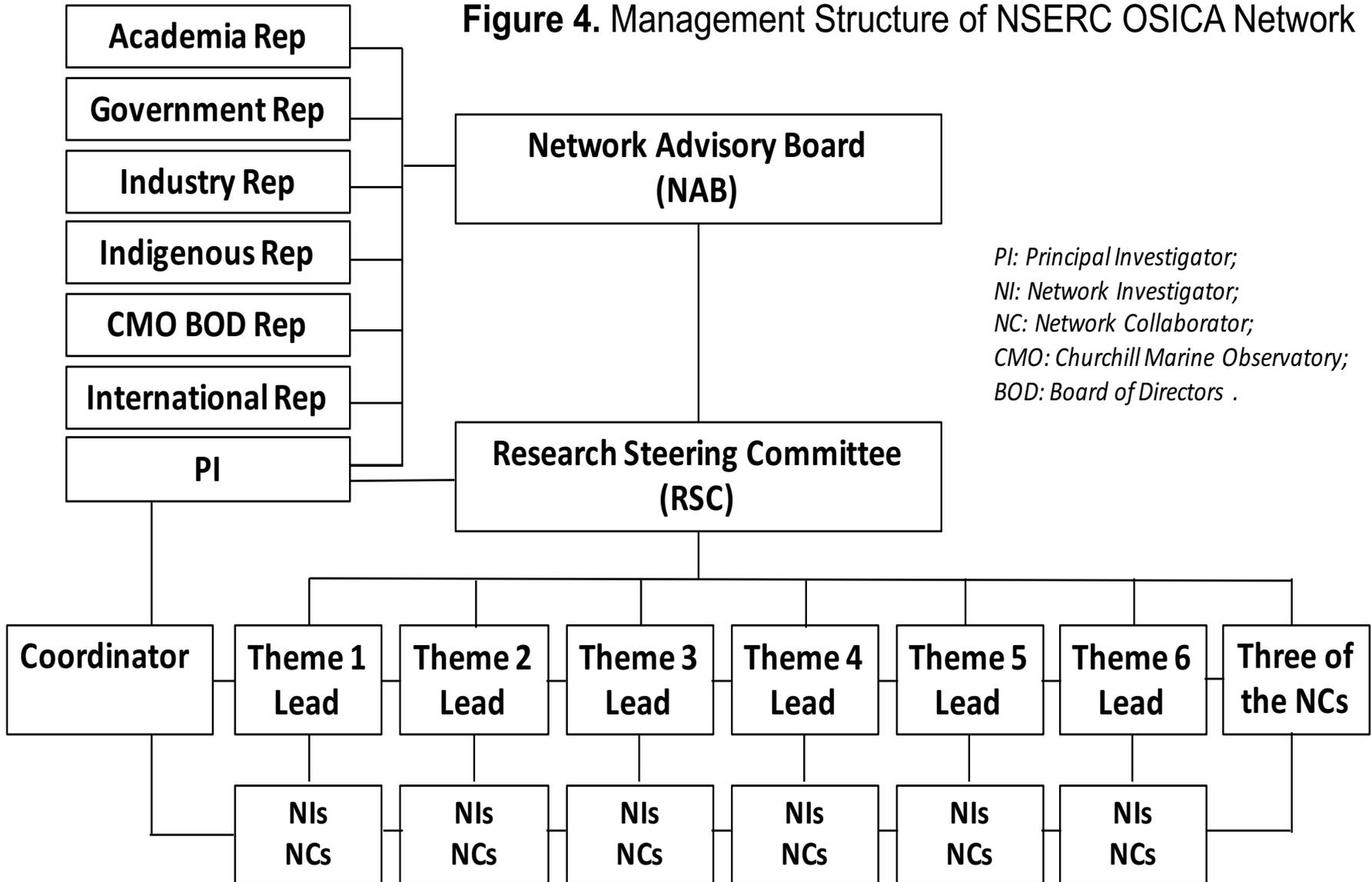


5 - H. Niu



6 - J. Dawson

Figure 4. Management Structure of NSERC OSICA Network



NSERC OSICA: Next Steps

- **Identifying gaps in science and in the team (NIs, collaborators, partners)**
- Completing theme proposals
- **Partnership Workshop (Ottawa; Nov. 2)**
- Finalizing match-up funds (cash & in-kind)
- Finalizing the full proposal
- **February 15, 2018: Full proposal is due to NSERC**
- March 2018: Site visit
- June 2018: Funding decision

Why should you be involved?

- **Networking:** Collaboration between the “oil camp” and the “Arctic/sea ice camp” is the only way to advance science and technology re oil spills in ice-covered Arctic waters
- **More networking:** Working together with academia, government, industries and local communities is the only way to make a real difference
- Shared access to **CMO and other major research facilities**
- Shared training of and access to the next generation **HQP**
- **Time is now: once-in-a-human-history opportunity to prepare for an opening Arctic Ocean**

New investigators, collaborators, & partners welcome!

Contact: feiyue.wang@umanitoba.ca