

Baffinland Iron Mines Corporation

Mary River Project

MARINE SHIPPING AND VESSEL MANAGEMENT REPORT TO THE
NUNAVUT IMPACT REVIEW BOARD



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- Appendix 1 – 2022 Shipping and Marine Wildlife Management Plan
- Appendix 2 – 2022 Shipping and Marine Monitoring Summary

ABBREVIATIONS

AIS	Automatic Identification System
AiS	Aquatic Invasive Species
Baffinland	Baffinland Iron Mines Corporation
ERP	Early Revenue Phase
EWI	Early Warning Indicator
FEIS	Final Environmental Impact Statement
HTO	Hunters and Trappers Organization
IIBA	Inuit Impact and Benefit Agreement
MEEMP	Marine Environmental Effects Monitoring Program
MEWG	Marine Environment Working Group
MHTO	Mittimatalik Hunters and Trappers Association
MMASP	Marine Mammals Aerial Survey
MTPA	Million Tonnes Per Annum
NAMRP	Narwhal Adaptive Management Response Plan
NIRB	Nunavut Impact Review Board
NIS	Non-Indigenous Species
NLCA	Nunavut Land Claim Agreement
PIP	Production Increase Proposal
PIPE	Production Increase Proposal Extension
PIPR	Production Increase Proposal Renewal
RSA	Regional Study Area
SSA	Stratified Study Area
the Project	Mary River Project
QIA	Qikiqtani Inuit Association
UAV	Unmanned Aerial Vehicle

1 INTRODUCTION

1.1 BACKGROUND

The amended Project Certificate No. 005 (Amendment 003, dated June 18, 2020), requires that Baffinland Iron Mines Corporation (Baffinland) submit a Marine Shipping and Vessel Management Report (the Marine Shipping Report) to the Nunavut Impact Review Board (NIRB) prior to the commencement of the shipping season informing the Board of six (6) key components, as described in Table 1.1.

Table 1.1: Marine Shipping Report Components

Report Component	Report Section
Anticipated number of ship transits along the approved shipping route	Section 2
Identification of specific areas to be used for drifting and anchorage of vessels with details of how community feedback and comments from the Marine Environment Working Group (MEWG) has been used to inform the selection of suitable areas	Section 3
Timeline for organizing pre- and post-shipping meetings with the community	Section 4
Plans for preventing or mitigating vessel interference with marine mammals and traditional hunting activities pursuant to term and condition 125(a) of the Project Certificate;	Section 5
Evidence of community involvement to review preliminary results of the monitoring programs, and to compare results with experiences of community members and hunters with respect to the marine environment and marine mammals during the shipping season;	Section 6
Evidence of reporting new or non-native species identified as a result of Aquatic Invasive Species monitoring, to MTHO and DFO with confirmation of whether or not this species had been observed in the past or through other community or regional monitoring initiatives.	Section 7

Subsequent sections will provide additional details to support information requirements associated with components listed in Table 1.1.

2 2022 SHIPPING OPERATIONS

2.1 2022 SHIPPING OPERATIONS

Baffinland currently plans to ship 4.2 million tonnes of iron ore over the 2022 shipping season along the Northern Shipping Route. On June 13th, 2022, Baffinland applied to the NIRB for a Production Increase Proposal (PIP) Renewal, which would allow Baffinland to ship 6.0 million tonnes of iron ore in 2022 if approved. This report is based on the current 4.2 million tonne operation, but includes information for a 6.0 million tonne scenario where applicable. The first vessels are anticipated to enter the Regional Study Area (RSA) between July 24 and August 7, subject to prevailing ice conditions. Refer to Figure 2.1 for an example of ore carriers that will be travelling to Milne Inlet throughout the 2022 shipping season. Vessels will not enter the RSA until a continuous path along the Northern Shipping Route (see Figure 2.2) of 3/10ths ice concentrations or less is confirmed. A description of ice concentrations can be found in the appended 2022 Shipping and Marine Wildlife Management Report. Additionally, Baffinland will seek written confirmation from the Mittimatalik Hunters and Trappers Organization (MHTO) that the floe edge has been closed to hunters. Vessels will hold at least 40 km to the east of the RSA until they are approved by the Port Captain to enter and sail towards Milne Port (see Figure 2.3).

Vessels traveling to and from Milne Port in 2022 will consist of an icebreaker (MSV Botnica), tugs, ore carriers, cargo sealifts and fuel tankers. Vessel voyages will consist of both single transits and convoys. See Table 2.1 below for respective definitions, and Table 2.2 for anticipated vessel movements for the 2022 season.

Table 2.1: Definitions

Term	Definition
Voyage	The two-way movement of one vessel into and out of Milne Port.
Transit	The one-way movement of one vessel or two or more vessels in a convoy inbound or outbound to/from Milne Port but only for the purpose of/under transit restrictions (i.e., 24-hour time restrictions). A convoy may be treated as a single convoy. A single vessel travelling one-way through the RSA will always be treated as a single transit. Tug activity is excluded when remaining within Milne Port. For additional information pertaining to transits, please review the Operational Guide for Ore Carrier Convoys in Attachment 3 of Appendix D in the Shipping and Marine Wildlife Management Plan (SMWMP; Baffinland, 2022a; refer to Appendix 1).
Convoy	The movement of one or more vessels at the same time into or out of Milne Port during either escort or instructed to travel as a group. Previously, convoys would only occur under ice conditions that required it. In 2022, Baffinland will implementing convoys more regularly to achieve a minimum 15 per cent decrease in the total number of vessel transits compared to a system without convoys. For additional information pertaining to transits, please review the Operational Guide for Ore Carrier Convoys in Attachment 3 of Appendix D in the SMWMP (Baffinland, 2022a; Appendix 1).

Table 2.2: Anticipated Vessel Transits in 2022

Vessel Type	Anticipated Number of Voyages to and from Milne Port	Anticipated Number of Transits	Note
Icebreaker (MSV Botnica)	Early shoulder season: 1	Early shoulder season: 1	The icebreaker will be present towards the beginning of the shipping season, despite plans to avoid icebreaking. The icebreaker will continue to be

Vessel Type	Anticipated Number of Voyages to and from Milne Port	Anticipated Number of Transits	Note
	Fall Shoulder season: 1 to ~15	Fall Shoulder season: 2 to ~30	<p>available for escort as a precaution, if required by a vessel owner. The Botnica may also provide emergency response support, if required and will continue participation in the Marine Mammal Observer Network (MMON) program while transiting along the Northern Shipping Route. The Botnica will also be used to retrieve the two acoustic monitors that are currently deployed in Milne Inlet.</p> <p>At the end of the shipping season, the icebreaker will be required to support safe passage of ore carriers as freeze up along the Northern Shipping Route begins. The number of transits are subject to prevailing ice conditions and the number of vessels requiring escorting (convoy scenario) during observed ice conditions. Icebreaker operations are limited to when escort of vessels is required.</p>
Tugs	2	4	Tugs will travel to Milne Port, and will remain for the entire shipping season to support ore carriers anchoring and berthing at the Port.
Ore Carriers	55 to 57 78 to 80	110 to 114 156 to 160 Note – convoys are intended to reduce the effective number of transits by up to 15% in 2022	<p>Baffinland is aiming to ship 4.2 million tonnes of iron ore in 2022.</p> <p>If the Production Increase Renewal (PIPR), is approved by the NIRB, then Baffinland will ship 6.0 million tonnes of iron ore in 2022.</p>
Resupply Cargo Vessel	3	6	Cargo vessels may be serving other Nunavut communities either before or after delivery to Baffinland. In 2022, some cargo vessels may be employed for the purposes of backhauling equipment from site.
Fuel Tanker	4	8	Fuel tankers may be serving other Nunavut communities either before or after delivery to Baffinland.



Figure 2.1: Tug Support for the Ore Carriers at Milne Port



Figure 2.2: Milne Inlet Nominal Shipping Route



Figure 2.3: Shipping Route Buffer Zone

3 ANCHORING AND DRIFTING AREAS

3.1 CONTEXT

NIRB has requested that Baffinland identify the specific areas to be used for drifting and anchorage of vessels and also to provide details of how community feedback and comments from the Marine Environment Working Group (MEWG) has been used to inform the selection of suitable areas.

3.2 2022 ANCHORING AND DRIFTING AREAS

As a critical component to the safety and efficiency of Baffinland's marine operations, two primary locations for anchoring in the RSA will continue to be used in 2022. Vessels waiting for an anchor at Milne Port will continue to anchor to the west of Ragged Island in North Milne Inlet and vessels undergoing cargo inspections and ballast water testing will anchor within the vicinity of Milne Port prior to berthing at the Ore Dock (Figure 3.1).

3.2.1 Community Engagement and Feedback

In 2020, Baffinland undertook an options exercise of five alternative locations proposed by the MHTO for anchoring along the Northern Shipping Route. The results of this alternative options exercise confirmed that the established anchorage locations near Ragged Island remain the most suitable for the Project. A memo summarizing the options exercise was provided to the North Baffin Hamlet and Hunters and Trappers Organizations (HTOs) on January 13, 2020 (NIRB Registry No. 330789).

The 2022 Pre-Season Shipping Meeting has not yet been held, despite three separate attempts by Baffinland to host meetings in Pond Inlet on July 6th, July 12th/13th, and July 13th/14th, 2022. Until alternate requests are made, Baffinland will continue to minimize impacts on hunters and those traveling on water by enforcing that no more than three ore carriers can anchor or drift in the Ragged Island area at any time. Baffinland also commits to avoiding any Baffinland-contracted vessels from drifting in Eclipse Sound, unless warranted for safety considerations. Ore carriers are also prohibited from discharging ballast water at the Ragged Island anchorage locations. Furthermore, all ore carriers are prohibited from discharging grey water and sewage throughout the RSA.

Baffinland remains open to working with Pond Inlet on exploring feasible alternatives or modifying current practices further for anchoring at Ragged Island to minimize interference of shipping on land users.

3.2.2 Marine Environmental Working Group (MEWG)

No comments related to Baffinland's anchorage locations were raised by the MEWG during the May 13th, June 14th, June 22nd, or June 29th, 2022 pre-shipping season MEWG meetings. However, a concern was raised by MHTO during the June 29th pre-shipping meeting regarding the discolouration of water near the Ragged Island anchorages that had been observed by community members, and whether this could be related to ballast water discharges. Baffinland confirmed that there have been no ballast water or grey water discharges at Ragged Island, and that discolouration may be the result of anchor wash from the hawsepipe. MHTO requested that Inuit monitors be positioned at Ragged Island to observe vessels at anchorage. While this raises numerous health and safety concerns, Baffinland encourages community members to document any items of concern, including the location, date, and time of observation. Video footage is encouraged and can be provided to Baffinland's shipping monitors using their dedicated email address, shipping@baffinland.com. All documentation will be reviewed by Sustainable Development Department team representative(s) and a written response will be provided, as well as follow-up actions if required.

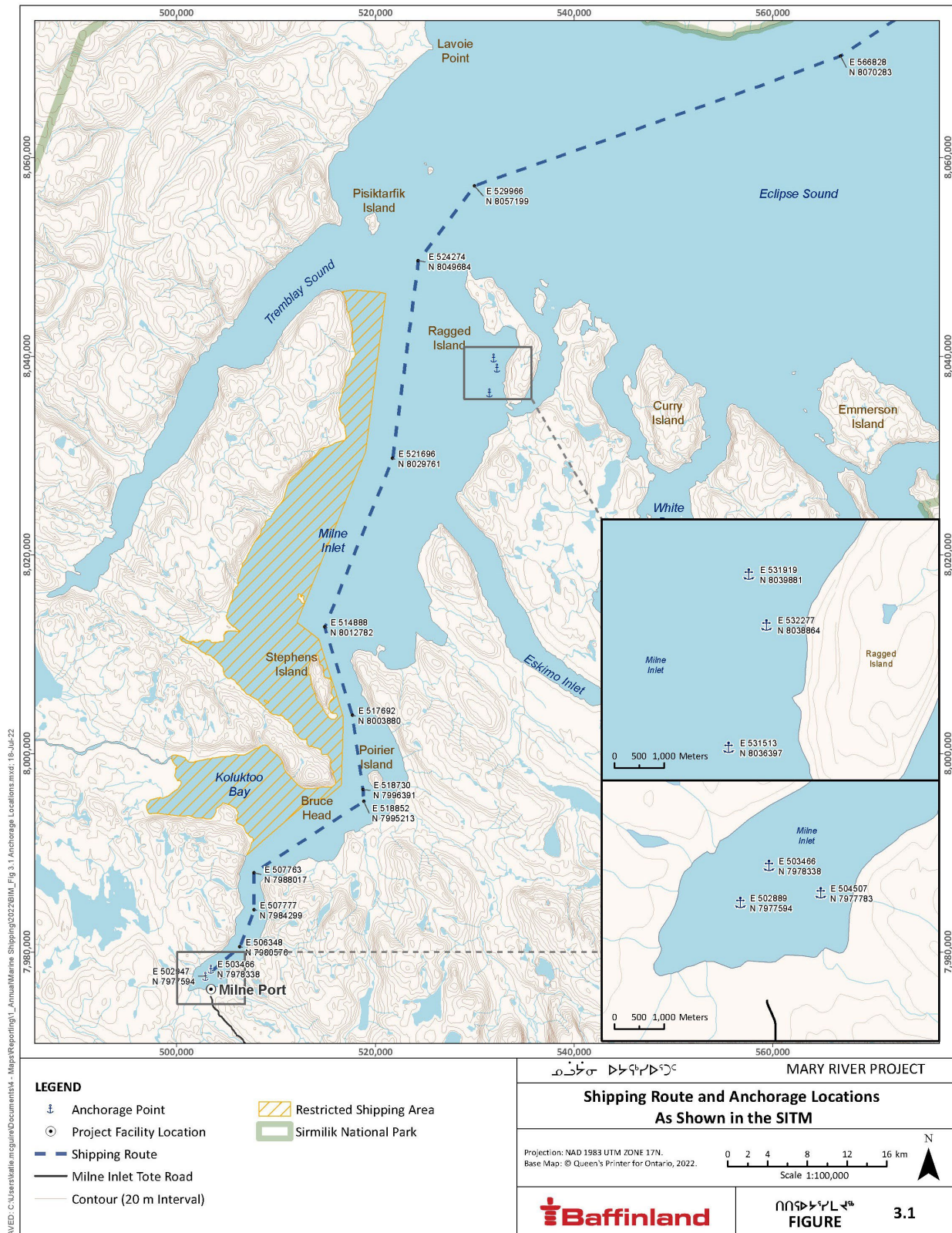


Figure 3.1: Shipping Route and Anchorage Locations

4 SHIPPING ACTIVITY-RELATED COMMUNICATIONS

4.1 CONTEXT

As part of its regular operation, Baffinland has as Shipping-related Communications Protocol to guide specific engagement activities with the MHTO and Hamlet of Pond Inlet. As part of this protocol, Baffinland typically hosts pre- and post-shipping season meetings. Baffinland also maintains a number of communication and engagement activities throughout the shipping season. A summary of the key activities is summarized in Table 4.1 below.

Table 4.1: Key Components of Shipping-Related Communications

Timing	Key Component	Description
Pre-season	Pre-Shipping Season Meeting	Baffinland to host a Pre-Shipping Season Meeting with representative of MHTO, the Hamlet of Pond Inlet (the Hamlet) and local QIA.
	Confirmation of floe edge closure	Baffinland to obtain written confirmation from the MHTO that the floe edge has been closed to hunters.
	Local radio announcement of start of shipping season	Baffinland to notify the residents of Pond Inlet of the anticipated start dates for Baffinland-related shipping activities on the local public radio.
	Official start of shipping season	Baffinland notifies the official start of the shipping season by sending a letter addressed to the MHTO, and shares letter with the Hamlet and the local Pond Inlet Qikiqtani Inuit Association (QIA) representative via email at least 72 hours prior to anticipated start of shipping. An additional letter is also sent 24 hours prior upon further refinement of start of shipping based on latest ice conditions.
During Shipping	Ongoing shipping activities-related communications	Baffinland maintains active communications with the MHTO and residents of Pond Inlet about ongoing shipping operations throughout the summer via multiple modes including local public radio, marine VHF radio, social media, and live ship tracking available on the Baffinland website (www.baffinland.com) under its >Operation>Shipping & Monitoring> webpage.
		Hiring of shipping monitors based in Pond Inlet
		Dedicated email address (shipping@baffinland.com) for concerns, questions and comments directed to Baffinland
		Posting of Shipping and Marine Monitoring Summary brochure, including Shipping Route, in key locations in Pond Inlet (see Appendix 2).
		Maintain comment/concern tracker relevant to shipping season
Post-season	Overall shipping season summary	Baffinland to prepare a summary on all vessel-related activity
	End of Shipping Season Meeting	Baffinland to host an End of Shipping Season Meeting with representatives of MHTO, the Hamlet of Pond Inlet and local QIA. Meeting is typically held in the same year of shipping season being discussed after the last Baffinland Project vessel has left the RSA.
		Baffinland considers the potential for integrating feedback in planning of subsequent year’s shipping operations, including consideration of adoption of new management and mitigation measures.

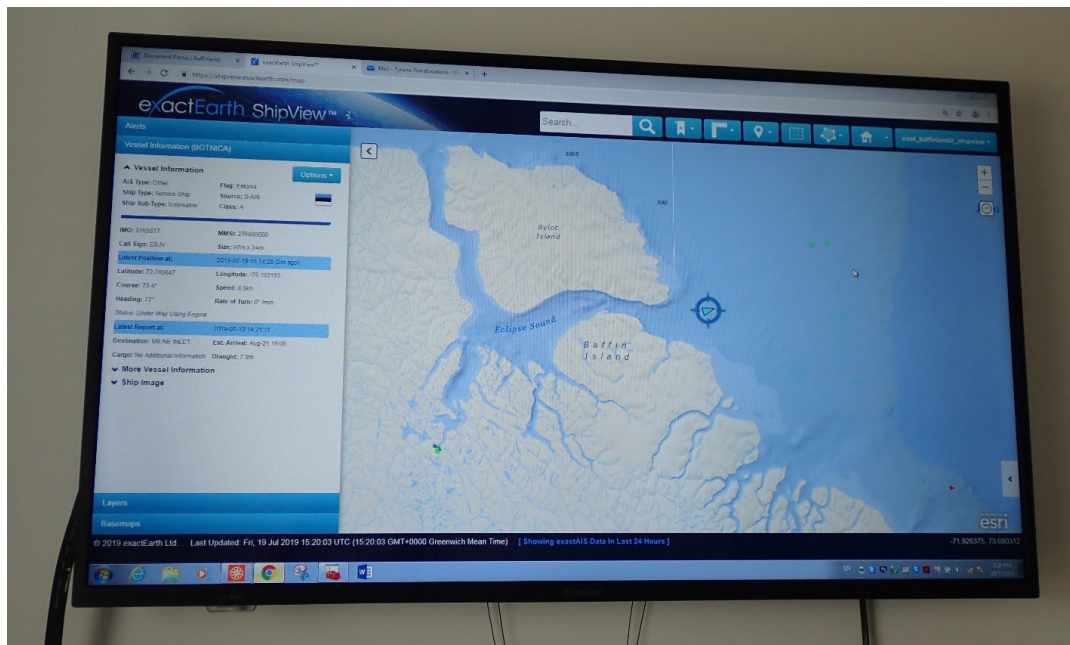


Figure 4.1: Large wall-mounted TV monitor in Baffinland’s Shipping Monitor office located on the 2nd floor of the MHTO office building in Pond Inlet showing live ShipView tracking of Baffinland vessels

4.2 SUMMARY OF 2022 IMPLEMENTATION OF BAFFINLAND’S SHIPPING COMMUNICATIONS PROTOCOL

Baffinland’s shipping season ended on October 31, 2021 when all vessels had exited the Regional Study Area. Although Baffinland strives to hold the End of 2021 End of Shipping Season Meeting as soon as it is feasible to do so after the closing of each shipping season, the Company has not yet held a meeting with representatives of the MHTO, the Hamlet and QIA. Baffinland made several informal and formal requests between October 27, 2021 and April 6, 2022 through verbal and written methods to obtain potential availabilities of the MHTO board members, as well as to obtain input on agenda items to include. Baffinland recognizes that the MHTO has had many obligations given the Phase 2 Hearing/Community Roundtable sessions, the MHTO board elections, and submission of Phase 2 intervener closing statements in November 2021, December 2021 and January 2022, respectively. Nunavut has also had to address rising COVID-19 case numbers, which have led to numerous restrictions on social gatherings, further limiting the potential to hold in-person gatherings. Baffinland is also aware that the MHTO has had capacity challenges filling in their manager role.

Baffinland rescheduled the End of 2021 Shipping Season meeting for July 6th, 2022, which was also meant to include pre-shipping discussions for the upcoming 2022 season. Baffinland’s Community Resources Services Manager flew to Pond Inlet to onboard new Shipping Monitor team recruits on July 4th, 2022 and also be available to conduct a meeting, however, the MHTO requested that the meeting be moved to a later date. Baffinland proposed July 12th/13th and July 13th/14th, 2022 as alternative meeting dates, but the MHTO stated that this time frame was inappropriate due to ongoing narwhal harvesting efforts. Baffinland will continue to converse with MHTO members to reschedule the aforementioned meetings and ensure that community members are well-informed of upcoming 2022 shipping activities and mitigation measures.

In addition to attempts made for a 2021 End of Shipping Meeting, Baffinland’s Senior Director of Sustainable Development corresponded with the MHTO on May 31st, June 23rd, and June 27th, 2022 requesting availabilities to schedule a meeting in the coming week(s) to discuss various items. Proposed key agenda items included (i)

Discussion regarding Baffinland's Production Increase Proposal (PIP) to the NIRB for approval to ship 6.0 million tonnes per annum (Mtpa); (ii) 2022 pre-shipping season details; and (iii) 2022 Monitoring Programs. The MHTO stated that a meeting was not feasible due to MHTO members travelling outside of the community. Baffinland offered to remain flexible with regards to meeting location and timing, but the MHTO requested additional time to review relevant documents internally.

WSP Golder (previously known as "Golder Associates Ltd." or "Golder"), Baffinland's marine consultants, also reached out to the MHTO on April 27th, 2022 via email to request an in-person meeting. The purpose of this meeting was to discuss the development of a narwhal tagging program in partnership with the MHTO. On May 17th, 2022, the MHTO disclosed in a letter to WSP Golder that the organization would not support the proposed program.

While Baffinland was unsuccessful in organizing direct meetings with the MHTO, several MHTO representatives did attend the MEWG teleconference meetings that were held on May 3rd, June 14th, June 22nd, and June 29th, 2022. One MHTO representative attended the two-hour teleconference meeting on May 3rd and did not address any concerns related to the 2021 draft marine monitoring reports, which were being discussed at that time. Additionally, the MHTO was given an opportunity to provide written comment on all 2021 marine monitoring reports, which were to be submitted to Baffinland by May 27th, 2022. Baffinland did not receive any comments from the MHTO. Three MHTO representatives attended the June 14th MEWG meeting, but did not address any concerns or provide comment on the proposed 2022 monitoring programs and shipping activities. MHTO did address concerns related to decreased char abundances that have been observed by community members. Baffinland provided an overview of the 2021 Milne Inlet Freshwater Char Studies, which are outlined in the 2021 NIRB Annual Report. Baffinland then sent a more in-depth response via email to the MEWG on July 7th, 2022, comparing methodologies and results of the Baffinland 2021 char studies to the historical DFO char studies conducted in the RSA during the late 1990s. A comparison of these studies indicated that no temporal changes were detected for Arctic Char populations based on samples collected from Tugaat and Qurluktuk Lakes.

Two MHTO representatives attended the June 22nd MEWG meeting and one MHTO representative attended the June 29th MEWG meeting. The only concern raised by MHTO at these meetings was related to the proposed 2022 Marine Mammal Aerial Survey Program (MMASP) and the lack of MHTO involvement. Baffinland has since offered one MHTO representative to participate in Leg 2 of the 2022 MMASP. A more detailed outcome of this engagement is captured in Section 4.3.1, Table 4.2. Details of any additional meetings will be included in the 2022 Annual Report to the NIRB. Baffinland continues to seek alternative methods of communication in response to failed in-person meeting attempts. Baffinland's Community Resources Services and Sustainable Development Manager remained in Pond Inlet despite failed meeting attempts, to host a public radio show on July 13th, 2022 in order to continue discussions with residents of Pond Inlet. A brief update was provided at the start of the radio show covering the following topics: i) overview of 2022 shipping season; (ii) a summary of key mitigation measures that will be implemented this year; (iii) and an update regarding communication between the community of Pond Inlet and Baffinland for the upcoming shipping season. These subjects were discussed in greater detail, which included a summary of the number of ore carriers expected to transit in the Regional Study Area (RSA) in 2022 under both a 4.2 Mtpa and 6.0 Mtpa scenario. Mitigation measures described included: i) Baffinland's commitment to avoiding ice-breaking during the 2022 spring shoulder season and waiting until there is a continuous path of 3/10s ice concentration prior to commencing shipping; (ii) reasoning for not further lowering the vessel speed limit from the current 9 nm/h, as described in Section 4.3.1, Table 4.2; (iii) restrictions imposed on vessels entering the RSA, including the inability to enter unless instructed by the Port Captain; (iv) mitigation measures enforced at Ragged Island, including a limit of three anchorage locations, and prohibiting vessel drifting in Eclipse Sound unless

warranted due to safety concerns. Baffinland's communication update was related to the hiring of additional shipping monitors. Baffinland provided a list of all shipping monitors hired to date, which totals currently 9 monitors for the 2022 shipping season. The duties of the shipping monitors were highlighted, including their ability to monitor and track vessel activities. Baffinland acknowledged that a shipping monitor will always be on duty and therefore are available 24 hours/day, 7 days/week. Subsequently, the phone line was opened for questions to Baffinland from the general public. Only two off-air calls were received, one of which asked for additional clarification on the number of vessels entering the RSA under a 4.2 Mtpa scenario, to which Baffinland responded approximately 57. The second caller commented that a lack of incoming calls suggests that Baffinland's adaptive management efforts are being recognized by the community, and to continue with ongoing efforts.

Baffinland's Head of Northern Affairs corresponded with the Igloodik Hunter and Trappers Organization and the Nangmoutaq (Clyde River) Hunters and Trappers Organization on June 29th, 2022 to discuss the upcoming shipping season. Baffinland's Community Resources Services and Sustainable Development Manager also had an independent phone call with the Acting Manager of the Sanirajak (Hall Beach) Hunters and Trappers Organization on July 7th, and met in person with the Ikajutit (Arctic Bay) Hunters and Trappers Organization on July 13th, 2022 to discuss the upcoming shipping season. Key points of conversation included proposed mitigation measures associated with the proposal for Production Increase Renewal (PIPR), such as a reduction in vessel transits, a maximum of 80 vessels in a 6.0 Mtpa scenario, and ongoing dust management efforts.

Similar to 2021, Baffinland will continue to announce the start of the marine mammal aerial surveys using Facebook and provide responses to certain questions received via Facebook. The commencement of the marine mammal surveys will also be announced on public radio and marine VHF radio. Tentative Marine Mammal Aerial Survey program start dates are listed in Section 6.2, Table 6-1. The MHTO typically announces on Facebook's Pond Inlet News page when the floe edge has been closed for the 2022 season. At the time of this report, no formal report has been made on the closure of the floe edge closure. However, informally, the floe edge was closed at 11:59 pm on July 10 due to ice degradation, however the ice continues to be used by experienced hunters as numerous ice leads have formed allowing safer access for narwhal harvesting. Narwhal were anecdotally observed from shoreline of Pond Inlet on the morning of July 13, 2022. Baffinland will follow-up directly with the MHTO to receive formal confirmation that the floe edge has been closed prior to commencing any shipping activities and latest hunter use.

4.3 ENGAGEMENT RELATED TO NARWHAL ADAPTIVE MANAGEMENT RESPONSE PLANS

On April 8 2021, Baffinland provided to the NIRB a Technical Memo prepared by Baffinland's marine mammal monitoring technical consultants, WSP Golder, entitled Preliminary Summary of 2020 Narwhal Monitoring Programs (the Memo) (Golder, 2021a; NIRB Registry No. :334991). The Memo outlined key results of Baffinland's 2020 marine mammal monitoring programs, notably that through the 2020 Marine Mammal Aerial Survey, Golder had recorded a statistically significant decline in the stock estimate for the Eclipse Sound narwhal stock. The memo focused on the implementation of mitigation measures to address the observed decline in narwhal stock. A comment and response period was facilitated by the NIRB following the submission of the memo. Relevant engagement activities and parties that submitted comments are outlined in Baffinland's 2021 NIRB Marine Shipping and Vessel Management Report (Baffinland, 2021a).

In addition to NIRB's facilitated exchange of written comments on the Memo in 2021, Baffinland continued to conduct its own engagements with several Parties. Baffinland recognizes that the 2021 Marine Mammal Aerial Survey results as reported in WSP Golder (2022a) indicated a further decline in Eclipse Sound narwhal stock even though shipping activity was reduced in 2021 in comparison to 2020 and that icebreaking had not occurred. Given

the uncertainty on the causal mechanisms for these observed reductions in narwhal abundance over the last two years, Baffinland has maintained or expanded upon existing measures as described within the updated the Narwhal Adaptive Management Response Plan (NAMRP) to be implemented throughout the 2022 season (Appendix 2). A summary of relevant engagement attempts and/or engagement opportunities where feedback was considered and considered in the amended NAMRP for 2022 is as follows:

1. Provided the MEWG copies of all its 2021 Draft Marine Monitoring Program Reports on April 3rd, 2022, with comments expected back from the MEWG on May 27th, 2022.
2. Submitted to the Nunavut Impact Review Board (NIRB) its 2021 Annual Monitoring Report as of March 31st, 2022, with comments expected back from interested Parties on June 30th, 2022.
3. Held a meeting with the MEWG on May 3rd, 2022 to provide an opportunity for members to ask questions or address concerns related to the Draft 2021 Marine Monitoring Reports in advance of their written submissions. These draft reports were circulated to working group members a month prior on April 3rd, 2022. Distributed reports included: 2021 Bruce Head Shore-based Monitoring Program, 2021 Marine Mammal Aerial Survey, Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program, 2021 Ringed Seal Aerial Survey Report, Passive Acoustic Monitoring Program (Open-Water Season) Report, in addition to two final reports including Year 2 Freight Dock Offset Habitat Monitoring Report (submitted to Fisheries and Oceans Canada as part of Fisheries Authorization 18-HCAA-00160) and 2020 Passive Acoustic Monitoring Report
4. Held a meeting with the MEWG on June 14th, 2022 to provide an update on proposed 2022 shipping activities, as well as marine monitoring programs. Three hours were allocated for this teleconference, which was extended to four hours to allow for additional comment. Presentation materials were circulated to the MEWG on June 7th, 2022 in both English and Inuktitut.
5. Held a meeting with the MEWG on June 22nd, 2022 to provide a question and answer period related to the shipping update and proposed 2022 marine monitoring program presentations that were given on June 14th, 2022. Three hours were allocated for this teleconference, which was extended to four to allow for additional comment.
6. Held a meeting with the MEWG on June 29th, 2022 to provide an additional question and answer period related to the shipping update and proposed 2022 marine monitoring program presentations that were given on June 14th, 2022. Three hours were allocated for this teleconference.
7. Baffinland's Community Resources Services and Sustainable Development Manager flew to Pond Inlet on July 4th, 2022 to meet with MHTO representatives and the Hamlet of Pond Inlet to discuss plans for the 2022 shipping season. As outlined in Section 4.2, no formal meeting was able to be held with the MHTO as a group, however, Baffinland was able to engage independently with the MHTO Manager and Chairperson.
8. Hosted a radio show in Pond Inlet with a question and answer period on June 13th, 2022.
9. WSP Golder, Baffinland's marine consultants, reached out to the MHTO on April 27th, 2022 via email to discuss the development of a narwhal tagging program in partnership with the MHTO. This proposed program was meant to be a community-based monitoring program designed to fill the data gap around the effect of icebreaking and icebreaker noise on narwhal during the early shoulder season.

10. On May 10th, 2022, Baffinland responded to a letter submitted to the NIRB by the MHTO on May 6th, 2022 (NIRB File No. 08MN053, Registry No. 124703).
11. On May 31st, 2022, Baffinland provided the MHTO with the letter that was submitted to the NIRB regarding the submission of Production Increase Proposal Renewal (Refer to Attachment 1 in Appendix D of Appendix 1).
12. On July 6th, 2022, Baffinland contacted MHTO via email to discuss potential participation of a MHTO participant for Leg 2 of the 2022 Marine Aerial Survey Program following request from MEWG meeting held on June 29, 2022.
13. On July 11th, 2022, Baffinland contacted MHTO to follow-up with site requirements to support the MHTO's selection process for MHTO representative participation during Leg 2 of the 2022 Marine Aerial Survey Program.
14. Baffinland's Head of Northern Affairs had an independent phone call with the Igloodik Hunters and Trappers Organization on June 29th, 2022 to discuss the upcoming shipping season. Key points of conversation included proposed mitigation measures associated with the Proposal for Production Increase Renewal (PIPR), such as a reduction in vessel transits, a maximum of 80 vessels in a 6.0 Mtpa scenario, and ongoing dust management efforts.
15. Baffinland's Community Resources Services and Sustainable Development Manager met in person with the Ikajutit (Arctic Bay) Hunters and Trappers Association on July 12th, 2022 to provide an update on Baffinland's latest Project update, expectations for the upcoming shipping season under 4.2 Mtpa or 6.0 Mtpa scenarios, and the Marine Mammal Aerial Survey Program. Key points of conversation included 2022 marine monitoring program and proposed mitigation measures associated with the Proposal for Production Increase Renewal (PIPR), such as a reduction in vessel transits, and a maximum of 80 vessels in a 6.0 Mtpa scenario.
16. Baffinland's Community Resources Services and Sustainable Development Manager had an independent phone call with the Acting Manager of the Sanirajak (Hall Beach) Hunters and Trappers Organization on July 7th, 2022. Relevant key points of conversation included proposed mitigation measures associated with the proposal for PIPR, such as a reduction in vessel transits, a maximum of 80 vessels in a 6.0 Mtpa scenario, and ongoing dust management efforts.
17. Baffinland's Head of Northern Affairs had an independent phone call on June 29th, 2022 with the Nangmautaq (Clyde River) Hunters and Trappers Organization to discuss the upcoming 2022 shipping season. Relevant key points of conversation included proposed mitigation measures associated with the proposal, such as a reduction in vessel transits, a maximum of 80 vessels in a 6.0 Mtpa scenario, and ongoing dust management efforts.

4.3.1 Key Outcomes

Through these consultation efforts, to-date Baffinland has received at a high level, the following feedback.

Table 4.2: Summary of Engagement Outcomes

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
<p>Recommendations from MHTO to further reduce ship speed beyond the current commitment of 9 nm/h</p>	<p>Baffinland has directly contacted the affiliated shipping companies (Nordic, Oldendorf, Golden Ocean) to understand if it is possible to reduce speeds further than the current 9 nm/h speed limit. The general response is that even a reduction to 8 nm/h could not be implemented across the fleet, and the implications of doing it may not be desirable to MHTO, some key points include:</p> <ul style="list-style-type: none"> • Auxiliary Blowers: the lowest speed that most of the vessels can run at without the auxiliary blowers (used to flush air out of engine) cutting out is between 9-10 nm/h. Running at lower speeds of even 8 nm/h would require the auxiliary blowers to run non-stop, which they are not designed for, substantially increasing the risk of equipment failure. • Engine Maintenance: Extended periods at 8 nm/h and below will see a build-up of engine/stack soot and accumulated cylinder oil in the exhaust system, which would require a daily speed increase to full power for 2-3 hours to clear exhaust passages. Without this, fouling of engine and turbochargers will occur, substantially increasing the risk of failures and creating the need for additional maintenance. • Safe Navigation: Even at 8 nm/h the vessels that serve Milne Port would be nearing an unsafe steering speed, which means at that speed or under vessel Captains can lose the ability to effectively maneuver their vessels. Removing the ability to maneuver/steer vessels as they transit through Eclipse Sound and Milne Inlet is not an option. • Longer Transits: The reduction in speed to 8 nm/h would also cause an increase in transit time of 3-4 hours for vessels as they transit from the entrance of Eclipse Sound to Milne Port. This would increase the time vessels and hunters would interact in the marine area.
<p>Recommendations from MHTO to further reduce shipping</p>	<ul style="list-style-type: none"> • Baffinland has committed to decreasing the total number of vessel transits by 15 per cent through the use of convoys. The reference value is what the total number of transits would have been in the 2022 season if vessels travelled individually (Refer to Section 2.1, Table 2.2 for exact values pertaining to 4.2 Mtpa and 6.0 Mtpa scenario). Additional details pertaining to convoys are included in the SMWMP (Baffinland, 2022a; Appendix 1). • Baffinland has committed to allowing no more than 80 ore carriers enter the RSA if approved to ship 6.0 Mtpa in 2022. This is 4 to 6 vessels less than what Baffinland had previously proposed for a 6.0 Mtpa scenario.

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
Recommendations from MHTO and Hamlet of Pond Inlet to eliminate all icebreaking activities from Baffinland's operational activities.	<ul style="list-style-type: none"> Baffinland proposes to avoid icebreaking at the beginning of the 2022 shipping season. The trigger to begin shipping will be a continuous path of 3/10ths ice concentrations between Baffin Bay and Milne Port. The icebreaker is expected to enter Eclipse Sound after conditions are met and after the first convoy of ore carriers. It will remain in the area throughout the season, however, it will be available to assist for emergencies. Icebreaking may still be required at the end of the shipping season, depending on ice conditions. However, Baffinland will continue to close the shipping season to avoid breaking landfast ice.
Recommendations from MHTO and the community of Pond Inlet to discontinue the use of acoustic monitors in the RSA	<ul style="list-style-type: none"> Baffinland will not be redeploying the two acoustic recorders that are currently deployed. These monitors will be retrieved in August, 2022. Baffinland may deploy a single acoustic recorder in August, 2022 approximately 2 km south of Bruce Head to satisfy the below request from Oceans North. At this time, the MHTO is not in support of any additional acoustic recorder deployments since other organizations, including Oceans North, will be deploying recorders in the region.
Recommendations from Oceans North to continue acoustic monitoring in the RSA, to ensure that all vessel convoy combinations are captured during the 2022 shipping season. This acoustic monitoring will support the concept of using convoys to mitigate total sound exposure to marine mammals.	<ul style="list-style-type: none"> Baffinland may deploy a single acoustic monitor in August, 2022 approximately 2 km south of Bruce Head to ensure that a convoy without the Botnica (ice management vessel) is captured in the absence of icebreaking. Recordings of convoys from previous seasons occurred at the beginning of the shipping season and all included the Botnica. Oceans North agreed to review their historical recordings and report back to Baffinland as to whether or not a convoy without the ice management vessel has been captured previously, which would allow Baffinland to discontinue the use of acoustic monitors as per MHTO's request.
Concerns from the MHTO that Baffinland did not include the results of their 2021 Marine Mammal Aerial Survey within the 2021 Annual Report to the NIRB.	<ul style="list-style-type: none"> Baffinland responded to the MHTO letter on May 10th, 2022 (NIRB File No. 08MN053, Registry No. 124703). Baffinland clarified that due to the structure of the MEWG, all draft marine monitoring reports are to be reviewed by the MEWG prior to finalization. 2021 Draft Marine Monitoring Reports were circulated to the MEWG on April 3rd, 2022 for review. MEWG members were then given an opportunity to provide written comment on these reports, as well as engage in a teleconference meeting on May 3, 2022 to address questions/concerns in advance of the written submission

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
	<p>deadline. The deadline to submit written comments to Baffinland on these reports was May 27th, 2022 and the first MEWG meeting related to these reports was held May 3rd, 2022. Consequently, the 2021 marine monitoring reports could not be appended to the 2021 NIRB Annual Report, which was submitted March 31st, 2022. Final report versions will be appended to the 2022 NIRB Annual Report and will become publicly available on the Baffinland website following final revisions sometime in 2022.</p>
<p>The MHTO addressed concerns in their May 6th, 2022 letter to the NIRB that Baffinland has been engaging in unauthorized icebreaking since 2017.</p>	<p>There are no regulations stating that Baffinland is not authorized to break ice as icebreaking is used by other vessels sailing in Canadian waters, including various Canadian coast guard vessels in order to safely escort vessels. Baffinland has committed to eliminating icebreaking during the spring shoulder season in 2021 and 2022, but will not commit to eliminating ice breaking during the fall shoulder season. This is primarily due to safety concerns affiliated with vessels travelling through ice.</p>
<p>Recommendations from Hamlet of Pond Inlet, Parks Canada, DFO and QIA on enhancements to Baffinland's existing and proposed monitoring programs.</p>	<p>Baffinland has committed to working with these Parties further on the refinement of these programs (i.e., analysis of Early Warning Indicator [EWI] monitoring at Bruce Head). Baffinland also reaffirmed the need for and importance of strengthened regional monitoring that will enhance Baffinland's ability to discriminate Project-related effects from other anthropogenic activities or environmental changes that could be affecting the Eclipse Sound narwhal stock. Baffinland attempted to implement a narwhal tagging program for the 2022 shipping season, but did not receive support from the MHTO to proceed.</p>
<p>Recommendations from the MHTO to include an MHTO representative on the marine mammal aerial surveys.</p>	<p>Baffinland engaged with MHTO on July 6 and 11th, 2022 to request MHTO participation in Leg 2 of the 2022 Marine Mammal Aerial Survey, occurring August 9th to August 23rd, 2022. Baffinland will continue to correspond with MHTO regarding participation in future aerial studies.</p>
<p>On May 17th, 2022, the MHTO recommended that Baffinland abandon the proposed narwhal tagging program. MHTO voiced concerns about additional stress imposed on narwhals during their migratory stage through the use of tagging darts, as well as the proposed work being issued by Baffinland. MHTO stated that preference is given to DFO for any programs involving the tagging of marine mammals.</p>	<p>Baffinland abandoned the proposed 2022 Narwhal Tagging Program.</p>
<p>Recommendations from DFO that Baffinland develop a more robust zooplankton monitoring program.</p>	<p>Baffinland's current zooplankton monitoring program involves both the use of settlement plates and vessel-based net tows. DFO offered to provide Baffinland a more robust methodology, but no comments have been received to date.</p>

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
<p>The MEWG identified the need for additional meetings to discuss concerns related to the draft 2021 marine monitoring reports.</p>	<p>Baffinland distributed copies of all of its draft 2021 marine monitoring programs to the MEWG on April 3rd, 2022. Comments were to be submitted by MEWG members on May 27th, 2022. Responses to all comments received will be provided as an appendix to the final versions of these monitoring reports, which will incorporate comments from the MEWG. Should the MEWG feel as though these written responses are insufficient, Baffinland will explore options to further discuss the 2021 marine reports via teleconference.</p>
<p>Baffinland requested that Parks Canada discuss ongoing research efforts within the proposed Tallurutiup Imanga National Marine Conservation Area (TIMCA) and share with the MEWG.</p>	<p>Parks Canada stated that they are currently not conducting any research projects in the TINMCA and provided a list of cruise ships entering the region during the 2022 season. This information was circulated to the MEWG on July 5th, 2022.</p>
<p>Recommendations from MHTO that community members be stationed at Ragged Island to observe anchored vessels. As stated in Section 4.2, there were concerns related to the discolouration of water near Ragged Island, which had been noted by local hunters.</p>	<p>Baffinland confirmed with MHTO that no ballast water or grey water discharges occur at Ragged Island. Discolouration of the water may be the result of anchor wash from the vessel hawespipe. While stationing Inuit monitors at Ragged Island raises numerous health and safety concerns, Baffinland encourages community members to document any items of concern, including the location, date, and time of observation. Photos and video footage is encouraged and can be provided to Baffinland’s shipping monitors via email (shipping@baffinland.com) or in person. All documentation will be reviewed by Sustainable Development Department representatives and a written response will be provided, as well as follow-up actions if required.</p>
<p>Multiple organizations from the MEWG recommended that the comment and response system for monitoring reports be revised to correspond with Annual Report dates.</p>	<p>Certain reports cannot be completed by the NIRB Annual Report deadline due to times associated with laboratory analysis. Baffinland will continue to engage with the MEWG to revise this process to limit the effort required by group members.</p>
<p>Various MEWG members had concerns related to convoys, including whether these convoys will minimize noise, what the maximum number of vessels per convoy will be, and what the approximate percentage of vessels travelling in convoy will be.</p>	<p>Details will be provided in the Convoy System Operational Guide, appended to this report.</p>
<p>Recommendations from MHTO that QIA visit the community of Pond Inlet to document Inuit Qaujimagatuqangit related to the Mary River Project.</p>	<p>QIA agreed to inform the MHTO of any upcoming consultations planned in the community of Pond Inlet and arrange future visits.</p>
<p>Recommendations from the Ikajutit (Arctic Bay) Hunters and Trappers Association (IHTA) that members be included in future programs and that hard copies be provided of reports in addition to USB and/or links being provided.</p>	<p>Baffinland will engage with the IHTA to ensure that members are included in future marine monitoring programs, and that copies of reports are provided, as requested.</p>

5 MITIGATIONS FOR MARINE MAMMALS AND TRADITIONAL HARVESTING

5.1 ADAPTIVE MANAGEMENT MEASURES FOR 2022

Recognizing the value of the Eclipse Sound narwhal stock to the residents of Pond Inlet, and that there are unknown and/or unmitigated cumulative activities occurring in the Marine RSA that are likely to continue in 2022, Baffinland is committed to taking a precautionary approach and adding additional mitigations to its shipping activities in 2022 on an interim basis.

Baffinland has elected to implement an additional mitigation measure during the 2022 shipping season as a precaution. Baffinland has committed to decreasing the number of vessel transits by 15 per cent through the use of convoys, as defined in Section 2.1, Table 2.1. This reduction will be measured based on what the total number of vessel transits would have been in 2022, should vessels have travelled individually. Refer to the appended Convoy System Operational Guide for more details pertaining to what constitutes a convoy, and how this process will be executed and documented. The additional mitigation measure will result in less vessel traffic throughout the Regional Study Area (RSA), less noise disturbance to marine mammals, and less potential interactions with harvesters. Baffinland will continue to implement all other existing mitigation measures as described in Section 6 of the SMWMP (see Appendix 1; Baffinland, 2022a) and in Table 5.1 below, including delaying the shipping season until a continuous path of 3/10ths or less ice concentration is available along the Northern Shipping Route. This mitigation measure was first introduced in 2021 and could delay the start of shipping between 2 and 3 weeks based on historical ice conditions.

5.2 SHIPPING MITIGATIONS MEASURES TO REDUCE IMPACTS ON MARINE MAMMALS

All vessels are instructed to follow the nominal shipping route to the fullest extent possible, however at the start and end of the shipping season there may be a need for slight deviations from the nominal route to avoid interactions with ice. Any notable deviations will be communicated to hunters on the water and in the communities via the Baffinland’s Shipping Monitors. In all cases vessels will continue to be instructed to avoid Koluktoo Bay, the western shoreline near Bruce Head and 10 km from the shoreline of Pond Inlet to minimize effects on marine mammals and interference with hunting activities (Figure 5.1).

All Project vessels will restrict speed to 9 knots when transiting along the established shipping corridor, and will be operated in such a way as to avoid separating an individual member(s) of a group of marine mammals from other members of the group. When marine mammals appear to be trapped or disturbed by vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area.

A detailed description of mitigations for minimizing Project-related activities on marine mammals are available for review in Baffinland’s SMWMP (Baffinland, 2022a; refer to Appendix 1). Table 5.1 summarizes these mitigations:

Table 5.1: 2022 Mitigation Measures for Marine Mammals

Project Activity	Mitigation Measure(s)	Species
Vessel traffic to/from Milne Port	<ul style="list-style-type: none"> • Maintain constant speed and course when possible. • Reduce vessel speed to 9 knots. • Reduce vessel idling. 	Ringed Seal, Bearded Seal, Walrus, Beluga, Narwhal, Bowhead Whale, Polar Bear

Project Activity	Mitigation Measure(s)	Species
	<ul style="list-style-type: none"> • No more than 3 ore carriers anchoring at Ragged Island and/or drifting in Eclipse Sound. Drifting to be avoided unless warranted for safety reasons. • No icebreaking to commence the 2022 shipping season. Ore carriers will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA) from the entrance of Eclipse Sound and Milne Port. • No breaking of landfast ice will occur in the spring or fall shoulder season. • When marine mammals appear to be trapped or disturbed by Project vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area (as safe navigation allows). • All Project vessels will be provided with standard instructions to operate their vessel in a manner that avoids separating an individual member(s) of a group of marine mammals from other members of the group; • All Project vessels will be provided with standard instructions to not approach within 300 m of a walrus or polar bear observed on sea ice; • Vessels awaiting instructions from the Port Captain to enter the RSA will be instructed to wait in Baffin Bay at least 40 km east of the Nunavut Settlement Area. • No more than 80 ore carriers will be chartered during the 2022 season to transport up to 6 Mtpa, pending approval. This is six (6) ore carriers less than the maximum anticipated and approved in the previous Production Increase Proposal (PIP) and Extension (PIPE) requests. • Use of convoys throughout the 2022 season to further reduce total sound exposure. Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure (See Appendix D in Appendix 1). Baffinland proposes to target a 15% reduction in overall independent one way transits by implementing 	

Project Activity	Mitigation Measure(s)	Species
	<p>convoys, which effectively combines individual transits into single ‘effective transits’.</p> <p>2022 Narwhal Adaptive Management Response Mitigations:</p> <ul style="list-style-type: none"> • Use of convoys throughout the 2022 season to further reduce total sound exposure. Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure (See Appendix D in Appendix 1 for additional details). Baffinland proposes to target a 15% reduction in overall independent one way transits by implementing convoys, which effectively combines individual transits into single ‘effective transits’. 	

It is important to note that none of the aforementioned mitigations related to vessel movement, should be read in any way as over-riding the Master’s authority and responsibility for safe navigation and management of the vessel.

Baffinland has also developed several mitigation and management measures to directly minimize the effects of the Project on Inuit hunting and harvesting activities and to ensure land user safety in the presence of Project activities.

Mitigation measures include:

- Waiting for confirmation from the MHTO that the floe edge has been closed for hunting prior to the start of the shipping season
- Development of an extensive Internal Communications Shipping Protocol for Shipping Activities (Baffinland, 2021b), that includes the hiring of a minimum of four full-time and up to six full-time shipping monitors within Pond Inlet who provide community updates on vessel traffic both over community radio and VHF throughout the shipping season.
- Limiting the number of vessels anchored or drifting at Ragged Island to a maximum of three vessels at any time throughout the shipping season, unless there is a need for safety reasons.
- Establishment of voluntary speed restrictions (9 knots) for all Project vessels travelling along the Northern Shipping Route to minimize ship wake and disturbance to marine mammal harvesting activities.
- Establishment of a nominal shipping route for all Project-vessels to follow to increase predictability and safe passage for hunters while Project-vessels are present in the Northern shipping corridor (see Figure 5.1).

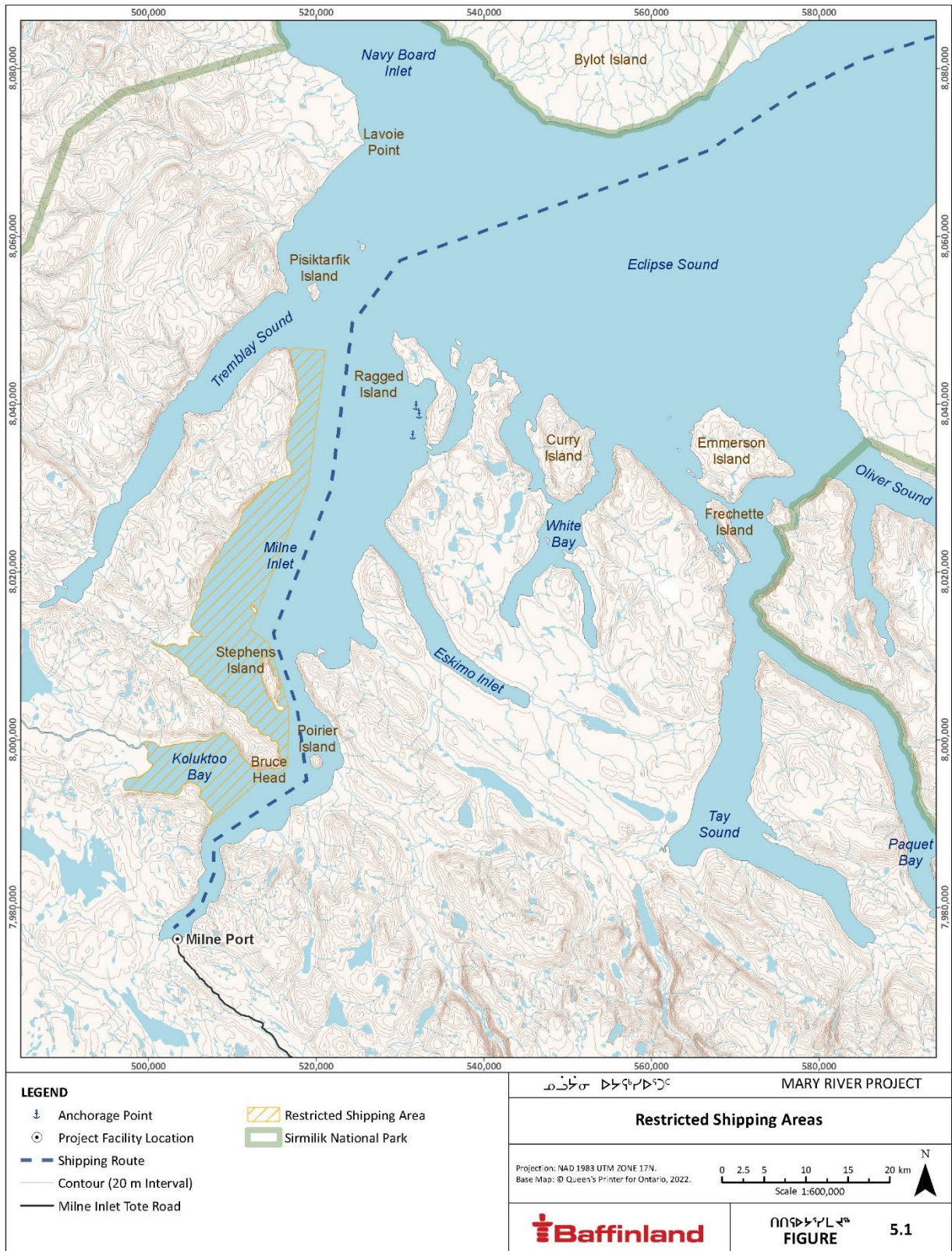


Figure 5.1: Nominal Shipping Route and Restricted Shipping Areas

- Establishment of ‘no-go zones’, specifically near Saviit (along shoreline of Bruce Head), which has been identified as an important hunting area (see Figure 5.1).
- Providing fuel to hunters who visit the Project site.
- Providing food, water and shelter at the Project site.
- Support Inuit in identifying, communicating and using safe routes in or around the Project infrastructure.

5.3 IMPACT AND BENEFIT PROGRAMS FOR INUIT

Consistent with Article 12.5.5 (e) of the Nunavut Agreement, Baffinland has also made the following commitments to compensate for Project-effects on Inuit land use that were predicted within the Early Revenue Phase Final Environmental Impact Statement (ERP FEIS) and Production Increase Proposal Extension (PIPE) Amendment Package and have since been reported by community members since the start of the Project.

When Project activities began in 2013, Inuit and the Company acknowledged that impacts to harvesting may occur from the Project. Specifically, Article 13.1 of the Mary River Project Inuit Impact and Benefit Agreement (IIBA) notes the following:

“The objective of Article 13 hereof is to ensure that any potential incompatibility of the rights of Inuit to free and unrestricted travel and access for harvesting to all lands, water and marine areas within the Nunavut Settlement Area with the Company’s land use activities and rights of navigation in marine areas may be reduced....The QIA recognizes that the Company’s right to operate and manage their activity within the Project area including the rail and shipping corridor, subject to the provisions of this Agreement and QIA recognizes the restriction on Inuit right of access under Sections 5.7.18 and 5.7.25 of the NLCA...”

More specifically, concerns raised relating the discharge of firearms within the Project area are accounted for under Article 13.5.1 of the IIBA, which states the following:

“Inuit travelling in or accessing the Project lands shall not discharge firearms or otherwise pursue access for harvesting, within one (1) mile of a Project building, structure or facility, in conformity with Clause 5.7.17 (b) of the Nunavut Land Claim Agreement (NLCA), subject to wider safety or where the access for harvesting, including the discharge of firearms is incompatible with ongoing land use activity of the Company.”

In consideration of these effects, Article 5 (Financial Participation) ensures that Inuit receive a minimum of \$1,250,000 quarterly, or \$5,000,000 annually, in the form of resource royalties (IIBA 5.6.3, 2018).

Baffinland also provides funding for the Wildlife Compensation Fund (Article 17.6 of the IIBA); with distribution of this fund managed directly by the QIA. One of the stated purposes of IIBA Article 17 is to establish a wildlife compensation fund that QIA, an HTO, or an Inuk may apply to, as an additional remedy to an NLCA claim for wildlife compensation.

The amended IIBA, which was signed after the QIA provided support for the Production Increase Proposal (PIP), also included the establishment of

- Hunters Enabling Fund which provides 300 Liters of fuel to Inuit over the age of 12 residing in Pond Inlet, with an annual maximum value of \$400,000. (IIBA 17.7, 2018),
- Marine Research Equipment which will provide each North Baffin Community with a marine vessel after three amortization years of use (IIBA 17.9, 2018), and

- The Wildlife Monitoring Program which provides \$200,000 annually to the MHTO to conduct community based research based on a scope and design established by the community and the MHTO, and subsequent approval by the Joint Executive Committee (IIBA 17.8, 2018).

The Marine Research Equipment (IIBA 17.9) and Wildlife Monitoring Program (IIBA 17.8) were developed in part due to the concerns expressed by harvesters and the desire for more community based monitoring that is planned, led, and carried out by Inuit in the North Baffin Communities. This allows for topics of greatest concern to be actively monitored by Inuit.

Moreover, in response to concerns raised during the PIP, Baffinland, the Mittimatalik Hunter and Trappers Organization, and the Hamlet of Pond Inlet signed the, "Agreement to Establish the Pond Inlet Committee"¹. This agreement recognized the desire for improvements to the way in which Project benefits were being distributed to communities. The agreement commits Baffinland to providing \$10,000.00 to the Tasiuqtiit Working Group (TWG) for every ore carrier required to ship in excess of 4.2 Mtpa. Since its signing, this Agreement had led to the direct disbursement of \$730,000 to the community of Pond Inlet (\$130,000.00, \$240,000.00, \$170,000.00, and \$190,000 for years 2018, 2019, 2020, and 2021, respectively). Baffinland has also committed to providing funding of up to \$50,000 towards a TWG Fund Administrator position for this group to support the functioning and disbursement of funds for up to 3 years, though at this time, the position remains unfilled. While Baffinland is currently only approved to ship 4.2 million tonnes, this agreement will be reinstated should the Project be approved to ship above 4.2 Mtpa.

¹ This agreement led to the creation of Tasiuqtiit Working Group (TWG).

6 MONITORING PROGRAM REVIEW

6.1 MARINE MONITORING PROGRAM ENGAGEMENT ACTIVITIES

Baffinland's 2022 engagement activities with the community of Pond Inlet and other Parties, including the MEWG are summarized in Section 4. There were four notable outcomes as a result of these engagement activities:

1. Leg 1 of the Ship-based Observer (SBO) Program was eliminated due to reinstated ice breaking restrictions, as Baffinland committed to no ice breaking during the 2022 spring shoulder season.
2. MHTO sought approval to participate in the Marine Mammal Aerial Survey Program (MMASP) on June 29, 2022 as part of a MEWG meeting. Baffinland has secured a position on Leg 2 of the 2022 MMASP for a MHTO member, and will continue to invite MHTO members to participate in monitoring programs in the future. Should no MHTO recommendation come forward, Baffinland will seek participation from the Ikajutit Hunters and Trappers Association.
3. Baffinland was not going to deploy passive acoustic monitors in 2022 due to community concerns. After Oceans North requested during the June 29th, 2022 MEWG meeting that recorders be deployed during the upcoming shipping season to capture convoy noise, Baffinland committed to deploying a single recorder approximately 2 km south of Bruce Head in August, 2022. Baffinland still awaits confirmation that they are in agreement with this new deployment and study going forward.
4. The proposed 2022 Narwhal Tagging Program was eliminated due to community concerns outlined in Section 4.

More generally, historical engagement with the MHTO and the MEWG throughout 2021 and 2022 also resulted in the following key changes to the 2022 marine monitoring programs:

1. Elimination of the proposed narwhal tagging program for the 2022 season.
2. A second year of morphometric analysis of body condition via the drone program at Bruce Head in summer 2022.
3. Additional targeted sediment quality sampling at sampling locations SW-01, SW-02, SW-03, and SW-04 to address observed changes in sediment grain size.
4. Addition of 12 quadrats for benthic epifauna and epiflora monitoring as per the Marine Environmental Effects Monitoring Program (MEEMP).
5. Commencement of freshwater char studies in 2021 within river systems feeding into Milne Inlet, and continuation of program in 2022. Relevant details on the 2021 program can be found in the 2021 Annual Report to the NIRB (Baffinland, 2022b).
6. The establishment of a reference area for the fish health program (component of the MEEMP)—to be determined in 2022.
7. Reintroducing the Ship-based Observer (SBO) Program fall survey to determine distribution, occurrence, relative abundance, and behavioural response of marine wildlife to shipping activity.

6.2 2022 MONITORING ACTIVITIES

Baffinland has several marine mammal monitoring programs designed to assess the effects of Project shipping activities on marine mammals. The marine mammal monitoring programs outlined in Table 6.1 (pulled from Table 5.1 in the NAMRP [Appendix D in the SMWMP for ease of review]) will be implemented during the 2022 shipping season. These programs will serve to further Baffinland’s understanding of project related and cumulative effects to narwhal in the Regional Study Area:

Table 6.1: Summary of 2022 Marine Mammal Monitoring Programs

Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
Bruce Head Shore-Based Monitoring Program (Visual)	<p>Visual Observations:</p> <ul style="list-style-type: none"> • Relative Abundance and Distribution (RAD) • Group Composition and Behaviour • Human Activity <ul style="list-style-type: none"> ○ Vessel Traffic ○ Hunting • Weather and Anecdotal Observations <p>Project-related vessels tracked via both satellite and shore-based AIS</p> <p>Estimated Start Date: July 28th</p> <p>Estimated Duration: 4 weeks</p>	<ul style="list-style-type: none"> • Monitor for local change in relative abundance and animal distribution including interannual variation • Monitor behavioural responses to shipping and other stressors (hunting, predation) • Monitor Early Warning Indicator (EWI): change in the proportion of immature narwhal between years – was calving or calf survival potentially impacted based on observations made in 2022, noting that exact causal factor remains unknown since narwhal utilize habitats in the RSA temporarily for only ~up to 4 months per year (i.e., 1/3 of the year), and is dependent on ice conditions. Potential for spatial and temporal interaction with Baffinland shipping activities are therefore limited to the RSA and days over which shipping is occurring.
Bruce Head Shore-Based Monitoring Program (includes Unmanned Aerial Vehicle [UAV])	<p>UAV Observations:</p> <ul style="list-style-type: none"> • Focal Follows – Northern Shipping Route, Koluktoo Bay • Systematic Survey – Stratified Study Area (SSA) • Morphometrics – Body Condition <p>Proposed system by InDro Robotics: DJI M300</p> <p>Estimated Start Date: July 28th</p> <p>Estimated Duration: 4 weeks</p>	<ul style="list-style-type: none"> • Monitor narwhal behaviour in the presence and absence of vessels – do individual narwhal or narwhal pods modify their behaviour in the presence/absence of vessels in the open-water shipping season (multiple response variables examined)? • Does the distance at which individual narwhal or narwhal groups react to vessels differ from past years, irrespective of the overall abundance of narwhal in

Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
		<p>the RSA? Do narwhal react to vessels in a similar manner to previous years?</p> <ul style="list-style-type: none"> Collect second year of morphometric data to contribute towards a narwhal body condition monitoring program (base year is 2021). The photogrammetric data collection of narwhal (morphometric baseline data) using UAV will be used to monitor for potential interannual and seasonal changes in narwhal body condition (variable length/width measurements along body) that would indicate food/foraging success and/or stress response, noting that narwhal spend only spend up to 1/3 of their year in the RSA with overlapping shipping activities.
<p>Marine Mammal Aerial Survey Program (Leg 1)</p>	<ul style="list-style-type: none"> Open-water and floe edge area east of Pond Inlet; Pond Inlet and Baffin Bay strata Line-transect surveys – data recorded by onboard MMOs Transition to photographic surveys when large animal aggregations encountered (same as 2019-2021 survey design) <p>Estimated Start Date: July 19th Estimated Duration: 14 days</p>	<ul style="list-style-type: none"> Monitor narwhal relative abundance and distribution in the Regional Study Area (RSA) prior to and during the early part of the season. Allows comparison to previous year(s) (interannual variation). Collect simultaneous data on sea ice conditions and killer whale data, which allows for these factors to be considered in the analysis. The 2022 Leg 1 aerial surveys will last two weeks and end one week prior to Leg 2 aerial surveys (separate 2-week survey). Will allow for abundance estimates in the RSA throughout the season from the start of shipping operations. Narwhal sightings data will be used to inform shipping schedule and shipping routing such to avoid concentrations of narwhal in ice leads (if present), though this benefit will be limited in 2022 given

Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
		<p>that ore carriers will only enter the RSA once specific ice concentration conditions have been met (i.e., 3/10ths ice concentrations).</p>
Marine Mammal Aerial Survey Program (Leg 2)	<ul style="list-style-type: none"> • Same strata as 2016 DFO photographic aerial survey and 2019-2021 BIM aerial survey • Line-transect surveys – data recorded by onboard MMOs • Transition to photographic surveys when large animal aggregations encountered (same as 2019-2021 survey design) <p>Estimated Start Date: August 9th Estimated Duration: 14 days</p>	<ul style="list-style-type: none"> • Updated abundance estimate for the Eclipse Sound and Admiralty Inlet narwhal summer stocks – compare abundance estimates to previous years. • Survey design and data collection methodology previously developed by Fisheries and Oceans Canada (DFO) (Matthews et al. 2017; Marcoux et al. 2016; Doniol-Valcroze et al. 2015; Asselin and Richard 2011; Golder 2020, 2021a; WSP Golder, 2022a) will be used for Leg 2 to allow for a comparison to previously reported abundance estimates.
Passive Acoustic Monitoring Program	<p>Early August</p> <p>Retrieval of 2 recorders deployed at the floe edge in September 2021</p> <ul style="list-style-type: none"> • Recorded late shoulder season transits in 2021: <ul style="list-style-type: none"> • Acoustic monitors recorded for approximately one month from September, 2021 to October, 2021 • Slept overwinter • Will start recording in early July 2022: Record narwhal at floe edge and shipping and tourism activities at the beginning of 2022; Acoustic monitors will turn on July 7th, 2022 and record until August 8th or 9th, 2022 <p>Due to concerns raised by MHTO and Pond Inlet community members, Baffinland as planning to scale back the acoustic</p>	<ul style="list-style-type: none"> • Measure and characterize ambient noise levels along the Northern Shipping Route – compare the data to previous years. • Acoustically monitor for narwhal and killer whale presence along the shipping corridor – document spatial and temporal variability in the RSA. • Evaluate underwater noise levels from Project shipping and icebreaking noise levels in relation to established marine mammal underwater acoustic thresholds for injury and onset of disturbance. • Estimate the extent of listening range reduction (LRR) associated with vessel transits along the Northern Shipping Route relative to ambient noise conditions. • Compare measured sound levels of shipping/icebreaking to estimated (modelled) sound levels.

Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
	<p>monitoring program for 2022 by not deploying any recorders in 2022.</p> <p>However, deployment of 1 recorder at Bruce Head to evaluate effectiveness of convoys as a noise mitigation in open water conditions is being proposed, pending engagement with the MHTO.</p> <ul style="list-style-type: none"> Recording convoys to validate mitigation measure as a way of reducing total noise exposure to marine mammals. <p>Estimated Start Date: August 11th, 2022</p> <p>Estimated Duration: 2022 shipping season to October</p>	<ul style="list-style-type: none"> Evaluate vessel noise signatures and potential changes in narwhal vocal behaviour in relation to shipping.
Ship-Board Observer (SBO) Program	<ul style="list-style-type: none"> Marine wildlife observers (MWOs) will record systematic marine mammal and seabird observations from the enclosed bridge of the MSV Botnica. Surveys will be conducted throughout Milne Inlet and Eclipse Sound along the Northern Shipping Route. In addition to MWO watch periods, the WSP Golder biologists will perform dedicated seabird surveys throughout the daily watch schedule, which will be conducted in accordance with the Canadian Wildlife Service (CWS) Eastern Canadian Seabirds at Sea (ECSAS). <p>Estimated Start Date: October 19th, 2022</p> <p>Estimated Duration: 14 days</p>	<ul style="list-style-type: none"> Estimate relative representation of species Assess presence, relative abundance, distribution, and behavioural response of narwhal (<i>Monodon monoceros</i>) and other marine mammals to vessel traffic and associated activity during the 2022 shipping fall shoulder season. Compare abundance estimates to previous years (last SBO program completed in 2019)
2022 Narwhal Tagging Program (Planning in 2021) 2022 Narwhal Tagging Program (program rejected by MHTO, ultimately not feasible without icebreaking in July 2022)	<ul style="list-style-type: none"> Deployment of high-resolution location (satellite) tags and dive loggers on narwhal in ice leads in Eclipse Sound during early July 2022. No tagging of narwhal will occur near floe edge (no interference with Inuit hunting activities) No live capture involved. Remote deployment of tags. Tags will fall off animal after several weeks. 	<ul style="list-style-type: none"> Will provide detailed 3-dimensional movements of narwhal in relation to ice conditions and vessel movements in RSA. Studying narwhal behavioural responses to shipping/icebreaking – includes 12 response variables (e.g. surface time, bottom time, dive velocity, travel speed, travel orientation, etc).

Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
	<p>Estimated Start Date: July 5, 2022</p> <ul style="list-style-type: none"> • Estimated Duration: 14 days. • Deployment of high-resolution location (satellite) tags and dive loggers on narwhal in ice leads in Eclipse Sound during early July 2022. • No tagging of narwhal will occur near floe edge (no interference with Inuit hunting activities) • No live capture involved. Remote deployment of tags. Tags will fall off animal after several weeks. <p>Estimated Start Date: July 5, 2022 Estimated Duration: 14 days</p>	<ul style="list-style-type: none"> • Program was initially rejected by MHTO (See Attachment 1 in Appendix D of Appendix 1), Baffinland then determined it would not break ice to begin the shipping season in 2022 as a precautionary measure, negating the possibility and need to run this program.



Figure 6.1: 2021 Bruce Head Shore-Based Program Field Research Team

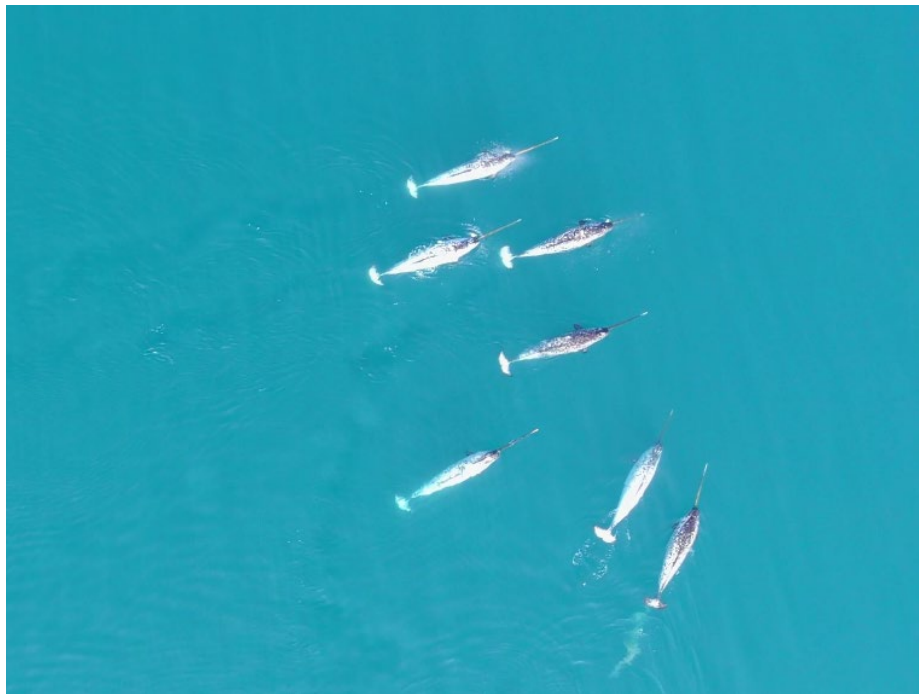


Figure 6.2: Still Frame Taken During Focal Follow Survey #35 Showing Seven Adults (with tusks) at a Distance of 4.2 km from a Northbound Vessel (MSV Botnica) on 7 August, 2021 (13:16)

6.3 INUIT PARTICIPATION AND COMMUNITY BASED MONITORING

6.3.1 Inuit Participation in Marine Monitoring Programs

The integration of local Inuit knowledge in field program design is essential for all environmental monitoring programs to be successful. As part of this task, WSP Golder (Baffinland’s marine consultants) and Baffinland aim to engage with the Mittimatalik Hunters and Trappers Organization (MHTO) prior to commencing all programs to receive input on the program components. Prior to all field work, WSP Golder will request a Letter of Approval from the MHTO in order for the programs to proceed following receipt of the approval. Letters of approval have been sent and hard copies provided to the hunters and trappers organizations of Pond Inlet (MHTO) and Arctic Bay (Ikajutit Hunters and Trappers Association), but approval remains to be granted as of July 18th, 2022. WSP Golder includes Inuit participants in field monitoring programs to ensure that Inuit Qaujimagatuqangit is incorporated. Inuit participation for the 2022 monitoring programs is as follows:

- Marine Mammal Aerial Survey (Leg 1) – 2 participants
- Marine Mammal Aerial Survey (Leg 2) – 4 participants (tentatively a 5th participant from MHTO—to be confirmed)
- Bruce Head Shore-based Monitoring Program (visual and UAV) – 4 participants
- Passive Acoustic Monitoring Program – 0 participants, as this is a limited-scope program that only requires 2 participants
- Ship-based Observer Program (SBO) – 2 participants

In addition, Baffinland has expanded its community-based shipping team in Pond Inlet to include up to four full-time and up to 6 part-time shipping monitors for the upcoming 2022 season. These shipping monitors are based out of the MHTO office building and act as a liaison between community members, hunters, and Baffinland. A community-

based Environmental Coordinator was also hired in November, 2021 to provide a community-based contact in Pond Inlet for residents to engage directly with Baffinland on any environmental matters.

6.3.2 Support for Community-Based Monitoring Programs

In 2018, as part of updates to the Inuit Impact Benefit Agreement (IIBA) for the Mary River Project (the Project), Baffinland established the Wildlife Monitoring Program (Article 17.8 of the IIBA), which is a community-based monitoring program, specific to the research interests of the community of Pond Inlet. Baffinland looks forward to considering the results of these community-driven monitoring efforts into the design of future monitoring programs led by Baffinland and as part of contributions to overall adaptive management practices adapted by Baffinland. As results from the community-based monitoring programs become available, Baffinland will seek to work with the MHTO to conduct a comparison of results, where appropriate. Prior to implementing any programs in a given year, the community of Pond Inlet is responsible for developing an annual work plan, which is then presented to the Joint Executive Committee (Baffinland and QIA) (JEC) for review and approval. To date the JEC has not received any project plans for 2022, nor for years 2020 and 2021, however, should a proposal be received Baffinland would expedite its review and approval.

7 AQUATIC INVASIVE SPECIES / NON-INDIGENOUS SPECIES MONITORING

7.1 2021 AQUATIC INVASIVE SPECIES / NON-INDIGENOUS SPECIES MONITORING PROGRAM RESULTS

Benthic infauna samples for DNA analysis were collected from nine stations in 2021 where flagged taxa had been observed in previous surveys. A total of 168 taxa were identified in the samples collected for DNA, all of which had been documented in previous surveys. Appendix 8D-1 of the Draft 2021 Marine Environmental Effects Monitoring Program (MEEMP) Report (WSP Golder, 2022b) shows a complete list of identified taxa. The finalized report will become publicly available on the NIRB Registry once Baffinland has responded to comments from MEWG members on the Draft report. The number of collected specimens and the respective sampling locations are listed in Table 8-7 of the Draft 2021 MEEMP report (WSP Golder, 2022b).

Specimens that were flagged as requiring closer examination underwent secondary taxonomic review by Biologica Environmental Services (Biologica; Victoria, BC) and were then sent for independent verification to the Benthic Ecology Lab at Université Laval (Laval); where warranted, specimens were also sent to global specialists in specific taxonomic groups at National Scientific Center of Marine Biology at the Far Eastern Branch of the Russian Academy of Sciences, EcoAnalysts Inc. and Columbia Science. Results showed that all species sent for independent verification were of Arctic origin.

7.1.1 Update on *Marenzelleria Viridis* Species

During 2019 AIS sampling, a polychaete worm species was collected that was initially identified through examination of morphological features as *Marenzelleria viridis* (*M. viridis*). While *M. viridis* is listed on global databases as being invasive in Northern European waters, multiple lines of evidence indicate it is unlikely invasive in the Canadian Arctic. During the 2020 and 2021 field seasons, targeted sampling was undertaken to collect specimens for genetic analysis and assess if the range or relative abundance of the worm had changed at Milne Port since the 2019 finding.

On June 2nd, 2022, Baffinland received genetic results resolving the identification of *Marenzelleria* specimens collected as a part of targeted monitoring efforts in 2021. Molecular analysis confirms that these specimens were *Marenzelleria wireni*, which have a broad, pan-Arctic range. Another species of this genus, *Marenzelleria arctica*, was also identified through morphological assessment in 2021 sediment samples from Milne Inlet, near Phillips Creek. This means that all specimens that were originally identified as *M. viridis* between 2019 to 2021 have now been corrected to either *M. wireni* (high-confidence, based on taxonomic methods) or *M. arctica* (moderate-high confidence based on taxonomic methods). These findings indicate that no NIS/AIS species have been confirmed in Milne Port to date.

7.2 2022 AQUATIC INVASIVE SPECIES / NON-INDIGENOUS SPECIES MITIGATION AND MONITORING

In 2022, Baffinland will continue to require all ore carrier vessels with treatment systems to perform both a ballast water exchange and treatment as part of ongoing management and mitigation measures aimed at reducing/eliminating the potential risk of introduction of aquatic invasive species at Milne Port. Baffinland intends to continue implementation of its Ballast Water Management Plan (Baffinland, 2019) in 2022, which includes monitoring for compliance with D-1 Regulations on all project vessels prior to discharge of ballast water at Milne Port. Baffinland will also continue to implement monitoring of aquatic invasive species/non-Indigenous species (AIS/NIS) sampling at Milne Port in 2022 through marine sediment quality and benthic infauna sampling, as per the Marine Environmental Effects Monitoring Program (MEEMP).

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Appendix 1

2022 Shipping and Marine Wildlife Management Plan

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Baffinland Iron Mines Corporation


SHIPPING AND MARINE WILDLIFE MANAGEMENT PLAN

BAF-PH1-830-P16-0024

Rev 9

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DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
02/2012	1	BL	OC	Version submitted in February 2012 FEIS (Baffinland, 2012)
05/2013	2	BL	OC	Revisions related to the Terms and Conditions in NIRB Project Certificate No. 005
06/2013	3	BL	OC	Updates to Baffinland responsibilities table, updates for submission as supporting material for the FEIS addendum.
10/2014	4	BL	OC	Updated to reflect Early Revenue Phase (Baffinland, 2013) and the amended NIRB Project Certificate No. 005
03/2015	5	OC	EM	Update to reflect operations
03/2016	6	JS	OC	Update table of contents and concordance
07/2020	7	EM	LK	Updated to reflect 6 MTPA operations and associated mitigations
06/2021	8	EM	LK	Updated to reflect temporary additional mitigations for 2021 shipping season
07/2022	9	GM	LK	Updated to reflect temporary additional mitigations for 2022 shipping season

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1 INTRODUCTION

1.1 Purpose

The Shipping and Marine Wildlife Management Plan (SMWMP) has been developed to:

- Address the issues of concern to Inuit with respect to shipping associated with the Mary River Project (the Project).
- Establish rules and procedures applicable to shipping during the construction, operational and decommissioning phases of the Project.
- Outline the existing mitigation and management measures related to Project shipping designed to minimize potential effects of Project activities on the marine environment, marine mammals, and traditional hunting and harvesting activities.

The SMWMP is a part of the Baffinland Iron Mines Corporation (Baffinland) Environmental Management System (EMS) and reflects Baffinland commitments with respect to shipping activities associated with the Project. Specifically, the SMWMP:

- Describes the means whereby Baffinland ships, fuel and equipment to the site, and exports iron ore from the Milne Port Site.
- Describes the management of the shipping operation, including the commissioning and operation of iron ore carriers. The SMWMP also describes the specifications and procedures in place for charter and operation of suitable vessels to export iron ore on a seasonal basis.
- Addresses the management, routing and operation of ships and describes how the vessels will navigate through and in the vicinity of ice.
- Describes the monitoring and mitigation measures, and adaptive management procedures to be employed in addressing concerns related to marine wildlife, including mammals and birds.

It is noted that in all matters of marine transportation, the Master of the vessel has an overriding obligation to protect the safety of his vessel, crew and the environment for which he is ultimately responsible and, notwithstanding anything contained in this SMWMP, the Master will always be guided by this principle.

1.2 Relationship to Other Management Plans

This plan should be viewed in concert with the following additional plans that have been prepared for the Project:

- Environmental Protection Plan (EPP ; Baffinland, 2021a)
- Emergency and Spill Response plans (e.g., Spill at Sea Response Plan [Baffinland, 2015])

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- Spill Contingency Plan (Baffinland, 2021b)
- Oil Pollution Emergency Plan – Milne Inlet (OPEP; Baffinland, 2021c)
- Oil Pollution Prevention Plan – Milne Inlet (OPPP; Baffinland, 2021d)
- Marine Environmental Effects Monitoring Plan (MEEMP; Baffinland, 2016)
- Internal Communications Protocol for Shipping Activities (Baffinland, 2021e)
- Interim Closure and Reclamation Plan (Baffinland, 2018a)
- Ballast Water Management Plan (Baffinland, 2019)
- Standing Instructions and General Information for Masters of Vessels loading at Milne Inlet Port. (SITM – Managed by Fednav)

1.3 Management Plan Revision

The Shipping and Marine Wildlife Management Plan will be updated as required on the basis of management reviews, incident investigations, regulatory changes or other Project related changes, including the introduction of new adaptive management measures related to shipping.

Baffinland will update and modify its Standing Instructions to Masters and Shipping and Marine Wildlife Plan as necessary to reflect the outcomes of simulation modelling, regulatory approvals, and annual engagements with the community of Pond Inlet and the Mittimatalik Hunter and Trappers Organization (MHTO), and input on adaptive management and mitigations measures provided by the Qikiqtani Inuit Association (QIA), Fisheries and Oceans Canada (DFO) and the Marine Environment Working Group (MEWG).

1.4 Project Description

In 2012, the Nunavut Impact Review Board (NIRB) issued Project Certificate No 005 which provided approval for Baffinland to mine 18 million tonnes per annum (Mtpa) of iron ore, construct a railway to transport the ore south to a port at Steensby Inlet which operates year-round, and to ship the ore to market. The Project Certificate was subsequently amended to include the mining of an additional 4.2 Mtpa of ore, trucking this amount of ore by an existing road (the Tote Road) north to an existing port at Milne Inlet (see Figure 1.1). In 2018, Baffinland submitted a request for a third amendment to Project Certificate No.005 to allow for a short-term (2 year) increase in production and transport of ore via road through Milne Port from the current 4.2 Mtpa to 6.0 Mtpa (Baffinland, 2018b). A Production Increase to ship 6.0 Mtpa from Milne Port was subsequently approved by NIRB for 2018 and 2019. In January of 2020, Baffinland applied for an Extension Request to the Production Increase Proposal to ship up to 6.0 Mtpa. The Extension Request was approved by the Responsible Ministers through to December 31 2021, resulting in the fourth amendment to Project Certificate No. 005.



FIGURE 1.1: PROJECT LOCATION

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In May 2022, Baffinland submitted an application, the Production Increase Proposal Renewal, in order to continue to truck and transport up to 6.0 Mtpa along the Tote Road and Northern Shipping Route, respectively. As of July 15, 2022, Baffinland awaits a final decision from the NIRB on whether it will be shipping up to 6.0 Mtpa, which if approved, may modify/enhance mitigation measures or alter shipping operations during the 2022 shipping season. Implementation of such changes will be noted where relevant.

Although Baffinland is approved for shipping through the Steensby route, this component of the Project is not currently active. As Project development continues and in advance of when shipping from the South begins, Baffinland will update and revise this management plan to include relevant mitigations and operational guidance for the southern shipping route.

1.5 Regulatory Framework

Canada is an active member of the International Maritime Organization (IMO) and is a signatory to IMO agreements such as the International Convention for the Safety of Life at Sea (SOLAS), the International Convention for the Prevention of Pollution from Ships (MARPOL), the International Convention on Load Lines, the International Safety Management Code (ISM), and the IMO International Convention for the Control and Management of Ships' Ballast Water and Sediment. The majority of operations described in this SMWMP are marine or port-related and are federally regulated by Transport Canada through the Canada Shipping Act and various International Regulations augmented by various Shipping Notices and Publications.

Up-to-date versions of these Acts and Regulations are available on Transport Canada's website available at: <http://www.tc.gc.ca> The transportation of all cargoes between Canadian and international ports is regulated by the Government of Canada and the International Maritime Organization (IMO) through a variety of legislation. A list of relevant Acts and regulations is included as Appendix A.

1.5.1 Project Certificate No. 005 Terms and Conditions

The Plan addresses Project Certificate No. 005 Terms and Conditions as outlined in Table 1, recognizing that these may change following completion of the PIPR review process:

TABLE 1: PROJECT CERTIFICATE NO. 005 CONDITIONS RELEVANT TO THE SMWMP

PC Condition #	Term or Condition Description	Applicable to Active Phase of the Project
90	The Proponent shall incorporate into its Shipping and Marine Mammals Management Plan provisions to achieve compliance with the requirements under the International Convention for the Control and Management of Ship's Ballast Water and Sediment (2004) or its replacement and as implemented by the <i>Canadian Ballast Water and Control Regulations</i> as may be amended from time to time.	Yes

PC Condition #	Term or Condition Description	Applicable to Active Phase of the Project
100	The Proponent shall update its Shipping and Marine Wildlife Management Plan to include avoidance of polynyas and mitigation measures designed for potential fuel spills along the shipping lane during winter months, with consideration for the impact of spilled fuel on marine mammals when the might be less mobile or able to avoid contact with spilt fuel or fumes.	No
104	<p>Subject to safety considerations and potential for conditions as determined by the crew of transiting vessels, to result in route deviations:</p> <ul style="list-style-type: none"> The Proponent shall require, for shipping to/from Steensby Port, project vessels to maintain a route to the south of Mill Island to prevent disturbance to walrus and walrus habitat on the northern shore of Mill Island. Where project vessels are required to transit to the north of Mill Island owing to environmental or other conditions, an incident report is to be provided to the Marine Environment Working Group and the NIRB within 30 days, noting all wildlife sightings and interactions as recorded by Shipboard Marine Wildlife Observers. The Proponent shall summarize all incidences of significant deviations from the nominal shipping routes for traffic to/from Milne Port and Steensby Port as presented in FEIS and FEIS Addendum to the NIRB annually, with corresponding discussion regarding justification for deviations and any observed environmental impacts. 	Part A: No Part B: Yes
105	<p>The Proponent shall ensure that measures to reduce the potential for interaction with marine mammals, particularly in Hudson Strait and Milne Inlet, are identified and implemented prior to commencement of shipping operations. These measures could include, but are not limited to:</p> <ul style="list-style-type: none"> Changes in the frequency and timing (including periodic suspensions) of shipping during winter months in Hudson Strait and during the open water season in Milne Inlet, i.e., when interactions with marine mammals are likely to be the most problematic; Reduced shipping speeds where ship-marine mammal interactions are most likely; and Identification of alternate shipping routes through Hudson Strait for use when conflicts between the proposed routes and marine mammals could arise. Repeated winter aerial survey results showing marine mammal distribution and densities in Hudson Strait would greatly assist in this task. 	Part A: Yes Part B: Yes Part C: No
120	<p>The Proponent shall ensure that, subject to vessel and human safety considerations, all project shipping adhere to the following mitigation procedures while in the vicinity of marine mammals:</p> <ul style="list-style-type: none"> Wildlife will be given right of way; Ships will when possible, maintain a straight course and constant speed, avoiding erratic behavior; and When marine mammals appear to be trapped or disturbed by vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife have moved away from the immediate area. 	Yes

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PC Condition #	Term or Condition Description	Applicable to Active Phase of the Project
121	<p>The Proponent shall immediately report any accidental contact by project vessels with marine mammals or seabird colonies to Fisheries and Oceans Canada and Environment Canada, respectively, by notifying the appropriate regional office of the:</p> <ul style="list-style-type: none"> • Date, time and location of the incident; • Species of marine mammal or seabird involved; • Circumstances of the incident; • Weather and sea conditions at the time; • Observed state of the marine mammal or sea bird colony after the incident; and • Direction of travel of the marine mammal after the incident, to the extent that it can be determined. 	Yes
125 (a)	<p>The Proponent shall consult with potentially-affected communities and groups, particularly Hunters' and Trappers' Organizations regarding the identification of project vessel anchor sites and potential areas of temporary refuge for project vessels along the shipping routes within the Nunavut Settlement Area. Feedback received from community consultations shall be incorporated into the most appropriate mitigation or management plans.</p>	Yes
175	<p>The Proponent shall, in coordination and consultation with the Qikiqtani Inuit Association and the Hunters and Trappers Organizations of the North Baffin communities and Coral Harbour, provide updates to its Shipping and Marine Mammals Management Plan to include adaptive management measures it proposes to take should the placement of reflective markers along the ship track in winter months not prove to be a feasible method of marking the track to ensure the safety of ice-based travelers.</p>	No
177	<p>The Proponent shall enroll any foreign flagged vessels commissioned for Project-related shipping within Canadian waters into the relevant foreign program equivalent to Transport Canada's Marine Safety Delegated Statutory Inspection Program.</p>	Yes
183	<p>The Proponent shall collaborate with the Marine Environment Working Group to develop impact avoidance or mitigation strategies for the protection of the marine environment. The Proponent shall implement any direction from the Department of Fisheries and Oceans for any avoidance or mitigation measures, including cessation of any activity, for the protection of the marine environment.</p>	Yes

1.5.2 Marine Environment Working Group

Baffinland has cooperated with government regulatory and resource management agencies to establish a MEWG for the Project. The group comprises membership from Environment Canada, Fisheries and Oceans Canada, Parks Canada, the Government of Nunavut, the Qikiqtani Inuit Association, and Makivik Corporation.

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The MEWG provides advice to Baffinland in connection with mitigation measures for the protection of the marine environment, monitoring of effects on the marine environment and the consideration of adaptive management plans.

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2 ROLES AND RESPONSIBILITIES

Baffinland’s Shipping Team and Contractors are responsible for achieving compliance with applicable regulations and permit requirements. To meet these requirements, Baffinland is committed to working with only the best in class ship operators. Compliance is achieved through continuous monitoring, development and implementation of operational standards and procedures in addition to vessel owner/operator communication and awareness raising strategies.

General responsibilities include:

- To manage and schedule shipments of cargoes in and out of Project ports;
- To ensure, prior to chartering a vessel, that a pre-charter audit and/or document inspection is carried out on the vessel to confirm the condition of the vessel and that it is managed and operated in accordance with the International Safety Management (ISM) system with all certificates up to date, including any relevant foreign program equivalent to Transport Canada's Marine Safety Delegated Statutory Inspection Program.
- To provide vessel owner/operators and masters with a copy of the SITM and to maintain these documents to ensure they contain up-to-date commitments regarding operation of vessels while travelling along Project Shipping Routes;
- To review environmental monitoring and management practices and identify, as required, adaptive management measures to achieve environmental compliance.


Specific responsibilities related to shipping operations are as follows:

Vessel Owners and Operators (External)

- Ensure Project-vessels chartered to perform Baffinland trade meet all federal and international regulations.
- Subject to safety considerations, follow all instructions from Baffinland and or/it’s contractors for operating the vessel along the Northern Shipping Route.

Head of Shipping

- Communicate requirements of and distribute copies of relevant management plans, including Baffinland’s SMWMP to all vessel owners and operators and any contractors hired by Baffinland to support shipping operations.
- Conduct audit and inspections of vessel documents to ensure they meet Baffinland’s internal requirements and federal and international regulations, as needed.

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Port Captain (Contractor)

- The Port Captain oversees and organizes efficient operation of the assigned fleet at Milne Port.
- The Port Captain will contact the Head of Shipping if vessels are not following protocols and instructions as outlined in the Standing Instructions to Master.

Shipping Monitors (Baffinland Employee– Resident of Pond Inlet)

- Track Project-related vessels travelling along the Northern shipping route via AIS monitoring and live monitoring stationed out of Pond Inlet.
- Track, record and provide communications to residents of Pond Inlet on the use of convoys over the entire duration of the shipping season.
- Record events where ships have made significant deviations from shipping routes.
- Record environmental conditions, siting of marine mammals and vessel interactions with hunters, when information is available.
- Act as a community liaison between Baffinland and residents and hunters from Pond Inlet to address community concerns related to Project-shipping, if any when these arise.

2.1 Priorities

With respect to shipping, the priorities of the team are:

- The safety of personnel;
- The protection of the marine environment; and
- The preservation of the ship and its cargo.

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3 EMERGENCY MANAGEMENT AND RESPONSE

3.1 Spill Prevention and Management

Vessels procured by Baffinland and Baffinland staff will ensure the following is in place to prevent and respond to spills, in the unlikely even they occur:

- Comply with the *Oil Pollution Prevention Regulations* and maintain an approved Shipboard Oil Pollution Emergency Plan (SOPEP).
- Conduct exercises with the Terminal staff at regular intervals to ensure ship and shore can co-operate to minimize the damage from any spill of fuel.
- Maintain an up-to-date oil transfer record book covering the disposal of engine room sludge and the discharge of oily water through a separator.
- Maintain a separate record book for oil cargo and the treatment and disposal of cargo slops.
- Conduct exercises to test the ship and shore joint capability to handle an oil pollution incident in accordance with the provisions of the Ships' Oil Spill Response Plan and the Oil Pollution Emergency Plan – Milne Inlet (OPEP).
- Ensure that all hazardous materials are stored and handled as per information provided in Safety Data Sheets (SDS).
- Ensure that all dangerous goods are transported as per requirements under the *Transportation of Dangerous Goods Act and Regulations*.

Management plans for the Project related to spill response and management include the following:

- Spill Contingency Plan - BAF-PH1-830-P16-0036
- Spill at Sea Response Plan - BAF-PH1-830-P16-0042
- Environmental Protection Plan - BAF-PH1-830-P16-0008
- Emergency Response Plan - BAF-PH1-840-P16-0002 (Baffinland, 2021f)
- Oil Pollution Emergency Plan – Milne Inlet (OPEP) - BAF-PH1-830-P16-0013
- Oil Pollution Prevention Plan – Milne Inlet (OPPP) BAF-830-P16-0058
- Shipboard Oil Pollution Emergency Plan¹.

Copies of Baffinland's management plans for the Project are available at www.baffinland.com.

¹ SOPEPs are developed by and for the Master of the vessel. The SOPEP is not a Baffinland Management plan. SOPEPs must meet external standards as dictated by IMO under MARPOL 73/78.

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3.2 Extreme Weather Conditions

The Vessel Master (the Master) is responsible at all times for the safe navigation and operation of the vessel within the applicable laws of Canada, having special responsibility for the safety of life, the safety of the ship and the preservation of the environment. In order to meet these responsibilities, the Master has full authority to take whatever action considered necessary to successfully complete the voyage. This includes responding to extreme weather conditions and taking actions to adjust speed, seek shelter, accept assistance or deviate to save lives, as required.

3.3 Accidental Events during Shipping and Reporting Procedures

In the event of a malfunction or other incident during shipping operations within Milne Inlet, the Master will immediately inform the port emergency control system requesting such assistance as may be practical. Outside of Milne Inlet, the Master shall immediately report the incident verbally and later in writing to the nearest Transport Canada reporting station.

In the event any accidental contact occurs between a Project vessel and a marine mammal or an aggregation of seabirds, with resulting death or serious injury, the regional office of Fisheries and Oceans Canada (marine mammals) or Environment and Climate Change Canada (seabirds) is to be notified and supplied with information documenting the incident (date/time/location, affected species and condition, circumstances of the incident, weather and sea conditions, location/travel direction of the affected animal(s)). The Vessel Master will inform Baffinland Site personnel, who will contact the appropriate government agency. Annually, Baffinland will summarize any such incidents in its report to NIRB.

3.4 Unforeseen Events

During shipping operations, unforeseen events or unanticipated interactions with the environment may occur that may require intervention by the Ship's Master. Baffinland has adopted a response management strategy for all phases of the Project that will prepare Project personnel to identify, resolve and learn from any unforeseen events. One of the main principles of an effective response management strategy is to expect the unexpected and to be prepared to act quickly and decisively when it occurs. Examples of unforeseen events associated with Project shipping activities might include unanticipated startle reactions by marine mammals or unexpected attraction to ship's lighting by seabirds. If an unforeseen event were to occur, corrective actions would be taken by the Master of the vessel to avoid or reduce any adverse effects. In the case of the examples provided, these actions might include adjusting ships speed to reduce noise, or to maintain essential lighting only, in sensitive areas. Any such events, the subsequent corrective action taken and the degree of success will be documented to allow others to learn from these experiences to ensure continual improvement.

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4 SHIPPING AND PORT OPERATIONS

Figure 4.1 shows the shipping route associated with the Mary River Project. This route has been established based on safe navigation, as well as environmental factors.

In order to ensure that all tonnage chartered for operation in Milne Inlet is in compliance with the Baffinland Shipping and Marine Wildlife Management Plan, all vessels that utilize Milne Port must comply with Baffinland environment, health and safety policies and general site rules while on route to, and while anchored within the Port.

4.1 Charter Vessel Specifications

Baffinland has established a protocol for selecting chartered iron ore carriers. The standard is identical to the specifications for dedicated iron ore carriers and includes the requirement to have appropriate ice class, Canadian Arctic class (or equivalent) and familiarity with AIRSS to operate in the ice conditions forecast to be encountered during the projected periods of the voyages into Milne Inlet.

An Ice Information Contractor will be engaged to forecast ice condition at the time of the vessel's planned loading and will advise what, if any, ice class is required.

The shipping class and types of ore carriers proposed for use are provided below:

- A. Ice class designs for ore carriers include (not an exhaustive list, but based on current knowledge of market availability):
 - i) Non Ice Class (Type E)
 - ii) Ice Class 1C (Type D)
 - iii) Ice Class 1B (Type C)
 - iv) Ice Class 1A (Type B)
 - v) Ice Class 1A Super (PC 7)
- B. Types of ore carriers include (not an exhaustive list, but based on current knowledge of market availability):
 - i) Supramax
 - ii) Panamax
 - iii) Kamsarmax
 - iv) Capesize

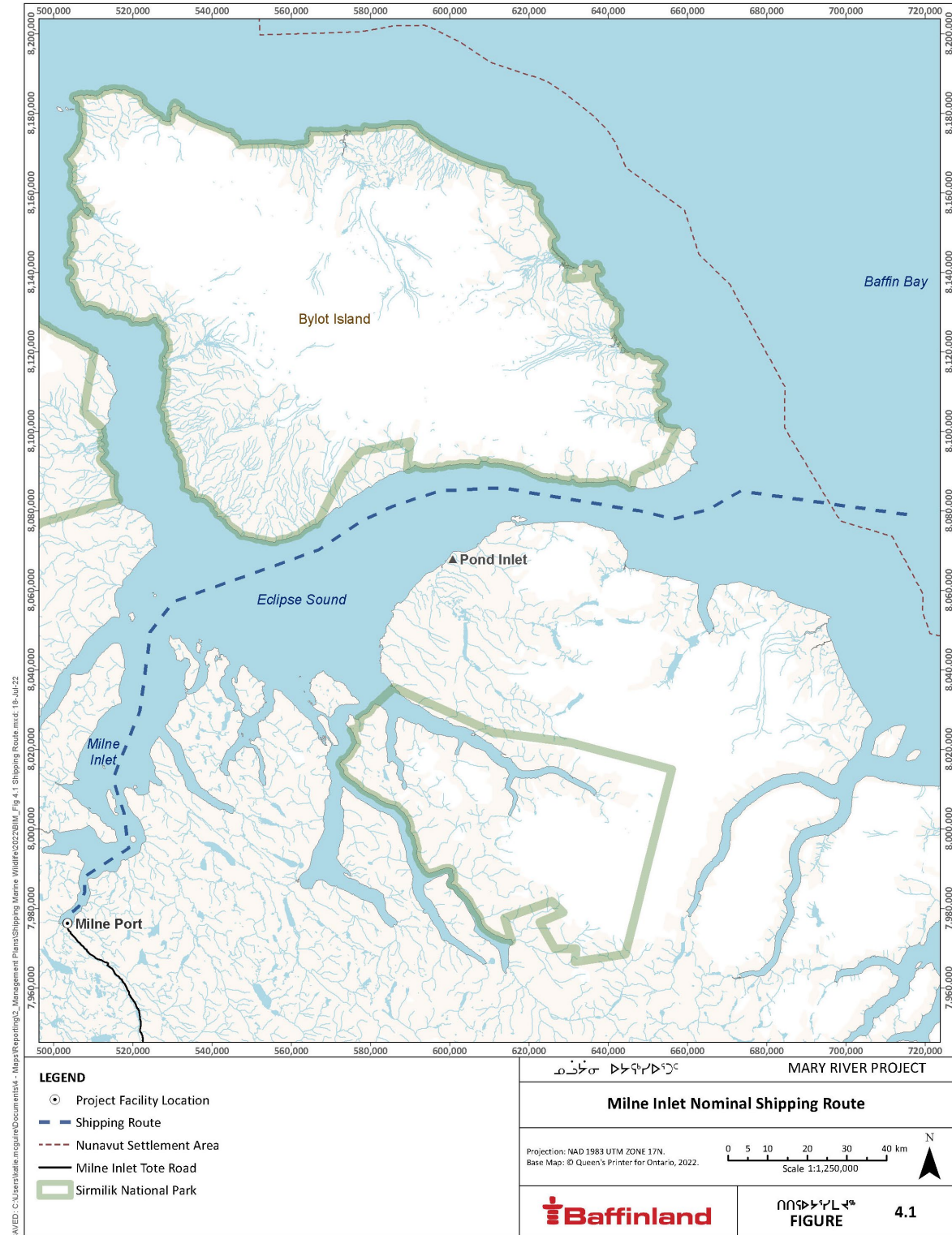


FIGURE 4.1: MILNE INLET NOMINAL SHIPPING ROUTE

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4.1.1 Pre-Charter Audit/Inspection of Iron Ore Carriers

All foreign-registered ships entering Canadian ports are liable to be inspected by Transport Canada to ensure compliance with the regulations and to confirm that the ships are safe for their crew and the environment when they proceed to sea. All of the major shipping countries have similar port state inspections. Ships failing to pass inspection can be held until they have been repaired and achieve compliance.

Baffinland will arrange for each candidate vessel (foreign and domestic) to be assessed before being placed on charter, to ensure that the vessel is capable of operating in the ice conditions that are forecast for Milne Inlet during the period of operation. Appendix B provides a copy of the Baffinland Pre-Charter Bulk Carrier Ice Capability Assessment. In order to ensure that the chartered vessel can load and carry the iron ores safely and efficiently, vessels that meet the required criteria for navigating in the forecast ice conditions will undergo a limited audit to ensure conformance with the ISM system before the vessel is chartered. This limited audit will be an adaptation of the ISM internal audit and the ship inspection will follow the Transport Canada port state inspection format. A copy of the Baffinland Pre-Charter Bulk Carrier Inspection Checklist and Limited Audit is provided in Appendix C.

4.2 Vessel Traffic Management

4.2.1 Navigation

Milne Inlet Port is located at latitude 71 53' 23" North, longitude 80 54' 13" West. All Vessels will follow the nominal shipping route as described in the Standing Instructions to Masters (SITM) (see Figure 4.1 and 4.2). The Standing Instructions to Masters is a document prepared and distributed to vessel owner/operators and Masters with detailed instructions regarding the shipping route, anchorage locations and Baffinland set restrictions to be followed when navigating through the Project area.

Specific information regarding vessel traffic management for icebreakers and shipping during shoulder seasons is outlined in Section 5 below.

4.2.2 Drifting / Anchoring

Project vessels will not anchor within the RSA along route to Milne Port except at one of the following anchorages near Ragged Island or at Milne Port (see Figure 4.2). The number of Project vessels allowed to wait, drift or anchor near Ragged Island is limited to three vessels.

4.2.3 Routing

The nominal shipping route to Milne Inlet (Figure 4.1) was developed with guidance from experienced Vessel Masters retained by Baffinland to load at Milne Port. Ultimately deviations from the shipping route may occur and as dictated by the over-riding Master's authority and responsibility for safe navigation.

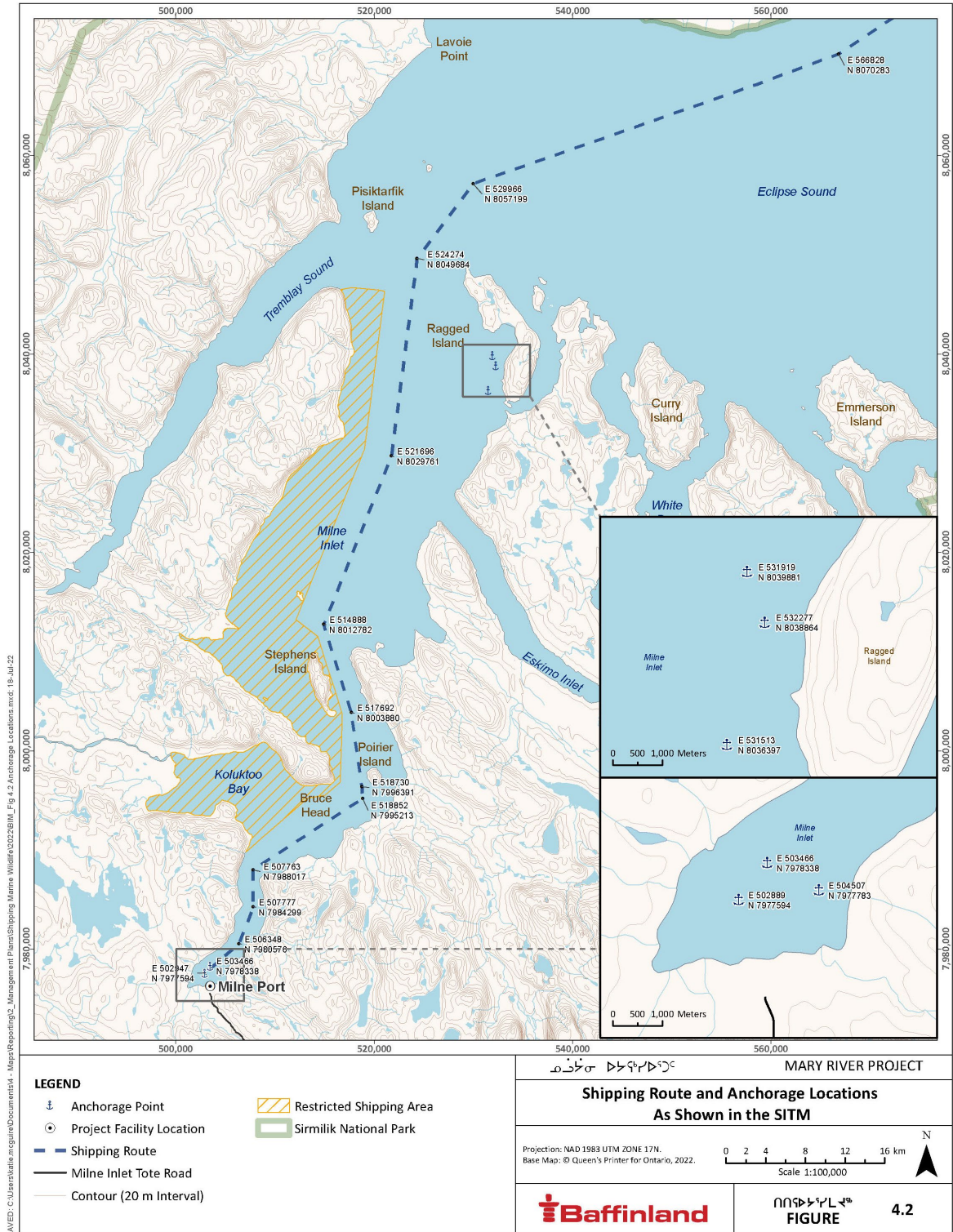


FIGURE 4.2: SHIPPING ROUTE AND ANCHORAGE LOCATIONS AS SHOWN IN THE SITM

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4.2.4 Convoy System

Baffinland may operationalize a reduction in the number of independent transits in the marine Regional Study Area (RSA) by implementing a convoy system during the shipping season. The anticipated benefit of implementing convoys will be to reduce cumulative noise exposure for marine mammals, and reduce the frequency of visual observations of vessels passing through and potentially interacting with land users and harvesters. Baffinland will be implementing the 2022 Convoy Operational Guide (See Attachment 3 of Appendix D) in an approved 6.0 Mtpa scenario.

4.2.5 Tug Support

Tugs operate primarily in Milne Port assisting vessels to travel from their anchorage points in Milne Port to the ore dock for loading. However, tugs may occasionally escort ore carriers between Milne Port and Ragged Island.

4.2.6 Berthing

Ore carriers are berthed with the assistance of two tugs and a Docking Master on board the vessel. All vessels are brought alongside in a safe and efficient manner to avoid contact with the berth or other hazards. A person on the berth assists in properly positioning the vessel to ensure loading operations will be most effective. Linesmen ensure the vessel is properly tied up once in position.

4.2.7 Fueling

Fuel (diesel, gasoline and jet fuel) will be delivered to Milne port by tankers which will be off-loaded into holding tanks using the commonly-employed floating hose fuel transfer method. Milne Port maintains a Transport Canada approved OPEP which is reviewed and resubmitted annually.

Port contingency and vessel-specific response plans exist to address issues relating to:

- Appropriate fuel intake devices that prevent overflows.
- Spill fuel collection and recycling or destruction facilities, where applicable.
- Infiltration and other devices including porous pavement, soak-away pits or dry wells, seepage or infiltration trenches, percolation basins, catch basins, to contain spills.

4.2.8 Summary of Communications Protocol and Shipping Monitors

Prior to the start of each shipping season, Baffinland will confirm with the Mittimatalik Hunters and Trappers Organization (MHTO) or the Hamlet that the floe edge is no longer being used by hunters prior to having the first vessel enter the shipping corridor. Specific details are included in the Internal Communications Protocol for Shipping Activities (Baffinland, 2021e).

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Communications will be maintained with local harvesters and hunters throughout the season by supplying community members with a contact information for Baffinland staff that they can engage with if there are concerns regarding Project-shipping throughout the season.

In accordance with Article 9.4 of the IIBA, Baffinland will also hire Inuit Ship Monitors. The land-based Shipping Monitors will track Project shipping using both observational methods and tracking through AIS monitoring (see Section 6.5). Ship Monitors will also serve as key communications liaisons between community members and Baffinland.

If any incidents require reporting (i.e. fuel spill) to federal or territorial agencies, Baffinland will also contact the Hamlet of Pond Inlet and the MHTO to ensure they are aware of the details of the incident, investigations being undertaken and any actions that will occur to resolve and address the incident.

Prior to the start of each shipping season, Baffinland will consult with MHTO on the protocol for communications, lessons learnt from the past shipping season and whether any modifications to the process are required.

4.3 Construction Shipping

During construction phases of the Project, containerized equipment and materials will be shipped to Milne Inlet. Vessels will be required to follow the same instructions for navigating through Milne Port as they would for the operations phase of the Project.

4.4 Operations Shipping

During the Operations Phase, dedicated voyages carrying re-supply materials and equipment will travel to Milne Port. Fuel will be delivered by sealift tankers. Iron ore will be shipped from Milne port, using the routes presented in Figure 4.2.

Vessels are provided with specific guidance regarding their travel to site. In the SITM vessel captains are instructed to follow the shipping route and avoid areas such as Koluktoo Bay and the western shoreline near Bruce head to minimize effects on marine mammals and interference with hunting activities. The Standing Instructions to Masters also provide details regarding dedicated anchorage locations at Ragged Island and Milne Port and speed restrictions (9 knots) imposed by Baffinland to be followed while they are transiting the Northern Shipping Route. Under an approved 6.0 Mtpa shipping scenario, the convoy system will be developed and implemented (See Attachment 3 in Appendix D).

Vessels procured for the Project operate in accordance with two primary legal instruments regulating ship traffic in the Canadian Arctic: the *Canada Shipping Act*, and the *Arctic Waters Pollution Prevention Act*, and their associated regulations (See Section 1.5).

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4.4.1 Ship Loading and Unloading

Ships loaded with equipment and supplies for a full year of Project operation are docked at the Milne Port floating freight dock and unloaded either directly or via lightering barges (see Figure 4.3). Goods are stored in Milne Inlet laydown areas for transfer to vehicles that transport the goods to the Mine Site along the Tote Road. Most goods are transported in containers that will limit spills and facilitate transfer from ship to shore and transport to the Mine Site. Fuel is transported in tankers and offloaded from the moored vessel by means of floating hoses.

Fuel for shipping is to be purchased only from accredited suppliers that can provide assurance that the fuel used for shipping conforms to Canadian regulations (*Benzene in Gasoline Regulations, 1997; Contaminated Fuels Regulations, 1991; Gasoline Regulations, 1990; Fuel Information Regulations, No. 1, 1999; Sulphur in Diesel Fuel Regulations, 2002; Sulphur in Gasoline Regulations, 1999*).

Ship Loading Fines Ore at the Panamax Ore Dock:

The ship loader for the panamax dock is designed as a conveyance system used to fill the holds of the vessels with the ore, and has a capacity of 6,000 t/h.

4.4.2 Schedule

Annual shipping occurs seasonally over a period of approximately 90 days, roughly between July 15 and October 15 of each year. Chartered vessel will typically make one to three round trips per season. Each round trip of a ship from Milne Inlet to a port in Europe is estimated to take 25 to 27. The vessels will travel at a speed of maximum 9 knots when transiting through Eclipse Sound and Milne Inlet.

4.4.3 Safety

Baffinland requires that the ship-owner/operator of candidate vessels will have as priorities safety of life, protection of the environment, and the preservation of ship and cargo.

While Baffinland and the vessel owner/operators wish to obtain the maximum efficiency in all of the company's chartered ship operations, it is recognized that the Master of a ship has sole responsibility for the safety of the ship, crew and cargo, and the protection of the environment. The Master has the authority to adjust speed, heave to, deviate, seek shelter or enter a port of refuge to re-stow cargo or seek medical assistance should environmental conditions or the condition of the vessel, the machinery, safety of the crew or cargo require such a precaution.

Baffinland requires that candidate ship-owner/operators have a safety and operating management system based on the principles of the International Safety Management Code (ISM Code). The objective of the ISM Code is to ensure safety at sea, prevention of human loss of life or injury and avoidance of marine environment pollution. To achieve this objective, the Code requires that the ship-owner/operator

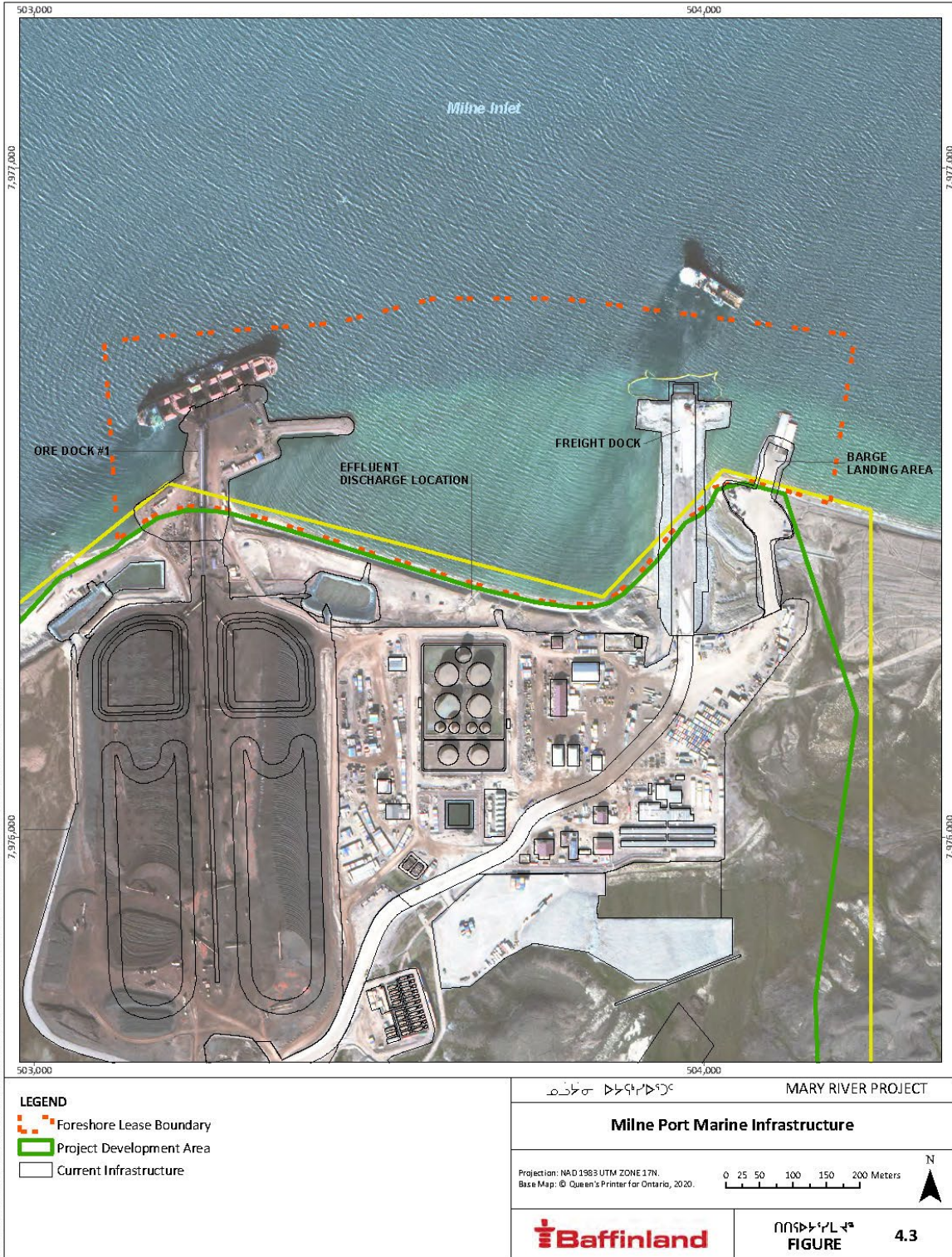


FIGURE 4.3: MILNE PORT MARINE INFRASTRUCTURE

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share fully with the vessel personnel the responsibility to maintain a safe ship. The Code establishes a clear and concise safety management system, including, as examples, the following functional requirements:

A safety and environmental protection policy. By considering the nature of the waters that vessels are to travel within, standards of watch keeping are reinforced with additional lookouts on the bridge and engineers in the machinery space. The manoeuvring ability of machinery and the operation of steering gear are tested prior to arrival or departing in a passage where navigation is restricted or where the route is close to shore. Strict measures regarding the handling and transfer of bunker and cargoes are established. Masters will be required to navigate within established channels.

Levels of authority and lines of communication defined. This ensures that safety remains a high priority and that the lines of communication between shore and ship personnel remain open. Responsibilities are clearly defined and contacts to provide the ship with round the clock shore support are mandatory.

Procedures for reporting accidents and non-conformities with the Code. The method of recording non-conformities, establishing corrective measures, and ensuring open dialogue between all parties is to be documented and reviewed.

Procedures to prepare for and respond to emergency situations. Ships must have a set of operating manuals that supplement and support regulatory requirements and vendor instructions. These manuals evolve from standard practices and procedures, and they are to be tailored to individual ships. The objective is to document and provide guidance and instruction on the safe handling and operation of all shipboard equipment. Clear instruction is provided with regard to pre-arrival and departure check lists, navigation, handling of cargoes, bunkering, stability conditions, and the stresses imposed and acceptable to each concentrate carrier. The manuals are a concise guide for both ship and shore personnel to ensure safe operation, with emergencies considered and responses planned.

In addition, ship and shore personnel engaged in operations must be aware of hazards arising from cargo operations and from the materials and iron ores being handled. This includes the provision of Safety Data Sheets (SDS) information and any additional training required.

4.4.3.1 Safety of Persons Using Small Boats in the Shipping Route

Subject to ship and human safety considerations, mitigation measures to safeguard the safety of those in small boats will include the following:

- Barge-tugs or ships will restrict themselves to the recommended shipping route thereby not surprising any small boat travelling outside the shipping route;

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- The ship will sound its horn if a small boat seems unaware of its presence; and
- Baffinland will inform communities of planned shipping transits both prior to the start of the shipping season and in real-time via AIS monitoring data available at MHTO office and on the Baffinland website (www.baffinland.com).

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5 ICE MANAGEMENT AND ICE BREAKING ACTIVITIES

5.1 Standard Definitions

For the purpose of management plan the following definitions of ‘ice conditions’ are applicable:

Landfast Ice (Fast ice): Ice that forms and remains fast along the coast.

Mobile ice/Mobile pack: Ice that is not consolidated and may drift with winds and currents.

Concentration: Ration expressed in tenths (/10) describing the area of water surface covered by ice as a fraction of the whole area.

Grey-White Ice: Sea ice between 15 cm and 30 cm

Break-up: Moment when ice starts to fracture in late spring or summer.

Freeze-up: Moment when the freezing process begins in fall or early winter.

Open Water: Are of freely navigable water in which ice can be seen in concentrations less than 1/10 (traces)

5.2 Ice Management and Icebreaking Activities

A combination of ice management and icebreaking activities may be required to allow for the safe passage of vessels at the start and end of the shipping season, though in 2022, no icebreaking will be conducted at the start of the shipping season. Ice management is considered the act of preventing ice floes or icebergs from making contact with vessels and port infrastructure at Milne Port. Icebreaking activities will involve the use of a designated icebreaking vessel to facilitate the passage of lesser ice class vessels through prevailing ice conditions (i.e. ice escort services). Ice management will typically occur when there are icebergs or smaller ice floes in an area while icebreaking will be necessary to facilitate passage through much heavier ice concentrations.

Icebreakers aim to avoid the heaviest ice concentrations areas during transits along the Northern Shipping Route. During the periods of ice freeze-up and ice break-up during the shipping shoulder seasons, the Master or Ice Navigator on the icebreaker optimizes the use of leads in the ice to facilitate safe vessel passage and to limit fuel consumption. Interaction of the icebreaker with very close ice and compact ice is possible during the shoulder seasons but only if the ice is mobile (comprised of mobile ice floes as opposed to landfast ice). Ice thickness is another critical component of an icebreaker’s ability to engage ice.

Refueling of icebreakers will occur at Milne Port using ship-to-ship fuel transfer between the icebreaker and a fuel tanker. Once Project tug vessels arrive at Milne Port, they will remain there for the duration of

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the shipping season. In addition to ice management services, the tug vessels will escort Project vessels between Milne Port and Ragged Island during the open water season as a precaution against other possible risks and malfunctions associated with shipping (e.g., vessel loss of power).

5.2.1 Shipping Routes during Shoulder Seasons

Along the Northern Shipping Route, the Icebreaker Master or Ice Navigator will determine the best travel route between the entrance of Pond Inlet and Milne Port based on local ice conditions at the time of transit. It is noted that in 2022, active icebreaking will not be undertaken by Baffinland at the start of the shipping season. As ice conditions will vary from year to year, it is not possible to define a permanent route during the shoulder seasons with any level of accuracy. It is possible that transits during the shoulder seasons may deviate from the nominal open water shipping route (as defined in the Standing Instructions to Masters) by > 5 nautical miles (nm) if dictated by ice conditions. However, ships will not enter any restricted areas unless it is a matter of safety from extreme conditions (i.e. storms, large multi-year ice floes that become mobile and threaten navigational safety).

5.2.2 Icebreaker Operations during Shoulder Seasons

Icebreakers will maintain sustained travel speeds of no greater than nine (9) knots within the prescribed area, however, temporary and localized increases in speed may be required from time to time to break through larger ice floes and allow vessels under escort to safely follow. As aforementioned, up to two icebreakers and ten tugs will be required to support shoulder season shipping. Vessels will be sourced from the available market and could be either domestic or international.

The shoulder season shipping windows will vary from year to year based on local ice conditions. Since ice conditions vary from year to year, it is not possible to predict an accurate number, frequency and duration of expected transits for each shoulder season. Similar to 2021, timing for the start of the 2022 shipping season will be determined by confirmation that a continuous shipping path of 3/10ths ice concentrations or less is available along the Northern Shipping Route. Local ice conditions at the time of transit will dictate which vessels can enter the region, how many vessels can be escorted by the icebreaker, and how long the transit will take.

5.2.3 Vessel Information

The suite of vessels for the shipping season will be a function of vessel commercial availability required for the anticipated ice conditions at different points of the shipping season. As such, an exact shipping schedule which outlines the number of vessels during each period of the shipping season year over year is not possible to provide. The shipping season will be maximized each year based on commercial availability of vessels and weather conditions. The shipping class and types of icebreakers and ore carriers proposed for use are provided below:

- A. Ice class designs for ore carriers include (not an exhaustive list, but based on current knowledge of market availability):

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- i) Non Ice Class (Type E)
- ii) Ice Class 1C (Type D)
- iii) Ice Class 1B (Type C)
- iv) Ice Class 1A (Type B)
- v) Ice Class 1A Super (PC 7)

- B. Types of ore carriers include (not an exhaustive list, but based on current knowledge of market availability):
- C. Supramax ~55,000 DWT
- D. Panamax ~75,000 DWT
- E. Kamsarmax ~80,000 DWT
- F. Post Panamax ~95,000 DWT

5.2.4 Ice Navigation

Ice conditions along the Northern shipping route to Milne Inlet (Enfotec, 2016) are as follows:

- The nominal open water season is from August 5th to October 15th (71 days).
- On some years, it is expected that a shoulder window will allow the shipping season to be extended beyond the high confidence shipping window for certain classes of ships. This will need to be assessed on a year-by-year basis as there is high variability in terms of length and timing of the shoulder period.
- Provision for access to icebreaking services will be strongly recommended for all 'Type' vessels as well as Polar Class 6 and 7 ships during the shoulder periods at the beginning and the closing of the season. In comparison, Polar Classes 5 and higher can engage ice and face a certain amount of pressure on the ice cover.
- Type E vessels (no ice class) are not meant to encounter any significant amount of ice at all. The high confidence shipping window is therefore defined as the average period of open water, about August 5th to October 15th (71 days), with a shoulder window possibly extending the season by about a week. Extending the season will likely require an icebreaker escort.
- Type B, C and D and Polar Class 7 vessels can encounter a certain amount of ice. The high confidence window is from August 5th to October 15th (71 days), with an additional shoulder window that can add 10 to 30 days to the season, depending on the ice class. Extending the season will likely require an icebreaker escort.
- Type A and Polar Class 6 vessels have a slightly longer high confidence shipping window, from July 25th to October 15th (82 days) and the shoulder window can extend the season by up to 25 days. Extending the season might require an icebreaker escort.

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- Polar Class 5 vessels can navigate with high confidence from July 20th to December 31st (164 days), with a shoulder window possibly extending the season through January. Vessel speeds are expected to be lower from mid-November onward.
- Polar Class 4 vessels can navigate with high confidence from June 15 to February 15 (246 days), with a shoulder window covering the rest of the year. Indeed, the combination of substantial ice thickness and heavy pressure in western Baffin Bay is likely to result in slow progress and possible interruptions through the voyages from early or mid-February to late May or even mid-June.

5.2.4.1 Ice Navigators

When regulations and safe operation require an Ice Navigator will be placed aboard each vessel. An Ice Navigator is a qualified Officer who has several years of experience navigating vessels in ice infested waters, Canadian Arctic Waters, and elsewhere. Onboard the chartered ship, his duties are advisory only and his principal responsibility is to provide the Master with advice with regard to the navigation of the vessel into and outward from Milne Inlet, in the areas north of 60 degrees latitude, as well as anywhere sea ice can be present. It is intended that the Ice Navigator will join each chartered vessel at the last port of discharge, prior to the vessel's departure for Milne Inlet. The Ice Navigator will remain onboard for the duration of the voyage, leaving the vessel after the vessel arrives in the designated discharge port. Among the Ice Navigators duties is to ensure the chartered vessel is capable of entering/exiting and safely operating in Milne Inlet in the presence of ice.

After boarding, the Ice Navigator will convene a meeting with all watch keepers wherein they may wish to discuss various aspects of their role onboard and general information regarding navigating in potential ice. The Ice Navigator shall verify that the vessel has up to date charts and nautical publications required to be onboard in accordance with governing regulations. Ultimately it is the Owners' responsibility to ensure the proper charts and publications are onboard. The Ice Navigator will witness the safe and reliable operation of the machinery and familiarize themselves with the manoeuvrability of the vessel, the change out of ballast, and will report any apparent deficiencies to Fednav International. The Ice Navigator shall provide the Master with advice on safe navigation in ice covered Canadian waters, coastal navigation and environment protection procedures in Canadian Arctic Waters & loading at Milne Inlet.

Furthermore, an Ice Navigator may among other duties:

- Assist the Master to understand and complete the required environmental procedures.
- Verify that the vessel has the required Canadian Charts and Publications as specified by Canadian Regulations, and that all are the latest edition and corrected up to date.
- Advise the Master in the navigation of the vessel though ice prone areas en route to Milne Inlet.
- Coach and train the crew as necessary on detecting and avoiding glacial ice features, in a variety of sea and ice conditions.

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- Assist the Master in completion of navigation safety and ice entry checklists; and
- Assist the Master in establishing communications with ECAREG and/or NORDREG and with the Milne Inlet site personnel.
- Advise/assist the Master in berthing the vessel alongside the Milne Inlet facility in the event the Milne Inlet Port Docking Master cannot attend on-board.
- Act as facilitator between ship and shore reloading procedures.
- Assist the Master in cargo, customs and immigration documentation for arrival and sailing from Milne Inlet.

5.2.4.2 Transiting In Ice-Infested Waters

It is expected that ice could be present on the approaches to Milne Inlet at any time during the season (especially at the beginning and at the end of the shipping season).

In the event of ice being present in the approaches to Milne Inlet, the vessel is to be navigated according to the principles defined in the *Canadian Ice Regime Shipping Control System*. The Ice Navigator will be conversant with this system and will provide information as to its application.

For the purpose of implementing icebreaking mitigation measures, ice conditions in the RSA will be verified by the Ice Navigators onboard vessels, on a daily basis, using up to date ice charts, satellite imagery and ice reconnaissance from the bridge. In addition, ice conditions in the RSA will be verified by Fednav on a daily basis using the Canadian Ice Service's Daily Ice Charts and satellite imagery. For the avoidance of doubt and to ensure more timely information on ice conditions, the daily ice charts will be used as a guide, however the ultimate opinion of ice coverage will be made by Ice Navigator onboard vessel.

It should be noted that while there may be an Ice Navigator onboard who is familiar with the conditions the vessel might encounter, the responsibility for the safe prosecution of the voyage rests solely with the vessel's Master.

When landfast ice is present, operations will not be executed along the Northern Shipping Route, and ore carriers will be prevented from rendering a positive ice numeral.

5.3 Criteria Used by Baffinland to Initiate Shipping Season

Baffinland will rely on several criteria for determining the start of each annual shipping season, including information on prevalent ice conditions based local land use activities and several technical and environmental determinants, as defined further below:

5.3.1 Community

Baffinland's first priority is to confirm shipping activities will not pose a safety issue for local land users.

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- Before commencing shipping operations Baffinland (Sustainable Development) must receive written confirmation from the Mittimatalik Hunter and Trappers Organization (MHTO) that the floe edge has been closed for hunting.

5.3.2 Environmental

Each season’s shipping activities will be governed by prevailing ice conditions and a commitment that landfast ice must have broken along the entire shipping corridor prior to commencement of icebreaking and ice management operations.

- Similar to 2021, in 2022, Baffinland Shipping Department must confirm that a continuous path of 3/10ths ice concentrations along the Northern Shipping route is available. Baffinland’s Shipping Department will use up to date ice charts and satellite imagery to make this determination.

5.3.3 Vessel Safety

Navigation in waters under Canadian Jurisdiction north of 60° North Latitude is governed by the Arctic Shipping Safety and Pollution Prevention Regulations (ASSPPR), under the provision of the Arctic Waters Pollution Prevention Act (AWPPA). ASSPPR incorporates by reference the international Polar Code.

ASSPPR includes the obligation to employ an approved risk assessment tool to validate the capability of a vessel to navigate safely in prevailing ice conditions. The Arctic Ice Regime Shipping System (AIRSS) and POLARIS were developed as tools to be used by each ship’s Captain or Ice Navigator (i.e., ice pilot) to validate accessibility of a vessel through a given area based on prevailing sea ice conditions. This process is described in more detail in Section 3 of TSD 16 (Enfotec, 2016).

- Define Regimes present along the Northern Shipping Route through review of satellite imagery, Canadian Ice Service’s Daily Ice Charts, Canadian Coast Guard Ice Conditions reports, and ice observations conducted by Ice Navigators on board.
- Calculate the Ice Numerals for all Ice Regimes present along the Shipping Route by calculating the sum of the concentration in tenths of each Ice Regime and the Ice Multiplier associated with the ice type and the class or type of vessel.
- Vessel Captain transmits Ice Regime Routing Message to NORDREG to obtain permission for navigation along the route.
- Vessel Captain and Ice Navigator confirm passage with Port Captain and Vessel Captain of Ice Breaker escort when required.

5.3.4 Ecological

No icebreaking operations will occur during the ringed seal parturition, nursing, or breeding period (i.e. between March to April). Similar to 2021, there will also not be any icebreaking at the start of the shipping season, therefore no overlap between icebreaking operations and narwhal during their seasonal

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migratory movements (i.e. between early-July to mid-August) in the Regional Study Area. This is one of many mitigation measures that have been developed to reduce the potential effects of this overlap.

- Baffinland will not break ice during the ringed seal parturition, pupping and nursing periods.
- In 2022, as done in 2021, Baffinland will not break ice at the start of the shipping season, avoiding this activity during
the Eclipse Sound narwhal summer stock spring migratory period.

5.4 In Instructions to Escort Vessels

The following instructions assume all the criteria Baffinland uses to initiate the shipping season have been met. In 2022, condition 2(iii) will be applied at the start of the shipping season.

1. The Vessel Captain on-board the ice breaker will assess the concentrations of ice using best available resources to determine vessel escort limitations.
2. Once the concentration is assessed, the on-board personnel will report the concentration to the Port Captain to enable the Port Captain to properly manage the vessel traffic. The possible scenarios are as follows:
 - i) If the ice breaker encounters greater than 6/10 concentration of ice or more, and ice cannot be avoided during the transit, once the icebreaker has finished its transit, the vessel will wait until 24 hours has passed since escort operations began before commencing a new transit.
 - ii) If the ice breaker encounters 4/10 to 6/10 concentration of ice along a transit but no greater, the ice breaker may complete the transit and start a second transit immediately thereafter. If both transits are completed in less than 24 hours, the icebreaker will wait until a period of 24 hours has passed since the first transit began before commencing a third transit. That third transit will be the first in a new cycle (i.e. a 24-hour period).
 - iii) If the vessel encounters 3/10 or less of ice, or is able to transit without breaking ice, normal operations will resume, which may or may not include using the icebreaker to escort vessels.
3. The 24-hour period under these mitigation measures commences at the time the vessel crosses into the RSA and/or departs Milne Port.

5.5 Additional Mitigation for the 2022 Shipping Season

Baffinland will delay shipping in 2022 until there is a continuous path of 3/10ths or less ice concentration along the Northern Shipping Route. Baffinland will also implement a convoy procedure for ore carriers in

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2022. See Attachment 3 in Appendix D (the 2022 Narwhal Adaptive Management Response Plan) for more details.

5.6 Instructions to Vessels Entering/Exiting the RSA During Implementation of Mitigation Measures

The following instructions assume all the criteria Baffinland uses to initiate the shipping season have been met.

- The vessels will inform the Port Captain when they are permitted to enter the RSA based on the ice class of their respective vessels.
- The Port Captain will issue and adjust the vessel schedules and instructions depending on the ice concentrations and associated transit limitations.
- For the vessels being escorted, the Port Captain will notify them as to when and where to meet the icebreaker to begin escort operations.
- For the vessels sailing without icebreaker escort assistance, the Port Captain will notify them at which time they can enter the RSA or depart from Milne Inlet.
- When more than one vessel is entering or exiting the RSA at a given time (convoy system; see (See Attachment 3 in Appendix D (Narwhal Adaptive Management Response Plan) for additional details), the vessels shall proceed in a single line-up, while keeping a safe distance between vessels.

Vessels awaiting an icebreaker escort, or vessels awaiting instructions from the Port Captain to enter the RSA, will be instructed to wait in Baffin Bay at least 40 km east of the Nunavut Settlement Area when incoming, or in Milne Port when outgoing (see Figure 5.1). If an entrance delay is expected, vessel captains may anchor, at their own discretion, at a known anchorage location within Baffin Bay identified as Store Hellefiskebank (see Figure 5.2).



FIGURE 5.1: SHIPPING ROUTE BUFFER ZONE

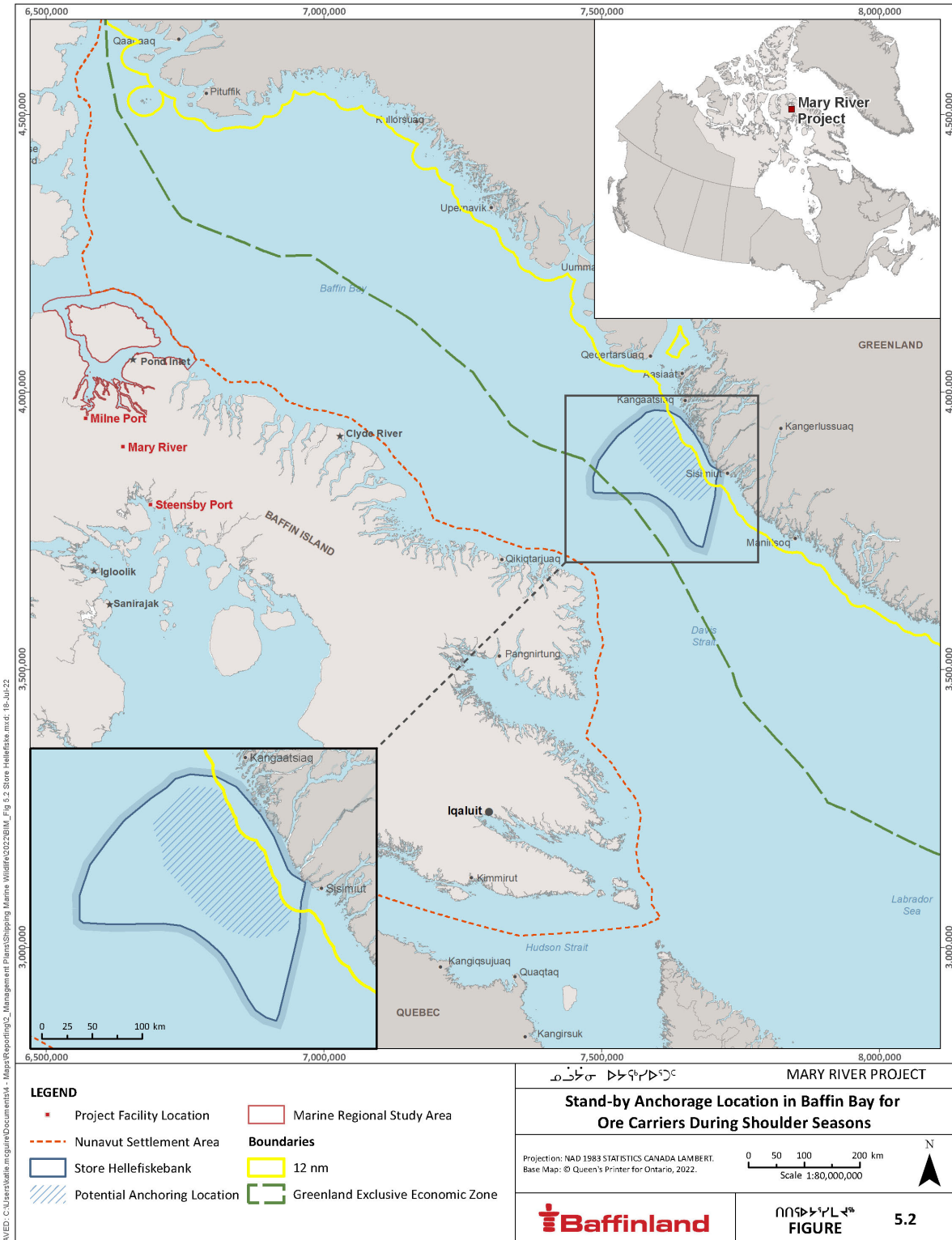


FIGURE 5.2: STORE HELLEFISKEBANK ANCHORAGE LOCATION

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6 ENVIRONMENTAL MANAGEMENT

6.1 Fish Habitat Protection

The authority for the management and conservation of fish and fish habitat in Canada is contained in the federal *Fisheries Act*. DFO is the federal agency responsible for managing Canada’s fisheries through the *Fisheries Act*. The fish and fish habitat protection provisions of the *Fisheries Act* are the authorities for the regulation of works, undertakings or activities that risk harming fish and fish habitat (see the Fisheries Protection Policy (Fisheries and Oceans Canada [DFO], 2019). The prohibitions include two prohibitions against persons carrying on works, undertakings or activities that result in the “death of fish by means other than fishing” (referred to as the death of fish; subsection 34.4(1)), and the “harmful alteration, disruption or destruction of fish habitat” (subsection 35(1)).

The fish and fish habitat protection provisions apply to all fish and fish habitat throughout Canada.

The prohibition in subsection 35(1) states that: 35. (1) No person shall carry on any work, undertaking or activity that results in harmful alteration, disruption or destruction of fish habitat. Under subsection 35(1) a person may carry on such works, undertakings or activities without contravening this prohibition, provided that they are carried on under the authority of one of the exceptions listed in subsection 35(2), and in accordance with the requirements of the appropriate exception. In most cases, this exception would be Ministerial authorizations granted to proponents in accordance with the Authorizations Concerning Fish and Fish Habitat Protection Regulations. This exception is provided for under paragraph 35(2)(b), described further in DFO (2019). The Fisheries Act includes a number of other exceptions, some of which have not yet been brought into force, which are also further described in DFO (2019).

6.2 Marine Mammals

Project shipping and port operations have the potential to interact with marine mammals and their habitats with potential for adverse effects on these receptors. Project activities of concern include vessel discharges (ballast water), vessel movements, vessel noise and vibration, and accidental spills and releases. Vessel strikes on marine mammals have the potential to result in direct mortalities or injury.

In addition to the mitigation measures for marine mammals outlined in Table 2 below, potential adaptive environmental management measures that might be considered could include/ such actions as:

- A. Changes in the frequency and timing of shipping during periods of the year when interactions are found to be most common; or
- B. Identification of alternate routing.

All vessels are to follow the nominal shipping route (See Figure 4.1) to the fullest extent possible and avoid such areas such as Koluktoo Bay and the western shoreline near Bruce Head (see Figure 4.2) to minimize effects on marine mammals and interference with hunting activities.

All Project vessels will restrict speed to 9 knots when transiting along the established shipping corridor, and will be operated in such a way as to avoid separating an individual member(s) of a group of marine mammals from other members of the group. When marine mammals appear to be trapped or disturbed by vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area.

TABLE 2: MITIGATION MEASURES FOR MARINE MAMMALS FOR 2022

Project Activity	Mitigation Measure(s)	Species
Vessel traffic to/from Milne Port	<ul style="list-style-type: none"> Maintain constant speed and course when possible. Reduce vessel speed to 9 knots. Reduce vessel idling No more than 3 ore carriers anchoring at Ragged Island and/or drifting in Eclipse Sound. Drifting to be avoided unless warranted for safety reasons. No icebreaking to commence the 2022 shipping season. Ore carriers will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA) from the entrance of Eclipse Sound and Milne Port. No breaking of landfast ice will occur in the spring or fall shoulder season. When marine mammals appear to be trapped or disturbed by Project vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area (as safe navigation allows). All Project vessels will be provided with standard instructions to operate their vessel in a manner that avoids separating an individual member(s) of a group of marine mammals from other members of the group; All Project vessels will be provided with standard instructions to not approach within 300 m of a walrus or polar bear observed on sea ice; Vessels awaiting instructions from the Port Captain to enter the RSA will be instructed to wait in Baffin Bay at least 40 km east of the Nunavut Settlement Area. No more than 80 ore carriers will be chartered during the 2022 season to transport up to 6 mtpa, pending approval. This is six (6) ore carriers less than the maximum anticipated and 	Ringed Seal, Bearded Seal, Walrus, Beluga, Narwhal, Bowhead Whale, Polar Bear

Project Activity	Mitigation Measure(s)	Species
	<p>approved in the previous Production Increase Proposal and Extension Request.</p> <ul style="list-style-type: none"> Use of convoys throughout the 2022 season to further reduce total sound exposure. Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure (See Appendix B). Baffinland proposes to target a 15% reduction in overall independent one way transits by implementing convoys, which effectively combines individual transits into single 'effective transits'. <p>2022 Narwhal Adaptive Management Response Mitigations:</p> <ul style="list-style-type: none"> Use of convoys throughout the 2022 season to further reduce total sound exposure. Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure (See Attachment 2 in Appendix B for additional information). Baffinland proposes to target a 15% reduction in overall independent one way transits by implementing convoys, which effectively combines individual transits into single 'effective transits'. 	

It is important to note that none of the aforementioned mitigations related to vessel movement, should be read in any way as over-riding the Master's authority and responsibility for safe navigation and management of the vessel.

6.3 Onboard Waste Management

All vessels are to have Waste Management Plans for sewage and solid waste.

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6.3.1 Sewage and Grey Water

All ore carriers are to be fitted with a holding tank with sufficient capacity to meet the grey and black water requirements of the ship for the duration of its time in the RSA. Ore carriers are not to discharge effluent from treated or untreated sewage or grey water while in the RSA.

6.3.2 Solid Waste

In accordance with MARPOL and the *Arctic Waters Pollution Prevention Act*, no solid waste materials or garbage is to be disposed of in Canadian waters. As no facility exists to dispose of foreign or Canadian ship waste materials or garbage at Milne Port, such materials will either be incinerated or retained on-board and later disposed of in accordance with Canadian and International regulations.

6.4 Invasive Species Management

6.4.1 Ballast Water Management

In order to reduce or eliminate the risk of invasive aquatic species and pathogens being introduced into Canadian waters as a result of shipping, all ships will exchange ballast water in accordance with the *Ballast Water Regulations SOR/2021-120* (Transport Canada, 20019). The regulations require that ships transiting to Canadian ports exchange ballast water at sea in deep water away from coastal zones. This measure limits the potential for foreign harmful aquatic organisms or pathogens to be released in Canadian waters where they may colonize. Vessels are required to adhere to the Ballast Water Control and Management Regulations and will follow their own Ballast Water Management Plan (BWMP). Additionally, chartered vessels will be required to follow protocols for ballast water management and discharge as outlined in Baffinland's Ballast Water Management Plan (Baffinland, 2019). In 2022, Baffinland will also continue to require all ore carrier vessels with treatment systems to perform both a ballast water exchange and treatment as part of ongoing management and mitigation measures aimed at reducing/eliminating the potential risk of introduction of aquatic invasive species at Milne Port.

6.4.2 Anti-Fouling Management

In order to reduce or eliminate the risk of invasive aquatic species and pathogens being introduced into Canadian waters as a result of ship hull biofouling, an anti-fouling coating will be in applied to the hulls of all Project vessels that will arrive and depart from Milne Port. The anti-fouling coating used will comply with the anti-fouling convention as well as be approved under the Pest Management Regulatory Agency of Canada and Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals (2007-86). This convention prohibits the use of dangerous organotin chemicals in anti-fouling systems. Any anti-fouling system that has a component listed under Annex I of the convention will not be used. The potential anti-fouling systems include:

- Organotin-free polishing type paint

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- Organotin-free ablative type paint
- Organotin free conventional type paint
- Biocide-free silicon type paint
- Other biocide-free paints

As the iron ore carriers commissioned for operations will exceed 400 gross tonnes and will be undertaking international voyages, these vessels will require an international anti-fouling system certification. Baffinland is committed to ensuring all vessels procured for the Project meet the IMO International Convention on the Control of Harmful Anti-fouling Systems on Ships. As per Annex I of the convention (and Schedule 6 of the Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals [2007-86]), the anti-fouling system will:

- Not bear organotin compounds on their hulls or external parts or surfaces; or
- Bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling systems.

6.5 Automatic Identification System (AIS) Vessel Tracking

Project vessel transits along the Northern Shipping Route are tracked and recorded using a combination of shore-based and satellite-based Automated Identification System Data. Automated Identification System transponders are mandatory on all commercial vessels >300 gross tonnes and on all passenger ships. Information provided by the AIS includes vessel name and unique identification number, vessel size and class, position and heading, course, speed of travel, and destination port.

Satellite-based Automatic Identification System data is acquired through Spire (previously known as exactEarth Ltd.) is used to track Project vessel movements along the shipping corridors in real-time. In 2018 Baffinland also installed a shore-based real-time satellite-based Automatic Identification System vessel tracking system at the Pond Inlet Baffinland office located on the second floor of the MHTO Building.

6.5.1 Culture, Resources and Land Use

Ship locations are posted on the Baffinland Iron Mines website (www.baffinland.com) and available at the Baffinland office in Pond Inlet.

Additionally, Baffinland employs up to four (4) full-time and six (6) part-time land-based shipping monitors to work in Pond Inlet who are responsible for conducting live monitoring throughout the shipping season and has established communication protocols and designate contact information to respond to community concerns.

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These processes will help to increase response time to correct vessel movement or speed in the event of non-adherence to vessel management protocols.

6.6 Environmental Monitoring

Baffinland’s marine-based monitoring programs are focused on the interaction between Project activities and the receiving marine environment, and in the establishment of cause-effect relationships that flow from these interactions. Monitoring results provide information that serve to modify, add, or eliminate mitigation measures. Additional monitoring programs may be developed, if required, and could lead to the implementation of adaptive environmental management measures.

Environmental monitoring is conducted at three levels:

- **Research** – studies to establish basic monitoring parameters (e.g. natural variability; potential for project-environment interaction), or to establish a baseline for future monitoring;
- **Surveillance** – studies to record natural environment phenomena and act as an “early warning” of changes, which, while not attributable to the Project, could require attention and possible design of a specific EEM program;
- **EEM** –environmental effects monitoring (EEM) based on a statistically robust study design capable of accepting or rejecting a Null Hypothesis, and focused on establishing a cause/effect relationship between environmental phenomena and Project attributes.

Environmental compliance monitoring is also carried out to demonstrate that the conditions of applicable permits and approvals (e.g. with respect to limits on concentrations of discharges) have been met during in-water or near-water marine-based Project works.

Detailed information on Baffinland’s monitoring programs are outlined in Baffinland’s Marine Environmental Effects Monitoring Plan. This plan is intended to provide detailed information on program design and monitoring procedures for all of Baffinland’s monitoring programs. This Plan is intended to be regularly updated based on program design modifications that are required based on annual monitoring results and/or recommendations provided by the MEWG and the NIRB.

In design and execution of its monitoring programs, Baffinland is committed to applying rigorous standards for study design, analysis and reporting. All study designs are provided to the MEWG for review and comment. All monitoring data are analyzed rigorously by experienced analysts, and all draft monitoring reports are circulated to the MEWG for comment prior to issuance as final documents. Additionally, affected communities will continue to be consulted on study design and provided opportunities to participate in implementation of the monitoring programs. Monitoring results are regularly presented to community advisory groups for discussion. In all monitoring programs, Baffinland engages direct Inuit participation in study planning, execution and interpretation of results.

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7 ENVIRONMENTAL REPORTING

7.1 Reporting Requirements

All marine and Project operations monitoring activities and reports pursuant to the Project Certificate and various regulatory requirements of the Project will be submitted annually to the NIRB. All results are to be kept and maintained throughout the life of the Project and EIS and EEM predictions will be updated as new baseline information is collected. A Project-specific web page (www.baffinland.com) has been developed as a means of making all non-confidential monitoring and reporting information available to the general public. To the fullest extent possible, all results will be available in English and Inuktitut.

Additionally, prior to the start of each shipping season, Baffinland will provide to the NIRB a Marine Shipping and Vessel Management Report informing the Board of the following:

- Anticipated number of ship transits along the approved shipping route;
- Identification of specific areas to be used for drifting and anchorage of vessels with details of how community feedback and comments from the MEWG has been used to inform the selection of suitable areas;
- Timelines for organizing pre- and post-shipping meetings with the community;
- Plans for preventing or mitigating vessel interference with marine mammals and traditional hunting activities pursuant to Term and Condition 125(as) of the Project Certificate;
- Evidence of community involvement to review preliminary results of the monitoring programs, and to compare results with experiences of community members and hunters with respect to the marine environment and marine mammals during the shipping season; and
- Evidence of reporting new or non-native species identified as a result of Aquatic Invasive Species Monitoring to the MHTO and DFO with confirmation of whether or not this species had been observed in the past or through other community or regional monitoring initiatives.

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8 REFERENCES

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Appendix A: International and Federal Shipping Regulation and Act

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Federal and/or International Acts and Regulations	Reference
Aids to Navigation Protection Regulations	https://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 1403/index.html
Arctic Waters Pollution Prevention Act and Regulation	http://www.tc.gc.ca/eng/marinesafety/debs-arctic-acts-regulations-awppa-494.htm
Ballast Water Control and Management Regulations.	https://laws-lois.justice.gc.ca/eng/regulations/sor-2011-237/
Canada Labour Code	https://laws-lois.justice.gc.ca/eng/acts/L-2/
Canada Shipping Act	https://laws-lois.justice.gc.ca/eng/acts/c-10.15/
Canadian Transportation Accident Investigation and Safety Board Act	https://laws-lois.justice.gc.ca/eng/acts/c-23.4/
Canadian Transportation Act	https://laws-lois.justice.gc.ca/eng/acts/c-10.4/
Canadian Transportation of Dangerous Goods Act	http://www.tc.gc.ca/eng/tdg/act-menu-130.htm
Cargo, Fumigations and Tackle Regulations	https://laws-lois.justice.gc.ca/eng/regulations/sor-2007-128/
Charts and Nautical Publications Regulations	https://laws-lois.justice.gc.ca/eng/regulations/sor-95-149/
Classed Ships Inspection Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-89-225/
Collision Regulations	https://laws-lois.justice.gc.ca/eng/regulations/c.r.c., c. 1416/
Crew Accommodation Regulations	https://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 1418/
Dangerous Bulk Materials Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-87-24/index.html
Dangerous Chemicals and Noxious Liquid Substances Regulations	https://laws-lois.justice.gc.ca/eng/regulations/sor-93-4/page-1.html
Department of Transport Act	https://laws-lois.justice.gc.ca/eng/acts/t-18/index.html
Fire and Boat Drills Regulations	https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2010-83/index.html
Fire Detection and Extinguishing Equipment Regulations	https://laws-lois.justice.gc.ca/eng/Regulations/C.R.C., c. 1422/index.html
Fisheries Act	https://laws-lois.justice.gc.ca/eng/acts/f-14/
Garbage Pollution Prevention Regulations	https://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 1424/index.html
Home-Trade, Inland and Minor Waters Voyages Regulations	https://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 1430/
Hull Inspection Regulations	https://laws-lois.justice.gc.ca/eng/Regulations/C.R.C., c. 1432/index.html
International Convention for the Control and Management of Ships' Ballast Water and Sediment	https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-(BWM).aspx
International Convention for the Prevention of Pollution from Ships (MARPOL)	https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-

Federal and/or International Acts and Regulations	Reference
	(MARPOL).aspx#:~:text=The%20International%20Convention%20for%20the,2%20November%201973%20at%20IMO.
International Convention on Load Lines	https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-Load-Lines.aspx
International Maritime Dangerous Goods (IMDG) Code	https://www.imo.org/en/OurWork/Safety/Pages/DangerousGoods-default.aspx#:~:text=The%20IMDG%20Code%20was%20developed,prevent%20pollution%20to%20the%20environment.
International Maritime Solid Bulk Cargoes (IMSBC) Code	https://www.imo.org/en/OurWork/Safety/Pages/CargoesInBulk-default.aspx#:~:text=The%20primary%20aim%20of%20the,shipment%20of%20certain%20types%20of
International Safety Management Code	http://www.tc.gc.ca/eng/marinesafety/dvro-4066.htm
Life Saving Equipment Regulations	https://laws-lois.justice.gc.ca/eng/Regulations/C.R.C.,_c._1436/index.html
Marine Certification Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-97-391/index.html
Marine Liability Act	https://laws-lois.justice.gc.ca/eng/acts/M-0.7/
Marine Machinery Regulations	https://laws-lois.justice.gc.ca/eng/regulations/sor-90-264/
Marine Transportation Security Act	https://laws-lois.justice.gc.ca/eng/acts/m-0.8/
Marine Transportation Security Regulations	https://laws-lois.justice.gc.ca/eng/regulations/sor-2004-144/
Navigation Protection Act	https://laws-lois.justice.gc.ca/eng/acts/n-22/
Oceans Act	https://laws-lois.justice.gc.ca/eng/acts/o-2.4/
Oil Pollution Prevention Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-93-3/index.html
Response Organizations and Oil Handling Facilities	https://laws-lois.justice.gc.ca/eng/regulations/SOR-95-405/index.html
Safe Containers Convention Act	https://laws-lois.justice.gc.ca/eng/acts/S-1/
Safe Working Practices Regulations	https://laws-lois.justice.gc.ca/eng/Regulations/C.R.C.,_c._1467/index.html
Safety Management Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-98-348/
Ship Station Radio Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-260/
Shipping Casualties Reporting Regulations	https://laws-lois.justice.gc.ca/eng/Regulations/SOR-85-514/index.html
Shipping Inquiries and Investigations Rules	https://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._1479/index.html
Ships' Elevator Regulations	https://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._1482/
Standards for navigating Appliances and Equipment	http://www.tc.gc.ca/eng/marinesafety/tp-tp3668-menu-391.htm
Steering Appliances and Equipment Regulations	https://laws-lois.justice.gc.ca/eng/Regulations/SOR-83-810/index.html
Transportation of Dangerous Goods Program	http://www.tc.gc.ca/eng/tdg/safety-menu.htm

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Federal and/or International Acts and Regulations	Reference
Vessel Traffic Services Zones Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-89-98/
VHF Radiotelephone Practices and Procedures Regulations	https://laws-lois.justice.gc.ca/eng/regulations/SOR-81-364/

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**Appendix B:
Baffinland Pre-Charter Bulk Carrier Ice Capability
Assessment**

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B.1 Baffinland Pre-Charter Bulk Carrier Ice Capability Assessment

B.1.1 GENERAL

The Baffinland pre-charter bulk carrier ice capability assessment will be carried out prior to finalization of any charter.

B.1.2 APPLICATION OF THE VESSEL SELECTION PROTOCOL

The vessel selection protocol applies to vessels engaged in the export of iron ore according to the season during the planned period of the charter.

B.1.3 MINIMUM SPECIFICATIONS FOR VESSEL SELECTION

These are the minimum requirements for vessel selection according to the season during the planned period of the charter.

B.1.4 CRITERIA FOR DETERMINING VESSEL PERFORMANCE IN ICE

This is based on the Arctic Ice Regime Shipping System (AIRSS) calculation of ice numerals and Canadian Arctic Class or equivalent.

B.1.5 MINIMUM REQUIREMENTS FOR CARRIERS AND ALTERNATE IRON ORE CARRIERS

The minimum requirements will be specified in the Baffinland original request to brokers for proposals for vessels, taking account of the season and projected ice conditions during the period of the charter.

B.1.6 VESSEL ICE CAPABILITY ASSESSMENT

The main concern is to ensure that the carriers and alternate iron ore carriers selected are capable of operating in the ice conditions which are forecast for the period when the vessel will be operating in the approaches to Milne Inlet or within Milne Inlet.

The ice capability requirement is dependent on updated ice forecasting, based on current radar satellite information, related to the vessel's design, construction, ice performance, and operating procedures. The calculation is based on the following:

- i. The ice numerals of a vessel being considered for operations into Milne Inlet ice, which will be calculated under the Arctic Ice Regime Shipping System (AIRSS).
- ii. The vessel's Class and Type in accordance with Canadian Regulations (i.e., Canadian Arctic Class or equivalent).
- iii. The thickness and character of the ice in Milne Inlet during the period of the charter.

B.1.7 ICE CONDITIONS FORECASTS AND ICE CAPABILITY ASSESSMENT

The following summary is provided as an aid to understanding Baffinland's vessel selection process for selecting vessels for operation into Milne Inlet.

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1. An Ice Information Contractor, with expertise in ice measurement, forecasting and routing, will be contracted to provide a forecast of the ice conditions expected in the Milne Inlet area at the time of the proposed shipping.
2. The Owner and Managers of a vessel being considered for a charter shall be required to provide full details of the vessel's design, ice construction, machinery, class, etc. to the Baffinland Independent Contractor responsible for assessing the vessel's ice capability.
3. The Independent Contractor engaged by Baffinland shall consider the vessel's ice design and construction, ice performance and certificates to confirm if the vessel's ice numerals are positive and sufficient to enable the vessel to safely transit the forecast ice conditions in Milne Inlet during the projected time frame.

This contract shall be established well in advance of the first charter vessel assessment to enable the Independent Contractor to provide Baffinland with a list of information required to carry out their assessment of the proposed vessel's ice capability.

4. Providing the vessel meets all of the required criteria for navigating in the forecast ice conditions, the Independent Contractor shall determine that the vessel under consideration is structurally and mechanically capable of safely completing the contemplated voyage and will provide that determination to Baffinland.
5. Providing the vessel meets all of the above requirements for the charter, the vessel shall be subject to a general inspection to confirm that the vessel remains in good condition, meeting all of the equipment requirements and operating procedures necessary for vessels operating into Canadian ports. The Surveyor will also ensure that the equipment requirements and operating procedure requirements listed out in the Baffinland Inuit Impacts and Benefits Agreement (IIBA) are satisfied. These equipment requirements and operating procedure requirements are all included in the Baffinland pre-charter bulk carrier inspection checklist (refer to Appendix C).

The above inspection will be coupled with a limited audit to ensure that the vessel is operated in conformance with the International Safe Management regulations.

Providing that the vessel satisfies all of the above inspections and the limited audit, the vessel may be placed on charter.

Note: Surveyors conducting the pre-charter inspection will be informed of any special inspection requirements related to ice procedures and route planning not otherwise included in the Baffinland IIBA. The provision of a Berthing Master provides the necessary source of information and advice to a Master unfamiliar with the conditions in Milne Inlet.

6. Twenty-four hours before the chartered vessel enters the ice outside Milne Inlet, the Ice Information Contractor shall provide an updated estimate and forecast of the ice conditions which the vessel will encounter in and outside of Milne Inlet. The vessel's AIRSS ice numerals will again be calculated.

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If the ice numerals remain positive for the updated ice report, the vessel may enter Milne Inlet.

If the ice numerals are negative, the vessel may not enter port until ice conditions improve and positive numeral results.

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Appendix C: Baffinland Pre-Charter Inspection Checklist and Limited Audit

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C.1 BAFFINLAND PRE-CHARTER BULK CARRIER INSPECTION CHECKLIST AND LIMITED AUDIT

C1.1 INTRODUCTION

Baffinland Iron Mines Corp. has developed an Iron Ore mine at Mary River, Baffin Island, and shipping terminals at Steensby Port Site and Milne Inlet on Baffin Island in Nunavut.

In order to preserve the environment and the Inuit way of life, Baffinland have signed the Inuit Impacts and Benefits Agreement (IIBA) which, among other things, provides for the shipment of Iron Ore.

C.1.2 SHIPPING OPERATIONS

Carriers and alternate Iron Ore Carriers (should these be required) must be classed for ice navigation according to the expected ice conditions.

C.1.3 COMPLETION OF PRE-CHARTER BULK CARRIER INSPECTION AND LIMITED AUDIT

It is not the intention that the Baffinland inspector/surveyor inspect a bulk carrier and carry out a complete ISM Type audit in the course of the vessel's normal turn-around in port.

However, an experienced surveyor can examine the vessel's documentation or computerized safety and maintenance programs in sufficient depth to satisfy themselves as to the standard of operation and management of the vessel. This information coupled with a visual inspection of the hull and superstructure, machinery spaces, deck and safety equipment is normally sufficient for the Charter to decide whether the vessel is capable of working safely in Canada or otherwise. In order to save time we suggest that the surveyor uses a digital camera to photograph points of interest, general layout of the vessel, hull condition, etc., or any items which cause concern.

The following pre-charter bulk carrier inspection checklist is a combination of a Transport Canada Ship Safety Checklist, which is the standard required for all foreign ships entering Canada, to which we have added the requirements as identified by Baffinland as the outcome of the Environmental Assessment Process.

The limited audit outlined is sufficient to confirm that the vessel is maintaining ISM Standards.

PART 1 — PRE-CHARTER BULK CARRIER (INSPECTION AS PER THE FOLLOWING CHECKLISTS)

Section 1: General Information

Section 1: General Information		
1.1	Date this document completed	
1.2	Name of ship	
1.3	LR/IMO No.	
1.4	Date of name changes	
1.5	Flag	

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1.6	Call sign	
1.7	INMARSAT number	
1.8	Ship's fax number	
1.9	Ship's telex number	
1.10	Ship's e-mail address	
1.11	Type of hull: (1) Single Hull, (2) Double Hull, (3) Double Bottom (4) Double Side, (5) Other (if Other, Specify)	
Section 1.2: Ownership and Operation		
1.12	Registered Owner	
1.13	Full Address	
	Office telephone number	
1.14	Name of Operator (if different from above)	
1.15	Full Address	
	Office telephone number	
	Office fax number	
	Office email address	
1.16	Contact person	
	Contact person after hours telephone number	
	Emergency callout number	
	Emergency callout pager number	
1.16	Contact details for person responsible for oil spill response.	
1.17	Total number of ships operated by this Operator	
Section 1.3: Builder		
1.18	Builder	
1.19	Date delivered	
1.20	If applicable, date of completion of major hull changes	
1.21	If major hull changes, what changes were made?	
Section 1.4: Classification		
1.22	Classification Society	LLOYDS REGISTER
1.23	Class Notation	
1.24	Date of last dry-dock	
1.25	Date next dry-dock due	
1.26	Date of last special survey	
1.27	Was last special survey an enhanced special survey?	
1.28	Date next special survey due	
1.29	If ship has Condition Assessment Programme (CAP) rating, what is the latest rating?	
1.30	Date of last annual survey	

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1.31	Date of last boiler survey - port boiler	
1.32	Date of last boiler survey – starboard boiler	
1.33	If machinery on Continuous Survey are any item overdue or	
1.33.1	If Yes give details:	
1.34	Is ship subject to any conditions of class, class extensions, outstanding Memorandums or class recommendations?	
1.34.1	If Yes, give details:	

Section 1.4: Dimensions

1.35	Length overall (LOA)	
1.36	Length between perpendiculars (LBP)	
1.37	Extreme breadth	
1.38	Moulded breadth	
1.39	Moulded depth	
1.40	Does ship have a bulbous bow?	

Section 1.5: Tonnages

1.41	Net Registered Tonnage	
1.42	Gross Tonnages	
1.43	Moulded depth	

Section 1.6: Loadline Information

		Freeboard	Draft	Deadweight	Displacement
1.44	Summer				
1.45	Winter				
1.46	Lightship				
1.47	Normal Ballast Condition				
1.48	Segregated Ballast Condition				

Section 1.7: Recent Operational History

1.49	Has ship been involved in a pollution incident during the past 12 months?	
1.50	Has ship been involved in a grounding incident during the past 12 months?	
1.51	Has ship been involved in a collision during the past 12 months?	

Section 2: Certification and Documentation

	Certificates	Issue Date	Expiry	Last Annual
2.1	CERTIFICATE OF REGISTRY			
2.2	SAFETY EQUIPMENT CERT			
2.3	SAFETY RADIO CERTIFICATE			
2.4	SAFETY CONSTRUCTION CERTIFICATE			
2.5	LOAD LINE CERTIFICATE			
2.6	IOPP			
2.7	ISM			
2.8	INTERNATIONAL SEWAGE POLLUTION			

2.9	USCG (LETTER OF COMPLIANCE) CFR			
2.10	UNATTENDED MACHINERY SPACE CERTIFICATE			
2.11	INTERNATIONAL TONNAGE CERTIFICATE			
2.12	MINIMUM SAFE MANNING CERTIFICATE			
Documentation - Are the latest editions of the following publications tted on board?				
2.13	IMO <i>Safety of Life at Sea Convention (SOLAS 74)</i>			
2.14	IMO <i>International Code of Signals (SOLAS V-Reg 21)</i>			
2.15	IMO <i>international Convention for the Prevention of Pollution from Ships (MARPOL 73/78)</i>			
2.16	IMO <i>Ships Routing</i>			
2.17	IMO <i>International Regulations for Preventing Collisions at Sea (COLREGS)</i>			
2.18	IMO <i>Standards of Training, Certification and Watch Keeping (STCW Convention)</i>			
2.19	Does the Vessel carry a SOLAS Safety Manual available to Crew?			
2.20	ICS <i>Guide to Helicopter/Ship Operations</i>			

Section 3: Crew Management

Date of Minimum Manning Certificate			
	Minimum Manning	Officers	Rating
3.1	Minimum manning required		
3.2	Actual required		
3.3	Nationality		
	Nationality		
	Nationality		
3.4	Common language used		

Section 4: Navigation Equipment

4.1	Is the vessel equipped With the following equipment?	Yes/No	Type	No Of Units
4.2	Standard Magnetic Compass			
4.3	Steering Magnetic or Periscope compass			
4.4	Gyro Compass			
4.5	Gyro Repeaters			
4.6	Radar 1 X Band (9 GHz)			
4.7	Radar 2 S Band (4 GHz)			
4.8	Are radars gyro stabilized?			
4.9	Radar plotting equipment			
4.10	ARPA			
4.11	Depth sounder with recorder			
4.12	Speed/distance indicator			
4.13	Doppler log			
4.14	Docking approach Doppler			
4.15	Rudder angle indicator			
4.16	RPM indicator			
4.17	Controllable pitch propeller indicator			
4.18	Bow thruster indicator			
4.19	Rate of turn indicator			
4.20	Radio direction finder			

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4.21	Navtex receiver			
4.21	Satellite navigation receiver			
4.22	GPS			
4.23	Differential GPS			
4.24	ECDIS (Electronic Chart Display and Information System)			
4.25	EPIRB			
4.26	GMDSS Installation			
4.26	VHF Dual Installation			
4.28	VHF Portable hand Sets			
4.29	MFIHF Installation			
4.30	Inmarsat Installation			
4.31	Loran C receiver			
4.32	Course recorder			
4.33	Off — course alarm — gyro			
4.34	Off — course alarm — magnetic			
4.35	Engine order printer			
4.36	Anemometer			
4.37	Several pairs of binoculars			
4.38	Weather fax			
	Other Equipment			
4.40	Does vessel carry sextant(s)?			
4.41	Does vessel carry a signal lamp?			
4.42	Are steering and machinery controlled from the bridge?			
4.43	Are bridge controls available on bridge wings?			
4.44	Internal communications system?			
4.45	P.A. system?			
4.46	Sound signals, whistle, and fog horn?			
4.47	Navigation lights?			
4.48	Two powerful searchlights?			
4.49	Does the vessel have properly equipped pilot ladder clw manropes?			
4.50	Does the vessel have a substantial accommodation ladder either side?			
4.51	Does the vessel have a short light weight gangway with side ropes?			
4.52	Does the vessel have current navigational charts for the port and route?			

Section 5: Pollution Prevention

5.1	Is spill containment fitted under the cargo manifold?		
5.2	Is spill containment fitted under all bunker manifolds?		
5.3	Is containment fitted under the bunker tank vents?		
5.4	Is containment fitted around the deck machinery?		
5.5	Specify type of scupper plugs		
5.6	Are means provided for draining or removing oil from deck area/containment?		
5.7	Does the vessel have on board the equipment, procedures and resources for use in event of an oil spill?		
5.8	Does the vessel have a shipboard oil pollution emergency plan (SOPEP) that complies with the requirements of the MARPOL convention?		

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5.9	Is the following pollution control equipment available to clean up oil spilled on deck?	
5.9.1	Sorbents?	
5.9.2	Non-sparking hand scoops/shovels?	
5.9.3	Containers?	
5.9.4	Emulsifiers?	
5.10	Does the vessel have a certified sewage system?	
5.11	Does the vessel have a sewage storage tank?	
5.12	Does the vessel have on board holding of bilge water?	
5.13	Does the vessel have on board holding of oily waste?	
5.14	Does the vessel have on board holding of solid wastes?	
5.15	is a garbage incinerator fitted?	

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Part 2: LIMITED AUDIT OF THE OUTBOARD OPERATION OF THE ISM SYSTEM

International Safety Management Certificate	
Issued By Classification Society Name	
Last 5 year renewal	Date:
Intermediate audit	Date:
Internal audit	Date:
Name of Designated Person Ashore (DPA)	
Contact Phone Number	
Contact email address	

General	Yes /No
Are the ISM system manuals available to the crew?	
Are the Master, officers and crew familiar with the ISM system?	
Are crew familiar with the Ship's Contingency Plans & their responsibilities?	
Are crew familiar with safe working practices required onboard?	
Are crew wearing Personal Protective Equipment and Clothing as appropriate?	
Are safety signs exhibited throughout the vessel?	
Are ear defenders/plugs used in the machinery spaces?	
Are eye protectors available near burning and grinding gear?	
Is the Safety Officer named and familiar with his responsibilities?	
Are minutes of safety meetings kept and forwarded to Safety Officer/DPA?	
Are concerns raised at meetings dealt with effectively onboard?	
Are concerns beyond the ship's capacity attended to promptly by the ship's management?	
Is the secondary emergency control center maintained?	
Does the vessel have a Material Safety Data System (MSDS) in place?	
Accommodation	
Are the ship's accommodations clean, tidy and hygienic?	
Are lifejackets and survival suits stored in each cabin?	
Are fire extinguishers, alarms, etc. in place and in date?	
Are public rooms, mess rooms etc. clean, tidy and hygienic?	
Are the galley and food stores clean with refrigerators operational?	
Is proper food handling and food hygiene in effect?	
General Exterior Inspection	
Is the ship's hull in good external condition & well coated?	
Is the visible lower hull free from fouling?	
Is an organotin, tributalin or biocide based anti-fouling coating used?	

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Machinery Spaces						
Machinery Space						
Main Engines						
Generators						
Boilers						
Inert Gas System		Nitrogen		CO ₂	Yes	
General Cleanliness	Good					
Bilge Cleanliness	Good					
Oily Water Separator						
Oil Sludge Tank		Capacity	21.7 m ³			
Ballast Pumps			Capacity	cu. metres/Hr		
Sewage Pumps	Type					
Sewage Holding Tank	Capacity		m ³		Days	

Engine Rooms Records	
Engine Room Log Book (Note engine/generator/bolier breakdowns in port or shut downs at sea during the last two voyages)	
Fuel consumption per day	Mt/Day
Lube oil consumption	Ltrs/Day
Planned Maintenance System (Note if up to date and any outstanding work)	
Oil record book (Must be up to date and signed by C/E and Master)	

Deck Log Book – For Last Voyages

Average Speed	kts
Weather	
Are charts and publications corrected up to date?	
Has the Master been provided with a Port Information Book?	
Is the Master aware that he must carry all the necessary Canadian charts and publications before arrival in Canada?	
Are ballast transfer/changes recorded in a ballast log book records (Last Voyage)?	

Life Saving Appliances

Lifeboats	Total No		Open/Enclosed		
	Type		Motor		Enclosed
Davits	Type				
No. of Survivors	Capacity				
Rescue Boat	Condition				
Davits					
Life Rafts	Date		Capacity:		
Life Raft Davits for above					
Survival/Immersion Suits	Total				
SARTS					
Records of Lifeboat Drills, Fire Drills, etc.					
Are post exercise debriefings held after each exercise and are all crew invited to comment as to how to improve the effectiveness of the fire team, first aid teams, etc.?					

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CREW CERTIFICATION

Requirements:

All crew to have Certificate of Training in Emergency Duties and Fire Fighting issued by an accredited institution. The Master, 1st Mate and two Senior Engineers shall be certified for all Emergency Command and Control Issues. At least two Officers shall be qualified GMDSS operators.


All new crew shall be provided with an orientation of the ship on joining. This will include an introduction to his duties, the emergency signals and his emergency station under the various contingencies.

A booklet setting out details of the vessel should be provided in each cabin along with notices showing how to don a lifejacket and or survival/immersion suit.

Every vessel shall have a SOLAS manual onboard available to all crew members. This manual describes in the common language(s) of the crew, each piece of safety equipment, its position onboard and how to operate it.

Check make up and qualifications of all watch-keeping Officers and Engineers.

Can the vessel operate with the machinery spaces unmanned (UMS)? If so, the machinery space must be manned by at least one watch-keeping engineer when the vessel is reduced to manoeuvring speed for entering or leaving port.

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Other Information	Yes/No	Comments
The suitability of the winterization of the vessel's onboard systems and equipment, including deck and cargo equipment, evacuation craft, etc. for operation in cold temperatures and icing according to all expected conditions.		
The provision of clear vision systems for unimpaired forward and astern vision in cold temperatures, icing, etc		
The suitability of the vessel's navigation equipment and appliances for safe navigation through ice in all expected conditions.		
The suitability of key safety-related and survival equipment for cold temperatures, ice and icing conditions – including survival kits and immersion suits.		
Confirmation that the vessel's officers and crew are familiar with cold weather survival procedures and the environmental conditions which they can expect to encounter.		
Confirm that the vessel's ice navigation history has established that the vessel has a record of successful navigation in ice conditions comparable to those expected in Anaktalak Bay during the voyage.		
Confirm that the vessel's operating manuals include a clear statement of the operating limitations for the vessel and its essential systems in all anticipated ice conditions, temperatures and other environmental conditions.		
Confirm that the vessel's operating manuals include passage planning procedures accounting for anticipated ice and other environmental conditions and transit speeds having due regard to the vessel's class and type in the anticipated conditions.		
Confirm that the vessel's operating manuals include deviations from standard operating procedures when navigating in ice-covered waters, including the operation of machinery systems, remote control and warning systems, electric and electronic systems.		
Confirm that the vessel has appropriate escape and evacuation procedures into cold water and ice, etc		
Confirm that the vessel is adequately equipped and its crews are properly trained to provide effective damage control and minor hull repair under all expected conditions.		

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Appendix D: 2022 Narwhal Adaptive Management Response Plan

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Baffinland Iron Mines Corporation

2022 NARWHAL ADAPTIVE MANAGEMENT RESPONSE PLAN

< #BAF-PH1-830-P16-0024 >

Rev 2

Prepared By: Lauri Corlett
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1 INTRODUCTION

Baffinland Iron Mines Corporation (Baffinland) has prepared this 2022 Narwhal Adaptive Management Response Plan (the 2022 Plan) for the purpose of sharing information with interested Parties on Baffinland’s interim mitigation measures for the 2022 shipping season and its marine mammal monitoring programs. The contents of this Plan have been informed by the development and implementation of the 2021 Narwhal Adaptive Management Response Plan, as well as ongoing dialogue and feedback from interested parties including the Mittimatalik Hunter and Trappers Organization (MHTO), Fisheries and Oceans Canada and other members of the Marine Environmental Working Group (MEWG) (collectively, the Parties).

2 BACKGROUND

On April 8 2021, Baffinland provided to the Nunavut Impact Review Board (NIRB) a Technical Memo prepared by Baffinland’s marine mammal monitoring technical consultants, Golder Associates Ltd. (Golder), entitled Preliminary Summary of 2020 Narwhal Monitoring Programs (the Memo) (Golder, 2021a NIRB Registry ID: 334440). The Memo outlined key results of Baffinland’s 2020 marine mammal monitoring programs, notably that through the 2020 marine mammal aerial survey, Golder had recorded a statistically significant decline in the stock estimate for the Eclipse Sound summer narwhal stock. The Memo also included a preliminary investigation of several factors that may have contributed to the recorded decline in the stock estimate, including icebreaking activities associated with Baffinland’s 2020 shipping season.

Given the inability to determine the primary cause of the decline in the stock estimate, Baffinland committed to following up with the NIRB and the Parties on these results. Actions committed to included:

- seeking feedback on the Memo;
- engaging with the Parties and requesting input on the proposed additional mitigations Baffinland would implement during the 2021 shipping season;
- providing copies of the program-specific technical monitoring reports that substantiated the preliminary summary of results presented in the Memo, as feasible;
- completing additional investigations into potential causal factors; and
- providing an Adaptive Management Response Plan.

The 2021 Narwhal Adaptive Management Response Plan was released on July 15, 2021 and guided the implementation of Baffinland’s shipping mitigations and marine mammal monitoring programs through the 2021 shipping season.

On March 31, 2022 and April 3, 2022 Baffinland reported the results of its 2021 marine mammal monitoring programs, respectively, to the NIRB and the MEWG. The results confirmed a statistically higher

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abundance estimate for the combined Eclipse Sound and Admiralty Inlet stocks compared to 2020 surveys, however, another statistically lower abundance estimate was recorded for the Eclipse Sound stock alone compared to the 2020 surveys.

Baffinland recognizes the concerns with respect to the 2021 narwhal observations in Eclipse Sound. However, a holistic review of the data from the 2021 shipping season does not conclude that the relatively lower numbers of narwhal observed in Eclipse Sound in 2021 is Project-related. Elimination of early season ice-breaking in 2021 further reduced residual uncertainty that Project shipping is the primary driver of the observed change in narwhal abundance in Eclipse Sound. Despite this, as in 2021, Baffinland proposes to implement additional mitigation measures and modify and/or continue monitoring programs as a precaution and in respect of concerns raised by the community of Pond Inlet.

3 SUMMARY OF ENGAGEMENT AND OUTCOMES

3.1 MAY 6, 2022 REQUEST BY MHTO FOR ADDITIONAL ADAPTIVE MANAGEMENT IN 2022

Subsequent to Baffinland’s March 31st and April 3rd submissions of annual reports to the NIRB and MEWG, respectively, on May 6, 2022 the MHTO submitted a request for additional adaptive management measures to be applied to the 2022 shipping season (see Table 3.1 for summary of requested recommendations). On May 10, 2022 Baffinland issued a written response to the MHTO letter to the NIRB, providing additional context for the 2021 monitoring results, confirming our intentions to update the Narwhal Adaptive Management Response Plan for 2022 and providing copies of new information submitted by the Qikiqtaaluk Wildlife Board (QWB) to the Nunavut Wildlife Management Board (NWMB) related to narwhal management. On May 17, 2022 the NIRB responded to both the MHTO and Baffinland letter submissions, confirming its understanding that Baffinland was working to develop an updated Narwhal Adaptive Management Response Plan, that further engagement would occur with parties such as the MEWG, and that the NIRB would be kept informed of relevant outputs. A summary of correspondence directly related to the development of the 2022 Plan has been included as Attachment 1. A more general listing of engagements related to the 2022 shipping season can be found in Section 4.3 of the 2022 Marine Shipping and Vessel Management Report.

In the letter from May 6, 2022, the MHTO recommended several specific mitigation measures for consideration, which included:

- a reduction in shipping;
- further reduction in ship speed (beyond the 9 nm/h current commitment); and
- abandoning this season’s planned ice breaking.

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On May 31, 2022, following an internal evaluation of the MHTO’s recommendations, Baffinland shared its preliminary findings with the MHTO and requested a meeting to further discuss the findings. The update as shared with the MHTO is as follows:

TABLE 3.1: BAFFINLAND UPDATE ON ADAPTIVE MANAGEMENT INVESTGATION TO MHTO ON MAY 31, 2022

MHTO Recommendation	Baffinland Update to MHTO on May 31, 2022 [Note – precise wording provided here for reference, final commitment language differs and is confirmed in Section 5.2.4]
A reduction in shipping	Should Baffinland be approved to ship 6 Mtpa in 2022, it expects between 78 and 80 ore carriers to complete the task, which is 4-6 less than the 84 vessels Baffinland previously proposed would be required to ship 6 Mtpa. Further, there are options that include the use of convoys and/or the use of larger vessels that could further reduce the total number of transits. We are open to further discussing this concept with the MHTO and to investigating the feasibility with its vessel traffic management service for the 2022 shipping season and beyond.
Further reduction in ship speed (beyond the 9 nm/h current commitment)	<p>Baffinland has directly contacted the shipping companies we charter with (Nordic, Oldendorf, Golden Ocean) with to understand if it is possible to reduce speeds further than the current 9 nm speed limit. The general response is that even a reduction to 8 nm/h could not be implemented across the fleet, and the implications of doing it may not be desirable to MHTO, some key points include:</p> <ul style="list-style-type: none"> • Auxiliary Blowers: the lowest speed that most of the vessels can run at without the auxiliary blowers (used to flush air out of engine) cutting out is between 9-10 nm/h. Running at lower speeds of even 8 nm/h would require the auxiliary blowers to run non-stop, which they are not designed for, substantially increasing the risk of equipment failure • Engine Maintenance: Extended periods at 8 nm/h and below will see a build-up of engine/stack soot and accumulated cylinder oil in the exhaust system, which would require a daily speed increase to full power for 2-3 hours to clear exhaust passages. Without this, fouling of engine and turbochargers will occur, substantially increasing the risk of failures and creating the need for additional maintenance. • Safe Navigation: Even at 8 nm/h the vessels that serve Milne Port would be nearing an unsafe steering speed, which means at that speed or under vessel Captains can lose the ability to effectively maneuver their vessels. Removing the ability to maneuver/steer vessels as they transit through Eclipse Sound and Milne Inlet is not an option. • Longer Transits: The reduction in speed to 8 nm/h would also cause an increase in transit time of 3-4 hours for vessels as they transit from the entrance of Eclipse Sound to Milne Port. This would increase the time vessels and hunters would interact in the marine area.

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Abandoning this season's planned ice breaking	Baffinland is proposing to initiate the shipping season in 2022 the same as it did in 2021 by avoiding the need for ice-breaking. Operationally, the trigger to commence the beginning of the 2022 shipping season will be the presence of a continuous path of 3/10ths or less ice concentrations between the entrance of Eclipse Sound and Milne Port. Based on historical ice conditions, waiting for a continuous path of 3/10ths or less ice concentrations represents an approximate 2-week delay from when landfast ice would otherwise be completely broken across the Northern Shipping Route and normal shipping operations would regularly commence.
---	---

Despite issuing several requests to meet either in person or via teleconference to discuss Baffinland's 2022 shipping plans, the MHTO was unable to commit to a meeting. Section 4.2 of the 2022 NIRB Marine Shipping and Vessel Management Report outlines the details related to these meeting requests. On June 20, 2022 Baffinland issued a letter to the NIRB confirming its commitment to the shipping mitigations developed in response to the May 6, 2022 letter from the MHTO (See Attachment 1), which included:

- No icebreaking to commence the 2022 shipping season.** Vessels will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA).
- Use of convoys throughout the 2022 season to further reduce total sound exposure.** Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area (RSA) compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure. The use of convoys will be similar in effect to reducing the overall number of ships. A technical memo describing the benefits of convoys as a noise mitigation tool are included as Attachment 2. For a greater understanding of how convoys will be implemented in 2022, see Attachment 3 for the draft Operational Guide for Ore Carrier Convoys.
- No more than 80 ore carriers will be chartered during the 2022 season to transport 6 Mtpa, if approved.** This is 4 ore carriers less than the maximum anticipated in the previous Production Increase Proposal and Extension Request.

3.2 MARINE ENVIRONMENT WORKING GROUP MEETINGS

The MEWG met a total of three times in May and June 2022 (May 3, June 14, 22 and 29) to discuss Baffinland's planned shipping and marine monitoring activities for 2022. Time in the agenda was specifically reserved for discussion of the 2022 Marine Shipping and Vessel Management Report, inclusive

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of the 2022 Plan. Through the meetings Baffinland recorded a total of 28 new action items, with responsibilities allocated to various MEWG members. Action items with relevance to the Plan are summarized in the Table 3.2 below. Note that these are draft action items and have not yet been reviewed and verified by all MEWG Members.

TABLE 3.2: SUMMARY OF MEWG ACTION ITEMS RELATED TO THE 2022 NAMRP

Action Item	Responsibility	Status (July 15, 2022)
Confirm whether vessel convoys are expected to reduce noise; maximum no. of vessels per convoy; percentage of all vessels that will travel in a convoy.	Baffinland	Technical memo submitted to NIRB on June 15 and June 20, 2022 (See Attachment 2 to this Plan)
Oceans North to confirm whether they have acoustic recordings from any previous shipping season of convoys without the Botnica, and provide to Baffinland.	Oceans North	TBD
Oceans North to inform Baffinland of acoustic recorder locations that are being deployed in July, 2022.	Oceans North	TBD
QIA to provide Baffinland with a summary of completed and ongoing community-based monitoring programs, including harvester survey.	QIA	TBD
Baffinland to distribute all 2021 marine report comments to the MEWG upon completion.	Baffinland	Anticipated target of July 30, 2022
Baffinland and Golder to secure a spot on Leg 2 of the marine mammal aerial survey program for an MHTO member. BIM to follow-up with MHTO regarding travel requirements.	Baffinland, Golder	Baffinland issued email requests to MHTO on July 6 and 11, 2022 to select a representative to participate in the aerial surveys
Parks Canada to provide the MEWG with a written response that highlights all ongoing research related to cruise ships in the eastern Canadian Arctic.	Parks Canada	Updated circulated with MEWG via email on July 5, 2022

To ensure all recommendations provided by MEWG Members during the June 2022 meetings are captured and actioned, Baffinland requested that MEWG Members follow up by email with recommendations and associated rationale. As of July 15, 2022 Baffinland has not received any confirmation of MEWG Member recommendations.

Prior to the June 2022 MEWG Meetings Baffinland engaged directly with the Department of Fisheries and Oceans (DFO) to provide an update on 2022 shipping planning, including the additional mitigations

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proposed in response to the May 6 letter from MHTO. In a follow-up correspondence on June 20, 2022, DFO recommended the implementation of a summer acoustic monitoring program to evaluate the effectiveness of convoys at reducing overall noise exposure during the shipping season. This request was reiterated by DFO during the June 22, 2022 meeting of the MEWG, followed by a similar request by Oceans North in the June 29, 2022 meeting of the MEWG.

Prior to DFO and Oceans North recommending the continuation of the summer PAM program, Baffinland intended to reduce the frequency of that portion of the program given that no new activities were anticipated. During this time Baffinland also planned to work with the MHTO to confirm acoustic recorders do not emit noise or have that potential to affect narwhal.

While Baffinland is of the view that it has already collected relevant data and reported on the benefits of convoys as a noise mitigation tool (see Attachment 2), the time period is limited to when ice was present and convoys were implemented as part of the early shipping season transit restrictions. Since Baffinland does not have recordings of convoys specifically in open water conditions and without escort by the MSV Botnica (icebreaker), there is a rationale for implementing a limited open water PAM program in 2022. Baffinland is continuing to engage with the MHTO on the scope of the program, and also understands Oceans North will have one or more recorders installed in 2022 that may provide another source of data to evaluate the efficacy of the program. Section 5.1 of this Plan provides further discussion on this program.

4 NON-PROJECT RELATED FACTORS AFFECTING NARWHAL, 2022

Baffinland has identified several anthropogenic factors (construction noise from the small craft harbour, harvesting) and natural factors (regional sea ice conditions, increased killer whale presence and natural variation) that may have contributed to the reported decline in the Eclipse Sound summer stock abundance observed through 2020 and 2021 aerial surveys, and reported by members of the community of Pond Inlet. This section provides a summary of the potential non-project related factors and how they will be tracked as part of Baffinland’s ongoing investigation. Project related monitoring and mitigations are covered in Sections 5 and 6, respectively.

4.1 ANTHROPOGENIC FACTORS

4.1.1 CONSTRUCTION NOISE FROM SMALL CRAFT HARBOUR OR OTHER PROJECTS

Baffinland is not aware of any further construction planned in relation to the Pond Inlet Small Craft Harbour. Regular reporting by Baffinland’s Shipping Monitors in Pond Inlet will identify if any near shore or in water works occur in Pond Inlet in 2022.

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4.1.2 NON-PROJECT SHIPPING/CRUISE SHIPS

Non-project vessel activity, including research vessels, coast guard, community resupply and cruise ships, will continue to be tracked and reported by Baffinland, with specific attention to vessel speeds and routes. Baffinland understands that cruise ship activities in particular are expected to increase in 2022 compared to 2020 and 2021.

4.1.2.1 NON-PROJECT ICEBREAKING

Non-Project vessels with icebreaking capabilities may be in the Eclipse Sound/Pond Inlet area prior to when Baffinland expects ice conditions to diminish to a point (less than 3/10ths along the entire shipping route) that project shipping may commence. Specifically, Pond Inlet is in need of a fuel resupply that may require an icebreaker escort should ice conditions require it in the second half of July. Several cruise ships are also expected in the Eclipse Sound area in July that are either Polar Class or Ice Class. These cruise ships are not subject to regulations or permits that limit movements in ice. Baffinland will track any non-project vessel activity (not including hunters) in the marine RSA that may require icebreaking in 2022. Baffinland will also report any relevant recordings that may be captured by the two acoustic recorders Baffinland has placed at the floe edge as part of the early season PAM program, which are programmed to record through July to the first week of August 2022.

4.1.3 COMMUNITY HARVESTING

Since 2019 Baffinland has tracked the annual issuance of narwhal tags in Pond Inlet to provide better understanding of the potential effects of a fluctuating narwhal population on Inuit harvesting. Based on 21 years of available harvest and population data for Pond Inlet, an above average number of narwhal have been harvested on a nominal and per capita basis in 6 of the 7 years Project shipping has occurred. Baffinland will continue to track this information in 2022 and seek to augment it with regular reports from local monitors, harvesters and enforcement officers.

Baffinland also understands that the Qikiqtani Inuit Association (QIA) is meant to complete its Pond Inlet Country Food Baseline Study in 2022, which may contribute to better overall understanding of harvester effort and success with respect to narwhal.

4.2 NATURAL FACTORS

4.2.1 REGIONAL SEA ICE CONDITIONS

Baffinland monitors ice conditions in the marine RSA beginning in June each year. Weekly reports produced by Fednav provide insights into current temperatures and ice conditions to forecast the timing of ice break up. At present, the ice conditions necessary to commence Project shipping (less than 3/10ths along the entire shipping route) are not expected until late July or early August.

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The ice conditions reports, in addition to available ice charts and satellite imagery can also provide insight into the areas that become open to narwhal movement first outside of their overwintering habitat. The following information will provide a greater understanding of how narwhal distribution is affected by differences in sea ice conditions in 2022 and can also be compared to previous years:

- total ice cover of ice field (km²) in Eclipse Sound from time landfast ice is gone to <3/10 ice concentration;
- temporal persistence of ice leads; and
- range in size of ice floes (max diameter and area (km²)).

This information will provide a more accurate representation in terms of how long sea ice persists in Eclipse Sound during ice break-up and may be used to refine the proposed mitigation measures related to seasonal ice concentrations. This information and subsequent analysis will be included in Baffinland’s 2022 annual reporting.

4.2.2 INCREASED KILLER WHALE PRESENCE

Baffinland understands that DFO continues to implement a community-based killer whale sightings program in both Arctic Bay and Pond Inlet that may contribute important information in 2022. Killer whale will continue to be recorded through the early season and open water PAM program, shore based surveys (Bruce Head), aerial surveys, and the ship board observer program. This information will help identify the earliest arrival of killer whales in the RSA for comparative purposes to previous years and to inform how killer whales may influence narwhal space use patterns during aerial surveys.

4.2.3 NATURAL MOVEMENTS

There is a substantial body of evidence that suggests the Eclipse Sound and Admiralty Inlet summer narwhal stocks are actually a single stock, and that narwhal can move freely between the two areas. Relevant Inuit Qaujimagatunqangit (IQ) submitted to the NWMB in relation to the management of the Eclipse Sound summer stock in 2016¹ and 2022² both identify that there is a natural variation in the presence of narwhal between Admiralty Inlet and Eclipse Sound, where increases in abundance in one area are matched by decreases in another. During its 2022 engagements, Baffinland will look to discuss this information directly with the groups who have submitted it, specifically the MHTO and QWB. Natural variation in the narwhal population, as described by the MHTO and QWB in their submissions to the NWMB, is consistent with the results of Baffinland’s 2021 aerial survey abundance estimates.

¹ Transcripts Public Hearing To Consider Modifications To Total Allowable Harvests For The Eclipse Sound And Admiralty Inlet Narwhal Management Units (NWMB, 2016).

² Establishment of an Inuit System of Narwhal Management in the Waters of Northern and Eastern Baffin Island, 2022 (QWB, 2022).

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Baffinland will also continue to monitor submissions to the NWMB and other Institutions of Public Government, such as the Nunavut Planning Commission (NPC) in relation to the draft Nunavut Land Use Plan (NLUP), for relevant IQ and other information related to the Eclipse Sound summer narwhal stock.

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5 PROJECT EFFECTS MONITORING

5.1 PROJECT MONITORING PROGRAM OVERVIEW 2022

5.1.1 PROJECT SPECIFIC MONITORING PROGRAMS


Baffinland has several marine mammal monitoring programs designed to assess the effects of Project shipping activities on marine mammals, including narwhal. In 2022, Baffinland will implement the numerous marine mammal monitoring programs that will further our understanding of Project related and cumulative effects to narwhal in the RSA as summarized in Table 5.1 below:

TABLE 5.1: SUMMARY OF 2022 NARWHAL MONITORING PROGRAMS

Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
Bruce Head Shore-Based Monitoring Program (Visual)	<p>Visual Observations:</p> <ul style="list-style-type: none"> • Relative Abundance and Distribution (RAD) • Group Composition and Behaviour • Human Activity <ul style="list-style-type: none"> ○ Vessel Traffic ○ Hunting • Weather and Anecdotal Observations <p>*Project-related vessels tracked via both satellite and shore-based AIS</p> <p>Estimated Start Date: July 28th</p> <p>Estimated Duration: 4 weeks</p>	<ul style="list-style-type: none"> • Monitor for local change in relative abundance and animal distribution including interannual variation • Monitor behavioural responses to shipping and other stressors (hunting, predation) • Monitor Early Warning Indicator (EWI): change in the proportion of immature narwhal between years – was calving or calf survival potentially affected in 2022, noting that exact causal factor remains unknown since narwhal utilize habitats in the RSA temporarily for only ~up to 4 months per year (i.e., 1/3 of the year), and is dependent on ice conditions. Potential for spatial and temporal interaction with Baffinland shipping activities are therefore limited to the RSA and days over which shipping is occurring.
Bruce Head Shore-Based Monitoring Program (UAV)	<p>UAV Observations:</p> <ul style="list-style-type: none"> • Focal Follows – Northern Shipping Route, Koluktoo Bay • Systematic Survey – Stratified Study Area (SSA) • Morphometrics – Body Condition 	<ul style="list-style-type: none"> • Monitor narwhal behaviour in the presence and absence of vessels – do individual narwhal or narwhal pods modify their behaviour in the presence/absence of vessels in the open-water shipping season

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Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
	<p>*Proposed system by InDro Robotics: DJI M300</p> <p>Estimated Start Date: July 28th</p> <p>Estimated Duration: 4 weeks</p>	<p>(multiple response variables examined)?</p> <ul style="list-style-type: none"> Does the distance at which individual narwhal or narwhal groups react to vessels differ from past years, irrespective of the overall abundance of narwhal in the RSA? Do narwhal react to vessels in a similar manner to previous years? Collect second year of morphometric data to contribute towards a narwhal body condition monitoring program (base year is 2021). The photogrammetric data collection of narwhal (morphometric baseline data) using UAV will be used to monitor for potential interannual and seasonal changes in narwhal body condition (variable length/width measurements along body) that would indicate food/foraging success and/or stress response, noting that narwhal spend only spend up to 1/3 of their year in the RSA with overlapping shipping activities.
<p>Marine Mammal Aerial Survey Program (Leg 1)</p>	<ul style="list-style-type: none"> Open-water and floe edge area east of Pond Inlet; Pond Inlet and Baffin Bay strata Line-transect surveys – data recorded by onboard MMOs Transition to photographic surveys when large animal aggregations encountered (same as 2019-2021 survey design) <p>Estimated Start Date: July 19th</p> <p>Estimated Duration: 14 days</p>	<ul style="list-style-type: none"> Monitor narwhal relative abundance and distribution in the RSA prior to and during the early part of the season. Allows comparison to previous year(s) (interannual variation). Collect simultaneous data on sea ice conditions and killer whale data which allows for consideration of these factors in the analysis. The 2022 Leg 1 aerial surveys will last two weeks and end one week prior to Leg 2 aerial surveys (separate 2-week survey). Will allow for abundance estimates in

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Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
		<p>the RSA throughout the season from the start of shipping operations.</p> <ul style="list-style-type: none"> Narwhal sightings data will be used to inform shipping schedule and shipping routing such to avoid concentrations of narwhal in ice leads (if present), though this benefit will be limited in 2022 given that ore carriers will only enter the RSA once specific ice concentration conditions have been met (i.e,3/10ths ice concentrations).
Marine Mammal Aerial Survey Program (Leg 2)	<ul style="list-style-type: none"> Same strata as 2016 DFO photographic aerial survey and 2019-2021 BIM aerial survey Line-transect surveys – data recorded by onboard MMOs Transition to photographic surveys when large animal aggregations encountered (same as 2019-2021 survey design) <p>Estimated Start Date: August 9th Estimated Duration: 14 days</p>	<ul style="list-style-type: none"> Updated abundance estimate for the Eclipse Sound and Admiralty Inlet narwhal summer stocks – compare abundance estimates to previous years. Leg 2 to cover a two-week spatial extent to track potential changes in narwhal distribution and abundance during shipping operations (leaves approximate one week gap with Leg 1 aerial survey). Survey design and data collection methodology previously developed by DFO (Matthews et al. 2017; Marcoux et al. 2016; Doniol-Valcroze et al. 2015; Asselin and Richard 2011; Golder 2020, 2021a; WSP Golder, 2022a) will be used for Leg 2 to allow for a comparison to previously reported abundance estimates.
Passive Acoustic Monitoring Program	<p>Early August</p> <p>Retrieval of 2 recorders deployed at the floe edge in September 2021</p> <ul style="list-style-type: none"> Acoustic monitors recorded for approximately one month from September, 2021 to October, 2021 	<ul style="list-style-type: none"> Measure and characterize ambient noise levels along the Northern Shipping Route – compare the data to previous years. Acoustically monitor for narwhal and killer whale presence along the shipping corridor – document

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Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
	<ul style="list-style-type: none"> Slept overwinter Will start recording in early July 2022: Record narwhal at floe edge and shipping and tourism activities at the beginning of 2022; Acoustic monitors will turn on July 7th, 2022 and record until August 8th or 9th, 2022 <p>Due to concerns raised by MHTO and Pond Inlet community members, Baffinland as planning to scale back the acoustic monitoring program for 2022 by not deploying any recorders in 2022.</p> <p>However, deployment of 1 recorder at Bruce Head to evaluate effectiveness of convoys as a noise mitigation in open water conditions is being proposed, pending engagement with the MHTO.</p> <ul style="list-style-type: none"> Recording convoys to validate mitigation measure as a way of reducing total noise exposure to marine mammals. <p>Estimated Start Date: August 11th, 2022</p> <p>Estimated Duration: 2022 shipping season to October</p>	<p>spatial and temporal variability in the RSA.</p> <ul style="list-style-type: none"> Evaluate underwater noise levels from Project shipping and icebreaking noise levels in relation to established marine mammal underwater acoustic thresholds for injury and onset of disturbance. Estimate the extent of listening range reduction (LRR) associated with vessel transits along the Northern Shipping Route relative to ambient noise conditions. Compare measured sound levels of shipping/icebreaking to estimated (modelled) sound levels. Evaluate vessel noise signatures and potential changes in narwhal vocal behaviour in relation to shipping.
Ship-Board Observer (SBO) Program	<ul style="list-style-type: none"> Marine wildlife observers (MWOs) will record systematic marine mammal and seabird observations from the enclosed bridge of the MSV Botnica. Surveys will be conducted throughout Milne Inlet and Eclipse Sound along the Northern Shipping Route. In addition to MWO watch periods, the WSP Golder biologists will perform dedicated seabird surveys throughout the daily watch schedule, which will be conducted in accordance with the Canadian Wildlife Service (CWS) 	<ul style="list-style-type: none"> Estimate relative representation of species Assess presence, relative abundance, distribution, and behavioural response of narwhal (<i>Monodon monoceros</i>) and other marine mammals to vessel traffic and associated activity during the 2022 shipping fall shoulder season. Compare abundance estimates to previous years (last SBO program completed in 2019)

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Program	Basic Description	2022 Follow-up Monitoring Priorities/ Considerations
	Eastern Canadian Seabirds at Sea (ECSAS). Estimated Start Date: October 19 th , 2022 <ul style="list-style-type: none"> Estimated Duration: 14 days 	
2022 Narwhal Tagging Program (program rejected by MHTO, ultimately not feasible without icebreaking in July 2022) PROGRAM CANCELLED	<ul style="list-style-type: none"> Deployment of high-resolution location (satellite) tags and dive loggers on narwhal in ice leads in Eclipse Sound during early July 2022. No tagging of narwhal will occur near floe edge (no interference with Inuit hunting activities) No live capture involved. Remote deployment of tags. Tags will fall off animal after several weeks. Estimated Start Date: July 05 2022 Estimated Duration: 14 days	<ul style="list-style-type: none"> Will provide detailed 3-dimensional movements of narwhal in relation to ice conditions and vessel movements in RSA. Studying narwhal behavioural responses to shipping/icebreaking – includes 12 response variables (e.g. surface time, bottom time, dive velocity, travel speed, travel orientation, etc). Program was rejected by MHTO (See Attachment 1), Baffinland then determined it would not break ice to begin the shipping season in 2022 as a precautionary measure, negating the possibility and need to run this program.

Each monitoring program has its own objectives and scope, which includes:

- studying potential effects of shipping on marine mammal density;
- abundance and distribution in the RSA;
- fine-scale behavioural responses of marine mammals to vessel presence; and
- duration and scale of noise generated by Project vessels relative to marine mammal thresholds for injury and noise disturbance.

These programs provide relevant information independently as well as complementary information to support a holistic approach to studying the RSA. All programs can benefit from additional information, including community knowledge and other initiatives led by government or other parties if and when shared with Baffinland.

5.1.2 CUMULATIVE EFFECTS MONITORING

Baffinland’s responsibility with respect to cumulative effects monitoring for the Project is prescribed in Project Certificate conditions 110, 111 and 112. These terms and conditions require Baffinland to study the cumulative effects of vessel noise. Under Section 7.8 of the EIS Guidelines, a cumulative impact (or

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effect) is defined as the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. The scope of Baffinland’s cumulative effects monitoring is therefore focused on studying the adverse effects of anthropogenic activities on marine mammal populations, which is adequately addressed by Baffinland’s ongoing monitoring programs.

5.1.3 ECLIPSE SOUND NARWHAL STOCK ASSESSMENT

The Government of Canada, through the *Oceans Act (1997)* is committed to the integrated management of human activities in or affecting Canada’s marine ecosystems. Eclipse Sound narwhal are specifically subject to the Integrated Fisheries Management Plan for narwhal in the NSA. This integrated plan identifies that DFO maintains an active scientific research program, aimed at an increased understanding of narwhal population processes (e.g. seasonal distribution, movements and diving behaviour, habitat use, diet analysis), environmental factors that influence narwhal distribution and numbers, and the role of narwhal in marine ecosystems. Specific research and information needs have been identified to improve narwhal stock assessments, including:

- Conduct aerial surveys to estimate abundance for the Northern Hudson Bay and Baffin Bay management units to develop the time series necessary for risk analysis of various harvest scenarios.
- Assess other methods of estimating narwhal stock abundance (e.g mark/recapture).
- Gather traditional ecological knowledge (TEK) regarding Parry Channel/Jones Sound/Smith Sound narwhal.
- Use telemetry data to develop robust methods required to adjust counts for animals under water.
- Gather biological samples from harvests in as many communities as possible to assess stock status.
- Conduct fishery independent monitoring to determine loss rates.

Baffinland will continue to engage with DFO and Parks Canada directly and through the MEWG to determine what federal led or supported monitoring programs are planned to improve the collective understanding of the Eclipse Sound summer narwhal stock, consistent with the Integrated Fisheries Management Plan for narwhal in the NSA. Likewise, Baffinland remains open to exploring projects of mutual interest to advance the collective understanding of narwhal that interact with the Mary River Project and to continue to provide data that may be used by other parties for the same purpose.

5.1.4 COMMUNITY BASED MONITORING PROGRAMS

Baffinland has established the Wildlife Monitoring Program through the Mary River Inuit Impact Benefit Agreement. This Program is specific to the research interests of the community of Pond Inlet and makes up to \$200,000 available on an annual basis to support eligible proposals. Results and data summaries

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generated through the Program may be used by Baffinland and/or QIA to support other Mary River project monitoring and mitigation plans.

Prior to implementing any programs in a given year, the community of Pond Inlet is responsible for developing an annual work plan, which is then presented to the Joint Executive Committee (Baffinland and QIA) (JEC) for review and approval. To date the JEC has not received any project plans for 2022, however, should a proposal be received Baffinland would expedite its review and approval.

5.2 PROJECT MITIGATION AND ADDITIONAL ADAPTIVE MANAGEMENT MEASURES FOR 2022

5.2.1 APPROACH TO ADAPTIVE MANAGEMENT

As part of the Phase 2 Proposal Review, Baffinland developed a draft Adaptive Management Plan that sets out a tiered approach to adaptive management. This approach has been integrated into a draft Marine Monitoring Plan (MMP), in the form of a Trigger, Action and Response Plan (TARP) table that outlines the objectives, performance indicators, thresholds (low, moderate and high) and associated pre-defined responses to manage the potential effects of shipping on narwhal. This approach to adaptive management integrates and builds on the previous concept of early warning indicators, where a series of thresholds are set based on risk levels for the purpose of identifying early trends towards more serious effects, and preventing them with the implementation of proactive and pre-defined mitigation responses. Baffinland proposes to formally apply the current draft MMP TARP to the 2022 marine monitoring programs on an interim basis while it works with the MEWG to develop a final updated MMP to apply to 2023 onwards.

5.2.2 PERFORMANCE INDICATORS AND THRESHOLDS (PREVIOUSLY EARLY WARNING INDICATORS)

The 2022 monitoring programs will report on the following performance indicators, as feasible based on the final scope of the monitoring program (i.e. changes in vocal behaviour are contingent on the deployment of an acoustic recorder for the open water season). Monitoring results will be evaluated against to determine if any thresholds (low, moderate, high) have been exceeded (refer to Table 5.2 for further information).

TABLE 5.2: INTERIM MMP PERFORMANCE INDICATORS AND THRESHOLDS

Performance Indicators	Threshold		
	Low Risk	Moderate Risk	High Risk
Stock abundance Calving rate	Moderate severity behavioural responses	Confirmed ⁶ Moderate severity behavioural responses (Severity Score 5 and 6) that persist for a set time beyond	Confirmed ⁴ Moderate severity behavioural responses (Severity Score 5 and 6) ¹ that persists for a set time beyond the acoustic

⁶ Confirmed indicates that the Risk Status/ Threshold trigger has been observed in at least two consecutive monitoring programs, whether during the regular monitoring schedule or confirmed through a special study.

Performance Indicators	Threshold		
	Low Risk	Moderate Risk	High Risk
Change in surface behaviour ¹ Change in dive behaviour ³ Change in vocal behaviour ⁴	(Severity Score 5 and 6 ⁵) that do not persist beyond the acoustic detection period. This may include: <ul style="list-style-type: none"> Change in dive behaviour (e.g. surface time, bottom dive, dive duration) Change in surface behaviour Modification or cessation of vocal behaviour <p><u>Note:</u> For the threshold to be met, responses in movement behaviour would need to be observed as a trend in the movement data across individuals</p>	the acoustic detection period ⁷ . This may include: <ul style="list-style-type: none"> Prolonged change in dive behaviour (surface time, bottom dive, dive duration) Prolonged change in surface behaviour Prolonged modification or cessation of vocal behaviour <p>AND</p> <p>(ii) >10.0% decrease in calving rate (proportion of immatures) relative to pre-Phase 2 shipping dataset</p> <p><u>Note:</u> For the threshold to be met, responses in movement behaviour would need to be observed as a trend in the</p>	detection period) as described in the moderate risk column <p>AND/OR</p> Confirmed ⁴ High severity responses (Severity Score 7 to 10) ⁸ . This would include: <ul style="list-style-type: none"> Severe and or sustained (long-term) avoidance of disturbance zone area Outright panic, obvious flight or freeze response, stampede, or stranding events that can be directly linked to shipping <p>AND</p> <p>(iii) >25.0% decrease in calving rate (proportion of immatures) relative to pre-Phase 2 shipping dataset</p> <p>AND/OR</p>

³ Thresholds to be refined as narwhal behavioural data analysis proceeds. Application of behavioural response indicators are contingent on securing necessary permits and MHTO support for running a tagging/telemetry program with concurrent AIS data.

⁴ Thresholds to be refined as narwhal behavioural data and underwater acoustic analyses proceed. This indicator would be contingent on running an acoustic monitoring program with concurrent AIS data.

⁵ Moderate severity behavioural responses are consistent with Level 5 and 6 severity response scores from Southall et al. (2007) and Finneran et al. (2017). These consist of responses that could become significant (defined for this purpose as responses with potential to impact critical life functions and/or responses consistent with the level of ‘harassment’ as defined under the U.S. *Marine Mammal Protection Act*) if sustained over a longer duration (lasting over a period of several hours, or enough time to significantly disrupt a narwhal’s daily routine). These would be responses that fall within (if not sustained) or above (if prolonged) predicted behavioural responses in the FEIS Addendum for the Phase 2 Proposal.

⁷ To be determined based on behavioural analysis data.

⁸ High severity behavioural responses are consistent with Level 7-10 severity responses from Southall et al. (2007) and Finneran et al. (2017). These consist of responses with immediate consequences (e.g. stranding) and those affecting animals in vulnerable life stages (i.e., calving, pupping) and are therefore always considered to be a significant behavioural reaction. Thresholds to be refined as narwhal behavioural data and underwater acoustic analyses proceed. These would be responses that are above predicted behavioural responses in the FEIS Addendum for the Phase 2 Proposal.

Performance Indicators	Threshold		
	Low Risk	Moderate Risk	High Risk
		movement data across individuals.	(iv) >25.0% decrease in stock ⁹ size (abundance) relative to 2019 aerial survey abundance

5.2.3 PRE-DEFINED RESPONSES AND MODERATE AND HIGH ACTION TOOLKIT

Should there be an exceedance of an established threshold, the corresponding pre-defined response(s) will be implemented from Table 5.3. In the event an exceedance of a moderate or high risk level threshold, Baffinland will work with the MEWG and other interested parties, as necessary, to identify an appropriate mitigation to implement from the Moderate and High Action Pre-Defined Response Toolkit (Table 5.4). Parties may also identify other mitigations not within the Toolkit for consideration. Understanding moderate and high risk responses may challenge the overall scope, scale and viability of the Project, a higher degree of certainty that the Project is reasonably associated with the effect and that the responses have a reasonable likelihood of reversing the effect is required.

TABLE 5.3: INTERIM MMP PRE-DEFINED RESPONSES

Low Risk	Moderate Risk	High Risk
<u>Env't Dept:</u> Continue scheduled monitoring <u>Env't Dept:</u> If Low Action Threshold is triggered again in the next scheduled program (but Moderate is not), investigate trends over time and consider any uncertainties (e.g., differences in program timing, effort, methods, environmental variables) as a desktop study. <u>Env't Dept:</u> Consider refinement of the Moderate Risk Threshold if appropriate based on results of the desktop study.	<u>Env't Dept and Relevant Operations:</u> Investigate trends over time and consider any uncertainties (e.g., changes in operational processes, potential sources, confounding influences) in a formal Response Plan; Initiate component specific targeted studies as part of response planning. <u>Env't Dept and Relevant Operations:</u> Continue monitoring to confirm effects are linked to the project, to assess effectiveness of mitigations, and evaluate need for additional monitoring and/or mitigation. <u>Env't Dept:</u> Based on the results of continued monitoring and additional studies, consider refinement of the High Risk Threshold if appropriate.	Will be developed concomitant with the High Action Level Development response plan. <u>Responsible Dept(s):</u> Implement high-action level response in Mitigation Toolkit if causal effect or likely relationship is determined.

⁹ Eclipse Sound Summering Stock.

Low Risk	Moderate Risk	High Risk
	<u>Responsible Dept(s):</u> Implement moderate-action response from Mitigation Toolkit (or new mitigation identified through investigation) based on the outcome of targeted studies.	

It should be noted that the Moderate and High Action Pre-Defined Responses from Table 6 are preliminary and subject to further review and assignment into specific Moderate and High Risk categories before finalization of the adaptive management components of the MMP. Even when finalized these responses should not be considered exhaustive and may be supplemented pending the results of adaptive management investigations and MEWG consideration.

TABLE 5.4: INTERIM MMP MODERATE AND HIGH RISK RESPONSE ACTION TOOLKIT

Area	Potential Response
Shipping Activities	<ul style="list-style-type: none"> • Implement vessel convoy requirements – either southbound, northbound, in certain areas along shipping corridor, certain times of shipping season etc. • Limit the number of vessels allowed to call on Milne Port over the entire shipping season, or during specific periods within the shipping season (i.e. shoulder seasons) • Modify or expand existing transit restrictions • Modify vessel mix (e.g. vessel sizes) according to market availability • Permanent shift in the established shipping route through Eclipse Sound and Milne Inlet to avoid sensitive areas • Temporary deviations from established shipping route through Eclipse Sound and Milne Inlet to avoid heavy ice concentrations during the shoulder seasons • Cease or suspend shipping activities for a season or a component of a season (i.e. shoulder seasons)
Monitoring	<ul style="list-style-type: none"> • Install alternate technology for ship-based monitoring (i.e. cameras) as supplement for MWOs • Increase monitoring programs outside of the RSA
Negotiation of compensation for lost harvesting	

5.2.4 ADAPTIVE MANAGEMENT RESPONSE, 2022

Since the results of the 2020 aerial surveys were received in 2021, Baffinland has used the draft MMP TARP to guide its subsequent investigation. To be clear, however, **low narwhal abundance alone is not a moderate or high risk threshold**, and Baffinland’s implementation of moderate and high risk responses (suspending icebreaking, convoying) has been driven by an abundance of precaution rather than the establishment of a direct link between the observed effects and project shipping. Baffinland’s actions also recognize the value of the Eclipse Sound summer narwhal stock to the residents of Pond Inlet, and that

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there are a number of anthropogenic and natural factors outside of Baffinland’s control that may continue to affect narwhal abundance in Eclipse Sound in 2022.

As previously stated in Section 3.1, Baffinland has elected to maintain and implement three mitigation measures during the 2022 shipping season commensurate with a moderate or high risk response as a precaution. These include:

- **No icebreaking to commence the 2022 shipping season.** Vessels will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the NSA.
- **Use of convoys throughout the 2022 season to further reduce total sound exposure.** Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the RSA compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure. The use of convoys will be similar in effect to reducing the overall number of ships. A technical memo describing the benefits of convoys as a noise mitigation tool are included as Attachment 2. For a greater understanding of how convoys will be implemented in 2022, see Attachment 3 for the draft Operational Guide for Ore Carrier Convoys.
- **No more than 80 ore carriers will be chartered during the 2022 season to transport 6 Mtpa, if approved.** This is 4 ore carriers less than the maximum anticipated in the previous Production Increase Proposal and Extension Request.

Baffinland will continue to implement all other existing mitigation measures as described in Section 6 of the Shipping and Marine Wildlife Management Plan (2022).

5.3 ROLES AND RESPONSIBILITIES

The roles and responsibilities of Baffinland Shipping Team and Contractors will be consistent with those outlined in Section 2 ‘Roles and Responsibilities’ of the Shipping and Marine Wildlife Management Plan (2022) and the draft Operational Guide for Ore Carrier Convoys (2022; Attachment 3).

5.4 REPORTING

All marine and Project operations monitoring activities and reports will be issued in accordance with Section 7 of the Shipping and Marine Wildlife Management Plan (2022).

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Attachment 1

MHTO Correspondence

Now is not the time to advance with icebreaking, especially given the decline in narwhal abundance we have outlined above and as indicated by Baffinland's own monitoring. Now is the time to slow down and pause, to assess what is happening and make necessary adjustments to the course. The risks to Inuit harvesting rights are too great, and demand the exercise of extreme caution.

In the Ministers' approval letter for the Production Increase Proposal from September 2018, "The responsible Ministers acknowledge and share many of the Board's concerns about information deficiencies on the potential long term impacts of increased shipping, primarily to marine mammals, and how these impacts could be effectively monitored for, avoided, mitigated and managed." The Ministers also required that "The proponent shall collaborate with the Marine Environment Working Group to develop impact avoidance or mitigation strategies for the protection of the marine environment. The proponent shall implement any direction from the Department of Fisheries and Oceans for any avoidance or mitigation measures, including cessation of any activity, for the protection of the marine environment."

The MHTO suggests that Baffinland immediately be required to implement adaptive management measures. As a start, we suggest a **reduction in shipping, further reduction in ship speed** (beyond the 9 nm/h current commitment), **abandoning this season's planned ice breaking**, and making **any adjustment to mining and trucking operations** which may be required to support precautionary changes to shipping plans (i.e. fewer ships may mean less throughput).

The NIRB's Final Hearing Report for Mary River (2012) also noted that:

"Adaptive management provides the basis for sound environmental decision-making even in the face of uncertainty surrounding the nature and extent of effects that is often inherent at the environmental assessment stage. **Adaptive management enables such projects to proceed, but in a manner that ensures the mechanisms chosen to manage the predicted effects are adjusted, when necessary, to reflect subsequent information that provides a more complete understanding of the nature, extent and appropriate management of such effects.**" *(emphasis added)*

In keeping with the Production Increase Proposal approval and NIRB's acknowledgement of the important role adaptive management must play in the Mary River project, the MHTO requests that the NIRB call an immediate meeting of the MEWG members to discuss the declining trend in narwhal abundance as documented by Baffinland's recent aerial surveying results, and that the Board consider requiring Baffinland to implement adaptive management measures in order to protect the marine environment and to limit impacts to narwhal and Inuit harvesting rights. A meeting of MEWG membership would provide an ideal forum for this discussion.

The MHTO appreciates your timely consideration of this request, and awaits the NIRB's re-sponse.

Sincerely,



David Qajaaq Qamaniq
Chairperson
Mittimatalik Hunters and Trappers Organization

cc: Olayuk Akesuk, QIA
Aluki Kotierk, NTI
Lori Idlout, MP, Nunavut
Hon. Dan Vandal, Minister of Northern Affairs
Hon. Steven Guibeault, Minister of Environment and Climate Change
Hon. Joyce Murray, Minister of Fisheries and Oceans
Hon. Johnathan Wilkinson, Minister of Natural Resources
Hon. Omar Alhabra, Minister of Transport
Members of Marine Environmental Working Group

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May 6, 2022

RE: Eclipse Sound narwhal abundance decline

Dear David Qamaniq,

Further to our last letter, dated April 29th, and the Baffinland Marine Environment Working Group conference call this week, Oceans North recommends significant mitigation measures be taken by Baffinland to reduce shipping intensity in an effort to protect summering narwhal populations and in the context of steep population decline in this region.

A growing body of evidence, from harvesters and biologists, suggests that the narwhal population in Eclipse Sound is less than a quarter of what it was before active Baffinland shipping began and further decline could lead to the abandonment of animals from your area. Underwater noise monitoring and numerous narwhal studies in the region suggests that there may be a correlation between narwhal decline and increased shipping. Therefore the precautionary principle should be applied. The principle stipulates that governments shall be obligated to restrict or ban activities that *may* cause serious and/or irreversible harm to human health and the environment, even without fully established scientific evidence of a causal relationship. NIRB has also required that adaptive management of this project be guided by the precautionary principle. Consequently, the most precautionary mitigation measures with biological relevance should be applied to shipping operations.

We suggest an urgent meeting be called to discuss adaptive management options for the upcoming shipping season. It is our opinion that ice breaking should not occur this year and further that a limit be placed on the number of vessels in Eclipse Sound and Milne Inlet. Term and Condition 110 and 111 for the existing project are clearly deficient and there is no indication in the 2022 monitoring plans that Baffinland is further developing Early Warning Indicators or shifting their monitoring programs to understand the significant reductions of narwhal in Milne Inlet and Eclipse Sound. Finally, any ultimate decision regarding Phase 2 must take into consideration the best and most recent evidence regarding narwhal health and numbers in this region.

Please note that despite our serious reservations regarding the management of this project, Oceans North remains hopeful that this project will result in significant development benefits for the people of this region and that the proponent will succeed in operating an environmentally responsible mine on Baffin Island. We believe that responsible shipping, the protection of marine life and Inuit harvesting can be achieved.

Please see the attached memo on our assessment of the decline in narwhal numbers.

Sincerely,

A handwritten signature in black ink, appearing to read "K. Westdal", is centered on a light yellow rectangular background.

Dr. Kristin Westdal
Arctic Field Science Director
Oceans North
E-mail: kwestdal@oceansnorth.ca
Tel: 604-404-7375

cc: Members of the Marine Environment Working Group

Assessment of Eclipse Sound narwhal population decline

The narwhal population in Eclipse Sound continues to show a significant decline. The 2020 aerial survey (Golder for Baffinland, April 7 2021) suggested a 50% reduction compared to historical estimates. 2021 numbers show an additional decline in this population which is significant compared to the years prior, and is near 20% of its original size (Table 1).

Table 1. Stock Assessment Estimates for Eclipse Sound Narwhal (from Golder, 2021)

Year	Abundance	Data Source
2013	10,489	Doniol-Valcroze et al. 2015
2016	12,039	Marcoux et al. 2019
2019	9,931	Golder 2020
2020	5,018	Golder 2021
2021	2, 595	Golder 2022

Suggestions have been made that the decline could be due to a number of factors including killer whales, small craft harbour development, and natural phenomena. Evidence to support these hypotheses are not available. Killer whales have been in this region for a long time, with records reaching back to mid 1800's in the Pond Inlet area (Higdon et al., 2012; Reeves and Mitchell, 1988) and small craft harbour construction (impact pile driving specifically) occurred for a short period of time – 7 days total between June 24 and July 1 2020. Additionally Inuit have reported changes in narwhal abundance, distribution, and behavior in response to the increased presence of project-related ships (QIA Tusaqtavut Study; June 14, 2019) and discussion with local hunters suggest that narwhal numbers have never been this low and a natural shift to another location is unlikely.

Shipping is the single largest environmental change in the Eclipse Sound region and has steadily increased in the last six years (Figure 1). Although no single source can be proven without a doubt to affect narwhal numbers, Oceans North, DFO, the MHTO, and Baffinland have all provided data (changes in distribution, changes in abundance, changes in distribution, changes in proportions of calves, higher cortisol levels, and changes to the underwater habitat due to noise from ships) that indicates disturbance and suggests that there may be a correlation between increased shipping and the declining numbers of narwhals.

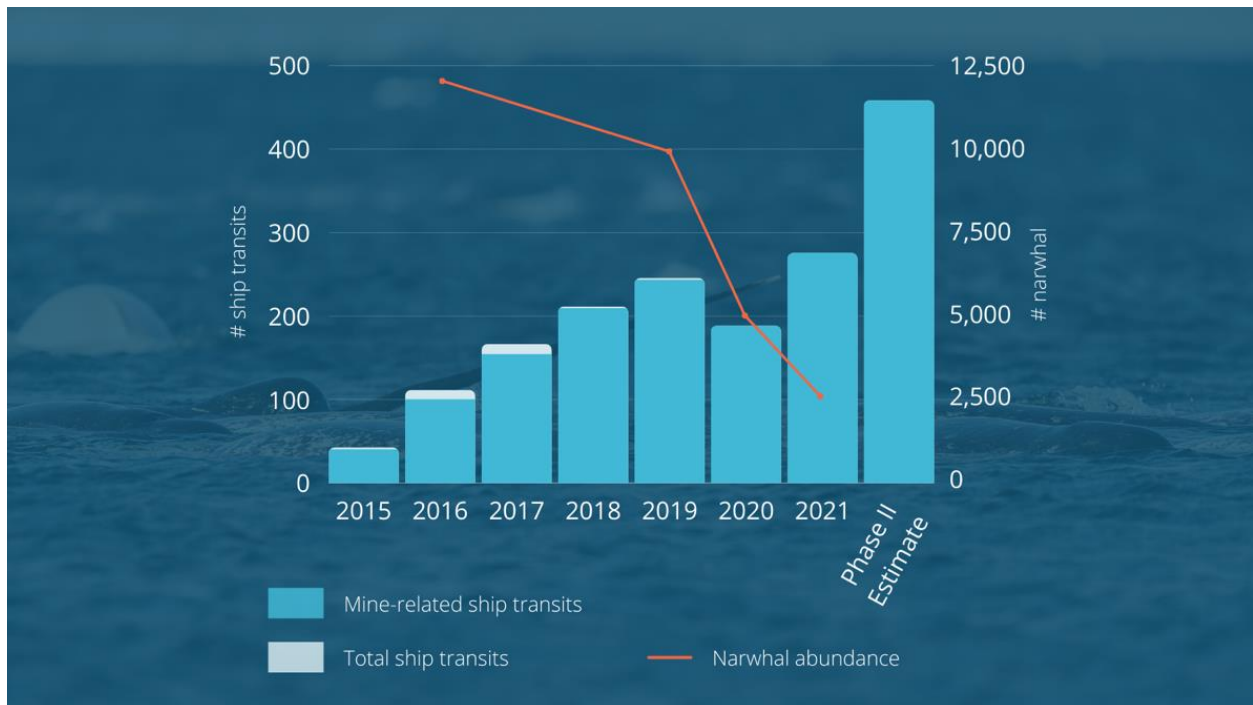


Figure 1. Narwhal population estimates (2016-2021) and ship transits in Milne Inlet, Nunavut

Through our long-term acoustic monitoring program in the region, carried out in collaboration with the Scripps Institution of Oceanography (SIO), we know that ships are much noisier than almost any other natural sounds underwater and that underwater noise from large ore carrier ships can be easily detected from more than 10 km away (Jones et al., 2021). Noise from some ships can be detected underwater by our hydrophones from more than 30 km away.

The information provided by Baffinland, Oceans North and others suggests that a precautionary approach to Baffinland shipping is required at this time until further information becomes available to disprove the role of shipping in disturbing narwhals. Options to reduce the current impact on narwhals, based on information currently available including Baffinland aerial survey and behavioral response data and independent acoustic research in partnership with Oceans North, include:

- Further reduction in speed, where this may reduce noise exposure
 - Reduced vessel speed is known to lower the levels of underwater noise from ships. While a general rule has been applied to reduce Baffinland ship speed to 9 knots, some vessels or vessel types may require further reductions in speed to achieve lower underwater noise levels.
- Reduction in the number of vessels in transit in Eclipse Sound and Milne Inlet at any one time
 - Analysis from Baffinland’s 2015 aerial survey suggested that a decline in narwhal densities was related to the presence of three or more vessels in a given area.
- Reduction in the number of vessels at anchor in Eclipse Sound at any one time.
 - Vessels at anchor emit underwater noise continuously due to operation of onboard machinery. Each additional ship at anchor adds to the total underwater noise levels and may increase the footprint of animal disturbance surrounding the anchorage area.

- No ice breaking in the region at any time
 - The first large jump in narwhal decline was seen in 2020. That year narwhal were concentrated in a small number of leads prior to the first ice breaking transit (July 21, 2020). The first transit (one ice breaker, two ore carriers and two tugs) passed in close proximity to these leads, that was noted to contain mothers with calves (Golder for Baffinland, September 7 2021)

Suggestions for these mitigation options are based upon Baffinland aerial survey data and on the results of independent acoustic studies carried out in partnership with Oceans North. Scripps Institution of Oceanography analyses of acoustic data (Jones, 2021) combined with Baffinland studies of narwhal behavioral responses to ships indicate that narwhal are likely more sensitive to man-made underwater noise than other species of marine mammals and may require special considerations to prevent long-term negative effects of increased shipping.

References:

Golder (for Baffinland). April 7 2021. Technical Memorandum: Preliminary Summary of 2020 Narwhal Monitoring Programs. Mary River Project Report.

Golder (for Baffinland). September 7 2021. 2020 Marine Mammal Aerial Survey. Mary River Project Report.

Higdon, J.W., Hauser, D.D.W., and Ferguson, S.H. 2012. Killer whales (*Orcinus orca*) in the Canadian Arctic: Distribution, prey items, group sizes, and seasonality. *Marine Mammal Science*. 28(2): E93–E109

Jones, J. M. 2021. Underwater soundscape and radiated noise from ships in Eclipse Sound, NE Canadian Arctic. Marine Physical Laboratory Technical Memorandum Number MPLTM651. Submitted to Nunavut Impact Review Board, 18 January, 2021.

Reeves, R. R., and Mitchell, E. 1988. Distribution and seasonality of killer whales in the eastern Canadian Arctic. *Rit Fiskedeildar* 11:136–160.

Thomas, T.A., S. Raborn, R.E. Elliott and Moulton, V.D. 2016. Marine mammal aerial surveys in Eclipse Sound, Milne Inlet and Pond Inlet, 1 August – 17 September 2015. LGL Draft Report No. FA0059-2. Prepared by LGL Limited, King City, ON for Baffinland Iron Mines Corporation, Oakville, ON. 85 p. + appendices.

Qikiqtani Inuit Association. June 14 2019. Tusaqtavut for Phase 2 Application of the Mary River Project. FINAL REPORT.

May 10, 2022

Kaviq Kaluraq
Chairperson
Nunavut Impact Review Board
Sent via Email: info@nirb.ca

Dear Madame Chair;

Further to the letters sent to the Nunavut Impact Review Board (**NIRB**) on May 6, 2022 by the Mittimatalik Hunters and Trappers Organization (**MHTO**) and Oceans North (**ON**), Baffinland Iron Mines Corporation is writing to provide additional context and correct several misrepresentations included in those correspondences.

Contrary to the claims in the MHTO letter, Baffinland publicly disclosed the 2021 aerial survey results in the 2021 Annual Report, and the full draft 2021 aerial survey results were provided to members of the Marine Environment Working Group (**MEWG**), including the MHTO, ON and NIRB on April 3, 2022.

At this time Baffinland has not made any final decisions with respect to the start of shipping in 2022, and does not plan to do so until after the upcoming June 2022 MEWG meeting is complete and Baffinland has carried out related consultations to finalize the 2022 Narwhal Adaptive Management Response Plan (**2022 NAMRP**). This follows a similar process and timing undertaken last year prior to the 2021 shipping season.

1. A summary of the results of the draft 2021 aerial narwhal survey is part of the 2021 Annual NIRB Report, and this information has been publicly available since March 31, 2022.

Baffinland included a summary of the results of the draft 2021 aerial narwhal survey in the 2021 Annual NIRB Report, which is publicly available on the NIRB registry (see NIRB Registry No. 338435 - 338468 at NIRB File No. 08MN053 under the heading “Annual Report” and subheading “Annual Report”) as well as Baffinland’s document portal (see <https://www.baffinland.com/media-centre/document-portal/>).

Numerous references, both generally and specifically, to the draft 2021 narwhal aerial survey results are found throughout the 2021 Annual Report. Specifically, the numbers related to the aerial survey results are found in the section of the 2021 Annual Report which reports on Baffinland’s compliance performance on Project Certificate Condition No. 101 (see excerpt from page 316 below):

For the Leg 2 surveys, narwhal summer stock abundance was calculated for the Eclipse Sound stock, Admiralty Inlet stock, and the combined Eclipse Sound and Admiralty Inlet stock. The narwhal abundance estimate for the combined Eclipse Sound and Admiralty Inlet stock during the 2021 open-water season (Leg 2) was 75,177 individuals based on aerial surveys completed on 19 to 21 August 2021. This estimate is statistically higher than the abundance calculated during the

previous DFO survey conducted in 2013 (45,532 narwhal), 2019 (38,677), and 2020 (36,044). **For the Eclipse Sound stock alone, the narwhal abundance estimate during the 2021 open-water season was 2,595 individuals based on aerial surveys conducted on 20 to 21 August 2021.** The 2021 estimate for the Eclipse Sound stock alone is statistically lower than the 2016 DFO estimate of 12,039, the 2013 abundance estimate of 10,489, the 2019 abundance estimate of 9,931, and the 2020 abundance estimate of 5,018.

For additional quotes directly from the report, please see Appendix A to this letter.

- 2. Baffinland provided a copy of the 2021 draft Marine Mammal Aerial Survey Report on April 3, 2022 to all members of the MEWG, which includes the MHTO, ON and NIRB staff. A MEWG meeting was held to discuss any preliminary comments on May 3, 2022, and a further MEWG meeting is already scheduled for June 2022. This follows established MEWG practice.**

Baffinland released its draft 2021 Marine Mammal Aerial Survey Report to the MEWG on April 3, 2022 and requested comments back by May 15, 2022 in order for final reports to consider member's feedback. This is the same collaborative and transparent practice Baffinland has implemented in response to Working Group members feedback and that was followed prior to the 2021 shipping season.

Baffinland has already held a meeting with the MEWG (May 3, 2022) to discuss their initial reviews of the 2021 Annual Report to the NIRB, as well as the draft 2021 Marine Mammal Aerial Survey Report. No substantive comments on the draft 2021 Marine Mammal Aerial Survey Report were shared by MEWG members, which includes the MHTO and ON.

Baffinland acknowledges feedback received during last week's MEWG meeting from the MHTO and QIA consultants, as well as Parks Canada with respect to the timing of the release of final reports. Baffinland recognizes that other project proponents in Nunavut file final technical reports together with their Annual NIRB Reports and Baffinland also follows this practice with respect to many of its technical monitoring reports (freshwater, atmospheric, geotechnical etc.). However, participants in the Mary River Terrestrial Environment Working Group (**TEWG**) and MEWG have previously expressed concerns with this practice and that they wished to have an opportunity to comment and collaborate prior to the final filing of our marine and terrestrial reports with NIRB. Given the enormous volume of data that is collected through our summer monitoring programs, it is not possible to generate any drafts on these topics earlier than April each year. As a result, Baffinland routinely releases marine and terrestrial technical reports in draft for comment to the TEWG and MEWG members (which, again for emphasis includes NIRB and the MHTO), considers comments on the drafts, and finalizes the reports by taking into account the comments received in the final technical reports filed on the NIRB public registry and posted to Baffinland's own public document portal. In order to ensure the public is made aware of key conclusions while the working group collaboration is ongoing, Baffinland also includes reference to key findings in its annual reports (as it has done in this case).

The practice of releasing draft technical reports to the TEWG and MEWG is designed to directly respond to working group member feedback, enhance collaboration and transparency, and increase the overall quality of the reports. Given the directly conflicting comments and preferences among TEWG and MEWG

members that are now being expressed on this topic, there may be a need to seek final direction from NIRB on how best to proceed.

3. A holistic review of the data from the 2021 shipping season does not conclude that the relatively lower numbers of narwhal observed in Eclipse Sound in 2021 is Project-related.

Baffinland recognizes the concerns with respect to the 2021 narwhal observations in Eclipse Sound. However, a holistic review of the data from the 2021 shipping season does not conclude that the relatively lower numbers of narwhal observed in Eclipse Sound in 2021 is Project-related. Elimination of early season ice-breaking in 2021 further reduced residual uncertainty that Project shipping is the primary driver of the observed change in narwhal abundance in Eclipse Sound.

A review of available Inuit knowledge and scientific monitoring data supports the conclusion that Admiralty Inlet and Eclipse Sound narwhal stocks may actually represent a single stock with the natural exchange of animals between the two putative summering areas. Another factor could be that narwhal migratory routes and summering areas have been influenced by environmental factors, such as changing ice conditions and/or prey/predator dynamics. This is further supported by recorded harvest levels in the spring at the Pond Inlet floe edge, which suggest that few narwhal were present at the floe edge waiting to migrate into Eclipse Sound in the months before Project shipping began. However, it is noted that Pond Inlet harvesters were able to fulfill their entire summer quota by the fall while shipping was ongoing.

4. Baffinland is currently undertaking the advance planning that would be necessary to ship through ice during the 2022 shipping season, and following consultation Baffinland will issue an updated Narwhal Adaptive Management Response Plan, which will include a final determination on the scope of 2022 shipping season activities and applicable mitigations.

As stated in the 2021 Annual Report Main Body at page 10:

Based on 2021 monitoring and the need to initiate planning for the 2022 shipping season, it is Baffinland's intention to resume icebreaking in 2022 concurrent with additional monitoring in the form of a spring narwhal tagging program, which will fill gaps on narwhal behavioural responses to icebreaking. Baffinland will carry out focused consultations with key parties on 2022 shipping activities and monitoring plans, all of which will be summarized to the NIRB in the 2022 Marine Shipping and Vessel Management Report. Baffinland will also engage DFO to understand what, if any, regional studies that could be planned in the near future that may provide greater insights into narwhal migratory behaviour, environmental conditions affecting regional narwhal abundance distribution, and/or to re-examine the classification of Eclipse Sound and Admiralty Inlet narwhal as distinct stocks. To be clear, such regional studies would be complemented by Baffinland's Project effects monitoring.

Baffinland is currently undertaking the advance planning necessary to be in a position to carry out icebreaking/ice management in July 2022 (should it be required after July 15 based on ice conditions).

However, it is important for all parties to understand that no final decision has been made by Baffinland at this time to proceed with icebreaking in the 2022 shipping season.

Baffinland worked with interested parties, including the MHTO, the Hamlet of Pond Inlet, DFO and other members of the MEWG to develop a Narwhal Adaptive Management Response Plan prior to the 2021 shipping season and we have committed to update that plan prior to the 2022 shipping season. For reference, a summary of key activities and dates that contributed to the development of the 2021 Narwhal Adaptive Management Response Plan are provided here:

Milestone	2021 Date	Anticipated 2022 Dates
Aerial Survey Program Results Released [Note a preliminary summary was released in advance of the Annual Report in 2021 because the Annual Report was not available until April 30]	April 8, 2021	March 31 to April 3, 2022
Interested Parties Submit Comments on the 2020 Aerial Survey Program	May 17, 2021	Requested for May 15, 2022
Baffinland Responds to Comments Submitted by Interested Parties	June 4, 2021	TBD Based on Timing and Volume of Comment Submissions
Baffinland Engages MEWG Members (collectively and individually) as well as the Hamlet of Pond Inlet	April 9 to July 12, 2021	Ongoing
Baffinland submits Marine Shipping and Vessel Management Report, including Narwhal Adaptive Management Response Plan	July 14, 2021	TBD Based on Submission of Comments and Engagement Outcomes

In 2022, in addition to the engagement with the MEWG, which was initiated first through the sharing of draft marine monitoring program report, Baffinland and Golder have also requested a workshop with the MHTO to develop a remote narwhal tagging program to be implemented at the beginning of the shipping season, with the intent to gain a greater understanding of how narwhal and ore carriers interact while shipping through the ice. We have also been requesting dates to hold the end of shipping season meeting with the MHTO since the fall of 2021, which has not yet been met with a response. The results of all this engagements will influence our 2022 marine monitoring programs, as well as our 2022 Narwhal Adaptive Management Response Plan.

In summary, Baffinland is following the same collaborative process in 2022 that was followed in 2021 to develop and meaningfully consult on a Narwhal Adaptive Management Response Plan. All mitigation and monitoring proposals brought forward in the ongoing engagement process will be given full consideration (including those outlined in the MHTO and ON letters), and following the conclusions of engagements, Baffinland will present its planned shipping activities and proposed 2022 shipping mitigations in writing to the NIRB.

5. **Additional information is available to inform narwhal abundance estimates in the North Baffin region, and it may be highly inappropriate to draw conclusions about the “Eclipse Sound stock”. The 2021 aerial surveys confirm overall regional population abundance is stable if not higher than when aerial surveys in Eclipse Sound were undertaken. Recent IQ collected and issued by the Qikiqtaaluk Wildlife Board suggests that there is no Eclipse Sound summering narwhal stock and narwhal should be characterized as a holistic regional population.**

As referenced above in Section 3 of this letter, the 2021 draft Marine Mammal Aerial Survey Report proposed that science and available IQ support the notion that there is considerable exchange between the Eclipse Sound and Admiralty Inlet summer stocks of narwhal, and since the combined population is stable, the decreases in Eclipse Sound are most likely reflective of a natural exchange between the two stock areas, or that animals are finding more favourable ecological conditions en route to Admiralty Inlet due to changing ice conditions, prey availability and/or predation pressure, all of which are known to be influenced by a rapidly changing climate in the Arctic.

As noted in the 2021 Annual Report excerpts above, questions have been raised by Qikiqtani Region Hunters and Trappers Organizations (HTOs) as to whether there is an “Eclipse Sound summering stock” at all. In recent (March 2022) submissions to the Nunavut Wildlife Management Board (NWMB) on the matter of narwhal hunting tag management by HTOs, the Qikiqtaaluk Wildlife Board (QWB) (which is comprised of the MHTO Chair as well as all other HTO Chairs in the region) presented IQ that concludes there are no distinct regional stocks and the Northern and Eastern Baffin Island (NEBI) narwhal population should be treated as a single population:

In January 2020 Eric Ootoovak, then Chairperson of the Mittimatalik HTO, told DFO scientists and managers repeatedly and emphatically that “there are no summer stocks” during a survey planning workshop in Winnipeg. Eric was referring to three hypothetical summer stocks delineated by DFO in the above-mentioned 2013 science-based management plan. According to IQ, the three summer stocks of narwhal do not actually exist in reality within the waters of NEBI!

In January 2020, DFO could not provide the needed evidence showing multi-year fidelity of narwhal to any one of the three hypothetical parts of NEBI waters. DFO offered no clear methods or plans to obtain the required information (C. Watt, DFO, Winnipeg, pers. com.). DFO’s telemetry data shows that narwhal may move from one area to other areas in the same open-water season in which they were tagged within and beyond NEBI waters.

At that 2020 workshop, delegates from all six HTOs agreed that DFO’s 2013 hypothetical summer-stock management system was not supported by Inuit Qaujimagatuqangit, and unduly restricted harvesting by Inuit in contravention of sections 5.3.3 and 5.6.50 of the Nunavut Agreement.”
[emphasis added]

The March 2022 QWB submissions also provided the following conclusions about the narwhal in the waters of NEBI:

... based on generations-old, up-to date, peer-reviewed Inuit Qaujimagatuqangit:

- Narwhal move freely throughout the NEBI area. Their distributions and abundances change across NEBI waters between years, showing that individual narwhal do not always return to the same specific areas within NEBI waters every year.
- Narwhal also move freely and widely from day to day, from week to week and from month to month in NEBI waters, and their local distributions and abundances change accordingly. Groups of narwhal are seen moving out of and into major inlets and sounds, and among various smaller fiords and bays, throughout the open-water period.
- In spring, narwhal arrive at various areas in NEBI waters at varying times each year, depending on the development of open water within variable patterns at the floe edges, leads in the ice in various areas, and ice break-up into summer. These patterns and their timing vary from year to year, and can affect the abundance and distributions of narwhal across NEBI waters into August and September.
- Throughout the open-water period, narwhal move as needed for their biological needs like birthing and mating, as well as in response to environmental factors like changing food concentrations, killer whales, and ships. Narwhal also probably move in response to factors largely unknown to humans.
- Underwater sounds are probably important factors that influence the real-world, real-time distributions and abundances of the narwhal because narwhal can hear other narwhal, other whales, predators, ships and other sources of sound across very long distances.
- Inuit manage their harvesting in real time as narwhal move throughout the open-water season because the movements, distributions and abundances of NEBI narwhal cannot be predicted accurately months in advance.

For the convenience of the NIRB as well as reviewers, we have attached the March 2022 QWB submissions to the NWMB to this letter as Appendix B, and this information is also available on the NWMB registry at the following link: <https://www.nwmb.com/en/public-hearings-a-meetings/meetings/regular-meetings/2022/rm-001-2022-march-9-2022/english-19>.

Baffinland acknowledges that the referenced IQ was submitted specifically for the QWB submission. We look forward to discussing and better understanding this submission to help incorporate IQ in our final NAMRP.

6. Overall narwhal harvesting in Pond Inlet continues to be above average, including 2021.

In their Closing Written Statement on the NIRB's Assessment of Baffinland's Phase 2 Development Proposal, the Government of Nunavut indicated that during the 2021-2022 harvesting year a total of 152 tags were issued to Pond Inlet (137 for Summer, and 15 for the Fall/Spring), with the entire summer quota of 137 narwhal successfully harvested and reported to the GN Wildlife Office. Based on information provided to Baffinland by community members as well as social media reporting, the majority of the summer quota of narwhal were harvested in waters directly adjacent to Pond Inlet following the completion of the Small Craft Harbour construction activities. Baffinland also acknowledges that this time

period coincides with when narwhal would be migrating back towards the Baffin Bay area for overwintering.

Since the development of the Food Security Assessment for the Phase 2 Proposal, Baffinland has been tracking the annual issuance of narwhal harvest tags to help inform a better understanding of the number of narwhal that are being reported as harvested and available for consumption in Pond Inlet. As presented in the table below, based on 21 years of available harvest and population data for Pond Inlet, an above average number of narwhal have been harvested on a nominal and per capita basis in 6 of the 7 years Project shipping has occurred.

Year	Pond Inlet Population	Narwhal Harvest	Per Capita Narwhal Harvest
2001	1,282	65	0.051
2002	1,307	63	0.048
2003	1,341	67	0.050
2004	1,358	65	0.048
2005	1,375	62	0.045
2006	1,369	88	0.064
2007	1,383	65	0.047
2008	1,400	73	0.052
2009	1,453	44	0.030
2010	1,482	62	0.042
2011	1,533	112	0.073
2012	1,544	97	0.063
2013	1,579	147	0.093
2014	1,613	135	0.084
2015	1,639	190	0.116
2016	1,663	118	0.071
2017	1,790	159	0.089
2018	1,784	64	0.036
2019	1,809	184	0.102
2020	1,835	140*	0.076
2021	1,862	152*	0.082
Average		102	0.065

*Still subject to final verification by DFO.

**Baffinland shipping commenced in 2015 (shaded values).

Baffinland provides supports to harvesters through the Mary River Inuit Impact Benefits Agreement including important dedicated articles for the Wildlife Compensation Fund, Harvesters Enabling Program, Wildlife Monitoring Program, and Marine Research Equipment. Baffinland also maintains the Tasiuqtiit Working Group Agreement with the Hamlet of Pond Inlet and MHTO, which provides direct compensation for each vessel required to deliver more than 4.2 Mtpa.

In closing, Baffinland is pleased to provide the additional clarifying information set out in this letter, and is happy to provide any follow up that is necessary. As we have continually suggested, we again reiterate

that we are open to meeting in person or by phone with the MHTO on these or any other matters at any time.

Yours truly,



Megan Lord-Hoyle
VP Sustainable Development

Cc. Olayuk Akesuk, QIA
Aluki Kotierk, NTI
Lori Idlout, MP, Nunavut
Hon. Dan Vandal, Minister of Northern Affairs
Hon. Steven Guibeault, Minister of Environment and Climate Change
Hon. Joyce Murray, Minister of Fisheries and Oceans
Hon. Johnathan Wilkinson, Minister of Natural Resources
Hon. Omar Alghabra, Minister of Transport
David Qajaaq Qamaniq, Chairperson, MHTO
Members of Marine Environmental Working Group

Appendix A

Relevant Annual Report Excerpts

Main Body (see NIRB Registry No. 338435):Popular Summary, page 9-10:

“Results from the open water narwhal aerial survey indicate that narwhal abundance in Eclipse Sound was statistically lower in 2021 than previous years (i.e. 2013, 2016, 2019 and 2020), while the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was statistically higher in 2021 to that observed in previous years (2013, 2019 and 2020)... A holistic review of the data from the 2021 shipping season does not conclude that the relatively lower numbers of narwhal observed in Eclipse Sound in 2021 is Project-related. Elimination of early season ice-breaking in 2021 further reduced residual uncertainty in that Project shipping is the primary driver of the observed change in narwhal abundance in Eclipse Sound.

A review of available Inuit knowledge and scientific monitoring data supports that the Admiralty Inlet and Eclipse Sound narwhal stocks may actually represent a single stock with natural exchange of animals between the two putative summering areas. Another factor could be that narwhal migratory routes and summering areas have been influenced by environmental factors, such as changing ice conditions and/or prey/predator dynamics. This is further supported by recorded harvest levels in the spring at the Pond Inlet floe edge, which suggest that few narwhal were present at the floe edge at this time waiting to migrate into Eclipse Sound in the months before Project shipping began. However, it is noted that Pond Inlet harvesters were able to fulfill their entire summer quota by the fall.”

Section 4, “Performance on PC Conditions”, page 306:

“In 2020 and 2021, there was a statistically significant decrease in the abundance of the Eclipse Sound narwhal stock compared to previous survey years (2013, 2016 and 2019) (Golder, 2022e). However, the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was shown to be similar in 2020 to that observed in previous survey years (2013 and 2019); and was statistically higher in 2021 than in previous survey years (2013, 2019 and 2020) (Golder, 2022e). A review of available Inuit knowledge and scientific monitoring data supports that the Admiralty Inlet and Eclipse Sound stock may actually be one stock that shift between summering areas. Another factor could be that narwhal migratory routes and summering areas have been influenced by environmental factors, such as ice condition and prey/predator dynamic.”

Section 4, “Performance on PC Conditions”, page 315:

“In 2021, marine mammal aerial surveys were conducted in the North Baffin during the early shoulder season (July), the peak open-water season (August), and at the end of the shipping season (October) as part of the 2021 Marine Mammal Aerial Survey Program (MMASP). Three different types of marine mammal aerial surveys were performed in 2021. A reconnaissance survey was initially run during the early shoulder season (Leg 1) to collect data on the presence/absence and distribution of marine mammals in the RSA relative to available ice conditions at that time of year and prior to the start of shipping activities. A systematic aerial-based transect survey was then conducted during the open-water season (Leg 2) to obtain

abundance estimates of the Eclipse Sound and Admiralty Inlet narwhal summer stocks. A visual clearance survey (Leg 3) was also conducted during the fall shoulder season to confirm that no narwhal entrapment events occurred in the RSA following completion of Baffinland's 2021 shipping operations along the Northern Shipping Route. A letter of support for the 2021 MMASP was requested from the MHTO and Arctic Bay HTO. DFO and other MEWG members were actively consulted on the study design and data collection methods during 2021 MEWG meetings (Appendix C.1). Input and recommendations provided by these parties were incorporated into the program. Detailed methodology and analytical procedures of the 2021 MMASP are presented in Golder (2022e)."

Section 4, "Performance on PC Conditions", page 316 (also repeated at page 357):

"A total of nine different species of marine mammals were observed during the 2021 aerial surveys: narwhal, bowhead whale, beluga whale, killer whale, ringed seal, harp seal, bearded seal, walrus, and polar bear.

At the beginning of Leg 1 surveys open water was present in the north Navy Board Inlet, Milne Inlet and Pond Inlet strata and by the end of Leg 1 open water was present throughout the RSA. Results from the 2021 Leg 1 survey indicated low narwhal numbers prior to the first vessel transit into the RSA. By the time of the first ore carrier transit in the RSA on 26 July 2021, narwhal relative abundance appeared to have increased and their distribution had moved to be primarily concentrated in Koluktoo Bay and Tremblay Sound and remained concentrated in those areas for the duration of the Leg 1 program. Detailed results for Leg 1 are presented in Golder (2022e).

For the Leg 2 surveys, narwhal summer stock abundance was calculated for the Eclipse Sound stock, Admiralty Inlet stock, and the combined Eclipse Sound and Admiralty Inlet stock. The narwhal abundance estimate for the combined Eclipse Sound and Admiralty Inlet stock during the 2021 open-water season (Leg 2) was 75,177 individuals and statistically higher than the abundance calculated during the previous DFO survey conducted in August 2013, 2019, and 2020. For Eclipse Sound stock alone, the narwhal abundance estimate was 2,595 narwhal, which is statistically lower than the 2016 DFO estimate. The 2021 abundance estimate is also statistically lower than the 2013, 2019, and 2020 abundance estimates. For the Admiralty Inlet stock alone, the narwhal abundance estimate was 72,582 narwhal and was statistically higher than the abundance calculated of the 2013 DFO estimate, and the 2019 and 2020 Baffinland estimates. Detailed results for Leg 2 are presented in Golder (2022e).

Given the ice conditions during the Leg 3 surveys (almost none), the low numbers and location of confirmed narwhal observations (east of Pond Inlet travelling toward Baffin Bay), and input from the community members who participated in the clearance aerial surveys, there was no concern regarding the risk of entrapment of narwhal caused by the Project at the end of the 2021 shipping season. Detailed results for Leg 3 are presented in Golder (2022e).

Results from the 2021 aerial survey indicate that: i) narwhal abundance in Eclipse Sound was statistically lower in 2021 than observed in previous years when aerial surveys were conducted

(i.e., 2013, 2016, 2019 and 2020), and ii) the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was statistically higher in 2021 to what was observed in previous years (2013, 2019 and 2020). These results suggest a displacement or shift of a portion of the Eclipse Sound stock to the Admiralty Inlet summering ground during the summer of 2021. They also suggest there is potentially more summer movement between neighbouring summer stocks (i.e., Admiralty Inlet, Somerset Island, and/or East Baffin Island) than previously thought.”

Appendix B

QWB Submission to the NWMB

**SUBMISSION TO THE
NUNAVUT WILDLIFE MANAGEMENT BOARD (NWMB)**

Regular Meeting No. RM 001-2022

FOR

Information:

Decision:

Issue: ***Establishment of an Inuit System of Narwhal Management in the Waters of Northern and Eastern Baffin Island, 2022***

Background:

Assertion of Primacy of Inuit Systems of Wildlife Management Decisions in Nunavut

In December 2020, the Qikiqtaaluk Wildlife Board (QWB) adopted the legal position to assert that the Nunavut Agreement, a constitutionally protected treaty between the Inuit of Nunavut and the Crown of Canada, intended to provide primacy to Inuit Systems of Wildlife Management with respect to decision-making processes and outcomes regarding wildlife and wildlife harvesting by Inuit. This primacy extends to Inuit Qaujimagatuqangit (IQ) because IQ is the basis for Inuit Systems of Wildlife Management. In this context, “primacy” refers to what comes first and remains most important. Inuit Systems of Wildlife Management are specifically recognized in sub-section 5.1.2(e) of the Nunavut Agreement. Several other sections of Article 5 of the Nunavut Agreement point out the special rights and roles that Inuit have in wildlife management and harvesting in Nunavut. Science and scientific systems of wildlife management are not specifically recognized or mentioned in Article 5 of the Nunavut Agreement.

More specifically, the QWB asserts that any wildlife management plan, recommendation or measure established or implemented by the NWMB or Fisheries and Oceans Canada (DFO) must give primacy to Inuit rights, Inuit Systems of Wildlife Management, and Inuit Qaujimagatuqangit. Such a view is supported by the Nunavut Agreement and the United Nations Declaration on the Rights of Indigenous Peoples.

Summary of Applicable Inuit Qaujimagatuqangit about Narwhal in the Waters of Northern and Eastern Baffin Island

In 2018, the QWB Executive and the Hunters and Trappers Organizations (HTOs) learned that DFO did not plan to review and revise the 2013 Integrated Fisheries Management Plan for Narwhal in the near future. As a result, the QWB Executive and HTOs began discussing improvements to narwhal management in the waters of Northern and Eastern Baffin Island (NEBI) based on Inuit Qaujimagatuqangit (IQ) and began developing the Inuit System of Narwhal Management, initially proposed to the NWMB in May 2020.

IQ about NEBI narwhal is far too extensive to describe fully here. IQ is orally transmitted among Inuit in every community, covering knowledge collected by many past generations to the current day across all waters that community members collectively and regularly travelled almost every day from the floe fledge in spring to the end of the fall migration of the narwhal. Harvesters, elders, youth, women and men all have roles in the IQ system and collectively share their knowledge within and between communities. The HTOs develop the best consensus-based decisions in keeping with IQ principles and practices, and Inuit Systems of Wildlife Management among affected Inuit communities, largely as Inuit have always done since time immemorial.

In January 2020 Eric Ootoovak, then Chairperson of the Mittimatalik HTO, told DFO scientists and managers repeatedly and emphatically that “there are no summer stocks” during a survey planning workshop in Winnipeg. Eric was referring to three hypothetical summer stocks delineated by DFO in the above-mentioned 2013 science-based management plan. According to IQ, the three summer stocks of narwhal do not actually exist in reality within the waters of NEBI!

In January 2020, DFO could not provide the needed evidence showing multi-year fidelity of narwhal to any one of the three hypothetical parts of NEBI waters. DFO offered no clear methods or plans to obtain the required information (C. Watt, DFO, Winnipeg, pers. com.). DFO’s telemetry data shows that narwhal may move from one area to other areas in the same open-water season in which they were tagged within and beyond NEBI waters.

At that 2020 workshop, delegates from all six HTOs agreed that DFO’s 2013 hypothetical summer-stock management system was not supported by Inuit Qaujimagatuqangit, and unduly restricted harvesting by Inuit in contravention of sections 5.3.3 and 5.6.50 of the Nunavut Agreement.

Below are some conclusions about the narwhal in NEBI waters based on generations-old, up-to-date, peer-reviewed Inuit Qaujimagatuqangit:

- Narwhal move freely throughout the NEBI area (see Appendix A). Their distributions and abundances change across NEBI waters between years, showing that individual narwhal do not always return to the same specific areas within NEBI waters every year.
- Narwhal also move freely and widely from day to day, from week to week and from month to month in NEBI waters, and their local distributions and abundances change accordingly. Groups of narwhal are seen moving out of and into major inlets and sounds, and among various smaller fiords and bays, throughout the open-water period.
- In spring, narwhal arrive at various areas in NEBI waters at varying times each year, depending on the development of open water within variable patterns at the floe edges, leads in the ice in various areas, and ice break-up into summer. These patterns and their timing vary from year to year, and can affect the abundance and distributions of narwhal across NEBI waters into August and September.
- Throughout the open-water period, narwhal move as needed for their biological needs like birthing and mating, as well as in response to environmental factors like changing food concentrations, killer whales, and ships. Narwhal also probably move in response to factors largely unknown to humans.
- Underwater sounds are probably important factors that influence the real-world, real-time distributions and abundances of the narwhal because narwhal can hear other narwhal, other whales, predators, ships and other sources of sound across very long distances.
- Inuit manage their harvesting in real time as narwhal move throughout the open-water season because the movements, distributions and abundances of NEBI narwhal cannot be predicted accurately months in advance.

In the opinion of the QWB, the following proposed Inuit System of Narwhal Management for the waters of NEBI is based on strong evidence from generations of up-date IQ. It will enable Inuit to better manage their harvesting of NEBI narwhal, so they can effective conservation this very important species and resource.

Further, the QWB and affected HTOs conclude that the following proposed Inuit System of Narwhal Management for the waters of NEBI is strongly and legally supported by the Nunavut

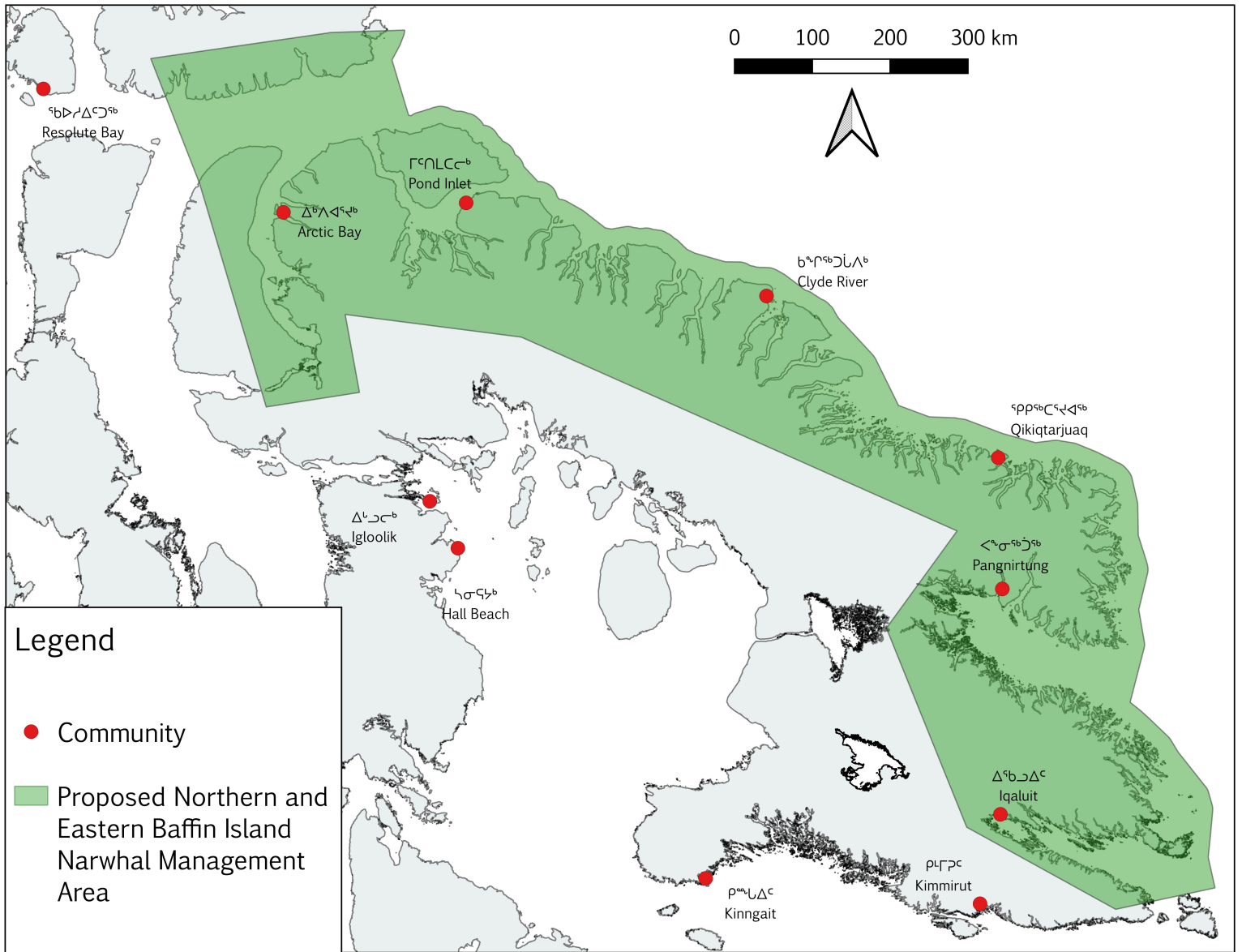
Agreement, including but not limited to the following sections: 5.1.2 (e), (g) and (h), 5.1.3 (a)(v) and (b) (iii) and (v), 5.1.4, 5.3.3 (a), 5.6.50, 5.7.3 and 5.7.6.

Recommendations:

1. The QWB and six affected HTOs of Arctic Bay, Pond Inlet, Clyde River, Qikiqtarjuaq, Pangnirtung and Iqaluit make the following recommendations for decision by the NWMB to implement an Inuit System of Narwhal Management in the waters of Northern and Eastern Baffin Island (NEBI) in accordance with sections 5.1.2 and 5.2.33 of the Nunavut Agreement:
 - a) Delineate only one narwhal management unit in the waters of NEBI in accordance with Inuit Qaujimagatuqangit, as per the map and boundary points described in Appendix A;
 - b) Amalgamate and total the current TAHs and BNLs for Admiralty Inlet, Eclipse Sound and East Baffin Island into a single annual TAH and BNL for narwhal in the proposed NEBI narwhal management unit of the six communities (see Appendix B);
 - c) Continue the current annual inter-regional allocation of the BNL for Somerset Island narwhal to be harvested by Inuit in Arctic Bay (i.e., 51) and Pond Inlet (i.e., 53), to avoid impacts on allocations to other HTOs in the Kitikmeot and Qikiqtaaluk Regions;
 - d) Establish only one annual season for management of narwhal in the waters of NEBI; and enable the issuance of “all-season” tags (valid from April 1 to March 31, inclusive) annually by DFO to the six affected HTOs;
 - e) Enable the QWB to allocate the proposed NEBI BNLs among the six affected HTOs, and any future changes in the BNLs, among the six HTOs, based on IQ and other information, as per clauses 5.1.2(e) and (h), and 5.7.6. of the Nunavut Agreement;
 - f) Continue to carry-forward unused allocated tags from one year to the next for each HTO;
 - g) Support the QWB’s and HTOs’ jurisdictions to establish by-laws to govern how the BNLs, including carry-forward tags, may be allocated, how narwhal may be harvested, and generally how narwhal harvesting may be managed among the six HTOs under section 5.7.6 of the Nunavut Agreement, and locally near each of the six communities under section 5.7.3 of the Nunavut Agreement.
2. This proposal was developed by the QWB in close consultation with the six affected HTOs, and all six HTOs have supported the proposal. Therefore, the QWB waives the need for a Public Hearing by the NWMB, of course at the NWMB’s discretion.
3. To facilitate initial implementation of this proposal in 2022-23, the NWMB may prefer to approve interim implementation for a period of 1-5 years with subsequent reviews, at the NWMB’s discretion
4. The NWMB could encourage the creation of a forum whereby the QWB, the HTOs, DFO and other co-management partners may exchange information on IQ, science and harvest management strategies and methods related to NEBI narwhal on an as-needed basis, at the NWMB’s discretion.

Prepared by: Michael Ferguson, Qikiqtaaluk Wildlife Board

Date prepared: February 1, 2022



ዕቃወክያት 2.1. የኢትዮጵያ ኢንፎርሜሽን ቴክኖሎጂ ደብዳቤ ተፈጻሚነት ስራ ዕቃወክያት
 የሰነድ ልማት ፍጥነት ምርመራ ማድረግ፣ ከጥቅም 2022

ID	የሰነድ ልማት ምርመራ	ዕቃወክያት	ዕቃወክያት ስራ	ዕቃወክያት ስራ
1	NEBI	1	-90	75
1	NEBI	2	-81.8	75
1	NEBI	3*	-78.633	74.833
1	NEBI	4*	-64.267	61.833
1	NEBI	5	-66.75	62.133
1	NEBI	6	-69.416	63.75
1	NEBI	7	-69.3	66.3
1	NEBI	8	-66.167	67
1	NEBI	9	-77.333	71
1	NEBI	10	-83.467	71.733
1	NEBI	11	-83.467	70.8
1	NEBI	12	-86.85	70.8
1	NEBI	13	-88.4	73.5

* ዕቃወክያት ስራ ስለሚደረግበት ጊዜ 3-ፋ 4-ፋ፣ የኢትዮጵያ ኢንፎርሜሽን ቴክኖሎጂ ደብዳቤ ዕቃወክያት ስራ ስለሚደረግበት ጊዜ ይሰጣል.

Table 2.1. Points for a Proposed Boundary of the Northern and Eastern Baffin Island Narwhal Management Area, January 2022

ID	Stock Name	Point Number	Longitude	Latitude
1	NEBI	1	-90	75
1	NEBI	2	-81.8	75
1	NEBI	3*	-78.583	74.833
1	NEBI	4*	-64.267	61.833
1	NEBI	5	-66.75	62.133
1	NEBI	6	-69.416	63.75
1	NEBI	7	-69.3	66.3
1	NEBI	8	-66.167	67
1	NEBI	9	-77.333	71
1	NEBI	10	-83.467	71.733
1	NEBI	11	-83.467	70.8
1	NEBI	12	-86.85	70.8
1	NEBI	13	-88.4	73.5

* From Point Numbers 3 to 4, the proposed border follows the boundary of the Nunavut Settlement Area.

Comments on DFO's Published Science
Advice and Harvest Data:
Reconciliation of Narwhal
Management with Inuit



Michael A.D. Ferguson
Qikiqtaaluk Wildlife Board

When Should Telemetry Studies and Surveys Happen? [1 of 4]

- DFO Science uses surveys to estimate narwhal populations, from which they then recommend Total Allowable Harvests (TAHs) to the NWMB and the Minister.
- Telemetry studies provide information about the diving behaviour of narwhal, in order to generalize estimates of narwhal at the surface to include the potential abundance of diving narwhal, and then estimate the whole population.
- Both types of studies impact the number of narwhal that Inuit may be allowed to harvest.

When Should Telemetry Studies and Surveys Happen? [2 of 4]

- Because both surveys and telemetry studies directly impact Inuit harvesting, they should both be done during the same period of time.
- DFO reports state that July 24/25 – August 24 is the best time to do surveys.
- Watt and Hall (2018) wrote that July 24 – August 24 “represent[s] the residency time of narwhals in the summering region” (if residency occurs).
- It is logical that telemetry studies should be done during that same period.

When Should Telemetry Studies and Surveys Happen? [3 of 4]

- If telemetry data does not cover at least half of the survey period, then the data would have little value for estimating population size and the TAH.
- In 2012, telemetry data from all 5 narwhal covered less than half of the survey period (19-38%).
- In 2016, all 5 more tagged narwhal again covered less than half of the survey period (0-22%).
- In 2018, both tagged narwhal again covered less than half of the survey period (22%).
- Telemetry data in these years has minimal value for determining Inuit harvest levels.

When Should Telemetry Studies and Surveys Happen? [4 of 4]

- 2017 was a mixed bag!
- 7 tagged narwhal provided data for more than half of the survey period (65-81%).
- 2 tagged narwhal provided data for less than half of the survey period (32-42%).
- And 9 tagged narwhal did not provide any data for the survey period (0%).
- Diving telemetry data for estimating population size and TAH should be used when the data were collected during the survey period, ideally in the same year as each survey.

Can Telemetry Data Really Detect Mixing of Narwhal between Areas?

- Not if they are tagged in only one part of one small management area, and in only one area in the same year!
- When narwhal mix, they move between any of the areas in any direction. The rate of mixing may not be equal in all directions. They do not do the same things every year.
- DFO has not tagged narwhal in all three areas each year, especially East Baffin, ignoring IQ!
- DFO has not tagged narwhal in all parts of any area in any year!

Are Tagged Tremblay Sound Narwhal Representative of All Eclipse Sound Narwhal? [1 of 3]

- IQ tells us that narwhal are always moving during summer, including during July 24 – August 24. Survey and harvest data supports this (more later).
- In other words, IQ tells us that DFO's hypothesized narwhal summer residency period is **NOT** real!
- Inuit and their ancestors have been on Baffin Island for an estimated 3,500 years or more.
- Ferguson et al (1997, 1998) documented accurate and detailed recall by Inuit of information about caribou dating back 80-100 years.
- It is likely that Inuit knowledge about narwhal has similar accuracy, detail and longevity.

Are Tagged Tremblay Sound Narwhal Representative of All Eclipse Sound Narwhal? [2 of 3]

- Is it likely that DFO Scientists in Winnipeg know true basic information about narwhal movements and distributions that Inuit have never heard of?
- As mentioned, IQ indicates that narwhal in different parts of Eclipse Sound (ES) tend to move in different directions, but not always.
- In 2017, DFO tagged only 7 out of perhaps 12,000 narwhal in ES for most of the survey period (i.e., 0.06%)! Can only 7 show behaviors of all 12,000?
- 7 at one site, compared to probably 1,000s of narwhal observed by Inuit across most of ES in 2017. Is Science or IQ more likely to be reliable?

Are Tagged Tremblay Sound Narwhal Representative of All Eclipse Sound Narwhal? [3 of 3]

- None of the narwhal tagged during 2012 - 2018 were tagged in Eclipse Sound on or about July 24.
- Two tagged narwhal moved from the mouth of Navy Board Inlet into Admiralty Inlet in about 16 hours during August 7-8, 2017.
- Narwhal could move much farther in the 7 – 29 days before tagging during summer survey period.
- I suggest that not all narwhal tagged during 2012-2018 represent ES narwhal because DFO cannot know if any of tagged narwhal were in Eclipse Sound, Admiralty Inlet or East Baffin at the start of the summer survey period.

Does Tagging Data or IQ Better Reflect the Years that Any Given TAH May Be in Place?

- Telemetry tags usually monitor narwhal movement for only part of a year, and very rarely for a full year or more.
- In January 2020, DFO offered no clear methods or plans to obtain the required information (C. Watt, DFO, pers. com.) to address multi-year fidelity or infidelity of narwhal to so-called summer stocks.
- During the same workshop in Winnipeg, Eric Ootoovak of Pond Inlet repeatedly told DFO staff that “summer stocks do not exist.”
- Eric, other HTO reps and the QWB initiated their first consultations with DFO in January 2020.

More 2016 Eclipse Sound Survey Results

- Total Abundance Estimate: 12,000
- 2020 TAH recommendation: 117
- However, changes occurred during 2016 Summer Survey Period, based on Surface Estimates (below). Telemetry data exists from only one of 6 parts of ES. Abundance in that one area changed the least of four re-surveyed areas.

August	Navy Board	Pond Inlet	Eclipse Sound	Milne Inlet	Tremblay Sound	Koluktoo Bay
7-10	0	0	1,924	853	407	602
21	?	?	85	1,257	525	884
Change	?	?	-96%	+47%	+29%	+47%

Do Such Changes within the Survey Period Occur Elsewhere? Based on IQ and Science, Yes!

2010 Survey Results for Admiralty Inlet

- Two repeated surveys with some differences in survey coverage.
- August 7-8, 2010 Estimate: 24,398
- August 10-11, 2010 Estimate: 13,729
- Change in only 4 days: -10,699 (-44%)
- Explanation: “sampling variation related to survey coverage, sea state and animal movement”
- TAH was based on the average: 233
- Change may have been real, or caused by survey methods.
- Such issues impact Inuit harvesting. How were QWB and the HTOs consulted? Did DFO reveal the change?

Do Such Abundance Changes between Surveys Occur over Large Areas and between Years? Based on IQ and Science, Yes!

Lou Kamermans, Senior Director of Sustainable Development

Reference No. 1663724-285-TM-Rev1-48000

Baffinland Iron Mines Corporation

7 April 2021

Table 2: Historical Abundance Estimates for Eclipse Sound and Admiralty Inlet Narwhal Summer Stocks

Stock	Year	Abundance	CV	95% CI	Source
Eclipse Sound	2013	10,489	0.24	6,342–17,347	Doniol-Valcroze et al. 2015
Eclipse Sound	2016	12,039	0.23	7,768–18,660	Marcoux et al. 2019
Eclipse Sound	2019	9,931	0.05	9,009–10,946	Golder 2020
Eclipse Sound	2020	5,018	0.03	4,736 – 5,317	Golder 2021a
Admiralty Inlet	2013	35,043	0.42	14,188-86,553	Doniol-Valcroze et al. 2015
Admiralty Inlet	2019	28,746	0.15	21,545-38,354	Golder 2020
Admiralty Inlet	2020	31,026	0.14	23,406-41,126	Golder 2021a
Eclipse & Admiralty	2013	45,532	0.33	22,440–92,384	Doniol-Valcroze et al. 2015
Eclipse & Admiralty	2019	38,771	0.12	30,667–49,016	Golder 2020
Eclipse & Admiralty	2020	36,044	0.12	28,267–45,961	Golder 2021a

Does the Resident Summer Stock Hypothesis Enable Consistent Summer Harvesting?

- If narwhal actually return to the same specific areas each summer, then Inuit should be able to find those places, and harvest consistent numbers of narwhal in those places each summer.
- Such a harvest strategy based on resident summer stocks should result in more consistent harvests during summer year after year compared to any other season for each community.
- There should be less variation in community harvest numbers between years during summer than during any other season.

Do Annual Harvests Support the Summer Stock Hypothesis or Inuit Qaujimajatuqangit?

- NWMB and DFO manage Inuit narwhal harvesting, not narwhal movements and distributions.
- Somerset Island and Northern Hudson Bay narwhal are harvested mainly by 8-11 communities each, with RWOs allocating harvest among Inuit, and without any summer seasons.
- Admiralty Inlet, Eclipse Sound and East Baffin narwhal are harvested by mainly 1-2 communities each that have summer seasons and allocations to Inuit effectively imposed by DFO.
- Are NEBI narwhal really so very different from SI & NHB narwhal? Inuit KNOW that they are not!

Seasons of NEBI Narwhal

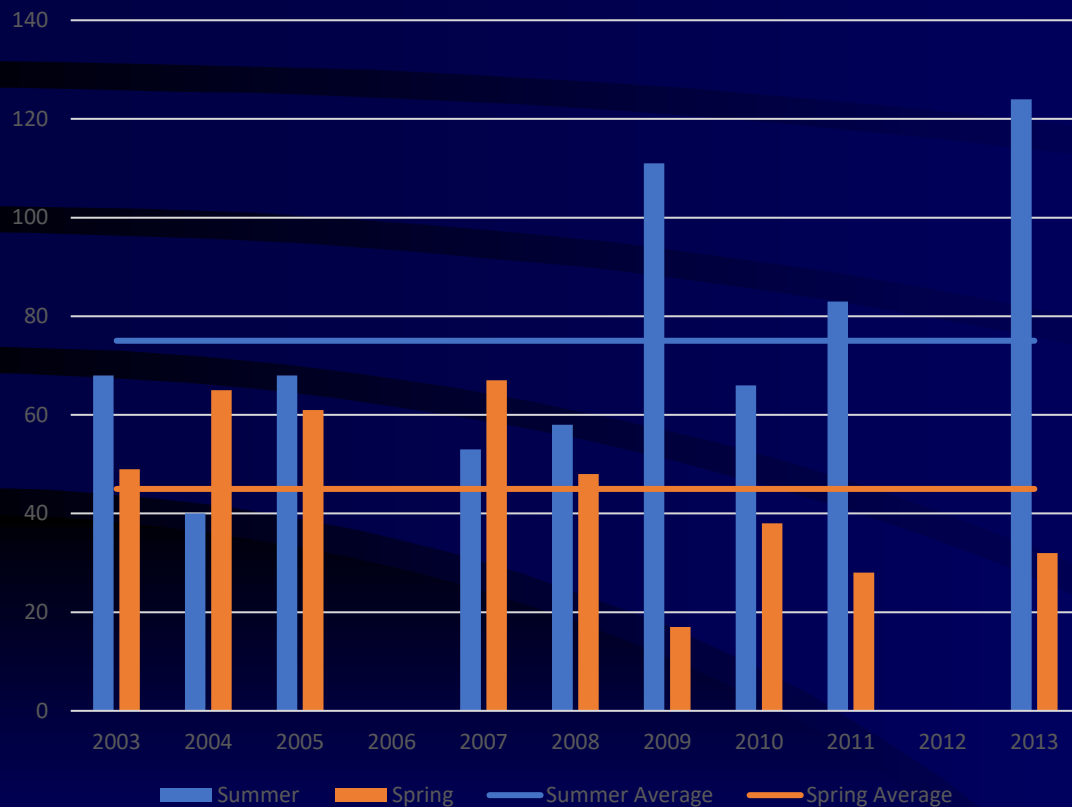
- Watt and Hall (2018) defined harvest seasons for narwhal. I went through the detailed harvest records for Arctic Bay, Pond Inlet, Clyde River and Qikiqtarjuaq from 2003 to 2013. I refined the dates for the spring and fall harvests, but I did not change DFO's summer dates.
- Spring: May 2 – July 23
- Summer: July 24 – August 24
- Fall: August 24 – November 4
- Qikiqtarjuaq and Clyde River usually started harvesting in July, with little harvesting in spring and summer. They harvested latest into the fall.

Simple Hypothetical Example of Assessing Variation in Harvest Numbers between Seasons

Season	Annual Seasonal Harvest			Average Seasonal Harvest	Coefficient of Variation
	2030	2032	2033		
Summer	39	41	40	40	2
Spring	70	5	45	40	67

- The Coefficient of Variation can tell us in which season harvests are most consistent, and in which season harvests differ most between years.
- In the above example, harvests would be very consistent in Summer, while harvests in Spring are over 30 x more variable than in Summer.

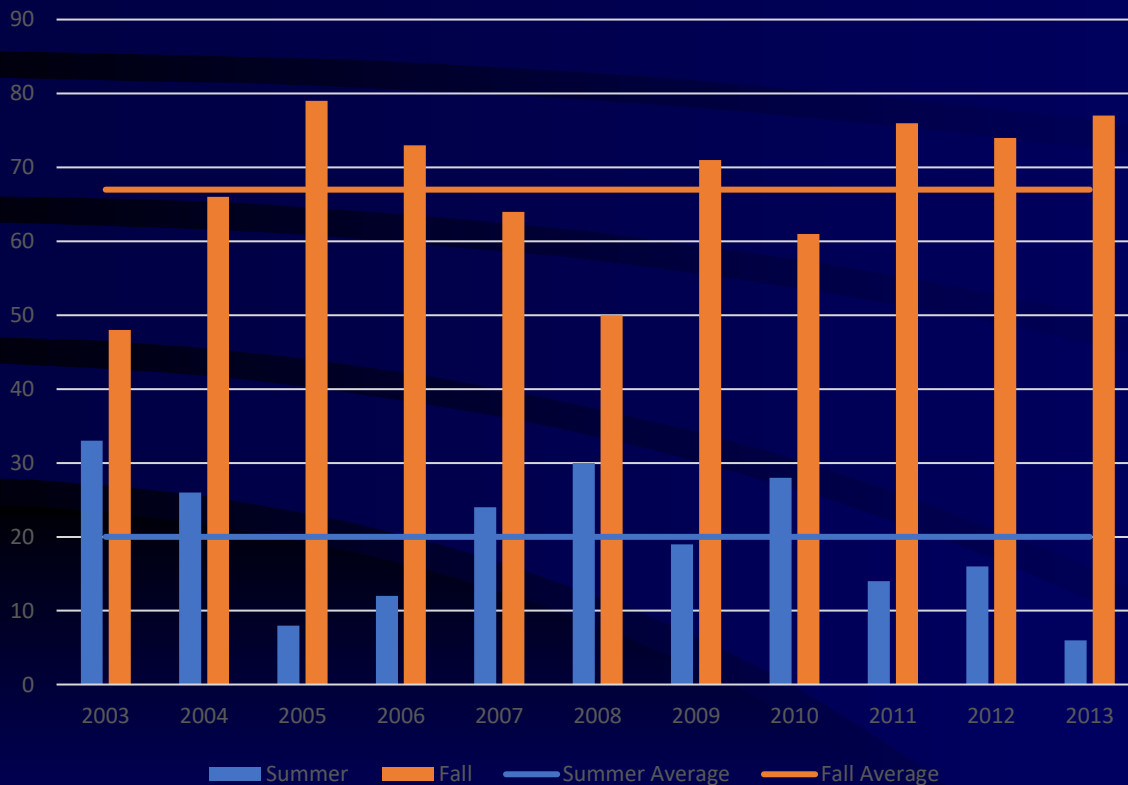
Summer (blue) and Spring (orange) Harvests, 2003-2013 Arctic Bay.



Arctic Bay may not have had enough tags in summer in 2006 and 2012, and very rarely in fall.

- Coefficient of Variation was 34 in Summer, and 37 in Spring.
- Harvest Variation in Summer and Spring were similar.
- No evidence in harvest data for greater residency of so-called summer stock.

Summer (blue) and Fall (orange) Harvests, 2003-2013 Qikiqtarjuaq



Qikiqtarjuaq appeared to have enough tags in all years in summer and fall.

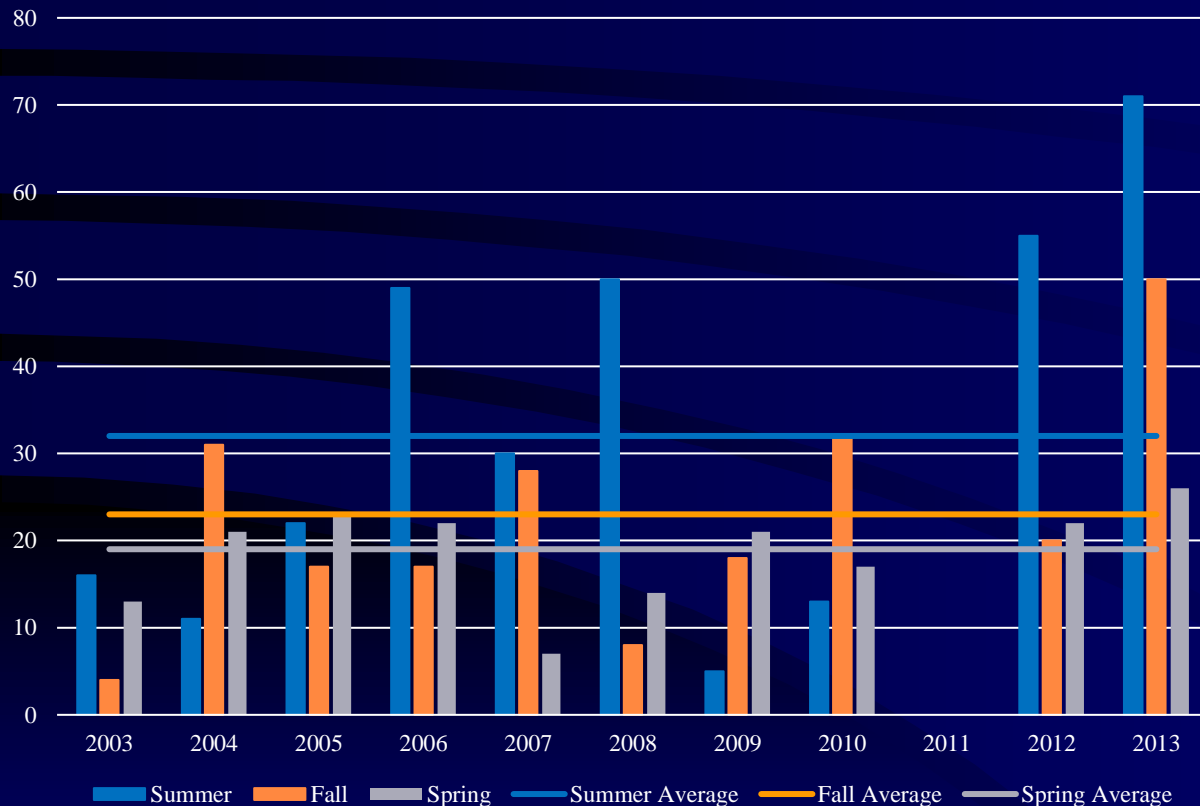
- Coefficient of Variation was 44 in Summer, and 15 in Fall.

- Harvest Variation in Summer about 3 x greater than in Fall.

- No evidence in harvest data for residency of so-called summer stock.

Summer (blue), Fall (orange) and Spring (grey) Harvests, 2003-2013

Pond Inlet

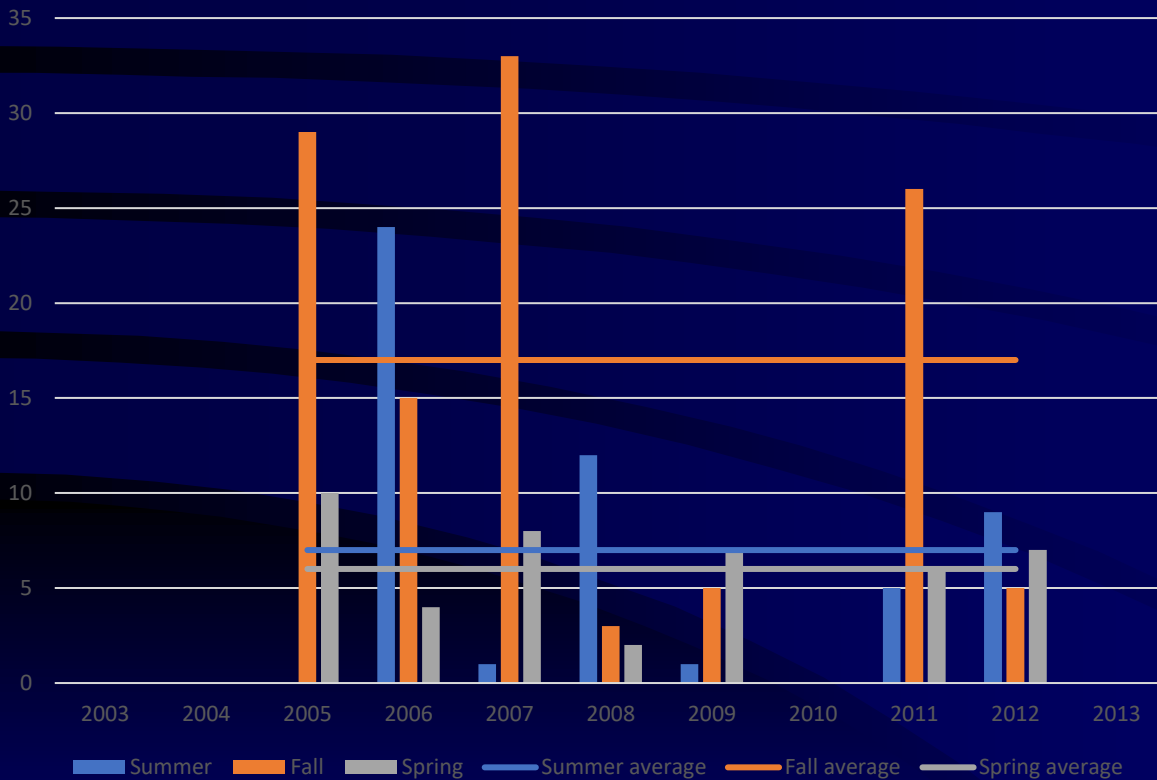


- Pond Inlet may not have had enough tags in 2011, but usually had enough in all 3 seasons.
- Coefficient of Variation was 67 in Summer, 55 in Fall and 29 in Spring.
- Harvest Variation in Summer was greater than in both Fall and Spring.
- **No evidence in harvest data for residency of so-called summer stock.**

Data from: Watt, C.A. and Hall, P. 2018. Catch statistics for narwhal (*Monodon monoceros*) in Canada from 1970-2015. Can. Tech. Rep. Fish, Aquat. Sci. 3270: 290 p.

Summer (blue), Fall (orange) and Spring (grey) Harvests, 2003-2013

Clyde River



- Clyde River may not have had enough tags in 2003, 2004, 2010 and 2013.
- Variation was 114 in Summer, 69 in Fall and 41 in Spring.
- Harvest Variation in Summer was greater than in both Fall and Spring.
- No evidence in harvest data for residency of so-called summer stock.

“There are No Summer Stocks!”

- Summer management of harvesting is neither efficient nor effective for any of the 4 communities because of harvest variation in summer is as high or higher than other seasons.
- NEBI HTOs tried to make summer-stock harvest management work for 8 years, but just can't!
- Eric Ootoovak told DFO several times in January 2020 that “there are no summer stocks”.
- The harvest data and surveys show that Inuit have been right! IQ is true, and Inuit Systems work!
- Will DFO reconcile with Inuit, and support Inuit Systems of NEBI narwhal management for at least a comparable period of 8 years, by May 2022?





NIRB File No.: 08MN053

May 17, 2022

David Qajaaq Qamaniq
Chairperson
Mittimatalik Hunters & Trappers Organization
P.O. Box 189
Pond Inlet, NU X0A 0S0

Sent via email: pond@baffinhto.ca

Re: The Nunavut Impact Review Board's response to Mittimatalik Hunters & Trappers Organization's request for action and implementation of specific adaptive management measures in respect of the Mary River Project

Dear David Qajaaq Qamaniq,

On May 6, 2022, the Nunavut Impact Review Board (NIRB or Board) received correspondence from the Mittimatalik Hunters and Trappers Organization (MHTO) in relation to the 2021 Annual Monitoring Report provided by Baffinland Iron Mines Corporation for the Mary River Project.¹ In the MHTO's correspondence, the MHTO expressed concern noting that:

Based on abundance estimates from aerial surveys conducted in 2004, 2013, 2016, 2019 and 2020, Baffinland is reporting in its Annual Report that the Eclipse Sound summering stock of narwhal has been significantly and steadily decreasing in number.

The MHTO requested the NIRB take immediate action to require Baffinland to implement the following adaptive management measures to mitigate the potential for effects on narwhal:

The MHTO suggests that Baffinland immediately be required to implement adaptive management measures. As a start, we suggest a reduction in shipping, further reduction in ship speed (beyond the 9 nm/h current commitment), abandoning this season's planned ice breaking, and making any adjustment to mining and trucking operations which may be required to support precautionary changes to shipping plans (i.e. fewer ships may mean less throughput)

¹ NIRB Document ID Nos.338435-338497.

The MHTO also requested: that the NIRB call an immediate meeting of the Marine Environment Working Group (MEWG) members to discuss the declining narwhal and the implementation of adaptive management. The MHTO also indicated that the most recent 2021 aerial narwhal survey was not publicly available and was only available to the members of the Marine Environment Working Group.

Oceans North (ON) also copied the NIRB on correspondence sent on May 6, 2022 to the MHTO,² in which Oceans North recommended “*significant mitigation measures be taken by Baffinland to reduce shipping intensity in an effort to protect summering narwhal populations and in the context of steep population decline in this region.*”

Before the NIRB had an opportunity to respond to the MHTO’s request, on May 10, 2022 Baffinland provided a response to the May 6, 2022 correspondence of the MHTO and ON to provide context and corrections.³ Baffinland stated the following:

Contrary to the claims in the MHTO letter, Baffinland publicly disclosed the 2021 aerial survey results in the 2021 Annual Report, and the full draft 2021 aerial survey results were provided to members of the Marine Environment Working Group (MEWG), including the MHTO, ON and NIRB on April 3, 2022.

At this time Baffinland has not made any final decisions with respect to the start of the shipping in 2022, and does not plan to do so until after the upcoming June 2022 MEWG meeting is complete and Baffinland has carried out related consultations to finalize the 2022 Narwhal Adaptive Management Response Plan.

The NIRB has now reviewed the correspondence received on this issue to date, and consulted with the NIRB’s Monitoring Officer for the file to consider the prior practice of the MEWG and Baffinland in respect of establishing the shipping window in each year. On this basis, it is the Board’s understanding that additional consultation with the MEWG and the MHTO is yet to come, and that Baffinland’s shipping and adaptive management planning for the upcoming 2022 shipping season have yet to be finalized, which is similar to the timing and process surrounding shipping in prior years.

The Board also highlights for all parties that the NIRB is not a member or a participant in the MEWG established under the Project Certificate, and does not have any decision-making authority or oversight functions in respect of the MEWG, its processes, or administration, such as organizing meetings, setting agendas or acting as a Chair. Accordingly, the Board does not have a role in mandating an immediate meeting of the MEWG as requested by the MHTO.

With respect to adaptive management, it is the Board’s expectation that the NIRB will be kept informed of the outputs of the MEWG such as thresholds, indicators, mitigation and adaptive

² NIRB Document ID No. 339606 and 339607.

³ NIRB Document ID No. 339608.

management plans and measures developed with the input of Working Group Members and adopted by Baffinland. It remains the responsibility of Baffinland, in consultation with relevant stakeholders, including local HTOs, community members, Designated Inuit Organizations, regulatory agencies with jurisdiction such as the Department of Fisheries and Oceans Canada, and other members of relevant Working Groups to develop and implement adaptive management measures that prevent or limit effects on valued ecosystemic components. As established under the Project Certificate, the MEWG is an essential mechanism relied upon by Baffinland to develop the specific plans for how effects on the marine environment, including marine wildlife, such as narwhal, are to be adaptively managed. As such, the Board encourages all participants to continue to actively participate in the MEWG's important discussions around this issue, and appreciates being kept informed regarding the outcomes of these discussions as part of the NIRB's project monitoring functions. However, the Board, as is appropriate for an impact assessment authority with project monitoring responsibilities, does not direct the implementation of specific adaptive management measures as requested by the MHTO.

In closing, the Board notes that the MHTO's correspondence was addressed to the NIRB's Chairperson, Marjorie (Kaviq) Kaluraq, but because the Chair is currently travelling and may be unavailable, and recognizing the importance of a timely response, this correspondence is provided on behalf of the Board by the Board's Acting Executive Director, Mark Ings.

Sincerely,



Mark Ings
Acting Executive Director
Nunavut Impact Review Board

cc: Mary River Distribution List



Mittimatalik Hunters & Trappers Organization

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P. O. Box 189, Pond Inlet, Nunavut X0A 0S0

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Email: pond@baffinhto.ca

May 17, 2022

Phil Rouget
Senior Marine Biologist
Golder Associates
Suite 300, 398 Harbour Road
Victoria, BC

Sent via Email: Philippe_Rouget@golder.com

RE: Golder Associates Proposal for 2022 Eclipse Sound Narwhal Tagging Study

Dear Phil Rouget:

On April 27, 2022, the Mittimatalik Hunters and Trappers Organization (MHTO) received Golder Associates' (Golder) proposal titled "2022 Eclipse Sound Narwhal Tagging Study". The MHTO understands Golder wishes to schedule a workshop to discuss the proposed research with the community of Pond Inlet.

While the MHTO understands the desire to collect information to fill various data gaps around narwhal behaviour in response to shipping in the early season and to the use of ice-breakers specifically, we have significant concerns and reservations about the work that has been proposed.

As noted within the MHTO's comments filed with the Nunavut Impact Review Board (NIRB) in response to Baffinland's 2019 Annual Report, the MHTO has not received indication that Baffinland is authorized to utilize icebreakers for the current project; we do not support the use of icebreaking vessels along the Northern Shipping Route.

In the MHTO's experience, narwhal and seal are disturbed by the use of icebreakers and by early season shipping, therefore we cannot support the use of icebreakers in our hunting waters, nor do we support the additional stress imposed by tagging darts on narwhals during an already-sensitive period in their migratory stage. Baffinland and Golder have been made aware of the MHTO's concerns around ice breaking and stressors to narwhal from shipping.

The MHTO also has concerns with Baffinland conducting or sponsoring this monitoring program and would prefer if Fisheries and Oceans Canada were the lead on any monitoring program involving the tagging of marine mammals.

During our regular meeting of May 4, 2022, the MHTO Board unilaterally passed motion No. 04-05-01-22 which states (summarized): “Whereas Phil Rouget is interested in developing and implementing a marine mammal monitoring program for Baffinland...and whereas MHTO prefers DFO conduct the tagging research instead of Golder Associates...and given that Golder Associates has no plan to include Inuit Qaujima-jatuqangit... and whereas Baffinland has no permission from NIRB to break ice... **therefore be it resolved that MHTO rejects Golder Associates’ request.**”

We thank Golder for submitting this proposal and workshop request, however the MHTO does not support the proposed narwhal tagging program.

Sincerely,

A handwritten signature in blue ink, appearing to read "David Qajaaq Qamaniq".

David Qajaaq Qamaniq
Chairperson
Mittimatalik Hunters and Trappers Organization

cc: Lou Kamermans, Baffinland
Cory Barker, NIRB
Jared Ottenhoff, QIA
Alasdair Beattie, DFO

MHTO Question	BIM Update
<p>What adaptive management options will we implement with 6MT operations?</p>	<p>In their May 6, 2022 letter to the NIRB concerning narwhal abundance observations in Eclipse Sound, the MHTO suggested several adaptive management measures including a reduction in shipping, further reduction in ship speeds (beyond the 9 nm/h current commitment) and abandoning this season’s planned ice breaking. Since received, Baffinland has been investigating the feasibility and effectiveness of the proposed mitigations. Below is a summary of our investigations to date, which we would like to discuss directly with the MHTO. There will also be additional discussions with the Marine Environment Working Group before our 2022 Narwhal Adaptive Management Response Plan is finalized.</p> <ul style="list-style-type: none"> • Avoiding Ice-breaking. Baffinland is proposing to initiate the shipping season in 2022 the same as it did in 2021 by avoiding the need for ice-breaking. Operationally, the trigger to commence the beginning of the 2022 shipping season will be the presence of a continuous path of 3/10ths or less ice concentrations between the entrance of Eclipse Sound and Milne Port. Based on historical ice conditions, waiting for a continuous path of 3/10ths or less ice concentrations represents an approximate 2-week delay from when landfast ice would otherwise be completely broken across the Northern Shipping Route and normal shipping operations would regularly commence. • Reduction in shipping. Should Baffinland be approved to ship 6 mtpa in 2022, it expects between 78 and 80 ore carriers to complete the task, which is 4-6 less than the 84 vessels Baffinland previously proposed would be required to ship 6 mtpa. Further, there are options that include the use of convoys and/or the use of larger vessels that could further reduce the total number of transits. We are open to further discussing this concept with the MHTO and to investigating the feasibility with its vessel traffic management service for the 2022 shipping season and beyond. • Reduction in ship speeds. Baffinland has directly contacted the shipping companies we charter with (Nordic, Oldendorf, Golden Ocean) with to understand if it is possible to reduce speeds further than the current 9 nm speed limit. The general response is that even a reduction to 8 nm/h could not be implemented across the fleet, and the implications of doing it may not be desirable to MHTO, some key points include: <ul style="list-style-type: none"> ○ Auxiliary Blowers: the lowest speed that most of the vessels can run at without the auxiliary blowers (used to flush air out of engine) cutting out is between 9-10 nm/h. Running at lower speeds of even 8 nm/h would require the auxiliary blowers to run non-stop, which they are not designed for, substantially increasing the risk of equipment failure

	<ul style="list-style-type: none">○ Engine Maintenance: Extended periods at 8 nm/h and below will see a build-up of engine/stack soot and accumulated cylinder oil in the exhaust system, which would require a daily speed increase to full power for 2-3 hours to clear exhaust passages. Without this, fouling of engine and turbochargers will occur, substantially increasing the risk of failures and creating the need for additional maintenance.○ Safe Navigation: Even at 8 nm/h the vessels that serve Milne Port would be nearing an unsafe steering speed, which means at that speed or under vessel Captains can lose the ability to effectively maneuver their vessels. Removing the ability to maneuver/steer vessels as they transit through Eclipse Sound and Milne Inlet is not an option.○ Longer Transits: The reduction in speed to 8 nm/h would also cause an increase in transit time of 3-4 hours for vessels as they transit from the entrance of Eclipse Sound to Milne Port. This would increase the time vessels and hunters would interact in the marine area.
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NIRB File No.: 08MN053, Registry No. 124703

June 20, 2022

Executive Director
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU X0A 0H0

Re: Further Update re MHTO Letter of May 6, 2022, Baffinland Letter of May 10, 2022 and NIRB Letter of May 17, 2022 re 2021 Annual Monitoring Report

Dear Ms. Costello,

Further to the letter from the Mittimatalik Hunters and Trappers Organization (**MHTO**) dated May 6, 2022, Baffinland Iron Mines Corporation (**Baffinland**)'s response of May 10, 2022, and the Nunavut Impact Review Board (**NIRB**) response of May 15, 2022, Baffinland is writing to update the NIRB Registry No. 124703 with respect to our planned shipping mitigations for 2022.

Baffinland has investigated the feasibility and effectiveness of the adaptive management measures recommended by the MHTO in their May 6, 2022 letter to the NIRB. Below is a summary of the adaptive management measures Baffinland will implement in 2022:

- **No icebreaking to commence the 2022 shipping season.** Vessels will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (**NSA**).
- **Use of convoys throughout the 2022 season to further reduce total sound exposure.** Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure. The use of convoying will be similar in effect to reducing the overall number of ships.
- **No more than 80 ore carriers will be chartered during the 2022 season to transport 6 mtpa, if approved.** This is 6 ore carriers less than the maximum anticipated in the previous Production Increase Proposal and Extension Request.

Baffinland investigated the feasibility of further reducing ship speeds within Eclipse Sound, per the MHTO's suggestion of May 6, 2022. Baffinland has contacted the shipping companies we charter with (Nordic, Oldendorf, Golden Ocean) to understand the consequences of reducing speeds further than the current blanket 9 nm/h speed limit. The consensus response is that even a reduction to 8 nm/h presents significant feasibility challenges with little benefit from a disturbance perspective. These issues include:

- **Auxiliary Blowers:** The lowest speed that most of the vessels can run at without the auxiliary blowers (used to flush air out of engine) cutting out is between 9-10 nm/h. Running at lower

speeds of even 8 nm/h would require the auxiliary blowers to run non-stop, which they are not designed for, substantially increasing the risk of equipment failure.

- *Engine Maintenance:* Extended periods at 8 nm/h and below will cause a build-up of engine/stack soot and accumulated cylinder oil in the exhaust system, which would require a daily speed increase to full power for 2-3 hours to clear exhaust passages. Without this, fouling of engine and turbochargers will occur, substantially increasing the risk of failures and creating the need for additional maintenance.
- *Safe Navigation:* Even at 8 nm/h the vessels that serve Milne Port would be nearing an unsafe steering speed, which means at that speed or under vessel Captains can lose the ability to effectively maneuver their vessels. Removing the ability to maneuver/steer vessels as they transit through Eclipse Sound and Milne Inlet is not acceptable from a project or public safety perspective.
- *Transit Times:* Reduced speeds do not translate to less disturbance. While sound fields may be reduced at slower speeds, the length of transit times increase. For each 1 nm/h reduction in speed an additional 3-4 hours is anticipated in transit time through Eclipse Sound and Mine Inlet. This additional transit time increases the period where vessels may interact with wildlife and hunters.

The current 9 nm/h speed limit is a strong and conservative mitigation measure. To our knowledge, this continues to be the lowest nautical speed limit in Canada, and well below the 11 nm/h speed limit applied on a voluntary basis in the Strait of Georgia (British Columbia) to mitigate noise impacts to Southern Resident Killer Whales, a highly endangered whale population (currently approximately 74 individuals).

The outcome of our investigation does not support any further reductions in ship speeds. However, to address MHTO's desire to reduce sound fields from ship movements overall within Eclipse Sound, Baffinland has committed to begin implementation of convoys during 2022, as noted above.

Baffinland has had meetings with the Marine Environment Working Group (**MEWG**), Department of Fisheries and Oceans (**DFO**) and MHTO with respect to the upcoming 2022 shipping season, and has issued an initial notification of these plans measures to each of these parties. Baffinland plans to continue engaging interested Parties to update the 2022 Narwhal Adaptive Management Response Plan (**NAMRP**) which will be filed with NIRB prior to the commencement of the 2022 shipping season.

Baffinland notes that the 2022 shipping mitigations have also been put forward as commitments within our Production Increase Proposal Renewal (**PIP Renewal**) application (filed May 20, 2022 and supplemented on June 15, 2022), which is currently out for public comment by NIRB until June 28, 2022. The PIP Renewal Application requests permission to continue to transport 6 mtpa during 2022, as Baffinland has been permitted to do since Project Certificate No. 05 was amended in 2018. For further background on our rationale for the planned 2022 shipping mitigations, Baffinland encourages reviewers to read our June 15, 2022 PIP Renewal supplemental materials (attached), including the supporting third party scientific rationale for the reduction in acoustic noise which can be expected as a result of implementing convoys. All documentation associated with the Board's processing of the PIP Renewal is available on the NIRB's Public Registry at www.nirb.ca/project/125710.

We appreciate the efforts of all parties in supporting the development and implementation of these adaptive management measures.

Best Regards,



Lou Kamermans
Senior Director, Sustainable Development Baffinland

Appendix A:

Production Increase Proposal Extension Renewal, Supplemental Materials June 15, 2022

MEMO

Production Increase Proposal Renewal

This memo is a supplement to Baffinland Iron Mines Corporation (**Baffinland**)’s an application filed on May 20, 2022, the “Production Increase Proposal Renewal” (**PIPR Proposal**), to provide further context for and clarity on commitments for the 2022 operation. This memo includes a summary of:

- Additional procedural background;
- Description of 2022 activities and updated commitments for 2022;
- Summary of relevant previous assessment materials and monitoring reports available on the NIRB registry;
- Summary of key issues to Inuit, including Inuit harvesting
- Summary of Inuit participation and stakeholder engagement; and
- Summary of ongoing compliance with the 2020 Project Certificate amendment monitoring program.

Baffinland has also attached a summary of applicable commitments to the continuing 6 mtpa operation for 2022, highlighting all-new commitments (see Appendix A). Further context for the new commitments is provided in this letter.

A Additional Procedural Background

On May 20, 2022, the Nunavut Impact Review Board (**NIRB**) received the PIPR Proposal application from Baffinland (the **2022 Application**) pursuant to s. 112 of the *Nunavut Planning and Project Assessment Act* (**NuPPAA**). Following an internal completeness check the NIRB requested additional information to determine the full scope and nature of the proposal which was provided by Baffinland via completion of a dedicated dashboard for the NIRB registry on May 30, with updated completed on May 31 and on June 10, 2022. The supplemental information in this document should also be considered by NIRB as part of the 2022 Application.

As the NIRB is also aware, on May 26, 2022, Baffinland asked the Minister to certify under s. 152 of the NuPPAA that an emergency exists and that it is in the interest of ensuring the health and safety of the general public that the 6 mtpa operation be permitted to continue during 2022, to avoid the significant harm to health that will arise in the event of significant workforce reductions at the Mary River Mine if we must operate at 4.2 mtpa during 2022. Under the process and requirements laid out under s.152, there is

a continuing strong regulatory role for NIRB, the Nunavut Planning Commission (NPC) and the Minister post certification of an emergency.

Key points raised in that request are summarized here:

- The emergency is avoiding the issuance of mass layoff notices on May 31, 2022 to up to 1,328 Canadians (which includes at least 209 Inuit), which would be triggered by the imminent stoppage of the production and trucking operation at Baffinland's Mary River Iron Ore Project (which represents 23% of Nunavut's economy).
- Baffinland is respectful of the current socio-economic realities in Nunavut, and the expressed desire of our employees to remain in their home communities. As communicated to NIRB by the Government of Nunavut during the Phase 2 Public Hearings, there are currently limited available alternatives to the jobs at Mary River in the North Baffin.
- Given current economic realities in Southern Canada there is no guarantee that alternative employment is available even if our workers are able and willing to leave their communities.
- Unemployment is associated with a negative impact on mental health and can amplify other stressors related to food security, housing, poverty, etc.
- The Nunavut Food Security Coalition Report states, "According to the Inuit Health Survey, the three main reasons for food insecurity are unemployment, low incomes, and high costs" (Nunavut Food Security Coalition Annual Report 2014-2015). Section 7.5 of the Mary River Project Food Security Assessment of the 2018 FEIS Addendum also speaks to the residual effects of employment and harvesting.
- Mary River Inuit workers have Section 35 Constitution Act rights, including rights under the Nunavut Agreement, that will be seriously and directly impacted if the mine is required to revert to a 4.2 mtpa operation during 2022. As an example, job loss will impair their ability to provide for themselves and their families, and to obtain hunting equipment to exercise their harvest rights.
- A reduction from 4.2 mtpa from 6 mtpa results in a reduction in benefits for Inuit under the IIBA. These are economic benefits negotiated by QIA on behalf of Qikiqtani Inuit as of right pursuant to Article 26 of the Nunavut Agreement.

Without a determination under s. 152 of NuPPAA or an amended Project Certificate that would permit 6 mtpa during 2022, on June 3, 2022 Baffinland had to take the first step towards mass workforce reductions by filing the required advance notices with the Government of Nunavut. As a result, confirmation as to whether the Mary River Mine can continue to run at 6 mtpa during 2022 is urgently required.

On June 7, 2022 the NPC issued a positive conformity determination for the PIPR Proposal and referred the proposal to NIRB. In their conformity determination (consistent with previous determinations in 2018 and 2019), the NPC confirmed that **the PIPR Proposal continues to not be considered a significant modification of the Mary River Project** under NuPPAA.

Continuing a 6 mtpa operation in 2022 is integrally linked to the ongoing Mary River Mine and does not require any activity or facility modifications. The PIPR Proposal is not a separate and distinct project from the Mary River Project – i.e. it would not be possible to operate the 6 mtpa operation as an independent proposal from the Mary River Mine.

Baffinland understands that despite the fact that the PIPR Proposal has already been determined by NPC not to be a “significant modification”, in order to proceed with 6 mtpa operations during 2022, two minor administrative amendments are required to Term and Condition 179(a) and (b) of the Project Certificate.

B Description of 2022 Activities and Mitigations

No changes are being proposed to our operations and activities that were previously permitted under Project Certificate No. 005 from 2018 to 2021. In fact, Baffinland is proposing several additional mitigations by design to apply to the 2022 operation that either reduce the overall scope of activities, or further reduce potential project effects. Mitigations by design aimed at reducing or avoiding project effects from occurring are the strongest forms of mitigation and increase the conservatism of our previous effects predictions reflected in the 2018 and 2020 applications.

Key relevant project activities (including where applicable new mitigations by design) include:

- Temporal and Spatial Scope: Continued operations at 6 mtpa for 2022.

If approved, Baffinland would be permitted to maintain the 6 mtpa transportation limits that were in place from 2018 to 2021 through to December 31, 2022. The spatial scale of the proposed activities remains the same as those approved for the current Mary River Mine.

- Ore Extraction and Processing: No change.

Ore extraction would continue from Deposit No. 1 at a rate of 6 mtpa for the purposes of transportation through the Northern Transportation Corridor, as it has previously from 2018 to 2021. This additional 1.8 Mt (i.e., an increase from 4.2 mtpa to 6 mtpa) will continue to require crushing and screening using existing facilities at the Mine Site.

- Ground Transportation of Ore to Milne Port: No change.

Ground transportation of iron ore by truck would continue at a rate of 6 mtpa, as it has previously from 2018-2021. As previously assessed in 2018 and 2020, the additional 1.8 mtpa increase in the amount of ore transported (i.e., an increase from 4.2 mtpa to 6 mtpa) will continue to require approximately 42 daily round trips by truck (84 one way transits) above what was assessed and approved during the ERP.

	ERP	PIP (2018-2021)	PIP (2022)
Daily Round Trips, Average (one way transits, average)	76 round trips (152 one way transits)	118 round trips (236 one way transits)	No change to previously assessed activities

- Stockpiling of Ore at Milne Port: No change to activities, additional design mitigation

Existing stockpile pads will continue to be sufficient to move 6 mtpa between the Mine and the ship loader. No additional stockpile space is required to support the PIP Extension Request.

Since November 2020 Baffinland has applied a spray (DusTreat) to the Milne Port ore stockpiles to reduce the potential for wind to transport dust outside of the Project Development Area (PDA). This program has produced measurable dust emission reductions from the Milne Port ore stockpiles (see 2021 Annual Report to NIRB, which is currently under public review and comment) and DusTreat will continue to be applied through 2022 as part of the PIPR.

- Marine Shipping of Ore from Milne Port: Reduced activities, additional design mitigation.

Marine shipping of iron ore would continue at a rate of 6 mtpa. As assessed previously, the additional 1.8 Mt increase in the amount of ore shipped (i.e., an increase from 4.2 Mtpa to 6 Mtpa) will require up to 22 voyages or round trips above what was assessed and approved during the ERP.

Baffinland is making additional commitments regarding 2022 shipping that were not part of the 2019 production increase application to NIRB. Baffinland has evaluated the mitigation measures proposed by the MHTO in their May 6, 2022 letter to the NIRB to apply to the 2022 shipping season.¹

As a result of the evaluation, Baffinland is proposing to include the following three additional mitigation measures in 2022, which will be included in the updated 2022 Narwhal Adaptive Management Response Plan which will be filed prior to the commencement of the shipping season:

- **No icebreaking to commence the 2022 shipping season.** Vessels will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA).
- **No more than 80 ore carriers will be chartered during the 2022 season to transport 6 mtpa.** This is 6 ore carriers less than the maximum anticipated and approved in the previous Production Increase Proposal (2019) and Extension (2020) requests.
- **Use of convoys throughout the 2022 season to further reduce total sound exposure.** Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to the separate vessel movements that Baffinland has implemented in previous years. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure (See Appendix B). The use of convoying will be similar in effect to reducing the overall number of ships.

The implementation of the new 2022 shipping season mitigations represents a significant reduction in many activities compared to the ERP, PIP and PIPE.

	ERP	PIP (2018-2021)	PIP (2022)
Seasonal Voyages (one way transits)	Break up of land fast ice required along entire shipping route to commence shipping*	Break up of land fast ice required along entire shipping route to commence shipping*	Ice coverage of 3/10ths or less required along entire shipping route to commence shipping*
	Up to 58 vessels	Up to 86 vessels	Up to 80 vessels

*As in previous years. confirmation from Pond Inlet that the floe edge has been closed will continue to be a requirement to commence shipping

¹ NIRB Registry, File No. 339606.

C Relevant Previous Assessment Materials and Monitoring Reports Available on NIRB Registry

As noted in our May 20, 2022 Application, a 6 mtpa transportation operation was assessed in the previous PIP (2018) Application and the PIPE (2020) Application. Further, the PIP and PIPE operations have been subject to comprehensive monitoring programs and reporting requirements under the Project Certificate for four consecutive years between 2018 and 2021.

For reference of parties, below is a summary of relevant review processes and/or materials that are available on the NIRB Registry:

i. Production Increase Proposal (PIP) Application (2018) and Production Increase Proposal Extension (PIPE) Application (2020) (also referenced in 2022 Application)

The PIP (2018) and PIPE (2020) both provide assessments of the project activities also contained in the PIPR (2022), consistent with the criteria set out at section 90 of NuPPAA as well as section 112 of NuPPAA. As detailed at Section B of this letter, the activities proposed under the PIPR (2022) are the same as or reduced as compared to the PIP (2018) and the PIPE (2020).

For ease of reference of interested reviewers, previous relevant assessment documents can be found on the NIRB registry as follows:

- Production Increase Proposal Application (2018), NIRB Registry, File Nos. 318140, 318283, and 318295.
 - Baffinland Response to Intervenor Comments (August 9, 2018), NIRB Registry, File No. 319335.
- Production Increase Proposal Extension Application (2020), NIRB Registry, File Nos. 327657, 327951, and 327952.
 - Baffinland Response to Intervenor Comments (February 13, 2020), NIRB Registry, File Nos. 328514 and 328515.

ii. Annual Reports to the NIRB covering PIP and PIPE Activities (2018-2021)

Baffinland recognizes that the topics raised in respect of the 2022 Application will overlap considerably with the current NIRB Annual Report process, which has been actively undergoing a public comment period on the results of the 2021 Project Certificate monitoring programs since April 12, 2022. While the NIRB requested comments on Baffinland's 2021 Annual Report by May 27, 2022, extensions were sought by the QIA and CIRNAC and comments are now anticipated to be submitted by June 30, 2022.

For ease of reference of interested reviewers, relevant documents can be found on the NIRB registry as follows:

- 2018 NIRB Annual Report for the Mary River Project, NIRB Registry, File Nos. 324120, 324121, and 324122.
 - Baffinland Response to Intervener Comments, NIRB Registry, File No. 325930
- 2019 NIRB Annual Report for the Mary River Project, NIRB Registry, File No. 327239.

- Baffinland Response to NIRB Recommendations and Intervener Comments, NIRB Registry, File Nos. 327564 to 327576.
- 2020 NIRB Annual Report for the Mary River Project, NIRB Registry, File No. 332232.
 - Baffinland Response to NIRB recommendations and Intervener Comments, NIRB Registry, File Nos. 333841 and 33851.
- 2021 NIRB Annual Report for the Mary River Project, NIRB Registry, File No. 337185.
 - Baffinland Response to NIRB Recommendations, NIRB Registry, File No. 337505, 337797.

iii. Phase 2 Proposal

While the PIPR Proposal is separate and distinct from the Phase 2 Project Proposal, a three-year 6 mtpa trucking operation is a sub-component activity of the Phase 2 Project Proposal during the construction period and so was considered as part of that assessment.

D Project Monitoring

Baffinland continues to implement a comprehensive environmental management system that has applied to four consecutive years of 6 mtpa activity levels (2018-2021). Provided here is a summary of 2021 monitoring results and 2022 monitoring and mitigations plans for species identified as of heightened importance to Inuit, including narwhal, seal, caribou and Arctic char. An update is also provided on Baffinlands Aquatic Invasive Species (AIS) Program. Baffinland understands the value in continual improvement and to address concerns raised regarding current approaches to adaptive management and administration of the environmental working groups, Baffinland also provides two solutions for consideration.

As noted above and in our letter to NIRB of May 10, 2022 (see NIRB Registry No. **339608**), summaries of the draft technical reports for 2021 described below were included in the 2021 Annual Report and copies of the draft technical reports for 2021 were provided to MEWG and TEWG members for review and comment in April 2022.

i. Narwhal Abundance in Eclipse Sound and Milne Inlet

2021 Aerial Survey Results

For the Leg 2 surveys, narwhal summer stock abundance was calculated for the Eclipse Sound stock, Admiralty Inlet stock, and the combined Eclipse Sound and Admiralty Inlet stock. The narwhal abundance estimate for the combined Eclipse Sound and Admiralty Inlet stock during the 2021 open-water season (Leg 2) was 75,177 individuals based on aerial surveys completed on 19 to 21 August 2021. This estimate is statistically higher than the abundance calculated during the previous DFO survey conducted in 2013 (45,532 narwhal), 2019 (38,677), and 2020 (36,044). For the Eclipse Sound stock alone, the narwhal abundance estimate during the 2021 open-water season was 2,595 individuals based on aerial surveys conducted on 20 to 21 August 2021. The 2021 estimate for the Eclipse Sound stock alone is statistically lower than the 2016 DFO estimate of 12,039, the 2013 abundance estimate of 10,489, the 2019 abundance estimate of 9,931, and the 2020 abundance estimate of 5,018.

2022 Monitoring Plans

The following monitoring programs specific to caribou will be carried out by Baffinland in 2022.

- Marine Mammal Aerial Survey Program
 - The 2022 MMASP is proposed to occur during two separate survey legs: Leg 1 (early shoulder season) and Leg 2 (open-water season). The Leg 1 surveys are proposed to occur in early July, when narwhal undergo their spring migration through Eclipse Sound. The objective of the Leg 1 surveys is to collect data on the presence/absence and distribution of marine mammals prior to and during initial shipping operations in the RSA. The Leg 2 surveys are proposed to occur in early August corresponding with the peak open-water period. The objective of the Leg 2 surveys is to obtain an updated abundance estimate for

the Eclipse Sound and Admiralty Inlet narwhal summer stocks and comparison to previously reported abundance estimates.

- Shore-Based Monitoring Program (Bruce Head)
 - The objective of the Bruce Head Shore-based Monitoring Program is to investigate narwhal response to shipping activities along the Northern Shipping Route in Milne Inlet, with data collected annually on relative abundance and distribution (RAD), group composition, and behaviour. Additional data are also collected on environmental conditions and anthropogenic activities (e.g., shipping and hunting activities) to distinguish between the potential effects of Project-related shipping activities and confounding factors which may also affect narwhal behaviour. Unmanned Aerial Vehicle (UAV)-based focal follow surveys will collect fine-scale behavioral response data of narwhal in close proximity to the Northern Shipping Route throughout Milne Inlet.
 - Baffinland plans to investigate the feasibility of collecting morphometric data from narwhal using a calibrated drone system, which could be used to feed into a remote body condition monitoring program. Baffinland collected similar data in 2021 and plans to engage a graduate student to develop the program design, data processing and reporting. It is important to note that this program will only provide insight into overall narwhal health, but it will not be possible to make associations with shipping as body condition of narwhal in August would only be reflective of their life cycle prior to shipping commencing.
- Ship-Based Observer Program
 - The SBO program was suspended in 2020 and 2021 due to Covid-19 restrictions on the Botnica. The program will be implemented again in 2022 when the Botnica is planned to be active in the Project area, which has been reduced to the Fall due to the continued commitment by Baffinland not to break ice to commence the shipping season. The SBO programs ensures that collisions with marine mammals and seabird colonies are observed and reported, as well as any incidental observations that are possible while SBO's are active.
- Passive Acoustic Monitoring (PAM) Program
 - The 2022 Floe Edge PAM Program aims to measure sound levels near the ice floe edge (as requested by the MHTO) in order to understand ship noise levels and the relative presence of marine mammal vocalizations near the entrance of the Regional Study Area (RSA) throughout the fall, winter and spring periods. No recorders will be redeployed for the 2022 Summer season out of respect for concerns raised by residents of Pond Inlet and carried forward by the MHTO

These programs were discussed during the Spring 2022 meeting of the Marine Environment Working Group (MEWG) on June 14th. Recommendations from this meeting will be tracked and either integrated

into the 2022 monitoring program designs, or if the recommendations are not feasible, Baffinland will provide a written response to explain the rationale. All recommendations will be considered and a full tracking table will be provided back to the MEWG.

In the 2022 reporting period the results of Baffinlands programs may be supplemented by other regional monitoring initiatives reported by DFO or other parties. Baffinland continues to be open to engage on regional monitoring initiatives that would support a greater understanding of narwhal generally, and not just in relation to potential project effects.

2022 Narwhal Adaptive Management Response Plan

As referenced above, Baffinland filed a Narwhal Adaptive Management Response Plan (**NAMRP**) with NIRB prior to the 2021 shipping season. The NAMRP was developed as an adaptive management response to 2020 marine mammal monitoring observations of a lower narwhal abundance in the Eclipse Sound summer stock area as compared to 2019. The NAMRP was developed in consultation with the Marine Environment Working Group (**MEWG**) and its individual members, including Fisheries and Oceans Canada (**DFO**), the Qikiqtani Inuit Association (**QIA**), the MHTO, the Hamlet of Pond Inlet and the Government of Nunavut. Baffinland is currently updating the 2021 NAMRP for 2022 to reflect updated monitoring programs and shipping mitigations.

As reflected in the 2021 Annual Report to NIRB and supporting technical reports currently in draft for comment with the MEWG, 2020 and 2021 observations of potential lower narwhal abundance in Eclipse Sound as compared to previous aerial surveys do not reflect an overall reduction of the regional narwhal population and do not appear to be a result of the Project. These observations are more likely the product of natural exchange of the species between Eclipse Sound and Admiralty Inlet, other more global factors that are affecting the Arctic marine area due to climate change i.e. predation, forage availability, ice conditions, etc., and other activities in the area such as construction of the Pond Inlet small craft harbour.

Per Baffinland's letter of May 10, 2020 to NIRB, comprehensive March 2022 submissions by the Qikiqtaaluk Wildlife Board (**QWB**) (which is comprised of the chair from each hunters and trappers organization within the Qikiqtaaluk region) to the Nunavut Wildlife Board support the QWB's view that narwhal move freely throughout the waters of Northern and Eastern Baffin Island (NEBI), and that there is no "Eclipse Sound Stock" of narwhal separate and distinct from the general narwhal population in NEBI. Baffinland will submit the final 2022 NAMRP to the NIRB attached to the Marine Shipping and Vessel Management Report on or before July 15, 2022 (same submission procedure and date as 2021)

ii. Seal Abundance in Eclipse Sound and Milne Inlet

2021 Aerial Survey Results

Two types of analyses were performed on the 2021 dataset. Strip-transect analysis of infrared imagery combined with digital photographs was used to calculate densities of ringed seals in the RSA, and density surface modelling was used to identify ringed seal hotspots in the RSA.

- Results from the 2021 forward-looking infrared (FLIR) survey indicated that ringed seal densities are stable in Eclipse Sound (ES) and Navy Board Inlet (NB) strata and increased in Milne Inlet (MI) stratum compared to surveys flown in 2016.
- Ringed seal hotspots were identified in similar geographic areas in 2021 as in 2016–2017, with hotspots in western Eclipse Sound, southern Milne Inlet and Tremblay Sound. The eastern Eclipse Sound hotspot identified in 2016 and 2017 was not present in 2021. The northern half of Navy Board Inlet had low sightings of ringed seals in all years (2016, 2017, and 2021).

Mitigation measures in place for ringed seal have been carefully developed to completely avoid shipping impacts on ringed seal during periods when they are “grouped up” (i.e., the winter and spring) when group behaviour is critical to reproductive activities such as mating. The timing of the shipping season protects seals during the basking period and aims to avoid impacts on seals at the time when they start maintaining breathing holes during initial ice freeze-up.

The results of the 2021 RSASP showed ringed seal densities have overall remained stable since the onset of shipping operations in 2015, and since Project icebreaking activities began in the shoulder seasons in 2018. These results confirmed that mitigation measures were functioning as intended and that Project activities are being managed in a way that has not adversely affected ringed seals. Given that no changes to icebreaking operations are proposed within Baffinland’s Phase 2 Proposal, these results also lend confidence to predictions made in Phase 2 impact assessment, which states that effects on ringed seal as a result of the Project would not result in population level effects (Golder, 2018).

2022 Monitoring Plans

Ringed seal surveys are not recommended in 2022 for the Eclipse Sound area based on the 2021 survey results.

iii. Caribou Interactions with the Project

2021 Height of Land, Snow Track and Camera Program Results

Caribou monitoring included snow track surveys, height of land caribou surveys and remote wildlife camera installations. No caribou were observed during the height of land surveys in 2021, and no caribou tracks were identified during the snow track surveys. These results are consistent with previous years, and with low regional abundance estimates provided by the Government of Nunavut. Remote wildlife cameras installed in 2021 to address questions from the Terrestrial Environment Working Group on whether caribou were near the Project site when height-of-land surveys were not being run did not detect a single caribou in the over 42,000 photos captured from the 12 cameras. Baffinland remains confident that the results of caribou monitoring programs are a by-product of the low regional abundance numbers in caribou, and not due to a methodological issue with the programs.

Caribou Monitoring Triggers and Recommendations Report

This work aimed to identify triggers for Project-related impact monitoring of caribou on North Baffin Island. Approximately 350 caribou or 35 caribou groups within the Study Area were identified as the

trigger to initiate a collaring program, which would be the primary means of regional-level impact monitoring. This study also revealed that a minimum of 35 collars/year in a spatially limited area (for both the North and South footprints, respectively) is necessary to provide adequate sample sizes for evaluating (1) potential barriers to movement and (2) indirect habitat loss due to the Project.

Although this assessment provides clear recommendations based on known caribou ecology, critical review of the literature, and statistical modelling, it is expected that input from the TEWG and Inuit will refine the triggers for modifications to Baffinland's caribou monitoring programs moving forward.

2022 Monitoring Plans

The following monitoring programs specific to caribou will be carried out by Baffinland in 2022.

- Height of Land Survey and Remote Camera Deployment
- Snow Track Surveys
- Aerial Caribou Survey

These programs will be discussed during the Spring 2022 meeting of the Terrestrial Environment Working Group (TEWG), currently planned for June 23rd. Recommendations from this meeting will be tracked and either integrated into the 2022 monitoring program designs, or if the recommendations are not feasible, Baffinland will provide a written response to explain the rationale. All recommendations will be considered and a full tracking table will be provided back to the TEWG.

In the 2022 reporting period the results of Baffinlands programs may be supplemented by regional caribou monitoring outcomes reported by the GN. Baffinland and the GN are continuing to work on the development of a Caribou Research Agreement and Data Sharing Agreement and look forward to finalizing and implementing the agreements for the benefit of regional caribou monitoring.

iv. Arctic Char Health and Abundance Outside of Project Area

2021 Milne Inlet Freshwater Fish Health Assessment Results

The assessment carried out in August 2021 represented the first year of the Milne Inlet Freshwater Fish Health Assessment. The objective of the program is to determine whether the Milne Port operations have had any negative effects of Arctic Char health. Given the comparison of endpoints between 2021 and historical data, the Milne Port operations did not appear to result in adverse effects on Arctic Char health from the Tugaat and Qurluktuk river systems. Fish growth (length-at-age) of fish captured from both Tugaat and Qurluktuk lakes in 2021 was either greater or not significantly different from those captured historically. Additionally, char body condition was significantly greater in males and females captured from Qurluktuk Lake in 2021 compared to those assessed historically, and no significant differences in condition were indicated between 2021 and historically at Tugaat Lake for males. Finally, the concentrations of mercury in char muscle tissue samples collected in 2021 at both Tugaat and Qurluktuk lakes were generally below federal consumption guidelines, and consistent with baseline values. Moving forward, further consultation with the MHTO is recommended to inform on additional analysis of the 2021 data

prior to report finalization, and to provide input regarding future monitoring as part of the Milne Inlet Freshwater Fish Health Assessment.

2022 Monitoring Plans

Baffinland plans to implement a second year of monitoring in the Tugaat, Robertson (Qurluktuk), and Ikaluit river systems in August 2022 to evaluate fish health based on comparisons to data reported from these systems in 2021 and prior to construction/operation of the Baffinland Milne Port operation. The MHTO has been asked to designate a representative to join the program, which will be carried out in August, similar to 2021. Baffinland will also seek the advice of the MHTO on the 2022 program prior to its final design and implementation.

v. Aquatic Invasive Species

Baffinland has a status update to share from the NIS/AIS Program. The worm initially thought to be *Marenzelleria viridis*, invasive to Northern European waters, has been confirmed to be two species of the same genus – *Marenzelleria arctia* and *Marenzelleria wireni* – which are indigenous to the Arctic Region and, therefore, not invasive to Milne Port.

On June 2, 2022, Baffinland received genetic results resolving the identification of *Marenzelleria* specimens collected as part of targeted monitoring efforts in summer of 2021. Molecular analysis confirms these specimens as *Marenzelleria wireni*, which appears to have a broad, pan-Arctic range. In addition, as communicated to the NIRB during the last round of hearings, another species of this genus - *Marenzelleria arctia* - was also identified in sediment samples from Milne Inlet, near Phillips Creek (in addition to *M. wireni*). The *M. arctia* identification was made by the global expert on this type of marine worm based on morphological analysis, not genetic methods so there is slightly less certainty in this identification. This means that all specimens that were originally identified as *M. viridis* between 2019-2021 have now been corrected to either *M. wireni* (high confidence, based on molecular analysis) or *M. arctia* (moderate-high confidence, based on taxonomic methods) meaning that no NIS/AIS species have been confirmed in Milne Port to date. To further support this, we have attached a recently published paper that represents the best available science on the origins of *Marenzelleria* species globally, and lists both *M. arctia* and *M. wireni* as indigenous to the Arctic region (Radashevsky et al. 2022). In 2022, Baffinland will continue to collect samples for molecular analysis to evaluate the distribution of *M. wireni* in Milne Port and to clarify the identification of *M. arctia*.

This experience also serves to highlight the prudent nature of Baffinland's approach to potential NIS/AIS detection, where we believe the first step must be additional information gathering and targeted monitoring until it is confirmed that the species in question is, in fact, non-indigenous AND showing signs of causing harm to the local environment. This is particularly important in the context of the Canadian Arctic, where benthic fauna are understudied and species inventories are incomplete, making it difficult to confirm species identifications and establish species origins and natural ranges. Eradication and control methods should neither be rushed nor undertaken lightly because these methods can be highly indiscriminate and destructive, resulting in the complete eradication or destruction of entire benthic

communities and/or habitats, not just the target species, potentially creating conditions that promote recruitment of AIS. In this case, rushing into intervention without performing the necessary due diligence following detection of a potential NIS/AIS would have unintentionally set off a cascade of long-term consequences on the marine ecosystem of Milne Port in an attempt to eradicate/contain species that have turned out to be indigenous.

vi. *Proposed Modifications to Existing Management Strategies*

Baffinland understands that parties continue to express concerns with existing approaches towards Baffinlands adaptive management framework and administration of the environmental working groups. Baffinland proposes the following two solutions, which may be implemented in 2022 and include:

- Baffinland will implement an interim version of the Adaptive Management Plan originally developed through the Phase 2 Proposal review process to apply to the remainder of 2022.
- Baffinland will agree to amendments to the Terms of Reference for the TEWG and MEWG that provides for consensus based decision making and the transfer of responsibilities for chairing and administering the working groups to either a community representative or a third party facilitator as agreed to between Working Group Members.

Baffinland commits to provide a draft interim Adaptive Management Plan and a revised draft Terms of Reference for the TEWG and MEWG to the NIRB.

D Inuit Harvesting

i. Baffin Island Caribou

On May 18, 2022 the GN confirmed the Baffin Island harvest quota of 250 caribou was met and the harvest was closed. The following harvest data for the 2021/2022 season was reported for the nine (9) Nunavut communities subject to the Baffin Island harvest quota:

Community	Tags	Harvest	Surplus/Deficit
Pond Inlet	35	42	120%
Arctic Bay	19	16	84%
Clyde River	31	31	100%
Igloolik	43	45	105%
Sanijarak	4	2	50%
Total North Baffin	132	136	103%
Iqaluit	43	45	105%
Kimmirut	35	35	100%
Kinngait	21	21	100%
Qikiqtarjuaq	19	10	53%
Total South Baffin	118	111	94%
Total Baffin Island	250	247	99%

Based on the table above, it appears that the North Baffin communities were relatively more successful in harvesting compared to their quotas than South Baffin communities and that North Baffin communities overall harvested more caribou than South Baffin communities. Pond Inlet specifically harvested the most caribou compared to their allotted tags, and the third most of all Baffin Island communities, only being passed by an additional 3 caribou in each of Igloolik and Iqaluit, the only two communities larger in population than Pond Inlet.

ii. Eclipse Sound Summer Narwhal Stock

On November 6, 2021 and again on January 10, 2022 the GN confirmed that during the 2021-2022 harvesting year a total of 152 tags were issued to Pond Inlet (137 for Summer, and 15 for the Fall/Spring). The entire summer quota of 137 narwhal were successfully harvested and reported to the GN Wildlife Office.

Since the development of the Food Security Assessment for the Phase 2 Proposal, Baffinland has been tracking the annual issuance of narwhal harvest tags to help inform a better understanding of the number of narwhal that are being reported as harvested and available for consumption in Pond Inlet. As presented in the table below, based on 21 years of available harvest and population data for Pond Inlet, an above average number of narwhal have been harvested on a nominal and per capita basis in 6 of the 7 years Project shipping has occurred.

Year	Pond Inlet Population	Narwhal Harvest	Per Capita Narwhal Harvest	Average Narwhal Harvest	Average Per Capita Narwhal Harvest
2001	1282	65	0.051	82	0.056
2002	1307	63	0.048		
2003	1341	67	0.050		
2004	1358	65	0.048		
2005	1375	62	0.045		
2006	1369	88	0.064		
2007	1383	65	0.047		
2008	1400	73	0.052		
2009	1,453	44	0.030		
2010	1482	62	0.042		
2011	1533	112	0.073		
2012	1544	97	0.063		
2013	1579	147	0.093		
2014	1613	135	0.084		
2015	1639	190	0.116	144	0.082
2016	1663	118	0.071		
2017	1790	159	0.089		
2018	1784	64	0.036		
2019	1809	184	0.102		
2020	1835	140	0.076		
2021	1862	152	0.082		
Increase in Harvest (2015-2021 compared to 2001-2014 period)				176%	144%

In the years that Baffinland has carried out commercial shipping of iron ore (2015-2021), an annual average of 144 narwhal were harvested in that time period, and the average narwhal harvested per resident of Pond Inlet was 0.082. In the 14 years prior to commercial shipping the annual average number of narwhal harvested was 82, and on a per resident of Pond Inlet basis it was 0.056. These differences are significant (176% and 144% growth since commercial shipping, respectively) and challenge the concept that there are less narwhal available for consumption since the Project started.

iii. Support for Harvesters in Inuit Agreements

When Project activities began in 2013, Inuit and the Company acknowledged that impacts to harvesting may occur from the Project. Specifically, Article 13.1 of the IIBA (QIA & Baffinland, 2018) notes the following:

“The objective of Article 13 hereof is to ensure that any potential incompatibility of the rights of Inuit to free and unrestricted travel and access for harvesting to all lands, water and marine areas within the Nunavut Settlement Area with the Company’s land use activities and rights of

navigation in marine areas may be reduced...The QIA recognizes that the Company's right to operate and manage their activity within the Project area including the rail and shipping corridor, subject to the provisions of this Agreement and QIA recognizes the restriction on Inuit right of access under Sections 5.7.18 and 5.7.25 of the NLCA..."

In consideration of these effects, Article 5 (Financial Participation) ensures that Inuit receive:

- a minimum of \$1,250,000 quarterly, or \$5,000,000 annually, in the form of resource royalties;
- funding for the Wildlife Compensation Fund (Article 17.6 of the IIBA); with distribution of this fund managed directly by the QIA;
- Hunters Enabling Fund which provides 300 Liters of fuel to Inuit over the age of 12 residing in Pond Inlet. (IIBA 17.7, 2018);
- Marine Research Equipment which will provide each North Baffin Community with a marine vessel beginning in 2021 (IIBA 17.9, 2018); and the
- Wildlife Monitoring Program which provides \$200,000 annually to the MHTO to conduct community based research (IIBA 17.8, 2018).

The Marine Research Equipment (IIBA 17.9) and Wildlife Monitoring Program (IIBA 17.8) were developed in part due to the concerns expressed by harvesters and the desire for more community based monitoring that is planned, led, and carried out by Inuit in the North Baffin Communities. This allows for topics of greatest concern to be actively monitored by Inuit.

Moreover, in response to concerns raised during the original PIP, Baffinland, the Mittimatalik Hunter and Trappers Organization, and the Hamlet of Pond Inlet signed the "Agreement to Establish the Pond Inlet Committee". This agreement recognized the desire for improvements to the way in which Project benefits were being distributed to communities. The agreement commits Baffinland to providing \$10,000.00 to the Tasiuqtiit Working Group for every ore carrier required to ship in excess of 4.2 mtpa. Between the 2018 and 2021 shipping seasons, this Agreement has earned the Tasiuqtiit Working Group \$730,000. If Baffinland uses up to 80 ore carriers to transport 6 mtpa, using 58 vessels as the approximate number of vessels required to transport 4.2 mtpa, the Tasiuqtiit Working Group should receive an average of \$220,000 per shipping season.

E Inuit Participation and Stakeholder Engagement

In addition to any process NIRB determines to carry out with respect to the 2022 Application, Baffinland appreciates that the NIRB monitoring process and the Phase 2 Process have also provided an ongoing opportunity for engagement with Inuit, Inuit organizations and regulatory agencies on the 6 mtpa operation.

Baffinland's previous PIPE (2020) Application contains a comprehensive description of how Inuit and Inuit Qauimajatuqangit are integrated into Baffinland's environmental management system, and how it applies to 6 mtpa operations specifically (Section 4.4).

These same commitments and practices will apply to the 2022 period, particularly with respect to Inuit participation in environmental monitoring, and engagement with Inuit on monitoring plans (See Appendix A).

i. Summary of PIPR Specific Engagement to Date

Baffinland has carried out extensive engagement activities in relation to the PIP (2018) and PIPE (2020) that have shaped the project as it has operated between 2018 and 2022, and continues to influence how we are planning for shipping and other project activities in 2022.

For the PIPR (2022) specifically, Baffinland has been communicating with various parties to discuss the need for the continuation of operations at 6 mtpa in 2022. These organizations and engagement dates include:

- Nunavut Tunngavik Incorporated (May 19)
- Qikiqtani Inuit Association (May 17, 25, 30, June 8, 9)
- Government of Nunavut (May 18, 25, June 7)
- North Baffin Hamlets (May 20, 24, 27, 30)
- Mittimatalik Hunters and Trappers Organization (May 24, 27, 31)

Further to the above engagements, Sanirajak has issued an updated letters of support specifically for the 2022 PIPR (see Appendix C). Other organizations have also issued letters of support (see Appendix D).

ii. Baffinland Support for Inuit Led Monitoring Related to Harvesting and Food Security

Baffinland acknowledges that the harvest data reported for caribou and narwhal do not account for harvesting effort. Further to that, harvest data is not available publically for Arctic char or seal, making it difficult to understand harvest effort and success on an annual or overall basis. As a result, Baffinland has already committed to support the reconciliation of differences in experiences between Baffinlands monitoring programs, publically available harvest data and harvesters experience. For clarity this commitment continues to stand for 2022.

Through the Inuit Certainty Agreement, Baffinland agreed to fund in its entirety, regardless of the outcome of Phase 2, a Pond Inlet Country Food Baseline Report, led by the QIA and community of Pond Inlet. The results of this study have yet to be released by the QIA, however, Baffinland is committed to

integrating the findings of this report into its own monitoring programs, annual reports, and adaptive management plans.

Further to the above, Baffinland is also willing to commit to work with QIA and communities to continue to develop Inuit specific indicators and thresholds and integrate them into Baffinlands relevant adaptive management plans, or a dedicated CRLU monitoring program to be administered by Baffinland with the support of an independent Inuit Committee, similar to the Dust Audit Committee, which has been formed to support the ongoing and independent audit of dust sources across the Project. Baffinland is willing, upon agreement with QIA and the North Baffin communities, to initiate this work as soon as Summer 2022, and to have the Inuit indicators and thresholds ready to apply against 2022 monitoring program results where possible, and future monitoring. Should community based monitoring initiatives be required to report on Inuit based indicators and thresholds, Baffinland will provide that funding through the existing Wildlife Monitoring Program or other arrangement as agreed to.

F Ongoing Compliance with the 2020 Project Certificate Amendment Monitoring Program

As part the PIPE (2020), the NIRB determined that certain aspects of the ongoing monitoring program for Project Certificate No. 005 and reporting requirements for the Mary River Project may need to be updated, and/or require additional follow up actions to address potential environmental issues.

The following monitoring and reporting updates were submitted to the NIRB by Baffinland as required by Section 3.1 of Project Certificate 005 (May, 2020).

i. Marine Shipping Report

Baffinland submitted a Marine Shipping and Vessel Management Report to the NIRB prior to the commencement of the shipping seasons in 2020 and 2021, informing the Board of the following:

- Anticipated number of ship transits along the approved shipping route;
- Identification of specific areas to be used for drifting and anchorage of vessels with details of how community feedback and comments from the MEWG has been used to inform the selection of suitable areas;
- Timeline for organizing pre- and post-shipping meetings with the community;
- Plans for preventing or mitigating vessel interference with marine mammals and traditional hunting activities pursuant to term and condition 125(a) of the Project Certificate;
- Evidence of community involvement to review preliminary results of the monitoring programs, and to compare results with experiences of community members and hunters with respect to the marine environment and marine mammals during the shipping season; and
- Evidence of reporting new or non-native species identified as a result of Aquatic Invasive Species monitoring, to MTHO and DFO with confirmation of whether or not this species had been observed in the past or through other community or regional monitoring initiatives.

Baffinland will submit a standalone Marine Shipping and Vessel Management Report to the NIRB prior to the commencement of the 2022 shipping season.

ii. Tote Road Monitoring Program

Results of Baffinland's Tote Road Monitoring Program were reported as part of Baffinland's 2020 and 2021 Annual Report to the NIRB. Summaries of the program are provided for in relation to Project Certificate Term and Condition No. 46 and also in the Annual Report for Operations to the NWB/QIA. Reporting has included considerations for the following NIRB recommendations:

- A detailed review of the data collected and indication of whether there are any observed Project-related increases to Total Suspended Solids in surface water as a result of the increased use of the Tote Road; and
- An assessment of whether dust management and mitigation measures committed to are functioning as intended to manage dust emissions along the road and sedimentation impacts on surface water as a result of the potential increase of Project-generated dust deposition associated with the production increase.

During 2022 Baffinland will continue submitting the results of the Tote Road Monitoring Program to the NIRB and NWB through its regular annual reporting obligations.

Baffinland will consider the proactive implementation of recommendations contained in the Interim Dust Audit Report, expected for release following the completion of the Dust Audit Committee Site Visit (June 8-15). Preliminary recommendations have been shared with Baffinland as follows:

- Strategic evaluation and installation of wind fencing
- Application of additional dust suppressants (DustBlok, DusTreat) to the airstrip and other stockpiles
- Revisions to blasting management plans and practices
- Continuous dust monitoring at PDA boundaries
- Ongoing involvement of Inuit in dust management
- Other operational practice improvements

A summary of mitigations related to dust applicable to the PIPR are included in Appendix A

iii. Management Plans

Following the approval of the 2020 (PIPX) application, Baffinland updated the following management plans as required to reflect the scale and scope of the proposed activities and potential impacts, including but not limited to:

- Waste Rock Management Plan;
- Air Quality and Noise Abatement Management Plan;
- Dust Management and Monitoring Plan;
- Shipping and Marine Wildlife Management Plan;
- Tote Road Monitoring and Management Plan;
- Greenhouse Gas Reduction Plan and Climate Change Strategy;
- Spill Contingency Plan;
- Freshwater, Sewage and Wastewater Management Plan, and
- Milne Port Oil Pollution Emergency Plan.

Baffinland is proposing to update additional plans as required to reflect the new mitigations outlined in Appendix A.

F Conclusion

Thank you for the opportunity to provide additional information on the PIPR Proposal. Baffinland would be pleased to provide additional information to NIRB as needed.

Appendix A
Mitigation List

1 ENVIRONMENTAL MITIGATIONS FOR KEY ISSUES

The table below includes mitigation measures relevant to the proposed sustained increase in the production and transportation of iron ore at 6 million tonnes per annum (mtpa). The majority of mitigations are already included in the current Shipping and Marine Wildlife Management Plan (SMWMP), the Terrestrial Environment Mitigation and Monitoring Plan (TEEMP) and the Air Quality and Noise Abatement Management Plan (AQNAMP). Additional mitigations proposed as part of the Production Increase Proposal Renewal (PIPR) are highlighted in yellow. Management plans will be revised as necessary based on agreements developed through the PIPR review process and submitted to NIRB following the issuance of an amended Project Certificate 005.

Project Activity	Mitigation Measure(s)
<p>Mitigation measures to reduce or avoid impacts to marine mammals as a result of shipping</p> <p>Relevant Species: Ringed Seal, Bearded Seal, Walrus, Beluga, Narwhal, Bowhead Whale, Polar Bear</p>	<ul style="list-style-type: none"> • Maintain constant speed and course when possible. • Reduce vessel speed to 9 knots. • Reduce vessel idling • Additional temporary measures have been introduced for 2021 that shipping will not commence a continuous path of 3/10ths or less ice concentrations between the entrance of Eclipse Sound and Milne Port is present. • No breaking of landfast ice will occur in the spring or fall shoulder season. • When marine mammals appear to be trapped or disturbed by Project vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area (as safe navigation allows). • All Project vessels will be provided with standard instructions to operate their vessel in a manner that avoids separating an individual member(s) of a group of marine mammals from other members of the group; • All Project vessels will be provided with standard instructions to not approach within 300 m of a walrus or polar bear observed on sea ice; • Vessels awaiting instructions from the Port Captain to enter the RSA will be instructed to wait in Baffin Bay at least 40 km east of the Nunavut Settlement Area. • No icebreaking to commence the 2022 shipping season. Vessels will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA). • No more than 80 ore carriers will be chartered during the 2022 season to transport 6mtpa. This is 6 ore carriers less than the maximum anticipated and approved in the previous Production Increase Proposal and Extension Request. • Use of convoys throughout the 2022 season to further reduce total sound exposure. Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated

Project Activity	Mitigation Measure(s)
	<p>for by shorter exposure duration, resulting in a net decrease of noise exposure (See Appendix B). The use of convoying will be similar in effect to reducing the overall number of ships.</p>
<p>Mitigation measures to reduce or avoid impacts to terrestrial wildlife as a result of operations (mine site, tote road and Milne Port)</p> <p>Relevant Species: Caribou, Wolf</p>	<p>Mitigation measures that will reduce the likelihood of reduced habitat effectiveness for caribou include:</p> <ul style="list-style-type: none"> • Sensory disturbances will be limited where possible throughout the year. This can include a quarry blasting program that can restrict blasting when migrating caribou and other wildlife may be negatively affected. • Active caribou calving sites (as identified by observations from area hunters, Project biologists or observed by aircraft pilots) will be avoided between May 15 and July 15. Where possible, there will be no increase in construction or operational activity within 3 km of the calving sites during this period. • In the Cockburn Lake Area (identified during baseline studies as having the highest occurrence of caribou calving sites), all non-essential activities will cease between May 15 and July 15 (e.g., construction activities will be planned to avoid this area during the calving season). • If any females (one or more) are observed within 3 km of a planned Project activity such as drilling or road construction from May 15 through July 15, then the activity location will be moved or the activity deferred as appropriate and, if possible, until a later date when caribou are not present. • Should a female caribou or a female with a calf or calves approach within 3 km of Project activities (between May 15 and July 15), the animals will be observed on the ground. If it is obvious that they are being disturbed, the activity will cease until they have moved away by at least 3 km. • If caribou approach a Project activity site before work commences, the animals will be observed on the ground, and if it is obvious that they are being disturbed (e.g., hesitating to cross work site, running in the opposite direction, visibly agitated), work will not commence until they have moved on. If caribou approach a Project site while work is in progress, caribou will be observed for signs of disturbance. If the caribou are disturbed, the activity will be modified or cease until the caribou have moved away or they are guided away from the worksite. • At such a time when caribou begin to be encountered regularly along the Tote Road, a wildlife monitor will be present on-site during the calving season to detect calving activities near the Tote Road, monitor cow/calf behaviour in relation to traffic, designate a temporary no-stopping zone, guide traffic, and document measures taken to reduce sensory disturbance to calving caribou. <p>Mitigation measures that will reduce the likelihood of the Project being a barrier to caribou movement include the following</p> <ul style="list-style-type: none"> • Snow management activities will, throughout the winter season, maintain a snowbank height less than 1 m with smooth tops along the Tote Road. • Identified trail crossings along the Tote Road where the physical structure might be a barrier to caribou movement will be constructed of finer fill material to

Project Activity	Mitigation Measure(s)
	<p>replicate natural trail conditions, preventing leg entrapment, and gentler gradients to reduce the visual barrier of the embankments. Any additional (i.e., beyond those already identified) trail crossings identified during construction or operation will also be modified with gentler slopes and finer fill if caribou deflections are detected. In the context of caribou movement monitoring, deflection is defined as “caribou that fail to cross the Tote Road after approaching it.”</p> <ul style="list-style-type: none"> • Wildlife signage could be posted at trail crossings along the Tote Road. Operators will be made aware of the crossing areas along the Tote Road, and daily observations will be reported so operators are aware of a potential presence at crossing sites and other areas. • Based on IQ knowledge provided by hunters and elders and/or site-staff observations, if migratory caribou start to move through the RSA, then the leading caribou will be allowed to cross over the Tote Road undisturbed so that others will follow. • Truck drivers will be provided with wildlife awareness training, including known crossing locations. Drivers will operate in accordance with the Caribou Decision Framework – Tote Road (Figure 3.2). • All site personnel entering and exiting the Tote Road will notify site dispatch and/or security. Notifications to road users will include mandatory wildlife reporting (Appendix C-14 — Wildlife Monitoring: Incidental Observations and Project Mortality Wildlife Log). <p>Mitigation measures implemented to reduce the likelihood of the Project increasing caribou mortality risk include:</p> <ul style="list-style-type: none"> • Wildlife right-of-way policy on Project roads • All site personnel entering and exiting the Tote Road will notify site dispatch and/or security. Notifications to road uses will include mandatory wildlife reporting (Appendix C-14 Wildlife Monitoring: Incidental Observations and Project Mortality Wildlife Log). • Reporting and documentation of all mortalities and near misses is mandatory, and follow-up investigations will be conducted for all mortality events. • When caribou are observed on roads a “caribou advisory” will be issued through the site radio network to alert operators and drivers that caribou are in the area and to maintain extra vigilance while driving in accordance with Baffinland’s Caribou Decision Frameworks. • Speed limits along Project roads are set at a maximum of 55 km/hr, in combination with the Caribou Decision Framework – Tote Road (Figure 3.2). Slow speeds and vehicle operator response to animal presence will allow caribou time to get off the road and will increase the chance of a truck being able to stop before colliding with a caribou. • Any carcasses will be removed from transportation corridors to discourage further collisions (e.g., scavengers).

Project Activity	Mitigation Measure(s)
	<ul style="list-style-type: none"> • A no-hunting policy for Project personnel will be implemented (notwithstanding the accommodation provided for traditional Inuit activities [Human Resource Management Plan SD-SEMP-003]). All site personnel are prohibited from transporting firearms to site. • Whenever practical and not causing a human safety issue, a stop work order will be used when wildlife in the area may become endangered (i.e., risk of physical injury or death) by the work being undertaken.
Mitigation measures to reduce or avoid impacts to marine mammals, terrestrial wildlife, fish and fish habitat, water quality, air quality, etc as a result of operations (mine site, tote road, Milne Port)	<p>Specific actions that have been implemented, or could be further implemented by Baffinland for dust management at Milne Port have included:</p> <ul style="list-style-type: none"> • redesigning the ore pads to position fines in the centre and lump ore around the margins • proper positioning of the conveyors to minimize ore drop distances when stockpiling • installation of rubber bellows at the end of each stacker to minimize dispersion of dust generated during the fall • installation of chutes on the shiploader to prevent windblown dust during loading operations • installation of shrouding at the discharge end of the ore stackers to reduce the effect of windblown dust during stacking activities • installation of downwind fencing • removal of dust impacted snow at strategic locations at the project. • application of a specialized crusting agent (DusTreat®) to the ore stockpile to reduce wind erosion and mobilization of fine iron ore particles. <p>Specific actions that have been implemented, or could be further implemented by Baffinland for dust management for vehicle traffic include:</p> <ul style="list-style-type: none"> • regulating speed limits • utilizing water and dust suppressants during snow free months. • Application of new dust suppression products with increased durability and longevity for site infrastructure and approved for use in Nunavut on unpaved roads (DustBlok) <p>Specific actions that have been implemented, or could be further implemented by Baffinland for dust management at the crushing facility include:</p> <ul style="list-style-type: none"> • Installation of shrouding and other engineered controls on conveyors and the ship loader • Moving and enclosing secondary crushing facilities to Milne Port. This will additionally increase the size of ore being transported. • Use of de-dusting equipment (e.g. baghouses) in the indoor crushing and screening facilities to reduce fugitive emissions of dust and particulate matter • Minimizing drop distances (i.e., using adjustable stackers) for stockpiling activities

Project Activity	Mitigation Measure(s)
	<p>Baffinland will consider the proactive implementation of recommendations contained in the Interim Dust Audit Report, expected for release following the completion of the Dust Audit Committee Site Visit (June 8-15). Preliminary recommendations have been shared with Baffinland as follows:</p> <ul style="list-style-type: none"> • Strategic evaluation and installation of wind fencing • Application of additional dust suppressants (DustBlok, DusTreat) to the airstrip and other stockpiles • Revisions to blasting management plans and practices • Continuous dust monitoring at PDA boundaries • Ongoing involvement of Inuit in dust management • Other operational practice improvements
<p>Environmental Management Structures and Processes</p>	<ul style="list-style-type: none"> • Recommendations from MEWG/TEWG meetings will be tracked and either integrated into the 2022 monitoring program designs, or if the recommendations are not feasible, Baffinland will provide a written response to explain the rationale. All recommendations will be considered and a full tracking table will be provided back to the MEWG/TEWG. • Baffinland will submit the final 2022 NAMRP to the NIRB attached to the Marine Shipping and Vessel Management Report on or before July 15, 2022 (same submission procedure and date as 2021) • Baffinland will implement an interim version of the Adaptive Management Plan developed through the Phase 2 Proposal review process to apply to the remainder of 2022. • Baffinland will agree to amendments to the Terms of Reference for the TEWG and MEWG that provides for consensus based decision making and the transfer of responsibilities for chairing and administering the working groups to either a community representative or a third party facilitator as agreed to between Working Group Members. • Through the Inuit Certainty Agreement, Baffinland agreed to fund in its entirety, regardless of the outcome of Phase 2, a Pond Inlet Country Food Baseline Report, led by the QIA and community of Pond Inlet. The results of this study have yet to be released by the QIA, however, Baffinland is committed to integrating the findings of this report into its own monitoring programs, annual reports, and adaptive management plans. • Further to the above, Baffinland is also willing to commit to work with QIA and communities to continue to develop Inuit specific indicators and thresholds and integrate them into Baffinlands relevant adaptive management plans, or a dedicated CRLU monitoring program to be administered by Baffinland with the support of an independent Inuit Committee, similar to the Dust Audit Committee, which has been formed to support the ongoing and independent audit of dust sources across the Project. Baffinland is willing, upon agreement with QIA and the North Baffin communities, to initiate this work as soon as Summer 2022, and to have the Inuit indicators and thresholds ready to apply against 2022 monitoring program results where possible, and future monitoring.

Project Activity	Mitigation Measure(s)
	<ul style="list-style-type: none"><li>• Should community based monitoring initiatives be required to report on Inuit based indicators and thresholds, Baffinland will provide that funding through the existing Wildlife Monitoring Program or other arrangement as agreed to.

Appendix B

Vessel Convoys as a Means of Noise Mitigation

Memo

DATE: 13 June 2022
FROM: Melanie Austin (JASCO Applied Sciences (Canada) Ltd)
TO: Lou Kamermans (Baffinland Iron Mines Corporation)

Subject: Vessel convoys as a means of noise mitigation

This memo has been prepared to describe how the implementation of vessel convoys can serve as a mitigation measure to reduce cumulative noise exposure from shipping related to the Baffinland Iron Mines Mary River Project. Underwater noise from shipping can be mitigated through several mitigation measures intended to reduce the spatial and/or temporal extent of noise exposure within the Regional Study Area. The spatial extent of noise can be reduced through measures such as slowing vessels to reduce noise output. Baffinland has implemented a strict speed control of 9 kn for all vessels travelling through the Regional Study Area; this is slower than the 11 kn speed limit that is implemented as part of a voluntary vessel slow down measure in the Strait of Georgia (British Columbia) to mitigate noise impacts to Southern Resident Killer Whales. The temporal extent can be mitigated through reducing the number of vessel transits, or by convoying vessels to reduce the total duration of sound exposure. It is the latter measure that is discussed in this memo.

Because sound levels are logarithmic, the combined noise from multiple sound sources does not scale or multiply correspondingly with the number of sources. That is to say that the spatial extent of the combined noise footprint for two vessels travelling in close proximity to one another is not double that of the noise footprint for one vessel. The same is true for the duration of noise exposure for multiple transits of individual vessels in comparison to a single transit of a vessel convoy.

The degree to which a vessel noise footprint is increased by the nearby presence of additional vessels is dependent on the relative sound signatures of the vessels and on the spatial separation between the vessels. If one vessel is significantly louder than the other, then the composite noise footprint for the two overlapping sources will closely resemble that of the louder source (Figure 1, top). Overlapping sound footprints from two vessels that generate underwater noise of similar amplitude will combine in a way that is dependent on the separation between the vessels. The distance from either vessel to the edge of the composite sound footprint is expected to extend minimally compared to that in the absence of the second vessel (Figure 1, bottom). Sound levels in the space between the two vessels would increase by an amount of 3 dB or less (3 dB is the maximum increase caused by adding together sounds of equal amplitude). This would result in a small increase of the instantaneous sound exposure in some areas, but the corresponding decrease in exposure duration would yield an overall reduction of the total sound exposure.

The worst-case scenario, in terms of mitigating noise exposure duration, is for the vessels in convoy to be spaced far enough apart such that the sound footprints do not overlap. In that case, there would be no net

decrease in the total sound exposure achieved through the convoy. In the case of Baffinland's ore carriers, this would occur if the vessels were separated by a distance of approximately 10 km or greater. During shoulder season convoys in 2019 and 2020, the spacing between ore carriers in a convoy was always less than 10 km, in which case one would expect the footprints to overlap and result in an overall decrease in the exposure duration compared to that from two individual vessel transits.

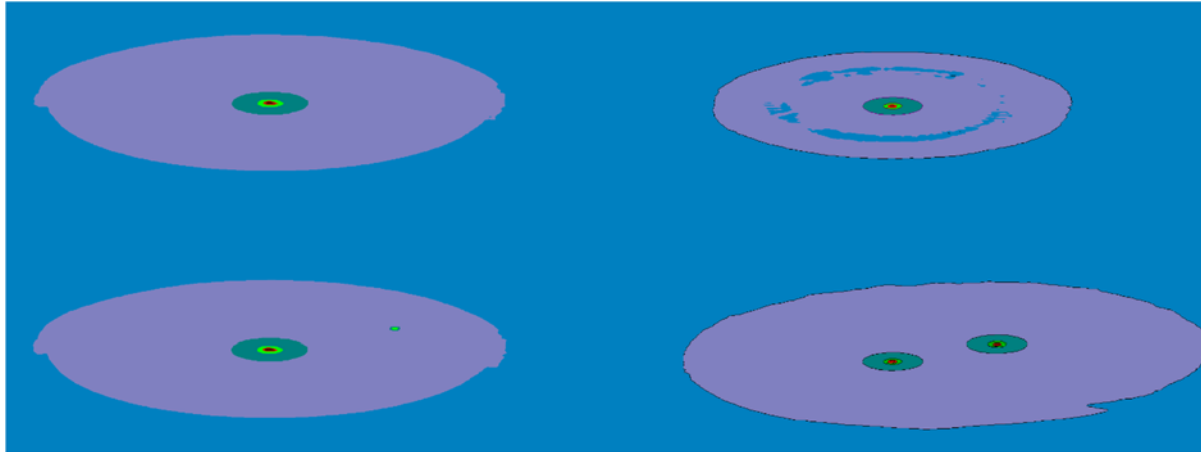


Figure 1 Example schematic of composite vessel footprints for vessels in convoy. The top panels depict individual vessel sound footprints and the bottom panels are sound footprints that overlap. (Left) one vessel is significantly louder than the other. (Right) vessels emit sound of similar amplitude.

In consideration of the benefit of Baffinland potentially using vessel convoys as a means to reduce underwater noise exposure in the Regional Study Area, consider that the duration of exposure from an individual ore carrier transit is approximately 30 minutes. The total duration of exposure for two individual transits (not in convoy) would then be 1 hour. If the vessels were to transit in a convoy, with an inter-vessel separation less than 10 km, it is expected that the duration of exposure for the vessels in convoy would be in between 30 minutes and 1 hour.

This is supported by review of acoustic recordings collected by Baffinland in 2019 and 2020, while the icebreaker *MSV Botnica* escorted vessels to and from Milne Port in convoy. Details about the collection of these data, and how they were processed, were provided in a previous report (Austin and Dofher, 2021). For this memo, we consider from that dataset transits with similar transit speeds, in open water conditions, when the icebreaker transited with between 0 and 3 ore carriers in convoy (Table 1). The sound output from all of these vessels are similar enough that the composite footprint for the convoy is best represented by the concept in the right hand side of Figure 1 (Austin and Dofher 2020).

Table 1 provides the ranges forward and aft from the *Botnica* to the 120 dB sound level threshold associated with marine mammal behavioural disturbance, and the amount of time that the recorded sound levels exceeded this threshold during each convoy transit. As the number of vessels in the convoy increased, the range from the *Botnica* to the 120 dB re 1 μ Pa threshold increased slightly, particularly aft of the vessels. The distance was 5.6 km when the *Botnica* travelled alone and 11.7 km when the *Botnica* escorted three ore carriers in convoy. Correspondingly, the duration of exposure above the 120 dB threshold increased slightly from 18 to 22 minutes when one or two ore carriers were added to the convoy, and to 40 minutes when there were three vessels in convoy with the *Botnica*. Figures showing the sound pressure level, and the distance between the vessels and the acoustic recorder, as a function of time are presented in Figures 2 through 5 for each of these transits.

In summary, acoustic monitoring data collected to date by Baffinland indicate that if ore carriers were to transit in convoys with inter-vessel separation less than 10 km, there would be an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. The composite noise footprint for the convoy of vessels would be slightly larger than that for an individual vessel, but not by a factor of the number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels would be compensated for by shorter exposure duration, resulting in a net decrease of noise exposure. In light of this, vessel convoys appear to provide a viable proposal for reducing total sound exposure, if appropriate inter-vessel separation is maintained optimally with the vessels as close together as safety measures would allow.

Table 1 Examples of ore carrier convoys measured during icebreaker escorts in 2019 and 2020 with correspond distances and durations for exposure to sound levels at or above 120 dB re 1 µPa.

Convoy Details					Range from <i>Botnica</i> to 120 dB (km)		Time > 120 dB (minutes)
Number of Vessels in Convoy	Vessel Name	Vessel type	Distance from <i>Botnica</i> (km)	Speed (kn)	Forward	Aft	
1	<i>Botnica</i>	Icebreaker	–	8.1	1.8	5.6	17.8
2	<i>Botnica</i>	Icebreaker	–	8.6	2.4	8.8	21.7
	<i>Gisela Oldendorff</i>	Ore carrier	2.6	8.1			
3	<i>Botnica</i>	Icebreaker	–	8.3	1.8	7.8	21.7
	<i>NS Yakutia</i>	Ore carrier	2.8	8.5			
	<i>Golden Brilliant</i>	Ore carrier	9.9	8.9			
4	<i>Botnica</i>	Icebreaker	–	8.5	4.0	11.7	40.8
	<i>Golden Ruby</i>	Ore carrier	6.5	8.7			
	<i>NS Yakutia</i>	Ore carrier	6.6	8.6			
	<i>Rio Tamara</i>	Ore carrier	2.8	8.9			

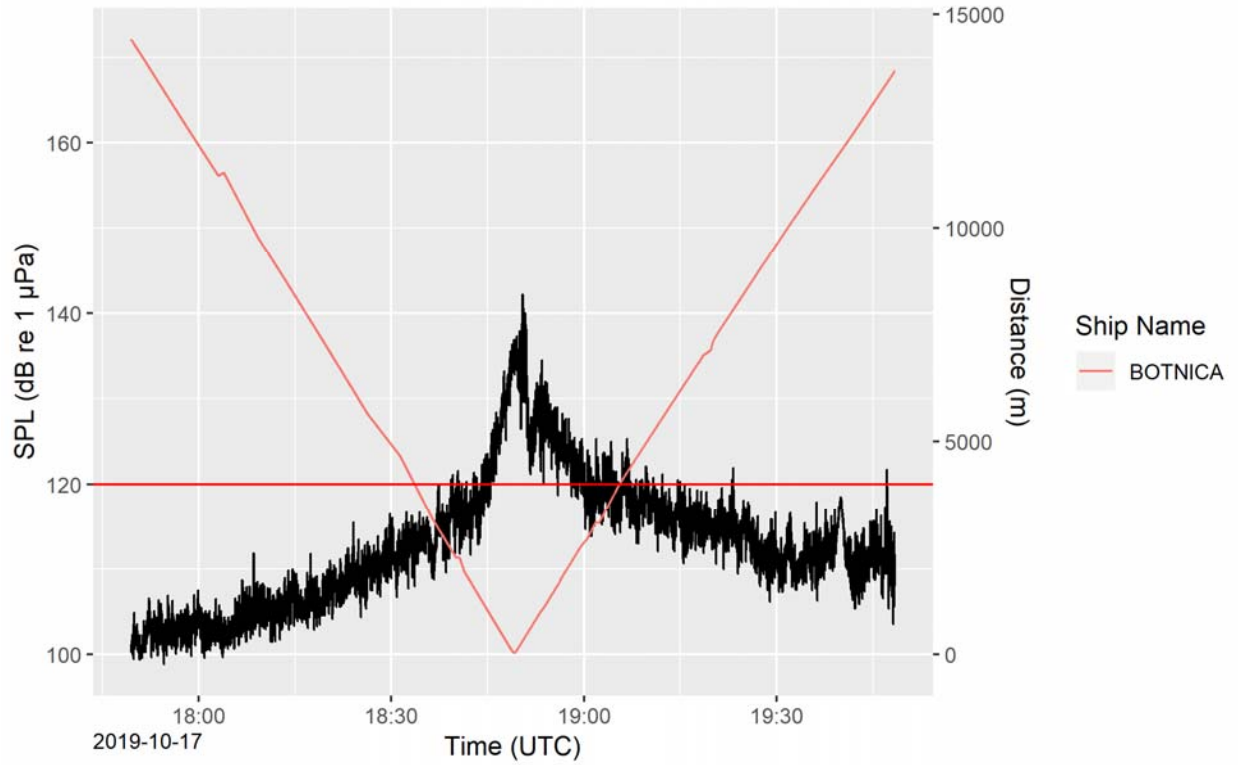


Figure 2 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 17 Oct 2019 coming to Milne Port, with no vessels in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 μ Pa.

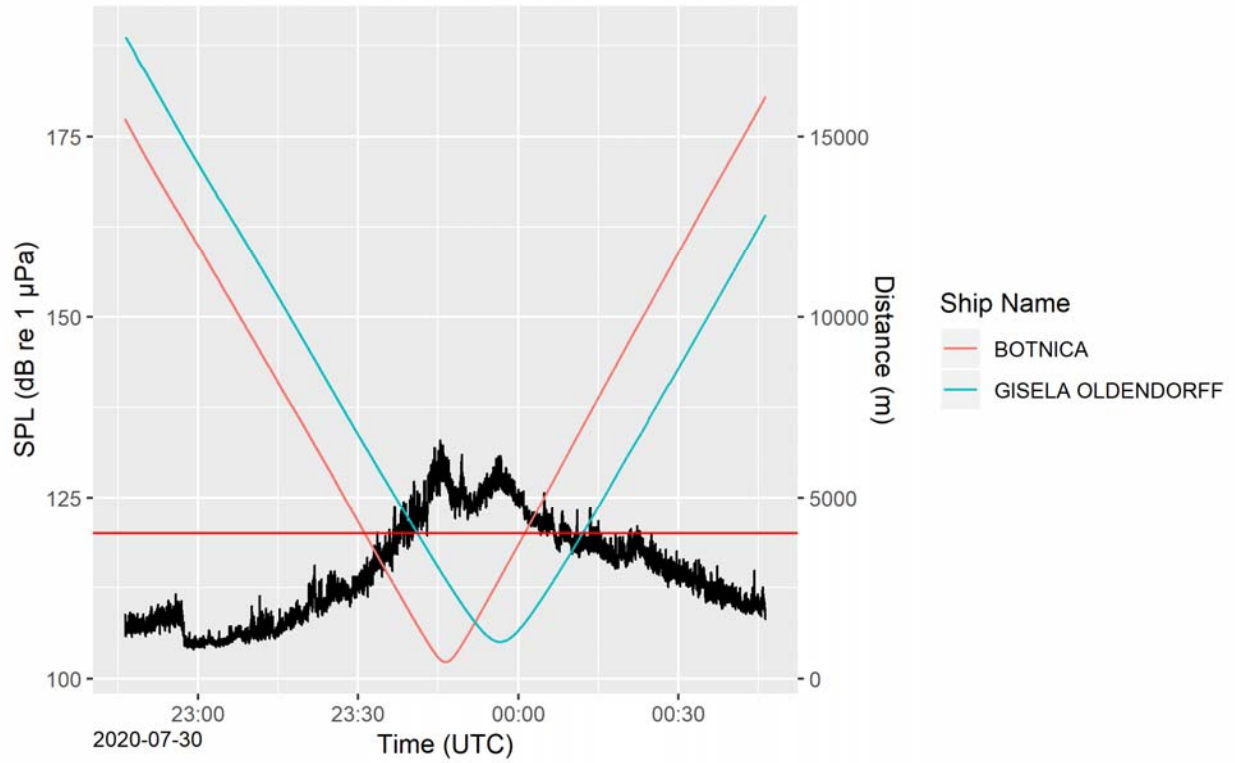


Figure 3 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 30 Jul 2020 leaving Milne Port, with 1 vessel in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 µPa.

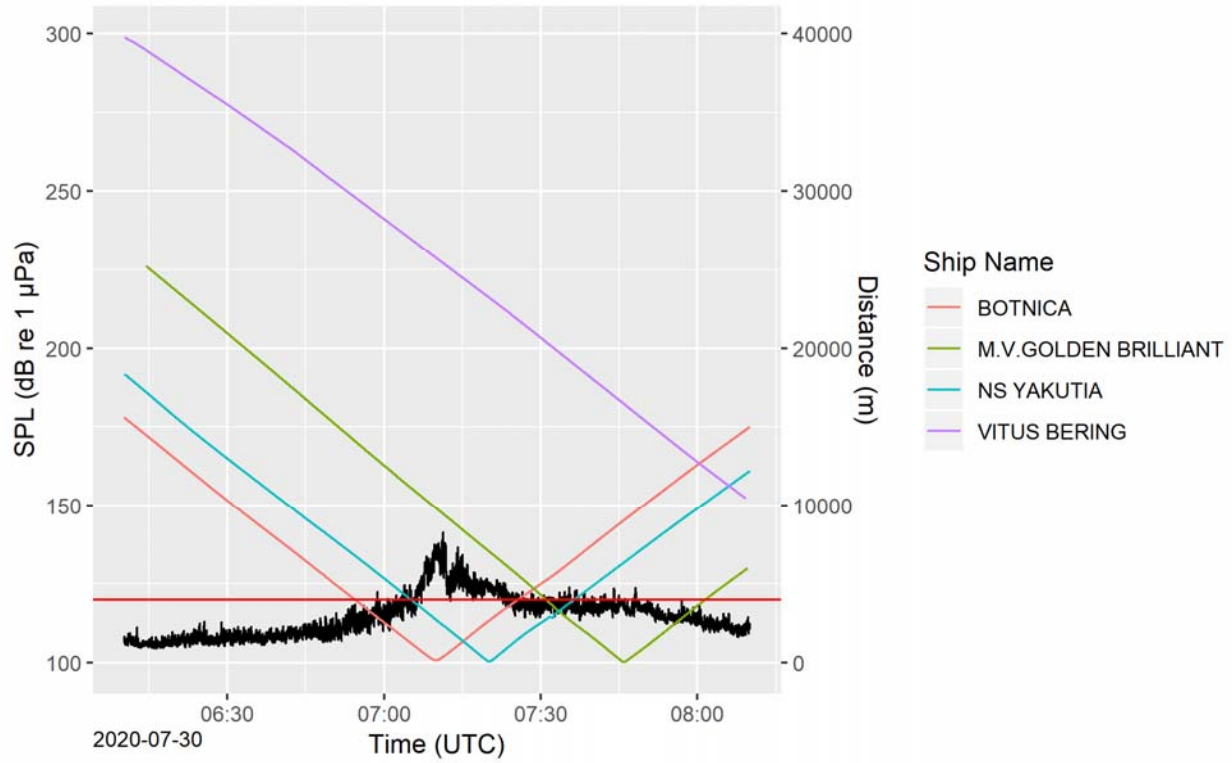


Figure 4 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 30 Jul 2020 coming to Milne Port, with 2 vessels in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 μ Pa.

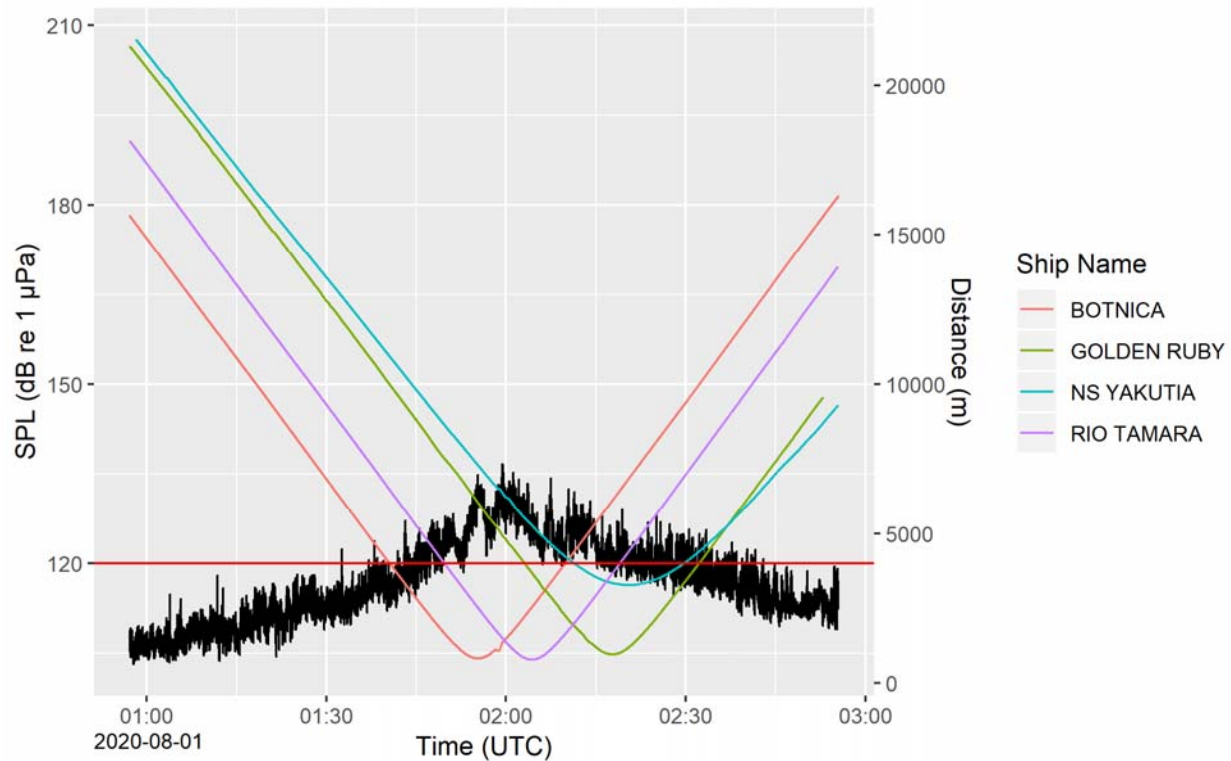


Figure 5 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 1 Aug 2020 coming to Milne Port, with 3 vessels in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 μ Pa.

References

- Austin, M and T. Dofner. 2020. *Technical Memorandum - Vessel Source Level Estimates for the 2018 and 2019 Shipping Seasons: Baffinland Mary River Project*. Document 02235, Version 2.0. Technical Memorandum by JASCO Applied Sciences for Golder Associates Ltd.
- Austin, M.E. and T. Dofner. 2021. *Underwater Acoustic Monitoring: Baffinland Iron Mines Shoulder Season Shipping 2019–2020*. Document 02330, Version 1.0. Technical report by JASCO Applied Sciences for Golder Associates, Ltd.

Appendix C

Community Support Letters



Hamlet of Sanirajak

P.O. Box 198
Sanirajak, NU Ph: 867-928-8829
X0A 0K0 Fax: 867-928-8871

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May 26, 2022

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

Attention: Chairperson, Kaviq Kaluraq
Via Email: info@NIRB.ca

NIRB File No.: 08MN053

Letter of Support for Baffinland Iron Ore Mines Request to Continue Shipping 6.0 Million mtpa

As you are no doubt aware, the Hamlet of Sanirajak supports Baffinland Iron Mines Corporation's Phase 2 application. After the issuance of the N.I.R.B. final report and ministerial recommendations on this file, the Hamlet contacted the company to find out what next steps might be taken. They advised that they had requested support from the federal ministers for a direction to the Board to modify Project Certificate No. 005 to authorize the transportation and shipment of 6 million tonnes of iron ore per annum (mtpa), and that term and condition 179 (a) and (b) of the Project Certificate be updated to reflect such an authorization. In addition, they provided a copy of the Honourable Minister Daniel Vandal, P.C., M.P.'s response dated May 20, 2022 in which he advised that, "Baffinland can request from the Board a reconsideration of the Project Certificate pursuant to section 112 of the Nunavut Planning and Project Assessment Act".

At the Council meeting last night, Council passed a motion in support of Baffinland's application, which reads:

"Whereas Baffinland Iron Mines Corporation (B.I.M.) has indicated that they are applying to the Nunavut Impact Review Board (N.I.R.B.) to have permission to ship 6.0 million metric tons per annum (mtpa) through Milne Inlet continued for the 2022 shipping season; and Whereas BIM is requesting that community organizations from impacted communities consider providing them with a letter of support for their application to N.I.R.B.; Therefore, I move that the Council authorize the Mayor to sign a letter of support for B.I.M.'s application to N.I.R.B."

In discussions with Baffinland, they indicated that they require a positive decision on their application to be able to continue to operate through to the end of June and beyond. As such, I would like to encourage the N.I.R.B. Board to review this matter on an urgent basis.

As a percentage of the local population, Sanirajak has more employees per capita working for Baffinland than any of the other communities. As a small community that does not have many other opportunities for employment, Sanirajak is highly reliant on the mine's continuing ability to operate. If the mine must go into care and maintenance because of not receiving a timely, positive response to their application, it will have a devastating impact of this community.

Further, the company must raise huge amounts of capital necessary to finance the railway from the mine to the Steensby Inlet Port. To make that feasible, the company's continued ability to function as an operating mine is essential. If the mine is forced to go into care and maintenance due to not being approved to mine and ship 6.0 million mtpa, its ability to ever finance the infrastructure that is required to build the railway across the island and the port at Steensby Inlet would be in severe jeopardy.

It is worth noting that the most notable concern from the community of Pond Inlet seems to be the potential loss of narwhal that might in part be due to the mine's shipping activities. I would assume that you are aware that there is an ever-increasing prevalence of killer whales in the arctic resulting from increased open water caused by climate change. These apex predators are known to chase a pod of narwhal for hundreds of miles, chase them into an inlet from which they cannot escape and then kill the entire pod. It would be truly unfortunate if the mine is forced to close over such concerns and then subsequently there are no narwhal in Pond Inlet anyway because they have fled the area to seek ice cover from killer whales.

For these and many more reasons, I urge the N.I.R.B. to quickly approve the mine's ability to continue to produce and ship 6.0 million mtpa through Milne Inlet for 2022. Perhaps a fast decision approving their request for this year could be made without a protracted review process and if a detailed review on the requested activity level is desirable, perhaps that could be applied to years after 2022 only.

Thank you in advance for your consideration of this matter.

Yours truly,



Mayor Jaypetee Audlakiak

CC: Brian Penney, Chief Executive Officer, BIMC
Udlu Hanson, Vice-President, Community & Strategic Development

Appendix D

Other Support Letters

1121 Mivvik Street, P.O. Box 697, Iqaluit, Nunavut X0A 0H0 • T: (867) 979-3799 • F: (867) 979-2535 • E: nssi.iqaluit@ArcticCo-op.com

Ste-Catherine, May 31, 2022

The Honourable Dan Vandal
House of Commons
Ottawa, Ontario K1A 0A6
Canada

Subject: Support for Baffinland's Request for Emergency Order

Mr. Vandal

We hereby wish to confirm our support for Baffinland's Request for an Emergency Order to allow the company to truck and ship 6.0 million tonnes of iron ore during the 2022 calendar year, in compliance with all environmental permit limits, as the company has done since 2018.

We understand that Baffinland has committed to working with the Federal government to avoid layoffs and protect communities as clearly stated in their request, *"Baffinland is committed to working with the Federal government and all stakeholder groups to do everything possible to avoid the necessity of layoffs and to protect our employees and their communities."*

In our opinion, this request should be supported in an interim measure that will allow Baffinland and all its employees and contractors to continue working through the end of 2022 based on Baffinland continuing to actively work with the Federal Government, regulators, and Inuit Organizations to identify a longer-term solution.

We sincerely hope that all efforts will lead to a positive result.

Kindly accept our best regards.

NUNAVUT SEALINK AND SUPPLY INC.



Daniel Desgagnés,
Managing Director



Web site: www.arcticsealift.com

1121 Mivvik Street, P.O. Box 697, Iqaluit, Nunavut X0A 0H0 • T: (867) 979-3799 • F: (867) 979-2535 • E: nssi.iqaluit@ArcticCo-op.com

About NSSI

Nunavut Sealink and Supply Inc. (NSSI), is an Inuit Majority Owned Nunavut-based firm having its Head Office in Iqaluit. NSSI is a partnership between Arctic Co-operatives Limited (Arctic Co-ops), Desgagnés Transarctik Inc. (DTI), Qikiqtaaluk Corporation (QC), Sakku Investment Corporation (Sakku) and Kitikmeot Corporation (KC). NSSI offers dry cargo and bulk fuel sealift services throughout Nunavut and is Baffinland's dedicated sealift carrier.

For more about NSSI, please visit our website: <https://www.arcticsealift.com>

Operations Management Office

6565 Hébert Blvd., Suite 201, Sainte-Catherine (Québec) J5C 1B5 • T : (450) 635-0833 1 (866) SEA-LIFT • E: info@transarctik.desgagnes.com

Baffinland Submits Request for Emergency Order to Federal Government

Iqaluit, NU [May 26, 2022] – Today, Baffinland submitted a request for an emergency order from the Minister of Northern Affairs, the Honourable Dan Vandal that would allow the company to truck and ship 6.0 million tonnes for the 2022 calendar year, in compliance with all environmental permit limits, as the company has done since 2018. This request was made in order to protect our employees and the economy of North Baffin. Baffinland currently represents 23% of Nunavut's economy

Should the order not be granted, once production reaches 4.2 million tonnes, the Company will be required to suspend operations for the balance of 2022. This will result in the layoff of over 1,300 Baffinland employees and impact more than 400 contract employees, many of whom work for Inuit businesses.

“Baffinland is committed to working with the Federal government and all stakeholder groups to do everything possible to avoid the necessity of layoffs and to protect our employees and their communities.”

Given the uncertainties of the permitting process and the emergency order application, Baffinland is preparing to file a notice with the Nunavut Labour Standards Compliance Office (“LSO”) of termination of staff at its Mary River operations and Nunavut offices. Should this step be necessary, Baffinland will notify the more than 1,300 employees, including 209 Inuit employees, 16 weeks after its notice to the LSO.

In the letter submitted to the Minister, the Company stated: “This request is based on the significant negative impact on mental health that will occur both directly to workers and their families and communities that receive termination notices if they are sent next week, as well as on our remaining workers that experience concern for their colleagues, an increase in their employment burden and ongoing employment insecurity as the overall workforce is downsized. Additionally, there is a recognized positive correlation between wage employment and food security.”

The request for an emergency order is an interim measure that will allow Baffinland and all of its employees and contractors to continue working through the end of 2022. Baffinland continues to actively work with the Federal Government, regulators and Inuit Organizations to identify a longer term solution.

“We request that the Minister use this legal authority granted under NuPPAA, which would enable Baffinland to maintain the status quo and avoid the significant negative impacts on the health of the workers at Mary River that will be directly and indirectly impacted by the layoffs and of Nunavut communities more broadly,” stated in the letter.

We are taking the actions we are taking today so that the company can continue to operate into the future.

“Baffinland is requesting that the Minister choose to exercise his power to extend the approval until December 31, 2022. This is a targeted exercise of this power, the use of which is justified in the circumstances to prevent harm,” stated in the letter.

For more information:

Peter Akman | Head of Stakeholder Relations & Communications

C: +1 289 834 0744

E: peter.akman@Baffinland.com

2275 Upper Middle Road East, Suite 300, Oakville, Ontario, Canada, L6H 0C3

www.baffinland.com

About Baffinland Iron Mines Corporation

Baffinland Iron Mines Corporation is jointly owned by The Energy and Minerals Group and ArcelorMittal, and operates a high-grade iron ore mine located on Baffin Island, Nunavut. The Mary River Mine produces the highest grade of direct shipping iron ore in the world. Baffinland is committed to operating in an environmentally and socially responsible manner that benefits all stakeholders. Learn more at baffinland.com and follow us on [Twitter](#), [Facebook](#) and [LinkedIn](#)



June 12, 2022

Honourable Dan Vandal
Minister for Northern Affairs
Room 434, Confederation Building
229 Wellington Street
Ottawa, Ontario K1A 0A6
By email to: dan.vandal@parl.gc.ca

Dear Minister Vandal,

We are writing to express our support for Baffinland Iron Mine's application to maintain annual ore production and shipping from the Mary River mine at 6 million tonnes.

This mine produces some of the highest-grade iron ore in the world and requires no concentrating, no processing and produces no tailings. This single mining operation currently contributes ~25% of Nunavut's GDP. In 2019, the year where Baffinland came closest to hitting its 6Mtpa transportation limit, Baffinland's Inuit employees earned over \$20M, Inuit firms were awarded contracts worth \$288M, Inuit labour force participated in more than 44,000 hrs of training, Baffinland paid the GN \$15.6M in payroll and gas taxes and Baffinland paid out \$12M in royalty and program payments. This high grade iron ore deposit has the potential to continue to provide substantial benefits to Nunavummiut and Canada for many decades to come. It is for this reason, that our Chamber is gravely concerned that the continued operation of this mine is at risk.

Mr. Minister, the fate of the Mary River Project, as of any mine in Canada, is bound to the price of the commodity being mined. Over the past 10 years, the price of iron ore has varied wildly. In 2012, the price of iron ore was approximately US\$145 per ton. By 2016, the price of iron ore declined dramatically to less than US\$50/t. From 2016 to 2021, the iron ore price see-sawed and then more than rebounded to over US\$200/t. Today the price sits at around US\$145/t, however, long term forecasts continue to see iron ore settling under US\$100/t, a price that Baffinland has publically explained on multiple occasions is on the wrong side of their break-even point to support a trucking operation. Companies like Baffinland are challenged to design developments and match production to the price at hand, and reasonably considered future demand. In the case of Baffinland their product is in fact a high value, ethical Canadian export necessary for society's shift to the Green Economy.

For the Nunavut regulatory regime to be workable and effective, it must allow developers the flexibility to adapt to variations in commodity prices. The 2018 NIRB Project Certificate Amendment approving a production level of 6Mtpa was a positive step and Baffinland's subsequent request to maintain this production level if Phase II was not approved was intended to maintain the viability of the mine. The current situation where Baffinland must go before the NIRB yet again to seek approval to maintain the 6Mtpa production level represents a grave risk to the future of the project.

Given that the NIRB has not identified any significant adverse effects of the Mary River Mine operating at 6Mtpa in its annual reports, it is unclear why Baffinland should be subject to further substantive NIRB review to maintain existing production levels. This situation is particularly hard to understand because

without maintenance of current production levels precious Nunavut jobs and contracts and benefits are put in jeopardy.

Mr. Minister, development and operation of mining projects in the north requires that large capital investments that are mobile on a global basis are attracted to a region which has some of the highest development and operating costs in the world. In order to do this successfully, it is critical that Nunavut and other northern and remote jurisdictions in Canada provide certainty of process. It is therefore important to note that the 2021 Fraser Institute Survey of Mining Companies indicates Nunavut's attractiveness for investment continues to slip due to concerns with process transparency, timelines and approval risks. We are concerned that the protracted NIRB rejection of the Mary River Phase II proposal will send a further chill through the investment and mining community at a time when there is so much opportunity to develop a vibrant and sustainable mining sector in the territory.

The Nunavut Agreement coupled with the significant mineral wealth and precedent setting Inuit co-management regime of resources has tremendous potential to support prosperity and growth for Nunavummiut. These attributes lay the groundwork for responsible mineral development that can help to support the future of Nunavut's communities, while also supporting energy transition in Canada and beyond.

Based on these factors, and in support of responsible resource development in Nunavut, we urge you to do what you can to support a timely review process that permits Baffinland to maintain its existing production levels. We strongly believe that keeping mining at Mary River strong, healthy, beneficial and environmentally responsible is in Canada's and Nunavut's best interests.

If there is anything we can do to help, please do not hesitate to reach out to us.

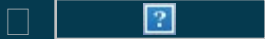
Yours truly,

NWT & NUNAVUT CHAMBER OF MINES



Tom Hoefler
Executive Director

c.c.: Honourable P.J. Akeegok, Premier of Nunavut
Olayuk Akesuk, President Qikiqtani Inuit Association
Aluki Kotierk, President of Nunavut Tunngavik Inc.
Honourable Dennis Patterson, Senator of Nunavut
Brian Penney, President and CEO, Baffinland Iron Mines
Paula Isaak, Associate Deputy Minister, Crown-Indigenous Relations & Northern Affairs Canada



Send a Release

FR



Hundreds of skilled unionized jobs at risk without approval of an increase in production at Baffinland's Mary River Mine

NEWS PROVIDED BY

International Union Of Operating Engineers - Local 793

May 27, 2022, 20:20 ET

SHARE THIS ARTICLE



OAKVILLE, ON, May 27, 2022 /CNW/ - The International Union of Operating Engineers, Local 793 ("Local 793") and International Union of Operating Engineers ("IUOE") urge the federal government to approve Baffinland's request for an emergency order to allow the company to increase production at the Mary River Mine through to the end of 2022. This step is needed to safeguard the jobs of hundreds of skilled unionized workers, many of whom reside in Nunavut.

Our union represents workers in a wide variety of occupational categories in the construction, industrial and mining sectors, which in this case at the Mary River Mine includes over 1,000 heavy machinery operators, heavy haul truck drivers, millwrights, electricians, welders, mechanics, crane operators, labourers, warehouse technicians and many other occupations. In total, Baffinland employs over 2,500 employees and contractor workers.

Since its inception, the Mary River Mine has provided good paying jobs for highly trained and skilled Canadian workers from across the country, including hundreds of workers from Nunavut who continue to be prioritized for training opportunities. The mine provides royalties and community benefits that directly benefit the local Inuit

communities. We understand that the mine represents nearly 23% of the GDP for Nunavut and is a vital component for Nunavut's future economic growth.

Baffinland's Inuit workers residing in Nunavut were sent home during most of the pandemic to ensure their communities' safety. It has only been in the last few months that all Inuit workers living in Nunavut have returned to the mine to continue their apprenticeships and skills upgrading. Having any reduction in the workforce would drastically undermine this progress. For the rest of Local 793 members working at the mine, losing their employment when the cost of living has skyrocketed, and good paying jobs are scarce in many parts of Canada would be devastating. "Recovery from the pandemic requires maintaining and more importantly growing quality jobs, not losing them", said Mike Gallagher, Local 793 Business Manager.

"If Baffinland is not granted an emergency order to increase production to 6 million tonnes we are very concerned there will be significant layoffs for our members at the mine," said Gallagher. "This would have a devastating impact on the mine's workers, including many Inuit, and their ability to provide for themselves, their families, and their communities."

The request for an emergency order is an interim measure that will allow Local 793 members to continue working through to the end of 2022. "We know that the company cannot compete on a global scale if it is unable to grow and increase its production at the mine," said Lionel Railton, IUOE Canadian Regional Director. "We encourage the federal government to work with Baffinland to identify and develop a long-term solution so to ensure the company is able to maintain employment for Local 793 members and all other workers into the future."

For the sake of our members, including our Inuit workers, and Nunavut's economic future, we are urging the federal government to do the right thing, and approve Baffinland's requested emergency order to increase production to 6 million tonnes so that our members can have the certainty of their continued and future employment at the mine.

SOURCE International Union Of Operating Engineers - Local 793

For further information: Local 793 Business Manager, Mike Gallagher, 905-469-9299, ext. 2202, IUOE, Director - Canadian Region, Lionel Railton, 604-308-1678


Organization Profile

International Union Of Operating Engineers - Local 793

Also from this source

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May 30, 2022

Delivered via Email: dan.vandal@parl.gc.ca

The Honourable Dan Vandal
Minister of Northern Affairs
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Minister Vandal:

RE: Letter of Support – Baffinland Iron Mine Corporation
Mary River Project – 6 Million Tonnes per Annum Permit Amendment

I am writing to you today on behalf of Nuna East Ltd., to express our support for Baffinland Iron Mine Corporation's request to amend their permit to enable an increase in production to 6 million tonnes per annum at the Mary River Project. Nuna East is a partnership between the 3 Arctic Co-operatives of Sanirajat (Hall Beach), Pond Inlet, and Igloolik; and Nuna Logistics Limited.

As Chairperson of the 3 co-operatives comprising Nuna East (collectively, 1641170 Alberta Ltd.), I recognize the critical importance of the Mary River Project and what it means for Inuit employment for current and future generations. In addition to the tremendous impact on employment, if the Project is not successful, the members of the co-operatives will lose out on dividend payments generated through the contracts Nuna East executes.

Our members lose on both fronts – loss of income from direct employment and loss of revenue sharing opportunities through our ownership position in Nuna East. I am therefore respectfully requesting your full support in approving the permit amendment requested by Baffinland Iron Mines.

Thank you for your consideration in this critically important request.

Sincerely,



Anne Curley
Director, Nuna East Ltd.
Chairperson of the Board, 1641170 Alberta Ltd.

cc: Udlu Hanson, Vice President, Community & Strategic Development, Baffinland Iron Mines Corporation
(udlu.hanson@baffinland.com)

May 27, 2022

Delivered via Email: dan.vandal@parl.gc.ca

The Honourable Dan Vandal
Minister of Northern Affairs
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Minister Vandal:

**RE: Letter of Support – Baffinland Iron Mine Corporation
Mary River Project – 6 Million Tonnes per Annum Permit Amendment**

I am writing to you on behalf of Nuna East Ltd. to express our support for Baffinland Iron Mines Corporation's (BIM) request to amend their permit, which expired in December 2021, to allow the increase in their production to 6 million tonnes per annum.

Nuna East Ltd. (NEL), a member of the Nuna Group of Companies (Nuna), is a majority Inuit-owned construction company that has been extensively engaged at the Mary River Project since 2007. NEL's Inuit ownership comprises Kitikmeot Corporation and the Arctic Cooperatives of Hall Beach, Igloodik, and Pond Inlet.

In addition to our long history of training and employing Inuit, our unique ownership structure provides direct benefits to the community members that belong to the cooperatives indicated through dividends paid on revenue generated from contracts awarded to NEL.

As the preferred contractor awarded the Mary River Phase 2 expansion work upon regulatory approval, the recent NIRB recommendation to reject the Phase 2 expansion application was a devastating blow to the Project and to our company directly. This decision will cause a loss in projected revenue of hundreds of millions of dollars over the next several years and eliminates the opportunity to employ Inuit as anticipated through the multiple job opportunities that Phase 2 would require – peak employment indicated as follows:

Year 1	250
Year 2	600
Year 3	500

In addition to the loss in direct employment, at least 25% of which would be Inuit, the recommendation also significantly reduces the opportunity for Co-op members to financially benefit through their dividend payments.

Nuna has been engaged on every major mining project across the Northwest Territories and Nunavut for the past 29 years and on many occasions have provided the flexibility required in order to support our clients as they scale their projects up or down. We recognize the challenges that operating in the North represents due to high fixed overhead costs and the realities of operating in a location that solely relies on sea transport during a narrow annual operating window.

In lieu of a positive NIRB recommendation, we believe that BIM's request to increase to 6 million tonnes per annum reflects the realities of operating in such an environment and considers the economies of scale required to maintain a minimum viable operation and continued opportunities for meaningful employment in the Region. On behalf of all the Inuit that work for NEL and for those that will not be provided the opportunity due to the NIRB recommendation, we respectfully request your full support in approving BIM's request for a permit amendment.

If you have any questions regarding our support for this amendment or more specifically to discuss the negative impact of the recent NIRB recommendation on Phase 2, please do not hesitate to contact me directly at 780 886 4431 or by email at miles@nunalogistics.com.

Sincerely,

NUNA EAST LTD.

per:



Miles Safranovich, P.Eng.
President

cc: Udlu Hanson, Vice President, Community & Strategic Development, Baffinland Iron Mines Corporation
(udlu.hanson@baffinland.com)



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May 30, 2022

House of Commons
Ottawa, Ontario,
Canada
K1A 0A6

Attention: The Honourable Dan Vandal

Re: Letter of Support

Good afternoon Minister Vandal,

My name is Matthew McElligott and I serve as VP, Commercial for the Summit Aviation Group – comprised of sister companies Summit Air and Summit Helicopters. I'm writing you today to express the Summit Aviation Group's support for Baffinland's application to continue to truck and ship 6 million tonnes of iron ore for the 2022 calendar year.

Summit Air is responsible for the movement of freight and groceries between Yellowknife and the Baffinland Iron Ore Mine at Mary River. We are also responsible for the provision of a site-based aircraft that facilitates the movement of Baffinland's Nunavummiut workforce between site and the north Baffin communities of Clyde River, Pond Inlet, Arctic Bay, Hall Beach and Igloolik. The site-based Dornier is also relied upon for emergency patient transfers and the movement of vaccines and test results between Mary River and Igloolik.

We are deeply concerned at the prospect of Baffinland being forced to lay off more than 1,300 employees, including 209 Inuit employees. Summit also employs over 200 northerners, most based in Yellowknife. Such a scale back related to our support of the Baffinland project would result in layoffs of our own workforce. As Summit is also contracted for the delivery of groceries, general merchandise and emergency supplies into most communities in the NWT



and Nunavut this would also reduce our ability to perform that service and would drive up costs substantially for all northerners.

We ask that your office take whatever actions are within your power to prevent this outcome as it will have significant mental health and economic consequences to those living in the north.

Sincerely,

Matthew McElligott
Vice President, Commercial
Summit Aviation Group

The Honourable Dan Vandal
House of Commons
Ottawa, Ontario,
Canada
K1A 0A6

May 30, 2022

Re: Baffinland Iron Mines- Mary River Mine

Dear Honourable Minister,

I am writing this letter on behalf of Dyno Nobel Canada and its over 20 direct employees working at the Mary River Mine. Dyno Nobel has been providing BIM the explosives and blasting services since the Mine started in 2014. Dyno Nobel employees' people from across Canada including from the local communities in Nunavut. These employees depend on the Mary River Mine for the economic benefit it brings them and their families. Should BIM need to close or suspend the operations at Mary River we would have no choice but to issue layoffs to our direct employees as well as several indirect employees that support our operations. The loss of these high paying jobs would be devastating to our people, their families, and the communities in which they live.

Since 2018 BIM has been producing and trucking 6M tonnes of ore to Milne. Dyno Nobel fully supports BIM in maintaining this production level through 2022 and beyond.

Sincerely



Jim Kasemets
General Manager-NL and Baffin
Dyno Nobel Canada



May 30, 2022

The Honourable Dan Vandal
House of Commons
Ottawa, Ontario,
Canada
K1A 0A6

Re: Letter of Support for our client Baffinland Iron Mines Corporation

Honourable Minister Dan Vandal,

Atelihai.

Minister Dan Vandal, we are writing to you today to express our support to our client Baffinland Iron Mines Corporation in their objective to continue trucking & shipping 6 million tonnes of iron ore.

QAJAQ Northern Builders Inc was born in 2020. We now have an established office in Iqaluit and we have secured good work with Baffinland Iron Mines Corporation. With strong encouragement, and empowerment from the senior management at Baffinland, we are a proud supplier of personnel for the mine's Crusher Rebuild Project, Freshet and Shiploader projects and we recently began supporting construction activities at the site. We are hoping to establish QAJAQ as an integral Nunavut-based staffing and logistics provider.

Needless to say, we are all very concerned to hear about the request for Emergency Order submitted by the client. Our employees, land beneficiaries and our sister companies are extremely worried at the prospect of massive lay offs at the mine.

QAJAQ NORTHERN BUILDERS INC.

**Building 1088, Noble House, Block E, Iqaluit, Nunavut, X0A OH0
867-979-4550
www.qajaqnorthern.com**



We are emailing this urgent letter to you in the hopes that our client, Baffinland Iron Mines Corporation, will be allowed to truck and ship 6 million tonnes and can continue contributing to the economic and wholistic well being of the Nunavut communities.

We are grateful for Baffinland's encouragement to these Inuit-owned-owned businesses like ours, who were created and will continue to see investment into the communities as they are grow.

With hope and prayers, we remain.

Yours Truly,

Jena Merkosak
Vice President
jena@qajaqnorthern.com

Cc Udlu Hanson

QAJAQ NORTHERN BUILDERS INC.

Building 1088, Noble House, Block E, Iqaluit, Nunavut, XOA OH0
867-979-4550
www.qajaqnorthern.com



ECLIPSE
CAMP SOLUTIONS

May 37, 2022

Honourable Minister Dan Vandal
Federal Minister of Northern Affairs
dan.vandal@parl.gc.ca

Dear Minister,

Respectfully, I am writing to you today on behalf of **Eclipse Camp Solutions** in support of the Baffinland Iron Mine (BIM) request to be allowed to transport 6.0 million tonnes of iron ore in 2022, as they have done since 2018.

Eclipse Camp Solutions, (ECS), is 60% owned by four of the North Baffin Community Coops, (Pond Inlet, Arctic Bay, Igloolik and Sanirajak), and as such, the economic benefits of our ECS partnership radiate out to virtually every family in the four Hamlets.

Approval of the 6.0 million tonne transport permit will result in continued and sustained operations of the 386-person Milne Port camp. Our services include supply of camps and ancillary support equipment and the management and execution of hospitality services, (food services, housekeeping and janitorial), as well as maintenance and utilities, (potable water treatment, wastewater treatment and solid waste management). Our operations employ over 60 people of which more than 60% are Nunavummiut and thus, providing careers for several generations of Qikiqtani Inuit and injecting over \$1,500,000 yearly into this economy in wages and enhanced patronage dividends.

ECS provides meaningful employment, career advancement and wealth creation for Nunavummiut but we need a customer with a project in order to exist. We believe in Baffinland's commitment to the stewardship of our environment; "employing a balance of scientific and Inuit knowledge known as Inuit Qaujimagatuqangit (IQ)" and we believe in Baffinland's social commitment to the North Baffin communities; "collaborating with Inuit to deliver long-term benefits".

On behalf of Inuit who work for Eclipse Camp Solutions and our Directors, ECS would like to respectfully encourage you to support approval of the 6.0 tonne transport permit through to the end of 2022 for the long-term security of our people and our communities.

Sincerely,

Anne Curley
Chairman, Eclipse Camp Solutions Inc.

cc. Udlu Hanson, Fred Hunt, Andrew Desilets, Jennifer Keith, Warren Murray and Pat Hammerschmidt

May 30, 2022

Attention: The Honourable Dan Vandal

House of Commons
Ottawa, Ontario,
Canada
K1A 0A6

Dear Minister Vandal,

Fountain Tire has been informed that Baffinland submitted a request for an emergency order from yourself that would allow Baffinland to truck and ship 6.0 million tonnes for the 2022 calendar year, in compliance with all environmental permit limits, as Baffinland has done since 2018. Fountain Tire would be concerned if the order was not granted.

Fountain Tire has been the sole provider of tires and service at Baffinland for many years and we currently employ **26 full time associates** at Baffinland. Secondly, Fountain Tire has over **\$6M of consigned inventory** on site today and this inventory was sent to Baffinland based on a forecast of the site being fully operational (i.e. 6.0 million tonnes). Lastly, we have more products being delivered daily from all parts of the world to arrive in time for the upcoming sea lift to go to Baffinland. Many of these resources (people, and product) will not be fully required if Baffinland does not receive the emergency order. This will be highly disruptive to our employees, their families, and our business.

Minister Vandal, please grant the request for an emergency order to protect the numerous employees and businesses serving Baffinland.

Thanks for your consideration,



Nelson Tonn
Vice President Sales and Mine Service
D 780.410.2253 | M 780.464.3700 | C 780.916.5232

Cc: Udlu Hanson (Vice President, Community and Strategic Development Baffinland)

Attachment 2

Convoy Technical Memo

Memo

DATE: 13 June 2022
FROM: Melanie Austin (JASCO Applied Sciences (Canada) Ltd)
TO: Lou Kamermans (Baffinland Iron Mines Corporation)

Subject: Vessel convoys as a means of noise mitigation

This memo has been prepared to describe how the implementation of vessel convoys can serve as a mitigation measure to reduce cumulative noise exposure from shipping related to the Baffinland Iron Mines Mary River Project. Underwater noise from shipping can be mitigated through several mitigation measures intended to reduce the spatial and/or temporal extent of noise exposure within the Regional Study Area. The spatial extent of noise can be reduced through measures such as slowing vessels to reduce noise output. Baffinland has implemented a strict speed control of 9 kn for all vessels travelling through the Regional Study Area; this is slower than the 11 kn speed limit that is implemented as part of a voluntary vessel slow down measure in the Strait of Georgia (British Columbia) to mitigate noise impacts to Southern Resident Killer Whales. The temporal extent can be mitigated through reducing the number of vessel transits, or by convoying vessels to reduce the total duration of sound exposure. It is the latter measure that is discussed in this memo.

Because sound levels are logarithmic, the combined noise from multiple sound sources does not scale or multiply correspondingly with the number of sources. That is to say that the spatial extent of the combined noise footprint for two vessels travelling in close proximity to one another is not double that of the noise footprint for one vessel. The same is true for the duration of noise exposure for multiple transits of individual vessels in comparison to a single transit of a vessel convoy.

The degree to which a vessel noise footprint is increased by the nearby presence of additional vessels is dependent on the relative sound signatures of the vessels and on the spatial separation between the vessels. If one vessel is significantly louder than the other, then the composite noise footprint for the two overlapping sources will closely resemble that of the louder source (Figure 1, top). Overlapping sound footprints from two vessels that generate underwater noise of similar amplitude will combine in a way that is dependent on the separation between the vessels. The distance from either vessel to the edge of the composite sound footprint is expected to extend minimally compared to that in the absence of the second vessel (Figure 1, bottom). Sound levels in the space between the two vessels would increase by an amount of 3 dB or less (3 dB is the maximum increase caused by adding together sounds of equal amplitude). This would result in a small increase of the instantaneous sound exposure in some areas, but the corresponding decrease in exposure duration would yield an overall reduction of the total sound exposure.

The worst-case scenario, in terms of mitigating noise exposure duration, is for the vessels in convoy to be spaced far enough apart such that the sound footprints do not overlap. In that case, there would be no net

decrease in the total sound exposure achieved through the convoy. In the case of Baffinland's ore carriers, this would occur if the vessels were separated by a distance of approximately 10 km or greater. During shoulder season convoys in 2019 and 2020, the spacing between ore carriers in a convoy was always less than 10 km, in which case one would expect the footprints to overlap and result in an overall decrease in the exposure duration compared to that from two individual vessel transits.

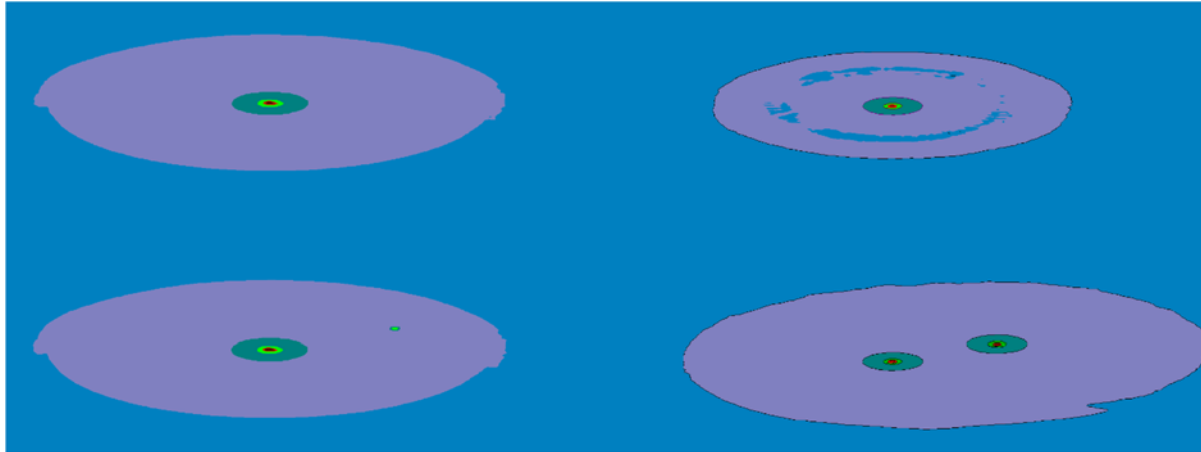


Figure 1 Example schematic of composite vessel footprints for vessels in convoy. The top panels depict individual vessel sound footprints and the bottom panels are sound footprints that overlap. (Left) one vessel is significantly louder than the other. (Right) vessels emit sound of similar amplitude.

In consideration of the benefit of Baffinland potentially using vessel convoys as a means to reduce underwater noise exposure in the Regional Study Area, consider that the duration of exposure from an individual ore carrier transit is approximately 30 minutes. The total duration of exposure for two individual transits (not in convoy) would then be 1 hour. If the vessels were to transit in a convoy, with an inter-vessel separation less than 10 km, it is expected that the duration of exposure for the vessels in convoy would be in between 30 minutes and 1 hour.

This is supported by review of acoustic recordings collected by Baffinland in 2019 and 2020, while the icebreaker *MSV Botnica* escorted vessels to and from Milne Port in convoy. Details about the collection of these data, and how they were processed, were provided in a previous report (Austin and Dofher, 2021). For this memo, we consider from that dataset transits with similar transit speeds, in open water conditions, when the icebreaker transited with between 0 and 3 ore carriers in convoy (Table 1). The sound output from all of these vessels are similar enough that the composite footprint for the convoy is best represented by the concept in the right hand side of Figure 1 (Austin and Dofher 2020).

Table 1 provides the ranges forward and aft from the *Botnica* to the 120 dB sound level threshold associated with marine mammal behavioural disturbance, and the amount of time that the recorded sound levels exceeded this threshold during each convoy transit. As the number of vessels in the convoy increased, the range from the *Botnica* to the 120 dB re 1 μ Pa threshold increased slightly, particularly aft of the vessels. The distance was 5.6 km when the *Botnica* travelled alone and 11.7 km when the *Botnica* escorted three ore carriers in convoy. Correspondingly, the duration of exposure above the 120 dB threshold increased slightly from 18 to 22 minutes when one or two ore carriers were added to the convoy, and to 40 minutes when there were three vessels in convoy with the *Botnica*. Figures showing the sound pressure level, and the distance between the vessels and the acoustic recorder, as a function of time are presented in Figures 2 through 5 for each of these transits.

In summary, acoustic monitoring data collected to date by Baffinland indicate that if ore carriers were to transit in convoys with inter-vessel separation less than 10 km, there would be an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. The composite noise footprint for the convoy of vessels would be slightly larger than that for an individual vessel, but not by a factor of the number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels would be compensated for by shorter exposure duration, resulting in a net decrease of noise exposure. In light of this, vessel convoys appear to provide a viable proposal for reducing total sound exposure, if appropriate inter-vessel separation is maintained optimally with the vessels as close together as safety measures would allow.

Table 1 Examples of ore carrier convoys measured during icebreaker escorts in 2019 and 2020 with correspond distances and durations for exposure to sound levels at or above 120 dB re 1 µPa.

Convoy Details					Range from <i>Botnica</i> to 120 dB (km)		Time > 120 dB (minutes)
Number of Vessels in Convoy	Vessel Name	Vessel type	Distance from <i>Botnica</i> (km)	Speed (kn)	Forward	Aft	
1	<i>Botnica</i>	Icebreaker	–	8.1	1.8	5.6	17.8
2	<i>Botnica</i>	Icebreaker	–	8.6	2.4	8.8	21.7
	<i>Gisela Oldendorff</i>	Ore carrier	2.6	8.1			
3	<i>Botnica</i>	Icebreaker	–	8.3	1.8	7.8	21.7
	<i>NS Yakutia</i>	Ore carrier	2.8	8.5			
	<i>Golden Brilliant</i>	Ore carrier	9.9	8.9			
4	<i>Botnica</i>	Icebreaker	–	8.5	4.0	11.7	40.8
	<i>Golden Ruby</i>	Ore carrier	6.5	8.7			
	<i>NS Yakutia</i>	Ore carrier	6.6	8.6			
	<i>Rio Tamara</i>	Ore carrier	2.8	8.9			

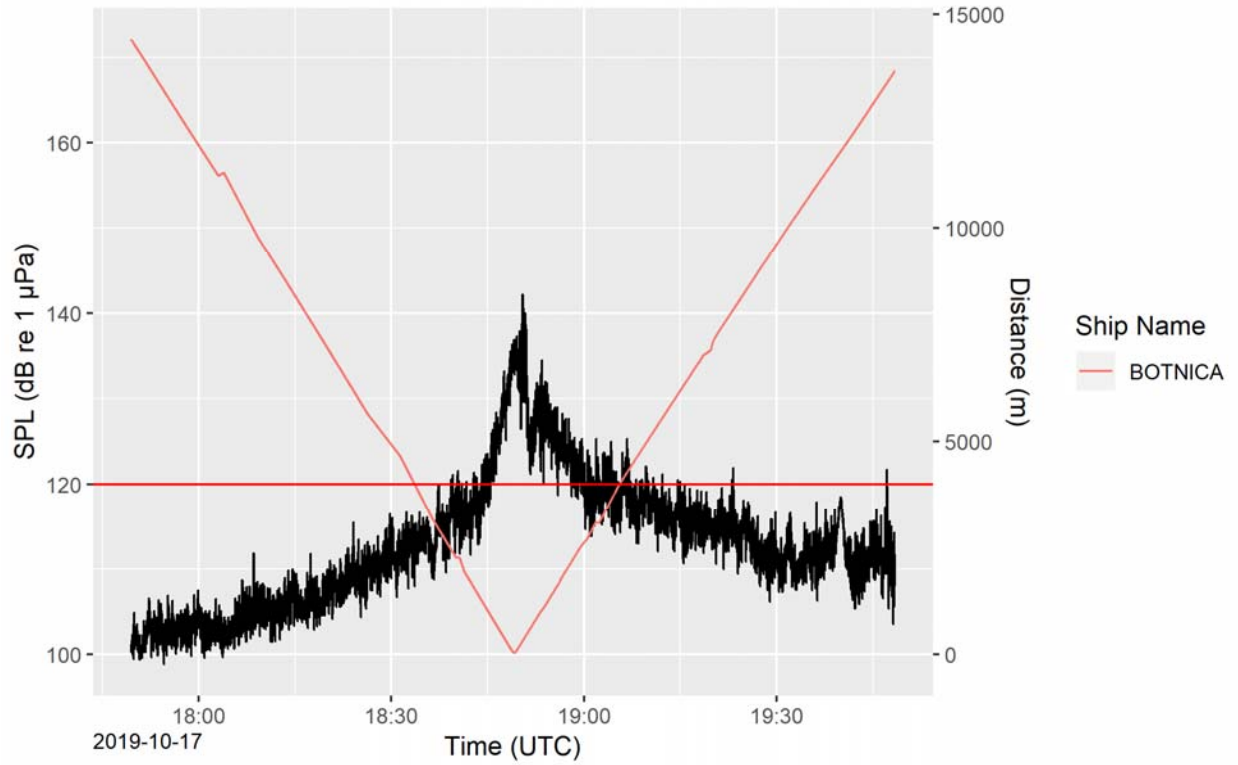


Figure 2 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 17 Oct 2019 coming to Milne Port, with no vessels in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 μ Pa.

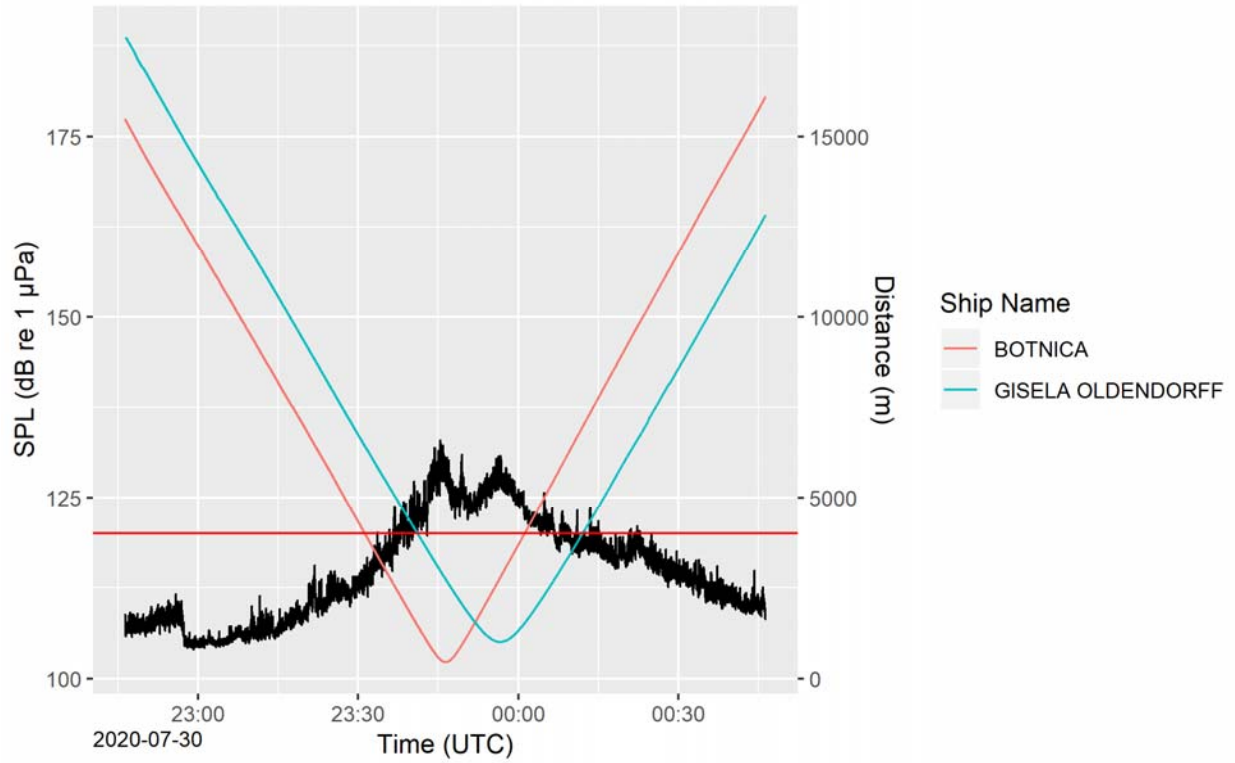


Figure 3 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 30 Jul 2020 leaving Milne Port, with 1 vessel in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 µPa.

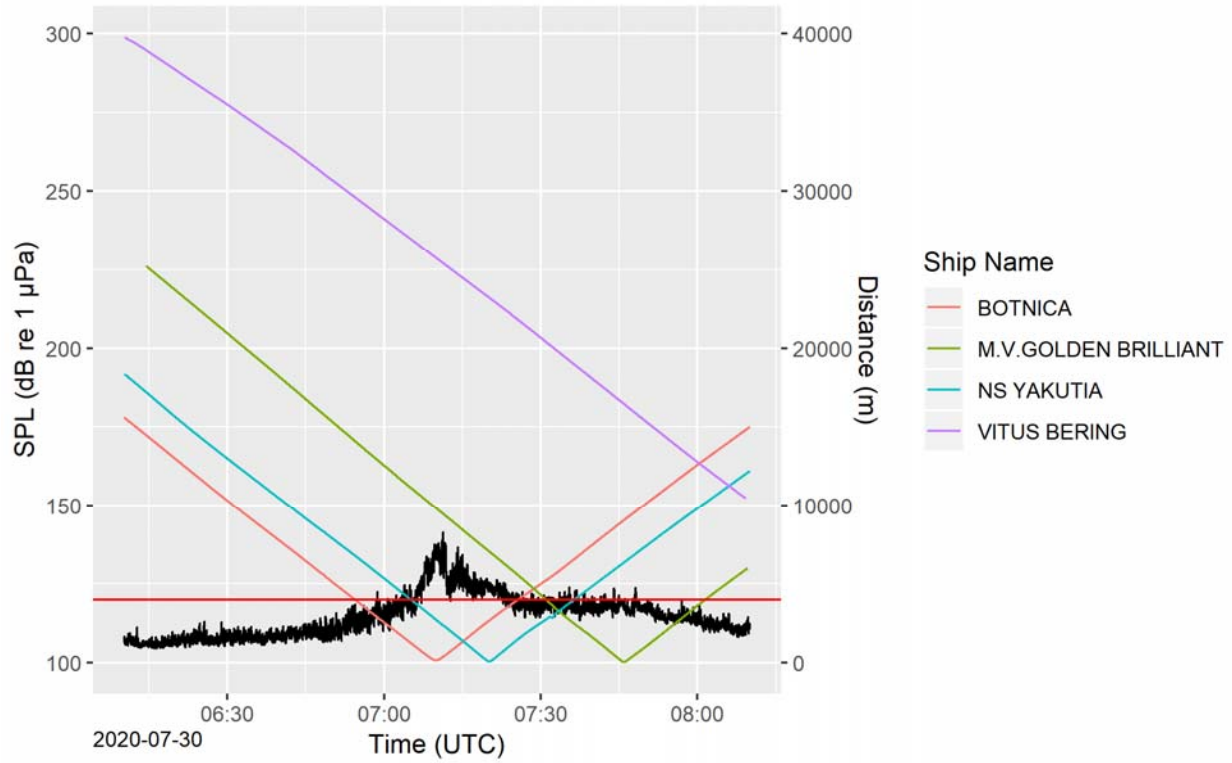


Figure 4 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 30 Jul 2020 coming to Milne Port, with 2 vessels in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 µPa.

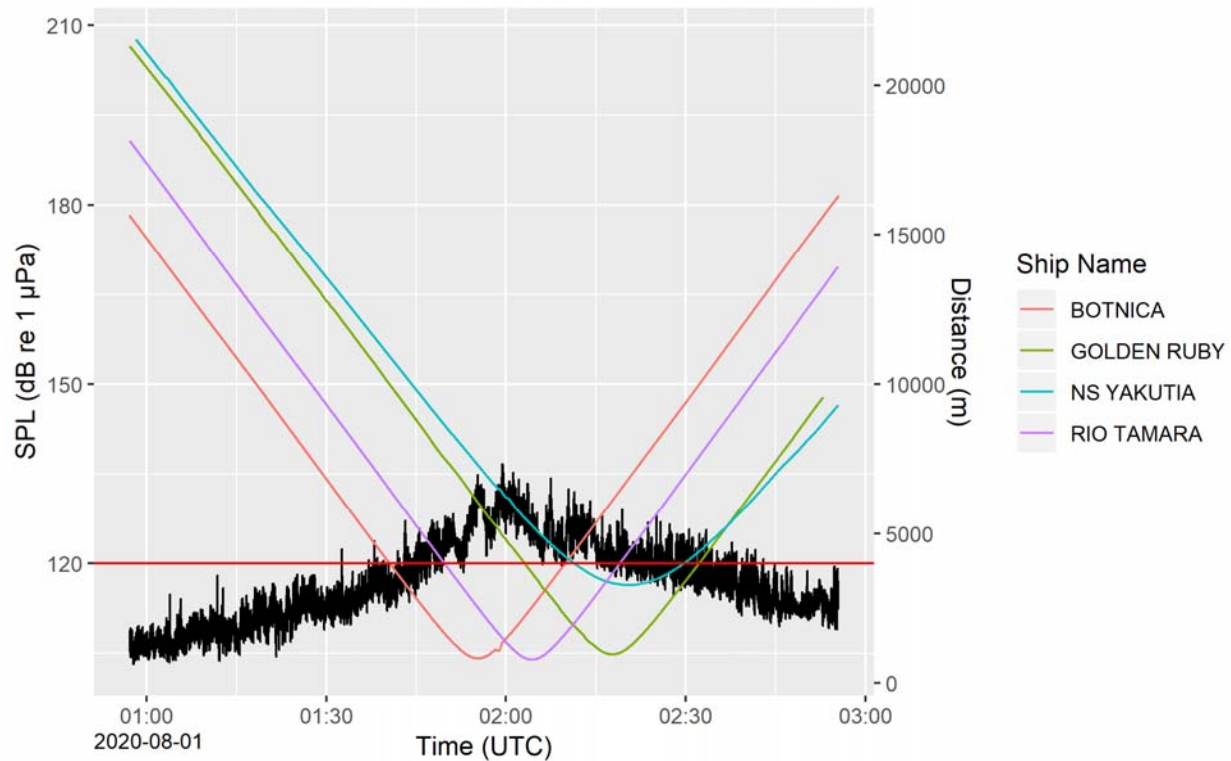



Figure 5 SPL (left axis) as a function of time recorded while MSV *Botnica* transited through Eclipse Sound on 1 Aug 2020 coming to Milne Port, with 3 vessels in escort and 0/10 ice concentration. The distances (right axis) between the vessels and the recorder are plotted in colour. A solid red horizontal line marks 120 dB re 1 μ Pa.

References

- Austin, M and T. Dofner. 2020. *Technical Memorandum - Vessel Source Level Estimates for the 2018 and 2019 Shipping Seasons: Baffinland Mary River Project*. Document 02235, Version 2.0. Technical Memorandum by JASCO Applied Sciences for Golder Associates Ltd.
- Austin, M.E. and T. Dofner. 2021. *Underwater Acoustic Monitoring: Baffinland Iron Mines Shoulder Season Shipping 2019–2020*. Document 02330, Version 1.0. Technical report by JASCO Applied Sciences for Golder Associates, Ltd.

Attachment 3

Operational Guide for Ore Carrier Convoys

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Baffinland Iron Mines Corporation

OPERATIONAL GUIDE FOR ORE CARRIER CONVOYS

FOR REVIEW PURPOSES ONLY

Prepared By:
Department:
Title:
Date:
Signature:

Approved By:
Department:
Title:
Date:
Signature:


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- Attachment 1 – Example Shipping Schedule
- Attachment 2 – Example Convoy Target Calculations

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1 PURPOSE

This implementation guide serves to provide an overview of how Baffinland may operationalize a reduction in the number of independent transits in the marine Regional Study Area (RSA) by implementing a convoy system during the shipping season. Through this convoy system, Baffinland aims to reduce the number of transits needed to achieve its targeted shipments in 2022 by approximately 15% compared to a system without convoying. The use of convoys will reduce the frequency of individual vessel transits calling to Milne Port, which will have a similar effect to reducing overall ship traffic. The anticipated benefit of this program will be to reduce cumulative noise exposure for marine mammals, and reduce the frequency of visual observations of vessels passing through and potentially interacting with land users and harvesters.

This convoy system is a novel approach to noise reduction for the benefit of marine mammals and has not been implemented at the proposed scale at Mary River or any other Port in Canada. Baffinland is confident it can implement a successful convoy system and achieve its stated target, however, in its first year of implementation the operational guidance may change as direct experience is gained with its implementation. Baffinland expects lessons to be learned and relayed in final reporting, which will inform future versions of this operational guide.

2 SCOPE


This operational guide includes details related to the use of convoys in order to minimize the total number of transits completed by Baffinland ore carriers over the entire duration of the shipping season within the marine RSA (Figure 2.1). This guide also covers the obligations and commitments made under regulatory or social license that require input and oversight from Baffinland’s Shipping Department, its shipping agents and vessel owner partners. This guide does not abdicate any departments’ responsibilities for understanding and following all legal requirement under permits and authorizations issued to the Company.

It is further noted that in all matters of marine transportation, the Captain of the vessel (the Vessel Master) has an overriding obligation to protect the safety of their vessel, crew, and environment for which they are ultimately responsible for. Notwithstanding anything contained in this Convoy System Operational Guide (the Guide), the Vessel Master will always be guided by this principle.

This Guide covers transits completed over the entire duration of the shipping season, for which the start and end of shipping operations is defined through a specific set of requirements allowing for safe passage in the marine RSA. It does not apply to vessels transiting outside the RSA.



FIGURE 2.1: SHIPPING ROUTE BUFFER ZONE

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3 RESPONSIBILITIES

To safely and effectively reduce the number of transits through the RSA over the entire duration of the shipping season, Baffinland and its shipping agents will work with best-in-class vessel owners. A description of the roles and responsibilities for individuals executing on the convoy system are as follows:

Baffinland Shipping Department (including Baffinland Head of Shipping and Vice President Sales and Logistics): Responsible for overall shipping operations including understanding and overseeing any requirements related to the regulatory and social licenses that requires actions from the Shipping Departments, its shipping agents and vessel owner partners. The Baffinland Shipping Department will provide a shipping schedule to the Port Captains on a daily basis, which among other things, consider where vessels are in their approach to the staging area in Baffin Bay at 73 W longitude, and their ability to travel in convoy. In addition to other factors (see 4.2 Criteria used for Convoys), this schedule will determine the feasibility of a convoy. The Baffinland Shipping Department, will report all planned vessel movements to Sustainable Development for external communications and reporting.


Baffinland Sustainable Development:

Manager Community Resource Services (CRS)/Environmental, Social and Governance (ESG): Manager CRS/ESG will provide oversight to the Shipping Monitors by informing them of incoming convoys. This information will be provided by the Shipping Department and its shipping agents. Direct engagement with community representatives (e.g., the Hamlet of Pond Inlet, the Mittimatalik Hunters and Trappers Organization) will be engaged prior to, during and after the shipping season is complete on convoy system implementation. At the end of the season, a summary report will be provided to the Marine Environment Working Group, the Hamlet, and the MHTO on the resulting convoy implementation.

Shipping Monitors: Shipping Monitors will be responsible for tracking, recording and providing communications using various formats (e.g., Facebook, VHF radio) to residents of Pond Inlet on Baffinland’s use of convoys over the duration of the shipping season. Baffinland Manager CRS/ESG will aim to provide advance notice of incoming convoy system prior to their entry into the RSA and/or prior to when ore carriers leave Ragged Island anchorage.

Baffinland Shipping Department and its Agents

Vessel Captain/Vessel Master: The Captains of the vessels calling to Milne Port are highly qualified, with years of experience in polar waters. They will be responsible for the actual implementation and performance of the convoy. All Captains performing in convoy will communicate via ship radio throughout the transit. Based on their experience and prevailing weather and ice conditions, the Captains will choose a safe distance between their vessel and the vessel ahead of them in the convoy and, if required, report any necessary deviations from the nominal shipping lane to all other vessels in convoy. It should be noted that all previously applied shipping mitigations will continue to apply in 2022 in addition to the new convoy

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system i.e. 9 knot speed limit, use of nominal shipping route, anchoring limits at Ragged Island, etc. The vessels will provide their expected time of arrival (ETA) during the voyage.

Port Captain: The Port Captain’s office situated at Milne Port will be the focal point for ship to shore communications and coordination of all marine shipping movements. The Port Captain will establish and communicate the shipping schedule, advising Vessel Captains on when to enter the marine RSA. The Port Captain will manage the implementation of the convoy system and will dictate the timing of departure and size of convoy. The Port Captain’s office will issue orders as required to all vessels under Baffinland’s ultimate authority and will report all planned vessel movements to the Shipping Department via Head of Shipping.

4 DEFINITIONS

4.1 GENERAL DESCRIPTIONS


For the purpose of this operational guide the following definitions of ‘convoys’ are applicable:

TABLE 4.1: Definitions

Term	Definition
Convoy	2 or more vessels traveling in proximity that provides inter-vessel separation less than 10 km
Full Transit	A convoy from Baffin Bay to Milne Port or Milne Port to Baffin Bay (243 km)
Partial Transit	A convoy from Baffin Bay to Ragged Island (173 km) or Ragged Island to Milne Port (70 km) (Note that vessels do not stop at Ragged Island when leaving Milne Port)
Convoy Target	The distance of ore carrier transits completed in convoy divided by the total distance of transits for all ore carriers
Effective Transits	The total number of transits for a segment or all segments where individual transits and convoys are accounted for as single transits, regardless of the number of vessels
Effective Distance	The total distance travelled for a segment or all segments where the distances of individual transits and convoys are accounted for equally, regardless of the number of vessels

4.2 TYPES OF CONVOYS

Convoys will occur throughout the shipping season as ore carriers travel in groups of 2 or more and maintain inter-vessel separation of less than 10 km, a distance demonstrated to reduce total sound exposure in the marine RSA (See Appendix A). Baffinland acknowledges that the closer the vessels travel together, the greater the benefits in noise reduction. As a result, Baffinland will endeavor to maintain distances between vessels at 2 km or less, however, operational realities not yet experienced may challenge our ability to satisfy this condition in all circumstances and some deviations should be expected.

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Convoys will either occur as full transits or a partial transit. The former occur when a convoy of ore carriers travel the entire distance from Baffin Bay to Milne Port, or Milne Port to Baffin Bay, whereas the latter occur when a convoy of vessels travel the distance from Baffin Bay to Ragged Island, or Ragged Island to Milne Port (Note that ore carriers do not typically stop of Ragged Island when outbound).

Since Ragged Island is not an exact midway point along the shipping route within the marine RSA, the total distance of ore carrier transits within the marine RSA must be considered when setting the Convoy Target for 2022. This process is explained further in Section 5.3.

5 PROTOCOL

5.1 CONVOY IMPLEMENTATION CRITERIA

The ability to execute a convoy will depend on the following factors:

5.1.1 VESSEL SAFETY

- The use of a convoy system for ore carriers calling to be Milne Port will be dependent on a number of risk factors that may affect the safe passage of vessels in the marine RSA including:
 - Ice conditions (what could prevent a convoy? e.g., bergy bits, growlers, Fall freeze up);
 - Timing of incoming and outgoing vessels and the potential to meet in the no passing zone established Bruce Head and Poirier Island;
 - Presence of other vessels in the RSA (Baffinland and non-Baffinland vessels);
 - Weather;
 - Other factors as identified in practice

5.1.2 AVAILABILITY OF ANCHORAGES AT RAGGED ISLAND AND MILNE PORT

- The size of convoy will depend on available anchorage capacity at either Ragged Island and/or Milne Port to accept ore carriers that have not been cleared for berthing at the ship loading dock. Ragged Island and Milne Port each have 3 designated anchoring points (for a single vessel at each), however, two of the three anchorages at Milne Port are relatively deep, which can cause safety concerns in bad weather as vessels can drift even at anchor. As a result, the 3rd anchorage is only ever occupied on an emergency basis.

5.1.3 NUMBER OF VESSELS IN STAGING TO THE EAST OF 73 W LONGITUDE OR RAGGED ISLAND

- The deployment and size of convoy will be dependent on the number of available ore carriers which are staging to the East of 73 W longitude (See Figure 5.1) or anchored at Ragged Island.

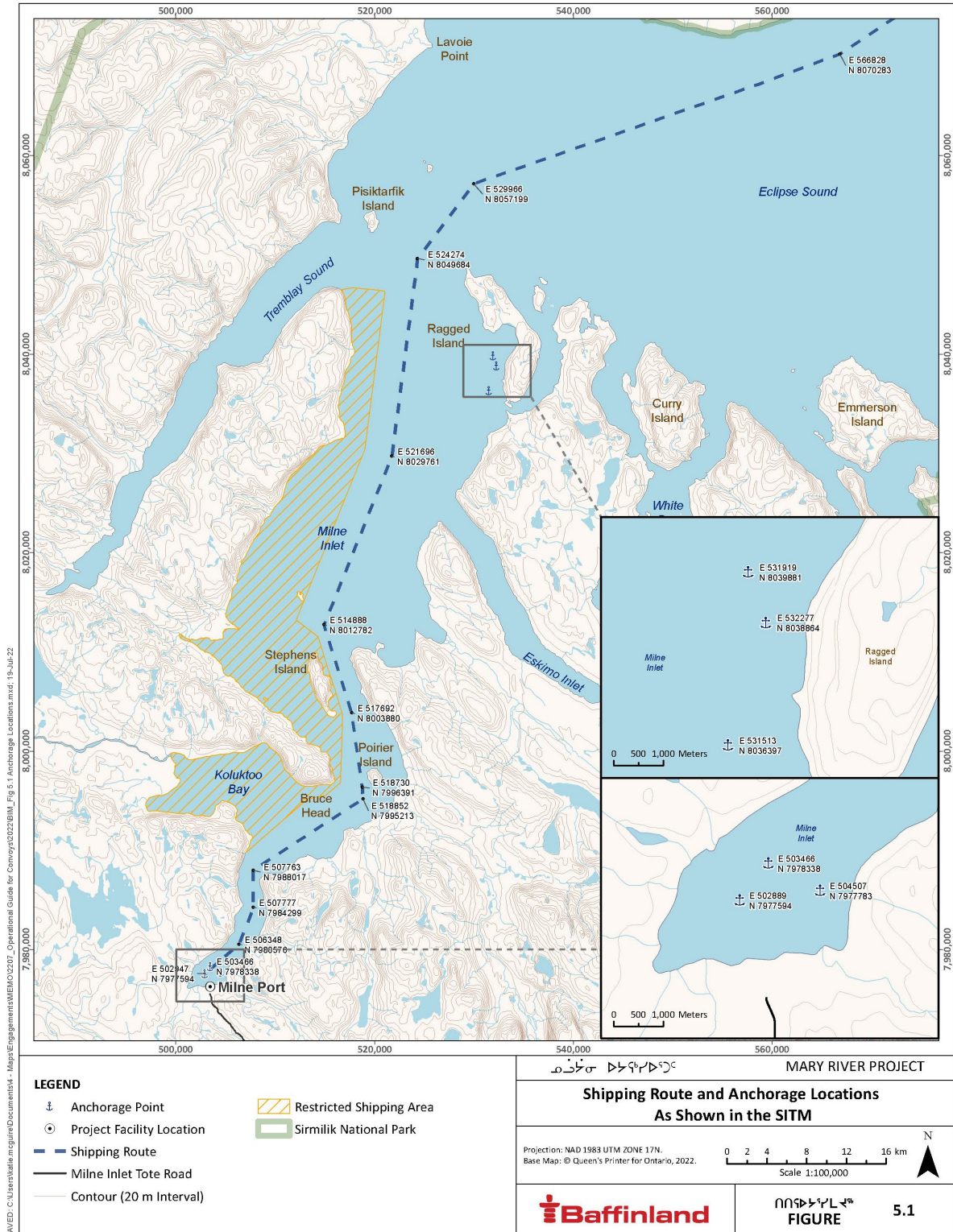



FIGURE 5.1: SHIPPING ROUTE AND ANCHORAGE LOCATIONS AS SHOWN IN THE SITM

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5.1.4 THE SHIPPING SCHEDULE

- Deployment schedule and frequency of convoys will depend on the need for individual vessels to commence sailing inbound and outbound. This will in turn be determined by factors including but not limited to: safety at all times, the ice-class of the vessel, the vessel’s location prior to commencement of convoying, crew and fuel status on each vessel, the utilization of the ore loading dock at Milne port, safety stock levels at customers’ discharge ports, changes in the loading sequence of vessels at Milne port, product availability at Milne port amongst others. Baffinland’s Shipping Department will coordinate the Shipping Schedule.

5.2 INSTRUCTIONS TO VESSELS TRANSITIONS IN A CONVOY

This section presents instructions to Captains when deploying a convoy.

1. The Port Captain will communicate with Baffinland vessels to coordinate daily vessel scheduling. Vessels standing by for clearance from Port Captain to enter the marine RSA and proceed to Milne Port will wait at the designated staging area to the east of 73 W longitude, or other established safe anchorage locations in Baffin Bay.
2. When feasible for the shipping project and safety permitted, vessels may enter the RSA under a convoy when instructed to do so by the Port Captain.
3. The Port Captain, with support from Baffinland Shipping Department and Vessel Captains, will the size and sequence of convoy.
4. Vessels will convoy in a single file line-up.
5. The Port Captain will provide instructions on where each vessel should complete their convoy (i.e. anchorage location).
6. Vessels performing a convoy will maintain a safe distance from one another, which will vary based on present conditions.
7. Vessels in convoy will be in constant communication via ship radio and can reach Port Captains by telephone or radio.
8. All vessels calling Milne Port must follow all instructions provided in the Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port, in addition to any additional instructions provided by the Port Captains.
 - All Project vessels operating in the RSA will maintain a maximum speed of nine knots.
 - Project vessels will maintain a constant course along the nominal shipping route and speed when in transit (as safe navigation allows).
 - Vessels entering the RSA will report ice conditions or presence of ice to Port Captain who will inform all vessels sailing throughout the RSA.

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- When marine mammals appear to be trapped or disturbed by vessel movements, the vessels will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area (as safe navigation allows).
 - All vessels will be provided with standard instructions to not approach within 300 m of a walrus or polar bear observed on sea ice.
 - All vessels will be provided with standard instructions to operate their vessel in a manner that avoids separating an individual member(s) of a group of marine mammals from other members of the group.
 - Vessels leading a convoy will report any change in course to other vessels in convoy to mitigate disturbance to marine mammals or wildlife.
9. Nothing contained herein should be read in any way as over-riding the Captain’s authority and responsibility for safe navigation and management of the vessel.
10. These instructions shall be revisited every shipping season with changes captured in annual updates to the Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port.

An example of a shipping schedule is provided as Attachment 1, which outlines how vessels may travel to Milne Port is segments independently and in convoy with other vessels.

5.3 CALCULATION OF REDUCTION OF TRANSITS


Since in some cases convoys may only be carried out over a portion of the nominal shipping route, and the point at which some convoys may end or begin at Ragged Island is closer to Milne Port than Baffin Bay, the overall implementation of convoys cannot be effectively measured by a simple accounting of full and half transits. The most accurate accounting must consider the overall distance travelled in convoy as a proportion of total distance otherwise travelled as individual transits.

In the calculation of the convoy target, the following distances are used for the potential inbound transits:

- The full transit from Baffin Bay to Milne Port is approximately: 243 km
- The partial transit from Baffin Bay to Ragged Island is approximately: 173 km
- The partial transit from Ragged Island to Milne Port is approximately: 70 km

Unlike inbound transits, outbound vessels do not anchor at Ragged Island and the only distance to be traveled is equivalent to a full transit from Milne Port to Baffin Bay, which is approximately: 243 km.

To illustrate how Baffinland will report on its performance against its Convoy Target of 15% for 2022, two illustrative scenarios are provided that break down different combinations of individual versus full and partial convoy transits as Attachment 2.

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5.4 CONVOY-RELATED COMMUNICATIONS AND REPORTING

5.4.1 INTERNAL

The Baffinland Shipping Department will provide regular updates to the Sustainable Development Department throughout the shipping season on potential upcoming implementation of a convoy system. As part of these updates, a number of details will be provided at minimum, including: potential for an upcoming convoy system within the next 7 days, and upon coordination of such a convoy. These communications will come via the shipping-dedicated email that is available to Shipping Monitors and Manager CRS/ESG.


5.4.2 EXTERNAL

Shipping monitors will track and record each convoy occurrence as part of their daily tracking duties and reporting. Convoys, when implemented, will be announced on the marine VHF radio in advance of the convoy formation to the extent possible. Shipping Monitors will announce convoy systems on Facebook upon their entry into the RSA. Wherever possible, a screenshot will be taken of the vessels when underway; this will be posted along with the messaging of an incoming convoy system.

5.4.3 END OF SEASON REPORTING

Baffinland will submit a summary of conveying activities within 30 days of the close of the shipping season to the Marine Environment Working Group (MEWG), the Hamlet of Pond Inlet and the Mittimatalik Hunters and Trappers Organization (MHTO). Input received from Pond Inlet residents, as received through various media, will be incorporated to the extent possible. This summary will include information such as the following (which may be change once convoy systems are implemented):

- Dates on which convoys were implemented;
- Start and end locations of each convoy system;
- Summary of distance travelled for individual and convoy system transits
- Any reported concerns.


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Attachment 1

Example Shipping Season

Transit	Convoy	Vessel	From	To	Vesse l	From	To	Vesse l	From	To	Distance (km)
1	X	Ship A	Baffin Bay	Milne Inlet	Ship B	Baffin Bay	Milne Inlet	Ship C	Baffin Bay	Milne Inlet	243
2		Ship D	Baffin Bay	Milne Inlet							243
3		Ship A	Milne Inlet	Baffin Bay							243
4	X	Ship E	Baffin Bay	Milne Inlet	Ship F	Baffin Bay	Ragged Island				243
5		Ship B	Milne Inlet	Baffin Bay							243
6		Ship C	Milne Inlet	Baffin Bay							243
7	X	Ship G	Baffin Bay	Ragged Island	Ship H	Baffin Bay	Ragged Island				173
8		Ship D	Milne Inlet	Baffin Bay							243
9		Ship F	Ragged Island	Milne Inlet							70
10		Ship E	Milne Inlet	Baffin Bay							243
11		Ship F	Milne Inlet	Baffin Bay							243
12	X	Ship G	Ragged Island	Milne Inlet	H	Ragged Island	Milne Inlet				70
13		Ship G	Milne Inlet	Baffin Bay							243
14		Ship H	Milne Inlet	Baffin Bay							243

Total Distance covered: 2,986km


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Attachment 2

Example Convoy Target Calculations



SAVED: C:\Users\stafie.mnguire\Documents\Map - Maps\Efigem\Map\MEMO\2027_Operational Guide for Convoy\2022\BILM_Fig 2.1 Shipping Route Buffer.mxd: 19-Jul-22

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The following tables demonstrate how the effective distances are calculated by transit segment (i.e. Baffin Bay to Ragged Island) and as a total for the season. Ultimate performance is measured by comparing the total effective distance travelled by the base case, which is the total distance travelled by all vessels without consideration for convoys. In both scenarios 80 ore carriers as assumed to be chartered

Number of Ore Carriers (A)	Individual Transits (B)	Distance of Transits (km) (C)	Overall Distance Travelled (B x C)
80	160	243	38,880

Scenario 1

In this scenario 55 vessels transit direct from Baffin Bay to Milne Port during the shipping season, 20 travel individually, and 35 travel in convoys between 2 and 5 in size. The remaining 25 vessels must anchor at Ragged Island en-route to Milne Port, 10 of which travel individually and 15 travel in convoys between 2 and 3 in size. Once at Ragged Island, 15 travel independently to Milne Port while the remaining 10 travel in convoys of 2. All outbound transits from Milne Port to Baffin Bay are traveled independently.

While a total of 80 vessels travelled between Baffin Bay and Milne Port and back, convoying combines individual transits to produce ‘effective transits’, in this case it’s 34 for the Baffin Bay to Milne Port segment, 17 for the Baffin Bay to Ragged Island segment, and 20 for the Ragged Island to Milne Port segment. The total effective distance per transit segment is calculated by multiplying the number of total effective transits for the transit segment by the corresponding transit distance (km). The total effective distance for the shipping season is calculated by adding each of the total transit segment distances together. In this case, convoying provides a total effective distance for the season of 32,043km, which represents an 18% reduction from the base case. Baffinland’s Convoy Target of 15% for 2022 is achieved.

Transit Segment	INBOUND			OUTBOUND
	Baffin Bay to Milne Port	Baffin Bay to Ragged Island	Ragged Island to Milne Port	Milne Port to Baffin Bay
Transit Distance (km)	243	173	70	243
Individual Transits	20	10	15	80
Convoy Transit - 2	9	5	4	0
Convoy Transit - 3	2	1	0	0
Convoy Transit - 4	2	0	0	0
Convoy Transit - 5	1	0	0	0
<i>Total Vessels</i>	57	23	23	80
Total Effective Transits	34	16	19	80
Effective Distance per Transit Segment	8262	2768	1330	19440
Total Effective Distance for the Shipping Season	31,800			
Total Reduction from Base (38,880 km)	18%			

Scenario 2

In this scenario 35 vessels transit direct from Baffin Bay to Milne Port during the shipping season, 20 travel individually, and 15 travel in convoys between 2 and 4 in size. The remaining 45 vessels must anchor at Ragged Island en route to Milne Port, 20 of which travel individually and 25 travel in convoys between 2 and 3 in size. Once at Ragged Island, 14 travel independently to Milne Port while the remaining 31 travel in convoys of 2 to 4 in size. All outbound transits from Milne Port to Baffin Bay are traveled independently.

In this case, convoying provides a total effective distance for the season of 33,324 km, which represents a 14% reduction from the base case. Baffinland’s Convoy Target of 15% for 2022 is not achieved.

Transit Segment	INBOUND			OUTBOUND
	Baffin Bay to Milne Port	Baffin Bay to Ragged Island	Ragged Island to Milne Port	Milne Port to Baffin Bay
Transit Distance (km)	243	173	70	243
Individual Transits	20	19	13	80
Convoy Transit - 2	6	8	12	0
Convoy Transit - 3	0	3	1	0
Convoy Transit - 4	1	0	1	0
Convoy Transit - 5	0	0	0	0
<i>Total Vessels</i>	36	44	44	80
Total Effective Transits	27	30	28	80
Effective Distance per Transit Segment	6561	5190	1960	19440
Total Effective Distance for the Season	33,151			
Total Reduction from Base (38,880 km)	14%			

Appendix 2

2022 Shipping and Marine Monitoring Summary



SHIPPING AND MARINE MONITORING SUMMARY

2022 Shipping Season

BAFFINLAND SHIPPING

Contents

- 1** Baffinland Shipping Activities
 - 2** Addressing Concerns
 - 3** Shipping Route
 - 4** Potential Effects on the Environment
 - 5** Marine Monitoring Programs
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-





BAFFINLAND SHIPPING ACTIVITIES

In 2022, Baffinland Iron Mines Corporation ("Baffinland or the 'Company'") will begin its shipping activities once certain minimum requirements have been met including no presence of landfast ice along the entire Northern Shipping Route, and confirmation that the Pond Inlet floe edge has been closed.

Baffinland will continue to implement mitigation measures for the 2022 shipping season in direct response to Inuit input. In an effort to reduce potential cumulative impacts of the Project to narwhal during this sensitive time period, Baffinland will again delay the start of the shipping season until icebreaking is no longer required for ore carriers transiting towards Milne Port, as done in 2021. With this decision, the trigger to commence the beginning of the 2022 shipping season will be the presence of a continuous path of 3/10ths or less ice concentrations between the entrance of Eclipse Sound and Milne Port. An icebreaker will therefore not be used to be used to break ice and escort ore carriers when ice is greater than 3/10ths ice concentration.

Baffinland will also introduce the use of convoys, where vessels travel in a group, throughout the shipping season to further reduce total underwater sound exposure. This will reduce the frequency of potential interactions with hunters and observations of vessels over the season. As the season progresses, we will keep you updated on any new changes.

The final shipping schedule will depend on prevailing ice conditions and once initiated will continue until approximately mid-to-late October. Within this timeframe, and in consideration of approved transportation limits, we expect to need between 55 to 80 ore carriers, three (3) re-supply voyages and up to four (4) fuel tanker voyages.

What you've shared with us

Through valuable conversations with local community members, Baffinland has heard a number of primary concerns related to shipping through the Northern Shipping Route.

The potential for shipping to interfere with local hunting

The potential for dust to impact the marine environment including water and sediment quality, and marine organisms

The potential for vessels to affect marine mammals

The potential for shipping activity to harm the health of the marine ecosystem

ADDRESSING CONCERNS



How has Baffinland addressed these concerns?

Baffinland is committed to continuing to monitor any potential effects of shipping activities. Here are some of the measures we will be implementing to manage and mitigate potential issues:

1. Baffinland vessels will not break through landfast ice and will wait for confirmation that the floe edge has been closed before entering Eclipse Sound. In 2022, the shipping season will only start once it is confirmed that there is a continuous path of 3/10ths or less ice concentrations between the entrance of Eclipse Sound and Milne Port.
2. No more than 80 ore carriers will be chartered should Baffinland be approved to transport up to 6 mtpa. In addition, convoys will be used to further reduce total underwater sound exposure.
3. Vessels are to travel as closely as possible to the approved Northern Shipping Route but may deviate at times to ensure safe sailing conditions. We have a notification system that alerts Baffinland staff if any Baffinland vessels are travelling above the speed limit (maximum of 9 knots) or outside of the approved Northern Shipping Route.
4. A maximum of three vessels can be anchored or drifting at Ragged Island at any one time.
5. Ensure that all Baffinland vessels follow the Standing Instructions to Masters which provides information to vessel captains on speed limits, the shipping route, and anchorage locations.
6. No grey water, sewage or ballast water will be discharged in Eclipse Sound by ore carriers. Ballast water is only discharged by ore carriers at Milne Port after compliance testing.
7. Baffinland will continue to work with community members, Hunters and Trappers Organizations and Hamlets to ensure that all concerns related to shipping activities are considered. Full-time Shipping Monitors will be available in the Baffinland Pond Inlet office to support daily tracking and viewing of vessels passing through Eclipse Sound all the way to Milne Port.

To date, no significant changes have occurred to the marine environment at Milne Port as determined through marine environmental effects monitoring programs implemented since start of operations.

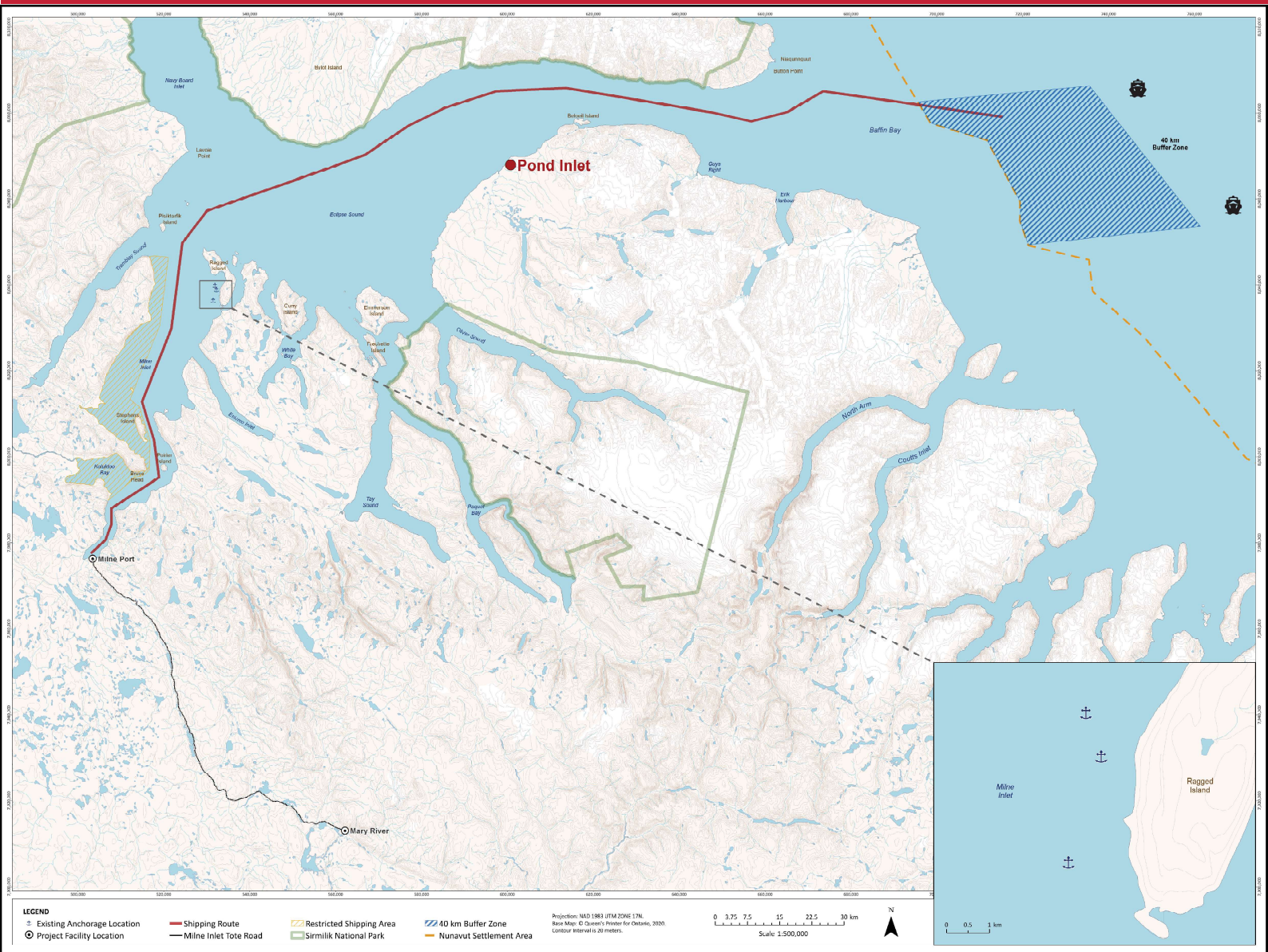
However, a reduction in Eclipse Sound narwhal numbers relative to historical estimates (pre-2020) based on analysis of latest aerial survey data (2021) from Eclipse Sound has been reported, consistent with concerns raised by the community.

In response, a precautionary approach is being taken where adaptive management mitigation measures will be enhanced during the 2022 shipping operations: the avoidance of icebreaking at the start of the shipping season and the use of convoys to further reduce total underwater sound exposure.



It is important to remember that the health and safety of people is always Baffinland's top priority. In some situations, the vessel captains may need to deviate away from standard operating procedures to ensure safe passage.

SHIPPING ROUTE



HAVE QUESTIONS OR CONCERNS?

If you are on the water and have an immediate concern, **contact our shipping monitor via VHF radio channel 26.**

Visit the Baffinland office and speak with our shipping monitor or **view vessel tracks** in the Mittimatalik Hunters and Trappers Organization (MHTO) building, 2nd floor.

Email us at:
shipping@baffinland.com

Call us at:
899-1807

For shipping updates visit:
www.baffinland.com

- > Operation
- > Shipping & Monitoring



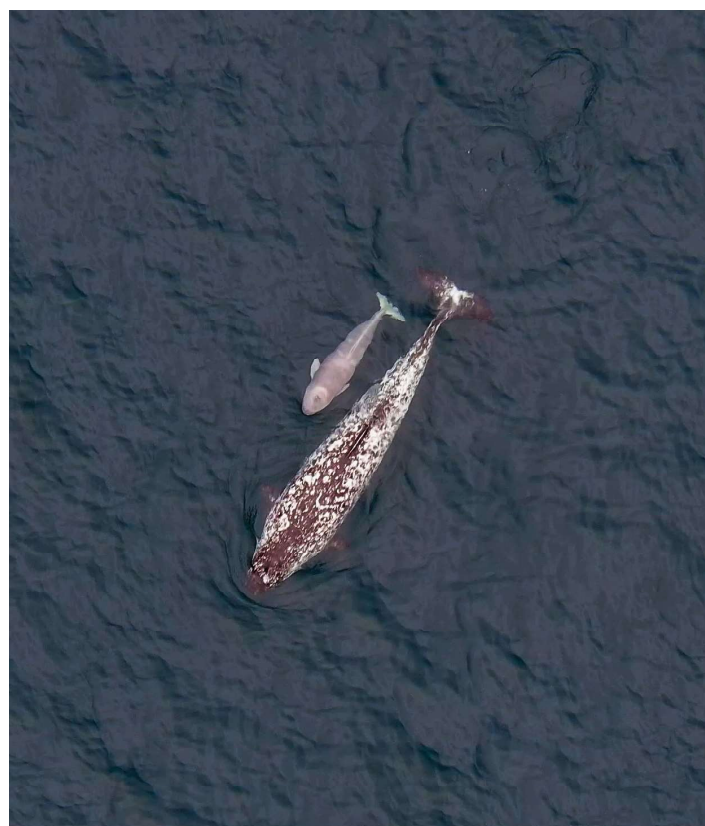
POTENTIAL EFFECTS ON THE ENVIRONMENT

Shipping may affect marine mammals:

- Distribution and abundance
- Behaviour
- Habitat

Shipping could potentially affect the local marine environment by:

- Introducing aquatic invasive species
- Altering the quality or quantity of fish habitat
- Altering water quality near Milne Port



Mother-calf pair observed in Milne Inlet (August 2021)

MARINE MONITORING PROGRAMS

What are we doing to monitor the marine environment?

To monitor potential effects from shipping on the marine environment, Baffinland will be running a number of different monitoring programs throughout the shipping season.

The marine monitoring programs will:

- Measure the effects that the shipping is having on the marine environment
- Assess the accuracy of predictions of effects
- Determine if adaptive mitigation measures need to be developed.



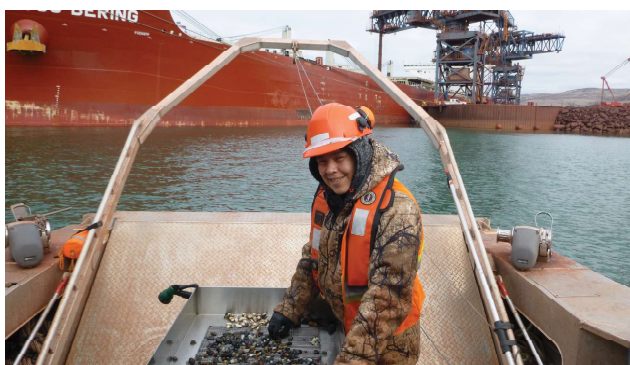
Marine Mammal Aerial Surveys

Monitors narwhal abundance and distribution and other marine mammal species in Project area throughout the summer.



Bruce Head Shore-based Monitoring

Investigates narwhal response to shipping along the Northern Shipping Route by observing them from the top of Bruce Head.



Marine Environmental Effects and Aquatic Invasive Species and Habitat Offset

Monitors water and sediment quality including metals, benthic infauna, epifauna and epiflora, fish abundance and health (focus on Arctic char) including contaminant analysis, and ballast water compliance testing.



Passive Acoustic Monitoring

Retrieval of two (2) recorders at the floe edge which recorded underwater noise during the 2021 fall shoulder season and 2022 floe edge conditions. Potential monitoring of underwater noise at one (1) location from August to September near Bruce Head.



COMMUNICATIONS

In order to provide better communications about Baffinland vessel activities, full-time Shipping Monitors will be available over the entire shipping season working from the Baffinland Pond Inlet office located in the Mittimatalik Hunters and Trappers Organization (MHTO) office building (2nd Floor). If you have questions, comments or concerns about Baffinland vessels, please contact Baffinland by visiting one of our Shipping Monitors, or provide your concern to a representative from the MHTO who can then relay the message to Baffinland.

In addition to interacting directly with Shipping Monitors, vessel traffic in 2022 may be monitored through a variety of methods including:

1. Accessing the Baffinland website (www.baffinland.com) and following the path to “Operation>Shipping & Monitoring”; access also available in the Baffinland Pond Inlet office;
2. Visiting the Pond Inlet Baffinland office to observe live tracking of vessels through the Automatic Identification System (AIS) monitoring station, and learning more about the type of vessels that Baffinland requires for its operations;
3. Announcements about upcoming vessel activity including convoys will be made on the local Pond Inlet radio at regular intervals;
4. Listening to periodic announcements of daily and upcoming vessel activity including convoys on marine VHF radio channel 26;
5. Accessing Facebook pages for Baffinland Iron Mines, Pond Inlet News and Pond Inlet Hunters Information Page for periodic postings about past, current and future shipping activities.



QUESTIONS? HERE IS HOW YOU CAN REACH US

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L6H 0C3

If you have questions, comments or concerns about Baffinland vessels, please contact us by visiting one of our Shipping Monitors at the Baffinland Pond Inlet office (in Mittimatalik Hunters and Trappers Organization (MHTO) building, 2nd floor), contact us via marine VHF radio channel 26, or provide your concern directly to the MHTO. For specific vessel operation concerns, if possible, please indicate the name of the vessel, location, the date and time of observation, as well as any details about your concern. Please provide photos and video if available.

Manager, Community Resource Services

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Pond Inlet Shipping Monitors

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