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Canada

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August 11, 2020

Your files Votre référence
17SN034

Our file Notre référence
17-HCAA-01798

Nunavut Impact Review Board
Attention: Heather Rasmussen
29 Mitik Street, P.O. Box 1360
Cambridge Bay, NU, X0B 0C0

Dear Heather Rasmussen,

Subject: NIRB Follow-up to Parties Regarding the Board's Recommendations in the Final Report for the Strategic Environmental Assessment in Baffin Bay and Davis Strait - Fisheries and Oceans Canada and Canadian Coast Guards responses

The Fish and Fish Habitat Protection Program of Fisheries and Oceans Canada (DFO-FFHPP) on behalf of Fisheries and Oceans Canada, would like to thank the Nunavut Impact Review Board (NIRB, or the Board) for the opportunity to provide updates to the NIRB respecting the Recommendations within the NIRB's Final Report and Recommendations for the Strategic Environmental Assessment in Baffin Bay and Davis Strait (the SEA).

As outlined in your request dated March 23, 2020 parties are invited to provide written submissions identifying the recommendations presented within the Final Report for the SEA that align with each of the organizations' mandate and to provide comments on 'how the recommendations are being addressed to date and plans for implementation moving forward'. As per NIRB's follow-up correspondences, parties are invited to submit comments to the NIRB by August 21, 2020.

The attached summary outlines the recommendations that align with DFO's mandate and where updates and progress have been made. Fisheries and Oceans Canada notes that the following submission also includes updates from the Canadian Coast Guard (CCG) and the Canadian Hydrographic Service (CHS).

If you or any other parties have any questions, please contact Mark D'Aguiar by email at Mark.D'Aguiar@ dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

A handwritten signature in black ink, consisting of several fluid, overlapping strokes that form a stylized representation of the name Thomas Hoggarth.

Thomas Hoggarth
Regional Director, Ecosystems Management
Central & Arctic Region
Fisheries and Oceans Canada

Copy: Mark D'Aguiar, DFO
Rich Rudolph, DFO

RECOMMENDATIONS ADDRESSING CONSULTATION, COORDINATION, AND PUBLIC ENGAGEMENT

Recommendations to address irrespective of the current moratorium

Recommendation 1: *Building on the data collected in Recommendation #29, develop accessible public guidance on the roles and responsibilities of Nunavut stakeholders (Federal agencies, Government of Nunavut, Inuit organizations, and communities) for oil and gas spill response within the Nunavut Settlement Area and in the Canadian offshore adjacent to the Nunavut Settlement Area.*

Canadian Coast Guard response:

The Canadian Coast Guard (CCG) is the lead federal response agency responsible for ensuring an appropriate response to all ship-source and mystery source pollution incidents in waters under Canadian jurisdiction

When the polluter has been identified and is willing and able to respond, the CCG will advise the polluter of its responsibilities under the *Canada Shipping Act, 2001*, and assume the role of Federal Monitoring Officer (FMO) when CCG is satisfied with the polluter's intentions and plans. However, in cases where the polluter is unknown, unwilling or unable to respond, the CCG will assume the overall management of the incident as On-Scene Commander (OSC). In all cases, CCG Environmental Response will ensure an appropriate response.

Coast Guard will continue to implement the new Arctic Region in partnership with Inuit, First Nations and Métis, and Northern partners. As part of this process, Coast Guard will be engaging on potential service delivery enhancements on programs including ER to ensure the needs of Northern communities are met.

The Canadian Coast Guard Marine Spills Contingency Plan defines the scope and framework within which the Canadian Coast Guard will operate to ensure a response to marine pollution incidents. In accordance with Canada's Marine Oil Spill Preparedness and Response Regime, the polluter is expected to respond to incidents while the Canadian Coast Guard will act in the capacity of Incident Commander for the federal government. The Canadian Coast Guard acts as lead responder in the event the polluter is unwilling or unable to respond, or the source of the pollution is unknown.

Coast Guard continues to support Government of Nunavut spill response training. The training is for both terrestrial and marine spill response. Partners in developing this training include: Nunavut Fishing and Marine Training Consortium (NFMTC), Environment and Climate Change Canada (ECCC), petroleum products division (PPD) and AECOM. CCG has provided feedback as a subject matter expert on marine spill response and incident management. In February 2020 Coast Guard- in partnership with the Nunavut Fisheries and Marine Training Consortium- hosted a five-day environmental response workshop in Iqaluit. Training and an exercise was scheduled to take place April 8, 2020 but was cancelled due to COVID-19.

Recommendation 4: *The Government of Nunavut, Nunavut Tunngavik Incorporated, the Qikiqtani Inuit Association, marine users (including commercial and traditional harvesters), and the communities in the Area of Focus should be included as active participants in all marine planning with the potential to affect the Canadian offshore waters of Baffin Bay and Davis Strait.*

DFO is working with the Qikiqtani Inuit Association (QIA), relevant communities, and Other Government Departments in the planning and development of Tuvaijuittuq Marine Protected Area and Sarvarjuaq (Canadian portion of Pikialasorsuaq) which occur in, or adjacent to the Baffin Bay region.

The Tuvaijuittuq Marine Protected Area was established by ministerial order in August 2019 in partnership with Parks Canada Agency (PCA) and Qikiqtani Inuit Association (QIA) as per the Tallurutip Imanga Inuit Impact Benefit Agreement (IIBA). DFO have engaged with key Inuit partners, communities, the Government of Nunavut (GN) and other key stakeholders to seek input and guidance prior to, and throughout, the establishment process.

A feasibility assessment to advance long-term protection consideration in Tuvaijuittuq is currently being conducted in partnership with PCA, QIA and the GN. The feasibility assessment will include community consultations with all five High Arctic communities to seek feedback on the feasibility assessment process and results. This will include work exploring fisheries potential within the TINMCA. Key stakeholders will also be engaged through this process to advance recommendations toward long-term protection.

DFO is working with the Qikiqtani Inuit Association on a Sarvarjuaq (Pikialasorsuaq) initiative to advance Inuit leadership in marine conservation and planning for the region. It is being developed in partnership with Greenland and the Kingdom of Denmark to explore bi-national management of shared aquatic resources. IQ knowledge collection, consultation and engagement with both Canadian and Greenlandic communities and other opportunities for Inuit leadership and decision making are being explored through the partnership.

Recommendation 5: *All parties with responsibilities for emergency response in the Area of Focus, including the communities in the region, should establish relationships with other circumpolar nations and transboundary groups to support active and timely coordination with these groups to enhance transboundary emergency preparedness and response capabilities.*

Canadian Coast Guard response

The Canadian Coast Guard actively participates in several bilateral and multilateral fora and agreements to ensure a timely and effective response(s) to transboundary emergencies.

Coast Guard maintains bilateral response agreements with the United States, and the Kingdom of Denmark, our two closest neighbours in the Arctic. Coast Guard participates in the Arctic Coast Guard Forum, and the Arctic Council under the Emergency Prevention, Preparedness and Response working group. Canada is signatory to the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, and the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic (MOSPA). Each of these

agreements and fora provide provisions for joint response to Search and Rescue (SAR) and Environmental Response (ER) events in the transboundary zones, or upon request domestically

Recommendations to address prior to lifting the current moratorium

Reecommendation 7: Opportunities should be pursued to establish relationships and develop decision-making processes with neighboring jurisdictions and the Government of Nunavut, Inuit Organizations, and communities, in support of developing common thresholds to assess effects from oil and gas development, to develop appropriate regulatory oversight of the industry, and to establish co-management mechanisms to address transboundary effects.

As a Responsible Minister/ Responsible Authority for Environmental Assessment processes in Nunavut and Northwest Territories, and Regulatory authority, DFO will continue to provide expert advice to the Boards, GN, Inuit organizations, and communities which may support the development of common effect thresholds, and work toward establishment of co-management mechanisms.

Recommendations to address should the current moratorium be lifted

Recommendation 8: In consultation with communities, relevant regulatory authorities should prepare community “toolkit” materials in plain language and general terms, which support community members becoming involved in research conducted in the Area of Focus and in the regulatory and marine planning processes associated with potential future oil and gas development in the Area of Focus.

Fisheries and Oceans Canada notes that a multi-departmental report has been co-authored by DFO, ECCC, PCA which examines the various federal spatial management tools to advance marine and terrestrial planning and is a resource to explore the variations among the approaches to help guide tool selection for marine planning. A plain language document to summarize this report is also being prepared and is anticipated to be ready by Fall 2020. Protection of the Arctic Marine Environment (PAME), a working group to the Arctic Council, has also developed a document on a Tool Box for MPA Network development at a circumpolar level (2015) which looks at marine spatial management measures in use across Arctic Council states

(https://www.pame.is/images/03_Projects/MPA/Toolbox/PAME_MPA_network_toolbox_Area-based_conservation_measures_and_ecological_connectivity.pdf).

Canadian Coast Guard response

Coast Guard participates at the Arctic Council Emergency Prevention, Preparedness and Response (EPPR) Working Group, and has helped support the development of a project entitled: Prevention, Preparedness and Response in Small Communities. This project developed a series of 6 videos (see link) that focus on themes such as planning, safety, coordination, action, and resources.

<https://vimeo.com/eppr>

In addition, the EPPR Working Group has developed the Circumpolar Oil Spill response Viability Analysis (COSVRA) and the Guideline for Arctic marine Risk Assessment.

Recommendations to address through future assessments

Recommendation 11: Future assessments and marine planning should include comprehensive transboundary effects assessments of valued environmental components and collaboration with Inuit residents in transboundary areas outside the Nunavut Settlement Area (e.g., Nunavik, Greenland, etc.) should occur whenever practical.

Marine planning in the Pikialasorsuaq (international waters between Canada and Greenland) is being led by QIA, supported by DFO, but also Greenlandic Inuit leadership, supported by the Kingdom of Denmark. The Pikialasorsuaq is an Inuit led process to develop authority and decision making responsibilities over culturally important areas and shared aquatic resources and to advance a marine management framework in international waters.

In Canada, the Sarvarjuaq (Canadian portion of the Pikialasorsuaq) initiative is led by the Qikiqtani Inuit Association and supported by DFO to advance Inuit leadership in marine conservation and planning for the region. IQ knowledge collection, consultation and engagement with both Canadian and Greenlandic communities and other opportunities for Inuit leadership and decision making are being explored through the Sarvarjuaq Steering Committee, comprised of QIA and DFO, and will be led by QIA to advance this initiative. Funding to QIA to support Sarvarjuaq and binational collaboration efforts is being provided in part by DFO to build capacity and support Inuit leadership.

Canadian Coast Guard response

Under the Arctic Council Emergency Prevention, preparedness and Response Working Group, a new Arctic-specific risk assessment tool for shipping has been developed and released in 2020. The Guideline was put together with input from the eight Arctic nations, and 6 Indigenous Permanent Participants, including the Aleut International Association, the Gwich-in Council International, and the Inuit Circumpolar Council. The guideline does not specifically focus on transboundary effects, but does consider this as part of the analysis. It is hoped that this will serve as a building block to more specific assessments focusing on sector-based activities such as oil and gas development.

RECOMMENDATIONS ADDRESSING REGULATORY AND BENEFITS REGIMES

Recommendations to address irrespective of the current moratorium

Recommendation 12: Develop an Inuit-led process to establish an accessible and central holding place in Nunavut to support the gathering and sharing of Inuit Qaujimajatuqangit and Inuit Qaujimaningit studies.

To support marine planning and conservation in the Qikiqtani region for initiatives such as Sarvarjuaq and Tuvaijuittuq (refer to response to recommendation 4), DFO is exploring opportunities to develop an online information portal to support sharing marine spatial

information. Inuit Qaujimajatuqangit and Inuit Qaujimaningit studies could also be hosted on such a platform.

Recommendations to address prior to lifting the current moratorium

Recommendation 14: *Potential impacts to Inuit harvesting and Inuit rights (including threats to food security) should be considered when developing and implementing compensation frameworks for impacts on marine fish, waterbirds, and marine mammals.*

Fisheries and Oceans Canada notes that should adequate data on community harvest statistics within the SEA be available, DFO Policy and Economics may be able to calculate food replacement costs for the value of fish and marine mammals for potentially impacted communities.

Recommendations to address through future assessments

Recommendation 17: *The scope of future assessments and marine planning must include comprehensive cumulative effects assessments for valued ecosystemic and socioeconomic components, including food security. Collaboration and input should be sought from all relevant parties and be informed by community-based monitoring programs.*

To address cumulative effects on valued ecosystem components, additional guidance and advice will be sought by DFO to ensure this is developed and understood in order to be incorporated into current or future marine planning initiatives. Discussions to advance the Sarvarjuaq initiative has an emphasis on the development of community based monitoring programs and will look to support this work going forward as the initiative progresses.

Canadian Coast Guard response:

Coast Guard supports the development of comprehensive cumulative effects assessments, and is a partner with Transport Canada, which is currently running a pilot program looking at cumulative effects of marine shipping in Cambridge Bay, NU

BOARD RECOMMENDATIONS ADDRESSING BASELINE RESEARCH

Recommendations to address irrespective of the current moratorium

Recommendation 19. *Collect baseline information and undertake assessments of the current and predicted effects of climate change in the Arctic, including direct and indirect impacts:*

- *on the physical environment (e.g., marine currents, fog, and precipitation),*
- *on the biological environment (e.g., wildlife migration patterns); and*
- *on the human environment (e.g., changes to wildlife availability and effects on harvesting, changes to ranges and availability of fish species and effects on commercial harvesting, etc.).*

The Arctic and Aquatic Research Division (AARD) is carrying out a limited amount of ecosystem research in the area of Baffin Bay and Davis Strait aimed at assessing ecosystem structure and function with a focus on primary production as part of the CCGS Amundsen based

program called Knowledge and Ecosystem Based Assessment for Baffin Bay (KEBABB) which is designed to support the implementation of an ecosystem approach to fisheries management. This program will be expanded to Lancaster Sound as part of DFO's responsibilities to provide science support to the TINMCA under Article 16 of the IIBA, to assess fisheries potential within the NMCA. A complete science program for the TINMCA will be co-developed over the coming year in association with QIA and Parks Canada. Species distribution modelling to project range shifts across the Canadian Arctic under climate change scenarios for native kelp and other northern species (key fish and invertebrates) of concern is being conducted by AARD as part of the Results Fund (Hudson Bay Change) and ArcticNet (ArcticKelp) research projects over the next 2-3 years.

To help inform management decisions in Sarvarjuaq, the Science advisory process to review available scientific and Inuit Qaujimaqatugangit that was completed (2020) represents a summary of the current state of knowledge for the polynya and adjacent waters; and has been peer reviewed.

Recommendation 21: *In consultation with the Qikiqtani Inuit Organization and communities in the Area of Focus, ongoing research programs should be prioritized to continue the gathering of Inuit Qaujimaqatugangit and Inuit Qaujimaningit regarding the marine environment and offshore areas in Baffin Bay and Davis Strait from Inuit knowledge holders in the communities in the Area of Focus.*

DFO in partnership with QIA is supporting additional IQ studies to inform the feasibility study to consider long-term protection for Tuvaqjuituq MPA and support informed management decisions by Inuit for Sarvarjuaq.

Recommendation 22: *Conduct additional bathymetry research to identify navigational hazards in the Area of Focus and to improve the safety of shipping in the region*

Canadian Hydrographic Service response

DFO's Canadian Hydrographic Service (CHS) measures and describes the physical features of Canada's navigable waters and their marginal land areas and provides this information to navigators via official navigational publications to facilitate safe and efficient navigation. This information may also be used for non-navigational purposes such as but not limited to environmental assessments, engineering studies, and resource management.

In the context of the Strategic Environmental Assessment Area of Focus in Baffin Bay and Davis Strait (per shaded area in Figure 2 -NIRB Final SEA report Vol 1), the combined area surveyed to either adequate or modern hydrographic standards now represents 24.5%. Areas surveyed to either of these standards are considered sufficient for charting purposes and therefore do not warrant the requirement for a hydrographic survey. Considerable areas within the Area of Focus that are insufficiently surveyed are very deep and therefore do not present a risk to navigation, further mitigating the urgency for modern hydrographic coverage. Note that sufficient hydrographic coverage within the Area of Focus has improved four-fold in the past ten years.

	April 1 2010	April 1 2015	May 20 2020
Modern Hydrography	0.0%	12.6%	20.3%
Adequate Hydrography	5.9%	5.8%	4.3%
	5.9%	18.4%	24.5%

Definitions

Surveyed to modern standards: represents areas where typically 100% of the bottom was sampled using either a multi-beam sonar, a sweep multi-transducer system, or an airborne bathymetric laser system (LiDAR).

Surveyed to adequate standards: represents areas where continuous profiles of the seabed were measured using echo-sounders at predefined spacing intervals, the vessel positions were acquired using radio or satellite positioning systems, and international hydrographic standards have been met.

Recommendation 24: *Conduct research in the Area of Focus to improve understanding of:*

- *marine plankton, including abundance, diversity and biomass; and benthic flora and fauna, including their respective biologies and ecologies.*

Assessment of marine plankton and benthic flora and fauna is addressed by KEBABB within the study area (see response to recommendation 19) and through coastal biodiversity studies in Milne Inlet and Frobisher Bay as part of OPP port baseline studies for the DFO Aquatic Invasive Species (AIS) program and collaborative research on the ArcticNet ArcticKelp project.

Recommendation 25: *Collect additional baseline data and undertake research in Baffin Bay and Davis Strait on:*

- *fish and fish habitat (including spawning grounds, nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly to carry out their life processes);*
- *waterbirds; and*
- *marine mammals.*

This research should be designed to improve the understanding of current status and potential for development activities to impact important populations and sensitive habitats. Research efforts should also include consideration for the effects of climate change and pollution and should focus on: population densities, distribution, abundance, and breeding success; monitoring of seasonal migration patterns and key habitat use; sensitive breeding and foraging habitat, including habitat used during winter conditions (e.g., polynyas); productivity; and prey abundance and distribution, include connections between species and other trophic levels (e.g., connections between plankton, fish, water birds, and marine mammals):

DFO is currently funding the following programs: multispecies and inshore fisheries assessment, inshore/offshore shrimp assessment, char assessment, ecosystem research in Baffin Bay/ Davis Strait (KEBABB), coastal biodiversity studies in Milne Inlet and Frobisher Bay as part of OPP and port baseline studies (DFO AIS program), as well as narwhal/ecosystem

research in Tremblay Sound. KEBABB is assessing primary production in the study area in conjunction with benthic and pelagic sampling of zooplankton.

DFO is also currently managing in-shore and offshore multi-species fisheries (including shrimp, char) and various marine mammal fisheries within the Baffin Bay and Davis Strait area. DFO currently manages the fisheries with co-managment organizations consistent with the Nunavut agreement.

Recommendation 27: *Collect baseline fisheries and ecosystem data to assess the commercial and ecosystemic viability of existing and potential expansions to the commercial fisheries in Baffin Bay and Davis Strait, including consideration of:*

- *turbot migratory patterns, spawning grounds, and stock connectivity with inshore waters in Nunavut and Greenlandic waters;*
 - *the viability of harvesting additional species (e.g., clams, Porcupine crab, redfish, etc.);*
 - *required investments in technology; and*
- increases to local quotas.*

To support the collection of baselines fisheries and ecosystem data, in particular with respect to the commercial fisheries in Baffin Bay and Davis Strait, DFO supplies fisheries data as allowed by privacy guidelines.

DFO explores species and assesses species viability through exploratory fisheries protocols and processes. The information collected through these fishing activities are considered by DFO, in consultation with communities and stakeholders. Increases to local quotas are considered during regular reviews of stock assessments.

DFO is beginning to engage with the 5 communities adjacent to the Tallurutiup Imanga National Marine Conservation Area, including Resolute Bay, Grise Fiord, Arctic Bay, Pond Inlet and Clyde River. This engagement will explore the fisheries potential for each community and will include assessing the viability of harvesting additional species that are of interest to each community.

DFO has funding opportunities to further support investment in commercial fisheries and technology such as:

- The Ghost Gear Fund – activities and projects supported include retrieval of ghost gear during closed fishing times, solutions for the disposal of fishing related plastic waste and ghost gear, acquiring and piloting of innovative gear technology for use in Canadian fisheries and supporting international work in high-risk areas to reduce ghost gear; and,
- The Northern Integrated Commercial Fisheries Initiative – provides funding and support to Indigenous groups and communities in areas where DFO manages the fishery. The initiative supports Indigenous-owned communal commercial fishing enterprises and aquaculture operations.

Recommendation 29: *Assemble available information on emergency preparedness and response, including:*

- *current regulatory oversight and responsibilities;*
- *current and required response capabilities for the Area of Focus;*
- *spill response technologies applicable to the Arctic (in both ice and open water);*
- *emergency response infrastructure; and best practices and measures for emergency prevention and response.*

DFO will be developing a relocatable drift prediction model to support the response; however will not necessarily be applicable to mitigation. Application to the Arctic will begin in 2020.

Particle dispersion models for Baffin Bay-Davis Strait developed as part of a DFO assessment for emergency ballast exchange zones (Goldsmit et al. 2019; DFO 2015) could aid in informing emergency response or be used for comparison with/validation of predictions from updated drift prediction models.

Canadian Coast Guard response:

Coast Guard will continue to implement the new Arctic Region in partnership with Inuit, First Nations and Métis, and Northern partners. As part of this process, Coast Guard will be engaging on potential service delivery enhancements on programs including ER to ensure the needs of Northern communities are met.

See input on legislative responsibilities and mandate under Recommendation 1.

Contingency Planning (Coast Guard Contingency Planning vs. Community Action Plans)

- Coast Guard-Environmental Response contingency plans focus on how *Coast Guard* maintains preparedness, response, tactics, strategies, management etc.
- Territorial Governments and hamlets have the primary responsibility for public safety in general, and develop, maintain and implement all-hazard emergency plans. The territorial governments in NWT (Municipal and Community Affairs-MACA) and Nunavut (Nunavut Emergency Management-NEM) lead a community-based Hazard Identification Risk Assessment (HIRA). In Nunavut each community completed a HIRA which identifies the top ten risks to the community as outlined by council. The community, with guidance from territorial governments, then complete a contingency plan for the identified top 10 risks. C&A-ER is seeking to participate in this process by facilitating *Community Action Plans* to help address maritime pollution incidents (this is in its infancy/development stages for the north). Territorial governments are responsible for public safety and this trickles down to the Hamlets. Inuit Organizations and Indigenous Services Canada also have roles to play with respect to public safety.
- Coast Guard is proposing a new initiative to address ship-source marine spills. These Community Action Plans aim to improve preparedness of communities and develop strategies to achieve that. These plans would provide a communication strategy about what the C&A-ER team needs to develop (tools and key messages) to ensure that the different communities in the region have a better understanding of their role and responsibilities (e.g. land manager) in case of a spill.

Community Action Plans provide the following:

[illegible]

Recommendation 31: *Building on the data collected in Recommendation #29, initiate a formal review of the existing capacity to respond effectively to a major spill of oil in the Area of Focus, highlighting the expected role of communities and community capacity in responding to emergencies. The Government of Nunavut, Designated Inuit Organizations, and Nunavut communities should be actively engaged through the review process.*

Recommendation 32: *Conduct baseline research to assess the capacity and infrastructure required to manage and respond to a well blowout or major spill in the Arctic and to determine whether an effective response can be mounted in remote locations under harsh weather conditions with periods of prolonged darkness and in the presence of ice.*

Coast Guard supports the DFO-led Multi-partner Research Initiative funded as part of the Oceans Protection Plan. The Initiative aims to support collaboration among leading national and international experts on oil spill research and response to:

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- develop new technologies and protocols to select the best methodologies for oil spill clean-up
- support science-based decisions that will aim to minimize the environmental impacts of oil spills and enhance habitat recovery

Fisheries and Oceans Canada will collaborate with:

- oil spill experts in government, industry and academia
- Indigenous and coastal communities
- regulatory agencies
- response organizations

The Initiative will build on the previous work of Fisheries and Oceans Canada's Centre for Offshore Oil, Gas and Energy Research, located in Halifax, NS, as well as other Government of Canada research facilities.

Expected outcomes

Through collaboration with leading oil spill experts, oil spill response protocols and decisions to help minimize the environmental impacts of oil spills can be improved.

Recommendation 33: *Conduct additional research to identify the potential effects of oil and gas activities and unplanned events (e.g., ice breaking, vessels, spills) on sensitive areas, including consideration of changing conditions associated with climate change.*

DFO is currently conducting research on the impacts of ship traffic on narwhal movements and behaviour in Tremblay Sound, and on coastal biodiversity of marine plankton and benthic flora and fauna in Milne Inlet and Frobisher Bay. Ecological niche modelling is underway to project range shifts across the Canadian Arctic under climate change scenarios for native and potential vessel-mediated invasive kelps, fish and invertebrates.

In addition, under the Arctic Council, the Protection of Arctic Marine Environments (PAME) working group has completed a state of knowledge review in the circumpolar Arctic in order to get a baseline understanding of underwater noise in Arctic regions, including ambient sound levels, underwater noise created by anthropogenic activities, and impacts of underwater noise on marine life, including marine mammals, fish, and invertebrates. DFO has provided expert review and additional information to support the completion of the PAME report and continues to be involved through the OPP program to develop recommendations on noise thresholds, impacts and mitigation measures.

(<https://www.pame.is/index.php/document-library/pame-reports-new/pame-ministerial-deliverables/2019-11th-arctic-council-ministerial-meeting-rovaniemi-finland/421-underwater-noise-report/file>)

Canadian Coast Guard response: refer to CCG response in recommendation 32

Recommendation 34: *Conduct baseline research to improve understanding of oceanographic processes in Baffin Bay and Davis Strait during ice-covered and open-water conditions. This*

baseline information should be used to inform analysis of potential environmental effects and oil spill modeling.

DFO is currently conducting several ongoing projects that are documenting baseline information during open-water conditions (e.g., KEBABB, multi-species survey, killer whale research).

Recommendation 35: *Undertake research to establish baseline information on coastal habitat features such as:*

- *shoreline form, substrate, and vegetation type;*
- *biological resources, presence of sensitive species;*
- *life stages;*
- *sensitive human use resources; and*
- *the potential oil residency in different shoreline/substrate types.*

Community based coastal research and monitoring activities are being developed under the Arctic Coast program in Nunavut communities of Kinngait and Igloodik, and coastal biodiversity studies are ongoing in Milne Inlet, Frobisher Bay and other communities with high vessel activity, as part of OPP and port baseline studies (DFO AIS program). The Arctic Salmon program engaged Baffin Bay communities starting in 2019 to collect data on the presence of salmon and other unusual fishes in coastal waters used for subsistence fishing.

Recommendation 37: *Baseline data should be used to identify sensitive (or critical) habitat for Species at Risk for incorporation into marine planning for the Area of Focus.*

DFO notes that **baseline** data will be used to identify sensitive (or critical habitat) for SAR, that will be incorporated into marine planning.

Recommendation 38: *In collaboration with communities and responsible parties, update statistical data for key socio-economic indicators in the Area of Focus, including business investment data and contributions of economic sectors at the community level.*

DFO (Policy and Economics) could update harvest data and the economic values of subsistence harvest of fish and marine mammals at the community level.

Recommendation 40: *Conduct a comparative analysis of oil and gas developments and alternative forms of economic development in the Area of Focus (e.g., commercial fishing, shipping, mining, and tourism) to include:*

- *a labour market analysis*
- *cost-benefit-analysis;*

- *identification of education and training opportunities and ability to gain transferable skills;*
- *identification of types and numbers of local employment opportunities and other benefits; and*
- *discussion of potential limitations on the ability of Inuit communities to effectively participate in job, training, or other economic opportunities associated with a given type of economic development.*

DFO is supporting advancement of marine planning in the Pikialasorsuaq/Sarvarjuaq area in the eastern Arctic under the leadership of the Qikiqtani Inuit Association. This initiative looks at potential management and international governance between Canada and Greenland (Denmark) of the region around the North Water Polynya. Geospatial information on ecological features and socio-economic activities is being collected and developed to inform management questions and decisions.

Recommendations to address should the current moratorium be lifted

Recommendation 41: *Conduct baseline research to:*

- *establish baseline atmospheric and underwater sound levels in Baffin Bay and Davis Strait;*
- *improve understanding of the potential effects of underwater noise and seismic activities on plankton, benthic organisms and invertebrates (including shellfish and arthropods), fish, waterbirds, and marine mammals; and apply research to develop threshold criteria for assessing injury and behavioural disturbance.*

DFO is currently conducting research on the impacts of ship traffic on narwhal movements and behaviour in Tremblay Sound (see response to recommendation 33)

Recommendation 45: *Conduct research regarding the potential for cumulative effects on marine fish, waterbirds, and marine mammals with consideration of:*

- *associated oil and gas activities combined with existing and potential future activities, including mining, marine transportation, commercial fishing, Inuit harvesting and traditional land use, and practices;*
- *direct project interactions;*
- *changes to water quality;*
- *habitat alteration or loss including disturbance of ice habitat;*
- *underwater noise;*
- *oil spills, including chronic leaks from platforms; and*
- *the release of sewage and grey water.*

A substantial science program is being implemented under the Ocean Protection Program Baseline project to collect baseline data in Frobisher Bay. This includes characterization of coastal, benthic and pelagic ecosystems in the study area as well as assessments of water quality.

Additionally, management measures are being examined to address the impacts of environmental stressors (e.g. noise, nutrients etc.) on marine species, habitats and ecosystems

(i.e The Arctic Pile driving protocol for reducing risks caused by underwater noise has been field tested at one of the Nunavut development sites and is being reviewed for modifications).

BOARD RECOMMENDATIONS ADDRESSING ASSESSMENT OF ECOSYSTEMIC AND SOCIO-ECONOMIC IMPACTS

Recommendations to address irrespective of the current moratorium

Recommendation 48: *Conduct research on the relationship between changes in bloom phenology, abundance, productivity, and species composition of benthic flora and changes in the marine environment (e.g., sea ice distribution, ocean circulation, surface conditions, and temperatures) to better understand the potential non-linear feedback loops between climate change and the benthic marine environment.*

DFO notes that additional resources would be required to address this recommendation. A project investigating stable isotope and fatty acid biomarkers of fish that prey upon shrimp in Davis/Hudson Strait was initiated by a DFO scientist who has since moved to the University of Quebec at Rimouski; however the project is continuing. A goal of this project is to gain long-term insight into ecosystem variability, including the impacts of climate change. Data on the distribution and abundance of non-shrimp benthic taxa will also be collected to help fill biodiversity and ecosystem knowledge gaps for this region.

Recommendations to address prior to lifting the current moratorium

Recommendation 49: *Conduct research on the effects on benthic filtering organisms resulting from the uptake of suspended solids due to increased turbidity from development activities on/near the seabed.*

DFO notes there are no updates at this time

Recommendation 50: *Conduct further research to assess:*

- *the resiliency of sensitive areas; and*
- *whether these areas would return to natural conditions following cessation of oil and gas development.*

DFO notes there are no updates at this time

Recommendation 51: *incorporating all relevant updated baseline data (including Inuit Qaujimagatuqangit and Inuit Qaujimaningit) and in collaboration with the Nunavut government, Inuit organizations, and local communities, initiate marine-based regional planning throughout the Area of Focus, including the development of regional priorities.*

DFO is currently working to complete a feasibility study for Tuvaijuittuq which includes the compilation of baseline data, knowledge sources and IQ to inform future management decisions. This will also be done in future phases of the Sarvarjuaq initiative, and in collaboration with Greenlandic partners to support Inuit decision making needs and inform an Inuit led

management framework for the region. Coordination in partnership with QIA and other partners using a whole of government.

Recommendation 53: *Reflecting updated baseline research, assess the potential impacts of oil and gas development on components of the biological, physical, and human environments in the Area of Focus including:*

- *sensitive areas;*
- *fish and fish habitat (including at different life stages);*
- *waterbirds; and*
- *marine mammals.*

Assessment should address uncertainty regarding potential physiological and behavioural responses to impacts (such as acoustic and underwater noise) and should indicate how areas impacted by development are expected to change over time and under different climate change conditions/models.

Fisheries and Oceans Canada currently assesses the potential impacts of development projects including oil and gas development projects on Fish and Fish habitat, marine mammals and their habitat and provides expert advice to the NIRB as part of the environmental impact assessment processes in Nunavut. Fisheries and Oceans Canada considers, and will continue to consider, the most up-to-date research, data and information in its review and assessment of proposed development projects.

Recommendation 54: *Conduct baseline studies to understand potential effects of an oil or gas spill/release on:*

- *the Arctic environment and wildlife (including migratory species of marine fish, waterbirds and marine mammals);*
- *the Inuit way of life, and northern economy, including tourism and fisheries, and food security; and*
- *preparedness for handling any spills that could occur.*

Studies should consider potential effects of oil or gas spill/release under-ice and during the open water season.

Refer to response to recommendation 29. Ongoing (e.g. OPP initiatives); DFO will be developing a relocatable drift prediction model (science to support the response, not mitigation) – application to the Arctic will begin in 2020.

Recommendations to address should the current moratorium be lifted

Recommendation 56: *Conduct research to improve understanding of the potential for oil and gas development to have impacts on sensitive areas in the Area of Focus, including for polynyas and areas with ice cover. This research should address how these areas may change over time, based on which types of oil and gas development activities occur, and which climate change conditions/models are used.*

<p>DFO notes that ongoing (e.g., work on Pikialasorsuaq, protected areas, conservation targets) work includes processes to collect and synthesize existing knowledge in areas of potential interest for marine conservation. Canadian Science Advisory (CSAS) process on the State of Knowledge of the Pikialasorsuaq has been completed (January 2020) and will be used to inform future discussions on management decisions for the region, including binational waters with Greenland. Planning is underway for a ship based mission to the area in 2021-2022 in collaboration with the University of Manitoba.</p>
<p><u>Recommendation 57:</u> <i>Building on updated baseline information about commercial harvesting collected under Recommendation #27, identify the potential for oil and gas development (including resulting from associated spills or other incidents) to have adverse economic effects on Nunavut's existing and future commercial fisheries.</i></p> <p>DFO collects baseline information (as noted in recommendation #27) and can provide this fisheries information as requested.</p>
<p>BOARD RECOMMENDATIONS IN RELATION TO IMPACT MITIGATION</p>
<p>Recommendations to address prior to lifting the current moratorium</p>
<p><u>Recommendation 62:</u> <i>Reflecting updated baseline and effects assessment data, conduct research to analyze the effectiveness of mitigation measures (including new technologies) designed to reduce potential acoustic impacts associated with oil and gas development and project-related shipping on:</i></p> <ul style="list-style-type: none"> • fish; • waterbirds; and • marine mammals. <p><i>Research should include delineation between different species and their various life stages.</i></p> <p>DFO notes there are no updates at this time</p>
<p>Recommendations to address should the current moratorium be lifted</p>
<p><u>Recommendation 63:</u> <i>In the development of emergency response plans, spill contingency and prevention plans, standard operating procedures, etc. and in the design of impact mitigation measures, oil and gas developers should incorporate lessons learned from accidents and malfunctions in similar jurisdictions, including associated standard operating procedures and impact mitigation measures.</i></p> <p>Refer to response to recommendations 29 and 32.</p>
<p>BOARD RECOMMENDATIONS REGARDING MONITORING</p>
<p>Recommendations to address irrespective of the current moratorium</p>
<p><u>Recommendation 64:</u> <i>Establish a mechanism for harvesters and community members to report:</i></p>

<ul style="list-style-type: none"> any observed issues with the quality of country food; and any other observed changes or concerns regarding impacts associated with development activities in the Area of Focus. <p>DFO notes there are no updates at this time.</p>
Recommendations to address should the current moratorium be lifted
<p><u>Recommendation 66:</u> <i>Develop and implement programs to involve Inuit and nearby communities in local monitoring programs in Baffin Bay/Davis Strait (particularly including monitoring of priority harvesting areas).</i></p> <p>Discussions around monitoring programs, community based monitoring activities and research are underway for Sarvarjuaq initiative, including community exchanges across the polynya with Greenlandic communities. It is recognized that this is an important aspect for management and monitoring of the marine region and will be developed through later stages of the Sarvarjuaq project. DFO will support capacity development of communities to lead this initiative and will build off of other work already being done by eNGO's and academic partners in this region on community based monitoring programs.</p> <p><u>Canadian Coast Guard response:</u> Coast Guard supports NTI's Inuit Marine Monitoring Program, which could be adapted to monitor oil and gas developments in the future should the moratorium be lifted.</p>
BOARD RECOMMENDATIONS ADDRESSING IMPACT MODELING, MAPPING AND PREDICTIONS
Recommendations to address irrespective of the current moratorium
<p><u>Recommendation 69:</u> <i>Reflecting up to date information, including additional baseline gathered under Recommendations #27 and #50, produce up-to-date online maps of sensitive habitats for the Area of Focus with layers of information for relevant species and factors considered to identify sensitive habitats.</i></p> <p>DFO notes there are no updates at this time.</p>
BOARD RECOMMENDATIONS ADDRESSING IMPACT MODELING, MAPPING AND PREDICTIONS
Recommendations to address prior to lifting the current moratorium
<p><u>Recommendation 71:</u> <i>Identify sensitive/critical habitat for Species at Risk where oil and gas activities should be limited, restricted, or prevented from occurring and/or where establishment of Marine Protected Areas may be appropriate.</i></p> <p>There is ongoing work and discussions on protected area. The recent Northwater CSAS (refer to recommendation 56) identifies sensitive/critical habitat for Species at Risk, e.g., ivory gull.</p>
Recommendations to address should the current moratorium be lifted

<p><u>Recommendation 75:</u> <i>Based on baseline research conducted under Recommendation #41 to establish baseline atmospheric and underwater sound levels in Baffin Bay and Davis Strait, complete updated modeling of the dispersion of sound from anthropogenic sources and the potential direct, and cumulative effects, of noise from oil and gas development activities on wildlife receptors (including marine fish, waterbirds and marine mammals).</i></p> <p>DFO suggests that this may be completed when enough baseline data is available.</p>
<p><u>Recommendation 76:</u> <i>Establish setbacks or other potential development restrictions on the proximity of oil and gas development activities, infrastructure, and other components to the floe edge.</i></p> <p>DFO notes there are no updates at this time.</p>
<p><u>Recommendation 77:</u> <i>Establish setbacks or other potential development restrictions on the proximity of oil and gas development activities, infrastructure, and other components (particularly seismic surveying activities) in areas, and during seasons, where commercial harvesting takes place currently, or in areas where expansion of commercial harvesting is expected to take place in the future.</i></p> <p>DFO notes there are no updates at this time.</p>
<p><u>Recommendation 78:</u> <i>Consider establishing setbacks or other development restrictions on the proximity of oil and gas development activities, infrastructure and other components (particularly seismic surveying activities) in areas, and during seasons, that are currently closed to fishing in order to protect sensitive benthic areas and Narwhal overwintering habitats.</i></p> <p>DFO notes there are no updates at this time.</p>