



June 26, 2023

Mark Ings
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Nunavut Impact Review Board
P.O. Box 1360,
Cambridge Bay, NU X0B 0C0

Via e-mail: info@nirb.ca

**Re : Government of Canada Technical Review Comments and Final Written Submissions
for Baffinland Iron Mines Corporation's Sustaining Operations Proposal**

Dear Mr. Ings,

Further to the Nunavut Impact Review Board's (the Board) Notice of Reconsideration, issued on May 8, 2023 for Baffinland Iron Mines Corporation's (Baffinland) Sustaining Operations Proposal, the Government of Canada would like to provide the following Technical Review Comments and Final Written Submissions from departments participating in the Board's reconsideration process.

The Northern Projects Management Office (NPMO) is responding on behalf of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO), Health Canada (HC), Natural Resources Canada (NRCan), Transport Canada (TC), and the Parks Canada Agency (PC).

The Government of Canada looks forward to continued participation in the Board's reconsideration process. If you have any questions regarding this correspondence, please contact Kaitlyn Bakker, A/Senior Project Manager at Kaitlyn.bakker2@canor.gc.ca or 867-765-8057.

Sincerely,

Lisa Dyer
Director General
Northern Projects Management Office
Canadian Northern Economic Development Agency

- c. Terry Audla, Regional Director General, Nunavut Region, Crown-Indigenous Relations and Northern Affairs Canada
- Tom Hoggarth, Regional Director, Ecosystem Management, Fisheries and Oceans Canada, Central and Arctic Region
- Mary Taylor, Director General, Environment Protection Operations Directorate, Environment and Climate Change Canada
- Greg Carreau, Director General, Safe Environments Directorate, Health Canada
- Rinaldo Jeanty, Associate Assistant Deputy Minister of Lands and Mineral Sector, Natural Resources Canada
- Shari Currie, Regional Director General, Prairie and Northern Region, Transport Canada
- Jenna Boon, Field Unit Superintendent, Nunavut, Parks Canada
- Jarred Picher, Director, Natural Resource Management Branch, Parks Canada
- Lou Kamermans, Senior Director, Sustainable Development, Baffinland

Government of Canada

Technical Review Comments / Final Written Submissions

*For the Reconsideration Process for Baffinland's Sustaining
Operations Proposal*

Date: June 26, 2023

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Executive Summary

Crown-Indigenous Relations and Northern Affairs Canada

Crown-Indigenous Relations and Northern Canada has a broad mandate for the co-management of land and water resources in Nunavut, as well as the management of Crown land under various acts and regulations.

As set out in the Nunavut Agreement and the *Nunavut Planning and Project Assessment Act*, the Minister of Northern Affairs, in concurrence with other responsible Ministers, has a decision-making role for proposed projects undergoing assessment, based on the Nunavut Impact Review Board's (the Board) report and recommendations (and after ensuring the Crown's duty to consult has been discharged). If a proposed project is approved to proceed, CIRNAC is responsible for the enforcement of the terms and conditions of the Project Certificate, Crown land authorization, and water licences issued for the project, as applicable.

As part of the Board's assessment process, CIRNAC acts as an intervenor, providing advice and expertise to the Board based on CIRNAC's regulatory mandate and decision-making role.

CIRNAC also administers the Northern Participant Funding Program, which supports meaningful participation of Inuit and other Indigenous peoples and Northerners in the assessment of major projects.

CIRNAC has undertaken a technical review of the Final Environmental Impact Statement (FEIS) Addendum for Baffinland Iron Mines Corporation's (Baffinland) "Sustaining Operations" Proposal (SOP) for the Mary River Project and its supporting documents. CIRNAC is pleased to provide the Board with its technical review comments (TRC).

In general, the information, analysis, and presentation of the material within the SOP and supporting documents are well presented. However, there is some uncertainty regarding the potential effects of aspects of the project and suitable mitigation measures. In certain instances, aspects of the proposed activities are not clearly described or require further assessment.

CIRNAC's review of the assessment of the biophysical impacts of the SOP on the natural environment resulted in the generation of seven TRCs and recommendations for consideration by the NIRB and Baffinland. These TRCs are described in detail later in this submission and are summarized below:

1. To ensure adequate mitigation of Acid Rock Drainage and Metal Leaching in the long term (mine closure and beyond), CIRNAC is seeking assurance that the proposed criteria for identification of Potentially Acid Generating rock are robust and reliable, the operation of the Waste Rock Facility guarantees encapsulation of the Potentially Acid Generating rock under inert materials, and that the proposed Waste Rock Management Plan and Interim Closure and Reclamation Plan are based on best management practices.
2. The FEIS Addendum conclusion regarding non-significant effects on surface water quality and sediment quality caused by the management of Potentially Acid Generating rocks from the Waste Rock Facility requires justification by thermal modeling of the waste rock pile to demonstrate that the proposed mitigation is adequate.

3. Maintaining transportation and shipment of 6 Mtpa of iron ore will result in increased dust generation when compared to the originally approved 4.2 Mtpa. Although the SOP provides details of the mitigation measures planned and considered, it is unclear which of the mitigations have been implemented and which are still pending. Therefore, confirmation that the dust mitigation measures provided in the report are either implemented or planned to be implemented in the near future is required.
4. The project timeline and schedule has changed significantly during the course of the project. However, this change in schedule, potential future plans, and the project's next steps (e.g., extensions beyond 2024) have not been adequately detailed in the report.
5. Section 4.2 of the SOP provides details of the committed mitigation measures and decisions taken during the year 2022, and Section 4.6 provides information on the 'Production Increase Proposal Renewal Commitments'. However, CIRNAC requests additional details regarding the management plans, specifically on which plans need to be updated (Section 4.2), and timelines for the updating of the plans as well implementation of the plans (Section 4.6). Additional details are also required for the Adaptive Management Plans with details on the indicators' status and response levels of these indicators (Section 4.6).
6. Design validity of how the project infrastructure such as natural and engineered slopes, water courses, retention dikes, embankments, foundations, hazardous and other waste facilities, landforms, containment structures, and similar structures influenced by climate change has not been amended or updated in the SOP. Considering the National Building Code of Canada was recently upgraded to the 2020 version, relevant seismic design criteria from this new National Building Code of Canada should be applied to the SOP.
7. Dust deposition in surface water sources and its potential effect on surface water quality is mentioned in Section 6.4.2.2 (Water and Sediment Quality). However, the content in this section causes confusion as the statements are contradictory in some parts. As such, CIRNAC seeks information regarding the interrelation between the Surface Water and Aquatic Effects Ecosystems Management Plan (SWAEMP), the Air Quality and Noise Abatement Management Plan (AQNAMP), and Trigger Action Response Plans (TARP), along with confirmation of whether surface water quality and sediment quality is affected by dust deposition due to SOP project activities.

Fisheries and Oceans

Fisheries and Oceans' Fish and Fish Habitat Protection Program undertakes the review of project proposals in and around fisheries waters. The Fish and Fish Habitat Protection Program ensures that works, activities and undertakings are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act* (see below). The Fish and Fish Habitat Protection Program also serves as the lead and coordinates all of Fisheries and Oceans' participation in environmental assessments conducted under the various enabling legislation throughout Canada, including the *Nunavut Planning and Project Assessment Act*.

Additionally, Fisheries and Oceans, in partnership with Inuit, Parks Canada, Transport Canada, and the Government of Nunavut is, under Schedule 1 of the *Canada National Marine Conservation Areas Act* (the Act), in the process of establishing Tallurutiup Imanga National

Marine Conservation Area in Lancaster Sound; the Act, and the Tallurutiup Imanga Inuit Impact and Benefit Agreement, provide the foundation for the framework under which the Tallurutiup Imanga National Marine Conservation Area will be managed and add weight to the precautionary recommendations provided by DFO in this submission.

The proposed extension of increased shipping as part of *'Baffinland Iron Mines Corporation's (Baffinland or Proponent) submission of the "Sustaining Operations Proposal"'* and considering modifications of condition 179(a) and 179(b) of Mary River Project Certificate 005 has the potential to cause additional negative impacts to the marine environment including behavioural changes resulting from increased frequency of noise, displacement of a significant proportion of the Eclipse Sound summer stock to other summer areas, potential increased mortality to marine mammals and further introductions of aquatic invasive species and non-indigenous species.

Fisheries and Oceans remains concerned with the ongoing, significant decline in the abundance of Narwhal in Eclipse Sound. In 2013, Fisheries and Oceans estimated the population of Narwhal within Eclipse Sound to be 10,489, current (2022) Baffinland reporting estimates the population to be 4,592. Any adaptive management plans and action must take into consideration that the population remains at a critical level within Eclipse Sound.

Fisheries and Oceans does not agree that natural exchange between Admiralty Inlet is the cause for the decline. Tagging studies have indicated an exchange rate of approximately 30%, which agrees with our understanding of Inuit Qaujimajatuqangit for the Eclipse Sound summer stock. This does not represent the decline being seen currently. Other factors cited are not specific to Eclipse Sound, for instance Narwhal and Orcas are concurrent in Admiralty Inlet where Narwhal populations may be increasing, climate change would impact either area similarly and that the decline was occurring prior to project-related shipping. Shipping has been noted in previous submissions occurring beginning in 2006, with an increase in vessels noted in 2013. Baffinland's reference year for pre-shipping comparisons, 2015, is therefore not reflective of pre-shipping conditions and may mask the true scale of impacts. Furthermore, the global pandemic resulted in an almost total reduction of shipping traffic in Eclipse Sound, other than project related traffic, and this period of reduced traffic overlaps with the observed narwhal displacement.

Fisheries and Oceans supports the mitigation measures put in place by the company, however robust monitoring of the measures, using the best practices in data analyses, is key to understanding their effectiveness. Adaptive management plans, including thresholds for responses and the responses themselves must take into consideration that the population remains at a critical level within Eclipse Sound.

Fisheries and Oceans does not agree with Baffinland's conclusions on the significance of aquatic invasive species and has numerous issues with the *'Risk Assessment for Introduction of Aquatic Invasive Species from Ballast Water'* (WSP 2023). The risk assessment underestimates the risk associated with vessel traffic to the mine due to the use of outdated information and inaccurate assumptions. The introduction of aquatic invasive species and non-indigenous species from shipping activities remains a significant risk. While no introduced species to date has been declared an aquatic invasive species, there are several species on the watch list. Non-indigenous species have an unknown capability to become invasive and warrant the same level of concern as aquatic invasive species.

Environment and Climate Change Canada

The mandate of Environment and Climate Change Canada is determined by the statutes and regulations under the responsibility of the Minister of Environment and Climate Change. In delivering this mandate, Environment and Climate Change Canada is responsible for the development and implementation of policies, guidelines, codes of practice, inter-jurisdictional and international agreements, and related programs. Environment and Climate Change Canada's specialist advice is provided in the context of the *Canadian Environmental Protection Act* including the Disposal at Sea Regulations, the pollution provisions of the *Fisheries Act* including the Metal and Diamond Mining Effluent Regulations, the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

Baffinland is planning to use Capesize ore carriers. The Sustaining Operations Proposal has not considered potential air quality impacts from the use of Capesize ore carriers. Baffinland should update air quality modeling to include the use of Capesize ore carriers.

Health Canada

Health Canada is a federal department responsible for helping Canadians maintain and improve their health. One of the ways this is accomplished is through participation in the environmental impact review of major resource and infrastructure projects. Specifically, Health Canada provides its expertise, information, or knowledge on human health issues related to the potential environmental impacts of a proposed project. Note that Health Canada only provides recommendations to help prevent, reduce, and mitigate the potential effects of any change to the environment on the health of Indigenous peoples; the Department does not approve or issue licenses or permits to enforce its recommendations.

Health Canada has undertaken a technical review of Baffinland's "Sustaining Operations Proposal" Project Proposal (the "Project"), as part of the Board's reconsideration of Project Certificate No. 005. During the review process, Health Canada's review resulted in one technical review comment related to the proposed Risk Communication Program.

Health Canada does not have any specific recommendations with respect to the Sustaining Operations Proposal. Below is a summary of Health Canada's comments regarding the proposed Risk Communication Program:

- Considering the following during implementation would help to ensure an effective Risk Communication Program:
 - Clearly defining roles and responsibilities for the Risk Communication Program and any associated working groups or committees by co-developing Terms of Reference.
 - Inviting the Government of Nunavut to participate in the Risk Communication Program.
 - Respecting community availability and capacity when developing timelines and schedules for Risk Communication Program consultation activities and workshops.
 - Using community-based monitoring information and local and traditional knowledge when developing Risk Communication Program messaging and workshop content.
 - Actively inviting diverse community members (including Elders, Knowledge Keepers, Project Monitors, and trusted health or care partners) to help create and

share risk communication messages and materials on topics of community concern.

Full details on Health Canada's comments and further information on the Department's participation in the Board's review of the Proposal is provided in this final submission.

Natural Resources Canada

Natural Resources Canada works to improve the quality of life of Canadians by ensuring that our natural resources are developed sustainably, providing a source of jobs, prosperity and opportunity, while preserving our environment and respecting our communities and Indigenous peoples. The Minister of Natural Resources is a responsible Minister under the *Nunavut Project Planning and Assessment Act* when issuing explosives licences under the *Explosives Act*. Natural Resources Canada's review of the Sustaining Operations Proposal did not reveal any information relevant to Natural Resources Canada's areas of expertise. Natural Resources Canada therefore does not have any comments on this application.

Parks Canada

Parks Canada's mandate: "On behalf of the people of Canada, we protect and present nationally significant examples of Canada's natural and cultural heritage and foster public understanding, appreciation and enjoyment in ways that ensure their ecological and commemorative integrity for present and future generations". National marine conservation areas, including Tallurutiup Imanga National Marine Conservation Area, are established in accordance with the *Canada National Marine Conservation Areas Act* for the purpose of protecting and conserving representative marine areas for the benefit, education and enjoyment of the people of Canada and the world. Under this Act, Parks Canada must ensure that National Marine Conservation Areas are managed and used in a sustainable manner that meets the needs of present and future generations without compromising the structure and function of the ecosystems, including the submerged lands and water column, with which they are associated. At this time, the key concern that Parks Canada is focused on is the decrease in narwhal abundance in Eclipse Sound. This decline of narwhal abundance in Eclipse Sound is of considerable concern to Parks Canada because narwhal play a significant role in the marine ecosystem of the Tallurutiup Imanga National Marine Conservation Area and the continuation of Inuit cultural practices.

Transport Canada

Transport Canada is responsible for the Government of Canada's transportation policies and programs. Transport Canada develops legislative and regulatory frameworks and conducts oversight through legislative, regulatory, surveillance and enforcement activities. While not directly responsible for all aspects or modes of transportation, Transport Canada plays a leadership role to ensure that all parts of the transportation system across Canada work together effectively. Transport Canada is providing two technical comments regarding marine-related matters:

1. Seeking clarity regarding Baffinland's potential use of larger (Capesize) vessels
2. Requesting that Baffinland reference the most current ballast water regulations in future documentation.

List of Abbreviations

AMP:	Adaptive Management Plan
AQNAMP:	Air Quality and Noise Abatement Management Plan
ARD:	Acid Rock Drainage
Baffinland:	Baffinland Iron Mines Corporation
CEPA:	<i>Canadian Environmental Protection Act</i>
CIRNAC:	Crown-Indigenous Relations and Northern Affairs Canada
CNWA:	<i>Canadian Navigable Waters Act</i>
DAS:	Disposal at Sea
DFO:	Department of Fisheries and Oceans Canada
ECCC:	Environment and Climate Change Canada
FA:	<i>Fisheries Act</i>
FFHPP:	Fish and Fish Habitat Protection Program
FEIS:	Final Environmental Impact Statement
FWS:	Final Written Submission
HADD:	Harmful Alteration, Disruption, or Destruction of Fish Habitat
HC:	Health Canada
HHRA:	Human Health Risk Assessment
IIBA:	Inuit Impact Benefit Agreement
ICRP:	Interim Closure and Reclamation Plan
QIA:	Qikiqtani Inuit Association
MBCA:	<i>Migratory Birds Convention Act</i>
MDMER:	Metal and Diamond Mining Effluent Regulations
ML:	Metal Leaching
NBCC:	National Building Code of Canada
NIRB/ Board:	Nunavut Impact Review Board
NMCA	National Marine Conservation Area
NPMO:	Northern Projects Management Office
NRCan:	Natural Resources Canada
Nunavut Agreement:	Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada
NuPPAA:	<i>Nunavut Planning and Project Assessment Act</i>
NWB:	Nunavut Water Board
NWNSTRA:	<i>Nunavut Waters and Nunavut Surface Rights Tribunal Act</i>
PAG:	Potentially Acid Generating
PIP:	Production Increase Proposal
PIPE:	Production Increase Proposal Extension
PIPR:	Production Increase Proposal Renewal
PC:	Parks Canada Agency
the Project:	Sustaining Operations Proposal
the Proponent:	Baffinland Iron Mines Corporation
QIA:	Qikiqtani Inuit Association
SARA:	<i>Species at Risk Act</i>
SOP:	Sustaining Operations Proposal
SWAEMP:	Surface Water and Aquatic Effects Ecosystems Management Plan
TARP:	Trigger Action Response Plan
TC:	Transport Canada
TI NMCA:	Tallurutiup Imanga National Marine Conservation Area
TRC:	Technical Review Comment
VC:	Valued Component
WRF:	Waste Rock Facility

Introduction

The Government of Canada actively participates in the Board's assessment process to provide technical expertise with regards to the Project's potential impacts and possible way of mitigating those impacts. The Government of Canada also actively participates in the Board's assessment process to learn about and understand opinions and concerns Inuit may have about the Project.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)

CIRNAC has a broad mandate for the co-management of land and water resources in Nunavut, as well as the management of Crown land under the following applicable acts and regulations:

- The *Department of Crown-Indigenous Relations and Northern Affairs Act*;
- The *Nunavut Land Claims Agreement Act* and the Nunavut Agreement;
- The *Nunavut Planning and Project Assessment Act*;
- The *Arctic Waters Pollution Prevention Act* and Regulations;
- The *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and Regulations; and
- The *Territorial Lands Act* and Regulations.

As set out in the Nunavut Agreement and the *Nunavut Planning and Project Assessment Act*, the Minister of Northern Affairs, in concurrence with other responsible Ministers, has a decision-making role for proposed projects undergoing assessment, based on the Nunavut Impact Review Board's (the Board) report and recommendations (and after ensuring the Crown's duty to consult has been discharged). If a proposed project is approved to proceed, CIRNAC is responsible for the enforcement of the terms and conditions of the Project Certificate, Crown land authorization, and water licences issued for the project, as applicable.

As part of the Board's assessment process, CIRNAC, along with other parties, acts as an intervenor, providing advice and expertise to the Board. Based on CIRNAC's regulatory mandate and decision-making roles, CIRNAC participates in the assessment process by providing expertise on a variety of matters related to project works, activities, and associated management, mitigation and monitoring plans, such as:

- Environmental impact assessment methodology and best practices, including cumulative effects assessment;
- Surface water quality and quantity;
- Groundwater quality and quantity;
- Marine water quality as affected from land;
- Permafrost;
- Waste management;
- Vegetation;
- Crown land contamination/degradation (particularly closure and reclamation planning); and
- Indigenous consultation and accommodation.

CIRNAC also administers the Northern Participant Funding Program, which supports meaningful participation of Inuit and other Indigenous peoples and Northerners in the assessment of major projects.

Environment and Climate Change Canada (ECCC)

ECCC carries out its legislated responsibility under Article 12 of the *Nunavut Agreement* and Section 197 of NuPPAA by providing recommendations, advice, and information within its

mandate to both the proponent and decision-makers. ECCC's advice may be used to develop potential conditions or measures that may accompany a final decision for the Project.

The mandate of ECCC is determined by the statutes and regulations under the responsibility of the Minister of Environment and Climate Change. In delivering this mandate, ECCC is responsible for the development and implementation of policies, guidelines, codes of practice, inter-jurisdictional and international agreements, and related programs. ECCC's specialist advice is provided in the context of the *Canadian Environmental Protection Act* (CEPA) including the Disposal at Sea (DAS) Regulations, the pollution provisions of the *Fisheries Act* (FA) including the Metal and Diamond Mining Effluent Regulations (MDMER), the *Migratory Birds Convention Act* (MBCA), and the *Species at Risk Act* (SARA).

ECCC administers the pollution prevention provisions of the FA, which prohibits the deposit of a deleterious substance into water frequented by fish. The MDMER regulate the deposit of mine effluent and mine waste into water frequented by fish and places referred to in subsection 36(3) of the FA. Under MDMER, Environmental Effects Monitoring is a science-based performance measurement tool used to evaluate the adequacy of the effluent regulation in protecting fish, fish habitats and the usability of fisheries resources. ECCC also regulates DAS under CEPA with the objective of protecting the marine environment. Regulated aspects of DAS include the loading of material for disposal, the transport of that material to a disposal site and the disposal itself.

ECCC is responsible for protecting and conserving migratory bird populations and individuals under the MBCA. ECCC also administers SARA in cooperation with DFO and the Parks Canada Agency to prevent wildlife species from being extirpated or extinct; to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity; and to manage species of special concern to prevent them from becoming threatened, endangered or extirpated.

Fisheries and Oceans Canada (DFO)

Fisheries and Oceans Canada (DFO) is a federal department responsible for protecting Canada's three oceans and waterways ensuring they remain healthy for future generations and providing economic opportunities to Canadians and coastal communities. DFO's Fish and Fish Habitat Protection Program (FFHPP) administers and ensures compliance for development projects taking place in and around fish habitat under the fish and fish habitat protection provisions of the *Fisheries Act* and relevant provisions of the *Species at Risk Act* (SARA).

The *Fisheries Act* and SARA provide a legal basis for conserving and protecting fish and fish habitat. The fish and fish habitat protection provisions of the *Fisheries Act* include: a prohibition against causing the death of fish, by means other than fishing (section 34.4); a prohibition against causing the harmful alteration, disruptions or destruction of fish habitat (section 35); a framework of considerations to guide the Minister's decision-making functions (section 34.1); and ministerial powers to ensure the free passage of fish or the protection of fish or fish habitat with respect to existing obstructions (section 34.3).

The fish and fish habitat protection provisions provide an approach to conserving and protecting fish and fish habitat, supported by policies and programs that provide for the long-term sustainability of freshwater and marine resources. The fish and fish habitat protection provisions apply to all fish and fish habitat throughout Canada and are applied in conjunction with other

applicable federal laws and regulations related to aquatic ecosystems, including the SARA, the *Oceans Act*, regulations respecting aquaculture, and the *Aquatic Invasive Species Regulations*.

Health Canada (HC)

HC is the federal department responsible for helping Canadians maintain and improve their health. One of the ways this is accomplished is through participation in the environmental assessment of major resource and infrastructure projects. One of the key objectives of HC's environmental assessment program is to help prevent, reduce, and mitigate the potential effects of any change to the environment on the health of Indigenous peoples. At the request of a Responsible Authority, Review Panel, or other jurisdiction conducting an environmental assessment, HC makes available specialist or expert information or knowledge in its possession on human health issues related to the potential environmental impacts of a proposed project. These areas include contamination of country foods (also known as traditional foods), human health risk assessments (HHRA), and health effects related to air quality, noise, radioactivity, and drinking and recreational water quality. In this context, HC provides expert information at the request of the Board for the Project.

In its review, HC examines the assessment of health impacts of current and potential future environmental conditions resulting from the Project. The Department provides comments on potential risks to human health and assesses the results of any relevant modelling but does not validate the predicted future contaminant levels in the air, water, or country foods.

The Department considers the following aspects of environmental assessment reviews:

- The appropriateness of methodologies used;
- The predicted health risks and any comparisons to health-based guidelines and standards;
- The measures proposed to mitigate human health impacts;
- The conclusions made concerning human health effects, and the accompanying rationales and justifications; and,
- The evidence provided to justify the conclusions, and the scientific defensibility of the rationales for the conclusions regarding the potential effects on human health.

The Department's review and comments focus on the accuracy, scientific validity, and completeness of assessments concerning human health effects. HC does not issue any approvals or make any regulatory decisions concerning this Project.

Additional information on HC's mandate can be found at: <https://www.canada.ca/en/health-canada/corporate/publications/health-canada-participation-environmental-assessments.html>.

Natural Resources Canada (NRCan)

Natural Resources Canada (NRCan) is committed to improving the quality of life of Canadians by ensuring the country's abundant natural resources are developed sustainably, competitively, and inclusively. NRCan develops policies and programs that seek to enhance the contribution of the natural resource sector to the economy, improve the quality of life for all Canadians, and conducts innovative science in facilities across Canada to generate ideas and transfer technologies. NRCan is an established leader in the fields of energy sources and distribution; forests and forestry; minerals and mining; earth science; energy efficiency; and, science and data. NRCan draws its expertise from the following areas within the department when providing its technical review: the Geological Survey of Canada (GSC), CanmetMINING and the Explosives Regulatory Division.

Since 1842, the GSC has produced cutting-edge, authoritative geoscience to support mineral exploration, climate change research, marine and coastal resilience, and natural hazards mapping. The GSC provides expertise in hydrogeology and permafrost.

The Explosives Regulatory Division administers the application of the *Explosives Act*, which is the role that makes NRCan a Regulatory Authority under the *Nunavut Project Planning and Assessment Act*. The Explosives Regulatory Division ensures that manufacturers, importers, exporters, and vendors of explosives, as well those who store explosives or sell restricted components, comply with Canada's *Explosives Act* and its regulations. Explosives licensing by NRCan is limited to licensing of storage or manufacture of explosives. NRCan does not monitor or authorize their use.

Transport Canada (TC)

Transport Canada (TC) is responsible for the Government of Canada's transportation policies and programs. TC develops legislative and regulatory frameworks and conducts oversight through legislative, regulatory, surveillance and enforcement activities. While not directly responsible for all aspects or modes of transportation, TC plays a leadership role to ensure that all parts of the transportation system across Canada work together effectively.

TC is a Responsible Minister for the Mary River Project pursuant to the Nunavut Agreement and *Nunavut Project Planning and Assessment Act* (NuPPAA) and has issued approvals for components of the mine in accordance with the Navigation Protection Act (NPA) (repealed) and the *Canadian Navigable Waters Act* (CNWA). TC also has regulatory authority related to the *Canada Shipping Act, 2001*, *Canadian Navigable Waters Act* (CNWA), *Arctic Waters Pollution Prevention Act*, *Marine Liability Act*, *Marine Transportation Security Act*, *Railway Safety Act*, and *Transportation of Dangerous Goods Act, 1992*. Additionally, TC is a signatory to the Tallurutiup Imanga and Inuit Impact and Benefit Agreements (IIBA), along with Qikiqtani Inuit Association, Parks Canada and the Department of Fisheries and Oceans Canada.

TC has undertaken a technical review of the FEIS Addendum for the Sustaining Operations Proposal (SOP) and is providing technical comments, based on TC's mandate, roles, and responsibilities.

Parks Canada (PC)

Parks Canada (PC) is involved in the review of the Baffinland Mary River Sustaining Operations Proposal because the proposed project shipping is located beside Sirmilik National Park and within the waters of the proposed Tallurutiup Imanga National Marine Conservation Area. Note that once Tallurutiup Imanga NMCA is established under the *Canada National Marine Conservation Areas Act* (CNMCAA), Parks Canada will have a regulatory role.

National marine conservation areas (NMCA), including Tallurutiup Imanga NMCA, are established in accordance with the *Canada National Marine Conservation Areas Act* (CNMCAA) for the purpose of protecting and conserving representative marine areas for the benefit, education and enjoyment of the people of Canada and the world. Under this Act, Parks Canada must ensure that NMCAs are managed and used in a sustainable manner that meets the needs of present and future generations without compromising the structure and function of the ecosystems, including the submerged lands and water column, with which they are associated.

The Tallurutiup Imanga and Inuit Impact and Benefit Agreements (IIBA) was signed by the Qikiqtani Inuit Association and the Government of Canada, as represented by Parks Canada, the Department of Fisheries and Oceans, and Transport Canada on August 1, 2019. It secures important social, cultural and economic benefits for Inuit and establishes how Inuit and government will work together to realize these benefits and manage Tallurutiup Imanga NMCA.

Finally, Parks Canada is also involved because the Project is located near Sirmilik National Park; it therefore has the potential to impact the park's coastal/marine ecosystem.

Specific Comments

Crown-Indigenous Relations and Northern Affairs Canada

Review Comment	CIRNAC-TRC-01: Waste Rock Facility: PAG Rocks.
Reference(s)	<ul style="list-style-type: none"> • SOP FEIS Addendum. Appendix 10. Table 1. FEIS Summary of Residual Biophysical Effects. (NIRB File No. 08MN053). • Baffinland, Phase 1 Waste Rock Management Plan Rev 2, December 31, 2019, Mary River Project. • Baffinland, Interim Closure and Reclamation Plan, Appendix D, updated May 1, 2019. • 2022 Qikiqtani Inuit Association and Nunavut Water Board Annual Report for Operations. • CIRNAC's Closing Statements to the NIRB for the Mary River Phase 2 Development Proposal. 2022.
Summary	CIRNAC is seeking assurance that the proposed criteria for identification of Potentially Acid Generating (PAG) rock are robust and reliable. In addition, CIRNAC would like to ensure that the operation of the Waste Rock Facility (WRF) guarantees appropriate encapsulation of the PAG rock and that the proposed Waste Rock Management Plan and Interim Closure and Reclamation Plan are based on best management practices. This is important in mitigating Acid Rock Drainage and Metal Leaching (ARD/ML) in the long term (mine closure and beyond).
Importance of Issue to Impact Assessment	Clear and adequate derivation of appropriate PAG identification criteria is critical for the effective management of waste rock at the mine site. If the Net Potential Ratio value and associated total sulphur wt% criteria are not suitably conservative, Baffinland may underestimate the tonnages of PAG in the Block Model for Deposit 1. Greater than expected tonnages of PAG may result in the WRF design and water treatment sizing not being adequate to prevent short- or longer-term adverse impacts to the associated watershed.
Detailed Review Comment	<p>In 2022, during the assessment of the Phase 2 Development Proposal, Baffinland agreed to the following commitments related to ARD/ML from the WRF (Commitment 186):</p> <ul style="list-style-type: none"> a) Baffinland shall develop reliable criteria for the identification of PAG rock that clearly accounts for uncertainty in the 0.2% total sulphur threshold and the presence of acidic soluble sulphates upon projected life of mine tonnages of PAG and Non-Acid Generating rock.

	<p>b) Baffinland shall incorporate these criteria, clearly stated ranges in the projected life of mine Potentially Acid Generating and Non-Acid Generating (NAG) rock tonnages, and the resultant necessary contingencies and methods of validation that need to be incorporated into engineering design, environmental monitoring, and management strategies for the Waste Rock Management Plan and Interim Closure and Reclamation Plan. These documents are to be submitted for review during the Water Licence Amendment process, subject to Nunavut Water Board (NWB) requirements.</p> <p>c) Baffinland shall review the performance of these plans and provide evidence of the effectiveness of these plans by demonstrating compliance with the management measures and that the desired outcomes of mitigation are achieved on an annual basis.</p> <p>The SOP FEIS Addendum does not discuss the PAG identification criteria. It is not clear if the solution to this issue has been developed in the updated Waste Rock Management Plan (BAF-PH1-830-0029) and Interim Closure and Reclamation Plan, which were not presented in the SOP FEIS Addendum.</p> <p>Due to the information gap, CIRNAC cannot confirm if the management of PAG rocks from the WRF will not cause significant effects on surface water and sediment quality.</p>
Recommendation/ Request	<p>If the Project is approved, CIRNAC requests that Baffinland commits to providing the following:</p> <ol style="list-style-type: none"> 1. Baffinland shall develop reliable criteria for the identification of PAG rock that clearly accounts for uncertainty in the 0.2% total sulphur threshold and the presence of acidic soluble sulphates upon the projected life of mine tonnages of PAG and NAG rock. 2. Baffinland shall incorporate these criteria, clearly stating ranges in projected life of mine PAG and NAG rock tonnages, and the resultant necessary contingencies and methods of validation that need to be incorporated into engineering design, environmental monitoring, and management strategies for the Waste Rock Management Plan and Interim Closure and Reclamation Plan. 3. Baffinland shall review the performance of these plans and provide evidence of the effectiveness of these plans by demonstrating compliance with the management measures and that the desired outcomes of mitigation are achieved on an annual basis.

Review Comment	CIRNAC-TRC-02: Waste Rock Facility: Thermal Modeling
Reference(s)	<ul style="list-style-type: none"> • SOP FEIS Addendum. Appendix 10. Table 1. FEIS Summary of Residual Biophysical Effects. (NIRB File No. 08MN053). • Baffinland, Phase 1 Waste Rock Management Plan Rev 2, December 31, 2019, Mary River Project. • Baffinland, Interim Closure and Reclamation Plan, Appendix D, updated May 1, 2019. • 2022 Qikiqtani Inuit Association and Nunavut Water Board Annual Report for Operations. • CIRNAC's Closing Statements to the NIRB for the Mary River Phase 2 Development Proposal. 2022.
Summary	The FEIS Addendum conclusion regarding non-significant effects on surface water and sediment quality caused by the management of PAG rocks from the WRF requires justification by thermal modeling of the waste rock pile to demonstrate that the proposed mitigation is adequate.
Importance of Issue to Impact Assessment	Thermal modelling results are important for the environmental impact assessment to determine if permafrost conditions will affect project infrastructure. Management of the WRF relies on freeze-back to mitigate ARD/ML issues. Thermal modeling is required to demonstrate that the proposed management approach is appropriate.
Detailed Review Comment	<p>In 2022, during the assessment of the Phase 2 Development Proposal Baffinland agreed to the following commitments related to the thermal modeling of its WRF:</p> <ul style="list-style-type: none"> a) Baffinland shall complete thermal modeling of the WRF and include the results in the Waste Rock Management Plan prior to the conclusion of the Water Licence Amendment process, subject to NWB requirements (Commitment 100) b) Baffinland commits to providing the following information during the Water Licence Amendment process, subject to NWB requirements (Commitment 188). c) Baffinland shall provide a heat balance as well as relationship between the heat generation associated with the exothermic reaction of PAG waste rock deposited and the associated soluble sulphates. Baffinland shall demonstrate that the current design of the WRF will maintain permafrost conditions in the long term (closure and beyond). d) Baffinland shall perform an oxygen balance of the WRF and correlate it with soluble sulphates. This will provide an

	<p>understanding of the process of ARD generation and the performance of the WRF.</p> <p>Performance of the WRF is described in the Phase Waste Rock Management Plan (BAF-PH1-830-0029) and Interim Closure and Reclamation Plan, which were not presented in the SOP FEIS Addendum. It is not clear if the Waste Rock Management Plan was updated by Baffinland to address thermal modeling results.</p> <p>The 2022 QIA and NWB Annual Report for Operations states: <i>Baffinland continued to conduct geochemical testing of waste rock to expand the analytical dataset and monitor temperatures within the WRF to confirm the management strategy ensured that frozen conditions could be achieved and maintained within the waste rock pile.</i></p> <p>Based on the information provided, it is not clear whether a heat balance has been performed and whether the internal heat generation correlates with the heat generation associated with the exothermic reaction of PAG waste rock. It is not clear if the oxygen consumption correlates with the extent of the oxidation process taking place and if the water balance are a result of infiltration rainfall that percolates through the waste rock.</p> <p>Due to the information gap, CIRNAC cannot confirm if management of PAG rocks from the WRF will not cause significant effects on surface water quality and sediment quality.</p>
Recommendation/ Request	CIRNAC recommends that Baffinland makes a commitment to complete thermal modeling of the Waste Rock Facility and include the results in the Waste Rock Management Plan.

Review Comment	CIRNAC-TRC-03: Soil Contamination from Dustfall
Reference(s)	<ul style="list-style-type: none"> • Baffinland Dust Audit- Final Recommendation Report. Nunami Stantec Ltd. February 2023. • SOP FEIS Addendum., (NIRB File No. 08MN053) <ul style="list-style-type: none"> • Section 6 Environmental Review • Appendix 6 Annual Report PC Results • Appendix 7 Commitment List • Appendix 9 Baseline Summary • Modified Terms and Conditions 179(a) and (b) • Terms and Conditions 179(c) and 10 • Commitments 004 and 007 in Appendix B of the Project Certificate No 005.
Summary	CIRNAC requires confirmation and application status of the dust

	mitigation measures listed in the SOP; whether these mitigation measures are either currently being implemented or are planned to be implemented.
Importance of Issue to Impact Assessment	Dust mitigation is a key measure presented in the SOP and is one of the fundamental issues discussed with the local communities. Furthermore, modification to T&C No.10 was suggested regarding this same impact. Sufficient and timely mitigation measures are paramount to alleviate the issues stemming from the increased dust production, especially as it is also an impact that may accumulate over time.
Detailed Review Comment	<p>Maintaining transportation and shipment of 6 Mtpa will result in increased dust generation when compared to the originally approved 4.2 Mtpa. As documented in the SOP, dust generation at the project sites is an ongoing issue with respect to widespread dustfall across the various mine areas, near the Crusher, Milne Port and Tote Road. Widespread soil contamination is a common issue at mines, and it is typically attributed to dustfall from operations such as ore extraction, crushing, and hauling. Therefore, soil contamination may be present near the Crusher, Milne Port, and Tote Road.</p> <p>CIRNAC recognizes the efforts made by Baffinland to suppress and reduce dust generation and funding an Inuit-led dustfall monitoring program as well as the Independent Dust Audit Committee. Commitment 004 in Appendix B of the Project Certificate lists the measures that Baffinland has implemented or that could be further implemented to manage dust at the mine.</p> <p>CIRNAC understands that Baffinland is committing to increasing the number of continuous particulate monitoring stations to better define the extent and magnitude of the dustfall issue. As indicated in the SOP, there was a low level of certainty in the extent and magnitude of the dustfall related to the residual effects prediction.</p> <p>At this time, CIRNAC cannot determine which of the dust management measures have been implemented at the mine and there is no definitive statement in the SOP that the remaining management efforts will be implemented.</p>
Recommendation/ Request	<p>CIRNAC supports implementation of all feasible measures for dust reduction. CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> 1. Confirms that the dust mitigation measures provided in the SOP are either implemented or are planned to be implemented in the near future. 2. Installs continuous particulate monitoring stations along the Tote Road, up to 1 km away from the centerline, and include co-located soil sampling stations. Include annual soil

	<p>sampling to assess metal accumulation and test for leachability.</p> <ol style="list-style-type: none"> 3. Describes how it can ensure that the road surface does not contain materials contributing to the spread of metal contamination into the soils found within the various mine areas. 4. Tracks potential trends in increased dustfall generation with soil contamination in the various mine site areas.
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Review Comment	CIRNAC-TRC-04: Project Schedule
Reference(s)	<ul style="list-style-type: none"> • SOP FEIS Addendum, (NIRB File No. 08MN053) <ul style="list-style-type: none"> • Section 2.1 Purpose and Need for the Sustaining Operations Proposal
Summary	CIRNAC requires details on the project's schedule, especially on Baffinland's plans beyond year 2024.
Importance of Issue to Impact Assessment	Section 2.4 of SOP provides very brief information regarding the project schedule, which addresses the project's future up to only year 2024. Considering the scale and importance of the project, as well as the criticality of this SOP, the project schedule is a vital component of the SOP which should be addressed correctly and with sufficient detail, to identify any potential impacts (individual or cumulative) and to discuss ways forward in considering alternatives and scenarios.
Detailed Review Comment	<p>The execution strategy for the project has changed dramatically from the originally proposed project that received approval in 2012, and it is difficult to understand and predict potential cumulative effects without a greater understanding of what the project may look like beyond 2024.</p> <p><i>Baffinland has indicated they are "continuing to evaluate the feasibility to proceed with the already approved Southern rail option and/or other options. Ultimately Baffinland must switch to a rail operation for the economic longevity of the Project."</i></p> <p><i>The proposed continuance of the approved 2018-2022 transportation activity levels in 2023 and 2024 will allow Baffinland to sustain relationships with existing markets, thus capitalizing on the demand for ore, which will contribute to the long-term viability of the Project and help prevent temporary or early closure of the Project."</i></p> <p>CIRNAC notes that there is no clear indication of the Proponent's plans for the project beyond 2024. Consequently, it is difficult for CIRNAC to confirm the Proponent's conclusion regarding</p>

	potential cumulative effects of the SOP.
Recommendation/ Request	<p>CIRNAC requests that Baffinland:</p> <ol style="list-style-type: none"> 1. Clarifies its long-term plans for the Mary River Project as it relates to project viability and next steps or an indication of their intent to seek an additional extension for the status quo beyond 2024.

Review Comment	CIRNAC-TRC-05: Environmental Management Plans - Updating of plans
Reference(s)	<ul style="list-style-type: none"> • SOP FEIS Addendum, (NIRB File No. 08MN053) <ul style="list-style-type: none"> • Section 4.2 Mitigation • Section 4.6 Production Increase Proposal Renewal Commitments
Summary	Sections 4.2 (Monitoring) and 4.6 (PIPR Commitments) of the SOP require further details on Management Plans (MPs) which require updating, Adaptive Management Plans (AMPs) indicators' status and response levels, as well as timelines for updating of MPs/AMPs.
Importance of Issue to Impact Assessment	Management plans are an essential component of the SOP as they provide all the vital information on measures to mitigate potential negative impacts of the project. Proper updating of MPs/AMPs is important for the environmental assessment process, as it reflects the commitments and Terms and Conditions developed through the project assessment process. As per Section 4.6, further details on AMP development as well as indicators and response levels of the indicators within AMPs are to be provided.
Detailed Review Comment	<p>CIRNAC seeks to clarify the timeline for the commitment in Section 4.2 and the two commitments in Section 4.6.</p> <p>Section 4.2 of the SOP includes the following statement:</p> <p><i>“Management plans will be revised as necessary to reflect the Project Certificate amendments and commitments developed through the PIP Renewal review process. Updated management plans will be submitted to NIRB as they are finalized.”</i></p> <p>CIRNAC seeks to clarify which management plans need to be updated and the timeline for when the updated management plans will be finalized and submitted.</p> <p>Section 4.6 of the SOP includes the following statements:</p>

	<ul style="list-style-type: none"> • <i>“Baffinland to provide a timeline and plan for development of monitoring and AMP plans.</i> • <i>Baffinland to provide data on which indicators within the draft adaptive management plans have been triggered within the low, medium, and high response levels.”</i>
Recommendation/ Request	<p>For Section 4.2, CIRNAC requests that Baffinland provide a list describing the management plans that need to be updated and a timeline describing when the updated management plans will be finalized and submitted.</p> <p>For Section 4.6 CIRNAC requests that Baffinland provide information as follows.</p> <ul style="list-style-type: none"> • Baffinland to provide a timeline and plan for development of monitoring and AMP plans. • Baffinland to provide data on which indicators within the draft adaptive management plans have been triggered within the low, medium, and high response levels.

Review Comment	CIRNAC-TRC-06: Infrastructure and Engineering Related to Site Works
Reference(s)	<ul style="list-style-type: none"> • SOP FEIS Addendum, (NIRB File No. 08MN053). <ul style="list-style-type: none"> • Section 1 Introduction • Section 2 Sustaining Operations Proposal Description • Section 5.2 Mary River Project Physical Setting • Section 6.3.1 Summary of Baseline Conditions (for Terrestrial Environment) • Section 6.7 Effects of the Environment on the Project • Section 8 Relevant Previous Assessment Materials and Monitoring Results • Section 9 Summary and Conclusion • Appendix 1 Concordance Table • Appendix 2 Project Certificate Amendments • Appendix 6 Annual Report PC Results • Appendix 7 Commitment List
Summary	Infrastructure of the Mary River Project is susceptible to climate change and its operations and closure should be reviewed considering the new National Building Code of Canada (NBCC) 2020 and its seismic design criteria.
Importance of Issue to Impact Assessment	The Mary River Project's infrastructure was designed based on the NBCC 2015, however, considering the NBCC 2020 which was recently introduced, project infrastructure should be reviewed to understand if there are any risks to overall stability during

	operations or closure due to the potential for seismic activity in the area.
Detailed Review Comment	<p>The SOP does not propose any significant changes to the design validity of various project infrastructure elements.</p> <p>There have been significant upgrades in the seismic design code of Canada from the previous National Building Code of Canada (NBCC 2015) to the now current NBCC 2020. The most recent NBCC 2020 seismic design criteria will be applicable to the SOP.</p> <p>Design of infrastructure elements such as slopes (natural and engineered), watercourses, retention dikes, embankment, foundations, hazardous and other waste facilities, landform and other containment structures should be revalidated with regulatory or national building and bridge codes as the stability of these infrastructure elements may be significantly impacted as a result of evolving climate change scenarios.</p>
Recommendation/ Request	<p>CIRNAC recommends that:</p> <ol style="list-style-type: none"> 1. Baffinland's Engineer of Record (EOR) who is responsible for infrastructure examines changes in the NBCC 2020 and validates the design of these structures in the light of the revised seismic design criteria for the project. The infrastructure design criteria to be reviewed should include earthworks slopes; foundations, dams/dikes, and earth retention structures. 2. Baffinland confirms that NBCC 2020 has been reviewed by the EOR and that the Mary River Project infrastructure are validated with the revised seismic design criteria in the latest NBCC standards.

Review Comment	CIRNAC-TRC-07: Dustfall Impact on Surface Water Quality and Quantity
Reference(s)	<ul style="list-style-type: none"> • SOP FEIS Addendum., (NIRB File No. 08MN053) <ul style="list-style-type: none"> • Section 6.4.2.2 • Section 6.3.1.2
Summary	<p>The presentation of the impacts of dust deposition on surface water quality in Section 6.4.2.2 lacks enough details and clarity for CIRNAC to identify whether there is an impact or not. Considering the community concerns raised related to dustfall, CIRNAC requires confirmation regarding the presence of project-related dust deposition, and how the various management plans are addressing this potential impact or if plan updates can be triggered should baseline conditions change.</p>

Importance of Issue to Impact Assessment	<p>Dust deposition is one of the main impacts of the project highlighted by multiple parties. As such, sufficient details regarding this impact should be provided within the SOP.</p> <p>Under Section 6.4.2.2 (Water and Sediment Quality) there is inadequate information to clearly identify whether there is an impact on surface water quality and sediment quality due to dust deposition. Additionally, the management plans and the trigger action response plans require interrelation between dust deposition and water / sediment quality to be described more clearly.</p> <p>Without comprehensive information regarding such an ongoing and significant issue as dust deposition, it is unclear if the proposed impact mitigations strategies will meet the required standards.</p>
Detailed Review Comment	<p>It is unclear whether unforeseen dust deposition impacts on surface water quality are a trigger for updating the Surface Water and Aquatic Effects Ecosystems Management Plan (SWAEMP), the Air Quality and Noise Abatement Management Plan (AQNAMP), their respective Trigger Action Response Plans (TARP), and any linkages between these plans.</p> <p>The first sentence in the third paragraph in Section 6.4.2.2 states that “<i>Changes to dust deposition along the Tote Road and at Milne Port were predicted to alter water quality [and] sediment quality</i>”. Then the third sentence states “<i>No effects of dust on sediment quality were predicted due to the limited amount of anticipated settling</i>”. There is an apparent contradiction between the two statements. Furthermore, there is insufficient information to confirm the Proponent’s conclusions regarding the impacts of the SOP on water and sediment quality.</p>
Recommendation/ Request	<p>CIRNAC requests that Baffinland:</p> <ol style="list-style-type: none"> 1. Confirms if and how unforeseen dust deposition impacts on surface water quality trigger updates to the SWAEMP, the AQNAMP, their respective TARPs, as well as the linkages between these plans. 2. Confirm whether impacts from dust deposition on sediment quality are present, and clarify whether sediment quality is being altered, but not enough to be considered an effect.

Environment and Climate Change Canada

Review Comment	ECCC-TRC-01
Subject/Topic	Air Emissions from Capesize Ore Carriers
References	Baffinland Mary River Project – Sustaining Operations Proposal, Section 2.3.4 Marine Shipping; Section 6.2.2.2 Air Quality; Section 6.2.3.1 Monitoring Programs Established by Baffinland Under the Project Certificate
Summary	Baffinland ('the Proponent') is planning to use Capesize ore carriers. However, the Sustaining Operations Proposal has not considered potential air quality impacts from the use of Capesize ore carriers. The Proponent should update air quality modeling to include the use of Capesize ore carriers.
Importance of Issue to Impact Assessment Process	The Sustaining Operations Proposal does not consider the impact of Capesize ore carrier air emissions on air quality at the Milne Port. The Capesize carriers will have higher air emissions than the ships currently used at the Mary River mine and will therefore have higher potential negative impacts to air quality.
Detailed Review Comment	<p>Section 2.3.4, PDF page 41, indicates that the proponent is planning the use of Capesize ore carriers for transporting iron ore. Capesize carriers have a carrying capacity of 200,000 t to 215,000 t, which is more than double that of the largest ore carriers presently used for the Mary River project, namely post-Panamax (94,000 t). Larger ore carriers will have greater air pollutant emissions, such as NO_x, PM_{2.5}, and black carbon, whether they are berthed in port, anchored nearby, or underway. The impacts may be magnified if the Capesize carriers will be used in a convoy, whereby one carrier will be at port while another or multiple carriers will be at anchor nearby as part of the convoy.</p> <p>In Section 6.2.2.2, the Final Environmental Impact Statement (FEIS) and Early Revenue Phase (ERP) FEIS Addendum, PDF pages 133-138 describe CALPUFF air dispersion modelling studies from 2012 and 2013 used to predict maximum ground-level contaminant concentrations at Milne Port. These analyses were performed assuming ore carriers smaller than Capesize, and thus, would potentially underestimate ship emissions and future air quality impacts.</p> <p>Furthermore, Section 6.2.3.1, PDF page 139, states that Milne Port generally experienced north-northeast winds off Milne Inlet, which would result in greater air quality impacts to receptors, such as workers at Milne Port, if the larger Capesize ore carrier was part of a convoy.</p>

Recommendation/Request	<p>ECCC requests that:</p> <ul style="list-style-type: none"> - the Proponent indicate whether Capesize ore carriers will be deployed, and whether they would be used as part of a convoy. - the Proponent update CALPUFF air dispersion modelling to incorporate the air emissions of Capesize ore carriers, whether they will be used on their own or as part of a vessel convoy.
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Fisheries and Oceans Canada

Review Comment	DFO-TRC-01
Subject/Topic	Marine Environment: Narwhal Regional Study Area Abundances
References	<p>DFO. 2020. Information related to the delineation of the Eclipse Sound and Admiralty Inlet narwhal stocks. Canadian Science Advisory Secretariat, Science Advisory Report 2020/048. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/40951881.pdf</p> <p>Finley, K.J., Miller, G.W., Davis, R.A., and Greene, C.R. 1990. Reactions of belugas, <i>Delphinapterus leucas</i>, and narwhals, <i>Monodon monoceros</i>, to ice-breaking ships in the Canadian High Arctic. Canadian bulletin of fisheries and aquatic sciences/Bulletin canadien des sciences halieutiques et aquatiques. 224: 97–117.</p> <p>Golder 2020. 2017-2018 Integrated Narwhal Tagging Study – Technical Data Report.</p> <p>Tervo, O.M., Blackwell, S.B., Ditlevsen, S., Conrad, A.S., Samson, A.L., Garde, E., Hansen, R.G., and Mads Peter, H.-J. 2021. Narwhals react to ship noise and airgun pulses embedded in background noise. Biol. Lett. 17(11): 20210220. Doi:10.1098/rsbl.2021.0220.</p> <p>Sweeney, S.O., Terhune, J.M., Frouin-Mouy, H., Rouget, P.A. 2022. Assessing potential perception of shipping noise by marine mammals in an arctic inlet. J. Acoust. Soc. Am. 151: 2310-2325</p>
Summary	<p>Narwhal abundance within Eclipse Sound continues to decline. Fisheries and Oceans Canada contests the proponent's assessment of Narwhal abundance, behavioural responses, the significance of these changes, and relation to project activities.</p> <p>Specific issues for which DFO has comments or questions include:</p> <ol style="list-style-type: none"> 1. Baseline conditions refer to the state of the existing environment prior to commencing a project, including construction phase activities. Underwater noise remains a gap in the baseline data (Appendix 9, SOP FEIS). The proponent has claimed baseline marine conditions of the project existed in 2015, prior to the operation of the project. However, information relayed in previous assessments, from Table 1.2, Figure 1.3 and p.16 of <i>Mary River Project Phase 2 Proposal Technical Supporting Document 27: Cumulative and Transboundary Effects Assessment</i>, "Occasional sealifts occurred during the project definition phase (2006 to 2012), and then increased in 2013 when construction of

	<p><i>the Project was initiated.</i>” In terms of impacts to Narwhal, this means that project shipping and shipping related noise have been affecting Narwhal for much longer and that activities of the proponent have been affecting Narwhal between the first studies on Narwhal abundance (e.g., 2004 to 2013 assessment years).</p> <ol style="list-style-type: none"> 2. DFO acknowledges there is evidence of Narwhal movement between stock areas and that there is a single Narwhal population, consistent with Inuit Qaujimajatuqangit. Further, we acknowledge that it is not clear if Narwhal return to the same stock area each year. However, tagging studies have suggested that exchange between stock areas is approximately 30%, and DFO recommended the stocks remain separately managed to be alert for within stock depletions (DFO 2020). 3. DFO recommends changes to data analyses of summer stock narwhal abundance estimates. Current practices by the Proponent tends toward higher estimates when differences are found between observers, and overestimates in photographic analyses. The total estimate of Narwhal abundance across survey repeats also favors the higher estimates. DFO recommends taking the average of the survey repeats and the Proponent discussing their data analysis practices with the Marine Environment Working Group. 4. Statements in the SOP FEIS and appendices indicating no long-term adverse affects to Narwhal behaviour in Eclipse Sound, such as Narwhal response to shipping noise, may not fully depict the issue in context, as they apply only to Narwhal that have remained in the regional study area. The long-term, statistically significant decline of Narwhal in Eclipse Sound is most reasonably explained by a displacement out of the regional study area to alternative summering areas. This displacement should be considered a long-term adverse behavioural response to proponent activities. 5. Statements regarding the effects of underwater noise effects on Narwhal require caution in interpretation as Narwhal hearing abilities have not been studied (contrary to implications in Sweeney et al. 2022). Recent research shows Narwhal react to underwater noise at levels lower than the 120 dB threshold that has been used in acoustic modelling (Finley et al. 1990; Tervo et al. 2021). 6. In the SOP FEIS, page 182 the Proponent states, <i>“During the surveys which ran consecutively for six weeks from 18 July to 26 August, no evidence of displacement was observed.”</i> within the context of project related marine shipping affecting Narwhal abundance. Please clarify what displacement would look like and how it is measured. It is DFO’s understanding that the studies
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	were not designed to look for large scale displacement.
Importance of Issue to Impact Assessment Process	Impacts to Narwhal are significant.
Detailed Review Comment	<ol style="list-style-type: none"> 1. In appendix 12, table 5: please compare convoys to individual vessel transits that are heading in the same direction. 2. In appendix 12, please clarify what analyses were referred to, <i>"In an effort to understand the variability in the data, we examined the 120 dB exceedance durations as a function of these influencing parameters for all analyzed vessel transits measured by JASCO since 2018 (Appendix A). Counterintuitively, there was not a consistent trend noted in the 120 dB exceedance duration with CPA distance, speed, heading, or measurement location."</i> 3. Please clarify what photos are discussed in, <i>"Baffinland agrees to conduct a study to determine if the simple seasonal average observer data from Bruce Head and the Leg 2 surveys correlates with the photo estimates for all the years to assess whether these metrics could provide an EWI for the year's results that would be applied in future to increase or decrease shipping at the end of summer."</i> 4. Table 6.20, Marine Mammal Aerial Survey Program (MMASP)/ Narwhal: Please provide the rationale for an effect threshold of >25.0% decrease in Narwhal stock size relative to 2019 aerial survey abundance and what mitigations would be triggered. 5. Table 6.20, Bruce Head Shore-based Monitoring Program / Narwhal & Narwhal Tagging Program / Narwhal: Please define change
Recommendation/Request	<ul style="list-style-type: none"> • DFO recommends the proponent clarifies when baseline conditions existed • DFO recommends taking the average of the survey repeats and the Proponent discussing their data analysis practices with the Marine Environment Working Group.

Review Comment	DFO-TRC-02
Subject/Topic	Aquatic Invasive Species/Non-indigenous Species
References	Bailey, S.A., Brydges, T., Casas-Monroy, O., Kydd, J., Linley, R.D., Rozon, R.M., and Darling, J.A. 2022. First evaluation of ballast water management systems on operational ships for minimizing introductions of nonindigenous zooplankton. Mar. Poll. Bull. 182, 113947.

	<p>https://doi.org/10.1016/j.marpolbul.2022.113947</p> <p>Benoît, H. P., Gagné, J. A., Savenkoff, C., Ouellet, P., and Bourassa M.-N. (eds.). 2012. State-of-the-Ocean Report for the Gulf of St. Lawrence Integrated Management (GOSLIM) Area. Can. Manuscr. Rep. Fish. Aquat. Sci. 2986: viii + 73 pp.</p> <p>BIM 2023. Sustaining Operations Proposal - Appendix 13 Marine Environmental Effects Memo.</p> <p>Brinklow, T.R., Chan, F.T., Etemad, M., Deb, J.C., Bailey, S.A. 2022. Vessel Biofouling as a Vector for Nonindigenous Species Introductions in Canada. Canadian Science Advisory Secretariat. Research Document 2022/072</p> <p>Chan, F. T, MacIsaac, H. J., and Bailey, S. A. 2015. Relative importance of vessel hull fouling and ballast water as transport vectors of nonindigenous species to the Canadian Arctic. Canadian Journal of fish and Aquatic Sciences, 72: 1230–1242.</p> <p>DFO. 2020. Additional analyses of ballast water management scenarios to reduce the establishment of harmful aquatic species across Canada and the great lakes. Canadian Science Advisory Secretariat. Science Response 2020/053.</p> <p>Drake, A.R., Bradie, J.N., Ogilvie, D., Casas-Monroy, O., Bailey, S.A. 2020. Effectiveness of Ballast Water Exchange Plus Treatment as a Mechanism to Reduce the Introduction and Establishment of Aquatic Invasive Species in Canadian Ports. Canadian Science Advisory Secretariat. Research Document 2020/003</p> <p>Galil, B.S., McKenzie, C., Bailey, S., Campbell M., Davidson, I., Drake, L., Hewitt, C., Occhipinti-Ambrogi, A., and Piola, R. 2019. ICES Viewpoint background document: Evaluating and mitigating introduction of marine non-native species via vessel bio-fouling. ICES Ad Hoc Report 2019. 17 pp. http://doi.org/10.17895/ices.pub.4680</p> <p>Song, R., Tavakoli, Y., Bailey, S.A., Soares, A. 2023. A temporal assessment of risk of non-indigenous species introduction by ballast water to Canadian coastal waters based on environmental similarity. Biological Invasions. 25, 1991-2005. https://doi.org/10.1007/s10530-023-03019-1</p> <p>Spear, M.J., Walsh, J.R., Ricciardi, A., Zanden, M.J.V. 2021. The Invasion Ecology of Sleeper Populations: Prevalence, Persistence, and Abrupt Shifts. BioScience. 71(4), 357-369. https://doi.org/10.1093/biosci/biaa168</p> <p>WSP 2023. Mary River Project – Sustaining Operations Proposal: Risk Assessment for Introduction of Aquatic Invasive Species from Ballast Water. Prepared for Baffinland Iron Mines Corporation</p> <p>Xiang, J., Wang, Q., Wu., W. Wang, H., Wu., H. 2023. Discharge compliance at Shanghai port – a case study on discharged ballast water from vessels with Ballast Water Treatment System. Manag. Biol.</p>
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	<p>Invasions. 14(1), 178-191. https://doi.org/10.3391/mbi.2023.14.1.10</p> <p>Zenetos, A., Tsiamis, K., Galanidi, M., Carvalho, N., Bartilotti, C., Canning-Clode, J., Castriota, L., et al. 2022. Status and Trends in the Rate of Introduction of Marine Non-Indigenous Species in European Seas. Diversity 14 (12): 1077. https://doi.org/10.3390/D14121077/S1.</p>
Summary	<p>DFO assesses the risks of aquatic invasive species and non-indigenous species at a greater level than that of the proponent. In BIM 2023, the proponent reports one natural range expansion and several non-indigenous species are being monitored for precautionary measures. However, the detection of several non-indigenous species is evidence of introductions occurring and the potential harm these introductions may have on the marine environment is unlikely to be known for years while populations build (e.g., Spear et al. 2021). Furthermore, statements regarding the risk and significance of ballast water mediated introductions of aquatic invasive species and non-indigenous species in BIM 2023 conflict with the statements in WSP 2023.</p> <p>The risks posed by aquatic invasive species and non-indigenous species is underestimated in the risk assessment (WSP 2023, within Appendix 15). This underestimation of risk is due inaccurate assumptions and the use of outdated information. For example, the proponent states, “<i>The number of harmful nonindigenous species that could potentially be introduced from connected ecoregions was obtained from two sources – the Marine Invasive Database of the Nature Conservancy (Molnar et al. 2008) and a database available online at http://www.conservationgateway.org/ConservationPractices/Marine/Page/s/marineinvasives.aspx.</i>” The use of harmful non-indigenous species is less precautionary than the use of total non-indigenous species and Zenetos et al. (2022) identified 260 non-indigenous species in the North Sea, whereas the database associated with Molnar et al. 2008 identified only 77. Additionally, since 2014, DFO has moved to a quantitative approach using probabilities (Drake et al. 2020; Brinklow et al. 2022). Lastly, WSP (2023) did not consider the high rates of non-compliance that have been shown in the treatment systems currently (Bailey et al. 2022). Therefore, the risks of aquatic invasive species and/or non-indigenous species introductions are greater than indicated.</p>
Importance of Issue to Impact Assessment Process	<p>Aquatic invasive species and non-indigenous species introductions are estimated to be a high to very high risk for the proposed activities by DFO.</p>
Detailed Review Comment	<ol style="list-style-type: none"> 1. Has the Proponent considered taking response actions to remove/exterminate the NIS before they become problematic? Is the Proponent prepared for response to the detection of a NIS which is immediately recognized as invasive? 2. The Proponent states that “<i>Upon the Convention coming into force, new ships must meet the D-2 standard, while the requirements for existing ships will be phased over a period up to 2024 (until renewal of each ship's International Oil Pollution</i>

	<p><i>Prevention Certificate [IOPPC];IMO-MEPC 2017)</i>" (BIM 2023, p 5). Can the Proponent confirm that all project ships will be required to conduct exchange in combination with treatment in perpetuity, even if the requirement for exchange is phased out under Canadian/IMO regulations, or until there is sufficient evidence that the combined approach is no longer required?</p> <ol style="list-style-type: none"> 3. For ballast water management systems using an active substance for disinfection (e.g., chemical agent) will any monitoring be in place to confirm neutralization? Discharges of large volumes of highly chlorinated water has not been modelled and may need to be evaluated for effects on the marine environment. (see BIM 2023, p5, paragraph 4) 4. The Proponent states that "<i>Other marine shipping to Milne Port (e.g., supply vessels), or vessels that travel in Milne Inlet but Milne Port is not their destination (e.g., cruise ships, military vessels, research vessels, hunting or fishing vessels) will not be included in the assessment. Supply vessels arriving at Milne Port are likely to carry little or no ballast water as they would be arriving fully or partially loaded with supplies, and the release of ballast water is not required to support offloading activities. Information would not be available to inform a risk assessment on the latter group of vessels not associated with the Project and they would have no Project-related reason to discharge ballast water in Milne Inlet.</i>" (WSP 2023, Page 1). All vessels may pose a risk for AIS introductions by biofouling. Is there a separate assessment for biofouling risk? Biofouling may pose an even greater risk and requires assessment. See Chan et al. (2015) and Galil et al. (2019) for more information. Additionally, information on arrivals and vessel type should be available through NordReg or via AIS vessel reports and could allow for assessing biofouling risks. 5. The Proponent states that "<i>A representative shipping schedule under ERP that will be used to assess the risk of AIS invasion under existing conditions is shown in Table 1.</i>" (WSP 2023, Page 2). What is meant by "representative" is this based on actual vessel types and numbers from ERP? Likewise for scenarios (table 1) below. What are numbers based on? 6. The Proponent states that "<i>The second proposed future scenario is weighted toward fewer but larger vessels, increasing the transportation of ore by up to 10% under the OFA proposal (Table 3)</i>" (WSP 2023, Page 3). Please define OFA. What is meant by increased transportation and what is the reason for the increase? 7. The Proponent states that: "<i>Shipping during both existing and future scenarios would start no earlier than 15 July and cease no later than October 31. Information collected by Baffinland on the ports of origin of incoming ore carrier voyages in 2022 was used as the basis of the biogeographic component of this risk assessment. Previous AIS Risk Assessments conducted for Baffinland assumed the port of destination, which was known to Baffinland, was the same as the port of origin, which was not recorded (SEM 2013; Golder 2018). In 2022, both ports of origin</i>
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	<p>and destination were recorded by Baffinland, when possible.” (WSP 2023, Page 3). Would these dates be adhered to if conditions allowed for earlier shipping? Is the information collected by the Proponent based on Transport Canada ballast reporting forms? Ports of origin and destination are unlikely to be the same. This information would be available on Transport Canada forms.</p> <p>8. The Proponent states that: “<i>Any potential for risks to the environment related to release of biocides is not assessed in this report.</i>” (WSP 2023, Pg 5). There are risks associated with the release of biocides, that should be assessed, if not part of this report, then elsewhere.</p> <p>9. The Proponent states that: “<i>This correction factor is based on exchange efficiency rates, as determined by total zooplankton abundance, which was defined as 90% for saline water (Ruiz and Smith 2005; Chan et al. 2012).</i>” (WSP 2023, Pg 5). There should be consideration of exchange and treatment efficiency for phytoplankton as well.</p> <p>10. The Proponent states that: “<i>A further reduction in probability of arrival was applied based on the use of ballast water management systems to reduce the arrival of viable organisms.</i>” (WSP 2023, Pg 6). Is the assumption that all discharges meet the D-2 standards? This assumption does not align with the experience of Fisheries and Oceans scientists, particularly for the >50 size class. We have found about 50-60% of discharges meeting the standard in southern Canada. Rates are even lower in recent studies globally (e.g. China) (Bailey et al. 2022; Xiang et al 2023).</p> <p>11. The Proponent states that: “<i>Paololucci et al. (2017) found that a hybrid ballast water management strategy, utilizing ballast water exchange followed by a treatment system, reduced the colonization pressure of ballast water from 25 taxa to 16 taxa. Therefore, probability of arrival based solely on ballast water exchange will be multiplied by 16/25 (0.64) and the proportion of vessels that applied a D-2 ballast water treatment in 2022 to account for the effect of treatment.</i>” (WSP 2023, Pg 6). An overall reduction of ~94% in the probably of arrival by exchange plus treatment is reasonable. However, the primary effect of ballast water exchange is a change in the probably of survival, since mid-ocean species are less likely to survive in near shore environments. It is understandable the authors did not want to change the method of implementing the effects of exchange from earlier reports for simplicity and consistency. In the future, there are better ways to incorporate the effects of ballast water management systems (and exchange) than the methods used in this report (e.g., DFO 2020). It is important to note that a 0.64 reduction in colonization pressure (number of taxa) does not mean that the same reduction can be assumed for abundance of organisms so it seems inappropriate to apply this correction to probability of arrival in the context of the D2 standard is based solely on abundance of organisms. If there are large numbers of</p>
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	<p>only a small number of harmful taxa remaining following ballast management these can still pose a high risk.</p> <p>12. Regarding the data presented in Table 5 (WSP 2023), it would be useful to compare the Proponents discharge volumes to other major Canadian ports (e.g., Vancouver, Halifax, Hamilton). DFO has compared the Proponent's corrected ballast water volumes in earlier shipping assessments and found Milne Port to be among the top 10 ports in Canada.</p> <p>13. The Proponent states that: <i>"For climate classification, all ports were categorized by their location using latitude."</i> (WSP 2023, Pg 7). Latitude is an inaccurate measure of water temperature. This data could be better sourced from georeferenced databases such as BioOracle or World Ocean for future assessments.</p> <p>14. The Proponent states that: <i>"Although the SOP + OFA scenario would carry up to 10% more ore to market than the SOP scenario, the ballast water discharge associated with the SOP + OFA scenario would be 5% lower than ballast water discharge under the SOP as the SOP + OFA scenario uses larger but fewer vessels."</i> (WSP 2023, Pg 9). Please clarify this statement. Do larger vessels carry proportionally less ballast water? Please clarify how larger vessel use equates to less ballast.</p> <p>15. The Proponent states that: <i>"Using the actual number of species and abundance of AIS present in each ship's ballast water would provide a better estimate, however, this is not possible."</i> (WSP 2023, Pg 11). The proposed collaborative ballast water study between the Proponent and DFO Science would provide the data to do this.</p> <p>16. The Proponent states that: <i>"The level of uncertainty is ranked as moderate for probability of survival because annual salinity may not capture spatial and temporal changes in salinity at all ports, and additional physical and biological factors may influence survival in a species-specific manner."</i> (WSP 2023, Pg 13). Recent research shows that monthly analyses are more sensitive (Song et al. 2023).</p> <p>17. WSP 2023, Table 15: There are at least 25 aquatic invasive species within the Gulf of St. Lawrence (Benoît et al. 2012). Given the small number of source ecoregions and availability of updated non-indigenous species lists for these areas, it would be relatively straight forward to include updated numbers of NIS in this risk assessment. DFO can provide suggested lists/references and would encourage Proponent to use this updated information as they may be underestimating the number of NIS in source ecoregions. That said, magnitude of impact is already very high so this will not change overall risk scores. This updated information could be used to reduce the uncertainty level for the magnitude of consequence.</p> <p>18. WSP 2023, Table 16 and 17: Additional scenarios shown in earlier tables (e.g. Table 14) are not reflected here to allow for comparison. It would helpful to see these carried through to final risk calculations in Table 16 and 17. Text above Table 16 indicate</p>
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	<p>SOP consequences were ‘very high’. This would change the category in Table 16 and in Table 17 ‘SOP’ should be in the red squares under ‘high’. This would change “<i>the relative level of AIS invasion risk posed by ballast water</i>” (WSP 2023, pg 16) to high risk for SOP and SOP+OFA.</p> <p>19. The Proponent states that: “<i>While this is generally correct based on past observations, portions of Milne Port and Milne Inlet may have seasonally reduced salinity and be less susceptible to ballast-mediated invasions as a result.</i>” (WSP 2023, Pg 16). Does the Proponent have data to support this statement? Areas DFO has measured are mainly brackish and marine so introduced marine species would be able to find habitat with suitable salinity.</p> <p>20. The Proponent states that: “<i>This total AIS count is probably overestimated as species are likely to be duplicated in the AIS flora and fauna of more than one ecoregion. Additionally, not all species included in these ecoregional lists may be capable of being dispersed by ballast water and a few may already be present in the Eastern Canadian Arctic, whether as NIS or as native species.</i>” (WSP 2023, Pg 16). There are updated listed that could have been consulted and the DFO recommends the Proponent review these.</p>
Recommendation/Request	<ul style="list-style-type: none"> • DFO recommends the Proponent update the risk assessment methodology in collaboration with DFO subject matter experts. • DFO recommends the development of proactive measures and a response plan for <i>Marenzelleria</i>.

Review Comment	HC-TRC-01
Subject / Topic	Risk Communication Program Proposal
References	<p>2023 FEIS Addendum, Appendix 11 – Risk Communication Program Proposal</p> <p>NIRB Reconsideration Report and Recommendations for Baffinland's Phase 2 Development Proposal. Nunavut Impact Review Board File No. 08MN053. May 13, 2022</p>
Summary	<p>HC supports Baffinland's commitment to address community concerns about dust on the landscape and its potential contamination of country foods and surface water, as well as providing a mechanism to build community capacity related to human health risk assessment. Additional clarifications and implementation of best practices would support the proposal's implementation.</p>
Importance of Issue to Impact Assessment Process	<p>Potential impacts of the Mary River Iron Mine on country foods and water, particularly regarding contamination via dust, has been an ongoing community concern. The proposed Risk Communication Program could be an important process for community members to share knowledge, information, and concerns among the community, the Proponent, and other Intervenor, and could improve working relationships, the need for which was highlighted previously by the Board (NIRB, 2022).</p>
Detailed Review Comment	<p>HC recognizes that existing and potential future impacts of the Mary River Iron Mine on the safety of country foods (all foods sourced outside of the commercial food chain, including any food that is trapped, fished, hunted, harvested, or grown for subsistence or medicinal purposes) and surface water, particularly with regard to potential contamination via dust, has been a key community concern for previous project certificate reconsiderations (e.g., the Phase 2 Development Proposal), and remains a concern for some community members for the current SOP (e.g., 2023 FEIS Addendum, Table 3.9). HC also acknowledges the following from the Board's Reconsideration Report and Recommendations for Baffinland's Phase 2 Development Proposal (NIRB, 2022, PDF pg. 256):</p> <p><i>“that consumption of the animals and water is safe, it does not eliminate communities' worries about continuing their normal harvesting and land use practices on land that is seen to be impacted by accumulations of dust... the Board feels the issue of dust is a strong example of how the Proponent and community members are looking at potential effects through two (2) very different lenses and with two (2) different knowledge</i></p>

	<p><i>systems.”¹</i></p> <p>To address concerns about country foods, the Proponent proposed several commitments as part of the Mary River Phase 2 Development Proposal, including the creation of an Inuit-focused risk communication strategy. Baffinland is now moving forward with the implementation of those commitments as part of the SOP, including Commitment #157 (found in Appendix 4 [PDF pg. 431] of the 2023 FEIS Addendum), which states as follows:</p> <p><i>“Baffinland commits to develop a risk communication strategy focused on the gathering and dissemination of information to Inuit related to the Baffinland Iron Ore Mines Project, and linkages between the Project and human health and ecological risk assessment topics. The strategy will focus on, but not be limited to, building capacity within community groups to understand the mining process, elements of the mining process and how substances produced from the mining process move in the environment. Baffinland will work with communities to develop this program to ensure it is relevant to Inuit.”²</i></p> <p>Baffinland has proposed to develop and implement a Risk Communication Program (described in Appendix 11 of the 2023 FEIS Addendum). HC supports the implementation of such a program to address community concerns around contamination of country foods and to build community capacity related to human health risk assessment. HC looks forward to further discussions and refinement of the proposal with Baffinland and other interested parties.</p> <p>Consideration of the following during implementation would help to ensure an effective Risk Communication Program:</p> <p><i>Developing clear Terms of Reference to define roles and responsibilities for the Risk Communication Program and any associated working groups or committees.</i></p> <p>Further consideration and additional clarity around Baffinland’s expectations of the roles and responsibilities for the steps outlined in Task 1: Scoping Exercise (PDF pg. 739) will help establish an effective program. For example, HC is named as a party to be consulted in the Scoping Exercise and remains</p>
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¹ NIRB Reconsideration Report and Recommendations for Baffinland’s Phase 2 Development Proposal. Nunavut Impact Review Board File No. 08MN053. May 13, 2022.

² Baffinland Iron Mines Corporation, Mary River Project-Sustaining Operations Proposal. Nunavut Impact Review Board File. No. 08MN053. April 2023

	<p>available to provide expert information or knowledge within its areas of expertise on potential human health impacts associated with the Project upon request. HC also believes that the topics of interest should be solely identified by the impacted communities and suggests that Terms of Reference be co-developed with participating parties at the outset of the Risk Communication Program.</p> <p><i>Inviting the Government of Nunavut to participate in the Risk Communication Program.</i></p> <p>HC noted that the Government of Nunavut (GN) was not listed in Task 1 as an organization to consult with to identify key areas of community concern and topics of interest. Given the GN's role in health delivery in the territory, the Risk Communication Program would benefit from the GN's inclusion.</p> <p><i>Ensuring the availability and capacity within the community to participate in the Risk Communication Program.</i></p> <p>It was noted in the Schedule and Timelines (PDF pg. 741) that Task 1 (Scoping Exercise) may begin as early as Q2 2023, and that workshop development will begin following scoping activities. It is unclear whether the timeline considers any additional requests for community members to participate in reviews of projects in Nunavut, including any future proposals for the Mary River Mine. Efforts by the Proponent to avoid overburdening the affected communities with consultations and to consider flexible timelines, as required, to accommodate communities' involvement in other ongoing processes, will enable more meaningful and effective participation.</p> <p><i>Utilizing community-based monitoring information and local and traditional knowledge in the development of Risk Communication Program messaging and workshop content.</i></p> <p>The Draft Scope of Work to Develop a Risk Communication Strategy outlined documents to be used in the development of messages and workshop content (PDF pg. 739-740). Incorporating environmental monitoring studies completed by the Qikiqtani Inuit Association (QIA) and other community-based programs, as well as local and traditional knowledge, in the development of messaging and workshop content will support a robust and targeted program to meet the needs of the local community.</p>
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	<p><i>Actively inviting broad community-centred participation in the Risk Communication Program to support creation and dissemination of risk communication messages and materials related to areas of community concern.</i></p> <p>Involvement of a broad representation of the community (e.g., Knowledge Keepers, Elders, Project Monitors, and trusted community health partners like health care providers) in the creation and dissemination of risk communication messages ensures that diverse perspectives have been considered and improves the likelihood of a positive outcome from Risk Communications Program.</p>
Recommendation / Request	HC does not have any recommendations with respect to the SOP.

Review Comment	PCA-TRC-01
Subject/Topic	The importance of Narwhals in Eclipse Sound
References	<p>FEIS SOP Addendum: Section 4.4.1.8; table 6.34</p> <p>Fisheries and Oceans Canada. Technical Comments. Baffinland Iron Mines Corporation. Mary River “Production Increase” Proposal. Submitted to: Nunavut Impact Review Board. August 11, 2022</p> <p>DFO File No.: 07-HCAA-CA7-00050.</p> <p>NIRB File No.: 08MN053</p> <p>Tallurutiup Imanga National Marine Conservation Area Inuit Impact and Benefit Agreement : https://parks.canada.ca/amnc-nmca/cnamnc-cnnmca/tallurutiup-imanga/entente-agreement</p> <p>Nunavut Impact Review Board Reconsideration Report and Recommendations for Baffinland’s Phase 2 Development Proposal. Baffinland Iron Mines Corporation Project Certificate No. 005. NIRB. File No. 08MN053 NIRB. May 2022</p> <p>NAMMCO-North Atlantic Marine Mammal Commission (2022). Report of the Joint Disturbance Workshop of the NAMMCO Scientific Committee Working Group on the population status of narwhal and beluga, and the Canada/Greenland Joint Commission on narwhal and beluga Scientific Working Group. December 2022, Copenhagen, Denmark.</p> <p>Parks Canada comments on 2021 Annual Report filed with NIRB on June 30th, 2022.</p> <p>Parks Canada’s written submission to the Nunavut Impact Review Board respecting: Baffinland Iron Mines Corporation’s Production Increase Proposal Renewal project. NIRB file # 08mn053. August 9th, 2022</p> <p>DFO. 2019. Science Review of the Phase 2 Addendum to the Final Environmental Impact Statement for the Baffinland Mary River Project. DFO Can. Sci. Advis. Sec. Sci. Resp. 2019/015. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/40783844.pdf</p> <p>DFO. 2019. Science Review of Additional Documents Submitted June 18–August 29, 2019 for the Final Environmental Impact Statement Addendum for the Baffinland Mary River Project Phase 2. DFO Can. Sci. Advis. Sec. Sci. Resp. 2019/038. (Erratum: March 2020).</p> <p>Marcoux, M., and Watt, C. A. 2021. Eclipse sound narwhal (Monodon monoceros) movement and hunt composition and its relevance to stock delineation. DFO Can. Sci. Advis. Sec. Res. Doc. 2020/067. iv + 25 p. https://waves-vagues.dfo-</p>

	mpo.gc.ca/library-bibliotheque/41027152.pdf
Summary	The purpose of the TI NMCA is the protection and conservation of this representative marine area and the preservation of Inuit cultural practices, expression and customs, and to secure socio-economic benefits for Inuit. Narwhals in Eclipse Sound play a significant role in the marine ecosystem of TI NMCA and the continuation of Inuit cultural practices, therefore a significant decrease in the narwhal aggregations in Eclipse Sound is not compatible with the purpose of TI NMCA.
Importance of Issue to Impact Assessment Process	The <i>Nunavut Planning and Project Assessment Act</i> , section 90, indicates that the Nunavut Impact Review Board (NIRB) must take into account numerous factors, including item "(j) any other factor that the Board considers relevant to the significance of impacts". Often when determining significance, the "context" of the impacts is another factor that is considered. Parks Canada recommends that the Board considers the context and the purpose of the Tallurutiup Imanga NMCA in their recommendations.
Detailed Review Comment	<p>There have been repeated extensions of Six (6) Mtpa limits via the Northern Transportation Corridor at Mary River since 2018, in accordance with Project Certificate amendments that were issued in 2018, 2020 and 2022.</p> <p>Tallurutiup Imanga NMCA is an area that has been used for generations by the Inuit. It represents a natural and cultural seascape that is one of the most significant ecological areas in the world. For Inuit living in the communities of Tallurutiup Imanga, it is a home, rich in culture and wildlife.</p> <p>One of the overarching themes of the Tallurutiup Imanga IIBA (TI IIBA) is that of Inuit relationship with the environment. It indicates that the cultural values and identities of Inuit of Tallurutiup Imanga and the Qikiqtani Region are intrinsically connected with the Arctic marine environment and wildlife. The TI IIBA highlights the importance of ecosystem health and biodiversity, and the preservation of Inuit cultural practices. The TI IIBA states that Inuit understanding of how they fit into the world is based on their close relationship with the land, sea, ice, and environment; they are a part of the land and the sea.</p> <p>Key elements of the CNMCAA and the TI IIBA include:</p> <ul style="list-style-type: none"> • Tallurutiup Imanga NMCA must be "protected and conserved" (s. 4(1), CNMCAA; p. 4, IIBA); • Tallurutiup Imanga NMCA must be "managed and used in a sustainable manner that meets the needs of present and future generations without compromising the structure and function of the ecosystems" (s. 4(3),

	<p>CNMCAA; p.4 IIBA);</p> <ul style="list-style-type: none"> the "principles of ecosystem management and the precautionary principle" will be a primary consideration (s. 9(3), CNMCAA; p. 4, IIBA), and; the ecologically sustainable use of marine resources in the NMCA is for the lasting benefit of coastal communities (preamble, CNMCAA; p.4, IIBA). <p>Marine mammals are considered one of the principal elements of the marine ecosystem in the proposed Tallurutiup Imanga NMCA. Lancaster Sound is of critical importance to several marine mammal species at various times of the year, including the majority of global narwhal populations and a third of beluga populations in North America, as well as bowhead whales, walrus, ringed and bearded seals, and polar bears, which displays one of the highest densities in the Canadian Arctic. Many of these species are also harvested by Inuit and are therefore integral to the NMCA's objective of providing ecologically sustainable use of marine resources and benefits to coastal communities.</p> <p>The protection of all marine mammals in the NMCA is a key conservation objective for the area. For example, portions of Eclipse Sound and Milne Inlet provide important and perhaps even critical habitat for narwhals, such as nursery habitat. This narwhal aggregations in Eclipse Sound play a significant role in the marine ecosystem of TI NMCA and its associated Inuit cultural practices and are an iconic species for visitors.</p> <p>Parks Canada and Fisheries and Oceans Canada (DFO) work together on the protection of marine mammals within Tallurutiup Imanga NMCA. Given DFO's extensive scientific expertise in marine mammals and familiarity with the region, following careful analysis and discussions with DFO, Parks Canada shares DFO's opinion that the decline of Narwhal in Eclipse Sound is of considerable concern and shipping may cause this decline.</p> <p>It is unclear how the Proponent has considered this decrease in narwhal in the context of a marine protected area in the analysis of the SOP even though a significant decrease of narwhal in Eclipse Sound would not be compatible with the purpose of TI NMCA.</p>
Recommendation/Request	<p>Parks Canada would like to note that Term and Condition 179(a) and 179(b) were originally added to Project Certificate No. 005 prior to the signature of the TI IIBA.</p> <p>As a result, the context of the TI IIBA would not have been taken into consideration in the original analysis of the Production Increase Proposal (PIP) and it wasn't added in the SOP analysis. Therefore, Parks Canada recommends that the NIRB applies the precautionary principle and considers the decline in</p>

	narwhal abundance in Eclipse Sound in the protected area context when making recommendations related to the Sustaining Operations Proposal.
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Review Comment	PCA-TRC-02
Subject/Topic	Total vessel traffic and marine operations
References	<p>FEIS SOP Addendum: Section 1.2. - Table 1.4; 2.3.4</p> <p>FEIS SOP Addendum: Appendix 3: table 2., Marine Shipping Limit Memo</p> <p>FEIS SOP Addendum: Appendix 13.</p> <p>FEIS SOP Addendum: Appendix 14: 2.1; 3.1; 3.2; 4</p> <p>Fisheries and Oceans Canada. Technical Review Comments. Baffinland Iron Mines Corporation. Mary River "Phase 2 Development" Project Proposal. Submitted to: Nunavut Impact Review Board/Nunavut Water Board. March 7, 2019</p> <p>DFO File No.: 07-HCAA-CA7-00050.</p> <p>NIRB File No.: 08MN053</p>
Summary	<p>Overall, the total number of vessels and their movements required to support the Mary River site are not fully understood or clear to Parks Canada.</p> <p>It is important to determine the complete nature of the shipping activities including the use of Capesize vessel and its additional marine operation in order to confirm the assessment regarding the potential impacts of larger ore carriers on the environment.</p>
Importance of Issue to Impact Assessment Process	Shipping has the potential to cause negative impacts to marine mammals and the marine environment. It is important to fully understand the proposed vessel traffic at Milne Port, throughout Milne Inlet in order to adequately evaluate impacts associated with the project.
Detailed Review Comment	<p>Parks Canada recognizes that the use of larger vessels may result in a reduction in overall vessel traffic and a corresponding reduction in cumulative noise exposure for marine mammals.</p> <p>However, the SOP FEIS Addendum lacks details on the additional marine operations to fully understand the total vessel movements in the area.</p> <p>Baffinland has not clearly identified any operational changes or additional vessel traffic caused by the use of larger ore carriers (e.g., changes in tugs or icebreaker's movements for the Capesize vessel assistance, changes in the anchoring area time</p>

	<p>due to Capesize vessels loading time). Consequently, there is a lack of clarity concerning the total vessel movements and additional subaquatic noise for all type of vessels (e.g., Capesize, tugs, icebreakers or waiting ships) to confirm the reduction in cumulative noise exposure for marine mammals presented by Baffinland</p>
Recommendation/Request	<p>Parks Canada recommends clarification on the total vessel traffic movements and marine operation for all vessels in order to support the conclusions regarding the potential impacts of larger ore carriers on the environment.</p>

Transport Canada

Review Comment	TC-TRC-01
Subject/Topic	Port Facilities/Larger (Capesize) Vessels
References	<p>FEIS SOP Addendum: Section 2.3.4 (Marine Shipping)</p> <p>FEIS SOP Addendum: Section 6.5 (Marine Environment)</p> <p>FEIS SOP Addendum: Appendix 3 (Marine Shipping Limit Memo)</p> <p>FEIS SOP Addendum: Appendix 13 (Marine Environmental Effects Memo)</p>
Summary	Request for clarification regarding larger, including Capesize, vessels.
Importance of Issue to Impact Assessment Process	Compliance with the regulatory requirements and safety of navigation.
Detailed Review Comment	<p>In its April 2023 FEIS Addendum for the Sustaining Operations Proposal, the Proponent indicated that no revisions to loading equipment or ore dock facilities at Milne Port are required to accommodate the continued activities and that they would rely on the use of larger vessels to transport additional ore, as required.</p> <p>TC is seeking clarification regarding the potential use of larger (Capesize) vessels.</p>
Recommendation/Request	<p>Transport Canada requests that the proponent provide clarification/details on the use of larger vessels, especially Capesize vessels, associated with the Sustaining Operations Proposal, as follows:</p> <ol style="list-style-type: none"> 1. Confirmation of whether Post Panamax or Capesize vessels will be used for the SOP 2. Details of depth at and near the dock and areas of approach to accommodate the larger vessels 3. Details regarding precautions to be taken during heavy weather and emergencies 4. Description of the safe route of the vessel and any limitations on turning circles 5. Details for anchoring such a type of vessel 6. Mooring adequacy at the berth to accommodate such size of vessels, including loading of ore by the conveyors

	<p>7. Details regarding experience of the crew/personnel occupied in mooring the vessel. For example, tug crew/docking master for vessels of such size</p> <p>8. Any limitation on vessel's draft and load capacity, given the depth at the berth and approaches</p> <p>9. Suitability of the tugs and ice breakers for this size of vessel and confirmation if any additional tugs will be required to support vessels of such size</p>
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Review Comment	TC-TRC-02
Subject/Topic	Ballast Water Regulations
References	FEIS SOP Addendum: Appendix 13 (Risk Assessment for Introduction of Aquatic Species from Ballast Water)
Summary	Providing clarification regarding Ballast Water Regulations under the <i>Canada Shipping Act, 2001</i> .
Importance of Issue to Impact Assessment Process	Ensuring proper reference to current regulatory requirements related to ballast water.
Detailed Review Comment	In its April 2023 FEIS Addendum for the Sustaining Operations Proposal, particularly within Appendix 15, there are outdated references to regulations respecting ballast water management, so TC would like to provide clarification regarding the updated regulations.
Recommendation/Request	<p>Transport Canada requests that the proponent reference the new Ballast Water Regulations and associated guidance within any future documentation, including risk assessments.</p> <p>For reference Transport Canada offers the following clarifications/additional detail:</p> <ul style="list-style-type: none"> • The new Ballast Water Regulations came into force in 2021. These regulations strengthen existing rules for vessels on international voyages and the introduction of new rules for Canadian vessels that don't voyage internationally, other than to the U.S. and on the Great Lakes. • The Ballast Water Regulations gives effect to Canada's international obligations under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (The Convention), which entered into force in September 2017 and further

	<p>protect waters under Canadian jurisdiction from the introduction and spread of aquatic invasive species organisms and pathogens by Canadian and foreign vessels and maintain foundational requirements from the former regulations.</p> <ul style="list-style-type: none"> • These regulations apply to vessels in Canadian waters and to Canadian vessels anywhere in the world. They are based on a global approach to manage ballast water. • Vessels are now required to: <ul style="list-style-type: none"> ○ plan their ballast water management and reduce the number of organisms in their ballast water, typically by installing a ballast water management system; and ○ carry a valid certificate, keep records, and be regularly inspected. • Most vessels will need to install a Ballast Water Management System (BWMS) to comply with the Regulations. Smaller vessels (less than 50 meters in length and that carry less than eight cubic meters of ballast water) and certain non-self-propelled vessels have the option of an equivalent compliance regime tailored to their operations and size of their vessels. Equivalent compliance refers to a set of methods and best practices that allows vessel owners to determine how best to manage ballast water on board their vessel, as installing and operating BWMS and meeting all the requirements under the Regulations is not always doable. • Vessel operators must submit a ballast water reporting form for all ballast tanks, regardless of their ballast tank conditions, and even if vessel operators don't plan to discharge ballast while in water under Canadian jurisdiction. This reporting allows Transport Canada to provide timely advice to the vessel to ensure compliance with the Regulations should they be required to discharge or uptake ballast water later in the voyage. • Treatment and water quality standards applicable to ballast water discharged within Canada will be coming into effect in 2024, using a phased-in approach from 2019 to 2024. • The Ballast Water Regulations require the vessel to exchange ballast water using the order of priority ranked below: <ul style="list-style-type: none"> ○ At least 200 nautical miles/at least 2000 meters
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	<p>depth (Canadian requirements), whenever possible,</p> <ul style="list-style-type: none"> ○ At least 200 nautical miles/at least 200 meters depth (IMO requirements), ○ As far from the nearest land as possible and in all cases at least 50 nautical miles/ at least 200 meters depth (IMO requirements), and lastly, ○ In one of the alternate ballast water exchange zones listed in the TP 13617E (Canadian and IMO requirements). <ul style="list-style-type: none"> • For a description of the Alternate Ballast Water Exchange Zones in the Canadian Arctic, please refer to TP 13617E. <p>References:</p> <ul style="list-style-type: none"> • The Ballast Water Regulations are available at the following web published in the Canada Gazette, Part II.: https://gazette.gc.ca/rp-pr/p2/2021/2021-06-23/html/sor-dors120-eng.html • Edition 10 of the TP 13617 is available at: https://tc.canada.ca/en/marine-transportation/marine-safety/list-canada-s-designated-alternate-ballast-water-exchange-area-fresh-waters-tp-13617e-2021 • A new Ship Safety Bulletin has recently been published, which gives general information about the newly published Regulations. https://tc.canada.ca/en/marine-transportation/marine-safety/ship-safety-bulletins/coming-force-new-ballast-water-regulations-ssb-no-09-2021
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Conclusions

Crown-Indigenous Relations and Northern Affairs Canada

CIRNAC appreciates the opportunity to provide Technical Review Comments to the Board. CIRNAC is committed to working with the Proponent and other parties to resolve Technical Review Comments and looks forward to continued participation in the Board's process.

Environment and Climate Change Canada

ECCC has provided one technical comment requesting Baffinland provide an update to air quality modeling related to the use of Capesize vessels.

ECCC acknowledges and appreciates the effort that Baffinland has taken to provide information on the FEIS Addendum to inform parties of the SOP proposal. ECCC would like to thank the NIRB for this opportunity to provide input to the reconsideration process.

ECCC's technical review comments and recommendations are not to be interpreted as any type of acknowledgement, compliance, permission, approval, authorization, or release of liability related to any requirements to comply with federal or territorial statutes and regulations.

Fisheries and Oceans Canada

The protection of marine mammals is a key part of DFO's mandate. DFO has reviewed this Sustaining Operations Proposal focusing on the implications of changes to terms and conditions 179 a and b, assuming that other terms and conditions present in the previous PIP extensions will be carried forward. The ongoing decline of Narwhal in Eclipse Sound is of significant concern to the Department. Proponent activities in the area are the most rational reason for the decline, whether in conjunction with climate change mediated effects or alone. Regardless, it is the responsibility of the Proponent to investigate if their activities are contributing to the ongoing decline.

The protection of Canadian marine environments from aquatic invasive species and non-indigenous species is critical to protecting our fisheries and ecosystems from negative impacts and part of DFO's mandate. The application of thorough risk assessment methodologies and response plans are key to being ready in case species are found and preventing harm. The risk assessment presented within the Sustaining Operations Proposal is a step in the right direction but requires the incorporation of more recent information. Furthermore, a proposed collaborative study between the proponent and DFO will reduce uncertainty, making this a more useful tool. It is encouraging that the Proponent has proposed to carry forward AIS monitoring commitments from Phase 2.

Health Canada

HC is pleased to participate in the Board's assessment of the Project as part of the Department's role in ensuring the maintenance and improvement of the health of all Canadians. HC promotes a precautionary approach, including monitoring to verify modelled predictions, the development of additional mitigations to protect human health, and other follow-up activities to protect and promote human health.

HC does not have any specific recommendations or requests to the Board for the Sustaining Operations Proposal. HC appreciates the opportunity to provide comments to the Board on the Risk Communication Proposal presented as part of the Proponent's submission.

Parks Canada

Parks Canada's recommendations are consistent with the Agency's mandate and the Inuit Impact and Benefit Agreement for Tallurutiup Imanga National Marine Conservation Area, which recognize that ecosystem health and biodiversity of the Tallurutiup Imanga NMCA are of fundamental importance to the preservation of Inuit cultural practices.

As a Federal Agency, Parks Canada is working closely with DFO and is relying on their marine expertise to understand the potential impacts of Baffinland's Sustaining Operations Proposal on the marine ecosystem and to understand if the proposed mitigations are sufficient. As a result, Parks Canada supports the recommendations and conclusions provided by DFO to the Board for this assessment.

At this time, the key concern that Parks Canada is focused on is the decrease in narwhal abundance in Eclipse Sound. This decline of narwhal abundance in Eclipse Sound is of considerable concern to Parks Canada because narwhal play a significant role in the marine ecosystem of TI NMCA and the continuation of Inuit cultural practices. Therefore, a significant decrease of narwhals in Eclipse Sound would not be compatible with the purpose of TI NMCA. Consequently, Parks Canada recommends the Board consider the precautionary principle and the protected area context when making its recommendations on the significance of impacts.

Transport Canada

TC appreciates the opportunity to provide technical comments regarding the Sustaining Operations Proposal. TC looks forward to receiving clarification regarding the Proponent's potential use of larger (Capesize) vessels.