





# Baffinland Iron Mines Corporation

## Mary River Project

2020 ANNUAL REPORT TO THE NUNAVUT IMPACT REVIEW BOARD

REV 0



2021-05-06	0		
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<b>Date</b>	<b>Rev.</b>	<b>Reviewed By</b>	<b>Approved By</b>

**TABLE 0: REPORT SUBMISSION SUMMARY**

Year of Annual Report	2020
Annual Report Submission Date:	May 6, 2021
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## ABBREVIATIONS

AANDC	Aboriginal Affairs and Northern Development Canada
AAQS	Ambient Air Quality Standards
ADCP	Acoustic Doppler Current Profilers
AED	Automatic External Defibrillator
AEMP	Aquatic Effects Monitoring Plan
AIS	Aquatic Invasive Species
AiS	Automatic Identification System
AMBNS	Active Migratory Bird Nest Surveys
APRF	Annual Project Review Forum
AQ	Air Quality
ARD	Acid Rock Drainage
ARU	Autonomous Recording Units
ASR	Annual Security Review
Baffinland	Baffinland Iron Mines Corporation
BC MOE	British Columbia Ministry of Environment
BCLO	Baffinland Community Liaison Officer
BDO	BDO Canada LLP
BHL	Baffinland Hematite Lump
BOD	Biological Oxygen Demand
BSA	Behavioural Study Area
BWM	Ballast Water Management
BWMP	Ballast Water Management Plan
CAAQS	Canadian Ambient Air Quality Standards
CAO	Chief Administrative Officer
CC	Contracting Committee
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CDA	Canadian Dam Association
CF	Crusher Facility
CFIA	Canadian Food Inspection Agency
CFU	Colony-Forming Units
CHS	Canadian Hydrographic Service
CIRNAC	Crown Indigenous Relations and Northern Affairs Canada
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> eq	Carbon Dioxide Equivalent
CoPC	Contaminant of Potential Concern
CORI	Coastal and Ocean Resources Inc.
CPIT	Contracting and Procurement Information Tour
CPR	Cardiopulmonary Resuscitation

CPUE .....	Catch-Per-Unit-Effort
CRDG.....	Collaborative Research and Development Grant
CREMP .....	Core Receiving Environment Monitoring Program
CTD .....	Conductivity, Temperature, and Depth
CwS.....	Canada-Wide Standards
CWS .....	Canadian Wildlife Service
dB.....	Decibels
dBA .....	A-weighted Decibels
DAF .....	Dissolved Air Flotation
DFO .....	Department of Fisheries and Oceans
DOY.....	Day-of-Year
DPA .....	Development Partnership Agreement
DSMB .....	Dust Stop Municipal Blend
DSP.....	Direct Shipping Pellets
EC.....	Employment Committee
ECCC.....	Environment and Climate Change Canada
ECSAS.....	Eastern Canada Seabirds at Sea
EDC .....	Endocrine Disruption Chemicals
EDI.....	Environmental Dynamics Inc.
EEZ .....	Exclusive Economic Zone
EEM.....	Environmental Effects Monitoring
EFAP .....	Employee Family Assistance Program
EIS .....	Environmental Impact Statement
EPP.....	Environmental Protection Plan
ERP.....	Early Revenue Phase
ERP.....	Emergency Response Plan
ESDC.....	Employment and Service Development Canada
ETIS .....	Employment and Training Information Sessions
EWI .....	Early Warning Indicators
FAA.....	<i>Fisheries Act</i> Authorization
FEIS .....	Final Environmental Impact Statement
FIGQ.....	Federal Interim Groundwater Quality
FNBC .....	First Nations Bank of Canada
FWSSWMP .....	Fresh Water Supply, Sewage and Wastewater Management Plan
FTE .....	Full-Time Equivalent
GDP .....	Gross Domestic Product
GHG .....	Greenhouse Gas
GLGU.....	Glaucous Gull
GN .....	Government of Nunavut
Golder .....	Golder Associates Ltd.
GPS.....	Global Positioning System
GYRF.....	Gyr Falcon

ha	hectars
HADD	Harmful Alteration, Disruption or Destruction (of Fish Habitat)
Hatch	Hatch Ltd.
HEO	Heavy Equipment Operator
HSE	Health, Safety and Environment
HTO	Hunter and Trapper Organization
ICA	Inuit Certainty Agreement
ICE	Inuit Cultural Engagement
ICR	Inuit Content Requirement
ICRP	Interim Closure and Reclamation Plan
IEG	Inuit Employment Goals
IFC	Issued-for-Construction
IFO	Intermediate Fuel Oil
IHRS	Inuit Human Resources Strategy
IIBA	Inuit Impact and Benefit Agreement
ILBA	Inuit Labour Force Barriers Analysis
IMO	International Maritime Organization
INPK	Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat
IOL	Inuit Owned Land
IOPP	International Oil Pollution Prevention
IOPPC	International Oil Pollution Prevention Certificate
IPCC	Intergovernmental Panel on Climate Change
IQ	Inuit Qaujimagatuqangit
ISQG	Interim Sediment Quality Guidelines
JEC	Joint Executive Committee (Baffinland and the QIA)
JPCSL	Jason Prno Consulting Services Ltd.
KPI	Key Performance Indicators
kPa	Kilopascal
LMA	Labour Market Analysis
LMS	Learning Management System
LOA	Letters of Advice
LOTO	Lockout Tag-Out
LSA	Local Study Area
LTWMP	Long-Term Water Management Plan
MAC	Mining Association of Canada
magl	Meters Above Ground Level
MBR	Membrane Bioreactor
MDMER	Metal & Diamond Mining Effluent Regulations
MEEMP	Marine Environmental Effects Monitoring Program
MEWG	Marine Environment Working Group
MHTO	Mittimatalik Hunters and Trappers Organization
MIEG	Minimum Inuit Employment Goal

MIHR	Mining Industry Human Resources Council
Milne Port	Milne Port Facility
Mine Site	Mary River Mine Site
mL	Millilitre
ML	Metal Leaching
Mg/L	Milligrams per Liter
MMASP	Marine Mammal Aerial Survey Program
MMON	Marine Mammal Observation Network
MoU	Memorandum of Understanding
MRSEWG	Mary River Socio-Economic Working Group
m/s <sup>2</sup>	Meter per Second Squared
MSC	Mine Site Complex
Mt	Million Tonnes
Mtpa	Million Tonnes Per Annum
MWO	Marine Wildlife Observer
NCP	Northern Contaminants Program
NEDA	Nunavut Economic Developers Association
NDVI	Normalized Difference Vegetation Index
NHC	Nunavut Housing Corporation
NIRB	Nunavut Impact Review Board
NIS	Non-Indigenous Species
NLCA	Nunavut Land Claims Agreement
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxide
NPC	Nunavut Planning Commission
NPRI	National Pollutant Release Inventory
NSERC	Natural Sciences and Engineering Research Council of Canada
NTI	Nunavut Tunngavik Incorporated
NT-NU	Northwest Territories-Nunavut
NWB	Nunavut Water Board
NWPA	Navigable Waters Protection Act
NWT	Northwest Territories
OBPS	Output-Based Pricing System
OETIO	Operating Engineers Training Institute of Ontario
OHS	Occupational Health & Safety
ON	Oceans North
OPEP	Oil Pollution Emergency Plan
OPPP	Oil Pollution Prevention Plan
OSRL	Oil Spill Response Ltd.
OWTS	Oily Water Treatment System
PAI	Potential Acidic Input
PAH	Polycyclic Aromatic Hydrocarbons

PAM .....	Passive Acoustic Monitoring
PASS .....	Pathways to Adult Secondary School
PC .....	Project Certificate
PCa .....	Parks Canada
PDA .....	Project Development Area
PEFA .....	Peregrine Falcon
PEL .....	Probable Effect Level
PLC .....	Programmable Logic Controller
PM .....	Particulate Matter
PSC .....	Port Site Complex
psi .....	Pounds per Square Inch
PSU .....	Practical Salinity Unit
PWSP .....	Polishing and Waste Stabilization Pond
Q-STEP .....	Qikiqtani Skills and Training for Employment Partnership
QA/QC .....	Quality Assurance / Quality Control
QIA .....	Qikiqtani Inuit Association
QLMA .....	Qikiqtani Labour Market Analysis
QSEMC .....	Qikiqtaaluk Socio-Economic Monitoring Committee
RAD .....	Relative Abundance and Distribution
RBR .....	RBRconcerto CTD
RCMP .....	Royal Canadian Mounted Police
RLHA .....	Rough-Legged Hawk
RMA .....	Raptor Monitoring Area
ROM .....	Run of Mine
ROV .....	Remotely Operated Vehicle
RSA .....	Regional Study Area
SAR .....	Search and Rescue
SBO .....	Ship-Based Observer
SCA .....	Skills and Capacities Assessment
SEAT .....	Skills Equivalency Assessment Template
SEMWG .....	Socio-Economic Environment Working Group
SEMR .....	Socio-Economic Monitoring Report
SMWMP .....	Shipping and Marine Wildlife Management Plan
SOPEP .....	Shipboard Oil Pollution Emergency Plan
SITM .....	Standing Instructions to Masters
SNOW .....	Snowy Owl
SNP .....	Surveillance Network Program
SO <sub>2</sub> .....	Sulphur Dioxide
SOP .....	Standard Operating Procedure
SOPEP .....	Shipboard Oil Pollution Emergency Plan
SPL .....	Sound Pressure Level
SSA .....	Stratified Study Area

SSRP .....	Spill at Sea Response Plan
STP .....	Sewage Treatment Plants
SUEZ .....	SUEZ Water Technologies & Solutions Canada
SUSF .....	Super Sinter Fines
SWAEMP .....	Surface Water and Aquatic Ecosystem Management Plan
TAH .....	Total Allowable Harvest
TC .....	Transport Canada
TEMMP .....	Terrestrial Environment Mitigation and Monitoring Plan
TEAMR .....	Terrestrial Environment Annual Monitoring Report
TEWG .....	Terrestrial Environment Working Group
the Communities .....	North Baffin Communities
The Monitoring Report .....	2019-2020 Annual Monitoring Report
the Project .....	Mary River Project
the Report .....	2020 Annual Report
the Strategy .....	Climate Change Strategy
Tote Road .....	Milne Inlet Tote Road
ToR .....	Terms of Reference
TREEP .....	Tote Road Earthworks Execution Plan
TRMP .....	Tote Road Management Plan
TSD .....	Technical Supporting Document
TSP .....	Total Suspended Particulate
TSS .....	Total Suspended Solids
UAV .....	Unmanned Aerial Vehicle
UV .....	Ultraviolet
VOC .....	Volatile Organic Compounds
WHMIS .....	Workplace Hazardous Materials Information System
WQG .....	Water Quality Guidelines
WRF .....	Waste Rock Facility
WSCC .....	Workers' Safety and Compensation Commission
WTP .....	Water Treatment Plant
WWF .....	World Wildlife Fund
YOY .....	Young-of-Year

## 1 INTRODUCTION

This 2020 Annual Report (the Report) to the Nunavut Impact Review Board (NIRB) is a requirement of Baffinland Iron Mines Corporation's (Baffinland's) Project Certificate (PC) No. 005 for the Mary River Project (the Project). The Annual Report summarizes:

- Project activities undertaken during the reporting year (January 1, 2020 to December 31, 2020);
- Baffinland's performance against the requirements of the Terms and Conditions in PC No. 005;
- An evaluation of the Project's effects in relation to those predicted in the Final Environmental Impact Statement (FEIS; Baffinland, 2012); the Addendum to the FEIS (FEIS Addendum; Baffinland, 2013a) for the Early Revenue Phase (ERP) which includes a temporary approval for production increase up to 6 million tonnes per annum (Mtpa) exclusive to years 2018 to 2021 (NIRB, 2018a, 2020a); and
- Planned Project work for the next reporting year (January 1, 2021 to December 31, 2021).

### 1.1 COMPANY DESCRIPTION

Jointly owned by The Energy and Minerals Group (majority shareholder) and ArcelorMittal, Baffinland is a privately-owned company operating a high-grade, open-pit iron ore mine located on Baffin Island, approximately 160 km south-southwest of the nearest community of Pond Inlet (Mittimatalik), in the Qikiqtani region of Nunavut, Canada, and 1,000 km north-northwest of the territorial capital of Iqaluit (Figure 1.1). Unique to Baffinland's operations is that the high-grade ore can be shipped directly to markets following crushing and screening – no concentrating or processing is needed, and therefore no tailings are produced. Baffinland produces three iron ore products that are shipped during the shipping season to international markets; Direct Shipping Pellets (DSP), Super Sinter Fines (SUSF) and Baffinland Hematite Lump (BHL).

Baffinland's head office is located in Oakville, Ontario and its northern headquarters is located in Iqaluit, Nunavut in Canada. Baffinland also has offices in five North Baffin communities including Arctic Bay, Clyde River, Sanirajak, Igloodik and Pond Inlet (the nearest community to the Mary River Project).

Baffinland's Mission, Vision and Values were developed with the Government of Nunavut's eight Inuit Societal Values in mind, and include:

**Mission:** To become the lowest-cost producer of high grade iron ore in the world

**Vision:** To safely and efficiently identify and develop resources within Baffin Island, unlocking their wealth-generating potential

**Values:**

Health and Safety – Safety as a Value: When safety is a personal value, people naturally choose to make the safe choice. They even use hearing protection and safety glasses at home. Employers who have safety as a value make their workplace safe because they want to, not because of government regulation. Employees work safely because they want to, not because it is a company rule. In this environment, companies go above and beyond regulations to protect their people.

Integrity: Do What is Right, Not What is Easy: Integrity is often defined as doing the right thing even when no one else is around. It is the ability to act with honesty, be consistent, and ethical in whatever it is we are doing. It's about being accountable, transparent and building trust through communications.



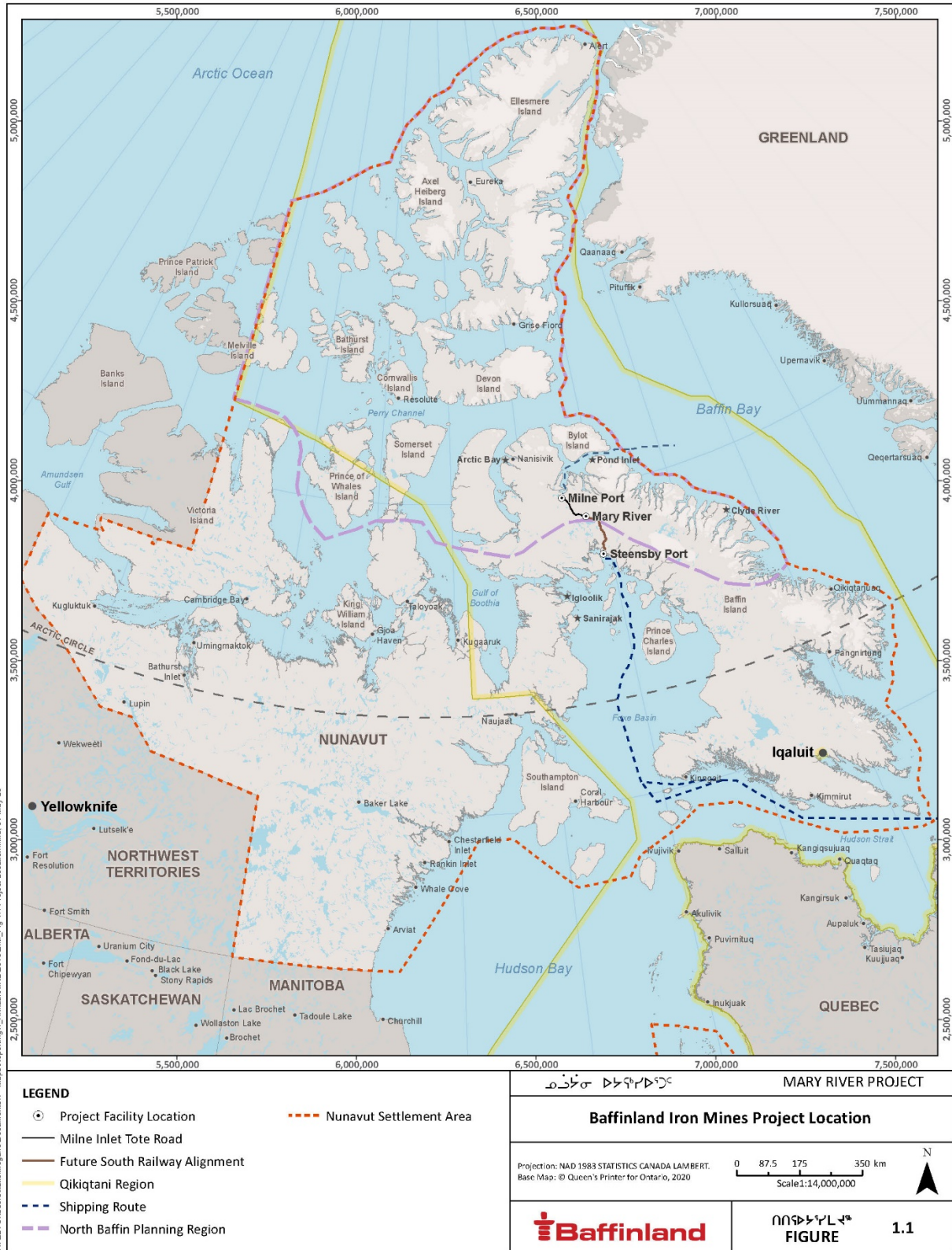


Figure 1.1: Baffinland Iron Mines Project Location

Engage and Develop our People: An organization where good work is recognized and rewarded. All employees are seen and treated as valued partners. Baffinland will invest in employee's success and growth through providing tools, training and support needed to unleash their potential. Baffinland will endeavour to become the employer of choice for Inuit in Nunavut.

Respect for All: We will respect and abide by Inuit Societal Values in the workplace and as a manner of doing business. We will strive to provide a healthy and safe workplace, free from physical or psychological bullying, harassment and violence. Violations of respect will be investigated and if substantiated will be dealt with expeditiously. Multiculturalism will be viewed as a strength and promoted. Consideration for people will be first and foremost in all interactions.

Environmental Stewardship: Respect the air, land, water and wildlife as we thoughtfully put to good use the earth's resources. Always remember that we are guests on this land and treat it respectfully. We will develop it responsibly and be good stewards of the land in concert with Inuit.

Pursue Performance Excellence: We are relentless in challenging ourselves and others to achieve high performance and create lasting socio-economic impacts in all that we do. We focus on improving every day and delivering on commitments. Innovation is seen as a key mechanism to achieve this outcome. Rigor in planning and thoughtful execution is a key strength. Teamwork is necessary for desired outcomes.

## 1.2 MARY RIVER PROJECT HISTORY

Baffinland is currently mining high-grade iron ore from the area referred to as Deposit No. 1, which was first discovered in 1962. The current approved mine operation is expected to last for more than 20 years, however through ongoing exploration activities and the development of additional deposits the Mary River Mine has the potential to operate for significantly longer. The Mary River Project has gone through a number of important milestones prior to operating at its currently approved production rate of 6 Mtpa. Baffinland's initial proposal consisted of mining iron ore from the reserve at Deposit No. 1 at a production rate of 18 Mtpa and using a port south of the mine in Steensby Inlet, serviced by an approximately 160 km southern railway to transport the ore to market (i.e., Southern Transportation Corridor; Figure 1.1). The NIRB issued Project Certificate No. 005 for this proposal on December 28, 2012 (additional information specific to the Project Certificate is provided in Section 1.4.1).

From 2013 to 2014, in response to changing iron market conditions, Baffinland prepared an alternative development approach, the Early Revenue Phase (ERP), supported by an addendum to the FEIS for the Mary River Mine. The Project Certificate was subsequently amended to include the mining of an additional 4.2 Mtpa of ore to be hauled on the existing Milne Inlet Tote Road (Tote Road) north to a port at Milne Inlet (Milne Port). In 2018 (NIRB, 2018a) and 2020 (NIRB, 2020a), the Project Certificate was amended again, allowing for up to 6 Mtpa to be transported and shipped through Milne Port until the end of 2021.

In parallel to these increases to the Project Certificate, which are only temporary to the end of 2021, Baffinland also developed the Phase 2 Proposal, which has been actively in the regulatory review since 2015. While there have been revisions to the Phase 2 Proposal since its inception, the current Phase 2 proposal outlines an increase in the quantity of ore shipped through Milne Port from the originally approved 4.2 Mtpa to 12 Mtpa (with operational flexibility) supported by the construction of a new railway running largely parallel to the existing Tote Road within a Northern Transportation Corridor. Should this be approved, the total mine production could eventually increase to 30 Mtpa,

with 12 Mtpa being transported via the North Railway to Milne Port and 18 Mtpa via the South Railway to Steensby Port.

### 1.3 EXISTING PROJECT OVERVIEW

In 2020, the Project is operating the ERP, which consists of a mining rate at Deposit No. 1 (Nuluujaak Pit) of 4.2 million tonnes per annum (Mtpa) with an additional temporary production increase to haul and ship up to 6.0 Mtpa from Milne Port in 2020.

The Project currently consists of four (4) main locations (Figure 1.2): The Mine Site, the Tote Road, the Milne Port, and the approved but yet to be built Southern Railway and Steensby Port. Operational activities include:

- Ore extraction;
- Ore processing via crushing;
- Transportation of the ore from the Mine Site to Milne Port via the Tote Road;
- Loading and shipping of ore from Milne Port;
- Stakeholder and Inuit community engagement; and
- Environmental monitoring and reporting.

During 2020 (the sixth (6) shipping season), the efficiency and productivity of the mining operations at Deposit No.1 continued to increase and resulted in a total of 6.0 Mt of ore crushed, which was an increase from the 5.6 Mt crushed in 2019. A total of 6.0 Mt of ore was transported by ore haul trucks along the Tote Road and stockpiled at Milne Port. Between July 20 to October 16, a total of 5.5 Mt of ore was shipped from the Project's Milne Port to international markets. This included ore mined and stockpiled after the previous 2019 shipping season ended. In 2020, marine ore shipments involved 72 individual ore carrier vessel round trip voyages during the shipping season. A summary of the Project is provided in Table 1.1.

### 1.4 REGULATORY CONTEXT

#### 1.4.1 Project Certificate

On December 28, 2012, the NIRB issued PC No. 005 for the Project to Baffinland (NIRB, 2012a) pursuant to Section 12.5.12 of Article 12 of the Nunavut Agreement (CIRNAC and Nunavut Tunngavik Inc., 2010). The basis for the Project Certificate is Baffinland's FEIS (Baffinland, 2012), which presented in-depth analyses and evaluation of potential environmental and socio-economic effects associated with mining the reserves of Deposit No. 1 at a nominal rate of 18 Mtpa.

In addition to the primary components of the ERP, the Approved Project includes construction, operation, closure and post-closure activities associated with the following proposed Project components:

- A 150 Km South Railway from the Mine Site to a new port facility at Steensby Inlet (Figure 1.1);
- Steensby Port, which will operate year-round; and
- Year-round shipping along the Southern Shipping Route (Foxe Basin - Hudson Strait).

The FEIS for the approved Mary River Project was prepared in adherence to Guidelines for the Preparation of an Environmental Impact Statement for Baffinland Iron Mines Corporation's Mary River Project (the Guidelines; NIRB, 2009); and NIRB's Preliminary Hearing Conference Decision (NIRB, 2011).

**Table 1.1: Mary River Project Description Summary**

Information Type	Description
<b>Location</b>	North Baffin Island, Nunavut; 160 km south/southwest from closest Inuit community, Pond Inlet (Mittimatalik) (Figure 1.1)
<b>Facility Name</b>	Mary River Mine and Milne Port connected via the Milne Inlet Tote Road Steensby Port and southern railway are approved but not active
<b>Type of Mine</b>	Open pit (Deposit No. 1; Photo 1 in Appendix D)
<b>Summary of Current Mine Operations (from blasting to shipping)</b>	<p>Iron ore is blasted and extracted from Deposit No. 1 and loaded onto trucks (Photos 1 and 2 in Appendix D)</p> <p>Blasted iron ore is crushed at Mine Site (Photo 6 in Appendix D)</p> <p>Crushed ore is transported from Mine Site to Milne Port (Photo 3 Appendix D)</p> <p>Ore is stockpiled at Milne Port until the shipping season is opened (Photo 4 in Appendix D)</p> <p>Ore is loaded onto ships at Milne Port (Photo 5 in Appendix D)</p> <p>Ore is shipped to customers worldwide.</p>
<b>Key Dates – Mary River and Milne Port</b>	<ul style="list-style-type: none"> <li>• Construction at Mary River and Milne Port initiated in 2013;</li> <li>• Bulk sample shipped from Milne Port in 2014;</li> <li>• Operations began in 2015; and</li> <li>• First ore carrier loaded and shipped out of Milne Port in 2015.</li> </ul>
<b>Environmental Impact Statement Submissions to the Nunavut Impact Review Board and Amendments</b>	<p>FEIS: Submitted in Feb 2012; approval in December 2012 (18 Mtpa production via rail to Steensby Port)</p> <p>Amendment No. 1: Submitted in June 2013; approval in 2014 (4.2 Mtpa via Northern Transportation Corridor)</p> <p>Amendment No. 2: Submitted in Apr 2018; approval in 2018 (increase to 6 Mtpa)</p> <p>Amendment No. 3: Extension request submitted in Jan 2020, approval in June 2020 (increase to 6 Mtpa)</p> <p>Phase 2 Proposal: Submitted in 2015, currently under review</p>
<b>Products</b>	Direct Shipping Pellets (DSP), Super Sinter Fines (SUSF) and Baffinland Hematite Lump (BHL);
<b>Expected Life</b>	20+ years, with potential for expansion
<b>Access</b>	Remote fly-in/fly-out access via charter flights to and from Mary River Mine from various hubs including Montreal, Iqaluit, and 5 North Baffin communities. In response to COVID-19 Pandemic, charter flights to Nunavut communities were suspended in 2020 and additional southern flight hubs were implemented. There are also two land based connections between the Mine Site and tidewater, the first being the Milne Inlet Tote Road to Milne Port, which existed prior to Baffinland developing the Project. The other is the 160km railway to Steensby Port, which has not yet been developed.



Figure 1.2: Project Activities Overview

Three (3) amendments to the PC have been issued to Baffinland, in 2013, 2018 and 2020. Additionally, the Company is currently seeking a further reconsideration for its Phase 2 Proposal which, if granted, will result in a fourth amendment to the PC. This history is described below.

#### **Amendment No. 001 of Project Certificate No. 005 for the Early Revenue Phase**

Following the issuance of the PC, Baffinland requested an amendment to the PC to undertake the 4.2 Mtpa ERP, and an Addendum to the FEIS was submitted to the NIRB in June 2013 (Baffinland, 2013a). The Minister of Aboriginal Affairs and Northern Development Canada (AANDC; now Crown Indigenous Relations and Northern Affairs Canada - CIRNAC) approved the ERP on April 28, 2014 (Minister of Aboriginal Affairs and Northern Development, 2014), and NIRB subsequently issued an amended Project Certificate in May 2014 (NIRB, 2014).

#### **Amendment No. 002 of Project Certificate No. 005 for the Production Increase Project Proposal and Extension Request**

In 2018, Baffinland applied for and was granted a second amendment to its PC for the Production Increase Proposal.

In April 2018, Baffinland submitted a project proposal to the Nunavut Planning Commission (NPC) for an increase in production from the current 4.2 Mtpa to 6.0 Mtpa (Stantec Consulting Ltd., 2018). On May 18, 2018 the NPC referred the Production Increase Proposal to the NIRB for screening. In the Production Increase Proposal, Baffinland requested that NIRB reconsider Mary River PC No. 005 and amend Conditions No. 179(a) and 179(b) in order to accommodate the increase in the volume of ore transported and shipped out of Milne Port.

On June 11, 2018 the NIRB determined that the modifications proposed in the Production Increase Proposal require assessment through a formal reconsideration of the PC Terms and Conditions. On June 20, 2018 Baffinland filed additional information in support of the FEIS Addendum and on June 27, 2018, the NIRB issued correspondence formally accepting the FEIS Addendum, and inviting comment on the proposal from interested parties to be received on or before July 26, 2018. The NIRB held a public information session in Pond Inlet on July 12, 2018.

A public hearing was not held in support of the review and the NIRB issued its Reconsideration Report and Recommendations on August 31, 2018 that partially approved the infrastructure and activities included in the Production Increase Proposal (NIRB, 2018b). Notably, Baffinland was approved to move forward with the construction of its 380-person camp and additional 15 mL fuel tank at Milne Port, but was not approved to increase its annual limits for trucking and shipping ore to market. On September 30, 2018, following an appeal by the Qikiqtani Inuit Association (QIA) to the Minister responsible for the final determination of the NIRB's Report – the Minister of Intergovernmental Affairs, Northern Affairs and Internal Trade - Baffinland received an approval to increase its trucking and shipping limits for 2018 and 2019 (Minister of Intergovernmental and Northern Affairs and Internal Trade, 2018). On October 30, 2018, the NIRB issued PC Amendment No. 2 (NIRB, 2018a).

#### **Amendment No. 003 of Project Certificate No. 005 for the Production Increase Project Proposal and Extension Request**

In early December 2019, Baffinland sent a notification of its intention to NIRB to request an additional extension to the production increase limits (i.e., extending the 6 Mtpa limit beyond 2019) and thereby consider further modifications of PC Conditions No. 179(a) and 179(b). On January 6, 2020, Baffinland submitted a formal Extension Request Package. Baffinland's intention to continue shipping 6 Mtpa in 2020 was widely supported by the five North Baffin region hamlets and regulators, with letters of support submitted to the NIRB. On March 4, 2020 the NIRB issued its "Reconsideration Report and Recommendations" indicating that they recommended the extension of the

6 Mtpa production increase until December 31, 2021. The Responsible Ministers approved the temporary expansion request on May 19, 2020. NIRB subsequently issued an amended Project Certificate in 18 June 2020 (NIRB, 2020a) with varied terms, notably Conditions No. 179(c) and 183.

#### 1.4.2 Permits

Baffinland operates the ERP in accordance with the permits, licences, approvals, authorizations and agreements identified in Table 1.2. In addition, Baffinland's contractors and consultants undertake various activities on the Project under additional permits in the areas of scientific research, archaeology, and explosives manufacture, storage and use.

**Table 1.2: Permit Registry**

Approval	Project Activity and Update	Expiry
<b>Nunavut Impact Review Board</b>		
<b>Nunavut Agreement, and the Nunavut Planning and Project Assessment Act</b>		
Project Certificate No. 005 (Amendment No. 001)	Required under Article 12 of the <i>Nunavut Agreement</i> to obtain the requisite permits and approvals to proceed with the Project.	No Expiry
Project Certificate No. 005 (Amendment No. 003)	Required under Article 12 of the <i>Nunavut Agreement</i> to obtain the requisite permits and approvals to proceed with the Project	December 31, 2021
<b>Nunavut Agreement (Article 12) Qikiqtani Inuit Association (QIA)</b>		
<b>Agreements issued under Articles 6, 20 and 26 of the Nunavut Agreement</b>		
Inuit Owned Land (IOL) Commercial Lease Q13C301	Mine development activities on Inuit Owned Land; Compliance with the lease is outlined in the <i>2020 QIA and NWB Annual Report for Operations</i> and the <i>2020 QIA and NWB Annual Report for Exploration and Geotechnical Drilling</i> , submitted March 31, 2021.	December 31, 2043
Inuit Impact and Benefit Agreement (IIBA)	Required under Article 26 of the <i>Nunavut Agreement</i> to proceed with Project - concluded first in September, 2013, subsequently amended in October, 2018 to account for the temporary 6 Mtpa production increase proposal; Compliance with the agreement is outlined in the Annual IIBA Implementation Report submitted by March 31 <sup>st</sup> of each year.	No Expiry
Wildlife Compensation Agreement	Wildlife Compensation required under Article 6 of the <i>Nunavut Agreement</i> , with the regime set out in IIBA.	No Expiry
Land Use Permit QL2-2012 Parcels PI-14 and PI-15	New land use permit issued in 2020 to allow for a legal survey to be conducted on IOL parcels PI-14 and PI-15. Issued on August 18, 2020. Compliance with permit is outlined in the <i>2020 QIA and NWB Annual Report for Exploration and Geotechnical Drilling</i> , submitted March 31, 2021.	December 31, 2020
Quarry Concession Agreement	Required to extract specified substances (quarried rock and borrow sand and gravel) on Inuit Owned Land under the Commercial Lease	N/A
Water Compensation Agreement	Required under Article 20 of the <i>Nunavut Agreement</i> to provide compensation to Inuit for water use by the project or impact to water use.	June 10, 2025

Approval	Project Activity and Update	Expiry
<b>Nunavut Water Board (NWB)</b> <b>Water Licences issued under the Nunavut Agreement (Article 13), the <i>Nunavut Waters and Nunavut Surface Rights Tribunal Act</i>, and the Northwest Territories Water Regulations</b>		
Type 'A' Water Licence 2AM-MRY1325 Amendment No. 1	Water use and waste disposal associated with the mine; In good standing; no amendments were issued by the NWB in 2020. Compliance with the Licence is outlined in the <i>2020 QIA and NWB Annual Report for Operations</i> , submitted March 31, 2021.	June 10, 2025
Type 'B' Water Licence 2BE-MRY1421	Regional exploration activities, including exploration drilling; In good standing; a licence renewal application was initiated in 2020. Compliance with the Licence is outlined in the <i>2020 QIA and NWB Annual Report for Exploration and Geotechnical Drilling</i> , submitted March 31, 2021.  Application for renewal submitted to the Nunavut Planning Commission in 2020. Renewal with NWB will be completed in 2021.	April 16, 2021
<b>Crown Indigenous Relations and Northern Affairs Canada</b> <b>Mineral Leases and Land Leases, Land Use Permits, and Quarry Permits on Crown Land, issued under the Territorial Lands Act and associated Canadian Mining Regulations and Territorial Land Use Regulations</b>		
Foreshore Lease 47H16-1-2	Supersedes historical Class A Land Use Permit N2014X0012; Use of foreshore area for current Milne Port Ore Dock; In good standing. Amendment to the lease is currently under review.	June 30, 2035
Tote Road and Borrow Area Land Use Permit N2019Q0011	Land use permit for the section of Milne Inlet Tote Road on Crown Land, associated quarries and infrastructure.	June 29, 2024
Land Use Permit Bruce Head: N2019J0010	Land use permit for the summer marine monitoring camp at Bruce Head, in Milne Inlet	June 29, 2024
Land Use Permit Steensby: N2019C0009	Land use permit for the Infrastructure and activities on Crown Land at Steensby Port.	June 29, 2024
Mineral Leases #2483, #2484 and #2485	Rights to extract minerals; Lease #2484 covers Deposit No.1.	August 27, 2034
<b>Department of Fisheries and Oceans (DFO)</b> <b>Authorizations and Letters of Advice issued under the <i>Fisheries Act</i></b>		
Letters of Advice (various)	Prior to 2020, DFO issued Baffinland various letters of advice in regard to Project crossings along Tote Road and at quarries, culvert extensions and replacements. In 2020, DFO issued one Letter of Advice for the expansion at Stockpile #1 at Milne Port.	No Expiry
Fisheries Authorization 06-HCAA-CA7-0084	Authorization to construct water crossings in fish habitat along the Tote Road; The authorization remains valid and has been amended over the years. A monitoring report for the water crossings was submitted to DFO on December 31, 2020.	N/A; monitoring ongoing
Fisheries Authorization 14-HCAA-00525	Authorization to construct the Milne Ore Dock in fish habitat; A monitoring report for the Milne Ore Dock was submitted to DFO on December 30, 2020.	December 31, 2020



Approval	Project Activity and Update	Expiry
Fisheries Authorization 18-HCAA-00160	Authorization to construct the Freight Dock in fish habitat; A monitoring report for the Milne Ore Dock was submitted to DFO on March 25, 2021. An amendment application was also submitted by Baffinland on March 31, 2021.	Originally June 1, 2020; request for extension TBD
<b>Transport Canada (TC)</b>		
<b>Approvals of in-water works under the <i>Navigable Waters Protection Act (NWPA; now the Canadian Navigable Waters Act)</i>; and Marine Facility Approval under the Marine Transportation Security Act and Regulations</b>		
Approvals: 8200-07-10273, 8200-07-10267, 8200-07-10269, 8200-07-10268, 8200-07-10274, 8200-07-10272, 8200-07-10266, 8200-07-10271	Approvals to interfere with navigation within navigable waters along the Tote Road at crossings: CV-040, BG-50, CV-128, CV-223, CV-072, BG-17, CV-217, and CV-099;  In good standing, no changes from previous year.	No Expiry; Until complete
Interim Statement of Compliance of a Marine Facility # 1000000576	Approval for the Milne Inlet Marine Facility to conduct iron ore operations	November 27, 2020
<b>National Resources of Canada</b>		
<b>Licensing of Explosives Manufacture and Storage Facilities under the <i>Explosives Act</i></b>		
Division 1 Factory Licence #F76068/E	Issued to Baffinland's explosives contractor to manufacture explosives for the mine	-

### 1.4.3 Permitting of the Phase 2 Expansion Project Proposal

The NIRB public technical review of the Phase 2 Proposal that was initiated in 2018 continued throughout 2020. Following the adjournment of the Phase 2 Proposal hearing in November 2019, the NIRB issued procedural direction for next steps in the Phase 2 Proposal review process. A third technical meeting followed by a community roundtable and Pre-Hearing Conference were subsequently scheduled for March 2020.

In response to the COVID-19 Pandemic, on March 13, 2020 the NIRB provided notice that the planned third technical meetings would not be held in-person, and would instead be replaced by a combination of teleconference sessions and written submissions. On March 17, 2020 the NIRB provided notification they will not be issuing a revised schedule for formal technical teleconferences until circumstances change or organizations have had sufficient time to adjust their operations to current conditions. On April 13, 2020, Baffinland provided correspondence to the NIRB requesting technical meetings be facilitated via teleconference in the weeks following to ensure the regulatory review process could continue to advance in a manner that respects public safety. In response, NIRB proposed a teleconference-based Technical Meeting option for April 28 to May 7, 2020 but this was also cancelled due to logistics-related complications associated with COVID-19. NIRB held Technical Meeting No. 3 via teleconference between September 14-18, 2020, and followed up with an in-person Community Roundtable and Pre-Hearing Conference in Pond Inlet with video and audio linkages to meeting hubs in Iqaluit, Winnipeg and Ottawa.

Subsequently, a 12-day reconvened Public Hearing Conference was held in-person between January 25 and February 6, 2021 in Pond Inlet with video and audio linkages with a hub in Iqaluit and for participants unable to

travel into Nunavut via video or audio links. Due to delays in moving through the various agenda items, an extension of the in-person Public Hearing (the Extended Public Hearing) and Community Roundtable was later scheduled for April 12 to 21, 2021 in Iqaluit with video and audio linkages available for remote participants.

On April 15, 2021, due a reported COVID-19 positive case in Iqaluit, NIRB suspended the Phase 2 extended Public Hearing and sent all meeting participants home. Baffinland currently awaits final direction from NIRB for the rescheduling of the Extended Public Hearing and Community Round Table pending public health considerations. Baffinland will continue to proceed through the Phase 2 FEIS review and approvals process, which may include further engagement with communities and regulators to address remaining concerns with the intent for developing joint recommendations for NIRB's consideration.

The Nunavut Water Board (NWB) review process for the amendment to Baffinland's Type 'A' Water License required for the Phase 2 Proposal was paused through 2020 following its submission to amend the Type 'A' Water Licence on August 16, 2018, in parallel with the NIRB review process. Since this time, Baffinland submitted on May 5, 2019 updated documentation to the NWB for the Phase 2 Proposal, including updated monitoring and management plans, as well as issued for construction drawings. At the end of 2020, the associated Type 'A' Water Licence amendment application remained paused, awaiting completion of the NIRB Public Hearing.

Baffinland looks forward to completion of the regulatory review process for Phase 2 and Type 'A' Water Licence amendment through 2021 with the aim of continuing to stabilize the Mary River Project for the continued benefit of all Nunavummiut.

## 1.5 REPORT STRUCTURE

### 1.5.1 Report Content

This report is structured as follows:

**Section 1:** Provides an overview of the Project and the regulatory context in which this Report is being submitted.

**Section 2:** Highlights key activities and consultation efforts conducted with Inuit and stakeholders for the Project, including:

- The five (5) North Baffin communities (the Communities);
- The Qikiqtani Inuit Association (QIA);
- Relevant regulatory agencies; and
- PC mandated Project working groups (Marine Environment Working Group (MEWG), Terrestrial Environment Working Group (TEWG) and the Mary River Socio-economic Environment Working Group (SEMWG).

**Section 3:** Describes the Project's operational context in 2020 including COVID-19 Pandemic-related considerations, provides an overview of operational successes, and discusses challenges Baffinland faced with respect to meeting PC Terms and Conditions in 2020.

**Section 4:** Includes tailored 'summary sheets' detailing compliance status for each of the PC conditions. The summary sheets provide an overview of the work completed towards meeting the requirements of the PC conditions in consideration of relevant active and inactive Project phases, and the assigned self-assessment compliance status. This section also describes the status and/or progress Baffinland has made towards fulfilling the commitments the

Company made during the Final Public Hearing (NIRB, 2012b) for the Project and a high-level review of the Project's effects in comparison to the potential effects predicted in the FEIS and FEIS Addendum.

**Section 5:** Outlines the correspondence Baffinland has had with NIRB during 2020 and comments provided by NIRB on Baffinland's 2019 Annual Report to NIRB.

**Section 6:** Lists all updates made to environmental management plans as a result of monitoring programs and engagement activities throughout 2020.

### 1.5.2 Supporting Documents and Appendices

Where PC conditions specify that Baffinland provide supporting documentation to NIRB as part of the submission of this Report, these documents have been appended to the Report. Other appendices, such as reports or documentation that are likely to be of specific interest to NIRB as part of their review of this Report, and those that provide a pertinent context to the discussions are also included in this Report. Reports that have yet to be issued as final as a result of review with the Terrestrial and Marine Environment Working Groups have not been included as attachments to this report, however, they have been released to the Working Groups for review and comment, to which the NIRB is an observing member.

In the interest of sustainability, other Project documentation that may be of interest to NIRB and other interested parties has been posted to the Project Document Portal available on the Baffinland website: <https://www.baffinland.com/media-centre/document-portal/>. As described in Section 2.5 several reports are shared with the Working Groups and regulatory agencies throughout the year during various engagement activities.

## 2 ENGAGEMENT ACTIVITIES

### 2.1 ENGAGEMENT APPROACH

Meaningful stakeholder, community, and Inuit engagement is valued by Baffinland as a means of building and maintaining community relationships and maximizing benefits from the Project. Baffinland's approach to engagement emphasizes the importance of informing Inuit, affected communities, and other stakeholders, as well as establishing effective dialogue, and collecting feedback and resolving issues and concerns (Figure 2.1). Baffinland had to make changes to its engagement approach in 2020 due to the COVID-19 Pandemic. Travel restrictions and increased focus on community and employee health and safety moved many engagements from in person to online (teleconference/videoconference) formats. While these types of engagements are not ideal from an Inuit cultural or relationship building perspective they have proven successful in ensuring that stakeholders and community representatives have been able to continue dialogue with Baffinland throughout the Pandemic. Public engagement has been most affected by the COVID-19 restrictions. In response, Baffinland increased use of social media and local radio as a means to ensure that information about the Company and its activities have been shared with wider audiences. As travel restrictions and public health orders are continually evolving, the Company continually evaluates what methods of engagement will inform an effective approach while ensuring that individual and community health and safety remains the foremost priority. This continual evaluation and adaptive approach to engagement is predicted to continue until the COVID-19 Pandemic and related public health orders and advice allow for in person engagements to once again be the most used engagement technique.



**Figure 2.1: Baffinland's Approach to Stakeholder Engagement**

## 2.2 ENGAGEMENT OBJECTIVES

Baffinland is committed to meaningful engagement with stakeholders potentially affected by the Project, including the five (5) North Baffin Communities (Arctic Bay, Clyde River, Sanirajak, Igloolik and Pond Inlet), the QIA, applicable regulatory agencies and the general public.

The objectives of Baffinland's engagement efforts are to:

- Provide Inuit, communities and other stakeholders with relevant Project information in a timely, accessible and culturally appropriate manner in order to identify issues and concerns and provide input into the development of appropriate mitigation measures and issues resolution;
- Ensure that Inuit, communities and other stakeholders have the opportunity to understand and meaningfully engage in the processes initiated by the Project;
- Consider Inuit traditional knowledge as well as scientific expertise and community feedback in decision-making processes;
- Build constructive and positive relationships with communities most likely to be affected by the Project; and
- Focus priorities so that potential adverse effects are mitigated, and Project benefits are enhanced.

## 2.3 ENGAGEMENT ACTIVITIES

In support of Baffinland's focus on continuous improvement and the engagement objectives defined for the Project (Section 2.2), Baffinland implements a variety of engagement mechanisms that are intended to ensure a broad and comprehensive approach to the identification of stakeholders and that the creation of enhanced opportunities for dialogue and input are executed. As noted in Section 3.2.2, Baffinland had to implement changes to its Engagement Approach in 2020 due to the COVID-19 Pandemic and in respect of Public Health Orders and guidelines in Nunavut. The most important changes were the limiting of public meetings and moving to non-in-person formats for meetings with community groups, governments and elected officials, Baffinland completed a number of engagement activities, which included:

- Providing regular and ongoing opportunities for the dissemination of Project-related information and receipt of stakeholder input through Baffinland Community Liaison Officers (BCLOs) stationed in each of the five (5) North Baffin communities;
- Providing regular and ongoing opportunities for the dissemination of Project-related shipping activities and receipt of stakeholder input through the Baffinland Shipping Monitor roles stationed in Pond Inlet (in-person visits, posters throughout the community, radio shows, ongoing marine VHF radio communications about ongoing vessel traffic);
- Hosting public meetings
- Conducting employee surveys;
- Participating in multi-stakeholder forums (e.g. Working Groups);
- Holding focus groups, workshops and meetings with community groups and Hamlet Councils; and
- Distributing Project-related information through the corporate website, social media sites including Facebook, LinkedIn and Twitter, newsletters, advertisements, radio shows, and other means.
- Holding one-on-one teleconference discussions with the Mayors from Igloolik and Pond Inlet to provide updates on Mary River's existing operations, the results of the 2019 Socio-Economic Monitoring Report (SEMR) and to listen to community updates and issues of importance.

Baffinland will continue to implement a proactive approach to engagement with various stakeholders through meetings, workshops, surveys and dissemination of information and reports. This will ensure that the communities, QIA, regulators and the public are informed in a timely and culturally sensitive manner of the Project's progress and the potential environmental and social impacts of the Project. Moving Forward, Baffinland will continue to ensure that any engagement activities planned will respect public health advice and any applicable COVID-19 guidelines.

### 2.3.1 Public Meetings & Events

In 2020, Baffinland held public meetings within the five (5) North Baffin communities. These meetings provided an important opportunity for Baffinland to share information with the Communities related to current operations and avenues for Inuit to become more involved in the Project and/or a way to access the benefits of the Project. A list of select public meetings and events held in the communities is provided in Table 2.1.

**Table 2.1: Public Meetings & Events in 2020**

Event Date	Event Name	Event Type	Event Description	Topics Discussed
2020-01-21	Community Radio Show	Radio Show – Clyde River	Update on Phase 2 and Ongoing Operations	Phase 2 and Ongoing Operations
2020-01-21	Meeting with RCMP Officers	Meeting – Clyde River	Meeting with Royal Canadian Mounted Police (RCMP)	Project impacts on RCMP services in Clyde River
2020-01-22	Meeting with Chief Administrative Officer (CAO) and Mayor	Meeting – Clyde River	Meeting with CAO and Mayor	Update on Phase 2 and Ongoing Operations
2020-01-22	Meeting with Hamlet Council and Mittimatalik Hunters and Trappers Organization (MHTO)	Meeting – Pond Inlet	Update on Phase 2 review process, direct project benefits	Phase 2 review process, direct project benefits
2020-01-22	Community Radio Show	Radio Show – Pond Inlet	2019 Shipping Season Update	Shipping Season
2020-01-23	Meeting with Hamlet Council and MHTO	Meeting – Pond Inlet	End of 2019 Shipping Season Meeting	2019 Shipping Season
2020-01-23	Community Radio Show	Radio Show – Pond Inlet	Update on Phase 2 and Ongoing Operations	Phase 2 and Ongoing Operation
2020-02-04	Nunavut Economic Developers Association (NEDA) Event	Meeting - Ottawa	Event with NEDA	Economic development opportunities in Nunavut
2020-02-08	Community Radio Show	Radio Show- Igloolik	Public Radio Show in Igloolik	Impacts on Terrestrial Habitat, Inuit Employment, Air Quality Monitoring, Direct Benefits, Dust, Job Progression, Workplace

Event Date	Event Name	Event Type	Event Description	Topics Discussed
				Culture, Shipping Impacts, Royalties
2020-02-08	Public Availability at Igloolik Co-Op	Informal Engagement	Informal engagement on Public Availability at the Co-Op.	Phase 2 project and ongoing operations
2020-02-11	Public Availability at Arctic Bay Northern Store	Informal Engagement	Informal engagement on Public Availability at the Co-Op	Phase 2 project and ongoing operations
2020-02-11	Community Radio Show	Radio Show- Arctic Bay	Discussing general inquiries on the Project	Royalties, Food Security, Inuit Employment, Other Terrestrial Wildlife, Air Quality Monitoring, Community Infrastructure, Physical Health, Marine Wildlife Monitoring, Invasive Species / Ballast Water
2020-02-11	NIRB Winter 2020 Site Visit	Site Visit	Inspection at Mary River Mine Site/Milne Port	Annual NIRB Winter Site Inspection (February 11-14 )
2020-02-14	NIRB-led community information session	Information Session- Igloolik	NIRB-led community information session	Project Operations
2020-03-13	Phase 2 March 2020 Technical Meeting Update	Teleconference	Phase 2 March 2020 Technical Meeting Update with Mayor of Pond Inlet and Technical Support	Phase 2 March 2020 Technical Meeting Update
2020-03-30	Discuss Phase 2 Final Written Submission Responses with MHTO	Teleconference	Discuss Phase 2 Final Written Submission Responses	Phase 2 Final Written Submission Responses
2020-04-07	Hamlet of Pond Inlet	Teleconference	Harvesters Enabling Program- Hamlet of Pond Inlet	Harvesters Enabling Program
2020-04-27	Discussion with Hamlet of Arctic Bay	Teleconference	Discussion on COVID-19, Food Relief	COVID-19, Food Relief
2020-04-28	Meeting- Hamlet of Igloolik	Teleconference	Discussion on COVID-19, Food Relief	COVID-19, Food Relief
2020-05-08	Working Group	Teleconference	MEWG and TEWG discussion on Terms	Terms of Reference for Working Groups

Event Date	Event Name	Event Type	Event Description	Topics Discussed
			of Reference for Working Groups	
2020-05-13	Meeting- MHTO	Teleconference	Discuss Phase 2 Final Written Submission Responses, specifically those related to the marine environment	Discuss Phase 2 Final Written Submission Responses, specifically those related to the marine environment
2020-06-19	Inuit Impact and Benefit Agreement Annual Project Review Forum (IIBA APRF) Planning Committee Meeting	Teleconference	APRF Planning	QIA APRF Planning
2020-06-24	Mary River Socio-Economic Working Group (MRSEWG)	Teleconference	Annual Meeting of the MRSEWG	Socio Economic Monitoring
2020-06-24	Working Group	Teleconference	TEWG- Discussion on 2019 Monitoring Results, 2020 Monitoring Plans	2019 Monitoring Results, 2020 Monitoring Plans
2020-06-25	Working Group	Teleconference	MEWG- Discussion on Monitoring Plans	2020 Monitoring Plans, Shipping Mitigations and Early Warning Indicators (EWIs)- Part 1
2020-07-08	2020 Pre-Shipping Season Meeting 1	Teleconference	2020 Pre-Shipping Season Meeting 1 with Hamlet of Pond Inlet and MHTO	Pre-Shipping Season
2020-07-10	Working Group	Teleconference	MEWG- Discussion on Monitoring Plans	2020 Monitoring Plans, Shipping Mitigations and EWIs - Part 2
2020-07-15	Meeting- Hamlet of Pond Inlet and MHTO	Teleconference	Discussion on pre-shipping season	2020 Pre-Shipping Season Meeting 2
2020-07-18	Meeting- Baffinland/ Ilisaqsivik	Teleconference	Discussing the community counsellor program with Ilisaqsivik Society Executive Director	Community counsellor program
2020-07-28	Meeting- MHTO Technical Consultant	Teleconference	Discussion on Engagement Forecast with MHTO	Engagement Forecast



Event Date	Event Name	Event Type	Event Description	Topics Discussed
			Technical Consultant	
2020-08-24	Information Session	Meeting- Pond Inlet	NIRB-led community information session	The Project
2020-08-24	NIRB - Annual community Monitoring Update	Community Event/Forum	The NIRB hosted the information session on August 24, 2020 in conjunction with the second annual Marine Mitigation and Marine Monitoring Workshop on August 25, 2020.	Dust, Water Resources, Inuit Lifestyles and Traditions, Marine Travel, Camps and Harvesting, Local Economy, Traditional Economy, Community and Social Stability, Physical Health, Inuit Employment, Marine Habitat, Shipping Impacts, Narwhals, Fish Habitat, Community Access, Contracting Opportunities, Traditional Knowledge, Territorial Economy, Job Progression, Youth Employment, Marine Conservation Area, Impacts on Terrestrial Habitat
2020-08-25	NIRB Marine Monitoring and Marine Mitigation Workshop	Teleconference and in-person (Pond Inlet)	NIRB Marine Monitoring and Marine Mitigation Workshop: annual NIRB-led workshop related to shipping activities under 6 Mtpa	NIRB Marine Monitoring and Marine Mitigation Workshop: annual NIRB-led workshop related to shipping activities under 6 Mtpa
2020-09-14	Technical Meeting - NIRB	Teleconference	NIRB Phase 2 Technical Meeting #3 (September 14-18)	Phase 2
2020-09-28	NIRB Phase 2 Community Round Table and Pre Hearing Conference	Teleconference	NIRB Phase 2 Community Round Table and Pre Hearing Conference (September 28- October 1)	Phase 2
2020-10-14	Meeting - MHTO	Teleconference	Phase 2 Issues Resolution	Phase 2
2020-10-20	Meeting - Mayor of Pond Inlet	In-Person	Phase 2 Discussion with Mayor of Pond Inlet	Phase 2

Event Date	Event Name	Event Type	Event Description	Topics Discussed
2020-10-21	Meeting - MHTO	Teleconference	Phase 2 Issues Resolution	Phase 2
2020-10-26	Meeting with Iliasaqviik Society and Hamlet of Pond Inlet Technical Advisor	Teleconference	Community Counsellor Program Discussion with the Hamlet of Pond Inlet Phase 2 Technical Advisor	Mary River Project Community Counsellor Program
2020-10-28	Meeting - Hamlet of Pond Inlet and MHTO	Teleconference	Phase 2 Engagement Planning	Phase 2 Engagement Planning
2020-11-04	Community Radio Show	Radio show- Pond Inlet	Radio Show- Phase 2 Update	Phase 2 Update
2020-11-04	Meeting- Mayor of Pond Inlet	In-Person	Phase 2 Discussion with Mayor of Pond Inlet	Phase 2
2020-11-05	Community Radio Show	Radio show- Pond Inlet	2020 Shipping Season Summary	2020 Shipping Season Summary
2020-11-05	Public Availability at Pond Inlet Co-Op	Informal Engagement	Information table at the Sauniq Co-Op	Phase 2 and ongoing Project operations
2020-11-05	Meeting- MHTO & Hamlet of Pond Inlet	In-Person	Phase 2 Discussion	Phase 2
2020-11-09	Meeting- Mayor of Igloolik	Teleconference	Discussion with the Mayor of Igloolik on the 2019 Socio-Economic Monitoring Report engagement	2019 Socio-Economic Monitoring Report engagement
2020-11-13	Meeting- Mayor of Pond Inlet and Technical Support	Teleconference	Discussion on 2019 Socio-Economic Monitoring Report engagement with Mayor of Pond Inlet and Technical Support	2019 Socio-Economic Monitoring Report engagement
2020-11-19	Meeting – Mayor of Pond Inlet	Meeting – Pond Inlet	Phase 2 Discussion with May of Pond Inlet	Phase 2
2020-11-25	Working Group	Teleconference	MEWG/TEWG - Review latest updates to Terms of Reference	Marine and Terrestrial Environments
2020-12-07	Community Radio Show in Arctic Bay and Sanirajak	Information Session	Radio Show- Phase 2	Dust, Direct Benefits, Royalties, Taxes, Inuit

Event Date	Event Name	Event Type	Event Description	Topics Discussed
				Employment, Job Progression, Narwhals
2020-12-08	Arctic Bay Hamlet and Hunter and Trapper Organization (HTO) Meeting	Informal Engagement	Meeting between Baffinland, HTO and Arctic Bay hamlet council.	Dust, Community Access, Marine Travel, Camps and Harvesting, Marine Habitat, Sea Ice, Shipping Impacts, Narwhals, Monitoring, Fish and Fish Habitat Monitoring, Marine Physical Environment Monitoring, Marine Wildlife Monitoring
2020-12-09	Baffinland-MHTO-Pond Inlet Hamlet-Tote Road Use and ATV/Snow machine Trail	Community Group Meeting	Meeting with MHTO and Pond Inlet Hamlet re: Tote Road usage rules and regulations, ATV Trail and regulatory approvals for water crossings.	Rail, Road, Community Access, Terrestrial Travel, Camps and Harvesting
2020-12-09	Working Group	Teleconference	MEWG Update Meeting - Baffinland shipping operations, 2020 monitoring programs, Early Warning Indicators discussions	Baffinland shipping operations, 2020 monitoring programs, Early Warning Indicators
2020-12-10	Working Group	Teleconference	TEWG Update Meeting - Baffinland operations, 2020 monitoring programs, caribou monitoring triggers discussions	Baffinland operations, 2020 monitoring programs, caribou monitoring triggers discussions
2020-12-11	Sanirajak Hamlet Council and HTO	Information Session	Sanirajak Community hall meeting with HTO, Hamlet Council to discuss Phase 2 review process and community direct benefits.	Dust, Greenhouse Gas Emissions, Communities and Community Organizations, Milne Port, Rail, Direct Benefits, Inuit Associations, Inuit Employment, Job Progression

Meeting details from public meetings and community group meetings held in 2020 are presented in Appendix B.

### 2.3.2 Community Group Meetings

Baffinland meets with various community groups on a regular basis to discuss aspects of the Project and ongoing issues, concerns or recommendations community representatives may have. Baffinland engaged with several community groups in 2020 including local community HTOs and Hamlet Councils, as presented in Table 2.1 above.

### 2.3.3 Community Sponsorships

Baffinland understands the importance of and is committed to proactively pursuing opportunities to support North Baffin communities. The following activities directly contribute to Baffinland's efforts in delivering long-term benefits to the communities. The following lists some of the community sponsorships provided in 2020:

- 60 Laptops to high school graduates in the North Baffin communities;
- \$25,000 to 5 recipients as part of the annual scholarship fund;
- \$300,000 made available as part of the North Baffin Local Study Area (LSA) School Lunch Program outlined in the Mary River Project Inuit Impact and Benefit Agreement (IIBA) ;
- Provided financial contribution to the Hamlet of Pond Inlet for a COVID-19 Food Relief Program;
- Provided over \$400,000 towards the Harvester Enabling Program, providing gas and food vouchers to residents of the Hamlet of Pond Inlet; and
- Provided a variety of donations to food banks and other food related initiatives in LSA communities.

In 2020, Baffinland, its business partners and staff provided nearly \$500,000 to communities in support of efforts to keep North Baffin LSA communities safe during the COVID-19 Pandemic, including funding for the COVID-19 Food Relief Program, donations of cleaning supplies to communities in coordination with Arctic Co-Op and Fednav, funding for non-medical mask workshops, and support for country food harvesting.

## 2.4 ENGAGEMENT WITH THE QIA

Baffinland is committed to maintaining a positive relationship with the QIA through ongoing engagement and collaboration. Engagement with the QIA is generally focused on the implementation of the IIBA and on the Commercial Lease (Q13C301), associated Agreements, and other regulatory authorizations.

### 2.4.1 Engagement on IIBA Implementation

Implementation of the IIBA is managed by a Joint Executive Committee (JEC), Employment Committee (EC) and Contracting Committee (CC). These committees consist of an equal number of representatives from Baffinland and QIA, and meet on a regular basis by phone or in-person.

During 2020, the Employment and Contracting Committees focused their efforts on supporting Inuit through employment, training, education and contracting. The committees met regularly to discuss and plan initiatives that could be executed in 2020 during the COVID-19 Pandemic.

Baffinland and QIA held teleconferences with the JEC, EC and CC on several occasions throughout 2020, as presented in Table 2.2.

**Table 2.2: JEC, EC and CC Meetings in 2020**

Date	Location	Sample of Topics Discussed
<b>Joint Executive Committee (JEC)</b>		
February 11	Teleconference	<ul style="list-style-type: none"> <li>• Harvesters Enabling Fund</li> <li>• COVID-19 Restrictions</li> <li>• Minimum Inuit Employment Goals</li> </ul>
March 26	Teleconference	
June 9	Teleconference	
August 27	Teleconference	
November 20	Teleconference	
<b>Employment Committee (EC)</b>		
February 20	Teleconference	<ul style="list-style-type: none"> <li>• Community Based Training</li> <li>• Minimum Inuit Employment Goals</li> <li>• Education and Training Fund</li> <li>• Career Paths</li> <li>• COVID-19 Restrictions</li> </ul>
March 11-12	Ottawa	
April 6	Teleconference	
May 12	Teleconference	
June 17	Teleconference	
July 31	Teleconference	
September 24	Teleconference	
November 10	Teleconference	
December	Meeting by letter	
<b>Contracting Committee (CC)</b>		
January 23	Teleconference	<ul style="list-style-type: none"> <li>• Country Food supply</li> <li>• Development of Inuit Content Requirements (ICR)</li> <li>• Contractor Inuit Training</li> <li>• Contractor Inuit Content Plans</li> <li>• COVID-19 Restrictions</li> </ul>
February 5-6	Iqaluit	
March 13	Teleconference	
April 30	Teleconference	
June 11	Teleconference	
July 30	Teleconference	
August 17	Teleconference	
September 30	Teleconference	
October 15	Teleconference	
November 12	Teleconference	
December	Meeting by letter	

Baffinland and QIA met throughout the 2020 year to assess discuss options to successfully hold the Annual Project Review Forum in 2020. While efforts were made to come up with alternate plans, both parties agreed that the forum will be held once COVID-19 restrictions are lifted and the forum presentation will cover all years missed. Baffinland will work closely with QIA in 2021 to ensure successful planning of subsequent forums pending COVID-19 restrictions.

Due to COVID-19 Baffinland was unable to hold Employment and Training Information Sessions (ETIS) and the Contracting and Procurement Information Tour (CPIT) in 2020. These sessions will be planned and rolled out in 2021 pending COVID-19 restrictions being lifted.

#### 2.4.2 Engagement on the Commercial Lease and Associated Agreements

In addition to engagement related to the implementation of the IIBA, Baffinland and QIA also engage on a regular basis with respect to the Commercial Lease, associated Agreements and a range of management plans. Meetings in 2020 were primarily focused on discussing the Annual Work Plan, Annual Securities Review, the Water Compensation Agreement, and the Interim Closure and Reclamation Plan. Regular engagement with QIA on the commercial lease and associated agreements has been ongoing. In 2020, Baffinland continued to discuss with QIA at the beginning of the year to set a schedule of activities for the year based on jointly agreed upon priorities, ensuring that the objectives of both the QIA and Baffinland could be achieved in reasonable and actionable timelines. In 2020, Baffinland and QIA successfully completed an arbitration regarding reclamation securities associated with the 2019 Work Plan.

#### 2.5 ENGAGEMENT WITH WORKING GROUPS

Project Certificate No. 005 Conditions require that Baffinland establish three (3) working groups for the Project, identified as the:

- Terrestrial Environment Working Group (TEWG);
- Marine Environment Working Group (MEWG); and
- Socio-Economic Monitoring Working Group (SEMWG).

The Working Groups provide a valuable forum for ongoing Project communication and reporting between Baffinland and interested parties. The Working Groups also serve as an advisory board to provide recommendations on monitoring and management approaches related to the Project.

The meetings are structured to enable participants to have the opportunity to provide input on monitoring program design and implementation, and follow-up at the conclusion of the field programs prior to finalization of the Annual Monitoring reports. The TEWG and MEWG receive presentations on the implementation of field programs and the subsequent results in order to prioritize monitoring plans and provide input on measures for mitigation where required. The Working Groups provide a platform for the discussion of collaborative research opportunities between parties and to identify monitoring programs suited for community-based monitoring and Inuit participation. The TEWG and MEWG includes both member-status and observer status participant organizations.

The SEMWG is typically structured to occur following the annual meeting of the Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC). Baffinland provides a short presentation and overview of monitoring activities for the year, as well as Project updates and any monitoring program updates. Comments and general discussion are then held with all working group members. In 2020, a QSEMC meeting did not occur, however SEMWG meetings were held on February 28, 2020 and June 24, 2020.

Updates on 2020 activities specific to each working group are provided below. A record of meeting minutes for all Working Group meetings held in 2020 are provided in Appendix C.

##### 2.5.1 Terrestrial and Marine Environment Working Groups

Project Certificate Conditions No. 49 and 77 mandated the establishment of working groups related to the terrestrial and marine environments. Members for each group include the Government of Nunavut, the QIA, Environment and Climate Change Canada (ECCC), Mittimatalik Hunters and Trappers Organization and Baffinland. Fisheries and Oceans Canada (DFO), Parks Canada and Makivik Corporation are also members of the MEWG. World Wildlife

Foundation (WWF) - Canada participates as an observer on both groups, and Oceans North participates as an observer to the MEWG.

Generally, the Working Group meetings are structured in such a way to include:

- Baffinland to provide a Project update to the members (e.g., includes mining and shipping-related activities such as ore production, and vehicular and vessel traffic);
- Discussion of monitoring program planning including sampling approach (e.g., sampling variables, sites, and data collection methods) in advance of field programs to obtain feedback by MEWG members;
- Discussion of results of monitoring programs to obtain feedback by MEWG members; and
- Various research presentations (given by Baffinland, Baffinland technical consultants and other members).

A list of the meetings and topics discussed with the TEWG and MEWG in 2020 is provided in Table 2.3.

**Table 2.3: Terrestrial Environment and Marine Environment Working Group Meetings in 2020**

Date	Location	Topics Discussed
<b>TEWG</b>		
February 26, 2020	Ottawa, ON	Baffinland Update <ul style="list-style-type: none"> <li>• 2019 Production Update</li> <li>• Response to 2018-2019 NIRB Recommendations (Dust and Caribou tissue metal monitoring)</li> <li>• Government of Nunavut Regional Monitoring Memorandum of Understanding (MoU) Update</li> <li>• TEWG Terms of Reference</li> </ul> 2019 Terrestrial Monitoring Program Overview <ul style="list-style-type: none"> <li>• Bird Monitoring               <ul style="list-style-type: none"> <li>○ Red-Knot Monitoring</li> <li>○ Raptor Monitoring</li> <li>○ Arctic Migratory Bird Nest Surveys</li> <li>○ Dust Fall Monitoring</li> </ul> </li> <li>• Vegetation Monitoring               <ul style="list-style-type: none"> <li>○ Abundance</li> <li>○ Metals</li> <li>○ Exotic Invasive Vegetation</li> </ul> </li> <li>• Helicopter Overflights</li> <li>• Snowbank Monitoring</li> <li>• Snow Track Surveys</li> <li>• Height of Land</li> </ul> Preliminary 2020 Program Revisions Imagery Analysis of Dust Fall Dispersion
June 24, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>• 2020 Production Update</li> </ul>

Date	Location	Topics Discussed
		<ul style="list-style-type: none"> <li>• Update on Extensions Request to Production Increase Proposal</li> <li>• Impacts of COVID-19 on 2020 terrestrial monitoring programs</li> </ul> TEWG Terms of Reference Review of Comments on 2019 Terrestrial Environment Annual Monitoring Report (TEAMR) <ul style="list-style-type: none"> <li>• TEWG feedback and program limitations</li> <li>• Low survey effort for mammal monitoring</li> <li>• Dustfall and vegetation monitoring program alignment</li> <li>• Incorporation of Inuit feedback and experiences (dustfall monitoring, caribou avoidance)</li> <li>• Mitigation for avoidance of migratory bird corridors</li> </ul> Helicopter flight analysis 2020 Terrestrial Monitoring Program Overview Caribou Monitoring: Triggers and Strategies
December 10, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>• 2020 Operational Update</li> <li>• 2020 Monitoring Program Update</li> <li>• Caribou Monitoring Trigger and Strategies</li> </ul>
<b>MEWG</b>		
February 25, 2020	Ottawa, ON	Baffinland Update <ul style="list-style-type: none"> <li>• 2019 Shipping Season Update               <ul style="list-style-type: none"> <li>○ Vessel traffic</li> <li>○ Mitigation and Management</li> </ul> </li> <li>• Response to 2018-2019 NIRB Recommendations</li> <li>• MEWG Terms of Reference</li> <li>• 2019 Marine Monitoring Draft Report Release Schedule</li> </ul> Early Warning Indicator Development 2019 Marine Monitoring Programs <ul style="list-style-type: none"> <li>• Bruce Head Shore-based Monitoring Program</li> <li>• Ship-Board Observer Program</li> <li>• Acoustic Monitoring</li> <li>• Aerial Surveys</li> <li>• 2018 Narwhal Tagging Memo and Integrated Analysis</li> <li>• Marine Ecological Effects Monitoring Program</li> <li>• Aquatic Invasive Species</li> <li>• Habitat Offset Monitoring</li> <li>• Physical Oceanography</li> </ul>
June 25, 2020/ July 10, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>• 2020 Shipping Season Overview</li> <li>• Update on Extension Request to the Production Increase Proposal</li> <li>• Impacts of COVID-19 on 2020 Marine Monitoring Programs</li> </ul>



Date	Location	Topics Discussed
		<ul style="list-style-type: none"> <li>MEWG Terms of Reference update</li> </ul> 2020 Marine Monitoring Programs Overview 2020 Shipping Mitigation Review Early Warning Indicator (EWI) Development Update
December 9, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>2020 Shipping Season Summary</li> </ul> 2020 Monitoring Program Update 2019 Monitoring Report Comment and Response Summary EWI Technical Memo Submission Summary

In addition to the annual operational activities of the TEWG outlined above, throughout 2020 Baffinland also continued to engage the Working Group to move forward updates to the Working Group Terms of Reference (ToR). Following a comment period on previous iterations of the ToR, an updated version was provided by Baffinland to the Working Group in October 2020 alongside a concordance table to demonstrate how feedback provided was integrated into the ToR by Baffinland. Baffinland also organized a meeting with the Working Group in November 2020 to discuss the latest draft. Throughout 2021 Baffinland will continue to engage with the Working Groups to finalize updates to the ToRs.

### 2.5.2 Mary River Socio-Economic Monitoring Working Group

Baffinland coordinates the Mary River Socio-Economic Monitoring Working Group (SEMWG) in fulfillment of Project Certificate Condition No. 129. The SEMWG is a sub-group of the Regional Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC), which meets annually. Baffinland also acts as a participant in the QSEMC. The SEMWG includes members from the Government of Nunavut (GN), the QIA, CIRNAC and Baffinland.

A list of 2020 meetings with the SEMWG and other meetings related to socio economic monitoring at the Project is provided in Table 2.4. A meeting of the QSEMC did not occur in 2020 due to the COVID-19 Pandemic. This was communicated by the meeting organizer, GN, to all participants in 2020. Baffinland attempted engagement with North Baffin QSEMC participants and community service providers in an effort to continue some form of QSEMC engagement in 2020. More information on the meetings held and information shared can be found in the 2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021). A list of 2020 meetings with the SEMWG and QSEMC is provided in Table 2.4.

**Table 2.4: Socio-Economic Monitoring Working Group Meetings in 2020**

Date	Location	Topics Discussed
<b>SEMWG</b>		
February 28, 2020	Teleconference	<ul style="list-style-type: none"> <li>Baffinland Project Update</li> <li>Update on Phase 2</li> <li>Update on development of the 2019 Socio-Economic Monitoring Report</li> </ul>

Date	Location	Topics Discussed
		<ul style="list-style-type: none"> <li>Review of sample design changes to 2019 Socio-Economic Report</li> </ul>
June 24, 2020	Teleconference	<ul style="list-style-type: none"> <li>Baffinland provided an update on the Phase 2 Environmental Assessment</li> <li>Baffinland provided an overview of its 2019 Socio-Economic Monitoring Report</li> <li>Meeting participants review of the report, its findings, methodology, etc.</li> <li>Baffinland provided an update on preliminary plans for 2020 Socio Economic Monitoring Report</li> </ul>
November 9, 2020	Teleconference	<ul style="list-style-type: none"> <li>Meeting with the Mayor of Igloolik in place of 2020 QSEMC</li> <li>Review of 2019 Socio Economic Monitoring Report</li> </ul>
November 13, 2020	Teleconference	<ul style="list-style-type: none"> <li>Meeting with the Mayor of Pond Inlet and Technical advisor in place of 2020 QSEMC</li> <li>Review of 2019 Socio Economic Monitoring Report</li> </ul>

## 2.6 LOOKING AHEAD

In 2021, Baffinland will work towards continuing operations for the Early Revenue Phase of the Project, and where permitted prepare for anticipated expansion of the Project, pending approval of Phase 2. Specific activities to support the Project that are proposed to be undertaken in 2021 include: ongoing improvements to the Tote Road and progressive reclamation of historic borrow sources, development and implementation of a Long Term Water Management Plan for the Mine Site to mitigate observed sedimentation and erosion, site grading and laydown construction to support future construction activities and remove ponding around current infrastructure, construction of new hazardous waste berms to streamline waste management, and the addition of a mine dry facility at the Sailiivik Camp. Project environmental monitoring programs prescribed by the Project Certificate, water licences, authorizations, management plans and environmental effects monitoring plans will continue through 2021.

Baffinland will continue to implement a proactive approach to engagement with various stakeholders and Inuit through meetings, workshops, surveys and dissemination of information through various communication modes including reports, though in consideration of alternative methods to in-person meetings should travel restrictions continue into 2021. This will ensure that the communities, QIA, regulators and the public are informed in a timely manner of the Project's progress and the potential environmental and social impacts of ongoing operations. Baffinland will continue to follow all public health advice and will adapt its engagements with communities, governments, and members of the public accordingly.

### 3 OPERATIONS OVERVIEW

#### 3.1 SITE ACTIVITIES COMPLETED IN 2020

Baffinland continued to focus on mine production from Deposit No. 1 in 2020. Key activities undertaken in 2020 occurred at the active Project component areas including Milne Port, the Milne Inlet Tote Road, and the Mine Site. No Project activities were undertaken related to the development of the South Railway or at Steensby Port in 2020.

Mining and hauling activities from the Mine Site to Milne Port continued throughout 2020, with 6.0 million tonnes of iron ore hauled using the Tote Road and stockpiled at Milne Port. This year also marked the sixth season of shipping with a total of 5.5 million tonnes of iron ore shipped between July 20 to October 16. Baffinland utilized an ice breaking vessel (the MSV Botnica) to escort ore carriers at the beginning and end of the shipping season, which served to facilitate safe passage through prevailing ice conditions. Seventy-two (72) voyages were executed, with vessels carrying an average of approximately 75,700 tonnes of iron ore each.

Operational activities in 2020 included:

- Development and operation of the mine, ore crushing and land transportation, stockpiling and marine shipment of ore;
- The continued development and construction of infrastructure required at Milne Port and the Mine Site, and along the Tote Road;
- Continued operation of Mine Site Sailiivik and Milne Port Complex Camps to support ongoing operations and construction activities, which included the use of water and deposition of waste as authorized under existing permits;
- Ongoing operation of permitted quarry and borrow sources;
- Arrival of vessels carrying fuel, equipment and supplies for use at the Mine Site and Milne Port during shipping season (approximately between mid-July and mid-October 2020). Transportation of material, fuel and supplies required for operational and construction activities to the Mine Site year-round via the Tote Road;
- Ongoing environmental effects studies and baseline data collection to support the construction and operation of the Project as well as for future engineering requirements;
- Environmental monitoring in accordance with the approved PC, licences, authorizations, management plans and environmental effects monitoring plans;
- Ongoing exploration activities including drilling, mapping, prospecting, sampling and geophysics;
- Tote Road improvements to address fish passage, drainage and sedimentation and erosion concerns;
- Site grading and laydown construction for supplies and equipment to support future construction activities and remove ponding and permafrost degradation issues;
- Milne Port Ore Stockpile #1 expansion and water management structure upgrades;
- Implementation of the Ore Crusher Pad Regrading Strategy to prevent the pooling of water on and around the Crusher Facility pad and installation of a pumping system to transfer collected water to Crusher Facility Pond MS-06; and
- Construction of the KM 106 Run of Mine Stockpile facility at the Mine Site to support improved ore handling.

Representative photographs showing major 2020 site activities are included in the Photo Essay (Appendix D).

### 3.2 2020 HIGHLIGHTS AND CHALLENGES

The Project has been in operation since September 2014 and the operational experience gained has proved that high volume, bulk commodity mining in the Canadian Arctic is feasible. Despite harsh environmental and economic conditions, Baffinland's investors continue to support the Project with the goal of increasing production to reach an economically sustainable operation.

Despite the many challenges associated with safely operating a mine during the COVID-19 Pandemic (refer to Section 3.2.2 for additional details), 2020 represented another relatively successful year of operations for Baffinland. Although the amount of ore shipped out of Milne Port was lower in 2020 (5.45 million tonnes [Mt] shipped in 72 ore carriers) than in 2019 (5.9 Mt shipped in 81 ore carriers), the efficiency and productivity of the mining operations at Deposit No. 1 continued to increase. The amount of ore crushed increased from 5.6 Mt in 2019 to 6.0 Mt in 2020, and a total of 6.0 Mt of ore was transported by ore haul trucks along the Tote Road and stockpiled at Milne Port.

#### 3.2.1 Project Economics

With the current ERP production rate of 4.2 Mtpa out of Milne Port and in consideration of the temporary expansion of 6.0 Mtpa until the end of 2021, the Project remains vulnerable to iron ore price fluctuations. As stated in Baffinland's request to the NIRB for the extension of the Production Increase submitted December 6, 2019, the 4.2 Mtpa operation is not financially viable for the Mary River Project in the long term. Further expansion of the Project is necessary for Baffinland to continue to operate and provide benefits to the North Baffin communities, governments, and other stakeholders.

While the second half of 2020 saw rising iron ore prices, which have continued into 2021, these high prices are forecast to be temporary in nature. The high prices seen today are expected to return to levels below the US\$100/tonne level in the near future. In order to insulate itself against these fluctuations in the market over the long-term, it is critical that Baffinland become a low cost producer through significant changes in the design and operation of the Project, including a transition from ore haulage by truck to rail.

Although the implementation of the 18 Mtpa South Railway and Steensby Port is authorized under Project Certificate No. 005, it is not economically feasible in the short-term, due to its high capital cost. However, the South Railway and Steensby Port remains an important part of Baffinland's long-term development plan for the Project, as Baffinland seeks to expand to 30 Mtpa to be competitive in the world's iron ore market.

Advancing the Phase 2 Proposal will allow Baffinland to increase production from 4.2 Mtpa (and temporary expansion increase of 6 Mtpa) to 12 Mtpa from Milne Port and achieve stable profitability in a shorter timeframe, while working incrementally towards the longer-term goal of reaching a production rate of 30 Mtpa. Continued pursuit of this phased approach will safeguard the Project from vulnerability to market fluctuations, which will subsequently help prevent temporary or early closure of the Project.

#### 3.2.2 COVID-19 Pandemic

As described to the NIRB by Baffinland in June 2020 (Baffinland, 2020a), the COVID-19 Pandemic presented a number of challenges throughout 2020 for Baffinland's operations. Tremendous efforts were made to ensure that the health and safety of Baffinland's employees, its contractors, and the neighbouring communities remained the foremost priority by developing and implementing comprehensive safety plans and protocols to minimize the risk of COVID-19 exposure. Accordingly, to protect communities in Nunavut from COVID-19, Baffinland requested that all Nunavummiut remain home with paid leave. At the time this report was prepared, these employees unfortunately

continue to remain at home, though we look forward to welcoming our Nunavummiut staff to Site as soon as public health measures will allow. Furthermore, specific protocols were also established to minimize the risk of COVID-19 transmission to hunters and visitors traveling through Project areas. With these extensive precautions and protocols in place by Baffinland, the risk of COVID-19 exposure to Nunavut communities was minimized while the operation continued. Baffinland's Northern and Oakville offices have also been impacted with the Northern office following protocols in their respective communities while the Oakville headquarters was closed and employees have been working from home since the start of the COVID-19 Pandemic.

To minimize risk of exposure to employees and contractors traveling to Mary River for essential travel at the early stages of the COVID-19 Pandemic, Baffinland established chartered private flights to ferry essential workers to Mary River from a series of flight hubs across Canada and screened all travellers for symptoms before flying. All contractors followed the same procedures and precautions as the rest of the Baffinland staff who travel to Mary River from across Canada. Preventive measures such as physical distancing, proper hand washing, frequent sanitizing, and mask use were enforced during travel and on site at Mary River, as per Baffinland protocols, as established in concert with federal and Nunavut public health experts. Baffinland and its consultants implemented comprehensive safety plans and protocols to minimize the risk of COVID-19 exposure to their employees and local communities.

Baffinland was one of the first companies to implement on-site COVID-19 testing facilities at its remote mining site to test all employees and contractors coming to Mary River. Additionally, the staff undergo daily health screenings to monitor for any symptoms of COVID-19; if any symptoms are experienced, these staff members do not conduct field work. If testing yields positive results or if symptoms develop while on-site, Nunavut Public Health is contacted and the employee is immediately quarantined until medically cleared.

With the extensive precautions and protocols in place by Baffinland, the risk of COVID-19 exposure to Nunavut communities was minimized, and the environmental monitoring programs were completed with minimal risk. Maintaining a continuous monitoring program in all survey years is critical to detect any effects and trends of the Mary River Project on the environment, to ensure a statistically strong dataset, and to comply with conditions outlined in the Project Certificate.

Baffinland had to also make changes to its engagement approach in 2020 due to the COVID-19 Pandemic. Travel restrictions and increased focus on community and employee health and safety moved many engagements from in person to virtual (teleconference/videoconference) formats. While these types of engagements are not ideal from an Inuit cultural or relationship building perspective they have proven successful in ensuring that stakeholders and community representatives have been able to continue dialogue with Baffinland throughout the Pandemic. Public engagement has been most affected by the COVID-19 restrictions. In response, Baffinland increased use of social media and local radio as a means to ensure that information about the Company and its activities have been shared with wider audiences. As travel restrictions and public health orders are continually evolving, the Company continually evaluates what methods of engagement will inform an effective approach while ensuring that individual and community health and safety remains the foremost priority. This adaptive approach to engagement is predicted to continue until the Pandemic and related public health orders and advice allow for in person engagements to once again be the most used engagement technique.

The below Table 3.1 provides an overview of the challenges and outcomes faced in 2020 as a result of the COVID-19 pandemic, as it relates to the implementation of the Project and adherence to the Project Certificate.

**Table 3.1: Summary of COVID-19 Challenges and Outcomes in 2020**

Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
<b>Health and Safety</b>		
Ensuring health and safety of employees and contractors working at Mary River during the global COVID-19 Pandemic	General application of any term and condition relevant to on-site activities	<ul style="list-style-type: none"> <li>Existing robust Emergency and Crisis Management Plans with pandemics in place that included an infectious disease component led to rapid responses based on risk;</li> <li>Implemented portable COVID-19 testing lab at Mine Site;</li> <li>Nunavummiut workforce were returned or requested to remain home and remain on standby pay; Baffinland's high risk (most-vulnerable) employees sent home;</li> <li>Introduced stringent preventative controls and increased H&amp;S protocols. For example:               <ul style="list-style-type: none"> <li>Quarantine and evacuation plans;</li> <li>Early implementation of Canada-wide flight hubs to ensure safe travel of workers to and from Mary River</li> <li>Increased sanitation cleaning of Site and equipment;</li> <li>Increased employee hygiene practices;</li> <li>Enhanced communications with employees; and</li> <li>Strict travel policies.</li> </ul> </li> <li>Baffinland continues to successfully manage the risks of potential COVID-19 transmission at its Project sites.</li> </ul>
<b>Monitoring Program Implementation</b>		
Delays in Permits and Licences	1, 6, 7, 8, 9, 14, 14b), 20, 21, 23, 24, 28, 34, 36, 38, 46, 50, 73, 74, 76, 83, 84, 85, 86, 87, 89, 91, 99, 101, 109, 110, 111, 112, 113, 114, 126,	Baffinland was ultimately able to secure all the permits required to complete its freshwater, marine and terrestrial monitoring programs including the Nunavut Wildlife Research Permit, Scientific Research Licence from Nunavut Research Institute and Fisheries and Oceans Canada Licences to Fish for Scientific Purposes and Animal Use Permits.
Field Work Logistical Considerations	General and applicable to all site-based monitoring programs	Numerous health and safety protocols were implemented to ensure the safety of employees and contractors, including during travel to and from Mary River. Work rotations were extended from 2 to 4 weeks, due to limited flights schedules into and out of Mary River.
Vessel Boarding Restrictions	101c, 106, 123	The Ship-based Observer Program as typically run in 2018 and 2019 could not be implemented due to boarding restrictions on the MSV Botnica. As an alternative, Baffinland piloted in partnership with the Marine Mammal Observation Network (MMON) an incidental marine mammal sighting program with a select fleet of vessels contracted by Baffinland, MSV Botnica and Nordic Ore Carriers.

Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
	89	As part of the ship-shore personnel interface risk evaluation, only the Port Captain was given permission to board ore carriers to test for ballast water salinity and temperature. Ballast water was successfully tested in all ore carriers calling to Milne Port followed the procedures outlined in Baffinland's Ballast Water Management Plan prior to discharge to Milne Port.
Minimal Inuit Participation	101c, 126	Due to travel restrictions, no Nunavummiut-based Inuit researchers could participate during the terrestrial and marine field programs, with the exception of one individual who was residing in a Southern Canadian location at the time of field work and could travel through the Montreal flight hub and supported the Marine Environmental Effects Monitoring Program.
Data Analysis and Reporting Delays	All relevant terms and conditions requiring annual reporting of results.	Due to various public health guidance measures and associated office/school/daycare closures of employees and contractors, as well as lab closures, time availability and work schedules were unpredictable. Accordingly, delays in reporting are the timeliest outcomes in consideration of unpredictable limitations imposed by the Pandemic.
<b>In-person Engagement Efforts</b>		
Pre-shipping and End of Season Shipping Meeting	N/A	Baffinland organized a pre-shipping season teleconference meeting held in Pond Inlet in consideration of physical distancing measures as directed by Nunavut Public Health. The meeting ran over two separate days (July 8 and 15, 2020); an end of shipping season meeting remains to be scheduled as of April 30, 2021.
Monitoring Program Engagement (Terrestrial, Marine and Freshwater)	N/A	Baffinland developed an information package for the Mittimatalik Hunters and Trappers Organization (MHTO) to provide details about the 2020 Monitoring Programs and was shared via email. Follow-up communications via email and phone provided details on anticipated program details, in addition to working group meetings held in June 2020.
Procurement and Contracting/Employment Tours	N/A	Baffinland had to implement changes to its Engagement Approach in 2020 due to the COVID-19 Pandemic and in respect of Public Health Orders and guidelines in Nunavut. The most important changes were the limiting of public meetings and moving to non-in-person formats (i.e., teleconference).
Community Tours - Operations	N/A	Baffinland had to implement changes to its Engagement Approach in 2020 due to the COVID-19 Pandemic and in respect of Public Health Orders and guidelines in Nunavut. The most important changes were the limiting of public meetings and moving to non-in-person formats (i.e., teleconference).

Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
<b>Regulatory Agency Site Visits</b>		
In-person Summer 2020 Site Visit by NIRB was not possible due to travel restrictions	N/A	NIRB provided a list of Project activities and locations of photos to be taken by Baffinland as an alternative to an in-person visit. In response, Baffinland sent photos to NIRB via file sharing system on Sept 20, October 6, and October 8, 2021.
<b>Working Groups</b>		
Travel restrictions prevented the organization and participation of in-person meetings	N/A	Shift from in-person to teleconference meeting format.
Delays in timely distribution of slide decks in advance of meetings and distribution of draft meeting minutes to working groups for review	N/A	Additional time, health and safety, and logistical considerations related to implementation of field programs during the Pandemic, and challenges related to office/school/daycare closures and consequent working from home scenarios resulted in re-evaluation of prioritization of tasks to maintain employee wellness. Accordingly, delays in reporting are the timeliest outcomes in consideration of unpredictable limitations imposed by the Pandemic.
<b>Hiring and Training of Inuit Employees</b>		
No to limited in-person training	135, 136, 138, 140, 141, 142, 156	Baffinland adapted its training to provide opportunities for Inuit to participate remotely in training while keeping health and safety as the number one priority. This led to the development of online delivery methods of training, and an enhanced focus on in-community training.
<b>Employee/Contractor and Family Wellness</b>		
Individual and family health (physical and mental health)	N/A	Employees and contractors were faced with unprecedented challenges related to implementation of extended and often variable lockdown measures, working from home scenarios and the need to care for sick family members including elderly, and/or the need to isolate/quarantine because of personal sickness and/or sick family members, and/or exposure to COVID-19 positive individuals identified through contact tracing. In response, focus has been placed on ensuring the wellness of individuals and their families.
Office/School/daycare closures (working from home and work-life balance)	N/A	Employees and contractors have been faced with unpredictable challenges related to lockdown measures including office closures to reduce transmission risk, exposure to positive COVID-19 individuals, sickness, etc. resulting in most non-Site-based employees individuals working from home since March 2020. School and daycare closures due to lockdown measures and/or institutional outbreaks have resulted in challenging work-life scenarios for over a year. Adaptation has been key.



Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
Shift from 2-week to 4-week rotations over field season	N/A	Based on risk management, flight schedules were modified in order to best manage the risk of COVID-19 transmission at remote mining sites. This has included a number of measures including reduced flights into and out of Mary River. These longer shifts have been challenging given the extended length of shifts over which employees and contractors have worked. Fatigue management and positive mental health are considered priority areas.

### 3.2.3 IIBA Implementation Highlights

Implementation of the IIBA contributed to many new and notable highlights for the year 2020. These include, but are not limited to, the following:

- Enhanced training opportunities through a significantly expanded Inuit training budget (\$2.25 million per year from 2018 to 2021 and \$1.5 million on the delivery of training to Inuit from 2021 to 2031);
- Successful implementation of the Harvesters Enabling Program in Pond Inlet which supplies each Inuk residing in Pond Inlet, who on January 1<sup>st</sup> of that year is not less than twelve years old, with three hundred liters of gas to support harvesting activities that occur during that year.
- Seasonal Monitoring Programs: in 2020, there were seasonal monitoring programs which employed Inuit, they consisted of the Shipping Monitors based out of Baffinland's Pond Inlet office and the Marine Environmental Effects Monitoring Program. These programs provided additional employment and training opportunities outside the scope of mine based roles at the Mary River Project.
- In 2020 Baffinland awarded five scholarships to North Baffin residents, totaling \$25,000. Since 2014, Baffinland has awarded \$194,000 to 39 well-deserving students in pursuit of continuing education. Inuit students are welcome to apply each year that they further their education.
- An expanded Human Resources team is dedicated to working with all Inuit employees to have discussions on their employment and on advancement opportunities. They will help employees map out a path to new roles, and will help facilitate a conversation with operations management to achieve these plans where possible. The team will communicate in either English or Inuktitut as appropriate and desired and will discuss training opportunities, career paths, and Inuit mobility.
- The adaptation of training to provide opportunities for Inuit to participate in training while keeping health and safety as the number one priority. This led to the development of online delivery methods of training, and an enhanced focus on in-community training.
- While not a direct requirement of the IIBA, since 2007 Baffinland has provided laptops to high school graduates in the North Baffin communities as an incentive to motivate local youth to complete their high school education and pursue post-secondary education. Baffinland provided 60 laptops to grade 12 Inuit graduates in 2019.

### 3.2.4 Waste Rock Facility

During the summer of 2017, the development of Acid Rock Drainage and Metal Leaching (ARD/ML) at the Mine Site Waste Rock Facility (WRF) in combination with the observation of seepage from the Waste Rock Facility surface

water management pond (WRF Pond) suggesting that the liner had become compromised, and had resulted in non-compliant effluent discharges at the Waste Rock Facility. In response to the concerns identified and non-compliant discharges in 2017, Baffinland developed and implemented several immediate corrective actions in since 2017 to ensure compliance regarding the management of waste rock and effluent at the Waste Rock Facility. These immediate actions were summarized and provided to regulators in the Project's 2017, 2018 and 2019 QIA and NWB Annual Report for Operations.

Key corrective actions executed in 2020 included the completion of the repair and expansion of the WRF Pond in January 2020 to mitigate the inferred source of the seepage. Baffinland continues to remain committed to addressing the identified concerns and maintaining compliance in the management of waste rock and effluent at the WRF. Industry best practices and procedures planned for the WRF to maintain compliance are detailed in the Project's most recent revisions of the Phase 1 Waste Rock Management Plan (June 2020; Appendix E.5), Metal & Diamond Mining Effluent Regulations (MDMER) Emergency Response Plan (BAF-PH1-830-P16-0047) and Fresh Water Supply, Sewage and Wastewater Management Plan (FWSSWMP; BAF-PH1-830-P16-0010).

Baffinland continued to operate a dedicated Water Treatment Plant (WTP) at the WRF to treat surface water runoff retained by the WRF Pond, when necessary in 2020. The WRF WTP uses a combination of coagulation, pH adjustment, precipitation, flocculation and filtration to ensure effluent discharged from the WRF Pond meets the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and MDMER. A full description of the WRF WTP treatment processes is provided in the Project's updated FWSSWMP (BAF-PH1-830-P16-0010). During 2020, the water quality of the WRF Pond was found to be compliant with the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and MDMER in June and July without any treatment being required. In August, operation of the WRF WTP was effective at mitigating any water quality concerns for the effluent to be compliant with the applicable criteria.

On February 20, 2020, Baffinland received email correspondence from ECCC Environmental Enforcement Division informing Baffinland that ECCC had concluded its investigation in regards to the WRF, specifically in regards to:

1. Fisheries Act subsection 36(3) - An effluent seepage and overflow identified during an ECCC on-site inspection on August 23-24, 2017 from the Waste Rock Stockpile Sedimentation Pond (MS-08) located at the BIMC, Mary River Project.
2. Metal Mining Effluent Regulations - Failing to comply with requirements under sections 4 to 31 set out in the Regulations. This notification information was received from Spill Reports 2017-289, 2017-312, 2017-328, 2017-361 and 2017-361 that were submitted to the Northwest Territories-Nunavut (NT/NU) spills line.

Based on the information collected during the course of the investigation and consistent with the Compliance and Enforcement Policy for the Habitat Protection and Pollution Prevention Provisions of the Fisheries Act, Baffinland was informed that ECCC has decided to close the investigation and not take any enforcement actions related to the investigation that was opened on September 13, 2017 under the *Fisheries Act* and the MDMER.

### 3.2.5 Dustfall

In 2020, Baffinland continued to address concerns regarding the generation of dust from Project facilities. As in previous years, during engagement activities in 2020, Baffinland heard community concerns about dust expressed several times, in relation to the Phase 2 Expansion Project Proposal, but also in regard to current operations. It is

acknowledged that project activities, particularly the crushing and stockpiling of ore, as well as road traffic on the Tote Road, are primary sources of dust generation. Baffinland has worked to address dust generation at the source, and committed significant effort and resources to mitigation of dust generation at the Project, such as;

- A Dust Mitigation Action Plan (Plan) was developed 2016, and has been implemented every year since. This plan includes continuing ongoing maintenance of new crusher shrouding and enclosed chutes, road resurfacing, limiting speed and volume of vehicles on all roads, application of water and dust suppression substances, continued implementation of redesigned stockpile activities and layout at the Port, and the removal of dust impacted snow at strategic locations at the Project.
- In 2019 Baffinland implemented a trial of a GN approved new dust suppressant; Dust Stop®, produced by Cypher Environmental. This action was a direct result of adaptive management to mitigate observed exceedances of dustfall thresholds within the Tote Road corridor. Initial application of Dust Stop in 2019 provide successful, and in 2020 a full scale application on the Tote Road was initiated.
- As a direct result of community feedback on the extent of dust impacts at Milne Port, Baffinland reviewed the current and potential mitigation measures employed at the ore stockpile facility. After reviewing several options that would not be feasible due to impacts to ore product quality (i.e. watering), Baffinland identified a potential crusting agent that could be applied to the stockpiles, effectively sealing the ore and mitigating wind generated dust. DusTreat®, a specialized crusting agent produced by SUEZ Water Technologies & Solutions Canada (SUEZ). To date, Baffinland has applied the product to eleven (11) zones within the Milne Port ore stockpile, as per the application techniques and dosage calculations provided by SUEZ. DusTreat® is a non-toxic substance which coats the outside of the stockpiles and acts as a sealant to prevent lift-off of dust from the stockpiles.

In 2021 Baffinland will continue to advance work to better understand and reduce dust across the Project. This will include the installation of additional dust collectors and the execution of a follow up audit of dust sources and mitigation measures to that carried out in 2016. The 2021 dust audit will be focused on community involvement and provide additional management recommendations, should they be required

### 3.2.6 Inuit Employment and Contracting

In 2020, a total of 502,852 hours were worked by Inuit and 3,300,627 by non-Inuit. These hours include both Baffinland and Contractor employees. In total, Inuit employment hours were 13.2% of the total hours worked. Baffinland's Inuit employee payroll totaled \$15,272,916. These amounts include all Inuit employees who lived in and outside of Nunavut. Contractor's Inuit employee payroll totaled \$5,591,556. These amounts include all Inuit employees who lived in and outside of Nunavut.

Since 2014, Baffinland (not inclusive of contractors) has provided \$75.8 million in payroll to Inuit. Wages paid to Inuit is an important measure of the Projects significant positive socio-economic impact on Nunavummiut. Through the provision of wages, Baffinland is providing Inuit with the opportunity to purchase goods and services in their communities creating positive benefits for local business, including Inuit owned firms.

Article 6 of the IIBA refers to procurement and contracting to ensure that all economic activity associated with the Project will be available to Inuit firms. Baffinland utilizes the registry of Inuit Firms maintained by Nunavut Tunngavik Incorporated (NTI) to identify Inuit Firms which may be eligible/qualified for various contracting opportunities.

Procurement with Inuit-owned businesses and joint ventures in 2020 totaled approximately \$91.1 million when measured on a commitment basis. This includes ten contracts with Inuit-owned businesses and joint ventures, all of which were based in either the North Baffin communities or Iqaluit. Since Project development, a total of approximately \$1.1 billion worth of contracts have been awarded to Inuit-owned businesses and joint ventures.

Throughout 2020, Baffinland continued to take steps to ensure that maximum benefits of the Project, represented by employment and contracting opportunities, were accessible to Inuit.

### 3.2.7 Training Initiatives

Baffinland and the Qikiqtani Inuit Association (QIA) as well as the government of Nunavut, Kakivak Association and the Government of Canada have partnered in the \$19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program, the objective of which is to provide Inuit with skills and qualifications to meet the employment needs of the Mary River Project as well as other employment opportunities in the region. Training under the Q-STEP program includes work readiness programs as well as targeted training programs directed at apprenticeships, skills development, and formal certification in heavy equipment operation.

The Qikiqtani Skills and Training for Employment Partnership has proven to be the most successful employment and training program currently offered at Baffinland. The Q-STEP Charter from Employment and Service Development Canada was scheduled to end on March 31st, 2021. Due to COVID-19, it has been extended with no additional funding until March 31st, 2022. The Q-STEP teams at Baffinland and QIA are seeking third party funding to ensure that this successful training program can continue into the future.

In 2020, Inuit training hours totalled 14,384 hours which is 13.7% of the total training provided by Baffinland. Baffinland is also working to develop new training programs that would be offered both in the community and at the Mine Site. Baffinland is also working with contractors to explore new skills development initiatives. Training programs are expected to continue to evolve at the Project as the operation advances, employment increases, and feedback from Inuit employees is implemented.

### 3.2.8 Support for Local Businesses

In addition to provisions respecting the participation of Inuit Firms in Project contracting opportunities as detailed in Article 6 of the Inuit Impact and Benefit Agreement (IIBA) and the Inuit Procurement and Contracting Strategy, Baffinland supports the development of local businesses through its annual contribution of \$250,000 through the IIBA's Business Capacity and Start Up Fund. The fund, which is administered by the QIA, is designed to assist existing Inuit Firms to develop capacity to participate in the bidding process and to encourage business start-ups in the communities.

In addition, Baffinland has worked and will continue to work with local businesses on an ongoing basis to create contracting opportunities in the communities.

## 3.3 LOOKING AHEAD

The 2021 Work Plan was submitted to the NWB and the QIA on November 6, 2020 (Baffinland, 2020b). This submission is a requirement under Part J, Item 3 of Amendment No. 1 of Type 'A' Water Licence 2AM-MRY1325 and under Section 6.1 of Commercial Lease No. Q13C301 agreed between Baffinland and the QIA (QIA and Baffinland, 2013).

A summary of the planned 2021 activities are as follows:

- Development and operation of the mine, ore crushing and land transportation, stockpiling and marine shipment of ore;
- The continued development and construction of infrastructure required at Milne Port and the Mary River Mine Site (Mine Site) and along the Tote Road for the Mary River Project;
- Continued operation of Mine Site and Milne Port Camps to support ongoing operations and construction activities which will include the use of water and deposition of waste as authorized under existing permits;
- On-going operation and expansion of permitted quarry and borrow sources;
- At Milne Port, vessels carrying fuel, equipment and supplies for use at the Mine Site and Milne Port will arrive during open water. Material, fuel and supplies required for operational and construction activities will be transported to the Mine Site year round via the Tote Road;
- Ongoing environmental effects studies and baseline data collection will continue to support the construction and operation of the Project as well as for future engineering requirements;
- Continued environmental monitoring in accordance with the approved Project Certificate, licenses, authorizations, management plans and environmental effects monitoring plans;
- On-going exploration activities including drilling, mapping, prospecting, sampling, and geophysics. Planning of the details of the summer drilling and/or trenching program is not yet finalized;
- Tote Road improvements to address safety concerns, freshet runoff issues and progressive reclamation of the historic borrow sources;
- Site grading and laydown construction for supplies and equipment to support future construction activities and remove ponding and permafrost degradation issues around current infrastructure; and
- Erection of additional maintenance facilities to safely service equipment.

The Project's Phase 2 Expansion Proposal continues to proceed through the review and approvals process facilitated by the NIRB and NWB. No activities are planned to be undertaken along the south railway or at Steensby Port in 2021, with the exception of select baseline studies to support the future development of the southern transportation corridor and Steensby Port, should that be possible. Project environmental monitoring programs prescribed by the Project Certificate, water licences, authorizations, management plans and environmental effects monitoring plans will continue through 2021. Due to the current precautions and measures taken in response to the COVID-19 global pandemic, some monitoring programs expected or required to be executed in 2021 may be impacted and require augmentation to proceed in a meaningful way. The health and safety of the North Baffin communities, Baffinland staff, and contractors are paramount, and we will take all measures necessary to protect our communities and staff while ensuring the greatest possible implementation of our monitoring programs in 2021. Updates to monitoring programs will be recorded and communicated to the NIRB, regulators, working groups and other interested parties as they become available.

## 4 PERFORMANCE ON PC CONDITIONS

The following sections provide a discussion of Baffinland’s self-assessed status of compliance and performance related to each of Project Certificate (PC) conditions for the Project in 2020.

The discussion of compliance with PC conditions has been disaggregated into the following categories:

- Performance on General Conditions;
- Performance on Compliance with Regulatory Instruments;
- Performance on Ecosystemic Terms and Conditions;
- Performance on Socio-Economic Terms and Conditions; and
- Performance on Other Terms and Conditions.

### 4.1 METHODOLOGY AND CRITERIA

Table 4.1 outlines the status of compliance levels and describes the criteria related to each of these options. Each PC condition has been assigned a status of compliance. Where a PC condition is designated as being only ‘In Progress’ or ‘Non Compliant’, a rationale explaining why ‘In Compliance’ was not achieved in 2020 and, where applicable, a strategy for moving towards full compliance in a future reporting year has been provided.

**Table 4.1: Status of Self-Assessment Compliance Terminology and Criteria**

Status	Criteria
<b>Status of Project Condition</b>	
Active	The PC term and condition is active during the current phase of the Project for the relevant monitoring period.
Not Active	The PC term and condition is not active for the relevant monitoring period, and/or is tied to a project component that was not yet applicable during the reporting year.
<b>Status of Compliance</b>	
In Compliance	Obligations described under the Term and Condition have been met or exceeded, as intended in the PC for the relevant monitoring period. *Rationale for meeting compliance requirements is provided.
In Progress	Obligations described under the Term and Condition have been partially fulfilled, as intended in the PC for the relevant monitoring period. *Demonstrable efforts towards meeting compliance requirements is evidenced.
Non Compliant	Obligations described under the Term and Condition have not been met as intended in the PC for the relevant monitoring period. *Rationale for being unable to meet compliance requirements is provided.
Not Applicable	The PC term and condition is not applicable to the current phase of the Project for the relevant monitoring period.

Baffinland has taken a conservative approach for self-assessing the status of compliance with PC conditions for 2020. When determining a status of compliance for each of the PC conditions, the following process was implemented by Baffinland and its technical experts:

1. A review of the specific requirements outlined in each PC condition is conducted.

2. A review of all relevant work completed by Baffinland in the reporting year and/or previous reporting years (if applicable) relevant to the PC condition is conducted.
3. A consideration of previous status assignments by NIRB and associated interpretation.
4. A gap analysis is completed to assess whether or not there is a delta between the requirements of the PC condition and the work completed by Baffinland to meet these requirements.
5. Inuit and stakeholder comments as relevant to the PC condition are considered. Baffinland maintains a list of meeting records (formal and informal) that were held with Inuit or other stakeholders and integrates any relative feedback heard according to topics covered through the various ecosystemic and socio-economic terms and conditions.
6. A status of compliance based on the results of Baffinland's self-assessment is assigned.

Baffinland will continue to complete its self-assessment using the approach described above until such time that additional formal guidance is provided by the NIRB on its expectations for completing self-assessments and/or its methodology for assessing PC compliance is disclosed to proponents.

#### 4.2 APPROACH TO REPORTING ON PERFORMANCE

An individual summary sheet for each of the ecosystemic, socio-economic and 'other' terms and conditions has been provided in Sections 4.6 to 4.8. The category and content of information provided in these summary sheets is outlined in Table 4.2.

**Table 4.2: Layout of PC Condition Summary Sheets**

Item	Summary of Content
Category	<ul style="list-style-type: none"> <li>• Category as defined in PC No. 005.</li> </ul>
Responsible Parties	<ul style="list-style-type: none"> <li>• Responsible party as defined in PC No. 005.</li> </ul>
Project Phase(s)	<ul style="list-style-type: none"> <li>• Phase(s) of the Project the PC Condition is applicable to:               <ul style="list-style-type: none"> <li>○ Construction</li> <li>○ Operations</li> <li>○ Temporary Closure / Care and Maintenance</li> <li>○ Closure</li> <li>○ Post-Closure Monitoring (as outlined in PC No. 005)</li> </ul> </li> </ul>
Objective	<ul style="list-style-type: none"> <li>• The objective as outlined in PC No. 005</li> </ul>
Term or Condition	<ul style="list-style-type: none"> <li>• The term or condition as written in PC No. 005</li> </ul>
Relevant Project Commitment	<ul style="list-style-type: none"> <li>• List of all corresponding Baffinland commitments outlined in the Final Hearing Report (NIRB, 2012b).</li> </ul>
Reporting Requirement	<ul style="list-style-type: none"> <li>• The reporting requirement as outlined in PC No. 005.</li> </ul>
Status of Project Condition	<ul style="list-style-type: none"> <li>• A self-assessed status of compliance for the PC Condition:               <ul style="list-style-type: none"> <li>○ Active</li> <li>○ Not Active</li> </ul> </li> </ul>

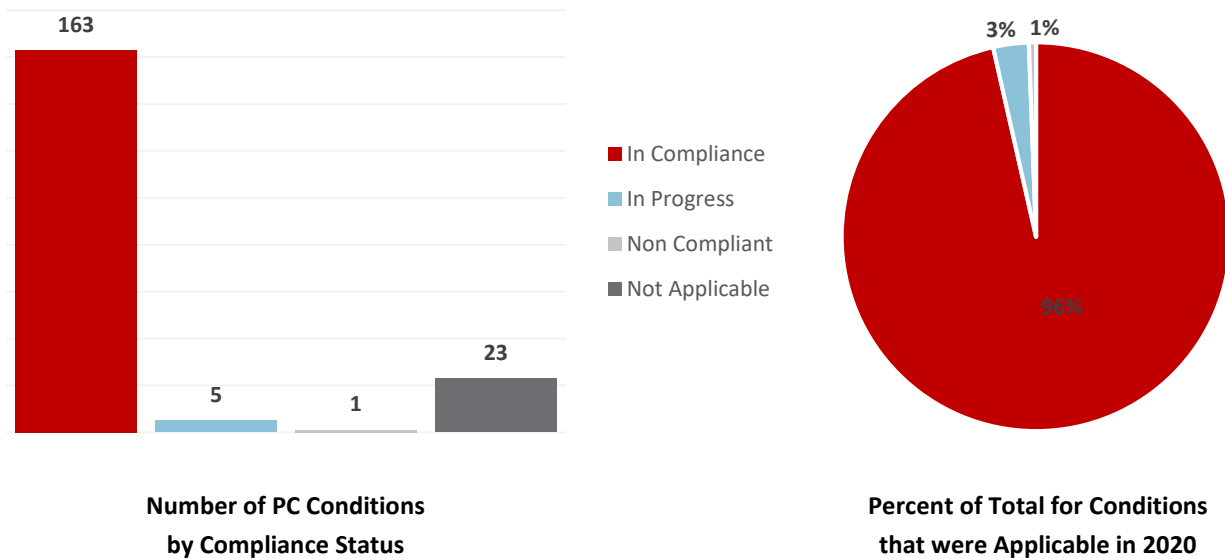
Item	Summary of Content
Status of Compliance	<ul style="list-style-type: none"> <li>• A self-assessed status of compliance for the PC Condition:               <ul style="list-style-type: none"> <li>○ In Compliance</li> <li>○ In Progress</li> <li>○ Non Compliant</li> <li>○ Not Applicable</li> </ul> </li> </ul>
Inuit and Stakeholder Review	<ul style="list-style-type: none"> <li>• Inuit, stakeholders and other interested parties that participate in discussions and reviews related to aspects and implementation of regulatory submission of actions or documents relevant to the PC condition.</li> </ul>
Reference	<ul style="list-style-type: none"> <li>• Description / title of relevant documents where supporting information related to PC condition status of compliance is available for review.</li> <li>• URL to web-portal where referenced documentation can be accessed, and/or Appendix where documentation can be found appended to the report.</li> </ul>
Methods	<ul style="list-style-type: none"> <li>• The methods employed to complete work required to meet compliance to the PC condition.</li> <li>• Summary of any adaptive management measures employed that year in support of achieving compliance to the PC condition.</li> <li>• If relevant, challenges associated with the COVID-19 Pandemic are provided, including whether specific program components were or could not be completed in 2020.</li> </ul>
Results	<ul style="list-style-type: none"> <li>• Summary of analytical results, quantitative/qualitative data or work that were completed in support of achieving PC condition compliance in 2020.</li> </ul>
Trends	<ul style="list-style-type: none"> <li>• Summary of notable trends from previous years, if identified, and relevant discussion on whether these are stemming from Project-related effects or due to natural variability. When relevant, reference is made to effects predicted as part of NIRB environmental assessment processes (i.e., FEIS and FEIS addendum).</li> <li>• Trends are identified using the following general guidance:               <ul style="list-style-type: none"> <li>○ A review of all work completed in the reporting year and/or previous reporting years (if applicable) relevant to the PC condition is conducted.</li> <li>○ If the data is quantitative, an evaluation of trends and statistical analysis is completed (i.e., graphs and metrics presented), where sufficient data exists to do so. Quantitative, statistical trends are presented numerically and in graphs using previously collected data, if available to do so.</li> <li>○ For qualitative indicators, an evaluation of applicable reports, engagement sessions and meeting records applicable to the topic are evaluated to develop content for the 'trends' information presented.</li> </ul> </li> </ul>
Recommendations / Lessons Learned	<ul style="list-style-type: none"> <li>• Summary of any operational changes undertaken or recommended for the future to achieve compliance or to further enhance environmental performance.</li> <li>• Assessment of effectiveness of monitoring program and whether any changes to the scope of monitoring are appropriate.</li> </ul>



Item	Summary of Content
	<ul style="list-style-type: none"> <li>Identification of any challenges related to implementing mitigation measures, undertaking monitoring, or obtaining data from other sources.</li> </ul>

### 4.3 SUMMARY OF 2020 COMPLIANCE WITH CONDITIONS

Baffinland’s performance in fulfilling the PC conditions in 2020 is presented on Figure 4.1. A summary of each of the conditions and the Project status with respect to the conditions in 2020 is presented in Appendix A.



**Figure 4.1: Baffinland's Overall Performance against Project Certificate Conditions in 2020**

Overall, Baffinland is in compliance with the required terms and conditions for the Project. Of the 169 Project Certificate conditions that were applicable to the Project in 2020, Baffinland is 96% in-compliance with these terms and conditions. This is consistent with 2019 and demonstrates Baffinland’s continued commitment to maintaining compliance with the Project Certificate. In areas where improvement is still required, Baffinland will continue to make operational changes, implement adaptive management, and work with regulators and the communities to ensure the Project remains in compliance with Project Certificate No. 005.

### 4.4 PERFORMANCE ON GENERAL CONDITIONS

The following presents the performance on general conditions set out in Section 4.1 of the Project Certificate, and Baffinland’s comment on the condition performance. Items one to four in this section of the Project Certificate speak to the NIRB’s monitoring responsibilities, and Sections five (5) through 12 describe additional requirements for Baffinland. A 2020 status on these items is provided below.

*5. The Proponent must obtain all required federal and territorial permits and other approvals, and shall comply with the requirements of such regulatory instruments.*

Baffinland has received the necessary approvals from NIRB to construct and operate the 18 Mtpa (Steensby) rail project, the 4.2 Mtpa ERP, and for the temporary production increase to 6 Mtpa until 2021 (NIRB, 2020a), as well as the permits necessary to operate the latter two projects (Table 1.2). Baffinland will obtain additional permits prior to initiating construction of the 18 Mtpa rail project to Steensby.

These authorizations often include their own annual reporting requirements. Other major annual reports include the combined annual report for operations submitted to the QIA and the NWB, pursuant to Baffinland's Type 'A' Water Licence and Commercial Lease. The Annual Report to the QIA and the NWB is substantial and, in comparison to the NIRB Annual Report, includes much greater detail on water, waste management activities, as well as spill management and other topics related to water. These reports can be found on Baffinland's Document Portal at: <https://www.baffinland.com/media-centre/document-portal/>.

A separate annual report on the status of implementation of the IIBA in 2020 was issued to the QIA and Joint Executive Committee on March 31, 2020. The contents of the IIBA report address or partly address many components of socio-economic monitoring and management.

The Company's performance on compliance with its regulatory instruments is described in Section 4.5.

*6. The Proponent shall take prompt and appropriate action to remedy any occasion of non-compliance with environmental laws and regulations and/or regulatory instruments, and shall report any non-compliance as required by law immediately. A description of all instances of non-compliance and associated follow up is to be reported annually to the NIRB.*

The Company's performance on compliance with its regulatory instruments is described in Section 4.5.

*7. The Proponent shall meet with respective licensing authorities prior to the commencement of construction to discuss the posting of adequate performance bonding. Licensing authorities are encouraged to take every measure to require that sufficient security is posted before construction begins.*

Closure and reclamation costs and resulting corresponding bonding requirements for the Mary River Project are determined through the Annual Security Review (ASR) process conducted in accordance with Schedule C of the Type 'A' Water License 2AM-MRY1325, Amendment No. 1, and the QIA Commercial Lease Q13C301. Under the ASR process, Baffinland, the respective landowners (the QIA & the Crown), the Nunavut Water Board, and other interested parties meet and confer to determine the estimated closure and reclamation costs for an upcoming year. Baffinland submitted the Marginal Closure and Reclamation Financial Security Estimate to the NWB and QIA with the Annual Work Plan on November 6, 2020. Publically available ASR document submissions for a respective year, describing in detail annual estimated closure and reclamation costs, can be downloaded from the NWB FTP site at: <ftp.nwb-oen.ca>.

Items eight to twelve speak to conditions related to monitoring records. The conditions and Baffinland's responses are included below.

*8. All monitoring information collected pursuant to the Project Certificate and various regulatory requirements for the Project shall contain the following information:*

*a. The name of the person(s) who performed the sampling or took the measurements including any relevant accreditations;*

- b. The date, time and place of sampling or measurement, and weather conditions;*
- c. The date of analysis;*
- d. The name of the person(s) who performed the analysis including any relevant accreditations;*
- e. A description of the analytical methods or techniques used; and*
- f. A discussion of the results of any analysis.*

Baffinland ensures that the records for all monitoring programs includes the above information. Baffinland has included this requirement in all monitoring program outlines and notifies all external consultants of the requirements.

- 9. The Proponent shall make its monitoring results available, to the fullest extent possible, in English and Inuktitut.*

From 2014 to 2020 Baffinland included a summary of all monitoring programs in the Popular Summary of the NIRB annual report which was translated into Inuktitut. Starting in 2019, Baffinland ensures that a popular / executive summary translated into Inuktitut is included for all final report versions of the Socio-economic, Terrestrial and Marine Annual Monitoring reports. A translated executive summary is also included with the QIA/NWB Annual Report for Operations and the QIA/NWB Annual Report for Exploration and Geotechnical Drilling. Meeting minutes from the Terrestrial and Marine Environment Working Group meetings are also typically translated into Inuktitut.

- 10. The Proponent shall keep and maintain the records, including results, of all Project-related monitoring data and analysis for the life of the Project, including closure and post-closure monitoring.*

Baffinland keeps and maintains all Project-related monitoring data and will continue to do so.

- 11. The Proponent shall maintain the Final Environmental Impact Statement and the Environmental Effects Monitoring program developed for the Project, with predictions updated as new baseline data is collected.*

The Environmental Effects Monitoring program components are reviewed on a regular basis through discussions with the Terrestrial and Marine Environmental Working Groups. Monitoring programs that are not managed under one of the environmental working groups are reviewed with applicable regulatory agencies. A summary of the effects of the Project compared to those predicted in the FEIS is also provided in Sections 4.5 through 4.7.

- 12. The Proponent shall establish a Project-specific web portal or web page as a means of making all non-confidential monitoring and reporting information associated with the Project available to the general public. This does not limit what the Proponent may be required to submit to the NIRB or other regulatory authorities to meet reporting requirements.*

In 2017, Baffinland launched a Project-specific Document Portal on its corporate website in order to provide monitoring and reporting information to the public (<https://www.baffinland.com/media-centre/document-portal/>). The web portal has been live as of March 31, 2017 and remained operational throughout 2020, and remains operational as of the date of this report's submission. Where possible the web portal provides links to English and Inuktitut versions of the popular summary of most recent final reports as well as the main body of the report or document.

Baffinland will continue to provide all documentation required by regulatory agencies directly to the appropriate body.

#### 4.5 PERFORMANCE ON COMPLIANCE WITH REGULATORY INSTRUMENTS

General regulatory requirements under the PC requires Baffinland to take prompt and appropriate action to remedy any event of non-compliance, and to report all instances of non-compliance and associated follow-up annually to NIRB. Baffinland's compliance with applicable regulatory instruments in 2020 is discussed below.

##### 4.5.1 Agency Inspections and Site Visits

To validate compliance with the Project's various regulatory instruments, Baffinland hosts regulatory inspections with representatives from CIRNAC, ECCC, QIA, DFO and the Workers' Safety and Compensation Commission (WSCC) throughout the calendar year. However, in 2020 due to travel restrictions related to the COVID-19 Pandemic, not all inspections were able to be completed in person. Wherever possible, Baffinland engaged with regulators to find alternative means for completion of inspections and site visits, including detailed photo journals and updates on specific activities. Where relevant, documentation and correspondence associated with these inspections are available in the 2020 QIA and NWB Annual Report for Operations (Baffinland, 2021a). The following subsections outline the inspections conducted by regulatory agencies and stakeholders at the Project in 2020. Details regarding NIRB's site visits are provided in Section 5.1.

###### 4.5.1.1 CIRNAC Inspections

During 2020, CIRNA Water Resources Offices conducted two (2) inspections of the Project in 2020. The date of the inspections is as follows:

- February 17-18; and
- October 13-15.

Inspection results were conveyed during close-out meetings and are documented in Water Licence Inspection Reports subsequently distributed to Baffinland and the NWB. Baffinland responded to any concerns identified in the inspections to provide additional information and/or address the identified concerns. More details are available in the 2020 QIA and NWB Annual Report for Operations (Baffinland, 2021a).

###### 4.5.1.2 QIA Inspections

In 2020, one (1) inspection/visit of the Project under the Commercial Lease. The date of the inspection is as follows:

- March 10-13, 2020.

In addition to this inspection, the QIA conducted one (1) environmental audit from September 3-11, 2020.

The findings from the inspection and audit were conveyed during the close-out meetings between QIA personnel and Baffinland representatives, as well as documented in subsequent reports and correspondence. Baffinland responded to the concerns identified in the inspections to provide additional information and/or address the identified concerns. More details are available in the 2020 QIA and NWB Annual Report for Operations (Baffinland, 2021a).

Additionally, four (4) QIA Environmental Monitor positions were employed by QIA and integrated into the Site Environment team, providing QIA oversight of monitoring activities and data collection year round.

###### 4.5.1.3 ECCC Inspections

ECCC Enforcement Officers did not conduct any inspections in 2020.

#### 4.5.1.4 DFO Site Visit

In 2020, no site visits were taken by DFO.

#### 4.5.1.5 Workers' Safety and Compensation Commission (WSCC) Mine Inspections

The WSCC conducted two (2) inspections of the Project through virtual visits in 2020. The dates of the inspections and visits are as follows:

- February 19-20; and
- August 17-21

In lieu of a site inspection, the WSCC also conducted a desktop geotechnical review for Baffinland Mary River Mine from December 7-11, 2020.

The reports generated from the inspections and geotechnical review were distributed to Baffinland management as well as Baffinland's Occupational Health & Safety (OHS) Committee. The 2020 inspections and visits resulted in directives being issued to the Company over the course of the year. All directives were reviewed by the management team and responses were sent to the Mines Inspector within a timely manner.

#### 4.5.2 Unauthorized Discharges and Spills

During 2020, thirteen (13) spills were reported to the Northwest Territories-Nunavut (NT-NU) Spill Report Line, CIRNAC and QIA by the Project. Overall, this represented a frequency decrease of 48% when compared to the frequency of reportable spills in 2019. Sewage (untreated) was the most commonly spilled product, at four (4) spills in 2020.

In addition to the original spill report submitted within 24 hours of each spill event in 2020, a detailed follow-up report was submitted within thirty (30) days of each reported spill. The follow-up reports included a description of the event, the immediate cause(s), corrective and preventative action(s), photos, and a map showing the location of the spill. Baffinland continued to investigate the basic causes of all spills that occurred on site in 2020 so that effective long-term corrective actions could be implemented to reduce the frequency of spills at Project sites. A summary of the 2020 spills reported by the Project are outlined in Table 4.3.

To further outline the corrective actions taken in 2020 and plans to address the sediment releases reported during freshet 2020, Baffinland provided the 2020 Freshet Monitoring Report to the NWB, CIRNAC, ECCC and the QIA in March 2021 with the Annual Report for Operations.

Copies of the 2020 initial and follow spill reports along with the 2020 Freshet Monitoring Report are provided in the appendices of the 2020 QIA and NWB Annual Report for Operations (Baffinland, 2021a).

#### 4.5.3 Water Licence Compliance (Type 'A' 2AM-MRY1325 and Type 'B' 2BE-MRY1421)

In 2020, Baffinland operated the Mary River Project under its Type 'A' Water Licence (2AM-MRY1325 – Amendment No. 1) and a Type 'B' Water Licence (2BE-MRY1421). The scope of the Type 'A' Water Licence focuses on active mining operations while the scope of the Type 'B' Water Licence focuses on geotechnical and exploration activities, including drilling operations and the establishment of satellite exploration camps. Both Water Licences include conditions on water use, wastewater management and water quality monitoring as well as the management of waste.

**Table 4.3: List of Reported Spills and Unauthorized Discharges – 2020**

Date of Occurrence	Quantity (m <sup>3</sup> )	Material Spilled	Approximate Location (UTM; NAD83 Zone 17W)		Proximity to a Water Body?	Spill Line ID No.
			Easting	Northing		
13-Jan-20	0.2	Arctic Diesel	561366	7913338	>100 m	20-009
10-Feb-20	15	Sewage	560731	7913289	>100 m	20-044
03-Mar-20	0.2	Hydraulic Oil	561724	7912076	>100 m	20-068
26-Apr-20	0.6	Motor Oil	505246	7971526	>100 m	20-115
18-May-20	Unquantified	Sediment-laden water	557805	7914795	0 m	20-141
14-Jun-20	Unquantified	Sediment-laden water	564406	7913024	0 m	20-179
30-Jun-20	Unquantified	Surface Water	562946	7916049	>3 km	20-199
4-Jul-20	Unknown	Surface Water	561497	7912908	>1 km	20-208
6-Aug-20	0.5	Sewage	560791	7913291	>100 m	20-261
11-Sep-20	0.1	Diesel Exhaust Fluid	503828	7975520	>100 m	20-332
29-Sep-20	0.6	Sewage	503798	7975954	>100 m	20-367
1-Oct-20	0.00025	Gasoline	503229	7976635	0 m	20-374
12-Nov-20	1	Sewage	560801	7913291	>100 m	20-436

Compliance with the conditions and requirements outlined in the Type 'A' Water Licence during 2020 is discussed in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a). Similarly, compliance with the conditions and requirements outlined in the Type 'B' Water Licence is discussed in the 2020 QIA & NWB Annual Report for Exploration and Geotechnical Activities (Baffinland, 2021b).

## 4.6 PERFORMANCE ON ECOSYSTEMIC CONDITIONS

### 4.6.1 Meteorology and Climate (PC Conditions 1 through 6)

The first six (6) PC conditions relate to the potential impacts of the Project on meteorology and the climate, including climate change.

#### Inuit & Stakeholder Feedback

Baffinland's stakeholders and local communities have identified climate change as a key issue in Nunavut, with communities reporting observations of the changing climate. NIRB prescribed several conditions in Baffinland's Project Certificate related to climate change, requesting Baffinland to identify Greenhouse Gas (GHG) emissions reduction opportunities and to share any research or observations of climate change with communities, agencies and researchers. Participants from the Mary River Inuit Knowledge Study (2007 to 2010; Baffinland, 2014a) shared observations related to climate change in the Arctic. Baffinland engaged the communities of Pond Inlet and Arctic Bay through workshops to discuss the Phase 2 Proposal in 2015 and 2016, and a limited amount of feedback was received regarding observations of climate change (JPCSL, 2017). Baffinland recorded questions from one community member during consultation events in 2017; the individual asked if the permafrost and the ocean was being monitored for climate change, if Baffinland was combining Inuit and scientific knowledge, and if rapid changes were being observed. Since then, climate change remained a topic in 2019 during Phase 2 community meetings

(Sanirajak, Igloolik and Mary River), and was also identified during Phase 2 Community Risk Assessment Workshops (ERM, 2019) where there was the recognition that all aspects of the environment (land, sea, people, wildlife) are changing because of climate change and that this should be considered in addition to mine impacts. In 2020, climate change was not brought up directly, however during a Phase 2 radio show information session held hosted by Baffinland in December 2020, it was discussed that emissions were expected to be reduced should the proposed Phase 2 transport of ore via train instead of trucks be approved (Appendix B).

### Monitoring Activities

Baffinland operates two meteorological stations, and this information is made publically available for Mary River and Milne Inlet through The Weather Network and on the Baffinland website. A third station is located along the Haul Road at Km 110 to support internal local tracking. Details on annual weather conditions at both Mary River Mine and Milne Inlet are included in the Draft 2020 Annual Terrestrial Environment Monitoring Report (EDI, 2021) as well as the Air Quality Monitoring Report (Stantec, 2021).

Ongoing Project monitoring provides the potential to track potential changes in temperature, precipitation, and wind speed over time. EDI (2021) indicated that the highest temperature recorded at the Mine Site was recorded in July 2009 (22.8°C) during baseline monitoring, whereas the historical record reports a high of 20.6°C in July 1965. The lowest temperatures recorded at the Mine Site vary depending on the month where temperatures were available. During baseline, a low of -59.1°C in April 2007 was recorded at the Mine Site, whereas in historical years, a low of -40.6°C had been recorded in April 1964 (no other comparable winter months are available). Precipitation is typically highest from June to August for the North Baffin region. Conditions in 2020 at Mary River experienced few days of precipitation in 2020 in comparison to baseline and post-baseline periods. At Milne Inlet, temperatures at Milne Port were consistent with previous periods (EDI, 2021). Similar to Mary River, cumulative precipitation at Milne Port in 2020 was less than averages for baseline and post-baseline monitoring periods. It remains unclear whether these differences stem from natural variation or climate change.

Baffinland continues to track and monitor GHG emissions and report as per Environment and Climate Change Canada's GHG Emissions Reporting Program and National Pollutant Release Inventory (NPRI), which is included as part of the Air Quality and Noise Abatement Management Plan (Baffinland, 2021c). Baffinland submitted a Climate Change Strategy to NIRB on February 12, 2019 (Baffinland, 2019a). The Strategy included a description of the actions the Company will undertake to validate and update climate change impact predictions for the Project and the effects of the Project on climate change. Baffinland has subsequently been working with an external expertise of a third-party partner since September 2019 to help refine and elaborate the existing Strategy and approach for effective implementation. Refinement of the Strategy aims to describe priorities and approach to greenhouse gas emissions management, the anticipated impacts on climate change on the Project, and how Baffinland will work with Nunavummiut to adapt to climate changes in the North.

Table 4.4 provides a summary of monitoring completed in 2020, and an evaluation of impacts relative to the predictions presented in the FEIS and FEIS Addendum. The calculated gaseous emissions in 2020 (Table 4.4) are below the maximum annual GHG, Sulphur Dioxide (SO<sub>2</sub>) and Nitrogen Dioxide (NO<sub>2</sub>) emissions predicted in the FEIS.

**Table 4.4: Climate Impact Evaluation**

Component	Effect	Monitoring Program	Impact Evaluation
Greenhouse Gases (GHGs)	Increased GHG emissions	GHG emissions calculated from fuel combustion: Emissions below FEIS forecast	Effect within FEIS predictions
SO <sub>2</sub> and NO <sub>2</sub> emissions at Milne Port	Increased SO <sub>2</sub> and NO <sub>2</sub> emissions	SO <sub>2</sub> and NO <sub>2</sub> emissions calculated from fuel combustion: Emissions below FEIS forecast	Effect within FEIS predictions
SO <sub>2</sub> and NO <sub>2</sub> emissions at Mine Site	Increased SO <sub>2</sub> and NO <sub>2</sub> emissions	SO <sub>2</sub> and NO <sub>2</sub> emissions calculated from fuel combustion: Emissions below FEIS forecast	Effect within FEIS predictions

### Path Forward

As Baffinland further refines its existing Climate Change Strategy, updates regarding the status of these activities will be provided as part of the annual reporting. The Climate Change Strategy, once fully refined, will be an important tool to guide and articulate Baffinland's efforts on PC Conditions No. 2, 3 and 4. Baffinland will continue to conduct monitoring activities and develop initiatives to ensure any impacts that the Project may have on the climate are measured to the extent possible. Reporting on each PC condition is included in the pages that follow.



## Project Certificate Condition No. 1

Category	Meteorology and Climate
Responsible Parties	The Proponent
Project Phase(s)	All phases
Objective	To provide feedback on the impacts that climate change might be having on the port facilities.
Term or Condition	The Proponent shall use GPS monitoring or a similar means of monitoring at both Steensby Port and Milne Port, with tidal gauges to monitor the relative sea levels and storm surges at these sites.
Relevant Baffinland Commitment	N/A
Reporting Requirement	The Proponent shall summarize and supply these monitoring results to NIRB in the annual project report.
Status of PC Condition	Steensby Port - Not Active Milne Port - Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Oceanographic Data Processing – Baffinland Ballast Water Study, Milne Inlet 2014-15 (ASL, 2015) Tide Gauge Collection at Milne Port During 2017 Open-water Season (Golder, 2018a) 2018 Milne Inlet Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2019a) 2019 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2020a) Draft 2020 Milne Inlet Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2021a) Baffinland Milne Port Tide Gauge Data Collection – 2020 Ice Free Season (Golder, 2021b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

In 2020, tide monitoring continued at Milne Port using an RBRconcerto CTD (RBR) sensor programmed to continuously measure pressure, temperature, and conductivity. Detailed methods are provided in Golder (2021b).

No tidal gauge systems were installed at Steensby Port as that component of the Project is currently inactive.

### RESULTS

A continuous time-series of water level, temperature, and conductivity data was collected and is provided in Golder (2021b). Water level data recorded at Milne Port indicated typical fluctuations resulting from tidal forcing. During the measurement period, a total of five neap-spring tidal cycles were observed and there were no observable storm surges.

**TRENDS**

Results are consistent with prior years, indicating that the current approach for monitoring relative sea levels and storm surges is effective.

**RECOMMENDATIONS / LESSONS LEARNED**

To support future trends analyses, Baffinland plans to reinstall the tide gauge in 2021 at Milne Port and extend the multi-year trends analysis of sea level rise at Milne Port (Golder, 2020a).

## Project Certificate Condition No. 2

Category	Meteorology and Climate - Climate Change Validation and Studies
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To provide feedback on the impacts that climate change might be having on the Project.
Term or Condition	The Proponent shall provide the results of any new or revised assessments and studies done to validate and update climate change impact predictions for the Project and the effects of the Project on climate change in the Local Study Area and Regional Study Area as defined in the Proponent's Final Environmental Impact Statement.
Relevant Baffinland Commitment	58
Reporting Requirement	The Proponent shall provide new or revised assessments and studies to the NIRB, the affected communities, relevant regulatory authorities, and interested parties.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Climate Change Strategy (Baffinland, 2019a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

No new or revised assessments or studies were required in 2020 to validate and/or update the climate change impact predictions for the Project. Prior to 2020, Baffinland submitted a Climate Change Strategy (the Strategy) to the NIRB on February 12, 2019 (Baffinland, 2019a). The Strategy describes the actions the Company will undertake to validate and update climate change impact predictions for the Project, and the effects of the Project on climate change. These include:

- Implementing comprehensive environmental monitoring and management programs that are based on a combination of scientific data and Inuit Qaujimagatuqangit to safeguard the environment.
- Modifying or replacing equipment with more efficient alternatives to reduce GHG emissions.
- Researching the potential for renewable energy sources, and where possible, implementing these sources to off-set fuel requirements and reduce GHG emissions.
- Conducting ongoing risk assessments to ensure that all aspects of the operations are able to withstand potential climate change related events
- Identifying opportunities for energy efficiency through Project design optimizations
- Ensuring that an effective closure strategy is in place at all stages of Project development that considers best available science for future climate scenarios
- Maintaining compliance with monitoring and regulatory reporting requirements

Baffinland sought the external expertise of a third-party partner in June 2019 to help refine and elaborate the Strategy and approach for effective implementation. Refinement of the Strategy will aim to identify priorities and

describe the approach to greenhouse gas emissions management, the anticipated impacts on climate change on the Project, and how Baffinland will work with Nunavummiut to adapt to climate changes in the North.

## RESULTS

In 2020, despite some delays related to challenges associated with the COVID-19 Pandemic, Baffinland continued to build upon the foundational basis initiated in September 2019 by continuing to work through the drafting of an amended draft strategy (Draft Strategy) based on its two-staged approach as summarized below and initially presented in the 2019 Annual Report to the NIRB:

- Stage 1: Development of an amended Draft Strategy, informed by (i) an external scan for benchmarking across similar sectors and region; (ii) an internal scan to assess current and future state of operations which incorporated information across the organization; (iii) establishment of a current state assessment and options for positioning in consideration of internal and external scans; and (iv) development of a Draft Strategy document that defines Baffinland's goals, objectives and priority action areas and approaches, with specific options for consideration for implementation; and
- Stage 2: Refinement of the amended Draft Strategy and Action Planning, based on the following considerations including; (i) external engagement; (ii) finalization of strategy based on external engagement and approval on path forward for establishment of short-term action areas; and (iii) development of plans for year 1 actions based on foundational elements.

In collaboration with an environmental and sustainability consultancy, Baffinland completed various elements of Stage 1, including the current state assessment (iii), which was informed by the results of the external (i) and internal (ii) scans. The external scan consisted of a review of publically available documents pertaining to the state of climate change action in the North and the mining sector. The internal scan consisted of a comprehensive review of 60 documents, covering Project-related information including existing climate change and sustainability strategies, GHG emissions, relevant PC conditions, and the Mary River IIBA. Information was also collected through multiple interviews undertaken across multiple organization levels at Baffinland. Since then, Baffinland hosted internal focus group workshops in November and December 2020 with participation of operations and executive-level representatives to further seek input, guidance and direction on potential elements of the Draft Strategy including Guiding Principles, Key Goals, and Supporting Actions. An amended Draft Strategy was developed between December 2020 and into January 2021, based on this input and in consideration of information acquired through prior activities. In 2021 Baffinland will be seeking input to better understand Inuit and stakeholder interests and expectations related to Baffinland's management of climate change impacts. Where appropriate, this could include identifying opportunities for collaborative action on climate change.

## TRENDS

Not applicable.

## RECOMMENDATIONS / LESSONS LEARNED

In 2021, Baffinland will work towards completing the various elements of Stage 2 which includes seeking input into the Draft Climate Change Strategy. As part of the Draft Climate Change Strategy, Baffinland has put forward its overall objective of being committed to *improving energy efficiency and greenhouse gas emissions performance, and working with Nunavummiut to monitor and adapt to climate change*. The path forward is intended to be forged on guiding principles which includes transparency, collaboration, and continual improvement. Efforts are proposed to

be based on working towards two main goals supported by a number of proposed actions that will be implemented over the short to long-term. These include: (1) Improving energy efficiency and GHG emissions performance, and (2) monitoring changes in climate and associated risks to inform adaptation and closure strategies. Supporting actions being considered as part of working towards Goal 2 include performing a climate scenario analysis, undertaking joint Inuit-Baffinland monitoring of climate changes and their impacts, and sharing information and approaches that Baffinland has taken to help North Baffin communities adapt to climate change. Input on these proposed goals and supporting actions will be obtained through future external engagements with various Inuit and stakeholder groups, with planning efforts currently underway.

As the Draft Strategy is finalized, Baffinland will provide its approach to managing climate change publicly available, including performance relative to targets. These results will be shared in future annual reports to NIRB, as well as the Mining Association of Canada's Towards Sustainable Mining reporting efforts.

### Project Certificate Condition No. 3

Category	Meteorology and Climate - Green House Gas Emissions
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To confirm that the Proponent is exploring and implementing concrete steps to reduce greenhouse gases.
Term or Condition	The Proponent shall provide interested parties with evidence of continued initiatives undertaken to reduce greenhouse gas emissions.
Relevant Baffinland Commitment	N/A
Reporting Requirement	The Proponent shall include relevant information in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	N/A
Ref. Document Link	N/A

#### METHODS

As operations progress and production increases, Baffinland has increased its efforts for exploring and implementing concrete steps towards the reduction of greenhouse gas emissions through the implementation of various initiatives. These initiatives were implemented prior to the formal development of a strategic plan aimed at reducing emissions because Project operations were still in their infancy, however they are all geared towards improving energy efficiency and greenhouse gas emissions performance.

In 2017, Baffinland established an Idling Policy to reduce unnecessary vehicle and equipment idling. This was developed with the specific purpose of reducing air pollution generated as a result of Project activities. Since its inception, employees are required to follow the Idling Policy where manufacturer guidelines for warm-up periods are not readily available. Where specific manufacturing guidelines are not provided, idling times are restricted to a maximum of 10 minutes for light vehicles and 20 minutes for heavy vehicles and equipment in -20 degrees Celsius or below, and a maximum of 5 minutes for light vehicles and 10 minutes for heavy vehicles and equipment when the ambient temperature is between 0 to -20 degrees Celsius.

From 2013 to 2017 Baffinland used solar/wind power generators to supplement energy requirements at its remote environmental monitoring sites (e.g., Bruce Head Camp). Substantial damage possibly from extreme cold prevented its use as a main energy source at Bruce Head Camp in both 2019 and 2020, however both radio and Automatic Information System relay systems continue to be powered by solar. Baffinland continues to have aspirations to explore the feasibility of incorporating alternative energy sources or enhanced energy storage capabilities that may be suitable for the remote reality of the Project's location and reduce dependency on fossil fuels. Further action planning will be informed by the updated Climate Change Strategy.

Baffinland submitted a Climate Change Strategy to the NIRB on February 12, 2019 (Baffinland, 2019a). The Strategy included a description of the actions the Company will undertake to validate and update climate change impact predictions for the Project and the effects of the Project on climate change. Baffinland subsequently sought the external expertise of a third-party partner in June 2019 and began background work in September 2019 to help refine and elaborate the Strategy and approach for effective implementation. Refinement of the Strategy will expand on descriptions of priorities and approach to greenhouse gas emissions management, the anticipated impacts on climate change on the Project, and how Baffinland will work with Nunavummiut to adapt to climate changes in the North.

In 2020, despite some delays related to challenges associated with the COVID-19 Pandemic and the reprioritization of activities, Baffinland continued to build upon the foundational basis initiated in September 2019 by continuing to work through the drafting of an amended draft strategy (Draft Strategy) based on its two-staged approach as initially presented in the 2019 Annual Report to the NIRB. Additional details on the status of the refinement initiative is summarized as part of Methods under PC Condition No. 02.

Recognizing that operations depend heavily on diesel fuel to produce energy and that emissions generated are tied directly to fuel consumption, and consistent with its objective to continually improve energy efficiency and greenhouse gas emissions performance, Baffinland completed the installation of two (2) new generators at the Mary River Mine Site to replace less fuel-efficient units in late February 2020. The site-based Power Generation and Distribution Department has the responsibility of overseeing power generation and distribution, which comprises, in part, the tracking of key performance indicators (KPIs) on fuel/energy use, efficiencies, load factor, etc. As part of this transfer to more fuel efficient generators, tracking of fuel consumption is now implemented on a weekly basis using an automated data collection tool. It is now possible to pull fuel consumption data directly from the engine control unit allowing to track weekly and monthly-based fuel consumption for each operating generator at the Mine Site and Milne Port to assess relative performance.

Due to reporting obligations related to the newly implemented Output-based Pricing System (OBPS) established in mid-2019, a third-party verification of Baffinland's 2019 GHG emissions data was completed in 2020. An external verification of 2020 emissions data will occur in 2021. Results from this work will feed into the finalization of the Climate Change Strategy, and will contribute towards the setting of future GHG emissions targets.

As a member of the Mining Association of Canada (MAC), Baffinland also completes a self-assessment for the Energy Use and GHG Emissions protocol on an annual basis. Results from Baffinland's 2019 external verification are made publically available on the MAC website (<https://mining.ca/companies/baffinland-iron-mines-corporation/>).

## RESULTS

As Baffinland continues to move forward with amending its existing Climate Change Strategy, Baffinland remains committed to implementing actions leading to improving its energy efficiency and greenhouse gas emissions performance.

One of the key steps to ensuring continued improvements in energy efficiency and GHG emissions performance is to focus on improving the management of energy/fuel use consumption. This includes developing and implementing processes that allow for tracking of energy use/fuel use by type of activity or infrastructure requirement. Tracking of energy consumption requires a good understanding of how much fuel is consumed by, for example, individual components of the heavy equipment fleet and how changes may lead to efficiencies (e.g., driving practices, regular maintenance), fuel required to run generators to heat individual buildings versus those connected on same power

grid, or key infrastructure components such as ore loader, crusher, and how efficiencies may be achieved through better ore handling sequencing, etc.

Baffinland constructed the Mine Haul Road Cross Cut in 2019, which significantly reduced the distance travelled for mine haul trucks as well as reduced the cycle time between Deposit No. 1 and the Run of Mine (ROM) stockpile at the Crusher Facility. As a result of this change in road configuration, the total fuel savings for 2020 have been estimated at 1,885,145 L, equivalent to a reduction in fuel use of 16% and 29% for 777 and 793 mining trucks, respectively.

Baffinland has also explored the transition to more energy efficient generators. Through the use of its energy use/output tracking software, Baffinland has determined that its two newly installed generators run approximately 30% more efficiently than the previous units, which means that less fuel has been required to produce the same output of electricity at the Mine Site. An estimated 1,471,228 L of fuel was saved in 2020 as a result of servicing energy load from these more fuel efficient generators.

Baffinland's third-party verification of its 2019 GHG emissions completed in 2020 has confirmed that the data has been accurately calculated. The external verification of 2020 emissions is currently underway. Results from this work will feed into the finalization of the amended Climate Change Strategy, and will contribute towards the setting of future GHG emissions targets.

As a member of the Mining Association of Canada, Baffinland also completes a self-assessment for the Energy Use and GHG Emissions protocol on an annual basis. Self-assessment scores were externally verified in 2020, which provided an opportunity for Baffinland to evaluate its current status and identify opportunities for improvement in the coming years. Results from this external verification will be considered as part of the Draft Strategy initiative and implementation of future supporting actions.

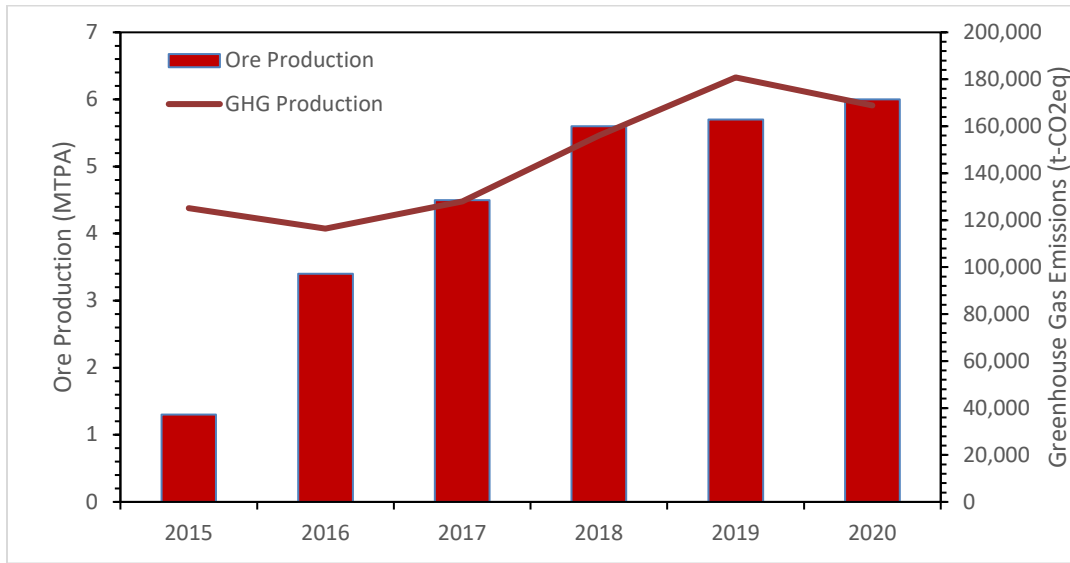
## **TRENDS**

Between 2015 to 2020, Baffinland increased the amount of iron ore hauled on the Tote Road by 361%, although GHG produced by the Project only increased by 35% (Figure 4.2).

## **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland actively looks for continuous improvement opportunities to lower its fuel/energy use. Baffinland will continue to modify or replace equipment with more energy efficient alternatives, and where possible implement renewable energy sources, (e.g., use of solar energy to power radio relay stations). Baffinland will continue to identify opportunities for energy efficiency through optimizations in the Project design and considering more energy-efficient generators for power generation all in an effort to further reduce GHG emissions. Additional initiatives will be identified and prioritized through the update to the existing Climate Change Strategy, informing future opportunities for GHG emission reductions guided by the development of an action plan that specifies most appropriate next steps to take. This is anticipated to be completed by the end of 2021 and is expected to include the setting of emissions targets allowing to track relative performance of efforts through time.





**Figure 4.2: GHG Emissions Relative to Ore Production**

Future updates regarding Baffinland’s GHG emission production and initiatives being undertaken to optimize efficiencies in energy requirements will continue to be reported in Baffinland’s Annual Report to the NIRB, in addition to any updates to the Climate Change Strategy as Baffinland works through the refinement process. Additional supporting actions will be integrated into the amended Strategy should the Phase 2 proposal be approved, noting that a key component of the proposed amendment to the Project under Phase 2 is the transition from road to rail. Phase 2 is expected to generate approximately 21.6 Mt CO<sub>2</sub>eq of GHG emissions, which represents a 10.3% reduction relative to the ERP.

## Project Certificate Condition No. 4

Category	Climate Change - Consultation on Climate
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To promote public awareness and engagement of affected groups.
Term or Condition	The Proponent shall endeavour to include the participation of Inuit from affected communities and other communities in Nunavut when undertaking climate-change related studies and research.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Climate Change Strategy (Baffinland, 2019a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland submitted a Climate Change Strategy to the Nunavut Impact Review Board (NIRB) on February 12, 2019 (Baffinland, 2019a). The Strategy includes a description of activities the Company will undertake to validate and update climate change impact predictions for the Project and the effects of the Project on climate change. This includes, though is not limited to:

- Implementing comprehensive environmental monitoring and management programs that are based on a combination of scientific data and Inuit Qaujimajatuqangit to safeguard the environment.

Baffinland has been working since 2019 to help refine and elaborate the Climate Change Strategy and approach for effective implementation. Refinement of the Strategy will expand on descriptions of priorities and approach to greenhouse gas emissions management, the anticipated impacts on climate change on the Project, and how Baffinland will work with Nunavummiut to adapt to climate changes in the North.

As part of one of its proposed goals to monitor changes in climate and associated risks to inform adaptation and closure strategies, one key supporting action has been put forward, namely that Baffinland is to share information and approaches to help North Baffin communities to adapt to climate change. Currently, Baffinland collects and reports data on climate-related metrics such as temperature and tidal data, however it is anticipated that these types of data collection efforts, in addition to others that may be identified through future external engagement efforts will be identified and integrated into the revised Strategy. Additional details on the efforts Baffinland has made to amend the existing Strategy is further described in PC Condition No. 02.

Results from these efforts will help to guide future participation of Inuit from affected communities and other communities in Nunavut when undertaking climate-change related studies and research as identified through the development of a Climate Change Strategy Action Plan.

**RESULTS**

Not applicable.

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

As Baffinland refines the existing Climate Change Strategy and implements new measures, updates regarding the status of these activities, including consultation with Inuit communities and identifying opportunities to integrate the participation of Inuit into climate change studies, will be provided in future relevant updates in the Annual Report to the NIRB.

## Project Certificate Condition No. 5

Category	Meteorology and Climate - Weather Monitoring Data
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To provide families of employees with up to date information.
Term or Condition	The Proponent shall endeavour to explore and implement reasonable measures to ensure that weather-related information for the various Project sites is readily accessible to the public on a continual basis throughout the life of the Project.
Relevant Baffinland Commitment	5
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Baffinland Corporate Website
Ref. Document Link	<a href="https://www.baffinland.com/operation/mary-river-mine/">https://www.baffinland.com/operation/mary-river-mine/</a>

### METHODS

Baffinland ensures that weather-related information is publicly accessible for the Mary River Project Site by posting current weather information on the by selecting the “+ Operation>Mary River Mine” tab on the Baffinland website ([www.baffinland.com](http://www.baffinland.com)). Weather related information is pulled onto its website from the publically available website, [www.weathernetwork.com](http://www.weathernetwork.com), for the two weather stations, Mary River and Milne Inlet.

### RESULTS

Weather related information for Project sites is publicly available.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to provide weather-related information on publicly available websites for all active Project sites.

## Project Certificate Condition No. 6

Category	Meteorology and Climate - Emissions
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To provide feedback on the Project's emissions.
Term or Condition	The Proponent shall provide the results of any emissions calculations conducted to determine the level of sulphur dioxide (SO <sub>2</sub> ) emissions, nitrogen oxide (NO <sub>x</sub> ) emissions and greenhouse gases generated by the Project using fuel consumption or other relevant criteria as a basis.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In-Compliance
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland used guidance documents provided by Environment and Climate Change Canada (ECCC, 2016; 2017, 2019; 2020) and the Intergovernmental Panel on Climate Change (IPCC, 2006) along with published emission factors to estimate the Project's annual GHG, SO<sub>2</sub> and NO<sub>x</sub> emissions. Annual emissions were calculated based on on-site fuel consumption and waste management at the Project.

Baffinland continues to report annual emissions to ECCC through the NPRI and GHG reporting programs.

### RESULTS

Baffinland's 2020 annual emissions for GHGs, SO<sub>2</sub> and NO<sub>x</sub> are presented in Table 4.5.

**Table 4.5: Calculated 2020 Project Gaseous Emissions**

Gaseous Emission	Units	Calculated Emissions
GHG	t-CO <sub>2</sub> eq	168,919
SO <sub>2</sub>	t (SO <sub>2</sub> )	13
NO <sub>x</sub>	t (NO <sub>2</sub> )	3,788

### TRENDS

Between 2015 to 2020, Baffinland increased the amount of iron ore hauled on the Tote Road by 361%, although GHG produced by the Project only increased by 35% (Figure 4.2).

Total gaseous emissions have decreased from 180,794 tonnes in 2019 to 168,919 tonnes in 2020, and when compared to FEIS predictions, Baffinland's 2020 total Scope 1 gaseous direct emissions from equipment owned or

controlled by the company are below FEIS predicted emissions estimates. The decrease in emissions between 2019 and 2020 can be attributed to a decrease in total fuel consumed for overall mobile combustion, as well as several energy improvement initiatives on site.

Recognizing that operations depend heavily on diesel fuel to produce energy and that emissions generated are tied directly to fuel consumption, and consistent with its objective to continually improve energy efficiency and greenhouse gas emissions performance, Baffinland completed the installation of two (2) new generators at the Mary River Mine Site to replace less fuel-efficient units in late February 2020. The site-based Power Generation and Distribution Department has the responsibility of overseeing power generation and distribution, which comprises, in part, the tracking of key performance indicators (KPIs) on fuel/energy use, efficiencies, load factor, etc. Through the use of its energy use/output tracking software, Baffinland has determined that its two newly installed generators run approximately 30% more efficiently than the previous units, which means that less fuel has been required to produce the same output of electricity at the Mine Site. An estimated 1,471,228 L of fuel was saved in 2020 as a result of servicing energy load from these more fuel efficient generators, equivalent to a reduction of t-CO<sub>2</sub>eq CO<sub>2</sub> emissions.

Baffinland constructed the Mine Haul Road Cross Cut in 2019, which significantly reduced the distance travelled for mine haul trucks as well as reduced the cycle time between Deposit No. 1 and the ROM stockpile at the Crusher Facility. As a result of this change in road configuration, the total fuel savings for 2020 have been estimated at 1,885,145 L, equivalent to a reduction in fuel use of 16% and 29% for 777 and 793 mining trucks, respectively.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Consistent with the existing Climate Change Strategy for the project, Baffinland will continue to modify or replace equipment with more energy efficient alternatives, research and where possible implement renewable energy sources, and identify opportunities for energy efficiency through optimizations in the Project design, all to further reduce emissions from the Project.

#### 4.6.2 Air Quality (PC Conditions 7 through 12)

Six (6) PC conditions relate to the potential impacts of the Project on air quality, including calculations of total Project emissions from fuel consumption and gaseous monitoring.

##### **Inuit & Stakeholder Feedback**

During review of the FEIS and FEIS Addendum, communities and regulators expressed concerns focused on dust, including Dustfall and potential impacts to soil, vegetation and forage to caribou. The focus of stakeholder feedback on dustfall and potential impacts on soil, vegetation and wildlife, along with several years of exceedances of the predicted levels for dustfall presented in the FEIS, has prompted Baffinland to implement additional dust mitigation measures described in the updates to PC Conditions No. 10 and 58c. Concern about dust was expressed several times during 2020 consultation activities, mostly in relation to the Phase 2 Expansion Project Proposal, but also in regard to current operations (Appendix B). As a direct result of concerns regarding the extent of dust, particularly at Milne Inlet, Baffinland began an investigation to evaluate additional mitigation measures that could be implemented at the ore stockpiles. Following a review of potential options that were deemed to not be feasible due to potential impact on the quality of the ore product, Baffinland identified a crusting agent (DusTreat) for implementation of a pilot project, with the objective of reducing the generation of wind blown fugitive dust.

##### **Monitoring Activities**

Table 4.6 provides a summary of air quality effects, monitoring completed in 2020, and an evaluation of impacts relative to the predictions presented in the FEIS and FEIS Addendum.

**Table 4.6: Air Quality Impact Evaluation**

Component	Effect	Monitoring Program	Impact Evaluation
Incineration of combustible non-hazardous wastes	Release of air contaminants, including particulate matter (PM), carbon monoxide (CO), mercury, dioxins, furans	Incinerator stack testing was completed at commissioning. The results of stack testing completed in 2019 and 2020 demonstrated exceedances of the in-stack standards for dioxin/furan parameters compared to the Canadian Council of Ministers of the Environment (CCME) Canada-Wide Standards (CwS), while commissioning of the units in 2013 demonstrated compliance with the applicable standards. Additional testing is required to demonstrate that corrective actions put into place have been effective.	Air quality limits should be met under normal operating conditions and appropriate use of incinerators. Corrective actions implemented include performance of maintenance work on the incinerators, and a review of the incinerator settings which resulted in minor process control changes at the PLC to optimize operation.

Component	Effect	Monitoring Program	Impact Evaluation
Release of air contaminants from mobile and stationary equipment due to fuel combustion	Increased concentrations of total suspended particulate (TSP), sulphur dioxide (SO <sub>2</sub> ), nitrogen dioxide (NO <sub>2</sub> ), CO and potential acidic input (PAI)	Continuous NO <sub>2</sub> and SO <sub>2</sub> monitoring was conducted at Milne Port and the Mine Site continuously through 2020.	2020 air quality monitoring was within Nunavut Ambient Air Quality Standards (AAQS) and FEIS predictions.
Earthworks, mining, hauling, stockpiling and transfer of ore	Ore handling and transport, including wheel entrainment from haulage of ore	Monitoring showed that although dustfall exceeded FEIS predictions at select locations, in general, total annual dustfall across the Project area in 2020 was within the ranges observed in previous years. These results demonstrate the ongoing effectiveness of reducing dust generation from crushing and ore stockpiling, and Tote Road traffic, despite increases in the production level at the Project and the volume of Tote Road traffic.	Monitoring showed that although dustfall exceeded FEIS predictions at select locations, in general, total annual dustfall across the Project area in 2020 was within the ranges observed in previous years.
Haulage of ore and other traffic on the Tote Road	Particulate matter emissions and dustfall from wheel entrainment	Monitoring showed that although dustfall exceeded FEIS predictions at select locations, in general, total annual dustfall across the Project area in 2020 was within the ranges observed in previous years. These results demonstrate the ongoing effectiveness of reducing dust generation from crushing and ore stockpiling, and Tote Road traffic, despite increases in the production level at the Project and the volume of Tote Road traffic.	Monitoring showed that although dustfall exceeded FEIS predictions at select locations, in general, total annual dustfall across the Project area in 2020 was within the ranges observed in previous years.

Baffinland continues to investigate how to better mitigate dust onsite and has included an updated Air Quality and Noise Management Plan (Baffinland, 2021c) as Appendix G.23. Baffinland continues to evaluate and report on dustfall through its approved dustfall monitoring program at the Mine Site, Port Site and Tote Road, including additional monitoring stations deployed in 2019. Baffinland has worked diligently towards decreasing dust generated by wheel entrainment across the Project Sites, specifically reducing dust generation from ground surfaces by applying water and/or chemical suppressants such as calcium chloride to road surfaces and site layouts during summer conditions. In 2020, Baffinland continued application of a new dust suppressant technology, Dust Stop by Cypher Environmental. Based on the trial application in 2019, Baffinland initiated full scale application on the Tote Road in 2020. Baffinland's effort with respect to the application of dust suppressants on the Tote Road are documented in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021).



In November 2020, Baffinland began a pilot project to apply a crusting agent (DusTreat) to stockpiles at Milne Port to address wind generated dust from the ore stockpiles. Results of this initial program will be evaluated for effectiveness and feasibility in 2021, for potential full scale application in future years.

Measures implemented in 2019 to mitigate downwind dust of the Ore Pad at Milne Port continued to be implemented in 2020 by removing dust impacted snow from areas of accumulation, including snow drifts near waterbodies and the beach west of the ship loader. The Crushers at the Mine Site were installed with engineered dust shrouds on the main surge bins to reduce windblown dust as well as hoods at the outflow areas.

The measuring of dust on vegetation will be incorporated into vegetation and soil base metals monitoring, which is planned to be reinstated for the 2021 season. Baffinland continues to investigate new methods of transportation that will generate less dustfall.

### **Path Forward**

In 2021, Baffinland will continue its monitoring programs of gaseous emissions and dustfall. The company will also continue to evaluate opportunities to further mitigate dustfall on the Project and implement adaptive management that considers feedback from communities, monitoring data, and available and novel mitigation measures. Reporting on each PC condition related to air quality is presented in the next several pages. Dustfall monitoring is described in more detail in Section 4.6.8 (PC Condition No. 58, Item c).

## Project Certificate Condition No. 7

Category	Air Quality - Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To provide feedback on the Project's emissions.
Term or Condition	The Proponent shall update its Air Quality and Noise Abatement Management Plan to provide for continuous monitoring at land-based monitoring stations designed to capture operations phase ship-generated SO <sub>2</sub> and NO <sub>2</sub> emissions at Steensby Port and Milne Port. Continuous monitoring is to be carried out through several shipping seasons at each port as required to determine that emissions are at acceptable levels.
Relevant Baffinland Commitment	57, 61, 62
Reporting Requirement	The updated plan shall be provided to the NIRB for review and comment at least 60 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Air Quality and Noise Abatement Management Plan (Baffinland, 2021c) Summary of Air Quality (AQ) Monitoring Results (Stantec, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Continuous ambient air quality monitoring equipment was set up at Milne Port and the Mine Site to monitor sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) levels at Project sites in 2014. Continuous ambient air quality monitoring commenced in November 2014 and continued throughout 2015. Monitoring throughout 2015 concluded that all results were well below the Government of Nunavut (2011) Air Quality Standards, resulting in the discontinuation of the monitoring program in 2016. To ensure compliance with Project Certificate Condition No. 7 and collect additional data over multiple shipping seasons, the monitoring program resumed at Milne Port in March 2017 and at the Mine Site in November 2017, and is currently ongoing. Results of the monitoring conducted in 2020 were compared to both the Nunavut Air Quality Standards and the 2020 Canadian Ambient Air Quality Standards (CAAQS). The 2020 CAAQS were developed by the Canadian Council for the Ministers of the Environment (CCME) to manage air emissions and ambient air quality concentrations in a regional airshed; CAAQS are not intended to determine compliance at the fence line for an industrial facility and are provided for comparison purposes only.

The Air Quality and Noise Abatement Management Plan was updated in April 2021, and has been included as Appendix G.23.

### RESULTS

In summary, the results of the monitoring during 2020 at the Mary River site are as follows:

- Sampling was conducted January to December, 2020;
- Sulphur Dioxide (SO<sub>2</sub>) data at the Mine Site Complex (MSC) ambient air quality monitoring station had 89.3% valid data for 2020.

- SO<sub>2</sub> levels remained very low throughout 2020 and did not exceed the hourly (172 ppb), 24-hour (57 ppb) or annual (11 ppb) air quality objectives (GN, 2011).
- The maximum hourly recorded data was 5% of the Nunavut Air Quality Hourly Standard, 5% of the Nunavut Air Quality 24-hour Standard and 1% of the Nunavut Annual Standard.
- Sulphur Dioxide levels were 4% of the 1-Hour CAAQS. The annual mean was 0.12 ppb representing 2% of the annual CAAQS SO<sub>2</sub> standard.
- SO<sub>2</sub> levels were highest in the winter and lowest in the summer months; consistent with historical trends (RWDI, 2016, 2018).
- Nitrogen Dioxide (NO<sub>2</sub>) data at the Mary River MSC ambient air quality monitoring station had 98.5% valid data for 2020 with a low of 96.3% for the month of September due to an extended calibration cycle.
- NO<sub>2</sub> levels did not exceed the hourly (213 ppb), 24 hour (106 ppb) or annual (32 ppb) air quality objectives (GN, 2011) with levels of 151 ppb, 76 ppb and 18.3 ppb, respectively.
- NO<sub>2</sub> exceeded the 1-hour CAAQs in 2% of the hourly averaged data (175 points) with the highest averaged hourly maximum occurring on January 21, 2020 (151.4 ppb). The annual CAAQS mean was 18.3 ppb which is 108% of the annual CAAQS arithmetic mean.
- NO<sub>2</sub> levels were highest in the winter and lowest in the summer months consistent with historical trends (RWDI, 2016, 2018).

In summary, the results of the monitoring during 2020 at the Milne Inlet site are as follows:

- Sampling was conducted January to December, 2020;
- Sulphur Dioxide data at the Port Site Complex (PSC) ambient air quality monitoring station had 98.5% valid data for 2020 with a low of 96.3% for the month of September due to an extended calibration cycle).
- SO<sub>2</sub> levels remained very low throughout 2020 and did not exceed the hourly (172 ppb), 24 hour (57 ppb) or annual (11 ppb) air quality objectives (GN, 2011).
- SO<sub>2</sub> levels for the maximum hourly recorded data was 4% of the Nunavut Air Quality Hourly Standard, 6% of the Nunavut Air Quality 24-hour Standard and 4% of the Nunavut Annual Standard. Sulphur Dioxide levels were 0.3% of the 1-Hour CAAQS. The annual mean was 0.44 ppb representing 4% of the Annual CAAQS SO<sub>2</sub> standard.
- SO<sub>2</sub> levels were highest in the winter and lowest in the summer months; consistent with historical trends (RWDI, 2016, 2018).
- NO<sub>2</sub> data at the Milne Port PSC had 98.52% valid data for 2020 with a low of 96.25% for the month of September due to an extended calibration cycle).
- NO<sub>2</sub> levels did not exceed the hourly (213 ppb), 24-hour (106 ppb) or annual (32 ppb) air quality objectives (GN, 2011) with levels of 148.5 ppb, 72.4 ppb and 16.9 ppb, respectively
- NO<sub>2</sub> levels exceeded the 1-hour CAAQS in 2% of the hourly averaged data (164 points) with the highest averaged hourly maximum occurring on November 16, 2020 (148.5 ppb). The annual CAAQS mean was 16.9 ppb which is 99% of the annual CAAQS arithmetic mean.
- NO<sub>2</sub> levels were highest in the winter and lowest in the summer months consistent with historical trends (RWDI, 2016,2018).

**TRENDS**

2020 Data collected at Mine Site Complex and Port Site Complex was consistent to previous years data trends, with the highest SO<sub>2</sub> and NO<sub>2</sub> levels occurring during the winter months and falling sharply during the summer collection periods.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to monitor SO<sub>2</sub> and NO<sub>2</sub> levels at Milne Port and the Mine Site during 2021. Air quality monitoring at Steensby Port will be implemented when the Port is developed and shipping activities commence.

## Project Certificate Condition No. 8

Category	Air Quality - Greenhouse Gas Emissions
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To provide feedback on the Project's emissions.
Term or Condition	The Proponent shall demonstrate through monitoring of air quality at the mine site and at the Steensby Inlet and Milne Inlet port sites that SO <sub>2</sub> and NO <sub>2</sub> emissions remain within predicted levels and, where applicable, within limits established by all applicable guidelines and regulations. In cases where exceedances are manifested, the Proponent shall provide an explanation for the exceedance, a description of planned mitigation, and shall conduct additional monitoring to evaluate the effectiveness of mitigative measures.
Relevant Baffinland Commitment	61
Reporting Requirement	To be included in the Proponent's annual reporting to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	None
Reference	Air Quality and Noise Abatement Management Plan (Baffinland, 2021c) Summary of AQ Monitoring Results (Stantec, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Continuous ambient air quality monitoring equipment was set up at Milne Port and the Mine Site to monitor sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) levels at Project sites in 2014. Continuous ambient air quality monitoring commenced in November 2014 and continued throughout 2015. Monitoring throughout 2015 concluded that all results were well below the Government of Nunavut (2011) Air Quality Standards, resulting in the discontinuation of the monitoring program in 2016. To ensure compliance with PC Condition No. 7 and collect additional data over multiple shipping seasons, the monitoring program resumed at Milne Port in March 2017 and at the Mine Site in November 2017, and is currently ongoing. Results of the monitoring conducted in 2020 were compared to both the Nunavut Air Quality Standards and the 2020 Canadian Ambient Air Quality Standards (CAAQS). The 2020 CAAQS were developed by the Canadian Council for the Ministers of the Environment (CCME) to manage air emissions and ambient air quality concentrations in a regional airshed; CAAQS are not intended to determine compliance at the fence line for an industrial facility and are provided for comparison purposes only.

The Air Quality and Noise Abatement Management Plan was updated in April 2021, and is included as Appendix G.23.

### RESULTS

In summary, the results of the monitoring during 2020 at the Mary River site are as follows:

- Sampling was conducted January to December, 2020;
- Sulphur Dioxide (SO<sub>2</sub>) data at the MSC ambient air quality monitoring station had 89.3% valid data for 2020.

- SO<sub>2</sub> levels remained very low throughout 2020 and did not exceed the hourly (172 ppb), 24-hour (57 ppb) or annual (11 ppb) air quality objectives (GN, 2011).
- The maximum hourly recorded data was 5% of the Nunavut Air Quality Hourly Standard, 5% of the Nunavut Air Quality 24-hour Standard and 1% of the Nunavut Annual Standard.
- Sulphur Dioxide levels were 4% of the 1-Hour CAAQS. The annual mean was 0.12 ppb representing 2% of the annual CAAQS SO<sub>2</sub> standard.
- SO<sub>2</sub> levels were highest in the winter and lowest in the summer months; consistent with historical trends (RWDI, 2016, 2018).
- NO<sub>2</sub> data at the Mary River MSC ambient air quality monitoring station had 98.5% valid data for 2020 with a low of 96.3% for the month of September due to an extended calibration cycle.
- NO<sub>2</sub> levels did not exceed the hourly (213 ppb), 24 hour (106 ppb) or annual (32 ppb) air quality objectives (GN, 2011) with levels of 151 ppb, 76 ppb and 18.3 ppb, respectively.
- NO<sub>2</sub> exceeded the 1-hour CAAQs in 2% of the hourly averaged data (175 points) with the highest averaged hourly maximum occurring on January 21, 2020 (151.4 ppb). The annual CAAQS mean was 18.3 ppb which is 108% of the annual CAAQS arithmetic mean.
- NO<sub>2</sub> levels were highest in the winter and lowest in the summer months consistent with historical trends (RWDI, 2016, 2018).

In summary, the results of the monitoring during 2020 at the Milne Inlet site are as follows:

- Sampling was conducted January to December, 2020;
- Sulphur Dioxide data at the PSC ambient air quality monitoring station had 98.5% valid data for 2020 with a low of 96.3% for the month of September due to an extended calibration cycle).
- SO<sub>2</sub> levels remained very low throughout 2020 and did not exceed the hourly (172 ppb), 24 hour (57 ppb) or annual (11 ppb) air quality objectives (GN, 2011).
- SO<sub>2</sub> levels for the maximum hourly recorded data was 4% of the Nunavut Air Quality Hourly Standard, 6% of the Nunavut Air Quality 24-hour Standard and 4% of the Nunavut Annual Standard. Sulphur Dioxide levels were 0.3% of the 1-Hour CAAQS. The annual mean was 0.44 ppb representing 4% of the Annual CAAQS SO<sub>2</sub> standard.
- SO<sub>2</sub> levels were highest in the winter and lowest in the summer months; consistent with historical trends (RWDI, 2016, 2018).
- Nitrogen Dioxide (NO<sub>2</sub>) data at the Milne Port PSC had 98.52% valid data for 2020 with a low of 96.25% for the month of September due to an extended calibration cycle).
- NO<sub>2</sub> levels did not exceed the hourly (213 ppb), 24-hour (106 ppb) or annual (32 ppb) air quality objectives (GN, 2011) with levels of 148.5 ppb, 72.4 ppb and 16.9 ppb, respectively
- NO<sub>2</sub> levels exceeded the 1-hour CAAQS in 2% of the hourly averaged data (164 points) with the highest averaged hourly maximum occurring on November 16, 2020 (148.5 ppb). The annual CAAQS mean was 16.9 ppb which is 99% of the annual CAAQS arithmetic mean.
- NO<sub>2</sub> levels were highest in the winter and lowest in the summer months consistent with historical trends (RWDI, 2016, 2018).

**TRENDS**

2020 Data collected at Mine Site Complex and Port Site Complex was consistent to previous years data trends, with the highest SO<sub>2</sub> and NO<sub>2</sub> levels occurring during the winter months and falling sharply during the summer collection periods.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to monitor SO<sub>2</sub> and NO<sub>2</sub> levels at Milne Port and the Mine Site during 2021. Air quality monitoring at Steensby Port will be implemented when the Port is developed and shipping activities commence.

## Project Certificate Condition No. 9

Category	Air Quality - Greenhouse Gas Emissions
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To provide feedback on the Project's emissions.
Term or Condition	The Proponent shall provide calculations of greenhouse gas emissions generated by activities at the Steensby Inlet and Milne Inlet port sites and other Project sources including aircraft associated with the Project. Calculations shall take into consideration, fuel consumption as measured by Baffinland's purchase and use as well as the fuel use of its contractors and sub-contractors.
Relevant Baffinland Commitment	57
Reporting Requirement	To be included in the Proponent's annual reporting to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland used guidance documents provided by Environment and Climate Change Canada (ECCC, 2016; 2017, 2019, 2020) and the Intergovernmental Panel on Climate Change (IPCC, 2006) along with published emission factors to estimate the Project's annual GHG emissions. Annual emissions were calculated based on on-site fuel consumption and waste management at the Project.

Baffinland continues to report annual emissions to ECCC through the GHG reporting and National Pollutant Release Inventory (NPRI) programs. Baffinland's 2020 annual emissions for GHGs are presented in Table 4.7.

**Table 4.7: Calculated 2020 Project Greenhouse Gas Emissions**

Gaseous Emission	Units	Calculated Emissions
GHG	t-CO <sub>2</sub> eq	168,919

### TRENDS

Between 2015 to 2020, Baffinland increased the amount of iron ore hauled on the Tote Road by 361%, although GHG produced by the Project only increased by 35% (Figure 4.2).

Total gaseous emissions have decreased from 180,794 tonnes in 2019 to 168,919 tonnes in 2020, and when compared to FEIS predictions, Baffinland's 2020 total Scope 1 gaseous direct emissions from equipment owned or controlled by the company are below FEIS predicted emissions estimates. The decrease in emissions between 2019 and 2020, can be attributed to a decrease in total fuel consumed for overall mobile combustion, as well as several energy improvement initiatives on site.



Recognizing that operations depend heavily on diesel fuel to produce energy and that emissions generated are tied directly to fuel consumption, and consistent with its objective to continually improve energy efficiency and greenhouse gas emissions performance, Baffinland completed the installation of two (2) new generators at the Mary River Mine Site to replace less fuel-efficient units in late February 2020. The site-based Power Generation and Distribution Department has the responsibility of overseeing power generation and distribution, which comprises, in part, the tracking of key performance indicators (KPIs) on fuel/energy use, efficiencies, load factor, etc. Through the use of its energy use/output tracking software, Baffinland has determined that its two newly installed generators run approximately 30% more efficiently than the previous units, which means that less fuel has been required to produce the same output of electricity at the Mine Site. An estimated 1,471,228 L of fuel was saved in 2020 as a result of servicing energy load from these more fuel efficient generators, equivalent to a reduction of t-CO<sub>2</sub>eq CO<sub>2</sub> emissions.

Baffinland constructed the Mine Haul Road Cross Cut in 2019, which significantly reduced the distance travelled for mine haul trucks as well as reduced the cycle time between Deposit No. 1 and the ROM stockpile at the Crusher Facility. As a result of this change in road configuration, the total fuel savings for 2020 have been estimated at 1,885,145 L, equivalent to a reduction in fuel use of 16% and 29% for 777 and 793 mining trucks, respectively.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Consistent with the Climate Change Strategy for the project, Baffinland will continue to modify or replace equipment with more energy efficient alternatives, research and where possible implement renewable energy sources, and identify opportunities for energy efficiency through optimizations in the Project design, all in an effort to further reduce GHG emissions. Future updates regarding Baffinland's GHG emission production and initiatives being undertaken to optimize efficiencies in energy requirements will continue to be reported in Baffinland's Annual Report's to NIRB.

## Project Certificate Condition No. 10

Category	Air Quality - Dust Management and Monitoring Plan
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to air quality from dust dispersion.
Term or Condition	<p>The Proponent shall update its Dust Management and Monitoring Plan to address and/or include the following additional items:</p> <ol style="list-style-type: none"> <li>Outline the specific plans for monitoring dust along the first few kilometres of the rail corridor leaving the Mary River mine site.</li> <li>Identify the specific adaptive management measures to be considered should monitoring indicate that dust deposition from trains transporting along the rail route is greater than initially predicted.</li> <li>Outline specific plans for monitoring dustfall at intervals along and in the vicinity of the Milne Inlet Tote Road to determine the amount and extent of dustfall.</li> <li>Identify the specific adaptive management measures to be considered if monitoring indicates that dust deposition from traffic on the Milne Inlet Tote Road is greater than initially predicted.</li> <li>The Proponent shall implement its Dust Management and Monitoring Plan, report all monitoring data to the NIRB annually, and take all adaptive management measures described in its Dust Management and Monitoring Plan if monitoring indicates that dust in the ambient air or dust deposition from the increased traffic associated with the increased volume of ore being shipped is greater than initially predicted.</li> </ol>
Relevant Baffinland Commitment	2, 57
Reporting Requirement	To be provided to the NIRB for review and comment at least 60 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Water Board, Nunavut Impact Review Board, Qikiqtani Inuit Association, Indigenous and Northern Affairs Canada, Environment and Climate Change Canada
Reference	Air Quality and Noise Abatement Management Plan (Baffinland, 2021c) Roads Management Plan (Baffinland, 2020c) Dust Mitigation Action Plan (Golder, 2016a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Dust management and monitoring was incorporated into the Air Quality and Noise Abatement Management Plan and the Roads Management Plan prior to the start of construction. Dust monitoring and mitigation measures continued to be implemented in 2020 at the Mine site, Port Site, and along the Tote Road. In consultation with the QIA and the Pond Inlet Hunter and Trapper Organization (HTO), six (6) additional remote dustfall sites were installed in the Tote Road corridor between the Mine Site and Milne Port in 2019, to further delineate the extent of dustfall and assess the effectiveness of mitigation measures.

A Dust Mitigation Action Plan (Plan) was developed in 2016 to identify specific measures to be implemented to reduce dust emissions (Golder, 2016a). Implementation of the Plan continued in 2020 including continuing ongoing maintenance of new crusher shrouding and enclosed chutes, road resurfacing, limiting speed and volume of vehicles on all roads, application of water and dust suppression substances, continued implementation of redesigned stockpile activities and layout at the Port, and the removal of dust impacted snow at strategic locations at the Project. In addition, in 2020 Baffinland implemented a pilot project applying a crusting agent to ore stockpiles to prevent lift-off of dust from the stockpiles, and a trial installation of sensors on the stacker is scheduled to be conducted to assess whether further optimization of ore drop distances from stackers into stockpiles during stockpiling can be achieved.

Baffinland is committed to continuous improvement in its work activities in the aim of reducing risks to the environment and improving operation effectiveness. The strategy employed by Baffinland is regular monitoring supported by operational change and adoption of other mitigating measures as warranted. As per the requirements of Baffinland's HSE Management Framework (SD-SDT-001), Baffinland will conduct and document management reviews of the Air Quality and Noise Abatement Management Plan on a regular basis. Such reviews will ensure the integration of monitoring results for the Air Quality and Noise Abatement Management Plan are integrated with other aspects of the Project and that necessary adjustments are implemented as required.

Section 5.2.1 of the Air Quality and Noise Abatement Management Plan outlines the performance indicators and corrective actions to be employed by the Project for air quality parameters, including dustfall. In 2019 Baffinland implemented a trial of a GN approved new dust suppressant; Dust Stop<sup>®</sup>, produced by Cypher Environmental. This action was a direct result of adaptive management to mitigate observed exceedances of dustfall thresholds. Dust Stop<sup>®</sup> is environmentally friendly, and is expected to have a longer lasting durability for both traffic and rainfall impact, as it promotes a hard, competent water repellent surface when properly applied. Baffinland commenced a trial application of the DSMB (Dust Stop Municipal Blend) dust suppression product in 2019 over a 4 km stretch of the Tote Road. Improved dust suppression was visually observed throughout the application zones and the product also showed signs of water shedding during rain events supporting improved road sealant and application lifespan. In 2020, the use of Dust Stop<sup>®</sup> was expanded with the product being applied along the entire Tote Road. Two (2) initial applications of the product along the entire Tote Road (24 hours apart) was completed. Subsequent maintenance applications of Dust Stop<sup>®</sup> were undertaken throughout the summer as needed based on routine visual inspections. Dust Stop<sup>®</sup> performance is currently being evaluated to determine suitability for long term use and possible application on the airstrip.

The inspection, maintenance and monitoring of dust mitigation equipment at the Crusher Facility was integrated into the equipment inspection and maintenance planning process in 2020. The integration of the maintenance of dust mitigation equipment into the equipment inspection and maintenance planning process has improved the availability of mitigation equipment and is therefore expected to positively impact overall dust deposition throughout the year.

As a direct result of community feedback on the extent of dust impacts at Milne Port, Baffinland reviewed the current and potential mitigation measures employed at the ore stockpile facility. After reviewing several options that would not be feasible due to impacts to ore product quality (i.e. watering), Baffinland identified a potential crusting agent that could be applied to the stockpiles, effectively sealing the ore and mitigating wind generated dust. DusTreat<sup>®</sup>, a specialized crusting agent produced by SUEZ Water Technologies & Solutions Canada (SUEZ) is designed to be applied to stockpiles for the mitigation of dust generation, and the equipment to apply this product was purchased

and arrived on the 2020 sealift for the implementation of a pilot project. To date, Baffinland has applied to product to eleven (11) zones within the Milne Port ore stockpile, as per the application techniques and dosage calculations provided by SUEZ. DusTreat® is a non-toxic substance which coats the outside of the stockpiles and acts as a sealant to prevent lift-off of dust from the stockpiles. This type of application has been shown to be effective at reducing dust from stockpiles at other sites, is known to last for months, and is rain resistant. Baffinland continues to discuss improvement strategies with Suez to learn from applications to date and improve application methodologies.

Following recommendations from the TEWG, a satellite imagery analysis was conducted in 2020 to assess winter dustfall extent around the Project from 2014 to 2020 using Landsat and Sentinel-2 imagery. Dustfall extent and relative magnitude were extracted from Landsat and Sentinel-2 satellite images collected between mid-March and mid-May using the reflective differences between dust and snow within a 20 km buffer of the Project Development Area.

## RESULTS

Monitoring showed that although dustfall exceeded FEIS predictions at select locations, in general, total annual dustfall across the Project area in 2020 was within the ranges observed in previous years. These results demonstrate the ongoing effectiveness of reducing dust generation from crushing and ore stockpiling, and Tote Road traffic, despite increases in the production level at the Project and the volume of Tote Road traffic. However it is noted that analysis of satellite imagery to assess dustfall extents identified that the overall range of dustfall may be greater than previously identified. Further discussion on dustfall monitoring, including the analysis of satellite imagery, and results is included in Section 8 of the Draft Terrestrial Environment 2020 Annual Monitoring Report. (EDI, 2021), which has been released to the Working Group for review and comment.

## TRENDS

Overall, dustfall continues to remain relatively constant at most year-round sampling locations throughout the project area. At the Mine Site, the magnitude of annual dustfall in 2020 was consistent with recent years. In 2020, the highest dustfall at the Mine Site area was associated with the airstrip. The airstrip has consistently had the highest dustfall deposition in the Mine Site area, with the exception of in 2019 when dustfall was highest near the ore haul road. The magnitude of dustfall at Milne Port has remained constant, or in some cases has decreased slightly; a trend that began in 2018. This decreasing trend is attributed to an increase in mitigations employed in 2019 and 2020, including shroud covers, optimal ore stockpiling with fines, and continuous monitoring of conveyor drop height. It is noted however that analysis of satellite imagery in 2020 identified that the extent of dustfall was greatest at Milne Port, extending approximately 12 km north of Milne Port over Milne Inlet. Along the Tote Road in 2020, dustfall was consistent with all monitoring years.

## RECOMMENDATIONS / LESSONS LEARNED

The Roads Management Plan and Air Quality and Noise Abatement Management Plan were updated in 2020 to provide further clarity on the adaptive management measures to be considered if elevated dustfall deposition is observed at the Project.

In 2021 Baffinland will continue to implement the application of Dust Stop® along the entire Tote Road including maintenance applications throughout the summer, as needed, based on routine visual observations. Based on the application in 2020, the use of Dust Stop® in combination with regular use of water for dust suppression on Project

roadways is anticipated to reduce dust generation below levels using current mitigation measures. Baffinland plans to assess the possibility of applying Dust Stop<sup>®</sup> to the airstrip in addition to regular water applications.

Baffinland will continue to apply DusTreat<sup>®</sup>, as per the application techniques and dosage calculations provided by the manufacturer, on an ongoing bases as sections of stockpiles are formed as part of operations.

## Project Certificate Condition No. 11

Category	Air Quality - Incineration Management Plan
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts to air quality from incineration activities.
Term or Condition	The Proponent shall develop and implement an Incineration Management Plan that takes into consideration the recommendations provided in Environment Canada's Technical Document for Batch Waste Incineration (2010).
Relevant Baffinland Commitment	57
Reporting Requirement	Updated Incineration Management Plan to be provided to the NIRB at least 60 days prior to the commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board
Reference	Air Quality and Noise Abatement Management Plan (Baffinland, 2021c) Waste Management Plan (Baffinland, 2020d) Incinerator Operation Procedure (see Waste Management Plan)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

An Incineration Management Plan is presented in Section 3.5 of the Waste Management Plan. Environment Canada's (EC) Technical Document for Batch Waste Incineration (EC, 2010) was considered during the development of the Incineration Management Plan, which meets the recommendations outlined by ECCC.

### RESULTS

Baffinland adheres to the six-step process for batch waste incineration as outlined in the EC's Technical Document (EC, 2010), including conducting periodic waste stream audits and waste sorting for the dual chamber incinerators, which are installed at both the Mine Site and Milne Port.

In January 2020, the Environment Department assessed the life cycle of waste from source control to segregation and final disposal of products across the Project. Through the assessment, items requiring corrective action were identified and follow up actions implemented. Findings from the waste assessment were shared with employees across site through the departmental bi-weekly safety meetings. Ongoing employee educations around proper waste sorting continues to be conducted to ensure site-wide adherence to the Waste Management Plan. In addition to ongoing employee education, routine inspections of Project facilities operations are completed with a focus on waste volume, composition and overall conformance to the Project's Waste Sorting Guidelines, which were recently updated.

### TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Not applicable.

## Project Certificate Condition No. 12

Category	Air Quality – Incineration
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To mitigate impacts to air quality from incineration activities.
Term or Condition	Prior to commencing any incineration of on-site Project wastes, the Proponent shall conduct at least one stack test immediately following the commissioning of each temporary and permanent incinerator.
Relevant Baffinland Commitment	N/A
Reporting Requirement	Stack test results to be reported to the NIRB and Environment Canada annually as required.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment and Climate Change Canada, Nunavut Impact Review Board
Reference	Air Quality and Noise Abatement Management Plan (Baffinland, 2021c) Waste Management Plan (Baffinland, 2020d) 2020 Source Testing (Wood, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G.23

### METHODS

Stack testing was conducted on the Mine Site and Milne Port incinerators when commissioned in 2013, as required by PC Condition No. 12. As part of ongoing operations, Baffinland conducts periodic monitoring of the dual chamber incinerator operation data. This data can be utilised to determine if the incinerators are operating to original specifications. Data includes operational temperature data, burn cycle times, and bottom residual ash composition results. In addition, Baffinland will conduct routine stack tests for dioxins, furans and mercury every five years following commissioning to confirm the above monitoring, in accordance with commitments made to the NIRB following recommendations on the 2018 Annual Report to the NIRB. As a result of this commitment, stack testing was completed in August 2019 on the existing Mine Site and Milne Port incineration units and subsequent confirmatory testing was conducted in August-September 2020.

In 2019, Baffinland installed one (1) new incinerator to support the 380-Person Camp infrastructure at Milne Port. Prior to operating the unit, the incinerator was subject to stack testing in 2019 to confirm emissions standards were being met immediately following commissioning of the unit. While stack testing was performed on the 380-Person Camp incinerator, it has not been put into operation due to exceedances of dioxin/furan parameter exceedances during preliminary stack testing completed in 2019.

### RESULTS

Stack testing completed on the Mine Site Incinerator and Milne Port Incinerator units was completed in 2013 upon commissioning of the units, and demonstrated compliance with the applicable emissions standards.



Stack testing completed in August 2019 on the Mine Site Incinerator and Milne Port Incinerator units indicated mercury concentrations below the applicable Canadian Council of Ministers of the Environment (CCME) Canada-Wide Standards (CwS) at both locations, however both incinerators demonstrated exceedances of dioxin/furan parameter standards compared to the CCME CwS. Corrective actions implemented following the receipt of stack testing results included performance of maintenance work on the incinerators, and a review of the incinerator settings which resulted in minor process control changes at the Programmable Logic Controller (PLC) to optimize operation. Additionally, specific guidelines were posted at incinerator chambers as visual reminders of waste load designs and suitable incineration materials and a review of the Incinerator Operation Procedure was completed by all operators. Further confirmatory stack testing was completed in August-September 2020 to demonstrate these corrective actions were effective and confirm emissions standards continue to be met. During the 2020 stack testing program, abnormal operating conditions were identified during two (2) of the six (6) tests, resulting in potential impacts in the validity of these stack test results.

Baffinland retained a third party consultant to further review and assess the results of the 2020 stack testing program, including the system logs for the incinerators from the days the units were being tested. The consultant concluded that with four (4) of the six (6) tests producing results that were well below the criteria level, the incinerators appear to be capable of meeting operational targets. The consultant further concluded that the two (2) tests run during abnormal operating conditions should be considered not to be representative of normal incinerator operations and should be classified as outliers. Operating limitations and temperatures that were not typical of the other two (2) test runs on the Mine Site Incinerator unit may have contributed to the abnormal operating conditions resulting in the outlier result. The outlier result at the Port Site appears to have resulted from the use of waste that was wetter than that used for the other two (2) tests on that unit. The test also followed a test with high primary operating temperatures, likely the result of a very dry charge to the incinerator, which might have contributed to higher dioxin/furan parameter levels due to artifacts left in parts of the system. Further confirmatory stack testing is scheduled to be completed in 2021 to verify emissions standards continue to be met.

#### **TRENDS**

Baffinland has noted that the residual bottom ash generated by the dual chamber incineration process rarely exceeds the guidelines outlined in the Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste Facilities (GN, 2011). Any exceedances are reported in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a). In 2020, all ash samples were below the threshold values for monitored parameters. These results suggest that the incinerators are generally operating as commissioned.

It is noted that the results of stack testing completed in 2019 and 2020 demonstrated exceedances of the in-stack standards for dioxin/furan parameters, while commissioning of the units in 2013 demonstrated compliance with the applicable standards. Additional testing is required to demonstrate that corrective actions put into place have been effective.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will conduct additional confirmatory stack testing in 2021 and report results to demonstrate corrective actions were effective and confirm emissions standards are met. The third party consultant will be present onsite during further confirmatory stack testing scheduled to be completed in 2021 to verify emissions standards continue to be met. The third party consultant will be present to oversee the 2021 stack testing and provide on-site support to ensure representative testing conditions are established and maintained throughout the 2021 stack testing

program. Baffinland will also continue to monitor the incinerator operational and residual bottom ash data to identify changes in operational effectiveness. Baffinland is currently implementing a real-time monitoring system on the network, to monitor incinerator operating parameters during burns to identify abnormal operating conditions.

### 4.6.3 Noise & Vibration (PC Conditions 13 through 15)

Five (5) PC conditions (including No. 13, 14, 14a, 14b and 15) relate to the potential impacts of the Project on noise and vibration.

#### Inuit & Stakeholder Feedback

Noise and vibration effects to fish and marine mammals as a result of site works was identified as a potential impact during the regulatory process. This was subsequently reflected in Fisheries Act Authorizations issued for the Project. Additionally, concern over noise and vibration levels at the accommodation facilities was identified as an issue for consideration for the health and safety of Project employees. Accordingly, Baffinland made several enhancements to improve noise levels near the accommodation facilities in 2018; a new 800-person camp (Sailiivik Camp) was established at a different location, between the mine infrastructure area and Sheardown Lake. Additionally, through the TEWG the potential for noise disturbance to impact wildlife interacting with the Project was raised as an issue that required monitoring to confirm FEIS predictions.

#### Monitoring Activities

In July and August 2020, accommodations at the Mine Site Complex (MSC), Sailiivik Camp, Port Site Complex (PSC) and 380-Person Camp were tested for noise and vibration. Due to limitations associated with the ongoing COVID-19 Pandemic, noise and vibration testing was not conducted at Project accommodation sites during the winter months in 2020.

Additionally, in 2020 Baffinland undertook a terrestrial wildlife noise monitoring program to assess noise generated by the Project relative to baseline values, ambient noise and FEIS predictions.

No in-water works that had the potential to create noise or vibratory impacts to fish or marine mammals were undertaken in 2020.

Table 4.8 provides a summary of noise effects monitored in 2020, and an evaluation of impacts relative to the predictions presented in the FEIS and FEIS Addendum.

**Table 4.8: Noise and Vibration Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Ambient Noise and Vibration	Disturbance of sleeping workers, affecting worker health and safety	Indoor noise and vibration levels were measured in the summer of 2020. Occupational noise and vibration at Baffinland was assessed according to the Mine Health and Safety Act, Consolidation of Mine Health and Safety Regulation, R-125-95, Part IX and Schedule 5.  Indoor noise measurements taken in the accommodation facilities at the Mine Site in 2020 were <65 dBA (A-weighted Decibels) and therefore respected the 75 dBA exposure level. This is consistent with overall average noise levels recorded at the Mine Site in 2019 (43 dBA) and with average recorded noise levels in 2018 (45 dBA). In	Effect within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
		general, average noise levels have experienced an increase over average recorded noise levels in years prior to 2018 (28 dBA in 2017, 30.6 dBA in 2016, and 34.8 in 2015); however, values remained below the 75 dBA exposure criteria.	
Underwater Noise and Vibration Levels	Increased noise or vibration levels affecting fish in nearby watercourses	Not applicable in 2020.	Not applicable in 2020.
Terrestrial Wildlife	Noise disturbance from the Project acting as a deterrent to wildlife	Results from the 2020 Noise Monitoring Study indicate that although the Project generates impulsive anthropogenic sound events in all Project areas that are loud enough to elicit a wildlife response at 1.5 km from the Project Development Area (PDA) (i.e., above 55 dB), these loud noises are infrequent and unlikely to cause significant wildlife disturbance.	Within FEIS predictions.

#### Path Forward

Baffinland will continue to implement noise and vibration monitoring in relation to human health and safety twice per year, at each receptor location (Milne Port and Mine Site). To ensure that noise and vibrations at the accommodations within the Project Sites are not adversely affecting our employees and contractors, Baffinland will continue to monitor noise levels in relation to human health and safety. Should the data identify a need for noise or vibration reduction efforts, a plan will be formulated to address these concerns in consultation with stakeholders.

Reporting on each PC condition is provided in the pages that follow.

## Project Certificate Condition No. 13

Category	Noise and Vibration - Use of Explosives
Responsible Parties	The Proponent, Fisheries and Oceans Canada
Project Phase(s)	Construction
Objective	To determine appropriate protection of fish and aquatic life in the Arctic.
Term or Condition	The Proponent is encouraged to work with Fisheries and Oceans Canada at the regulatory phase and to take a precautionary approach when selecting the overpressure threshold to be applied to explosives use for the protection of fish and aquatic life.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Fisheries and Oceans Canada, Nunavut Water Board, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board, Qikiqtani Inuit Association
Reference	Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2020e) Environmental Protection Plan (Baffinland, 2021d) Quarry Blasting Operations Management Plan (Baffinland, 2013b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP) states that work requiring the use of explosives (blasting) in or near water bodies shall be carried-out in accordance with Fisheries and Oceans Canada guidance (Wright and Hopky, 1998) in order to mitigate possible effects on fish habitat and fish health. Blasting at the Project is conducted in accordance with Baffinland's Quarry Blasting Operations Management Plan and Environmental Protection Plan (EPP).

The aforementioned plans described above mitigate the possibility of an explosive to be detonated in or near fish habitat that produces, or is likely to produce, an instantaneous pressure change (i.e. overpressure) greater than 100 Kilopascals (kPa; 14.5 psi) in the swim bladder of a fish.

### RESULTS

Not applicable. No blasting occurred in 2019 within the required setback distances detailed in the DFO guidance document (Wright and Hopky, 1998).

### TRENDS

Not applicable. No blasting has occurred at the Project within the required setback distances of fish habitat, as stipulated by the aforementioned DFO guidance document.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 14

Category	Noise and Vibration - Noise and Vibration Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate noise and vibration at Project sites, especially living areas.
Term or Condition	The Proponent shall conduct noise and vibration monitoring at Project accommodations sites located at the Mary River mine site, Steensby Inlet Port site, and Milne Inlet Port site. Sampling shall be undertaken during the summer and winter months during all phases of Project development.
Relevant Baffinland Commitment	32
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Consolidation of Mine Health and Safety Regulation, R-125-95 Noise and Vibration Surveys (HDS, 2020)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/Appendix G.17">https://www.baffinland.com/media-centre/document-portal/Appendix G.17</a>

### METHODS

Noise and vibration monitoring at the Mine Site and Milne Port accommodations is scheduled annually by Baffinland Health and Safety staff. Monitoring uses a sound meter with microphone and a vibration pad with meter set-up in different rooms and wings of accommodation buildings at both sites. Monitoring is conducted in the summer and winter seasons. Noise or vibration concerns brought forth by employees are taken seriously and addressed on an as-needed basis. Occupational noise and vibration at Baffinland is assessed according to the *Mine Health and Safety Act, Consolidation of Mine Health and Safety Regulation, R-125-95, Part IX and Schedule 5*.

The numerical thresholds from which protection is required include 8-hour equivalent sound exposures equal to or greater than 85 dBA, based on the expectation that a worker has a sound environment of 75 dBA or less for the remainder of the day. The noise monitoring equipment is calibrated before and after use as well as between the periods.

Since the *Mine Health and Safety Act* does not provide specific numerical limits, 8-hour equivalent vibration criteria are taken from the European Physical Agents Vibration Directive – 2002/44/EC. For whole body vibration, the directive provides an exposure action value of 0.5 m/s<sup>2</sup>, and an exposure limit of 1.15 m/s<sup>2</sup>. The action value provides the threshold for increased vigilance to prevent reaching the exposure limit.

In 2020, adaptive management continued to be employed to reduce noise and vibration near accommodation complexes:

- Quiet work hours continued to be implemented;
- Operation of equipment was limited in the vicinity of accommodation complexes, where practicable; and

- The Mine Site helicopter dedicated landing zone was located in a separate location from accommodations complexes, and flight paths were adjusted to ensure helicopters stayed clear of camps.

In July-August 2020, accommodations at the Mine Site Complex (MSC), Sailiivik Camp, Port Site Complex (PSC) and 380-Person Camp were tested for noise and vibration. Due to limitations associated with the ongoing COVID-19 Pandemic, noise and vibration testing was not conducted at Project accommodations sites during the winter months in 2020.

Sleeping accommodation sound level measurements demonstrate levels that are well below the 75 dBA level for off-work hours that is associated with the 8-hour exposure criterion. Summary statistics of average noise measurements collected within sleeping accommodations are presented in Table 4.9.

Vibration measurements were below the applicable criteria, and are presented in Table 4.10.

**Table 4.9: Summary Statistics of 2020 Noise Monitoring Results**

Sampling Period	Average Noise Level (dBA)
<b>Summer Monitoring</b>	
Sailiivik Camp	<65
PSC	<65
380-Person Camp	<65
<b>Winter Monitoring</b>	
Sailiivik Camp	NA
PSC	NA
380-Person Camp	NA

**Table 4.10: Summary Statistics of 2020 Vibration Monitoring Results**

Sampling Period	Peak <sup>1</sup> Vibration Exposure (m/s <sup>2</sup> )
<b>Summer Monitoring</b>	
Sailiivik Camp	0.022
PSC	0.024
380-Person Camp	0.052
<b>Winter Monitoring</b>	
Sailiivik Camp	NA
PSC	NA
380-Person Camp	NA

**Notes:**

<sup>1</sup> 2020 results presented as Apeak (frequency-weighted, peak acceleration sum over the sampling period) whereas 2019 results were presented as the maximum Aeq (frequency-weighted, time-weighted acceleration sum over the sampling period).

**TRENDS**

Indoor noise measurements taken in the accommodation facilities at the Mine Site in 2020 were <65 dBA and therefore respected the 75 dBA exposure level. This is consistent with overall average noise levels recorded at the Mine Site in 2019 (43 dBA) and with average recorded noise levels in 2018 (45 dBA). In general, average noise levels

have experienced an increase over average recorded noise levels in years prior to 2018 (28 dBA in 2017, 30.6 dBA in 2016, and 34.8 in 2015); however, values remained below the 75 dBA exposure criteria. The gradual increase in noise levels may have been the result of additional construction activities that have occurred since 2017 in comparison to previous years. Indoor noise measurements taken in the accommodation facilities at Milne Port in 2020 were <65 dBA and therefore respected the 75 dBA exposure level. This is consistent with overall average noise recorded at Milne Port in previous years (46 dBA in 2019, 48 dBA in 2018, 43 dBA in 2017 and 50 dBA in 2016).

Vibration levels measured in 2020 (0.022 to 0.052) were comparable to 2019 (0.003 to 0.18 m/s<sup>2</sup>), higher than vibration levels measured in 2018 (0.001 to 0.008 m/s<sup>2</sup>) and significantly less than vibration measured in 2017 (0.49 m/s<sup>2</sup>).

#### **RECOMMENDATIONS / LESSONS LEARNED**

To ensure that noise and vibration at the accommodations within the Project Sites are not adversely affecting employees and contractors, Baffinland will continue to monitor noise levels in relation to human health and safety. Should the data identify a need for noise or vibration reduction efforts, a plan will be formulated to address these concerns in consultation with stakeholders.



### Project Certificate Condition No. 14 (a)

Erin Category	Noise and Vibration - Noise and Vibration Adaptive Management
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To mitigate potential impacts of noise to marine wildlife during project construction.
Term or Condition	The Proponent, through coordination with the MEWG as may be appropriate, shall demonstrate appropriate adaptive management for construction activities at Milne Inlet that have the potential to disrupt marine mammal species, including pile driving and ore dock construction, are undertaken.
Relevant Baffinland Commitment	32
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	N/A
Ref. Document Link	N/A

#### METHODS

No construction activities occurred at Milne Inlet in 2020. In the event that future construction activities are undertaken at Milne Inlet that have the potential to disrupt marine mammal species, including pile driving and ore dock construction, the Proponent will work with DFO to ensure the relevant permits are obtained and that appropriate adaptive management measures are put in place.

#### RESULTS

Not Applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Prior to any future construction in the marine environment, Baffinland will develop an associated Construction Environmental Management Plan that would include mitigation and adaptive management measures to protect marine mammals during in-water and nearshore construction works including pile driving, infilling, dredging and other dock construction activities.

**Project Certificate Condition No. 14 (b)**

Category	Noise and Vibration- Noise and Vibration Adaptive Management
Responsible Parties	The Proponent
Project Phase(s)	Operations
Objective	To mitigate potential impacts of noise to wildlife and people during project operations.
Term or Condition	The Proponent, through coordination with the TEWG as may be appropriate, shall demonstrate appropriate adaptive management for project activities during operations which have the potential to produce noise and sensory disturbance to wildlife and other users of project areas.
Relevant Baffinland Commitment	32
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Air Quality and Noise Abatement Management Plan (Baffinland, 2021c)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

**METHODS**

In 2020 noise monitoring stations were established to assess noise levels that may produce a disturbance to wildlife. The monitoring program consisted of three (3) transects: at the Mine Site, along the Tote Road, and at Milne Port. Along each of the three transects, a noise monitoring station was established at three (3) distance classes: Near (200 m from current Project infrastructure), Far (1.5 km from the edge of the mapped PDA), and Reference ( $\geq 3$  km from the edge of the mapped PDA), for a total of nine (9) noise monitoring stations. Near sites were selected to capture a representative sample of noise near Project activities. The 1.5 km distance for Far sites was selected based on noise modelling completed by RWDI Air Inc (2008), which predicted slightly elevated noise levels at this distance but approaching background levels. The  $\geq 3$  km Reference distance was selected based on the same noise modelling, which predicted no elevated Project-related noise at this distance.

Noise monitoring stations comprised one AudioMoth Automatic Recording Unit (ARU) and one SongMeter4 (SM4) ARU mounted approximately 1 m above the ground. Before field deployment, all noise monitoring units were calibrated using a 94 dB tone. Each unit’s microphone was directed towards Project activities to maximize noise capture from the Project. The SongMeters were programmed to record using only the right-hand microphone to maintain comparability with Audiomoth units with a single microphone.

Additional details on the methods are provided in the 2020 Draft Terrestrial Environment Annual Monitoring Report (EDI, 2021), which has been released to the Working Group for review and comment.

**RESULTS**

As was predicted, the Project generates continuous and impulsive anthropogenic noise loud enough to elicit a wildlife response (i.e., continuous peak sound or impulsive sound events above 55 dBA). The Tote Road Near station had typical continuous Sound Pressure Levels (SPLs) above 55 dBA, and both the Tote Road and Mine Site Near

stations had peak continuous SPLs above 55 dBA. However, over 90% of continuous sound at 1.5 Km from the PDA was below 55 dB in all Project Areas, which generally would not cause a wildlife response.

Impulsive anthropogenic sound events above 55 dBA were detected at all distance categories and all Project areas but as expected, were more frequent and intense at Near stations. Although impulsive aircraft sounds (i.e., airplanes, helicopters) were consistently above 55 dBA in all distance categories, these sound events were rare, especially away from the Mine Site. Excluding the Mine Site Near site, no single site exceeded 1% frequency of impulsive aircraft noise, and cumulative frequency of impulsive aircraft noise over these sites was still less than 2%. Any disturbance to wildlife caused by aircraft noise would be infrequent and short in duration. Generally, impulsive machinery and vehicle sound events dissipated to the near threshold of wildlife response (i.e., 55 dBA to 60 dBA) at 1.5 Km distance from the PDA. These occurred less than 3% of the time. Although the Project generates impulsive anthropogenic sound events in all Project areas that are loud enough to elicit a wildlife response at 1.5 Km from the PDA (i.e., above 55 dB), these loud noises are infrequent and unlikely to cause significant wildlife disturbance.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Due to the infrequency of anthropogenic noise events and the noise dissipation away from the PDA, it is unlikely that Project-related noise will have any significant effect on wildlife distribution or behaviour at or beyond 1.5 Km from the PDA.

## Project Certificate Condition No. 15

Category	Noise and Vibration - Noise and Vibration Monitoring
Responsible Parties	The Proponent, Qikiqtani Inuit Association, local Hamlet organizations
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To enhance public safety when travelling around the Project area.
Term or Condition	The Proponent shall collaborate to the extent possible with the Qikiqtani Inuit Association and local Hamlet organizations when undertaking consultation with all affected communities regarding railway, tote road and marine shipping operations. During these consultations, it is recommended that the Proponent provide information including video, audio, and photographic representation as well as any other aids (i.e. models) that may enhance the general public's understanding of railway, Tote Road and marine shipping operations, as well as all safety considerations for members of the public who may be travelling around the project area.
Relevant Baffinland Commitment	32
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	2020 MEWG Meeting Minutes
Ref. Document Link	<a href="https://www.baffinland.com/operation/shipping-and-monitoring/">https://www.baffinland.com/operation/shipping-and-monitoring/</a> Appendix C.1

### METHODS

Baffinland continues to work with local Hamlet organizations, Hunters and Trappers Organizations (e.g., MHTO) and the Qikiqtani Inuit Association (QIA) regarding safety considerations for travel and interaction with the Project for those travelling in the area. In support of this, the QIA initially established the Mary River Community Group (which included representatives from the MHTO, the local Hamlet of Pond Inlet and Baffinland). In addition, the QIA and the MHTO are members of the Marine and Terrestrial Environment Working Groups are kept updated on operations.

Baffinland has created full-time Baffinland Community Liaison Officer (BCLO) roles in each of the five North Baffin communities. BCLOs provide for regular and ongoing opportunities for the dissemination of Project-related information and receipt of community-based input.

Through the various feedback obtained through various engagement activities (see Table 2.1 and Appendix B for summary of 2020 engagement activities), changes in communications have been made over time to better inform communities about Baffinland operations. For example, based on feedback received through pre-shipping season and end of shipping season meetings held in 2018 and 2019, it was recommended that communications be enhanced on daily shipping activities. In response, Baffinland created two (2) full-time Shipping Monitor roles based out of the Pond Inlet office located in the MHTO office building starting in 2019 to act as a liaison between community members, hunters and Baffinland. Daily vessel transit updates at various intervals throughout the day are provided to the community of Pond Inlet and land users using a variety of communication methods including announcements

on local Pond Inlet radio, marine VHF radio (aimed at informing those traveling on the water) and via social media (Facebook).

In order to support visual tracking of its vessels transiting to Milne Port, Baffinland also contracts annually exactEarth® a global vessel monitoring and tracking service to track and report on vessel movements using Automatic Identification System (AIS) technology. The ship tracks are typically accessible to residents of Pond Inlet at the Baffinland office on a large wall-mounted monitor (See Photo 27 in Appendix D) and individual viewing computer station and, more generally, also publicly accessible through the Baffinland website during the shipping season.

The computer station set-up in Baffinland's Pond Inlet office also allows visitors to view Baffinland reports, management plans, and general company information found on the online Document Portal of its corporate website. Baffinland continues to provide information related to the Project on the Baffinland corporate website including:

- Images of operational activities; and
- Ship tracks.

Baffinland also makes available posters showing Project components (Mine Site, Tote Road and Milne Port), in addition to a three-dimensional model showing the entire Project Area during Public Community Tours.

Baffinland hosted a site visit with MHTO in August 2018. The site visit included a discussion and mapping exercise of important travel areas in and near the Project area. Since then, Baffinland continues to welcome feedback from hunters on most appropriate areas to cross the Tote Road.

Baffinland has also in place a Hunter and Site Access Procedure which clearly identifies safe access route to, and within, Project areas and provides specific rules that must be followed when hunters and visitors arrive at these sites.

## RESULTS

During the June 25, 2020 MEWG meeting Baffinland reviewed the plans for the 2020 shipping schedule, mitigation and management, and communications protocol to be implemented during the 2020 shipping season. In addition, Baffinland hosted a pre-shipping season meeting over two separate afternoons (July 8 and 15, 2020) in Pond Inlet with representatives of the Hamlet, MHTO, and QIA, and later developed a Shipping and Marine Monitoring Fact Sheet and a large map showing the Northern Shipping Route for distribution throughout Pond Inlet (e.g., Hamlet of Pond Inlet, Northern, Co-Op). The change in the shipping route near Bruce Head, as requested by the MHTO, was implemented in 2020 to further minimize potential interactions between hunters and vessels traveling through Milne Inlet. Baffinland also hosted a shipping-related radio show in November 2020 after the shipping season ended to provide residents an opportunity to learn further about its shipping operations.

Baffinland continues to accommodate all hunting parties and other visitors that travel to the Project, though alternative practices were developed in 2020 to address transmission risks related to the COVID-19 Pandemic. To prevent potential transfer of the COVID-19 virus to Nunavummut, all visits to Project facilities by non-project staff were temporary halted during 2020. As a result of the temporary closure, all camps and accommodations were closed to non-Project staff, however, the HTO Cabins remained available for use by hunters/visitors.

Daily public communications via radio occurred at the onset of the COVID-19 Pandemic in Pond Inlet to notify personnel of the temporary closure at site and protocols in place. The BCLO monitored social media and advised

Nunavummiut of the COVID-19 protocols in place at the Project. Baffinland also placed COVID-19 signage at the HTO hunting cabins. Hunter and visitor supply requests continued to be accommodated in 2020 based upon supplies available on site.

To eliminate any potential contact with site personnel during the COVID-19 Pandemic, a non-contact Visitor Communication Center was established at each work site (Mary River and Milne Inlet), eliminating the necessity for visitors and Baffinland employees to interact closely. The Visitor Communication Center includes a radio with a dedicated channel for hunters/visitors to contact Security directly. Requests for food and other goods were dropped off at the Visitor Communication Centers at a predetermined drop off time.

During COVID-19, dedicated vehicles have been pre-determined for hunter/visitor transport purposes and are sanitized before and after use. Only personnel who have tested negative to both an initial and subsequent 5-day COVID-19 test provide hunter/visitor transport. A dedicated bus was utilized for transporting visitors across the Tote Road. A roll off trailer was utilized to transport all terrain vehicles on the Tote Road.

During the 2020 shipping season, Baffinland trained and hired 7 shipping monitors in 2020, consisting of 2 full-time, 3 part-time and 2 summer students based in Pond Inlet (see Photo 25 and 26 in Appendix D; additional information available in summary sheet for PC Condition No. 102). Baffinland notes that due to COVID-19 restrictions, the office was closed to visitors for the majority of the shipping season, and as a result viewing of vessels could only be possible by accessing the website through individual access points. Baffinland also created a dedicated “Baffinland Shipping” Facebook page to further enhance regular communications over the shipping season, attracting hundreds of followers during the active shipping season; a Facebook Baffinland Shipping group was also created for those particularly interested in most up to date information on vessel locations.

#### **TRENDS**

Baffinland continues to build upon its foundation for increasing community awareness and understanding of Project operations and related activities.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to work with the QIA, HTO representatives and local Hamlet organizations through the working groups and/or other venues to further enhance the general public’s understanding of the Project.

#### 4.6.4 Hydrology and Hydrogeology (PC Conditions 16 through 19)

Four (4) PC conditions relate to the potential effects of the Project on hydrology and hydrogeology. These conditions relate to aspects of the project that are regulated under Baffinland's Type 'A' Water Licence (for mining) and Type 'B' Water Licence (for mineral exploration).

##### **Inuit & Stakeholder Feedback**

The NWB is the primary stakeholder regulating water use and waste disposal through its issuance of water licences. The QIA is also a key stakeholder, and has a Water Compensation Agreement in place with Baffinland, pursuant to Article 20 of the Nunavut Agreement (CIRNAC and Nunavut Tunngavik, 2010). Water diversions have the potential to impact fish and fish habitat, and DFO administers the fish and fish habitat sections of the Fisheries Act. Effects to water quantity have not been raised in 2020 consultation activities (Appendix B).

##### **Monitoring Activities**

Hydrology monitoring is undertaken by recording water use and reporting this information to the NWB under the water licence, and by operating six long-term seasonal hydrometric stations. Visual monitoring is conducted of water conveyance structures, including bridges and culverts.

The mining footprint remains small relative to the fully developed project, and hence water diversions associated with the project footprint are minor in scale.

The Type 'A' Water Licence specifies water withdrawal limits. Under the authorization of the Type 'A' Water Licence, freshwater was withdrawn during 2020 to sustain three key activities at the Project: potable water supply (domestic), dust suppression, and for miscellaneous (industrial) uses. During 2020, daily water volume withdrawal limits, stipulated in the Type 'A' Water Licence, for domestic, industrial and dust suppression purposes were not exceeded at approved Project water sources, with the following exceptions:

- Although the total daily water withdrawal limit for Camp Lake (355.4 m<sup>3</sup>/day) was not exceeded in 2020, there was one (1) incident where the daily water volume withdrawn for domestic purposes exceeded domestic daily water withdrawal limit for Camp Lake (203.8 m<sup>3</sup>/day). This is a significant improvement over 2019 when twelve (12) exceedances of the daily water volume for domestic use exceeded the domestic daily water withdrawal limit for Camp Lake, and is attributed to improved documentation and categorization of water volumes withdrawn to support Project activities. Baffinland completed a root cause investigation for all exceedances of the domestic water use limits stipulated in the Type 'A' Water Licence to determine the root causes of daily water use exceedance events and identify effective corrective actions to prevent re-occurrences.
- Total daily water volume withdrawal limits for dust suppression purposes were exceeded thirty-one (31) times at approved Project water sources in 2020, including; one (1) exceedance at Camp Lake, two (2) at KM 32 Lake, eight (8) at BG-50, and twenty (20) at CV-217. Baffinland completed a root cause investigation for all exceedances of the daily dust suppression water use limits stipulated in the Type 'A' Water Licence to determine the root causes of water use exceedance events and identify effective corrective actions. Corrective actions that Baffinland has taken to prevent similar incidents from re-occurring include installing signs at dust suppression water sources that indicate the daily water use limits in numbers of truckloads per day, and implementing an improved water truck operator log that indicates when the maximum daily volume of water has been collected from each source based on the number of water truck loads filled. Prior to the

start of the summer 2021 dust suppression season, an additional corrective action will be implemented to install waterproof storage systems at each water source to house daily water use logs. Baffinland is committed to continue to improving the enforcement of source specific daily water withdrawal limits and maintaining effective record keeping practices for the approved dust suppression water sources.

Further discussion on the water withdrawals at the Project, including all supporting daily and monthly volumes, are provided in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

Table 4.11 provides an evaluation of the Project's impacts on hydrology and hydrogeology based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.11: Hydrology and Hydrogeology Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Water Usage	Water usage exceeding thresholds and affecting the aquatic environment	Measure/monitor and report water usage in accordance with water licence limits	Water usage generally within water licence limits. Effect within FEIS predictions
Water Diversions	Reductions or increases in water flow due to diversions	None; this is primarily a function of the growing Project footprint, particularly the open pit and waste rock stockpile	Minor; within FEIS predictions

#### Path Forward

Baffinland will continue to operate its long-term hydrometric network, and will monitor and report water use to the NWB under the company's water licences. Baffinland plans to improve the documentation and categorization of water volumes withdrawn to support Project activities and enforcement of the source specific daily water withdrawal limits at approved water sources.



## Project Certificate Condition No. 16

Category	Hydrology and Hydrogeology - Water Infrastructure
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To provide assurance that the potential impacts to flow and quantity of water in the Project area are minimized.
Term or Condition	The Proponent shall ensure that the water related infrastructure or facilities that are designed and constructed, including the modification of culverts, diversion of watercourses, and diversion of runoff into watercourses along the railway, access roads, port sites, the Milne Inlet Tote Road, and other areas of the Project site, are consistent with those proposed in the FEIS and FEIS Addendum in terms of type, location, and scope and that the requirements of all relevant regulatory authorities are satisfied advance of constructing those facilities.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Final Environmental Impact Statement (FEIS; Baffinland, 2012) FEIS Addendum - Early Revenue Phase (Baffinland, 2013a)
Ref. Document Link	N/A

### METHODS

Baffinland ensures that the water related infrastructure and facilities constructed at the Project are consistent with those proposed in the FEIS (Baffinland, 2012) and FEIS Addendum (Baffinland, 2013a).

### RESULTS

During 2020, the following work was completed on water related infrastructure and facilities at the Project:

- Maintenance of site surface water drainage infrastructure (i.e. culverts) to address sedimentation concerns and improve surface water drainage;
- Implementation of the Ore Crusher Pad Regrading Strategy to prevent the pooling of water on and around the Crusher Facility pad and installation of a pumping system to transfer collected water to Crusher Facility Pond MS-06;
- Construction of the KM 106 Run-of-Mine Stockpile and Sedimentation Pond;
- Completing the expansion of the Waste Rock Facility pond and continued operation of a dedicated water treatment plant to ensure effluent water quality compliance;
- Continued maintenance of the Tote Road to improve surface water drainage and address safety and operational concerns, including works proposed in the Tote Road Earthworks Execution Plan (TREP) and select implementation of the Hatch (2013) design;

- Implementation of preventative and corrective measures along the Tote Road (i.e. check dams, silt fences, excavating culverts of snow and ice, etc.) to address sedimentation concerns during high flow periods;
- Milne Port Ore Stockpile #1 expansion and water management structure upgrades; and
- Construction of berms, swales and ditches to improve surface water management at Milne Port, as outlined in the Milne Port Water Management Plan.

Prior to the commencement of construction, the applicable regulatory approvals were obtained by Baffinland for the works listed above.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Water related infrastructure and facilities constructed to date are consistent with those proposed in the FEIS (Baffinland, 2012) and FEIS Addendum (Baffinland, 2013a) in terms of type, location, and scope.

## Project Certificate Condition No. 17

Category	Hydrology and Hydrogeology - Effluent Management
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to water bodies from effluent.
Term or Condition	The Proponent shall develop and implement effective measures to ensure that effluent from project-related facilities and/or activities, including sewage treatment plants, ore stockpiles, and mine pit, satisfies all discharge criteria requirement established by the relevant regulatory agencies prior to being discharged into the receiving environment.
Relevant Baffinland Commitment	6
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Environment and Climate Change Canada (ECCC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Fresh Water Supply, Sewage and Wastewater Management Plan (FWSSWMP; Baffinland, 2021e) Metals and Diamond Mining Effluent Regulations (MDMER; Minister of Justice, 2020) Metals and Diamond Mining Effluent Regulations Emergency Response Plan (MDMER ERP; Baffinland, 2020y) Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2021f) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Wastewater and effluent management practices are outlined in the Project's FWSSWMP (Baffinland, 2021e) and the Metals and Diamond MDMER ERP (Baffinland, 2020y).

Water quality discharge criteria (discharge criteria) for effluent generated by the Project are stipulated in the Type 'A' Water Licence issued by the NWB, and Schedules 4 and 5 of the MDMER (Minister of Justice, 2020).

Consistent with the FWSSWMP (Baffinland, 2021e), prior to discharge, wastewater (e.g. treated sewage, treated contact water, oily water, etc.) is sampled to ensure the wastewater's water quality meets the applicable discharge criteria. Wastewater that meets the applicable discharge criteria is discharged to the receiving environment. Water samples are routinely taken prior to and during wastewater discharges to ensure the water quality remains in compliance with the applicable discharge criteria. In the event that water quality sampling during a discharge indicates that the water quality has changed and is no longer in compliance with the applicable discharge criteria, the discharge of the non-compliant wastewater is halted.

Wastewater that does not meet the applicable discharge criteria is treated on-site using approved treatment methods (e.g. sewage treatment plants, mobile oily water treatment systems, WRF treatment plant, etc.) and is not

discharged to the receiving environment until it has been confirmed by water quality analysis that the treated wastewater meets the applicable discharge criteria.

All water sampling at the Project is conducted in accordance with the Project's Sampling Program - Quality Assurance and Quality Control Plan (Baffinland; 2021f).

As required by the Type 'A' Water Licence, volumes and water quality analysis of all wastewater discharged to the receiving environment are reported to regulators (CIRNAC, NWB) on a monthly and annual basis. As a requirement of MDMER, volume and water quality results for discharges from the surface water management ponds associated with the Crusher Facility and Waste Rock Facility (WRF) at the Mine Site are reported to ECCC on a quarterly and annual basis.

## RESULTS

Effluents generated and managed by the Project in 2020 included sewage, contact water retained in surface water management ponds associated with ore and waste rock facilities and oily water retained in containment areas, such as bulk fuel facilities. Effluent treatment systems operated at the Project in 2020, included:

- Sewage Treatment Plants (STPs) at Milne Port (MP-01, MP-01B) and the Mine Site (MS-01, MS-01B);
- Dissolved Air Flotation (DAF) Treatment System at Milne Port to treat and discharge wastewater stored in Milne Port PWSP (MP-01A);
- Mobile Oily Water Treatment System (OWTS), at the Mine Site and Milne Port; and the,
- Waste Rock Facility Wastewater Treatment Plant (WRF WTP) at the Waste Rock Facility (MS-08), installed in 2018.

Seven (7) discharges of effluent at the Project in 2020 did not comply with the applicable discharge criteria. These were single isolated events at each of the Mine Site STP (MS-01B), the Milne Port STP (MP-01B), the Mine Site PWSP (MS-MRY-04B), and the mobile OWTS at the Milne Port Bulk Fuel Storage Facility (MP-03). These events are outlined as follows;

- On January 15, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp exceeded the applicable discharge criteria for fecal coliforms of 1,000 colony-forming units per 100 milliliters (CFU/100 mL). The elevated fecal coliforms (1,300 CFU/100 mL) is believed to be the result of either sampling error or external laboratory error, as the STP was operating as designed at the time the sample was collected. As a precaution, the ultraviolet (UV) bulbs used to disinfect effluent prior to discharge were replaced following receipt of the external laboratory results on February 6, 2020. The subsequent monthly effluent discharge sample for February 2020 was collected and sent for external laboratory analysis on February 4, 2020, prior to the replacement of the UV bulbs. The external laboratory results for the February 4, 2020 sample indicated a fecal coliform value of 0 CFU/100 mL, confirming the STP was functioning as designed prior to the UV bulb replacement.
- On April 7, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp exceeded the applicable discharge criteria for fecal coliforms of 1,000 CFU/100 mL. The elevated fecal coliforms (2,600 CFU/100 mL) was caused by a breakthrough on one of the effluent treatment membranes on Membrane Bioreactor (MBR) Train No. 2 that occurred on April 7, 2020. Upon observing the breakthrough, the STP Operator immediately stopped the effluent discharge and isolated the affected line from the overall STP system. Measurements taken for Total Suspended Solids (TSS), turbidity, phosphorus

and ammonia following the isolation on April 7, 2020 were all within acceptable operating levels, indicating that the effluent quality was compliant with discharge criteria, prior to resuming effluent discharge later that day. Subsequent to the affected membrane being isolated and the discharge being restarted on April 7, 2020, the monthly effluent sample that exceeded the effluent discharge criteria had been collected. It is believed that the presence of fecal coliforms in the April 7, 2020 effluent sample indicated the presence of short lived residual fecal coliform remaining from the membrane breakthrough. The external laboratory result for a subsequent effluent sample collected on May 12, 2020 had a fecal coliform value of 0 CFU/100 mL, confirming that fecal coliforms in treated effluent from the MS-01B STP were back in compliance with the discharge criteria.

- On June 9, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp was outside the applicable criteria range for pH (6.0 – 9.5 pH units) and exceeded the applicable discharge criteria for ammonia (4 mg/L). The low pH (5.34 pH units) and elevated ammonia concentration (14.9 mg/L) are believed to be the result of either sampling error or external laboratory error, as the STP was operating as designed at the time the sample was collected. Internal effluent quality measurements conducted prior to the collection of the June 9, 2020 sample indicated that the pH (7.23 pH units) and ammonia (0.06 mg/L) were in compliance with the discharge criteria. Following receipt of the external laboratory results for the June 9, 2020 sample on June 18, 2020, the accuracy of the pH and ammonia meters in STP MS-01B were verified by comparing pH and ammonia measured in a treated effluent sample with measurements of pH and ammonia in the same sample using the effluent quality meters at the MS-01 STP. External laboratory results for a subsequent treated effluent sample collected from the MS-01B STP on June 23, 2020, confirmed that the pH (8.17 pH units) and ammonia (0.20 mg/L) were in compliance with the discharge criteria.
- On September 16, 2020, a treated sewage effluent sample from the Milne Port STP (MP-01B) servicing the 380-Person Camp exceeded the applicable discharge criteria for fecal coliforms of 10,000 CFU/100 mL. The elevated fecal coliform value (18,900 CFU/100 mL) is believed to be the result of sampling error as the STP was operating as designed at the time the sample was collected. The external laboratory result for a subsequent effluent sample collected from the MP-01B STP on September 30, 2020 had a fecal coliform value of 0 CFU/100 mL, confirming that fecal coliforms in treated effluent from the MP-01B STP were in compliance with the discharge criteria.
- The measured ammonia concentration (4.1 mg/L) in Mine Site PWSP MS-MRY-04B effluent discharge to Sheardown Lake exceeded the applicable water quality discharge criteria (4.0 mg/L) in an in-field sample collected on June 20. The discharge was immediately stopped in accordance with the Project's Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010), and was not resumed in 2020. In addition, three (3) effluent quality monitoring requirements were not fulfilled due to an unexpected flight delay during transport of an effluent sample collected from the MS-MRY-04B effluent discharge on June 16, 2020 for the annual acute lethality analysis and the monthly BOD and Faecal Coliform analysis requirements specified in the Type 'A' Water Licence (Schedule I, Table 12, Group 3 and Group 2). As a result of the flight delay, the acute lethality sample was not received at the external laboratory within the five (5) day maximum allowable sample hold time for the results of the acute lethality analysis to be valid and the analysis was not completed. Similarly, the water quality sample was not received at the external laboratory within the allowable hold times for the results of the Biological Oxygen Demand (BOD) (4-day maximum) and Faecal Coliform (48 hours maximum) analysis to be valid and the analysis was not completed. Upon

receipt of notification from the external laboratory of the hold time exceedances on June 24, 2020, discharge from the MS-MRY-04B pond had ceased, preventing the opportunity for resampling and the annual acute lethality analysis and monthly BOD and Faecal Coliform analysis from being completed.

- On August 26, 2020, a treated effluent grab sample collected from the mobile OWTS, while stationed at the Milne Port Bulk fuel Storage Facility (MP-03) had an elevated total lead concentration of 0.00117 mg/L; exceeding the applicable discharge criteria for total lead of 0.001 mg/L. The elevated concentration of total lead is believed to be the result of either sampling error or external laboratory error, as the concentrations of total lead in three (3) pre-discharge samples collected from MP-03 on August 19, 2020 were all below the discharge criteria of 0.001 mg/L. No other exceedances involving treated oily water effluent from the mobile OWTS were observed in 2020.
- Measured total lead in a grab sample collected from the MS-03 stormwater discharge on July 22, 2020 was 0.00105 mg/L while measured total lead in a duplicate sample (MS-0301) collected at the same time had a total lead concentration of 0.000811 mg/L. The average total lead concentration for the MS-03 and MS-0301 field duplicate sample (0.00093 mg/L) was compliant with the discharge criteria of 0.001 mg/L. Upon receipt of the external laboratory results for the July 22, 2020 samples on July 28, 2020, the MS-03 discharge was re-sampled on July 30 and July 31, 2020. The external laboratory results for the grab sample collected on July 30, 2020 had a total lead concentration of 0.000465 mg/L and the results for the grab sample collected on July 31, 2020 had a total lead concentration of 0.000316 mg/L, indicating that the stormwater was compliant with the discharge criteria.

Baffinland continued to operate a dedicated WTP at the WRF to treat surface water runoff retained by the WRF Pond, when necessary in 2020. The WRF WTP uses a combination of coagulation, pH adjustment, precipitation, flocculation and filtration to ensure effluent discharged from the WRF Pond meets the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and Metal and Diamond Mining Effluent Regulations (MDMER). A full description of the WRF WTP treatment processes is provided in the Project's updated Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010). During 2020, the water quality of the WRF Pond was found to be compliant with the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and MDMER in June and July without any treatment being required. In August, operation of the WRF WTP was effective at mitigating any water quality concerns for the effluent to be compliant with the applicable criteria.

Beginning in June 2020, controlled discharges of effluent from the WRF Pond were conducted and resulted in no exceedances of the water licence water quality discharge criteria in 2020 observed in samples collected under Schedule I of the Type 'A' Water Licence. Additional effluent discharge sampling was completed to satisfy the requirements of the MDMER. The results of sampling completed to satisfy MDMER requirements are detailed in the 2020 QIA and NWB Annual Report for Operations (Baffinland, 2021a) for the Mary River Mine Site.

Periodic controlled discharges of the treated effluent from the Crusher Facility (CF) Pond occurred during August 2020. Controlled effluent discharges from the Crusher Facility in 2020 involved pumping retained surface water runoff from the CF Pond through a direct-discharge pipeline shared with the Mine Site STPs and releasing the effluent at an approved discharge point near the Mary River. During periods of discharge, water quality monitoring was conducted to ensure compliance with the applicable water quality discharge criteria outlined in the MDMER and the Type 'A' Water Licence. No exceedances of the applicable water quality discharge criteria were observed during the 2020 Crusher Facility (CF) effluent discharges.

2020 water quality exceedances for effluents monitored under the Type 'A' Water Licence were reported to CIRNAC, the NWB and the QIA in the monthly monitoring reports prescribed by the Type 'A' Water Licence. Water quality exceedances of the MDMER criterion were reported to ECCC and included in the annual MDMER report submission. A full discussion of the Project's 2020 monitoring results under the Type 'A' Water Licence is provided in the 2020 QIA and NWB Annual Report for Operations (Baffinland, 2021a) and a description of the monitoring results under the MDMER is provided in the NWB QIA Annual Report for Operations.

### **TRENDS**

Overall, the frequency of incidents involving the discharge of effluents to the receiving environment that exceed the applicable discharge criteria have remained low and incidental since the start of operations in 2014.

### **RECOMMENDATIONS / LESSONS LEARNED**

To ensure the accuracy of future water quality sampling results, Baffinland will continue to train all personnel involved with sampling effluents at the Project in the proper sampling practices and procedures, as outlined in the Project's Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2021f).

To address the exceedances at the STPs, Baffinland will continue to adjust process controls as necessary to optimize effluent treatment.

Baffinland plans to continue to operate the WRF WTP to treat contact water generated at the WRF as required in 2021. Since the commissioning and operation of the WRF WTP, Baffinland has increased the frequency and rigor of testing and sampling of WRF Pond effluent to optimize dosing requirements and reduce variances in Total Suspended Solids (TSS).

In preparation for discharge of stormwater from containment areas in 2021, the mobile OWTS will be inspected and, if necessary, the media will be replaced prior to operation of the mobile OWTS. In addition, all operators of the mobile OWTS will be thoroughly trained in the system's operation to ensure the media continues to be replaced at the frequency recommended by the media's manufacturer.

Overall, the low frequency of non-compliant discharges involving effluents generated and managed by the Project are evidence of the effectiveness of the Project's wastewater/effluent management practices and procedures. Baffinland will continue to update the Project's management practices and procedures and implement new mitigation measures as required to ensure effluent discharges to the receiving environment are in compliance with applicable water quality discharge criteria.

## Project Certificate Condition No. 18

Category	Hydrology and Hydrogeology - Pit Lake Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To enhance predictions for mine site closure conditions.
Term or Condition	The Proponent shall carry out continued analyses over time to confirm and update, accordingly, the approximate fill time for the mine pit lake identified in the FEIS.
Relevant Baffinland Commitment	42
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Interim Closure and Reclamation Plan (Baffinland, 2018a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

The latest revision of the Interim Closure and Reclamation Plan (ICRP; Baffinland, 2018a) discusses the estimated fill time for the mine pit lake. In order to address uncertainty in the estimated fill times and pit lake conditions at closure, reclamation research programs to evaluate the Open Pit flooding timeline is outlined in Appendix D.2 of the ICRP.

### RESULTS

Current mining activities have not yet created a pit at Deposit No. 1, the active mining area remains a hilltop outcrop. No additional information is available at this time to update the estimated fill time of the mine pit lake. A reclamation research program to evaluate the Open Pit flooding timeline is outlined in Appendix D.2 of the ICRP, however Tasks 1 and 2 under this program cannot be completed until an Open Pit has formed and active dewatering is occurring.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will update the estimated mine pit lake fill time in the ICRP as additional information becomes available through monitoring and implementation of the reclamation research program for Open Pit flooding.



## Project Certificate Condition No. 19

Category	Hydrology and Hydrogeology - Water Infrastructure Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts to natural water flow.
Term or Condition	The Proponent shall ensure that it develops and implements adequate monitoring and maintenance procedures to ensure that the culverts and other conduits that may be prone to blockage do not significantly hinder or alter the natural flow of water from areas associated with the proposed mine. In addition, the Proponent shall monitor, document and report the withdrawal rates for water removed and utilized for all domestic and industrial purposes.
Relevant Baffinland Commitment	57
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Fisheries and Oceans Canada (DFO), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Environmental Protection Plan (EPP; Baffinland, 2021d) Fish Habitat Monitoring - 2020 Annual Report - Early Revenue Phase - Tote Road Upgrades (Baffinland, 2020g) Fisheries Authorization No. NU-06-0084 (For Tote Road Crossings; DFO, 2007) Roads Management Plan (Baffinland, 2020c) Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021) 2020 QIA & NWB Annual Report for Exploration and Geotechnical Drilling Activities (Baffinland, 2021b) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a) Review of 2020 Dust Suppression Water Withdrawals, Mary River Project (Knight Piésold, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Routine inspections of water crossings (i.e. culverts, bridges) at the Project are conducted throughout the year by the Project's Road Maintenance Department and environmental monitoring personnel, to ensure water crossings are not obstructed and are working as designed. Monitoring and routine maintenance activities completed for Project water crossings are outlined in the Project's Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021g), Roads Management Plan (Baffinland, 2020c) and EPP (Baffinland, 2021d).

As a requirement of Baffinland's *Fisheries Act* Authorization for the Milne Inlet Tote Road (NU-06-0084; DFO, 2007), fish bearing water crossings at the Project are, at a minimum, assessed annually by a third-party Professional Fisheries Biologist. The assessment focuses on ensuring that surface water flows and fish passage is not being hindered or altered at Project fish bearing water crossings. The annual assessment is documented and summarized in an annual report (Baffinland, 2020g) submitted to DFO each year. Baffinland's DFO Tote Road Report is included

in Appendix G.6. Concerns identified by the annual assessment (i.e. perched culvert) are communicated to the Road Maintenance Department for corrective action and promptly addressed.

As stipulated by the Project's Type 'A' and 'B' Water Licences, the Project is required to monitor, document and report the Project's water withdrawal rates from approved water sources. This information is submitted to the CIRNAC, the NWB and the QIA on a monthly basis for the Type 'A' Water Licence, and compiled and presented annually in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a). Water withdrawal under the Type 'B' Water Licence is presented annually in the 2020 QIA & NWB Annual Report for Exploration and Geotechnical Drilling (Baffinland, 2021b).

## RESULTS

During 2020, Baffinland continued to monitor Project water crossings to ensure surface water flows were not being hindered or altered. Routine preventative maintenance conducted at Project water crossings in 2020 included the clearing of snow and ice at the ends of culverts prior to and during freshet. At Tote Road site CV-030, water flow was diverted from CV-031 into CV-030 during freshet due to ice blockage of the culvert. No culvert fish passage issues were identified by the third-party Professional Fisheries Biologist as a result of the diversion, however, the diversion caused flooding, erosion, and increased turbidity in the area of the stream at crossing CV-030. Baffinland will discuss proposed remediation works with the DFO prior to instream remediation work proceeding at these fish bearing crossings, as necessary, to ensure planned modifications to culverts and road embankments are in compliance of the *Fisheries Act* and the interim codes of practice for culvert maintenance and temporary cofferdams and diversion channels (as published). No significant blockages that had the potential of hindering or altering surface water flow volumes downstream of Project water crossings were observed in 2020.

Water withdrawal rates in 2020 for approved water sources under the Type 'A' and 'B' Water Licences are presented in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a) and the 2020 QIA & NWB Annual Report for Exploration and Geotechnical Drilling Activities (Baffinland, 2021b), respectively.

Under Table 3 of the Type 'A' Water Licence, source specific water withdrawal limits are specified for both domestic and industrial purposes for each approved water source. During 2020, daily water volume withdrawal limits, stipulated in the Type 'A' Water Licence, for domestic, industrial and dust suppression purposes were not exceeded at approved Project water sources, with the following exceptions:

Although the total daily water withdrawal limit for Camp Lake (355.4 m<sup>3</sup>/day) was not exceeded in 2020, there was one (1) incident where the daily water volume withdrawn for domestic purposes exceeded the domestic daily water withdrawal limit for Camp Lake (203.8 m<sup>3</sup>/day) that occurred on September 20, 2020. This is a significant improvement over 2019 when twelve (12) exceedances of the daily water volume for domestic use exceeded the domestic daily water withdrawal limit for Camp Lake, and is attributed to improved documentation and categorization of water volumes withdrawn to support Project activities. Baffinland implemented root cause investigation for all exceedances of the domestic water use limits stipulated in the Type 'A' Water Licence to determine the root causes of daily water use exceedance events and identify effective corrective actions to prevent re-occurrences. The findings of the root cause investigation of the water use exceedance incident that occurred in 2020 determined that it was caused by a lack of contingency water storage for a period when one or both of the water treatment plants (WTPs) are down for maintenance or repairs resulting in the raw water tank for the Mine Site Camp (MSC) WTP having to be refilled on September 20, 2020 after being emptied on September 19, 2020 to perform maintenance. A corrective action that Baffinland will take to prevent similar incidents from re-occurring is

to repurpose an existing fire water storage tank or install a new water storage tank in 2021 to provide contingency water storage for the MSC and Saliivik Camp WTPs to meet water demands during periods of equipment outages and maintenance shut downs. The same root cause investigation determined that lack of contingency water storage was also the root cause for the twelve (12) exceedances of the domestic daily water withdrawal limit for Camp Lake that occurred in 2019. No other water withdrawal incidents or exceedances for domestic and industrial water uses were noted in 2020.

During 2020, thirty-one (31) exceedances of source specific daily water withdrawal limits, outlined in the Type 'A' Water Licence, occurred at four (4) approved dust suppression water sources along the Tote Road including one (1) exceedance at Camp Lake, two (2) at KM 32 Lake, eight (8) at BG-50, and twenty (20) at CV-217. All exceedances were based on the source specific daily water withdrawal limits, with annual withdrawal volumes being within the source specific withdrawal water limits stipulated in the Type 'A' Water Licence.

Baffinland implemented a root cause investigation for all exceedances of the daily dust suppression water use limits stipulated in the Type 'A' Water Licence to determine the root causes of water use exceedance events and identify effective corrective actions. The findings of the root cause investigation of the water use exceedances determined that they were caused due to inadequate controls for tracking daily water use at the individual water sources with respect to the daily limits. Corrective actions that Baffinland has taken to prevent similar incidents from re-occurring include installing signs at dust suppression water sources that indicate the daily water use limits in numbers of truckloads per day, and implementing an improved water truck operator log that indicates when the maximum daily volume of water has been collected from each source based on the number of water truck loads filled. Prior to the start of the summer 2021 dust suppression season, an additional corrective action will be implemented to install waterproof storage systems at each water source to house daily water use logs, which will improve tracking between different trucks using the same source. Baffinland is committed to continue to improve the enforcement of source specific daily water withdrawal limits at approved water sources along the Tote Road and maintaining effective record keeping practices for the approved dust suppression water sources.

A third party consultant reviewed the 2020 dust suppression water withdrawals to assess the effects of the daily water withdrawal exceedances on instantaneous flows of streams and lake outflows, using estimated mean monthly and 10-year low flows (Knight Piesold, 2021). The consultant's memo that summarizes the assessment provided in Appendix G.9 concluded that the exceedances were not environmentally consequential and are not expected to adversely affect stream flows, lake outflows, fish, or fish habitat.

Further discussion on the water withdrawals at the Project, including all supporting daily and monthly volumes, are provided in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to monitor Project water crossings and conduits to ensure that surface water flows are not being significantly hindered or altered.

As required by the Type 'A' and 'B' Water Licences, Baffinland will continue to monitor, document and report water withdrawal rates from approved water sources to the appropriate agencies.

Baffinland plans to install waterproof storage systems in 2021 at each water source location along the Tote Road to house daily water use logs for tracking daily water use at the individual water sources with respect to the daily limits which will improve tracking between different trucks using the same source. Baffinland will continue to work on improving the enforcement of the source specific daily water withdrawal limits at approved water sources.

#### 4.6.5 Groundwater & Surface Water (PC Conditions 20 through 30)

Eleven (11) PC conditions relate to the potential impacts of the Project on groundwater and surface water. There is overlap in the scope of these PC conditions with PC Conditions No. 16 to 19 for hydrology and hydrogeology. Several of the conditions require the development of management plans. These conditions also overlap with aspects of the Project that are regulated under Baffinland's Type 'A' Water Licence (for mining) and Type 'B' Water Licence (for mineral exploration). PC Conditions No. 29 and 30 require Baffinland to submit construction designs, as-built drawings and site-specific management plans to the relevant regulatory agency, as required under Part D of the Type 'A' Water Licence.

##### **Inuit & Stakeholder Feedback**

As described in Section 4.6.4 (Hydrology and Hydrogeology), the NWB is the primary stakeholder regulating water use and waste disposal through its issuance of water licences. The QIA is also a key stakeholder; the QIA and Baffinland have a Water Compensation Agreement should the Project substantially affect the quality, quantity or flow of water through IOL. ECCC is a key regulator administering the section of the *Fisheries Act* regarding the prohibition on the release of deleterious substances to fish-bearing waters. Groundwater is limited to minor seepage through the active layer during the brief snow-free period. Surface water quality, however, is a key resource to Inuit and to regulatory agencies, and it is among the most closely regulated aspects of the environment through effluent monitoring and an aquatic effects monitoring program under the Project's water licences. In 2020, community members have expressed concern regarding the potential for dust to impact water quality in local streams (Appendix B).

##### **Monitoring Activities**

Throughout 2020, Baffinland continued to implement the Surveillance Network Program (SNP) outlined in Schedule I of the Type 'A' Water Licence, analyzing effluents (i.e. treated sewage, treated oily stormwater) discharged to the receiving environment and monitoring surface water quality within specific Project areas (i.e. surface water runoff downstream of Project areas). Based on a review of 2020 SNP results reported to the NWB, CIRNAC and the QIA, exceedances of applicable discharge criteria in 2020 involved mainly surface water runoff and effluents with elevated total suspended solids (TSS) levels. In each case, appropriate control measures were implemented to restore TSS levels below applicable discharge criteria. Baffinland continues to assess and implement the appropriate corrective and mitigation measures to address ongoing sedimentation concerns at the Project.

Baffinland continued to implement the Tote Road Monitoring Program to assess Project-related impacts to surface water resulting from sedimentation and erosion events. The program, jointly developed with the QIA, evaluates upstream and downstream concentrations of total suspended solids in surface water proximal to the Tote Road at select crossings considered representative of the respective catchment areas, where fisheries crossings have been identified, and other sources of sedimentation such as snow stockpiles and historic borrow sources.

In addition to the above monitoring programs, Baffinland implements ongoing environmental monitoring and effects studies, including the Project's Aquatic Effects Monitoring Plan (AEMP), in accordance with the Type 'A' Water Licence and PC terms and conditions.

Table 4.12 provides an evaluation of the Project's impacts on groundwater and surface water, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.12: Groundwater and Surface Water Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Groundwater Quality	Adverse seepage from project areas (landfill, landfarm, waste rock stockpile) affecting groundwater quality	A groundwater monitoring program was continued at the landfill in 2020. Future monitoring will seek evaluate additional project areas as warranted, and to establish trends.	Groundwater monitoring in identified the potential for mine related influence. Further monitoring is required to understand extent, and the applicable criteria as there are no established groundwater criteria in Nunavut.
Surface Water Quality	Releases of TSS or other changes in water quality due to point-source discharges (i.e., stormwater and sewage effluents)	Effluents are monitored prior to discharge under the SNP; the receiving aquatic environment is monitored in accordance with the AEMP.	Elevated TSS concentrations detected downstream of Project infrastructure and water crossings during freshet; within FEIS predictions. Discharges of effluent at the Project met the applicable discharge criteria, with the exception of seven (7) events involving water quality exceedances of discharge criteria outlined in the Type 'A' Water Licence.
	Releases of TSS or other changes in water quality due to non-point source releases (i.e., erosion and sedimentation)	Runoff from ground disturbance areas (construction areas, quarries) are monitored for TSS; site is inspected visually for evidence of erosion and sedimentation, with follow-up sampling if required.	TSS exceedances occurred at the Mine and along the Tote Road corridor. ECCC issued a Direction under the <i>Fisheries Act</i> , which Baffinland implemented satisfactorily. Erosion and sedimentation impacts were within FEIS predictions.
	Releases of TSS or other changes in water quality due to airborne emissions	Site is inspected visually for evidence of erosion and sedimentation, with follow-up sampling if required. Lake sedimentation monitored under the AEMP.	Ore dust runoff did not exceed FEIS predictions

### Path Forward

Baffinland will continue to implement the TREP and other sedimentation and erosion mitigation measures in 2021, and will monitor effluents and receiving waters in accordance with Type 'A' Water Licence and AEMP.

Baffinland plans to continue the groundwater monitoring program in 2021, and plans to implement a further expansion to the program to gain a better understanding of natural groundwater chemistry at the Project site. Due to challenges associated with sampling methodologies for groundwater data collection in a permafrost environment and the challenges in interpreting this data, however, long-term trends will likely not be identified even with an expanded dataset. Despite these operational challenges, Baffinland is committed to continuing to work with groundwater consultants that are knowledgeable in Arctic environments, to further assess the current program and implement additional recommendations in 2021.

## Project Certificate Condition No. 20

Category	Groundwater/Surface Waters - Explosives
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure that the effects associated with the manufacturing, storage, transportation and use of explosives do not negatively impact the areas surrounding the Project.
Term or Condition	The Proponent shall monitor the effects of explosives residue and related by-products from Project-related blasting activities as well as develop and implement effective preventative and/or mitigation measures, including treatment, if necessary, to ensure that the effects associated with the manufacturing, storage, transportation and use of explosives do not negatively impact the Project and surrounding areas.
Relevant Baffinland Commitment	57, 65
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Aquatic Effects Monitoring Plan (Baffinland, 2015a) Canadian Water Quality Guidelines for the Protection of Aquatic Life - Nitrate Ion (CCME, 2012) Canadian Water Quality Guidelines for the Protection of Aquatic Life - Ammonia (CCME, 2010) Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2021f) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Surface water runoff downstream of Project mining areas and quarries is monitored as prescribed by the Type 'A' Water Licence, with water quality results reported to CIRNAC, the NWB and the QIA on a monthly and annual basis. Water samples are collected using the practices and procedures described in Baffinland's Sampling Program - Quality Assurance and Quality Control Plan (QA/QC Plan; Baffinland, 2021f), which is an approved plan under the Type 'A' Water Licence.

In addition, the Aquatic Effects Monitoring Plan (AEMP; Baffinland, 2015a), a follow-up monitoring program identified in Baffinland's FEIS and prescribed by the Baffinland's Type 'A' Water Licence, monitors the receiving aquatic environment downstream of Project activities at the Mine Site.

### RESULTS

During 2020, surface water runoff downstream of active quarries and mining areas was monitored for the water quality parameters outlined by the Type 'A' Water Licence, including parameters related to explosives residue, such as ammonia and nitrate. Although select water samples collected downstream of active quarries and mining areas

showed elevated ammonia and nitrate levels in comparison to baseline concentrations, the majority of grab samples were below the established CCME water quality guidelines for ammonia and nitrate (CCME, 2010; CCME, 2012). All acute toxicity water samples collected in 2020 downstream of Project quarries and mining areas were demonstrated to be acutely non-lethal. A complete discussion of the 2020 water quality monitoring results collected under the Type 'A' Water Licence is provided in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2020a).

Monitoring under the AEMP in 2020 included the Core Receiving Environment Monitoring Program (CREMP), a key component of the AEMP used to detect Project-related changes in water quality, sediment quality, phytoplankton (chlorophyll a), benthic invertebrate community metrics, and arctic char (*Salvelinus alpinus*) populations in lakes and streams near the Mine Site. Evidence of Project-related change was observed in Camp Lake and Sheardown Lake systems as well as the Mary River. Within these systems, elevated levels of nitrate and/or ammonia were observed in 2020 when compared to baseline and/or reference conditions, however no adverse effects to phytoplankton, benthic invertebrates or arctic char were indicated. The 2020 AEMP reports, including a complete analysis and discussion of the 2020 CREMP results, are provided in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2020a).

#### **TRENDS**

Overall, 2020 monitoring results for surface water runoff and aquatic environments downstream of Project mining areas and quarries were generally consistent with monitoring results observed in prior years.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to monitor surface water runoff and aquatic environments downstream of Project mining areas and quarries as outlined in the Type 'A' Water Licence and the Project's AEMP (Baffinland, 2015a).



## Project Certificate Condition No. 21

Category	Groundwater/Surface Waters - Aquatic Effects Monitoring Plan and Dustfall Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To mitigate potential impacts to surface and ground waters.
Term or Condition	<p>The Proponent shall ensure that the scope of the Aquatic Effects Monitoring Plan (AEMP) includes, at a minimum:</p> <ol style="list-style-type: none"> <li>a. Monitoring of non-point sources of discharge, selection of appropriate reference sites, measures to ensure the collection of adequate baseline data and the mechanisms proposed to monitor and treat runoff, and sample sediments</li> <li>b. Measures for dustfall monitoring designed as follows:             <ol style="list-style-type: none"> <li>i. To establish a pre-trucking baseline and collect data during Project operation for comparison</li> <li>ii. To facilitate comparison with existing guidelines and potentially with thresholds to be established using studies of arctic char egg survival and/or other studies recommended by the Terrestrial Environment Working Group (TEWG)</li> <li>iii. To assess the seasonal deposition (rates, quantities) and chemical composition of dust entering aquatic systems along representative distance transects at right angles to the Tote Road and radiating outward from Milne Port and the Mine Site.</li> </ol> </li> </ol>
Relevant Baffinland Commitment	2
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous and Northern Affairs Canada (CIRNAC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	<p>Aquatic Effects Monitoring Plan (Baffinland, 2015a)          Final Environmental Impact Statement (FEIS; Baffinland, 2012)          Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)          2020 QIA &amp; NWB Annual Report for Operations (Baffinland, 2021a)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

The AEMP was submitted to the NWB on June 27, 2014, as required by the Type 'A' Water Licence, and was subsequently approved by the NWB. On October 31, 2015, Revision 1 of the AEMP was submitted to the NWB and subsequently approved. Revision 1 of the AEMP focused on updating the Plan to reflect Amendment No. 1 of the Type 'A' Water Licence.

The AEMP has been structured to serve as an overarching 'umbrella' that conceptually provides an opportunity to integrate results of individual but related aquatic monitoring programs including water and sediment quality, dustfall

monitoring and freshwater biota and fish health. Key component studies of the AEMP that were conducted in 2020, included the Core Receiving Environment Monitoring Program (CREMP), Lake Sedimentation Monitoring Program and the Dustfall Monitoring Program.

The CREMP evaluates potential mine-related influences on water quality, sediment quality, and/or biota (including phytoplankton, benthic invertebrates and fish) within aquatic environments near the Mine Site. Under the CREMP, receiving aquatic environments near the Mine Site are monitored during several periods throughout the year and include the Camp Lake, Sheardown Lake and Mary Lake Systems, as well as Reference Lake 3 and several reference tributaries. The AEMP includes benchmarks and an action framework to evaluate monitoring data and determine next steps and/or corrective actions, if required.

The Lake Sedimentation Monitoring Program monitors dust and sediment deposition rates in Sheardown Lake NW in an effort to better understand and evaluate potential mine-related influences on biota (e.g. fish larvae hatching success). Currently, the Lake Sedimentation Monitoring Program is conducted annually and involves the deployment and retrieval of submerged sediment traps to determine sediment deposition rates, density and thickness during ice-cover and open water periods.

Annual monitoring reports for both the CREMP and Lake Sedimentation Monitoring Program provide further discussion of the methods used and annual monitoring results, and are provided as appendices to the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

The Dustfall Monitoring Program is performed annually with sampling stations established at the Mine Site, Milne Port, along the Milne Inlet Tote Road and at reference sites located at various distances from Project operations.

The three (3) main objectives of the Dustfall Monitoring Program are as follows:

1. To quantify the extent, magnitude and composition of dustfall generated by Project activities;
2. To determine seasonal variations in dustfall; and
3. To assess annual changes in dustfall at sampling locations relative to thresholds associated with the models and assessments performed in the FEIS (Baffinland, 2012).

Results collected under the dustfall monitoring program are provided on an annual basis to NIRB and other relevant regulatory agencies and stakeholders in the Terrestrial Environment Annual Monitoring Report.

## **RESULTS**

Reports discussing the 2020 results for the CREMP and Lake Sedimentation Monitoring Program are provided in Appendix G.2 and as appendices to the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a). The 2020 results of the Dustfall Monitoring Program are presented in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021), which has been released to the Working Group for review and comment.

The current revision of the Project's AEMP (Rev. 1; Baffinland, 2015a) meets the requirements and intended scope outlined in PC Condition No. 21 and has been approved by the NWB.

## **TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to work with appropriate stakeholders and regulatory agencies to identify required revisions to the AEMP and associated environmental monitoring programs. Baffinland submitted Revision 2 of the AEMP in April 2016 to the NWB and continues to work with the appropriate stakeholders and regulatory agencies to finalize the revision. In November 2017, Baffinland chaired a freshwater workshop in Iqaluit, Nunavut to further discuss and justify the proposed changes to the CREMP outlined in Revision 2 of AEMP. Attending participants of the freshwater workshop included the NWB, QIA, CIRNAC, GN and ECCC.

An updated Revision 2 of the AEMP incorporating points of discussion from the freshwater workshop was submitted as part of the supporting documentation for the water licence amendment application for the Phase 2 Proposal. Pending the review and approval of the Phase 2 Proposal, Baffinland will implement the Revision 2 of the AEMP following further stakeholder feedback.

## Project Certificate Condition No. 22

Category	Groundwater/Surface Waters - Sediment and Erosion Management Plan
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To develop appropriate sediment and erosion controls to prevent impacts to surface waters.
Term or Condition	The Proponent shall develop a detailed Sediment and Erosion Management Plan to prevent and/or mitigate sediment loading into surface water within the Project area.
Relevant Baffinland Commitment	57
Reporting Requirement	Plan to be provided to the NIRB for review and comment at least 60 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021g)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

A comprehensive sediment and erosion management plan is incorporated into Baffinland's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021g). An earlier revision of the SWAEMP was submitted to and approved by the NWB prior to the commencement of Early Revenue Phase construction.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 23

Category	Groundwater / Surface Waters - Groundwater Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to groundwater quality.
Term or Condition	The Proponent shall develop and implement a Groundwater Monitoring and Management Plan to monitor, prevent and/or mitigate the potential effects of the Project on groundwater within the Project area.
Relevant Baffinland Commitment	57
Reporting Requirement	Plan to be provided to the NIRB for review and comment at least 60 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021g) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a) 2020 Groundwater Monitoring Report (Tetra Tech, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

A groundwater monitoring program, involving the installation of shallow groundwater wells downstream of Project infrastructure, is discussed in Baffinland's SWAEMP (Baffinland, 2021g). A standalone plan for Groundwater monitoring is not required due to inclusion in the above noted plan.

Baffinland continued to implement the groundwater monitoring program, as outlined in the 2020 Groundwater Monitoring Report in Appendix G.5. In 2020, Baffinland retained groundwater consultants that are specialized in Arctic environments to further assess the current program and provide recommendations. The consultants completed a desktop review of available groundwater monitoring data, as well as available data regarding lithology and hydrogeology in the area of the Mary River Project, to identify any trends in groundwater quality, groundwater flow, and any discernable information about the condition of subsurface and stratigraphy of the investigated area, and reviewed methodologies used in the execution of the previous monitoring programs including the use of drive-point piezometers and low-flow sampling techniques. Following this review, the consultants made recommendations on the implementation of the groundwater monitoring program for 2020 and subsequently executed the recommendations during the 2020 field season and completed the groundwater monitoring program. The 2020 groundwater monitoring program was expanded to include the installation of three (3) additional temporary shallow monitoring wells around the Landfill Facility to further establish and validate background conditions and further assess down-gradient groundwater quality.

In September 2020, the groundwater monitoring program was completed using the same methodology as in previous years and involved the installation of shallow groundwater wells up-gradient and down-gradient of the

Mine Site Non-Hazardous Waste Landfill Facility (Landfill Facility) using drive-point piezometers. Groundwater wells were established to the depth of permafrost (approx. 1.1 to 1.8 meters) and water samples were collected near the depth of the active layer. The methodology for the 2020 groundwater monitoring program is detailed in the 2020 QIA and NWB Annual Report for Operations (Baffinland, 2021a). The 2020 Groundwater Monitoring Report, which includes the results of the desktop review, is provided in Appendix G.5.

## RESULTS

During the 2020 program, groundwater was sampled at five (5) monitoring wells down-gradient and two (2) monitoring wells up-gradient of the Landfill Facility. A third up-gradient well was installed, however did not produce any water.

Contoured groundwater elevations for 2020 suggest that the shallow groundwater flow direction across the Landfill Facility is towards the southwest, under an estimated horizontal hydraulic conductivity of 0.03m/m, which is consistent with the local surface topography.

At monitoring locations MS-LF-GW1, MS-LF-GW2, and MS-LF-GW3, located in the vicinity of the Landfill Facility, the chloride and sulphate concentrations were greater than the Federal Interim Groundwater Quality (FIGQ) Guidelines and were elevated compared to concentrations observed at the reference locations and further down-gradient piezometers. This suggests the presence of groundwater impacts due to landfill operations; however, the results suggest the potential impacts are limited to the immediate vicinity of the Landfill Facility.

Dissolved metal parameters including boron, cadmium, iron, lead, mercury, nickel, silver, and uranium exceeded their respective FIGQ Guideline at one (1) or more down-gradient monitoring locations MS-LF-GW1, MS-LF-GW2 and MS-LF-GW3. Also increasing trends in select dissolved metals parameters were observed at MS-LF-GW1, and MS-LF-GW2. This also suggests the presence of groundwater impacts due to landfill operations; however, these results also suggest the potential impacts are limited to the immediate vicinity of the Landfill Facility.

The presence of elevated ammonia, and dissolved copper at hydraulically up-gradient reference locations suggests that these parameters may be naturally occurring at elevated levels at the down-gradient monitoring locations.

## TRENDS

As additional monitoring is conducted in future years, Baffinland will be able to better characterize natural groundwater chemistry at the Project and identify and evaluate the significance of any trends, including potential impacts from Project activities or infrastructure.

A statistical analysis was conducted to evaluate the significance of changes in groundwater quality over time. Parameters selected for trend analysis included chloride, sulphate, and dissolved metals parameters: boron, cadmium, iron, lead, manganese, nickel, and uranium. These parameters were greater than the Federal Interim Groundwater Quality Guidelines at one or more of the piezometers. The trend analysis was conducted using the non-parametric Mann Kendall method for results of all previously installed piezometers with sufficient data points. The piezometers installed in 2020 had only one data point and therefore were not included in the trend analysis. The Mann Kendall analysis was conducted with a confidence level of 95%. Results of the trend analysis indicate that dissolved iron, dissolved nickel and dissolved uranium are demonstrating an increasing trend.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to retain consultants to execute the groundwater monitoring program in 2021, which will be implemented based on the assessment and recommendations from the 2020 groundwater monitoring report. In 2021, Baffinland plans to evaluate the implementation of further expansion of the program to gain a better understanding of natural groundwater chemistry and potential project related effects at the Project site. Desktop reviews will be completed by consultants in conjunction with a review of site reconnaissance survey results of four (4) areas at Mary River, including the Mine Site Quarry, Mine Site Crusher Facility, Mine Site Waste Rock Facility (WRF), and Milne Port Site to determine if it is feasible to develop groundwater monitoring programs for those areas.

Implementing a groundwater program in a permafrost-rich environment presents significant methodological challenges including quantifying groundwater direction, flow and interpretation of groundwater quality. Additionally, groundwater flow dynamics are driven primarily by the permafrost table elevations rather than soil stratigraphy, resulting in significant challenges to determine flow direction and gradient. Given the challenges associated with sampling methodologies for groundwater data collection in a permafrost environment and the challenges in interpreting this data, long-term trends may not be identified even with an expanded dataset. Despite these operational challenges, Baffinland is committed to continuing to retain groundwater consultants specialized in Arctic environments to assess and provide recommendations for further expansion of the groundwater monitoring program in 2021 to gain a better understanding of natural groundwater chemistry and potential project related effects at the Project site. Baffinland will provide further recommendations following the completion of the 2021 monitoring program.

## Project Certificate Condition No. 24

Category	Groundwater/Surface Waters - Effluent Management
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts to groundwater and surface waters from effluent discharge.
Term or Condition	The Proponent shall monitor as required the relevant parameters of the effluent generated from Project activities and facilities and shall carry out treatment if necessary to ensure that discharge conditions are met at all times.
Relevant Baffinland Commitment	6
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Environment and Climate Change Canada (ECCC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Fresh Water Supply, Sewage and Wastewater Management Plan (FWSSWMP; Baffinland, 2021e) Metals & Diamond Mining Effluent Regulations (MDMER; Minister of Justice, 2020) Metals and Diamond Mining Effluent Regulations Emergency Response Plan (MDMER ERP; Baffinland, 2020f) Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2021f) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Wastewater/effluent management practices and procedures are outlined in the Project's FWSSWMP (Baffinland, 2021e) and the MDMER ERP (Baffinland, 2020f).

Water quality discharge criteria (discharge criteria) for effluent generated by the Project are stipulated in the Type 'A' Water Licence issued by the NWB, and Schedules 4 and 5 of the MDMER (Minister of Justice, 2020).

Consistent with the FWSSWMP (Baffinland, 2021e), prior to discharge, wastewater (e.g. treated sewage, treated contact water, oily water, etc.) is sampled to ensure the wastewater's water quality meets the applicable discharge criteria. Wastewater that meets the applicable discharge criteria is discharged to the receiving environment. Water samples are routinely taken during wastewater discharges to ensure the water quality remains in compliance with the applicable discharge criteria. In the event that water quality sampling during a discharge indicates that the water quality has changed and is no longer in compliance with the applicable discharge criteria, the discharge of the non-compliant wastewater is halted.

Wastewater that does not meet the applicable discharge criteria is treated on-site using approved treatment methods (e.g. sewage treatment plants, mobile oily water treatment systems, WRF WTP, etc.) and is not discharged



to the receiving environment until it has been confirmed by water quality analysis that the treated wastewater meets the applicable discharge criteria.

All water sampling at the Project is conducted in accordance with the Project's Sampling Program - Quality Assurance and Quality Control Plan (Baffinland; 2021f).

As required by the Type 'A' Water Licence, volumes and water quality analysis of wastewater discharged to the receiving environment are reported to regulators (CIRNAC, NWB) on a monthly and annual basis. As a requirement of the MDMER, volume and water quality results for discharges from the surface water management ponds associated with the Crusher Facility (CF) and Waste Rock Facility (WRF) at the Mine Site are reported to ECCC on a quarterly and annual basis.

## RESULTS

Effluents generated and managed by the Project in 2020 included sewage, contact water retained in surface water management ponds associated with ore and waste rock facilities and oily water retained in containment areas, such as bulk fuel facilities. Effluent treatment systems operated at the Project in 2020, included:

- Sewage Treatment Plants (STPs) at Milne Port (MP-01, MP-01B) and the Mine Site (MS-01, MS-01B);
- Dissolved Air Flotation (DAF) Treatment System at Milne Port to treat and discharge wastewater stored in Milne Port PWSP (MP-01A);
- Mobile Oily Water Treatment System (OWTS), at the Mine Site and Milne Port; and the,
- Waste Rock Facility Wastewater Treatment Plant (WRF WTP) at the Waste Rock Facility (MS-08), installed in 2018.

Seven (7) discharges of effluent at the Project in 2020 did not comply with the applicable discharge criteria. These were single isolated events at each of the Mine Site STP (MS-01B), the Milne Port STP (MP-01B), the Mine Site PWSP (MS-MRY-04B), and the mobile OWTS at the Milne Port Fuel Storage Facility (MP-03). These events are outlined as follows:

- On January 15, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp exceeded the applicable discharge criteria for fecal coliforms of 1,000 colony-forming units per 100 milliliters (CFU/100 mL). The elevated fecal coliforms (1,300 CFU/100 mL) is believed to be the result of either sampling error or external laboratory error, as the STP was operating as designed at the time the sample was collected. As a precaution, the ultraviolet (UV) bulbs used to disinfect effluent prior to discharge were replaced following receipt of the external laboratory results on February 6, 2020. The subsequent monthly effluent discharge sample for February 2020 was collected and sent for external laboratory analysis on February 4, 2020, prior to the replacement of the UV bulbs. The external laboratory results for the February 4, 2020 sample indicated a fecal coliform value of 0 CFU/100 mL, confirming the SPT was functioning as designed prior to the UV bulb replacement.
- On April 7, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp exceeded the applicable discharge criteria for fecal coliforms of 1,000 CFU/100 mL. The elevated fecal coliforms (2,600 CFU/100 mL) was caused by a breakthrough on one of the effluent treatment membranes on Membrane Bioreactor (MBR) Train No. 2 that occurred on April 7, 2020. Upon observing the breakthrough, the STP Operator immediately stopped the effluent discharge and isolated the affected line from the overall STP system. Measurements taken for Total Suspended Solids (TSS), turbidity, phosphorus

and ammonia following the isolation on April 7, 2020 were all within acceptable operating levels, indicating that the effluent quality was compliant with discharge criteria, prior to resuming effluent discharge later that day. Subsequent to the affected membrane being isolated and the discharge being restarted on April 7, 2020, the monthly effluent sample that exceeded the effluent discharge criteria had been collected. It is believed that the presence of fecal coliforms in the April 7, 2020 effluent sample indicated the presence of short lived residual fecal coliform remaining from the membrane breakthrough. The external laboratory result for a subsequent effluent sample collected on May 12, 2020 had a fecal coliform value of 0 CFU/100 mL, confirming that fecal coliforms in treated effluent from the MS-01B STP were back in compliance with the discharge criteria.

- On June 9, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp was outside the applicable criteria range for pH (6.0 – 9.5 pH units) and exceeded the applicable discharge criteria for ammonia (4 mg/L). The low pH (5.34 pH units) and elevated ammonia concentration (14.9 mg/L) are believed to be the result of either sampling error or external laboratory error, as the STP was operating as designed at the time the sample was collected. Internal effluent quality measurements conducted prior to the collection of the June 9, 2020 sample indicated that the pH (7.23 pH units) and ammonia (0.06 mg/L) were in compliance with the discharge criteria. Following receipt of the external laboratory results for the June 9, 2020 sample on June 18, 2020, the accuracy of the pH and ammonia meters in STP MS-01B were verified by comparing pH and ammonia measured in a treated effluent sample with measurements of pH and ammonia in the same sample using the effluent quality meters at the MS-01 STP. External laboratory results for a subsequent treated effluent sample collected from the MS-01B STP on June 23, 2020, confirmed that the pH (8.17 pH units) and ammonia (0.20 mg/L) were in compliance with the discharge criteria.
- On September 16, 2020, a treated sewage effluent sample from the Milne Port STP (MP-01B) servicing the 380-Person Camp exceeded the applicable discharge criteria for fecal coliforms of 10,000 CFU/100 mL. The elevated fecal coliform value (18,900 CFU/100 mL) is believed to be the result of sampling error as the STP was operating as designed at the time the sample was collected. The external laboratory result for a subsequent effluent sample collected from the MP-01B STP on September 30, 2020 had a fecal coliform value of 0 CFU/100 mL, confirming that fecal coliforms in treated effluent from the MP-01B STP were in compliance with the discharge criteria.
- The measured ammonia concentration (4.1 mg/L) in Mine Site PWSP MS-MRY-04B effluent discharge to Sheardown Lake exceeded the applicable water quality discharge criteria (4.0 mg/L) in an in-field sample collected on June 20. The discharge was immediately stopped in accordance with the Project's Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010), and was not resumed in 2020. In addition, three (3) effluent quality monitoring requirements were not fulfilled due to an unexpected flight delay during transport of an effluent sample collected from the MS-MRY-04B effluent discharge on June 16, 2020 for the annual acute lethality analysis and the monthly BOD and Faecal Coliform analysis requirements specified in the Type 'A' Water Licence (Schedule I, Table 12, Group 3 and Group 2). As a result of the flight delay, the acute lethality sample was not received at the external laboratory within the five (5) day maximum allowable sample hold time for the results of the acute lethality analysis to be valid and the analysis was not completed. Similarly, the water quality sample was not received at the external laboratory within the allowable hold times for the results of the BOD (4-day maximum) and Faecal Coliform (48 hours' maximum) analysis to be valid and the analysis was not completed. Upon receipt of notification from the

external laboratory of the hold time exceedances on June 24, 2020, discharge from the MS-MRY-04B pond had ceased, preventing the opportunity for resampling and the annual acute lethality analysis and monthly BOD and Faecal Coliform analysis from being completed.

Baffinland continued to operate a dedicated WTP at the WRF to treat surface water runoff retained by the WRF Pond, when necessary in 2020. The WRF WTP uses a combination of coagulation, pH adjustment, precipitation, flocculation and filtration to ensure effluent discharged from the WRF Pond meets the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and Metal and Diamond Mining Effluent Regulations (MDMER). A full description of the WRF WTP treatment processes is provided in the Project's updated FWSSWMP (Baffinland, 2021e). During 2020, the water quality of the WRF Pond was found to be compliant with the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and MDMER in June and July without any treatment being required. In August, operation of the WRF WTP was effective at mitigating any water quality concerns for the effluent to be compliant with the applicable criteria.

Beginning in June 2020, controlled discharges of effluent from the WRF Pond were conducted and resulted in no exceedances of the water licence water quality discharge criteria in 2020 observed in samples collected under Schedule I of the Type 'A' Water Licence. Additional effluent discharge sampling was completed to satisfy the requirements of the MDMER. The results of sampling completed to satisfy MDMER requirements are detailed in Baffinland's 2020 MDMER annual effluent monitoring report for the Mary River Mine Site.

Controlled effluent discharges from the WRF in 2020 involved pumping retained surface water runoff from the WRF Pond through the WRF WTP and releasing the treated effluent at an established Final Discharge Point (FDP) located within the catchment of Mary River Tributary F.

Periodic controlled discharges of the treated effluent from the Crusher Facility (CF) Pond occurred during August 2020. Controlled effluent discharges from the Crusher Facility in 2020 involved pumping retained surface water runoff from the CF Pond through a direct-discharge pipeline shared with the Mine Site STPs and releasing the effluent at an approved discharge point near the Mary River. During periods of discharge, water quality monitoring was conducted to ensure compliance with the applicable water quality discharge criteria outlined in the MDMER and the Type 'A' Water Licence. No exceedances of the applicable water quality discharge criteria were observed during the 2020 CF effluent discharges.

2020 water quality exceedances for effluents monitored under the Type 'A' Water Licence were reported to CIRNAC, the NWB and the QIA in the monthly monitoring reports prescribed by the Type 'A' Water Licence. Water quality exceedances of the MDMER criterion were reported to ECCC and included in the annual MDMER report submission. A full discussion of the Project's 2020 monitoring results under the Type 'A' Water Licence is provided in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a) and a description of the monitoring results under the MDMER is provided in the 2020 NWB QIA annual report.

## **TRENDS**

Overall, the frequency of incidents involving the discharge of effluents to the receiving environment that exceed the applicable discharge criteria have remained low and incidental since the start of operations in 2014.

## RECOMMENDATIONS / LESSONS LEARNED

To ensure the accuracy of future water quality sampling results, Baffinland will continue to train all personnel involved with sampling effluents at the Project in the proper sampling practices and procedures, as outlined in the Project's Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2021g).

To address the exceedances at the STPs, Baffinland will continue to adjust process controls as necessary to optimize effluent treatment.

Baffinland plans to continue to operate the WRF WTP to treat contact water generated at the WRF as required in 2021. Since the commissioning and operation of the WRF WTP, Baffinland has increased the frequency and rigor of testing and sampling of WRF Pond effluent to optimize dosing requirements and reduce variances in Total Suspended Solids (TSS). In 2020, the WRF WTP was upgraded to include the addition of a second geotube settling pond to facilitate future maintenance requirements.

In preparation for discharge of stormwater from containment areas in 2021, the mobile OWTS will be inspected and, if necessary, the media will be replaced prior to operation of the mobile OWTS. In addition, all operators of the mobile OWTS will be thoroughly trained in the system's operation to ensure the media continues to be replaced at the frequency recommended by the media's manufacturer.

Overall, the low frequency of non-compliant discharges involving effluents generated and managed by the Project are evidence of the effectiveness of the Project's wastewater/effluent management practices and procedures. Baffinland will continue to update the Project's management practices and procedures and implement new mitigation measures as required to ensure effluent discharges to the receiving environment are in compliance with applicable water quality discharge criteria.

## Project Certificate Condition No. 25

Category	Landforms - Additional Geotechnical Investigations
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To mitigate impacts to sensitive landforms.
Term or Condition	The Proponent shall undertake additional geotechnical investigations to identify sensitive landforms, modify engineering design for Project infrastructure, develop and implement preventative and/or mitigation and monitoring measures to minimize the impacts of the Project's activities and infrastructure on sensitive landforms.
Relevant Baffinland Commitment	N/A
Reporting Requirement	Plan to be provided to the NIRB for review and comment at least 60 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Water Board, Indigenous and Northern Affairs Canada, Qikiqtani Inuit Association
Reference	Annual Geotechnical Inspections (Wood, 2020) 2019 Inspection of the Milne Inlet Tote Road and Associated Borrow Sources (Tetra Tech, 2019) Borrow Source Management Plan - Kilometre 97 (Baffinland, 2014b) 2020 QIA & NWB Annual Report for Exploration and Geotechnical Drilling Activities (Baffinland, 2021b) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

In 2020, Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), completed two (2) geotechnical inspections of the following Project facilities and infrastructure:

- Bulk fuel and waste storage facilities;
- Water management ponds and associated surface water drainage infrastructure;
- Polishing and Waste Stabilization Ponds (PWSPs);
- Select water crossings and areas along the Tote Road;
- Non-hazardous Landfill Facility;
- Landfarm Facility;
- Deposit No. 1 Pit walls;
- Existing and proposed rock quarries; and
- Critical watercourse crossings including bridges and selected culverts (12) along the Tote Road.

The inspections took place from June 26 to July 7, 2020 and from September 3 to September 11, 2020. The inspections were carried out in accordance with the guidelines set out in the Canadian Dam Association's Dam Safety Guidelines 2007 (CDA, 2013).

The inspections primarily focused on the following aspects:

- The structures were inspected for conformance with the design basis as presented in "as constructed" and "as-built" drawings (provided in the first and subsequent reports);
- The structures were specifically inspected for settlement, cracking, and seepage through the berms;
- The areas around the structures were examined for evidence of seepage;
- Quarry and pit walls were reviewed for relative stability.
- New structures under construction were reviewed for conformity with design drawings; and
- The berms of the containment structures were examined with respect to possible tears in liner membranes.

Geotechnical investigations continued to be conducted at Project sites and proposed infrastructure contained within the Phase 2 Proposal, to support engineering studies for future Project infrastructure. Geotechnical investigations completed by Wood can be found in Appendix G.14.

## RESULTS

Results from the geotechnical inspections at the Mine Site indicate there has been little to no erosion from wind or rain and the dykes constructed of the sand/gravel soil for fuel and waste storage facilities have remained stable at slopes of 3:1 and 4:1. As noted in previous years, there are minor signs of settlement appearing at Polishing and Waste Stabilization Ponds (PWSP's) 1, 2 and 3. The settlements are not differential settlements of the dykes but are minor overall settlements of the total structures with respect to the surrounding area. These settlements appear within the one (1) metre ( $\pm$ ) active layer above the permafrost and are of little concern as the PWSP's are temporary structures and the settlements have no effect on the dyke stability. The 2019 and 2020 bi-annual geotechnical inspections confirm that these berms have stable foundations, which is supported by the fact that there are no indications of differential settlements, sinkholes, or sloughing at the perimeter berms. Minor repairs and actions were recommended at PWSP 2 to remove timber/lumber, at Hazardous Waste Berms 3,4 and 5 to provide controlled/ramped access points for skid steers, at the generator fuel berm to correct minor disturbance by foot and vehicle traffic, and at the effluent discharge area to correct minor surface erosion. Actions were also recommended to address ponding water at the QMR2 quarry. These are scheduled to be addressed in 2021.

To address water seepage at the Mine Site Crusher Facility (CF), Baffinland implemented earthworks remediation recommended by a third party consultant in September 2019. Testing of this initial earthworks remediation confirmed that the ditch was still compromised as indicated by an occurrence of seepage that was identified on July 4, 2020. On July 4, 2020, Baffinland conducted a tracer dye investigation on the CF pad, which indicated that contact water on the pad was seeping through the pad and being released to the tundra down-gradient of the facility. The occurrence of seepage from the CF pad was reported to the NU-NT Spill Report Line on July 5, 2020 and a follow up spill report was submitted to CIRNAC and the NU-NT Spill Report Line on August 4, 2020. The seepage through the CF pad appeared to be flowing below the grade of the perimeter ditch system. The following remedial measures were implemented in July 2020 to mitigate the source of the contact water and prevent CF pad seepage from being released to down-gradient tundra:

- A regrading strategy was implemented for the surface of the ore crusher pad to prevent pooling of contact water on and around the CF pad and direct it to the CF surface water management pond (MS-06);
- A sump was constructed on the CF pad to collect contact water and pump it directly to the CF surface water management pond using a portable pump;
- A diversion berm was constructed parallel to the CF pad perimeter ditch on the pad side of the entire length of the ditch to act as a barrier to prevent contact water from draining to the perimeter ditch and to redirect it directly to the CF surface water management pond; and,
- Two temporary sumps were constructed at the foot of the downstream toe of the collection ditch to collect seepage from the CF pad and pump it to the CF surface water management pond using portable pumps.

At Milne Port, minor repairs and actions were recommended at the Hazardous Waste Storage facility, the Ore Stockpile pond and the landfarm containment area. Actions were also recommended to address minor sloughing and other minor repairs at four (4) surface water collection ditch locations.

Along the Tote Road, the abutments at the four (4) inspected bridges were observed to be in good condition and no scour in the riverbed around the abutments was observed. Monitoring of sandbar development observed near the south abutment at the KM 80 bridge was recommended. Water crossings by culverts at the inspected locations were observed to be generally in good condition. Minor repairs and actions to address minor erosion, culvert extensions and other minor observations were recommended at several locations.

As identified in previous years, Project activities have led to localized permafrost degradation along the Tote Road. Baffinland has developed a multi-year Execution Plan to address locations identified as high-priority. Implementation of the Execution Plan was initiated in 2019 and continued in 2020. Reclamation efforts executed in 2020 included significant dewatering of the KM 97 borrow areas to reduce permafrost degradation. Works outlined in the Execution Plan are expected to continue in 2021.

Details of the geotechnical investigations (e.g. drilling) completed in 2020 are discussed in the 2020 QIA & NWB Annual Report for Exploration and Geotechnical Drilling Activities (Baffinland, 2021b). The 2020 Geotechnical inspections reports, along with Baffinland's plans to address any identified concerns, are included in Appendix G.14.

## **TRENDS**

All water retention structures have continued to remain stable, with minor settling.

Tetra Tech assessed the Tote Road and associated borrow sources in 2009, 2014 and 2019. The observations have established that there are clear links between some borrow pit locations adjacent to the road and thaw settlement observed on the road embankment.

## **RECOMMENDATIONS / LESSONS LEARNED**

Results from geotechnical investigations conducted in 2020 will be used to support the design of future Project infrastructure. Recommendations outlined in the 2020 geotechnical inspections reports will be completed in 2021 to address outstanding issues at Milne Port and Mary River, and along the Tote Road.

Baffinland has developed a multi-year Execution Plan to address locations identified as high-priority in the Tetra Tech assessment of the Tote Road and associated borrow sources completed in 2019. Implementation of the multi-year Execution Plan was initiated in 2019 with significant efforts executed in 2020. Additional works outlined in the

Execution Plan are scheduled to continue in 2021. An action plan was submitted to the NWB and QIA to address these priority locations, and was included in the 2019 NIRB Annual Report.

In 2020, Baffinland continued to address permafrost degradation at the KM 97 Borrow Source by executing significant dewatering of the KM 97 borrow areas to reduce permafrost degradation. Baffinland plans to continue implementing the borrow source's progressive reclamation and rehabilitation plan outlined in Appendix B of the borrow source's approved management plan titled Borrow Source Management Plan - Kilometre 97 (Baffinland, 2014b).



## Project Certificate Condition No. 26

Category	Landforms and Soils - Erosion Management Plan
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To develop appropriate measures for preventing destabilization and erosion.
Term or Condition	The Proponent shall develop and implement a comprehensive erosion management plan to prevent or minimize the effects of destabilization and erosion that may occur due to the Project's construction and operation.
Relevant Baffinland Commitment	57
Reporting Requirement	Plan to be provided to the NIRB for review and comment at least 60 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Environmental Protection Plan (Baffinland, 2021d) Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2020e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

A comprehensive erosion management plan is included in the Project's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021e). An earlier revision of the SWAEMP was approved by the NWB prior to the commencement of Early Revenue Phase construction.

Activity specific sediment and erosion control measures and procedures used at the Project are also discussed within the Project's Roads Management Plan (Section 3.4.5) and Environmental Protection Plan (Baffinland, 2021d):

- Section 4.03 Land Disturbance;
- Section 4.09 Sediment and Erosion Control;
- Section 4.17 Road Construction and Borrow Development;
- Section 4.18 Tote Road Watercourse Crossing Installation;
- Section 4.25 Quarry and Borrow Pit Operation; and
- Section 2.27 Excavations and Foundations.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 27

Category	Landforms, Geology and Geomorphology - Natural Aesthetics
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts to natural aesthetics.
Term or Condition	The Proponent shall include within its public consultation report information related to the sentiments expressed by affected communities about the impacts that changes to the topography and landscape have had on the aesthetic value of the Project area.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active – Milne
Status of Compliance	In Compliance
Stakeholder Review	The Communities of: Arctic Bay, Clyde River, Sanirajak, Igloodik and Pond Inlet
Reference	2020 Community Meeting Notes
Ref. Document Link	Appendix B

### METHODS

Due to the travel/health restriction measures in Nunavut as established by the Government of Nunavut Public Health Department related to the COVID-19 Pandemic, Baffinland was unable to hold community group meetings at frequencies or in-person formats as done in previous years. Alternative methods were explored and implemented as described in Section 2.3. Regardless of format, meetings provide an important opportunity for Baffinland to share information with the Communities related to current operations, the results of ongoing environmental monitoring programs and future planning to support the development of the Project. These meetings provide an opportunity for community representatives to discuss ongoing concerns, interests in participating in the benefits related to the Project and any changes they may have seen in the landscape as a result of the Project. Community Group meetings held in 2020 are presented in Table 2.1 (Appendix B).

### RESULTS

Public consultation did not reveal any significant concerns from affected communities about specific impacts that changes to the topography and landscape have had on the aesthetic value of the Project area. Other comments about changes to the land and sea were focused on ensuring the effects of the Project were being monitored and mitigated, and concerns with potential Project related effects on land use (hunting and harvesting). Concerns related to dust (specifically on snow), which may be visible on the landscape depending on distance from the Project, continue to be voiced, particularly around Milne Port (Appendix B). There are also aesthetic concerns related to the use of dust-laden snow to make tea by land users traveling near Project sites (e.g., see February 2020 TEWG Meeting Records; Appendix C.2) .

Discussions on aesthetic values as they relate to mine closure and the final state of the mine following reclamation were initiated by Baffinland during the May 7, 2019 Community Risk Workshop at the Mary River Mine Site. While limited direct feedback on aesthetic values was gained during the workshop discussion, Baffinland will continue to

engage with Inuit to identify closure objectives and criteria that respect the aesthetic values and end land use, while incorporating and respecting Inuit Qaujimajatuqangit.

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to track and report on comments made regarding the aesthetic value of the Project area.

## Project Certificate Condition No. 28

Category	Landforms, Geology and Geomorphology - Permafrost
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure that permafrost integrity is maintained.
Term or Condition	The Proponent shall monitor the effects of the Project on the permafrost along the railway and all other Project affected areas and must implement effective preventative measures to ensure that the integrity of the permafrost is maintained.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Environment Climate Change Canada, Qikiqtani Inuit Association, Nunavut Water Board, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board.
Reference	Annual Geotechnical Inspections (Wood, 2020) 2019 Inspection of the Milne Inlet Tote Road and Associated Borrow Sources (Tetra Tech, 2019) Environmental Protection Plan (Baffinland, 2021d)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Bi-annual geotechnical inspections were completed by Wood Environment & Infrastructure Solutions in 2020, as required by the NWB Type 'A' Water Licence No. 2AM-MRY1325, for the following on-site engineered Project facilities and infrastructure:

- Bulk fuel and waste storage facilities;
- Water management ponds and associated surface water drainage infrastructure;
- Polishing and Waste Stabilization Ponds (PWSPs);
- Select water crossings and areas along the Tote Road;
- Non-hazardous Landfill Facility;
- Landfarm Facility;
- Deposit No. 1 Pit walls;
- Existing and proposed rock quarries; and
- Critical watercourse crossings including bridges and selected culverts (12) along the Tote Road.

Inspections in 2020 took place between June 26 to July 7, 2020 and from September 3 to September 11, 2020. The inspection reports are provided to regulators for review and comment. Inspections are carried out in accordance with the Canadian Dam Association (CDA) *Dam Safety Guidelines* (CDA, 2013).

The inspections primarily focused on the following aspects:

- The structures were inspected for conformance with the design basis as presented in "as constructed" and "as-built" drawings (provided in the first and subsequent reports);
- The structures were specifically inspected for settlement, cracking, and seepage through the berms;
- The areas around the structures were examined for evidence of seepage;
- Quarry walls were reviewed for relative stability;
- New structures under construction were reviewed for conformity with design drawings.

Geotechnical investigations continued to be conducted at Project sites and proposed infrastructure contained within the Phase 2 Proposal, to support engineering studies for future Project infrastructure. Additionally, in 2019 Baffinland retained Tetra Tech to complete an evaluation of the stability and condition of the Milne Inlet Tote Road and the historic borrow sources within the Tote Road corridor (Tetra Tech, 2019). The investigation completed by Tetra Tech was included in the 2019 Annual Report to the NIRB. Geotechnical investigations completed by Wood can be found in Appendix G.14.

## RESULTS

As identified in previous years, Project activities have led to localized permafrost degradation issues along the Tote Road and Mine Haul Road.

Previous bi-annual geotechnical inspections indicated that the Mary River PWSPs 1, 2 and 3 were noted to be experiencing minor overall settlements of the structures with respect to the surrounding area. The minor settlement was restricted to the berms. The 2019 and 2020 bi-annual geotechnical inspections confirmed that these berms have stable foundations, which is supported by the fact that there are no indications of differential settlements, sinkholes, or sloughing at the perimeter berms.

## TRENDS

Baffinland continues to monitor, research strategies and remediate identified locations as required. Tetra Tech assessed the Tote Road and associated borrow sources in 2009, 2014 and most recently in 2019. The observations have established that there are clear links between some borrow pit locations adjacent to the road and thaw settlement observed on the road embankment.

## RECOMMENDATIONS / LESSONS LEARNED

Project designs and the placement of infrastructure consider sensitive landforms and permafrost. Baffinland continues to have a third-party conduct bi-annual geotechnical inspections.

To improve historical permafrost degradation issues along the Tote Road, Baffinland will continue to develop and prioritize preventative and mitigation measures to minimize the impacts of the Project's activities and infrastructure on landforms along the Tote Road. To address recommendations from the Tetra Tech inspection, Baffinland has developed an Execution Plan for locations identified as high-priority. Implementation of the multi-year Execution Plan was initiated in 2019 with significant efforts executed in 2020. Additional works outlined in the Execution Plan are expected to continue in 2021.

## Project Certificate Condition No. 29

Category	Landforms, Geology and Geomorphology - Design Plans
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To confirm constructed components meet design as assessed.
Term or Condition	The Proponent shall provide to the respective regulatory authorities, for review and acceptance, for-construction engineering design and drawings, specifications and engineering analysis to support design in advance for constructing those facilities. Once project facilities are constructed, the Proponent shall provide copies of the as-built drawings and design to the appropriate regulatory authorities.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Fisheries and Oceans Canada (DFO), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	N/A
Ref. Document Link	<a href="ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/5%20CONSTRUCTION%20(D)/">ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/5%20CONSTRUCTION%20(D)/</a>

### METHODS

Not applicable.

### RESULTS

As required by the Project's Type 'A' Water Licence and Commercial Lease with QIA, several engineering submissions were provided to regulatory agencies and stakeholders throughout 2020, including Issued-for-Construction (IFC) Drawings, As-Built Drawings and Construction Summary Reports. A summary of the relevant submissions is provided in Table 4.13.

**Table 4.13: 2020 Submissions to Regulatory Agencies and Stakeholders**

Date of Submission	Regulatory Agencies and Stakeholders	Content
February 14, 2020	NWB, CIRNAC, QIA	Camp Lake Sediment and Erosion Control Measures – As-Built Documentation
April 30, 2020	NWB, CIRNAC, QIA	Stockyard #1 Expansion – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Milne Port 386 Person Camp – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Milne Port Settling Pond 1A – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Mine Truck Workshop – Construction Summary Report

Date of Submission	Regulatory Agencies and Stakeholders	Content
April 30, 2020	NWB, CIRNAC, QIA	Sailiivik Camp Effluent Line – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Mary River Tank Farm Piping and Electrical – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Milne Port Water Management Structures – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Mary River Tank Farm – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Milne Port Tank Farm Capacity Addition – Construction Summary Report
April 30, 2020	NWB, CIRNAC, QIA	Sailiivik Camp – Construction Summary Report
May 21, 2020	NWB, CIRNAC, QIA, ECC	Mine Site Waste Rock Facility Pond Expansion and Drainage System – Construction Summary Report
May 21, 2020	NWB, CIRNAC, QIA, ECC	Waste Rock Water Treatment Plant – Construction Summary Report
December 12, 2020	NWB, CIRNAC, QIA	KM 106 Run of Mine Stockpile and Sedimentation Pond – Construction Summary Report

In addition, relevant as-built documentation was submitted with the 2020 QIA & NWB Annual Report For Operation, for infrastructure completed in 2020. These include the following pieces of infrastructure;

- Camp Lake Sediment and Erosion Control Measures – As-Built Documentation
- Milne Port Fuel Module – As-Built Documentation

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to provide the appropriate regulatory agencies and stakeholders, for review and acceptance, design and engineering documentation, drawings and construction reports for Project infrastructure.

## Project Certificate Condition No. 30

Category	Landforms, Geology and Geomorphology - Quarries
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To provide oversight on quarry design and management.
Term or Condition	The Proponent shall develop site-specific quarry operation and management plans in advance of the development of any potential quarry site or borrow pit.
Relevant Baffinland Commitment	65
Reporting Requirement	Plans to be provided to the NIRB for review and comment at least 30 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

To date, site-specific management plans for quarries and borrow sources have been developed and provided to the relevant agencies prior to development, for active quarry sources. No new management plans were submitted to the NIRB for review and comment in 2020.

### RESULTS

During 2020, Baffinland operated several quarries and borrow sources to support Project road maintenance and infrastructure construction. Quarries and borrow sources in operation during 2020 included the Q1 Quarry at Milne Port, the QMR2 Quarry at the Mine Site and the KM 97 Borrow Source near the Mine Site. It should be noted that while specified substances were crushed and removed from the quarries Q1 and QMR2 in 2020, there were no blasting activities to support this extraction, as blasting had been completed in 2019. Newly proposed quarries have not been developed, are pending submission and/or review of Quarry Management Plans.

### TRENDS

None.

### RECOMMENDATIONS / LESSONS LEARNED

Site-specific management plans for new quarries and borrow sources will be developed and provided to the relevant agencies prior to development.



#### 4.6.6 Vegetation (PC Conditions 31 through 40)

Ten (10) PC conditions relate to the potential impacts of the Project on vegetation. Several of the conditions require the development of vegetation monitoring plans within the Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a).

##### **Inuit & Stakeholder Feedback**

Key stakeholders who have expressed concern regarding vegetation have include land users, the QIA, ECCC and the Government of Nunavut (GN). Comments have focused on desire to minimize the Project's overall footprint, concerns related to the potential introduction of invasive plants, and the potential for ore dust deposited on vegetation and soil to be taken up by plants, potentially affecting foraging wildlife such as caribou. Additionally, despite the climatic challenges to revegetation at closure, stakeholders have expressed an interest in revegetation being incorporated into reclamation plans. Responses to these issues are reflected in PC Conditions No. 31 through 40. Additionally, concerns about the long-term impacts of dust on vegetation and the importance of dust control and vegetation (including lichen) monitoring through measures of growth and metals in soils was voiced during the Phase 2 Community Risk Assessment Workshops (ERM, 2019), consistent with previous feedback. The feedback included concern that caribou, birds and other animals will be negatively impacted by consuming dust on vegetation (ERM, 2019).

##### **Monitoring Activities**

Baffinland's vegetation monitoring programs include the following components:

- Vegetation abundance monitoring;
- Vegetation and soil base metals sampling;
- Exotic invasive plant species monitoring program; and
- Dustfall monitoring.

The vegetation abundance monitoring program continued to be paused for the 2020 season, consistent with its 3 to 5 year schedule. The last sampling year was 2019. The 2019 program included 15 transects, 75 sites, and 179 plots. Fifteen control (Reference) sites were established within the Regional Study Area (RSA), approximately 20 Km from the Project footprint. Of these 15 Reference sites, nine were newly added in 2019. The evaluation of vegetation abundance monitoring methods demonstrated that the method used to measure vegetation is highly objective and repeatable, confirming that it is appropriate for addressing the vegetation abundance monitoring program's objectives. Direct loss of plant habitat remains limited to developed areas of the Project Development Area (PDA). Outside of this, there were no distinguishable Project-related effects on vegetation ground cover, canopy cover, or plant group composition. These results are consistent with the FEIS prediction of no significant impact.

The vegetation and soil base metals program was repeated in 2020 to verify results seen in 2019. Baseline metal concentrations across 2012, 2013, 2014, and 2016 sampling sites were below Project-specific thresholds. In 2020, samples were collected from 60 sites among the three Project areas (Milne Port, Tote Road, Mine Site) at varying distances from the Project Development Area (PDA). A subset of total metals referred to as contaminants of potential concern (CoPCs) were analysed: arsenic, cadmium, copper, lead, selenium and zinc. These six CoPCs were compared to available Canadian Council of Ministers of the Environment (CCME) agricultural soil quality guidelines to protect environmental and human health, and available toxicity indicator values for lichen. Most CoPC metal concentrations in lichen and soil in 2019 and 2020 remained low or undetectable. Soil-metal concentrations and lichen-metal

concentrations at the Project mainly indicated no significant increases compared with Baseline values. Some discrete increases in metal concentrations have been identified, but values were either below or within an acceptable range relative to guidelines. Predictions outlined in the Final Environmental Impact Statement (FEIS) stated that some soil metal levels would exceed criteria guidelines by the end of the Project life (arsenic, manganese, cobalt, chromium, copper, nickel, and selenium). It also predicted that that sensitive vegetation classes might be affected by metal uptake. However, vegetation changes were predicted to be indistinguishable from natural variation, limited to within and near the PDA, and not significant at the RSA scale.

Exotic invasive plant monitoring in 2020 targeted a single site where domestic tomato plants were growing in 2019. No tomato plants were observed during two separate visits in 2020, and no other exotic invasive plants were identified during incidental monitoring opportunities.

A revegetation research program was initiated in 2019, establishing test plots to monitor for post-disturbance natural revegetation. No formal follow-up monitoring on these plots was done in 2020 as the establishment rates are so low in the Baffin Island climate. Baffinland plans to revisit these plots in 2021 to assess revegetation progress, as well as review locations for new test sites with the intent to establish test plots across a range of landscapes intersected by the Project

Table 4.14 provides an evaluation of the Project's impacts on vegetation.

**Table 4.14: Vegetation Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Vegetation Health	Ore dust emissions result in an increase in concentrations of contaminants of potential concern in soils and vegetation	Vegetation and soil base metals sampling was completed in 2020.	Soil-metal and lichen-metal concentrations at the Project generally indicated no significant increases compared with Baseline values. Some discrete increases in CoPC metal concentrations have been identified, but all values were either below or within an acceptable range. Soil-metal and lichen-metal concentrations presently represent a low risk to environmental and human health. Results consistent with FEIS predictions.
Vegetation Abundance	Dustfall results in changes in species composition and vegetation abundance	Vegetation abundance monitoring was last completed in 2019.	No Project-related effects on vegetation ground cover, canopy cover or plant group composition. Results within FEIS predictions
Invasive Species	Invasive species introduction to North Baffin Island	Exotic Invasive Vegetation Targeted Monitoring was completed in 2020	Targeted follow-up monitoring of exotic invasive vegetation in 2020 did not detect the presence of the garden tomato ( <i>Solanum lycopersium</i> ) plants that were observed at the effluent outflow in 2019. No new exotic invasive vegetation were identified during targeted or incidental sampling in 2020. Results within FEIS predictions.

**Path Forward**

Soil-metal concentrations at the Project generally indicated no significant increases from the Baseline values, and sample values were below or within an acceptable range for soil-metal concentrations. Lichen-metal concentrations had some discrete increases at the Project, but all sample locations were below or within an acceptable range for lichen-metal concentrations. As such, soil-metal and lichen-metal concentrations presently represent a low risk to environmental and human health and safety. Baffinland will continue monitoring these conditions in 2021. Results from the targeted exotic invasive vegetation sampling in 2020 and the vegetation abundance monitoring program in 2019 indicate that these programs can continue at their scheduled frequency (i.e. every 3 to 5 years as outlined in the TEMMP).

## Project Certificate Condition No. 31

Category	Vegetation - Construction and Operations
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To minimize impacts to vegetation.
Term or Condition	The Proponent shall ensure that Project activities are planned and conducted in such a way as to minimize the Project footprint.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board
Reference	Environmental Protection Plan (Baffinland, 2016b) Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a) 2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020a) Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

Baffinland's Project design philosophy focuses on minimizing earthworks, re-using existing facilities, and using pre-assembled infrastructures to minimize construction activities in the Project area. Design activities undertaken to minimize the Project footprint include:

- Using pre-cast concrete where feasible, including the use of integrated module foundations;
- Using pre-assembled material packages, such as building wall and roof panels, ground conveyors, elevated conveyors, conveyor belts, fuel tanks etc.;
- Conducting Environmental Protection Plan training, which outlines the importance of minimizing disturbed land at the Project and the process that must be followed prior to construction on non-disturbed land;
- Ensuring appropriate approvals are met with applicable stakeholders and land lease agreement; and
- Documenting and tracking land disturbance approvals associated with the Project.

### RESULTS

As of the end of 2020, the total Project footprint is 556 ha. To date, all of Baffinland's construction activities for the Project have occurred within the Project Development Area (PDA). Baffinland also restricts any overland movement of equipment or personnel required to operate to existing site roads and laydowns. Any unauthorized land disturbance or deviation from the PDA is reported as an incident and is investigated. Overburden that is removed from an area to be disturbed is stockpiled for the remediation of the area, wherever possible and materials are suitable for re-use. No unauthorized land disturbance occurred in 2020, and all disturbed land is reported in the

Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021), which has been released to the Working Group for review and comment.

### **TRENDS**

The Project footprint has increased modestly during operations to facilitate maintenance activities and support the temporary production increase (e.g. expanding equipment laydowns). During construction activities, direct habitat loss occurred primarily due to surface disturbance, including compaction, burial, and removal. During the operations phase, vegetation loss occurs mainly as ore extraction expands within Deposit No. 1, laydowns are constructed for material storage and infrastructure development, and as quarries expand to support ongoing maintenance. The Project footprint impacts on vegetation have not exceeded FEIS predictions. Terrestrial vegetation studies have not detected any significant vegetation abundance trends and diversity within the RSA to date associated with Project's footprint.

### **RECOMMENDATIONS / LESSONS LEARNED**

Long-term vegetation surveys will continue to be monitored and used for analysis to determine if vegetation is being impacted outside of the PDA. The Project footprint will continue to be minimized wherever possible to limit land disturbance and associated impacts of the Project.

## Project Certificate Condition No. 32

Category	Vegetation - Construction and Operations
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent introduction of invasive species.
Term or Condition	The Proponent shall ensure that equipment and supplies brought to the Project sites are clean and free of soils that could contain plant seeds not naturally occurring in the area. Vehicle tires and treads in particular must be inspected prior to initial use in Project areas.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Water Board, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board
Reference	2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020a) Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

Service agreements and contracts sent to suppliers were updated at the beginning of 2018 to include a clause “All equipment delivered to site must be free and clear of soils that may contain seeds of invasive species.” Baffinland staff further visually monitor equipment and supplies during offloading to verify compliance.

### RESULTS

No exotic invasive plant species have been identified as being introduced via equipment or supplies brought to the Project sites. In 2019, an exotic species (garden tomato plant; *Solanum lycopersicum*) was observed growing at the Mine Site below the sewage/effluent discharge pipe during the 2019 exotic invasive species survey, presumably introduced via a food pathway and not related to equipment. Targeted monitoring was conducted in 2020 to verify the presence of garden tomato plants in this location. No tomato plants were found during two surveys during the growing season, and the population was determined to have been eradicated. Refer to PC Condition No. 37 for additional information.

### TRENDS

The potential for the introduction of exotic invasive vegetation appears to be well managed through current practices for reducing risk.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland staff and suppliers will continue to clean, inspect, and monitor all equipment and supplies before loading at source and during offloading at Milne Port, as applicable. If repeated non-compliance or incidents occurs, Baffinland will consider using a third-party auditor to monitor compliance.

### Project Certificate Condition No. 33

Category	Vegetation – Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To facilitate monitoring.
Term or Condition	The Proponent shall include relevant Monitoring and Management Plans within its Environmental Management System, Terrestrial Environment Management and Monitoring Plan (TEMMP).
Relevant Baffinland Commitments	57
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2

#### METHODS

The Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) includes vegetation monitoring consisting of the following components: vegetation abundance and composition, vegetation health, culturally-valued vegetation, exotic invasive vegetation, natural revegetation, and dustfall. The TEMMP is updated regularly to reflect adjustments to programs and analytical results, statistical power analysis, and input provided on programs by the TEWG, and annual review by the Nunavut Impact Review Board.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.



## Project Certificate Condition No. 34

Category	Vegetation – Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	Monitor metals concentrations in both soils and vegetation, particularly caribou forage (i.e., lichen) at varying distances from the PDA to compare metal concentrations in soil and vegetation between near (impacted) and far (control) sites. Determine if metal concentrations in soil and vegetation exceed CCME and relevant available threshold levels provided in the literature.
Term or Condition	The Proponent shall conduct soil sampling to determine metal levels of soils in areas with berry-producing plants near any of the project development areas, prior to commencing operations.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Mary River Project Final Environmental Impact Statement: Volume 6 — Terrestrial Environment (Baffinland, 2012) Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020a) Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021) 2020 TEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

This Project condition is addressed by implementing a long-term vegetation and soil base metals monitoring program described in the TEMMP. Given that dustfall deposition is the primary source of anthropogenic metals at the Project, the vegetation and soil base metals monitoring program has been designed to align and facilitate comparisons with the dustfall monitoring program to assess metals uptake in vegetation soils related to Project activities.

The study design examines spatio-temporal trends in soil-metals and lichen-metals by comparing metal concentrations ‘Before’ the development period (i.e., baseline sampling) and ‘After’ the development period (i.e., post-baseline sampling). Soil and vegetation sampling is conducted in three-to-five-year intervals, typically during the summer (late July to early August). So far, baseline data collection was completed in 2012, 2013, 2014, and 2016; post-construction data collection was completed in 2019 and 2020. Monitoring in 2020 was completed outside of the 3 to 5 year schedule to verify results seen in 2019 sampling.

The study area was divided into three Project areas (Milne Port, Tote Road, Mine Site), and sampling was conducted at three distances from the PDA (Near: 0–100 m, Far: 101–1,000 m, and Reference: >1,000 m). Sampling distances

were informed based on the dustfall monitoring program results; vegetation and soil sample sites were paired in proximity to permanent dustfall locations.

Soil and vegetation samples were analyzed for a total of 36 elements. Reporting and interpretation of data trends focused on six (6) Contaminants of Potential Concerns (CoPCs): arsenic (As), cadmium (Cd), copper (Cu), lead (Pb), selenium (Se), and zinc (Zn). Base metal concentration thresholds and indicator values were informed by soil quality standards in Canada and values drawn from peer-reviewed literature relevant to the Canadian Arctic. All soil-metals and lichen-metals sample data were vetted and compared with CCME soil quality guidelines and lichen indicator values. Any aberrant values or potential exceedances (i.e., above CCME threshold or lichen indicator values) were flagged and communicated to Baffinland personnel. Data trends and statistical relationships were then examined according to the project area and sampling distances (listed above) to identify tendencies that could warrant further investigation.

## RESULTS

Comprehensive summaries of the 2020 Monitoring Program are presented in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021), which has been released to the Working Group for review and comment. The soil-metal concentrations mainly indicated no significant increases from Baseline values. The concentrations were below or within an acceptable range for soil-metal concentrations. (note: discrete soil-metal exceedances were recorded at two sample sites; the sources of these exceedances were identified and flagged for future monitoring and investigation). Lichen-metal concentrations had some discrete increases near the PDA, but all sample locations were below or within an acceptable range for lichen-metal concentrations. As such, soil-metal and lichen-metal concentrations presently represent a low risk to environmental and human health and safety.

Dustfall deposition is presumed to be the primary source of increased metals in soil and vegetation at the Project. A forthcoming objective of the study design based on feedback provided by the TEWG is to align and (where possible) correlate data from the dustfall monitoring program. This is intended to bridge interpretations of the effects of dustfall on soil-metal and lichen-metal concentrations and align any corrective actions. So far, no cohesive trends have been identified. Further analysis following additional data collection will help draw meaningful conclusions and recommendations. These outcomes will be presented (as necessary) to examine the current and potential value of this information to inform the vegetation and soil base metals monitoring program.

## TRENDS

So far, no cohesive trends have been identified. Further analysis following additional data collection will help draw meaningful conclusions and recommendations. One additional year of sampling following the 3 to 5 year schedule is required for statistical trend analysis for the vegetation and soil base metals monitoring program.

## RECOMMENDATIONS / LESSONS LEARNED

Soil-metal and lichen-metal concentrations presently represent a low risk to environmental and human health and safety. Future monitoring and subsequent analysis would assist in enhancing understanding of the relationship between dustfall and the vegetation and soil base metals monitoring program.

## Project Certificate Condition No. 35

Category	Vegetation - Monitoring
Responsible Parties	The Proponent, local Hunters and Trappers Organizations
Project Phase(s)	Construction, Operations
Objective	To determine baseline metal levels in foraging caribou.
Term or Condition	The Proponent shall undertake monitoring of baseline metal levels in organ tissue from caribou harvested within the local study area, prior to commencing operations. The Proponent is strongly encouraged to coordinate with local Hunters and Trappers Organizations regarding procurement of harvested caribou organs.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

As part of the approved Northern Contaminants Program (NCP) project funding for the 2020-2021 Caribou Contaminant Monitoring Program, of which Baffinland Iron Mines Corporation is a collaborator, tissue samples of caribou harvested by hunters will be analyzed for metals, in addition to other potential contaminants. NCP project co-leads are working with the GN and the Mittimatalik Hunters and Trapper Organization to secure samples for analysis.

### RESULTS

Three (3) samples for Baffin caribou were collected in 2020, which included two liver, two muscle, one kidney and one incisor bar. The samples are currently undergoing analysis. Results will be shared with the TEWG as they become available.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland maintains that collaboration with a planned regional-level collection program is the most beneficial way to address the requirements of PC Condition No. 35. Tissues would be analyzed by a third party on a regional scale and would contribute data to an Arctic-wide monitoring program. Baffinland intends to work with the GN and Northern Contaminants Program to understand how it can support the program further in 2021.

## Project Certificate Condition No. 36

Category	Vegetation – Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	Measure percent plant cover and plant group composition of available caribou forage within the RSA to track potential changes at varying distances from the edge of the PDA through long-term monitoring.
Term or Condition	The Proponent shall establish an ongoing monitoring program for vegetation species used as caribou forage (such as lichens) near Project development areas, prior to commencing operations.
Relevant Baffinland Commitments	67
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Mary River Project Final Environmental Impact Statement: Volume 6 — Terrestrial Environment (Baffinland, 2012) 2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020a) 2020 TEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

The vegetation abundance and diversity monitoring program considers the abundance and composition of caribou forage at sites of varying distances from the Mine Site, Milne Port, and the Tote Road. Lichen (caribou forage) monitoring is included in the broader vegetation abundance program. The vegetation abundance program operates on a 3 to 5 year schedule; the program was last run in 2019 and is currently scheduled to be repeated in 2022.

### RESULTS

Direct loss of plant habitat remains limited to developed areas of the PDA. Outside of this, there were no distinguishable Project-related effects on vegetation ground cover, canopy cover, or plant group composition based on 2019 vegetation abundance results. These results are consistent with the FEIS prediction of no significant impact.

### TRENDS

There was evidence of annual variation in total vegetation abundance and specific plant group cover in the Project area, but no evidence that these changes were due to a Project-related effect in 2019. These differences were attributed to natural variation between years rather than a Project-related effect. Trends will continue to be examined when vegetation abundance and diversity monitoring and analyses are repeated (planned for 2022).

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue with the scheduled vegetation abundance and diversity monitoring program per the TEMMP.

## Project Certificate Condition No. 37

Category	Vegetation – Monitoring
Responsible Parties	The Proponent, Government of Nunavut Department of Environment
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent establishment of invasive species.
Term or Condition	The Proponent shall incorporate protocols for monitoring for the potential introduction of invasive vegetation species (e.g. surveys of plant populations in previously disturbed areas) into its Terrestrial Environment and Monitoring Plan. Any introductions of non-indigenous plant species must be promptly reported to the Government of Nunavut Department of Environment.
Relevant Baffinland Commitments	43, 68
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016c) 2020 TEWG Meeting Records 2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

Exotic invasive vegetation monitoring was focused on surveying previously disturbed areas within and adjacent to the Project footprint. Presence/absence sampling was used to search for exotic invasive vegetation where invasive plants could be found (i.e., disturbance areas along buildings, infrastructure, road ditches, and pullouts). Most areas were surveyed on foot, with some sections surveyed from a vehicle travelling at slow speeds along the Tote Road. Each of the three focal areas (Mine Site, Milne Inlet, and Tote Road) was surveyed to the extent permitted to safely walk or drive in the Project footprint.

As outlined in the TEMMP, exotic invasive vegetation and natural regeneration monitoring are scheduled every three to five years or as triggered by observations of exotic invasive plant species. Exotic invasive species monitoring occurred in 2014 and 2019. In 2020, targeted exotic invasive species monitoring focused on one location where an exotic plant was located during the 2019 survey.

### RESULTS

One exotic species (garden tomato plant; *Solanum lycopersicum*) was observed growing at the Mine Site below the sewage/effluent discharge pipe during the 2019 survey. A total of 20 plants were scattered throughout the rock armour and down the outlet pipe's slope. All plants were in a vegetative state, and none were flowering or fruiting. Due to the short growing season and the growth requirements of tomatoes, the plants were not capable of producing flowers or fruit and were not acting invasive, and were not expected to survive over the winter. Targeted

monitoring was conducted in 2020 to verify the presence/absence of garden tomato plants in this location. No tomato plants were found during two surveys (July 13 and July 20, 2020) during the growing season, and the population was determined to have been eradicated.

#### **TRENDS**

The garden tomato plants noted in the 2019 surveys were the only exotic plant found during exotic invasive plant surveys to date for the Project. The potential for the introduction of exotic invasive vegetation appears to be well managed through current practices for reducing risk.

#### **RECOMMENDATIONS / LESSONS LEARNED**

As demonstrated by the detection and response to the garden tomato plants, Baffinland's exotic invasive plant monitoring program is effective at detecting and managing exotic invasive plants before they can establish permanent populations. The program will continue to monitor for exotic invasive plants in disturbed areas following methods outlined in the TEMMP.

## Project Certificate Condition No. 38

Category	Vegetation - Adaptive Management
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts to vegetation abundance, diversity, and health.
Term or Condition	The Proponent shall review, on an annual basis, all monitoring information and the vegetation mitigation and management plans developed under its Environmental Management System, Terrestrial Environment and Monitoring Plan (TEMMP) and adjust such plans as may be required to effectively prevent or reduce the potential for significant adverse Project effects on vegetation abundance, diversity and health.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be included in the Annual Report submitted to the NIRB
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board, Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016c) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

The vegetation monitoring program findings are summarized in each Terrestrial Environment Annual Monitoring Report for the given assessment year (EDI, 2021). As part of an adaptive management approach, these findings are carefully reviewed by Baffinland and presented to the TEWG to discuss the study design and methods' effectiveness. Recommendations to modify the vegetation monitoring programs are evaluated and implemented based on the appropriate rationale supported by data trends, interpretations, and statistical analyses. Any changes to assessment objectives and protocols are documented in the Terrestrial Environment Annual Monitoring Reports and the TEMMP.

### RESULTS

No adjustments to monitoring methods have been identified for the 2021 year.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

The current adaptive management approach based on engagement with the working groups has led to modifications to the study design and methods supported by data trends, interpretations, and statistical analyses. Baffinland will continue with implementation of this approach.



## Project Certificate Condition No. 39

Category	Vegetation - Reclamation and Revegetation
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent erosion and promote progressive revegetation of disturbed areas.
Term or Condition	The Proponent shall develop a progressive revegetation program for disturbed areas that are no longer required for operations, such program to incorporate measures for the use of test plots, reseeding and replanting of native plants as necessary. It is further recommended that this program be directly associated with the management plans for erosion control established for the Project.
Relevant Baffinland Commitment	39
Reporting Requirement	To be provided to the NIRB for review and comment at least 60 days prior to commencement of construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board
Reference	Interim Closure and Reclamation Plan (Baffinland, 2018a) Revegetation Survey & Preliminary Reclamation Trail (EDI, 2020b) Implications for Reclamation Practices & Trials at the Mary River Project (EDI, 2019)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

As described in the ICRP, a Reclamation Research program was proposed to identify best practices for promoting natural revegetation that will inform the progressive revegetation program for disturbed areas that are no longer required for operations. Due to limited research conducted to date for mines in the Canadian Arctic, the research will focus on the development of methods to successfully achieve sustainable vegetation cover that meets the desired land use for the Project sites post-closure in the shortest duration possible. These sites include gravel roads, gravel pads, waste rock, stockpiles, and waste dumps. The objective of the Reclamation Research Program is to identify methods to successfully achieve a sustainable vegetation cover, and the ability of a vegetation cover to enhance physical stability and/or achieve the desired aesthetic conditions for the Project site at closure.

In 2019, Baffinland retained EDI to complete a desktop review of available practices and recent advances from Arctic mine reclamation in Canada's northern territories and Alaska, USA (EDI, 2019). Following this, a field program to assess current conditions and establish test plots was implemented in 2019. EDI developed a pilot study designed to document the status of select post-disturbance areas of the Site, initiate preliminary reclamation trials to assess methods and approaches considered appropriate for the challenges of the Arctic environment, and identify future research opportunities (EDI, 2020b). Following a survey of existing disturbance sites, the pilot program involved the establishment of reclamation plots to assess methodologies for surface preparation. Two surface configurations were applied: (1) 'rough and loose' where the digging bucket of an excavator/loader is used to open small holes and generate mounds with the landscape, creating heterogeneity and micro-site conditions favourable to seed germination; and (2) 'track packing' which refers to the use of tracked equipment to create surface roughness and

is typically used to reduce soil erosion potential by enhancing surface stability, as well as providing micro-site conditions for seed germination.

#### **RESULTS**

A field study for the revegetation program was not conducted in 2020, as the ability to measure revegetative success within a single year is limited. The test plot locations were maintained in 2020, and will be revisited in 2021 to evaluate revegetative success to date.

#### **TRENDS**

Not applicable for 2020.

#### **RECOMMENDATIONS / LESSONS LEARNED**

In 2021 Baffinland will implement a field study to re-visit and monitor the test plots established in 2019. Additionally, locations for new test sites will be reviewed, with the intent to establish test plots across a range of landscapes intersected by the Project. If possible, medium scale sites may be reviewed where mine-disturbed areas are no longer required for operations and can be set aside for reclamation trials.

## Project Certificate Condition No. 40

Category	Vegetation - Reclamation and Revegetation
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent erosion and promote progressive revegetation of disturbed areas.
Term or Condition	The Proponent shall include revegetation strategies in its Site Reclamation Plan that support progressive reclamation and that promote natural revegetation and recovery of disturbed areas compatible with the surrounding natural environment.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	QIA
Reference	Interim Closure and Reclamation Plan (Baffinland, 2018a) Revegetation Survey & Preliminary Reclamation Trail (EDI, 2020b) Implications for Reclamation Practices & Trials at the Mary River Project (EDI, 2019)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

As described in the ICRP, a Reclamation Research program was proposed to identify best practices for promoting natural revegetation that will inform the progressive revegetation program for disturbed areas that are no longer required for operations. Due to limited research conducted to date for mines in the Canadian Arctic, the research will focus on the development of methods to successfully achieve sustainable vegetation cover that meets the desired land use for the Project sites post-closure in the shortest duration possible. These sites include gravel roads, gravel pads, waste rock, stockpiles, and waste dumps. The objective of the Reclamation Research Program is to identify methods to successfully achieve a sustainable vegetation cover, and the ability of a vegetation cover to enhance physical stability and/or achieve the desired aesthetic conditions for the Project site at closure.

In 2019, Baffinland retained EDI to complete a desktop review of available practices and recent advances from Arctic mine reclamation in Canada's northern territories and Alaska, USA (EDI, 2019). Following this, a field program to assess current conditions and establish test plots was implemented in 2019. EDI developed a pilot study designed to document the status of select post-disturbance areas of the Site, initiate preliminary reclamation trials to assess methods and approaches considered appropriate for the challenges of the Arctic environment, and identify future research opportunities (EDI, 2020b). Following a survey of existing disturbance sites, the pilot program involved the establishment of reclamation plots to assess methodologies for surface preparation. Two surface configurations were applied: (1) 'rough and loose' where the digging bucket of an excavator/loader is used to open small holes and generate mounds with the landscape, creating heterogeneity and micro-site conditions favourable to seed germination; and (2) 'track packing' which refers to the use of tracked equipment to create surface roughness and is typically used to reduce soil erosion potential by enhancing surface stability, as well as providing micro-site conditions for seed germination.

**RESULTS**

A field study for the revegetation program was not conducted in 2020, as the ability to measure revegetative success within a single year is limited. The test plot locations were maintained in 2020, and will be revisited in 2021 to evaluate revegetative success to date.

**TRENDS**

Not applicable for 2020.

**RECOMMENDATIONS / LESSONS LEARNED**

In 2021 Baffinland will implement a field study to re-visit and monitor the test plots established in 2019. Additionally, locations for new test sites will be reviewed, with the intent to establish test plots across a range of landscapes intersected by the Project. If possible, medium scale sites may be reviewed where mine-disturbed areas are no longer required for operations and can be set aside for reclamation trials.

#### 4.6.7 Freshwater Environment (PC Conditions 41 through 48a)

Nine (9) PC conditions (includes No. 48 and 48a) relate to the potential impacts of the Project on the freshwater environment, focused on fish and other freshwater biota. Several of the conditions recommend environmental protection measures, such as setbacks from watercourses and meeting blasting thresholds, or relate to meeting discharge requirements for effluents and runoff (the latter is evaluated in Section 4.6.5).

##### **Inuit & Stakeholder Feedback**

The Department of Fisheries and Oceans Canada (DFO) administers the fish and fish habitat sections of the *Fisheries Act* and is therefore the primary stakeholder with respect to freshwater biota. The Nunavut Water Board also regulates in-water structures such as bridges and culverts. The QIA in previous environmental reviews has also provided valuable feedback for freshwater biota. Freshwater biota has not been a key concern for local communities, as the Project does not interact with freshwater bodies containing anadromous (sea run) arctic char. For most stakeholders, the use of explosives near or in fish bearing waters was a key area of concern. Effects to fish and freshwater biota have not been raised in 2020 consultation activities (Appendix B).

##### **Monitoring Activities**

Monitoring activities undertaken in relation to the freshwater environment include:

- Monitoring of fish habitat offsetting measures associated with the 2007 Authorization under the Fisheries Act for water crossings along the Tote Road (DFO, 2007);
- Monitoring of the freshwater environment as part of the Aquatic Effects Monitoring Program (AEMP), including water and sediment quality, phytoplankton, benthic invertebrates and fish, as well as sedimentation rates; and,
- Monitoring of the water quality at representative water crossings under the Tote Road Monitoring Program (TRMP) to assess the potential for project-related effects as a result of sedimentation and erosion.

The fish habitat monitoring associated with the Tote Road Fisheries Act Authorization, identified that all compensation works completed prior to 2020 continued to be successful in 2020, including fish use of the rustic fishway installed at BG-30. In 2020, there was no in-stream construction works at crossings classified as Harmful Alteration, Disruption or Destruction (of Fish Habitat) (HADD), compensation, and Letters of Advice (LOA) crossings. Work completed since the previous 2019 Annual Report included remedial works at six (6) culvert crossings at fish bearing sites (CV-129, CV-114, CV-111, CV-106, CV-30 and CV-225).

The AEMP encompasses several component studies, including the Core Receiving Environment Monitoring Program (CREMP). The results of the 2020 CREMP indicated some mine-related influences on water and sediment quality of a few of the mine primary receiver systems, but no ecologically significant, adverse, mine-related effects to biota were identified in any of the Mine Site waterbodies based on comparisons to applicable reference conditions or baseline data. This includes: Camp Lake and tributaries, Sheardown Lake and tributaries, and Mary River and Mary Lake.

Lake Sedimentation monitoring at the Sheardown Lake NW Mine Site indicate that sedimentation rates are generally consistent with baseline except in the shallow stations, while accumulation rates were well below the proposed low action threshold of 0.15 mm. Overall, the 2019 to 2020 results indicated no effects on arctic charr reproductive success were likely at Sheardown Lake NW as the result of sedimentation rates/accumulation over the 2019 to 2020

egg incubation/larval pre-emergence period and, based on these results, no further management response was triggered for future studies.

Table 4.15 provides an evaluation of the Project's impacts on the freshwater environment, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.15: Freshwater Environment Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Freshwater Biota	Culvert replacements or extensions; sea container crossings were removed	Monitoring undertaken in accordance with the 2007 authorization under the <i>Fisheries Act</i> .	All compensation works are effective. Within FEIS predictions
	Culvert perching	Monitoring undertaken in accordance with the 2007 authorization under the <i>Fisheries Act</i> .	Perching of culverts was noted remaining at two (2) crossings. Effect within FEIS predictions
	Water withdrawals from lakes affecting nearshore fish habitat	Measure/monitor and report water usage in accordance with water licence limits	Water usage generally within water licence limits. Effect within FEIS predictions
	Fish impingements at camp and dust suppression water takes	No monitoring; appropriate screens are used on all intakes	Within FEIS predictions

### Path Forward

Baffinland plans to continue the implementation of improvements outlined in the TREEP and the Hatch 2013 design throughout 2021 to improve surface water drainage along the Tote Road and address outstanding fish passage concerns. Baffinland has initiated engagement with the MHTO regarding monitoring of arctic char in freshwater bodies near Milne Inlet, and will continue to engage with the MHTO on the development and implementation of a monitoring program in 2021.

## Project Certificate Condition No. 41

Category	Freshwater Aquatic Environment - Setbacks
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts of runoff into freshwater aquatic habitat.
Term or Condition	Unless otherwise approved by regulatory authorities, the Proponent shall maintain a minimum 100-metre naturally-vegetated buffer between the high-water mark of any fish-bearing water bodies and any permanent quarries with potential for acid rock drainage or metal leaching.
Relevant Baffinland Commitment	64, 65
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Water Board, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board
Reference	Borrow Pit and Quarry Management Plan (Baffinland, 2014c) Q1 Quarry Management Plan (Baffinland, 2020h) QMR2 Quarry Management Plan (Baffinland, 2017) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland maintains the 100 metre buffer from the high water mark to any fish bearing water bodies during the development and operation of the quarries at the Project. Baffinland continues to evaluate active quarries to assess the potential for generating Acid Rock Drainage (ARD) or Metal Leaching prior to and during development. Geochemical investigations have been carried out at the proposed sites, and ARD sources are avoided to the extent practicable. Additionally, Baffinland maintains specific quarry management plans that outline testing requirements to identify potential acid rock drainage material encountered during quarry operation and maintains appropriate buffers to fish bearing waters.

### RESULTS

No new quarries were developed in 2020. Existing quarries maintained the 100 metre buffer from the high water mark to any fish bearing water bodies. In 2020, there were no additional geochemical analyses completed for quarry sites at the Project, as there were no blasting activities conducted. All materials utilized from the Project quarries for construction in 2020 were blasted in 2019, therefore there was no borehole drilling and analysis of borehole samples. A discussion of geochemistry sampling of quarry rock and surface water runoff monitoring downstream of Project areas and quarries is provided in Section 9.5 and Section 7.4, respectively, of the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

New quarry developments will continue to be tested for ARD and metal leaching using the Protocol for the Assessment for the Potential for Acid Rock Drainage (Borrow Pit and Quarry Management Plan, Appendix 2) and the 100 metre buffer from the high water mark to any fish bearing water bodies will be maintained.

As no additional sampling was completed in 2020 at Project quarries, further evaluation of the potential for Acid Rock Drainage and Metal Leaching (ARD/ML) was not completed. In 2021, Baffinland will continue to monitor and evaluate any new geochemical data collected at Project quarries should blasting activities resume, in an effort to refine and expand the available dataset and assess the potential for ARD/ML from Project quarries.



## Project Certificate Condition No. 42

Category	Freshwater Aquatic Environment - Setbacks
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts of runoff into freshwater aquatic habitat.
Term or Condition	The Proponent shall maintain minimum a 30-metre naturally-vegetated buffer between the mining operation and adjacent water bodies.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board
Reference	Surface Water and Aquatic Ecosystems Management Plan (Baffinland, 2021g) Environmental Protection Plan (EPP; Baffinland, 2021d) Terrestrial Environmental Management and Monitoring Plan (TEMMP; Baffinland, 2016a) Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

Baffinland continues to perform regular inspections during construction activities to ensure all Project-related operations are at a distance greater than 31 metres from any water body, except where authorized under the Type 'A' Water License and DFO Letters of Advice. If infractions are discovered, responsible departments for development areas are actioned to remove materials or infrastructure, and to reclaim the developed area. New proposed development areas must be approved by the Baffinland Site Environment Department to ensure the area has a setback of 31 metres from the high water mark of natural water bodies. Consultants preparing design drawings for new infrastructure are also made aware of the requirement. Baffinland conducts orientation training on the EPP for new contractors. The presentation provides an overview of key Project activities and the required natural vegetation buffers to any waterbodies.

### RESULTS

No permanent or temporary Project-related operations were sited within 31 metre of a water body during 2020.

### TRENDS

Project operations have maintained the 31 metre buffer between water bodies, except where authorized under the Type 'A' Water License and DFO Letters of Advice, and the condition continues to be enforced.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland personnel continue to monitor all new Project developments to ensure the 31 metre buffer condition is adhered to, unless authorized under the Type 'A' Water License and DFO Letters of Advice. Baffinland will ensure all requirements and mitigation measures are clearly communicated to Baffinland staff and contractors.

### Project Certificate Condition No. 43

Category	Freshwater Aquatic Environment - Drainage
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To mitigate impacts of runoff into freshwater aquatic habitat.
Term or Condition	Prior to the start of construction, the Proponent must submit a Site Drainage and Silt Control Plan to the appropriate regulatory authorities for approval.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2020e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

#### METHODS

Drainage plans for Project sites and silt/sediment control measures used at the Project are outlined in the Project's Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021g). A modification to the Type 'A' Water Licence for the implementation of the Milne Port Surface Water Management Plan was approved in 2018. This plan was developed to manage surface water at Milne Port and reduce the volume of surface water in contact with project infrastructure by diverting surface flow using berms, ditching and culverts around and through developed areas of the Project.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

The SWAEMP will continue to be followed and enforced at the Project. In 2021, Baffinland will seek a modification to the Type 'A' Water Licence for the implementation of a Long Term Water Management Plan for the Mary River Mine Site, to address areas where sedimentation and erosion issues have been identified through Project monitoring.

## Project Certificate Condition No. 44

Category	Freshwater Aquatic Environment - Explosives
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts of explosives on freshwater aquatic habitat.
Term or Condition	The Proponent shall meet or exceed the guidelines set by Fisheries and Oceans Canada for blasting thresholds and implement practical and effective measures to ensure that residue and by-products of blasting do not negatively affect fish and fish habitat.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky, 1998) Environmental Protection Plan (Baffinland, 2021d)
Ref. Document Link	N/A

### METHODS

Baffinland implements the management practices for blasting in or near water as outlined in Section 4.24 the Environmental Protection Plan (BAF-PH1-830-P16-0008, Baffinland, 2021d).

### RESULTS

No blasting occurred in 2020 within the required setback distances detailed in the DFO guidance document titled “*Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*” (Wright and Hopky, 1998).

### TRENDS

Not applicable. To date, no blasting has occurred within the required setback distances at the Project.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 45

Category	Freshwater Aquatic Environment - General
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts to freshwater aquatic habitat.
Term or Condition	The Proponent shall adhere to the No-Net-Loss principle at all phases of the Project to prevent or mitigate direct or indirect fish and fish habitat losses.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Fisheries and Oceans Canada (DFO)
Reference	<p>Fisheries Authorization No. NU-06-0084 (For Tote Road Water Crossings; DFO, 2007)</p> <p>Fisheries Authorization No. 14-HCAA-00525 (For Ore Dock; DFO, 2014)</p> <p>Fisheries Authorization No. 18-HCAA-00160 (For Freight Dock; DFO, 2019)</p> <p>No Net Loss and Monitoring Plan (Knight Piésold, 2007)</p> <p>Fish Habitat Monitoring - 2020 Annual Report - Early Revenue Phase - Tote Road Upgrades (Baffinland, 2020g)</p> <p>2019 Milne Ore Dock Fish Offset Monitoring Report (Golder, 2019b)</p> <p>Floating Freight Dock Project – Revised Effectiveness Monitoring Plan for Coarse Rock Offsetting Habitat (Golder, 2019c)</p> <p>2019 Environmental Monitoring Completion Report - Milne Port Freight Construction Project, Baffin Island, Nunavut (Golder, 2020b)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

The three (3) above-referenced *Fisheries Act* Authorizations (DFO, 2007; DFO, 2014; DFO, 2019) are the regulatory instruments by which Baffinland is required to demonstrate adherence to the No-Net-Loss Principle. Annual monitoring programs of habitat off-setting works associated with Project fish bearing water crossings (i.e. culverts, bridges), the Milne Port Ore Dock and Milne Port Freight Dock were undertaken in 2020 as described below. In 2020, no other in-water construction works requiring a *Fisheries Act Authorization* were completed.

2020 assessments of Project fish bearing water crossings were completed by a third-party Professional Fisheries Biologist in June and September 2020. The emphasis of the 2020 monitoring program was to assess the presence of fish, habitat quality, and fish passage success at Project fish bearing water crossings. The 2020 monitoring program also resurveyed water crossings that had previously been identified as non-fish bearing to confirm continued lack of fish use.

## RESULTS

### *Milne Inlet Tote Road Water Crossings (Fisheries Act Authorization No. NU-06-0084)*

During the 2020 assessments, fish were captured and/or observed at thirteen (13) of the fish bearing crossings. Fish were not captured or observed at any of the remaining twenty-four (24) fish-bearing crossings in spring 2020. Fish presence at the Tote Road stream crossing areas and overall catch rates from spring 2020 were relatively low compared with previous years. These differences are attributed to the timing of the survey in 2020. Prior to 2020, surveys were typically conducted later in the spring freshet or later in the open-water season. Due to flight scheduling challenges associated with the COVID-19 Pandemic, the 2020 spring survey was largely conducted during peak freshet. Flows were higher and water temperatures lower during the spring 2020 survey relative to previous surveys and it is likely that seasonal movements of juvenile char from overwintering habitat to the stream crossing areas had not yet occurred or were limited at the time of the spring 2020 survey. No fish were observed at water crossings that had been categorized as non-fish bearing, confirming their previously determined status. It was also noted that compensation works completed prior to 2020 remained successful.

No fish passage or habitat issues were documented at 25 of the 37 fish bearing water crossings. Potential issues with fish passage and/or habitat were observed at twelve (12) fish bearing water crossings. To improve conditions at these sites, remediation actions were planned and implemented in early September 2020. Six of these crossings (CV-129, CV-114, CV-111, CV-106, CV-225, and BG-50) involved culverts that were identified as perched in spring 2019 and for which remediation measures were undertaken in fall 2019 or early spring 2020. Three sites (CV-129, CV-114, and CV-106) required minor repairs to the rocky ramps (damage was caused during freshet 2020) installed in 2018 and 2019 to restore full access. The third-party consultant completed this work by hand without the use of mechanized equipment or any disturbance occurring to the bed and banks of the watercourses. Additional remediation is required to eliminate the perch at BG-50. At water crossing CV-129, the culvert is damaged and requires repair. The perch at CV-111 remains too high to effectively mitigate with a rocky ramp and additional/alternative works will be required. The rock ramp installed at BG-50 in fall 2019 was washed away by high flows through the culverts during the 2020 freshet and alternative remediation works will be required at this site. Baffinland will work with the DFO prior to instream remediation work before establishing a practical course of action for addressing the perched culvert outlets at the CV-111 and BG-50 crossings.

At CV-076, there was also seepage under the road 5 m south of the culverts, though the culverts were not obstructed. Baffinland is evaluating options for sealing the seepage at this site including reinforcing the road embankments during non-flowing winter months. The spring 2020 survey identified that culverts at CV-057 were nearly completely buried by sediment, which is a recurring problem at this site. Baffinland will remove the accumulated sediment during non-flowing winter months. Options for addressing the sedimentation at CV-057 will be discussed with the DFO prior to remediation work proceeding during non-flowing winter conditions. During the 2021 open-water season, Baffinland will monitor turbidity upstream and downstream of this crossing and inspect the road embankment and upstream sections of the stream to identify and address potential sources of sedimentation with control measures if required. Additional efforts are planned in 2021 to address these outstanding concerns.

At Tote Road site CV-030, water flow was diverted from CV-031 into CV-030 during freshet due to ice blockage of the culvert. No culvert fish passage issues were identified by the third-party Professional Fisheries Biologist as a result of the diversion, however, the diversion caused flooding, erosion, and increased turbidity in the area of the stream at crossing CV-030. Baffinland will discuss proposed remediation works with the DFO prior to instream

remediation work proceeding at these fish bearing crossings, as necessary to ensure planned modifications to culverts and road embankments are in compliance of the *Fisheries Act* and the interim codes of practice for culvert maintenance and temporary cofferdams and diversion channels (as published).

***Milne Port Ore Dock (Fisheries Act Authorization No. 14-HCAA-00525)***

The coarse rock substrate was observed to be stable, with no indications of slumping or deterioration. Colonization of aquatic vegetation and benthic invertebrates was observed, with percent cover, species richness and abundances generally increasing over the monitoring period from 2015 to 2020, reflecting natural succession patterns. The continued presence of kelp and other perennial algae on the coarse rock substrate suggests the coarse rock is stable enough to provide sufficient habitat for the colonization and growth of large perennial and canopy forming aquatic vegetation species which, in turn, provide greater cover and habitat complexity for fish and invertebrates utilizing the habitat.

Fish association with the coarse rock habitat was also monitored using the Remotely Operated Vehicle (ROV) and supplemented by active fishing efforts. Over the monitoring period, increases in the number and diversity of associated fish, as well as observations of fish using the habitat for foraging and protection indicate the coarse rock substrate is functioning as fish habitat.

Additional details regarding the Ore Dock Habitat Offset Monitoring Program are available in Golder (2020c).

***Milne Port Freight Dock (Fisheries Act Authorization No. 18-HCAA-00160)***

Survey results indicate that macroalgae colonization was low-moderate at the Freight Dock offset habitat and, in general, the Reference Area showed relatively higher areal cover and taxa richness, as to be expected in Year 1 of a multi-year monitoring program. Taxa recorded in the Reference Area but not the Freight Dock include two species of brown-bladed understory kelp – sugar kelp (*Laminaria saccharina*) and sea colander (*Agarum clathratum*) – as well as a crustose coralline algae (*Corallinales* indet.). Turf macroalgae occurred in low cover at both the Freight Dock and Reference Area while an epilithic brown filamentous algae (*Pylaiella* spp.) was ubiquitous within both survey areas. Rockweed (*Fucus distichus*) was dominant within the Reference Area but not the Freight Dock, which instead was dominated by an unidentified fine green filamentous algae.

Sessile invertebrates were not observed at the Freight Dock offset habitat but were recorded in the Reference Area at low mean areal cover across the various tidal zones. In the intertidal, dominant species included wrinkled rock-borer *Hiatella arctica* and *Mya* spp. – both types of clam. In the upper subtidal and the shallow subtidal, dominant taxa were tunicate (*Tunicata* indet.) and clam (wrinkled rock-borer and *Mya* spp.). Motile invertebrates were not observed within intertidal or upper subtidal depth contours at either survey site; however, several taxa were recorded in the shallow subtidal zone, with the Reference Area supporting higher species richness than the Freight Dock. The Freight Dock offset habitat had occurrence of low mean density including green urchin (*Strongylocentrotus droebachiensis*) and brittle star (*Ophiuroidea* indet.), while the Reference Area was dominated by shrimp. Mysids (opossum shrimp, Order Mysida) were abundant at both the Freight Dock offset habitat and Reference Area and density tended to increase with depth.

Fish density and taxa richness were comparable between the Freight Dock and the Reference Area with low overall occurrence. Sculpins (Family Cottidae) dominated observations, consisting of the species shorthorn sculpin (*Myoxocephalus scorpius*), fourhorn sculpin (*Myoxocephalus quadricornis*), as well as individuals that were too small

to identify. One Greenland cod (*Gadus ogac*) was opportunistically observed during perimeter mapping of the Reference Area.

Additional details regarding the results of the 2020 Freight Dock Monitoring Program are available in Golder, 2021c.

#### **TRENDS**

As noted in previous years, habitat compensation works completed along the Tote Road remain successful.

In the sixth and final year of monitoring for the Ore Dock offset habitat, macroalgal cover, invertebrate abundances and fish usage of the habitat were all determined to meet the permitted requirements. The offsetting measures are complete and functioning according to the prescribed criteria. Overall, the coarse rock offset is considered stable, high quality fish habitat that is functioning in accordance with conditions set out in *Fisheries Act Authorization (FAA) #14-HCAA-00525*, and as designed in the Fish Offset Plan, such that contingency measures or modifications are not required.

Overall, Year 1 monitoring indicates that the three-dimensional structure of the Freight Dock offset habitat provides a suitable and stable substrate for colonization and growth of marine organisms, as evidenced by the presence of macroalgae, motile invertebrate, and fish taxa.

#### **RECOMMENDATIONS / LESSONS LEARNED**

During 2020, Baffinland continued to repair and upgrade water crossings at the Project to improve fish passage and surface water drainage. Baffinland continues to routinely inspect fish bearing water crossings at the Project and address identified concerns. Remedying fish passage concerns at water crossings remains a top priority for Baffinland to ensure compliance with the Project's Tote Road Fisheries Act Authorization (NU-06-0084; DFO, 2007) and No Net Loss and Monitoring Plan (Knight Piésold, 2007). Assessments of fish bearing water crossings will be continued in 2020 as part of the Project's fish habitat monitoring program.

There are a few small and localized areas where the crushed rockfill foundation associated with the freight dock has become exposed; these exposed areas are vulnerable to erosion and may potentially be impacted further by seasonal abiotic processes (i.e., ice scour, wave action). The stability assessment planned for Year 2 (summer 2021) will provide additional information on the physical stability of these areas and whether remedial work may be considered.



## Project Certificate Condition No. 46

Category	Freshwater Aquatic Environment – Drainage
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate impacts to freshwater aquatic habitat.
Term or Condition	The Proponent shall ensure that runoff from fuel storage and maintenance facility areas, sewage and wastewater other facilities responsible for generating liquid effluent and runoff meet discharge requirements.
Relevant Baffinland Commitment	64
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Environment and Climate Change Canada (ECCC), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Dust Mitigation Action Plan (Golder, 2016a) Fresh Water Supply, Sewage and Wastewater Management Plan (FWSSWMP; Baffinland, 2021e) Metals & Diamond Mining Effluent Regulations (MDMER; Minister of Justice, 2020) Metal & Diamond Mining Effluent Regulations Emergency Response Plan (MDMER ERP; Baffinland, 2020f) Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2021f) Sedimentation Mitigation Action Plan (Golder, 2016b) Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021g) Tote Road Earthworks Execution Plan (TREETP; Golder, 2017) 2020 Freshet Monitoring Report (Baffinland, 2021h) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

Wastewater/effluent management practices and procedures are outlined in the Project's FWSSWMP (Baffinland, 2021e) and the MDMER ERP (Baffinland, 2020f). Surface water monitoring, management practices and procedures are outlined in the Project's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021g).

Water quality discharge criteria (discharge criteria) for effluent generated by the Project are stipulated in the Type 'A' Water Licence issued by the Nunavut Water Board, and Schedules 4 and 5 of the MDMER (Minister of Justice, 2020).

Prior to discharge, wastewater (e.g. treated sewage, treated contact water, etc.) is sampled to ensure the wastewater's water quality meets the applicable discharge criteria. Wastewater that meets the applicable discharge criteria is discharged to the receiving environment. Water samples are routinely taken during wastewater discharges

to ensure the water quality remains in compliance with the applicable discharge criteria. In the event that water quality sampling during a discharge indicates that the water quality has changed and is no longer in compliance with the applicable discharge criteria, the discharge of the non-compliant wastewater is halted.

Wastewater that does not meet the applicable discharge criteria is treated on-site using approved treatment methods (e.g. sewage treatment plants, mobile oily water treatment systems, etc.) and is not discharged to the receiving environment until it has been confirmed by water quality analysis that the treated wastewater meets the applicable discharge criteria.

All water sampling at the Project is conducted in accordance with the Project's Sampling Program - Quality Assurance and Quality Control Plan (Baffinland; 2021f).

As required by the Type 'A' Water Licence, volumes and water quality analysis of wastewater discharged to the receiving environment are reported to regulators (CIRNAC, NWB) on a monthly and annual basis. As a requirement of MDMER, volume and water quality results for discharges from the surface water management ponds associated with the Crusher Facility and Waste Rock Facility (WRF) at the Mine Site are reported to ECCC on a quarterly and annual basis.

The Tote Road Monitoring Program (TRMP) was developed to monitor the water quality of surface water flows at select water crossings (culverts, bridges) along the Tote Road, with a focus on monitoring upstream and downstream TSS concentrations and addressing any sedimentation concerns identified during the monitoring events. The objective of the program is to identify potential project-related impacts to surface water as a result of operation and maintenance of the Tote Road throughout freshet and the remainder of the flowing water season, by comparing upstream concentrations to downstream concentrations at defined distances and sampling intervals. In screening the data to determine if the Project infrastructure has resulted in a change to the surface water quality, a potential Project related change is defined as a greater than 50 mg/L increase in TSS concentrations in the downstream sample when upstream concentrations are less than 250 mg/L. When concentrations are greater than 250 mg/L in the upstream sample, a potential Project related change is defined as a greater than 10% increase in TSS concentrations in the downstream sample.

Water crossings monitored under the TRMP were selected to give a geographically representative sample set of water crossings for each watershed intersected by the Tote Road. In selecting the water crossings, factors such as key depositional habitats located downstream of the Tote Road (e.g. fish habitat), and areas historically prone to sediment events, were considered. The program includes weekly visual inspections and water quality sampling at designated water crossings during freshet, and subsequently continues monthly until the freeze-up of flows. During 2020, upstream and downstream water quality was monitored for pH, Total Suspended Solids (TSS), Total Dissolved Solids (TDS) and turbidity at twenty (20) locations along the Tote Road.

Effluents generated and managed by the Project in 2020 included sewage, contact water retained in surface water management ponds associated with ore and waste rock facilities and oily water retained in containment areas, such as bulk fuel facilities. Effluent treatment systems operated at the Project in 2020, included:

- Sewage Treatment Plants (STPs) at Milne Port (MP-01, MP-01B) and the Mine Site (MS-01, MS-01B);
- Dissolved Air Flotation (DAF) Treatment System at Milne Port to treat and discharge wastewater stored in Milne Port PWSP (MP-01A);
- Mobile Oily Water Treatment System (OWTS), at the Mine Site and Milne Port; and the,

- Waste Rock Facility Wastewater Treatment Plant (WRF WTP) at the Waste Rock Facility (MS-08), installed in 2018.

## RESULTS

During freshet 2020, Baffinland conducted water quality monitoring programs at the Mary River Mine Site, Milne Port, and along the Tote Road. The Mine Site freshet-monitoring program is performed every year to characterize the water quality of several Mine Site tributaries and drainages during the elevated snowmelt runoff flows of the freshet period. The program starts around mid-May when snowmelt causes elevated runoff flows and ends around the end of June after runoff flows have receded. Four (4) monitoring locations on the Mine Site are routinely monitored during the freshet period, including the Camp Lake Settling Ponds outlet (CLSP-OUT), the Camp Lake Tributary 1 outfall (CLT-OUT), Sheardown Lake Landfill Gate Tributary outfall (LDFG-OUT), and Sheardown Lake Tributary 1 outfall (SDLT-OUT). Water quality monitoring involves measuring water quality parameters in the field using a portable meter and collecting water samples to be sent to an external laboratory for analyses. Water quality parameters include total suspended solids (TSS), total dissolved solids (TDS), pH, and turbidity. Intermittent monitoring is performed at additional locations along the tributary, upstream of the monitoring location, if elevated turbidity is identified at the monitoring location.

Several TSS exceedances at locations monitored under the Type 'A' Water Licence and unauthorized releases of sediment were reported to ECCC, CIRNAC, NWB and the NT-NU Spill Line, and are documented in NT-NU Spill Reports 20-141 and 20-179. Further analysis and discussion of the sediment releases and TSS exceedances reported by Baffinland during freshet 2020, including mitigate and corrective actions taken and planned to address sedimentation concerns at the Project, is provided in the 2020 Freshet Monitoring Report (Baffinland, 2021h) and 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

The Milne Port freshet-monitoring program is conducted every year to characterize the water quality of tributaries and drainages during the elevated runoff freshet period. The program starts around mid-May when snowmelt causes elevated runoff flows and ends around the end of June after runoff flows have receded. During past freshet periods, as many as ten (10) locations have been monitored during active flows including MP-C-B, MP-C-B01, MP-C-F, MP-C-G, MP-C-H, MP-C-J, MP-ED, MP-FFG, MP-Q1-01, and MP-Q1-02. Daily water quality monitoring involves measuring water quality parameters in the field using a portable meter and collecting water samples that are sent to an external laboratory for analyses. Water quality parameters include TSS, TDS, pH, and turbidity. The Milne Port water quality monitoring data is reported in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

During sampling conducted for the Tote Road Monitoring Program (TRMP) in 2020, there were eleven (11) sampling events when there was a greater than 50 mg/L increase in TSS concentrations between the downstream sample and the upstream sample. All of the sampling events that had a downstream TSS concentration greater than the screening criteria occurred during the May 25 to June 15, 2020 period when freshet conditions resulted in elevated sediment loading into the affected watercourses over a short period of time, and suggest the potential for Project related change in water quality. Following this period, all results demonstrated that there were no Project related changes to water quality as a result of the operation of the Tote Road. Where required, Baffinland implemented mitigation measures consistent with the Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026). The TRMP is part of the Roads Management Plan and water quality monitoring results are reported in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

Seven (7) discharges of effluent at the Project in 2020 did not comply with the applicable discharge criteria. These were single isolated events at each of the Mine Site STP (MS-01B), the Milne Port STP (MP-01B), the Mine Site PWSP (MS-MRY-04B), and the mobile OWTS at the Milne Port Fuel Storage Facility (MP-03). These events are outlined as follows:

- On January 15, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp exceeded the applicable discharge criteria for fecal coliforms of 1,000 colony-forming units per 100 milliliters (CFU/100 mL). The elevated fecal coliforms (1,300 CFU/100 mL) is believed to be the result of either sampling error or external laboratory error, as the STP was operating as designed at the time the sample was collected. As a precaution, the ultraviolet (UV) bulbs used to disinfect effluent prior to discharge were replaced following receipt of the external laboratory results on February 6, 2020. The subsequent monthly effluent discharge sample for February 2020 was collected and sent for external laboratory analysis on February 4, 2020, prior to the replacement of the UV bulbs. The external laboratory results for the February 4, 2020 sample indicated a fecal coliform value of 0 CFU/100 mL, confirming the SPT was functioning as designed prior to the UV bulb replacement.
- On April 7, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp exceeded the applicable discharge criteria for fecal coliforms of 1,000 CFU/100 mL. The elevated fecal coliforms (2,600 CFU/100 mL) was caused by a breakthrough on one of the effluent treatment membranes on Membrane Bioreactor (MBR) Train No. 2 that occurred on April 7, 2020. Upon observing the breakthrough, the STP Operator immediately stopped the effluent discharge and isolated the affected line from the overall STP system. Measurements taken for Total Suspended Solids (TSS), turbidity, phosphorus and ammonia following the isolation on April 7, 2020 were all within acceptable operating levels, indicating that the effluent quality was compliant with discharge criteria, prior to resuming effluent discharge later that day. Subsequent to the affected membrane being isolated and the discharge being restarted on April 7, 2020, the monthly effluent sample that exceeded the effluent discharge criteria had been collected. It is believed that the presence of fecal coliforms in the April 7, 2020 effluent sample indicated the presence of short lived residual fecal coliform remaining from the membrane breakthrough. The external laboratory result for a subsequent effluent sample collected on May 12, 2020 had a fecal coliform value of 0 CFU/100 mL, confirming that fecal coliforms in treated effluent from the MS-01B STP were back in compliance with the discharge criteria.
- On June 9, 2020, a treated sewage effluent sample from the Mine Site STP (MS-01B) servicing the Sallivik Camp was outside the applicable criteria range for pH (6.0 – 9.5 pH units) and exceeded the applicable discharge criteria for ammonia (4 mg/L). The low pH (5.34 pH units) and elevated ammonia concentration (14.9 mg/L) are believed to be the result of either sampling error or external laboratory error, as the STP was operating as designed at the time the sample was collected. Internal effluent quality measurements conducted prior to the collection of the June 9, 2020 sample indicated that the pH (7.23 pH units) and ammonia (0.06 mg/L) were in compliance with the discharge criteria. Following receipt of the external laboratory results for the June 9, 2020 sample on June 18, 2020, the accuracy of the pH and ammonia meters in STP MS-01B were verified by comparing pH and ammonia measured in a treated effluent sample with measurements of pH and ammonia in the same sample using the effluent quality meters at the MS-01 STP. External laboratory results for a subsequent treated effluent sample collected from the MS-01B STP on June 23, 2020, confirmed that the pH (8.17 pH units) and ammonia (0.20 mg/L) were in compliance with the discharge criteria.

- On September 16, 2020, a treated sewage effluent sample from the Milne Port STP (MP-01B) servicing the 380-Person Camp exceeded the applicable discharge criteria for fecal coliforms of 10,000 CFU/100 mL. The elevated fecal coliform value (18,900 CFU/100 mL) is believed to be the result of sampling error as the STP was operating as designed at the time the sample was collected. The external laboratory result for a subsequent effluent sample collected from the MP-01B STP on September 30, 2020 had a fecal coliform value of 0 CFU/100 mL, confirming that fecal coliforms in treated effluent from the MP-01B STP were in compliance with the discharge criteria.
- The measured ammonia concentration (4.1 mg/L) in Mine Site PWSP MS-MRY-04B effluent discharge to Sheardown Lake exceeded the applicable water quality discharge criteria (4.0 mg/L) in an in-field sample collected on June 20. The discharge was immediately stopped in accordance with the Project's Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010), and was not resumed in 2020. In addition, three (3) effluent quality monitoring requirements were not fulfilled due to an unexpected flight delay during transport of an effluent sample collected from the MS-MRY-04B effluent discharge on June 16, 2020 for the annual acute lethality analysis and the monthly BOD and Faecal Coliform analysis requirements specified in the Type 'A' Water Licence (Schedule I, Table 12, Group 3 and Group 2). As a result of the flight delay, the acute lethality sample was not received at the external laboratory within the five (5) day maximum allowable sample hold time for the results of the acute lethality analysis to be valid and the analysis was not completed. Similarly, the water quality sample was not received at the external laboratory within the allowable hold times for the results of the BOD (4-day maximum) and Faecal Coliform (48 hours' maximum) analysis to be valid and the analysis was not completed. Upon receipt of notification from the external laboratory of the hold time exceedances on June 24, 2020, discharge from the MS-MRY-04B pond had ceased, preventing the opportunity for resampling and the annual acute lethality analysis and monthly BOD and Faecal Coliform analysis from being completed.

During 2020, the water quality of the WRF Pond was found to be compliant with the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and MDMER in June and July without any treatment being required. In August, operation of the WRF WTP was effective at mitigating any water quality concerns for the effluent to be compliant with the applicable criteria. Beginning in June 2020, controlled discharges of effluent from the WRF Pond were conducted and resulted in no exceedances of the water licence water quality discharge criteria in 2020 observed in samples collected under Schedule I of the Type 'A' Water Licence. Additional effluent discharge sampling was completed to satisfy the requirements of the MDMER. The results of sampling completed to satisfy MDMER requirements are detailed in Baffinland's 2020 MDMER annual effluent monitoring report for the Mary River Mine Site.

Periodic controlled discharges of the treated effluent from the Crusher Facility (CF) Pond occurred during August 2020. Controlled effluent discharges from the Crusher Facility in 2020 involved pumping retained surface water runoff from the CF Pond through a direct-discharge pipeline shared with the Mine Site STPs and releasing the effluent at an approved discharge point near the Mary River. During periods of discharge, water quality monitoring was conducted to ensure compliance with the applicable water quality discharge criteria outlined in the MDMER and the Type 'A' Water Licence. No exceedances of the applicable water quality discharge criteria were observed during the 2020 CF effluent discharges.

2020 water quality exceedances for effluents monitored under the Type 'A' Water Licence were reported to CIRNAC, the NWB and the QIA in the monthly monitoring reports prescribed by the Type 'A' Water Licence. Water quality

exceedances of the MDMER criterion were reported to ECCC and included in the annual MDMER report submission. A full discussion of the Project's 2020 monitoring results under the Type 'A' Water Licence is provided in the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

### TRENDS

Overall, the frequency of incidents involving the discharge of effluents to the receiving environment that exceed the applicable discharge criteria have remained low and incidental since the start of operations in 2014.

### RECOMMENDATIONS / LESSONS LEARNED

To improve the water quality of surface water drainage at the Project during freshet, Baffinland continues to implement the corrective actions and improvements outlined in the Sedimentation and Dust Mitigation Action Plans and Tote Road Earthworks Execution Plan (Golder, 2016a, 2016b and 2017), as well as the Hatch 2013 design for the Tote Road. A number of corrective actions were undertaken to address the sediment releases associated with freshet 2020 Spill Reports 20-141 and 20-179. Consistent with Baffinland's Surface Water and Aquatic Ecosystem Management Plan, corrective and mitigation actions taken during freshet 2020 in response to reported sediment releases included one or more of the following:

- Installing and maintaining silt fences and runoff mitigation berms in strategic locations;
- Check dam and settling pond repairs, construction and operation;
- Gabion basket installation to reinforce check dams;
- Armouring of ditches, banks, and road embankments near waterbodies;
- Clearing of excess snow at culvert inlets and outlets; and
- Diverting sediment-laden runoff away from fish habitat by means of ditches, swales, and active pumping.

Tote Road water crossing locations where the screening criteria was exceeded and the potential for Project related changes to water quality were identified will be reviewed as part of the freshet preparedness planning process, to ensure that previously identified issues can be addressed in a timely and effective manner during freshet 2021, and confirm if Project related changes persist at these locations.

A Long-Term Water Management Plan (LTWMP) to manage water and control erosion and sediment at the Mine Site is being developed. The LTWMP will identify water management measures and actions including operational improvements, remedial measures, and new water management structures which will be implemented at the Project. A geotechnical drilling program to support engineering designs for new water management infrastructure is scheduled to commence in spring 2021. The results of the program will be used to inform the detailed engineering work, which is scheduled to commence in Q2 of 2021.

To ensure the accuracy of future water quality sampling results, Baffinland will continue to train all personnel involved with sampling effluents at the Project in the proper sampling practices and procedures, as outlined in the Project's Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2021f).

To address the exceedances at the STPs, Baffinland will continue to adjust process controls as necessary to optimize effluent treatment.

Baffinland plans to continue to operate the WRF WTP to treat contact water generated at the WRF as required in 2021. Since the commissioning and operation of the WRF WTP, Baffinland has increased the frequency and rigor of testing and sampling of WRF Pond effluent to optimize dosing requirements and reduce variances in TSS. In 2020,

the WRF WTP was upgraded to include the addition of a second geotube settling pond to facilitate future maintenance requirements.

To prevent unfulfilled effluent quality monitoring requirements due to sample hold time exceedances caused by unexpected flight delays that increased the amount of time between the sampling time and when samples arrive at the lab, Baffinland is committed to scheduling effluent sampling dates for acute lethality and water quality samples to coincide with the earliest day that outbound flights are scheduled each week to allow time to resample and ship new samples on the next available flight. Baffinland also requested shipping companies to notify the Environment Department immediately when there are flight or ground transport delays that could potentially result in a sample hold time exceedance, to allow time to resample and ship new samples to the lab. In preparation for discharge of stormwater from containment areas in 2021, the mobile OWTS will be inspected and, if necessary, the media will be replaced prior to operation of the mobile OWTS. In addition, all operators of the mobile OWTS will be thoroughly trained in the system's operation to ensure the media continues to be replaced at the frequency recommended by the media's manufacturer.

Overall, the low frequency of non-compliant discharges involving effluents generated and managed by the Project are evidence of the effectiveness of the Project's wastewater/effluent management practices and procedures. Baffinland will continue to update the Project's management practices and procedures and implement new mitigation measures as required to ensure effluent discharges to the receiving environment are in compliance with applicable water quality discharge criteria.

## Project Certificate Condition No. 47

Category	Freshwater Aquatic Environment - Watercourses
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent blockages or restrictions to fish passage.
Term or Condition	The Proponent shall ensure that all Project infrastructure in watercourses are designed and constructed in such a manner that they do not unduly prevent and limit the movement of water in fish bearing streams and rivers.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Fisheries and Oceans Canada (DFO), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Fish Habitat No Net Loss and Monitoring Plan (Knight Piésold, 2007) Fish Habitat Monitoring - 2020 Annual Report - Early Revenue Phase - Tote Road Upgrades (Baffinland, 2020g) Fisheries Act Authorization No. NU-06-0084 (For Tote Road Crossings; DFO, 2007)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

A fish habitat monitoring plan was developed by Baffinland to ensure that all measures and works specified in the No Net Loss and Monitoring Plan (Knight Piésold, 2007), as well as the *Fisheries Act* Authorization (NU-06-0084; DFO, 2007) and amendments, are implemented and are functioning as intended. Under Baffinland's Tote Road Fisheries Authorization, annual assessments of watercourse crossing infrastructure are conducted by qualified professionals at all fish bearing crossings with the objective of maintaining connectivity for fish species and verifying the functionality of all existing culverts. Findings and recommendations for mitigations are reported to DFO in annual reports and corrective actions are scheduled to mitigate perched or damaged culvert outlets, damaged culvert inlets, and erosion and sedimentation concerns. In 2020, monitoring was conducted at fish bearing water crossings at the Project. As an additional measure, crossings that had been previously categorized as non-fish bearing were resurveyed in 2020 to confirm continued lack of fish use. The emphasis of the 2020 monitoring program was to assess the presence of fish, habitat quality, and fish passage success at Project fish bearing water crossings.

### RESULTS

2020 assessments of Project fish bearing water crossings were completed by a third-party Professional Fisheries Biologist in June and September 2020. During the 2020 assessments, fish were captured and/or observed at thirteen (13) of the fish bearing crossings. Fish were not captured or observed at any of the remaining twenty-four (24) fish-bearing crossings in spring 2020. Fish presence at the Tote Road stream crossing areas and overall catch rates from spring 2020 were relatively low compared with previous years. These differences are attributed to the timing of the survey in 2020. Prior to 2020, surveys were typically conducted later in the spring freshet or later in the open-water



season. Due to flight scheduling challenges associated with the COVID-19 Pandemic, the 2020 spring survey was largely conducted during peak freshet. Flows were higher and water temperatures lower during the spring 2020 survey relative to previous surveys and it is likely that seasonal movements of juvenile char from overwintering habitat to the stream crossing areas had not yet occurred or were limited at the time of the spring 2020 survey. No fish were observed at water crossings that had been categorized as non-fish bearing, confirming their previously determined status. It was also noted that compensation works completed prior to 2020 remained successful.

No fish passage or habitat issues were documented at 25 of the 37 fish bearing water crossings. At the 25 water crossings, no velocity or physical obstructions were identified. Potential issues with fish passage and/or habitat were observed at twelve (12) fish bearing water crossings. To improve conditions at these sites, remediation actions were planned and implemented in early September 2020. Six of these crossings (CV-129, CV-114, CV-111, CV-106, CV-225, and BG-50) involved culverts that were identified as perched in spring 2019 and for which remediation measures were undertaken in fall 2019 or early spring 2020. Three sites (CV-129, CV-114, and CV-106) required minor repairs to the rocky ramps (damage was caused during freshet 2020) installed in 2018 and 2019 to restore full access. The third-party consultant completed this work by hand without the use of mechanized equipment or any disturbance occurring to the bed and banks of the watercourses. Additional remediation is required to eliminate the perch at BG-50. At water crossing CV-129, the culvert is damaged and requires repair. The perch at CV-111 remains too high to effectively mitigate with a rocky ramp and additional/alternative works will be required. The rock ramp installed at BG-50 in fall 2019 was washed away by high flows through the culverts during the 2020 freshet and alternative remediation works will be required at this site. Baffinland will work with the DFO prior to instream remediation work proceeding to decide upon a practical course of action for addressing the perched culvert outlets at the CV-111 and BG-50 crossings.

At CV-076, there was also seepage under the road 5 m south of the culverts, though the culverts were not obstructed. Baffinland is evaluating options for sealing the seepage at this site including reinforcing the road embankments during non-flowing winter months. The spring 2020 survey identified that culverts at CV-057 were nearly completely buried by sediment, which is a recurring problem at this site. Baffinland will remove the accumulated sediment during non-flowing winter months. Options for addressing the sedimentation at CV-057 will be discussed with the DFO prior to remediation work proceeding during non-flowing winter conditions. During the 2021 open-water season, Baffinland will monitor turbidity upstream and downstream of this crossing and inspect the road embankment and upstream sections of the stream to identify and address potential sources of sedimentation with control measures if required. Additional efforts are planned in 2021 to address the outstanding concerns.

At Tote Road site CV-030, water flow was diverted from CV-031 into CV-030 during freshet due to ice blockage of the culvert. No culvert fish passage issues were identified by the third-party Professional Fisheries Biologist as a result of the diversion, however, the diversion caused flooding, erosion, and increased turbidity in the area of the stream at crossing CV-030. Baffinland will discuss proposed remediation works with the DFO prior to instream remediation work proceeding at these fish bearing crossings, as necessary to ensure planned modifications to culverts and road embankments are in compliance of the *Fisheries Act* and the interim codes of practice for culvert maintenance and temporary cofferdams and diversion channels (as published).

## TRENDS

Baffinland continues to address perched culverts at Project fish bearing water crossings, as they are identified. Current monitoring and assessment of project watercourses is sufficiently robust to identify fish passage issues, and Baffinland has consistently demonstrated the ability to remedy these issues in a timely and effective manner.

Baffinland implements a proactive approach to prevent the onset of reduced fish passage in watercourse crossing infrastructure by installing, inspecting, and maintaining crossings in adherence with the approved Hatch (2013) design and the Tote Road Earthworks Execution Plan (TREETP), and Design Report developed in April 2017 (Golder, 2017). Proactive measures that Baffinland follows include the following:

- Install at least one (1) culvert at each fish bearing crossing with an embedment depth in the streambed that is 10% of the culvert diameter (i.e. a 2000 mm diameter culvert requires an embedment depth of 200 mm);
- Install rip rap erosion protections at culvert outlets to prevent scour that can result in perched or hanging culverts;
- Inspect culverts to verify inlets and outlets are free of debris and sediment and there are no signs of erosion;
- Inspect culverts in fish bearing crossings to verify they are embedded in the streambed (i.e. not perched or hanging);
- Inspect culverts to verify they are free draining;
- Inspect culverts to verify they are in good structural condition (i.e. ends are not damaged, no buckling, etc.); and
- Complete mitigations at the first sign of potential for reductions in fish passage, in consultation with DFO personnel and in compliance with the interim code of practice for culvert maintenance (DFO, 2020).

## RECOMMENDATIONS / LESSONS LEARNED

During 2020, Baffinland continued to repair and upgrade water crossings at the Project to improve fish passage and surface water drainage. Baffinland continues to routinely inspect fish bearing water crossings at the Project and address identified concerns. Additional works to address outstanding concerns are planned for 2021. Remedying fish passage concerns at water crossings remains a top priority for Baffinland to ensure compliance with the Project's Tote Road Fisheries Act Authorization (NU-06-0084; DFO, 2007) and No Net Loss and Monitoring Plan (Knight Piésold, 2007). Assessments of fish bearing water crossings will be continued in 2021 as part of the Project's fish habitat monitoring program.

Future Tote Road improvements/realignments required in support of on-going operations and future expansion projects will continue to follow the historical LOAs, and approved designs prepared by Hatch and Golder. Baffinland will continue to work with DFO to ensure planned modifications to fish bearing crossings are in compliance with the *Fisheries Act*.

Monitoring will continue in 2021 to assess fish passage at crossings on fish-bearing streams, to continue to assess the condition and performance of crossings, and to evaluate the effectiveness and performance of 2020 remediation works conducted.

## Project Certificate Condition No. 48

Category	Freshwater Aquatic Environment - Explosives
Responsible Parties	The Proponent, Qikiqtani Inuit Association, Fisheries and Oceans Canada
Project Phase(s)	Construction, Operations
Objective	To mitigate impacts to freshwater aquatic habitat.
Term or Condition	The Proponent shall engage with Fisheries and Oceans Canada and the Qikiqtani Inuit Association in exploring possible Project specific thresholds for blasting that would exceed the requirements of Fisheries and Oceans Canada's Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky, 1998).
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky, 1998) Environmental Protection Plan (Baffinland, 2021d)
Ref. Document Link	N/A

### METHODS

To date there has been no requirement to undertake blasting in or near water, and as such, there has been no requirement to discuss blasting near water with Fisheries and Oceans Canada and the Qikiqtani Inuit Association. Baffinland implements the management practices for blasting in or near water as outlined in Section 4.24 the Environmental Protection Plan (BAF-PH1-830-P16-0008, Baffinland, 2021d).

### RESULTS

No blasting occurred in 2020 within the required setback distances detailed in the DFO guidance document titled "*Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*" (Wright and Hopky, 1998).

### TRENDS

Not applicable. To date, no blasting has occurred within the required setback distances at the Project.

### RECOMMENDATIONS / LESSONS LEARNED

To date there has been no requirement to undertake blasting in or near water, and as such, there has been no requirement to discuss blasting near water with Fisheries and Oceans Canada and the Qikiqtani Inuit Association. Baffinland will discuss Project specific blasting thresholds with the appropriate parties if required in the future.

### Project Certificate Condition No. 48 (a)

Category	Freshwater Aquatic Environment - Arctic char
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To determine presence and health of arctic char in freshwater aquatic habitat.
Term or Condition	The Proponent shall develop plans to conduct additional surveys for the presence of arctic char in freshwater bodies and ongoing monitoring of arctic char health where applicable, within watersheds proximal to the mine, tote road and Milne Inlet Port project development areas, including but not limited to, Phillips Creek, Tugaat and Qurluktuk. The Proponent shall consult with the MHTO regarding the design, timing, and location of proposed surveys and ongoing monitoring.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Fisheries and Oceans Canada (DFO), Nunavut Impact Review Board (NIRB), Nunavut Water Board (NWB), Qikiqtani Inuit Association (QIA)
Reference	Fish Habitat Monitoring - 2020 Annual Report - Early Revenue Phase - Tote Road Upgrades (Baffinland, 2020g) 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

#### METHODS

In addition to the annual fish use assessments completed near Project water crossings, as discussed in PC Condition No. 47, Baffinland conducts annual fish population assessments for arctic char in Camp Lake, Sheardown Lake, Mary Lake and Reference Lake 3 near the Mine Site as part of the Project's Core Receiving Environment Monitoring Program (CREMP). The CREMP is an aquatic monitoring program conducted annually that focuses on evaluating mine-related influences on water quality, sediment quality and/or biota, including Arctic char, within aquatic environments located near the Mine Site. Under the CREMP, condition of arctic char populations within monitored lakes are assessed using a non-lethal sampling program that involves capturing and assessing 100 Young-of-Year (YOY) arctic char from nearshore lake habitat via electrofishing and 100 adult arctic char from littoral/profundal lake habitat via gill netting in each monitored lake.

In 2020, Baffinland committed to engage the MHTO to establish objectives and scope for a monitoring program to assess arctic char in Tugaat and Qurluktuk lakes. Formal engagement began in January 2021 with an invitation to meet, however, due to COVID-19 this could not be completed in person. In February 2021, Baffinland and the MHTO held a preliminary teleconference to review a proposed scope for the monitoring program. Since that time Baffinland followed up with a number of written questions for consideration by the MHTO. Baffinland looks forward to further collaboration on the implementation on this program in 2021.

**RESULTS**

As documented in the 2020 CREMP Monitoring Report, monitoring data collected to date suggest no adverse mine-related effects on arctic char populations within monitored lakes under the CREMP. The 2020 CREMP Monitoring Report, which provides a complete analysis and discussion of 2020 monitoring results, is provided as an appendix to the 2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a).

**TRENDS**

No adverse mine-related effects on arctic char populations within monitored lakes under the CREMP have been observed to date. Similar to previous years (2015, 2016, 2017, 2018, 2019), lower numbers of arctic char were captured in the littoral/profundal habitat of Reference Lake 3 in 2020 compared to the numbers captured at the other monitored lakes (e.g. Mary Lake, Camp Lake, Sheardown Lake). These results suggest lower fish abundance at the reference lake than at the other monitored lakes..

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland plans to continue the CREMP, described above, to assess the condition of arctic char populations within aquatic environments near the Mine Site.

Baffinland held a meeting with the MHTO in Q1 2021 to discuss additional monitoring including potential locations, design of program and timing of surveys in freshwater bodies north of Milne Inlet. Baffinland has also retained a third party consultant to execute this work in 2021 with the MHTO. The fish health monitoring study is planned for August 2021 to include Tugaat, Qurluktuk and/or Ikaluit river systems as suggest by the MHTO.

#### 4.6.8 Terrestrial Environment (PC Conditions 49 through 64)

Sixteen (16) PC conditions relate to the potential impacts of the Project on the terrestrial environment, focusing primarily on caribou, carnivores, and terrestrial wildlife habitat. The importance of Baffinland's support to regional wildlife monitoring and management initiatives was stressed by the NIRB, the GN, and other parties.

##### **Inuit & Stakeholder Feedback**

During the environmental review process for the FEIS and FEIS addendum, the potential for sensory disturbance on caribou resulting from the Project was a key issue. Concerns were related to potential sensory disturbance and the potential for mortalities due to collisions with trains on the south railway and truck traffic along the Milne Inlet Tote Road. Communities were initially very concerned that the railway would interrupt the typical northward movement of caribou into the North Baffin Region. Another concern identified was that caribou are particularly sensitive to disturbance at their current low abundance state within their natural population cycle. Effects to terrestrial wildlife, and in particular key issues such as the current low numbers of caribou in the area, potential impacts to calving areas, movement and migration, as well as potential effects of caribou eating vegetation with dust, continue to be expressed in 2020 consultation activities (Appendix B).

##### **Monitoring**

Baffinland completes several monitoring programs on the terrestrial environment, some of which are conducted in collaboration with government agencies. The TEWG members, consisting of government agencies, the QIA, technical experts, and the MHTO, provide recommendations and guidance on Baffinland's terrestrial monitoring programs. The TEWG provides review and comment on the Terrestrial Environment Annual Monitoring Report and provides comments and recommendations for future updates and revisions to the monitoring program. Currently, the TEWG aims to hold two (2) in-person meetings and two (2) teleconferences annually to review all programs' trends and results and solicit feedback regarding future monitoring. In 2020, only one (1) in-person and two (2) teleconferences were held with the TEWG due to the logistical challenges and travel restrictions associated with the COVID-19 Pandemic.

Table 4.16 provides an evaluation of the Project's impacts on the terrestrial environment, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.16: Terrestrial Environment Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Habitat Loss	Direct habitat loss due to the Project footprint, and indirect habitat loss due to sensory disturbances	Height of Land monitoring; snow track and snow bank monitoring; incidental observations.	The regional caribou population is currently too low to confidently assess potential effects; assessment will gain confidence when the caribou population increases.
Restriction of Movement	Project infrastructure and the tote road act as a barrier to the movement of caribou		
Mortality	Mortality resulting from vehicle collisions or project-induced hunting	Incidental observations; biologists and other staff on-site: no mortalities observed	Within FEIS predictions

**Path Forward**

Baffinland will remain vigilant about implementing the mitigation and monitoring activities that are in place to minimize and monitor any potential effects of the Project on the terrestrial environment and wildlife resources. Baffinland will continue to seek input and review monitoring results trends from technical members of the TEWG and other interested stakeholders. Reporting on each PC condition follows.

## Project Certificate Condition No. 49

Category	Terrestrial Wildlife and Wildlife Habitat - Terrestrial Environment Working Group
Responsible Parties	The Proponent
Project Phase(s)	All phases
Objective	To provide environmental oversight.
Term or Condition	The Proponent shall establish a Terrestrial Environment Working Group (TEWG) which will act as an advisory group in connection with mitigation measures for the protection of the terrestrial environment and in connection with its Environmental Effects Monitoring Program, as it pertains to the terrestrial environment. Members may consider the draft terms of reference for the TEWG filed in the Final Hearing, but they are not bound by them. The role of the TEWG is not intended to either duplicate or to affect the exercise of regulatory authority by appropriate government agencies and departments.
Relevant Baffinland Commitment	46, 47, 49, 50
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	2020 TEWG Meeting Records Concordance to 2019-2020 Board Recommendations
Ref. Document Link	Appendix C.2 Appendix E

### METHODS

Baffinland has fully met the condition through the establishment of the TEWG in 2013 and ongoing implementation of the TEWG process in 2020. Members of the TEWG include representatives from: Environment and Climate Change Canada, Qikiqtani Inuit Association, Government of Nunavut, Makivik Corporation and Baffinland with technical experts as required. The Mittimatalik Hunters and Trappers Organization joined the group in 2016. WWF-Canada also participates as an observer to the TEWG.

Generally, the Working Group meetings are structured in such a way to include:

- Baffinland to provide a Project update to the members (e.g., includes mining and shipping-related activities such as ore production, and vehicular and vessel traffic);
- Discussion of monitoring program planning including sampling approach (e.g., sampling variables, sites, and data collection methods) in advance of field programs to obtain feedback by MEWG members;
- Discussion of results of monitoring programs to obtain feedback by MEWG members; and
- Various research presentations (given by Baffinland, Baffinland technical consultants and other members).

The group typically schedules two (2) yearly in-person meetings, in addition to hosting two (2) interim teleconferences per year.



Draft technical annual reports and other documentation are provided to the TEWG in advance of meetings to the extent possible and on an on-going basis to allow for review, comment and advice to be provided by all members. Baffinland reviews all comments received on draft reports, makes effort to provide meaningful responses to each comment, and in so doing, takes into consideration the suggestions for improvement of the report and advice provided by TEWG. This mechanism allows TEWG members to provide constructive feedback on annual reporting efforts, which have resulted in meaningful program modifications.

## RESULTS

In 2020, the TEWG met three (3) times, as outlined in the below Table 4.17. Due to COVID-19 restrictions only one (1) meeting was held in-person, with the rest of the meetings occurring via teleconference.

**Table 4.17: Terrestrial Environment Working Group Meetings in 2020**

Date	Location	Topics Discussed
<b>TEWG</b>		
February 26, 2020	Ottawa, ON	Baffinland Update <ul style="list-style-type: none"> <li>• 2019 Production Update</li> <li>• Response to 2018-2019 NIRB Recommendations (Dust and Caribou tissue metal monitoring)</li> <li>• Government of Nunavut Regional Monitoring Memorandum of Understanding (MoU) Update</li> <li>• TEWG Terms of Reference</li> </ul> 2019 Terrestrial Monitoring Program Overview <ul style="list-style-type: none"> <li>• Bird Monitoring                             <ul style="list-style-type: none"> <li>○ Red-Knot Monitoring</li> <li>○ Raptor Monitoring</li> <li>○ Arctic Migratory Bird Nest Surveys</li> <li>○ Dust Fall Monitoring</li> </ul> </li> <li>• Vegetation Monitoring                             <ul style="list-style-type: none"> <li>○ Abundance</li> <li>○ Metals</li> <li>○ Exotic Invasive Vegetation</li> </ul> </li> <li>• Helicopter Overflights</li> <li>• Snowbank Monitoring</li> <li>• Snow Track Surveys</li> <li>• Height of Land</li> </ul> Preliminary 2020 Program Revisions Imagery Analysis of Dust Fall Dispersion
June 24, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>• 2020 Production Update</li> <li>• Update on Extensions Request to Production Increase Proposal</li> <li>• Impacts of COVID-19 on 2020 terrestrial monitoring programs</li> </ul> TEWG Terms of Reference

Date	Location	Topics Discussed
		Review of Comments on 2019 Terrestrial Environment Annual Monitoring Report (TEAMR) <ul style="list-style-type: none"> <li>• TEWG feedback and program limitations</li> <li>• Low survey effort for mammal monitoring</li> <li>• Dustfall and vegetation monitoring program alignment</li> <li>• Incorporation of Inuit feedback and experiences (dustfall monitoring, caribou avoidance)</li> <li>• Mitigation for avoidance of migratory bird corridors</li> </ul> Helicopter flight analysis 2020 Terrestrial Monitoring Program Overview Caribou Monitoring: Triggers and Strategies
December 10, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>• 2020 Operational Update</li> <li>• 2020 Monitoring Program Update</li> <li>• Caribou Monitoring Trigger and Strategies</li> </ul>

As a result of inputs from the TEWG, numerous program modifications have been made since 2015, and increasingly so since 2018, and these changes have been summarized as part of individual terrestrial and marine environment program reports. When suggestions have been made by working group members on specific programs, Baffinland has made the effort in considering these requests in the most expedited and feasible manner. When a change is not implemented, Baffinland has provided rationale as to why the modification cannot immediately be implemented and/or that additional information is required before it can make an informed decision and/or has provided its reasoning for not pursuing specific requests and requesting that alternative methods be suggested.

A summary of key monitoring-related feedback/suggestions provided to Baffinland since 2018 was provided to the NIRB in response to the Board’s 2019-2020 Recommendations (Appendix E). This summary is based on Baffinland’s review of past comments received on monitoring program reports and/or through review of meeting records from working group meetings that took place since 2018. It is noted that when applicable, modifications made to annual programs are typically summarized in program report sections describing changes/modifications to program design from the previous year(s) of study. This summary clearly demonstrates Baffinland’s commitment to consider and incorporate the numerous suggestions provided through working groups on program design modifications, data analyses and interpretation of results.

**TRENDS**

Baffinland, through collaboration with the various members of the TEWG, has successfully developed a robust terrestrial monitoring program that is reviewed and adjusted on an annual basis as deemed relevant and necessary to the objectives of Project Certificate No. 005 terms and conditions.

The TEWG continues to provide a valuable forum for ongoing Project communication and reporting between Baffinland and other interested parties. The TEWG also serves as an advisory group to provide recommendations on appropriate management approaches related to the Project.

The TEWG has guided the development of the annual Terrestrial Monitoring Program designs and adjustments are made to the monitoring program as needed following guidance from the group.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to work with the TEWG to review and guide monitoring programs on an annual basis and develop mitigation measures or action plans as and when deemed necessary based on review of any emerging trends requiring further investigation.

In addition to the annual operational activities of the TEWG outlined above, throughout 2020 Baffinland also continued to engage the Working Group to move forward updates to the Working Group Terms of Reference (ToR). Following a comment period on previous iterations of the ToR, an updated version was provided by Baffinland to the Working Group in October 2020 alongside a concordance table to demonstrate how feedback provided was integrated into the ToR by Baffinland. Baffinland also organized a meeting with the Working Group in November 2020 to discuss the latest draft. Throughout 2021 Baffinland will continue to engage with the Working Groups to finalize updates to the ToRs.

## Project Certificate Condition No. 50

Category	Terrestrial Wildlife and Habitat - General
Responsible Parties	The Proponent and other Parties as appropriate
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure appropriate and responsive adaptive management.
Term or Condition	The Proponent shall continue to develop and implement Project-specific monitoring for the terrestrial environment, and will demonstrate appropriate refinements to design, incorporation of analytical methods and elaboration of methodologies. The monitoring plan shall contain clear thresholds to allow for the assessment of long-term trends and cumulative effects where Project interactions are identified. Coordination and cooperation will be required where data collection, analysis and interpretation, or responsibility for mitigation and management requires the efforts of multiple parties (e.g., government, Qikiqtani Inuit Association, communities).
Relevant Baffinland Commitments	40, 70
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

The TEMMP outlines Baffinland's monitoring programs for terrestrial wildlife and habitat. Terrestrial environment monitoring programs are reviewed regularly during TEWG meetings to refine methodologies. Cumulative effects and long-term trends assessments are incorporated into various aspects of the monitoring programs outlined in the TEMMP.

The TEMMP is supplemented by Baffinland's contributions to information gathered from region-wide monitoring for caribou conducted by the Government of Nunavut, PRISM plot surveys, and seabird research by ECCC, and research on cliff-nesting raptor ecology by ArcticRaptors Inc.

### RESULTS

Terrestrial environment monitoring has been ongoing since 2012, following methods outlined in the TEMMP. The TEMMP has been revised numerous times since its creation to improve methodologies and address reviewer input.

### TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Updates to the TEMMP are developed on an as-needed basis, although adjustments to the monitoring program are not always formally updated yearly in the management plan itself. The updates are based on a statistical analysis of data and adjustments necessary to improve robustness of survey design and methods and as a result of discussion with the TEWG. The TEWG is engaged regularly to discuss annual monitoring programs for the terrestrial environment. Feedback received from TEWG members is incorporated into annual monitoring reports and updates to the TEMMP where relevant.

## Project Certificate Condition No. 51

Category	Terrestrial Wildlife and Habitat - General
Responsible Parties	The Proponent and/or TWEG
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To promote coordination of monitoring efforts.
Term or Condition	The Proponent, either directly or as part of the TWEG, shall consider and, where appropriate, cooperate with relevant regional and/or community-based monitoring initiatives that raise issues or produce information pertinent to mitigating Project-induced impacts. The Proponent shall give special consideration for supporting regional studies of population health and harvest programs for North Baffin caribou which help address areas of uncertainty for Project impact predictions.
Relevant Baffinland Commitments	58
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

Baffinland has provided financial and logistical support for the Government of Nunavut's (GN's) North Baffin Island caribou survey research on several occasions since 2009. Baffinland will continue to support future GN caribou surveys, as relevant, to enhance Baffinland's understanding of potential Project-related effects and regional knowledge about wildlife distribution and abundance.

Baffinland also presented options for larger-scale caribou surveys to the TEWG during June 2020 and December 2020 meetings, including aerial surveys and a remote collaring program as monitoring options, ideally in collaboration with GN. The intent of these presentations was to seek input from the TEWG on potential options, objectives, and methodologies for monitoring Project effects on the North Baffin Island caribou herd.

### RESULTS

In 2018, Baffinland provided financial and logistical support for the North Baffin Island spring caribou population survey. The GN executed no regional caribou population surveys in 2019. Baffinland has regularly engaged with several Federal, Territorial, and Non- Government Organizations, including the Mittimatalik Hunters and Trapper's Organization, through TEWG meetings.

During 2020 TEWG meetings, a remote collaring program was selected as the best survey option for monitoring Project effects on caribou. Details of required caribou density and the optimal number of collared caribou to reliably

detect Project effects in the Regional Study Area were discussed with the group. A collaring program would not be effective until a density of ~350 caribou per study area is reached, with a minimum of 30–35 collared caribou per study area. Aerial surveys of the RSA would be required to monitor caribou density and identify if and when 350 caribou has been reached. Ideally, this program would run concurrently with GN-led regional caribou surveys to gain a more thorough understanding of caribou distribution and behaviour in the Mary River stratum compared to the larger regional scale.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

In 2016, the MHTO became a member of the TEWG, adding a regional and community perspective to decisions and discussions within the group. Baffinland is currently finalizing an agreement for the ongoing support of regional monitoring projects carried out by the GN, with relevance to the project. Larger-scale Project effects monitoring on caribou cannot confidently detect potential Project effects to caribou at current population levels – a minimum density of 350 caribou per study area is required. When this density is met, remote collaring may be used to monitor caribou movement and behaviour in relation to the Project. Baffinland will continue to support the GN's regional caribou surveys and conduct independent aerial caribou surveys of the RSA, as appropriate.

## Project Certificate Condition No. 52

Category	Terrestrial Wildlife and Habitat - Caribou
Responsible Parties	The Proponent, TEWG
Project Phase(s)	Construction
Objective	To ensure best practices are used for caribou protection.
Term or Condition	Within 3 months of issuance of the Project Certificate, the Proponent shall initiate design, and develop the timeline to test and implement means of deterring caribou from pits and other hazardous areas. A review of best practices and techniques will be undertaken at other Northern mines where interactions with caribou occur. Considerations should include temporary ribbon placement, Inuksuks, or fencing and subsequent monitoring for effectiveness. These activities shall be reported back to the Terrestrial Environment Working Group.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister; results to be reported back to the Terrestrial Environment Working Group.
Status of PC Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

The issues of caribou protection measures and caribou deterrents were discussed with the TEWG in December 2013, and several techniques were considered, including Inuksuks, electric fences, wildlife fencing, and berms. It was suggested within the TEWG that caribou deterrents be considered “step-wise” mitigation to be addressed if a conflict between caribou and pit or other hazardous areas ever occurs or is likely to occur based on regional caribou abundance. Given the low regional population numbers of the North Baffin caribou herd, there has not yet been a need to implement caribou deterrent measures from hazardous areas.

As a preventative caribou protection measure, Baffinland requires all employees to adhere to a stop-work policy when wildlife is at risk of injury or death within the PDA, which reduces hazardous conditions. Baffinland has created guidelines (the Caribou Decision Tree; Figure 3-2 in the TEMMP) for driver response to caribou near roads based on distance and behaviour to reduce hazardous conditions further.

### RESULTS

Not applicable.



**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Currently, caribou abundance is relatively low on Baffin Island, and only a few incidental sightings of caribou have been made (see Section 8.4 in the Draft 2020 Terrestrial Environment Annual Monitoring Report). Baffinland will continue to monitor for caribou within the Project sites and RSA, support regional caribou monitoring conducted by the GN, and identify appropriate caribou deterrents in conjunction with the TEWG from Deposit No. 1 and hazardous areas when required.

## Project Certificate Condition No. 53

Category	Terrestrial Wildlife and Habitat - Caribou
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To mitigate impacts to caribou from Project-related traffic.
Term or Condition	<p>The Proponent shall demonstrate consideration for the following:</p> <ol style="list-style-type: none"> <li>a. Steps taken to prevent caribou mortality and injury as a result of train and vehicular traffic, including operational measures meant to maximize the potential for safe traffic relative to operations on the railway, Milne Inlet Tote Road and associated access roads.             <ol style="list-style-type: none"> <li>i. Specific measures intended to address the reduced effectiveness of visual protocols for the Milne Inlet Tote Road and access roads/trails during times of darkness and low visibility must be included.</li> </ol> </li> <li>b. Monitoring and mitigation measures at points where the railway, roads, trails and flight paths pass through caribou calving areas, particularly during caribou calving times. The details of these monitoring and mitigation measures shall be developed in conjunction with the Terrestrial Environment Working Group.</li> <li>c. Evaluation of the effectiveness of proposed caribou crossings over the railway, Milne Inlet Tote Road and access roads as well as the appropriate number.</li> <li>d. Development of a surveillance system along the railway corridor to identify the presence of caribou in proximity to the train tracks and operational protocols for the train to avoid collisions and enable caribou to cross the train tracks unimpeded.</li> <li>e. Protocols for documentation and reporting of all caribou collisions and mortalities, as well as mechanisms for adaptive management responses designed to prevent further such interactions.</li> </ol>
Relevant Baffinland Commitments	15, 71, 73
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Milne Inlet Tote Road – Active Steensby Rail Corridor – Not Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

#### *a. Prevention of Caribou Mortality and Injury as a Result of Vehicular Traffic*

- The Caribou Decision Tree presented in the TEMMP (Figure 3-2) directs driver responses when caribou are near or crossing the Tote Road to minimize the chance of collision or disturbance;

- Snowbank heights and slopes were managed throughout the winter season to decrease potential barriers to caribou movement across the Tote Road, and compliance of snow management to a 1 m height limit was monitored at least once per month during winter months by Baffinland Site Environment staff (frequency increased to twice per month following multiple caribou sightings from the Tote Road in January 2020); and
- Snow track surveys were used to monitor caribou interaction with the Tote Road to determine if they cross the road or deflect their paths of movement away from the road, and were conducted at least twice in late winter when snow and daylight conditions allowed.

Detailed methods are identified in the TEMMP (Sections 3.3.3 and 4.5.2, and Figure 3-2) and the Draft 2020 Terrestrial Environment Annual Monitoring Report (Sections 8.1 and 8.2), which has been released to the Working Group for review and comment.

#### ***b. Monitoring and Mitigation Measures***

In 2020, twenty-one (21) Height of Land survey stations were visited at least twice and three (3) were visited once during the caribou calving period annually to monitor caribou distribution, abundance, and behaviour.

Each site was visited for a minimum of 20 minutes, and the landscape was scanned using binoculars and a spotting scope to detect caribou presence and their proximity to Project infrastructure. If caribou were observed, a detailed survey would commence tracking caribou behaviour and interaction with Project infrastructure and vehicles. This monitoring data can then be used to inform mitigation measures.

Detailed methods are identified in the TEMMP (Section 4.5, Appendix 4-8) and the Draft 2020 Terrestrial Environment Annual Monitoring Report (Section 8.3), which has been released to the Working Group for review and comment.

In 2020, Baffinland explored numerous options for larger-scale caribou monitoring with input from the TEWG during 2020 meetings. This was done in response to TEWG concerns that Height of Land surveys are too local in focus to detect effects to caribou at greater distances from the Project. Aerial surveys, Global Positioning System (GPS) collaring, and remote camera monitoring were discussed as potential methods for monitoring caribou distribution, movement, and behaviour at the RSA scale, including in calving areas, with a focus on the Tote Road and proposed railway acting as barriers to movement.

#### ***c. Evaluation of Effectiveness of Caribou Crossings***

Snow track surveys were used to collect data on caribou response to Project activities based on movement patterns. The surveys were conducted by driving slowly (30 Km/hr) from the Mine Site to Milne Port on the Tote Road in late winter. When wildlife tracks were observed, surveyors stopped and walked to the tracks to confirm species and then followed the tracks to observe behaviour, habitat use, and possible divergence of travel paths. When tracks were near or intersected the Tote Road, surveyors recorded the location, species that produced the tracks, number of sets of tracks counted (i.e., group size), travel path in relation to the road (e.g., deflected, travelled along, or crossing the Tote Road) and the height of the snowbank measured at either the crossing point or likely point of deflection.

Detailed methods are identified in the TEMMP (Sections 4.5.2, Appendix 4-9) and the Draft 2020 Terrestrial Environment Annual Monitoring Report (Section 8.1), which has been released to the Working Group for review and comment.

In 2020, snow track surveys were conducted in March, April, May, and October by two Baffinland Site Environment employees using the methods described above.

Due to low embankments and existing low profile road conditions, there are no caribou crossings required for the Tote Road. Monitoring to date has focused on managing snowbank heights to minimize barriers to movement.

The RSA-scale caribou monitoring methods discussed with the TEWG during 2020 meetings (i.e. aerial surveys, Global Positioning System (GPS) collaring, and remote camera monitoring), if implemented, can be used to evaluate caribou movement in response to the Tote Road and proposed railway at a larger scale than snow track surveys to assess potential population-level effects.

#### ***d. Surveillance System***

Not applicable in 2020 as the railway has not yet been constructed. The TEMMP (Sections 3.3.1, 3.3.2, 3.3.3, and 4.5.2), including avoiding collisions with caribou, will include an updated surveillance system once the railway becomes a viable option.

#### ***e. Documentation and Reporting***

The TEMMP (Sections 3.3.3 and 3.3.4) details the protocol for documenting and reporting caribou collisions and mortalities. Although caribou numbers are very low and the risks of having a vehicle-caribou collision are low, ongoing mitigation such as the use of the Caribou Decision Tree is occurring to prevent caribou mortalities.

### **RESULTS**

#### ***a. Prevention of Caribou Mortality and Injury as a Result of Vehicular Traffic***

- Caribou numbers remained low in 2020, and therefore interactions with the Tote Road and vehicles have not occurred;
  - A total of 11 caribou were reported as incidental observations in 2020, seven (7) of which were outside the PDA. Most of the caribou were observed in exploration areas southeast of the Project in summer. Four (4) separate observations of a single caribou were recorded from the Tote Road in January 2020.
  - When caribou have been observed from the Tote Road, drivers have followed the Caribou Decision Tree to determine the most appropriate response — no collisions or mortalities have occurred to date.
- A stop-work policy is implemented when wildlife in the area could be endangered by work being conducted, including truck driver responses when caribou are near or crossing the Tote Road using the Caribou Decision Tree;
- Continued snowbank height management in 2020 resulted in 96% compliance to the 1 m height limit, ensuring the barrier-free movement of caribou; and
- Snow tracking surveys did not observe caribou tracks in 2020, consistent with the low regional caribou numbers.

#### ***b. Monitoring and Mitigation Measures***

- A total of 18 hours and 20 minutes of survey effort was conducted during the calving period in 2020;
- No caribou were detected on the landscape during 2020 snow track or Height of Land surveys; and

- Details of previous surveys dating back to 2013 are provided in the previous annual reports.
- With input from the TEWG during 2020 meetings, Baffinland determined that the most appropriate survey methods for detect potential Project effects at the RSA-scale would be aerial surveys and a GPS collaring program, ideally in conjunction with GN-led regional surveys. A minimum density of ~350 caribou (30-35 of them collared) per study area would be required for an effective GPS collaring program capable of detecting Project-related effects. These surveys could be used to monitor caribou density and distribution, evaluate population-level caribou movement and behaviour related to Project infrastructure, and ultimately inform better management and mitigation methods.
- A total of eleven (11) caribou from seven (7) groups were reported from incidental observations in 2020. Most of the caribou were observed in exploration areas southeast of the Project in summer. Four (4) separate observations of a single caribou were recorded from the Tote Road in January. The observed caribou was confirmed to have crossed the Tote Road in three (3) of these four (4) instances, suggesting that the road did not act as a barrier to movement.

#### ***c. Evaluation of Effectiveness of Caribou Crossings***

Results were inconclusive as of 2020, as caribou have only been incidentally and sporadically detected in or near the PDA since 2013 (see the Draft 2020 Terrestrial Environment Annual Monitoring Report). However, ongoing snowbank height management and wildlife response monitoring continues. Caribou were confirmed to have crossed the Tote Road in three of the four incidental observations in January, suggesting that the road did not act as a barrier to movement in those instances.

#### ***d. Surveillance System***

Not applicable in 2020 as the south railway was not constructed.

#### ***e. Documentation and Reporting***

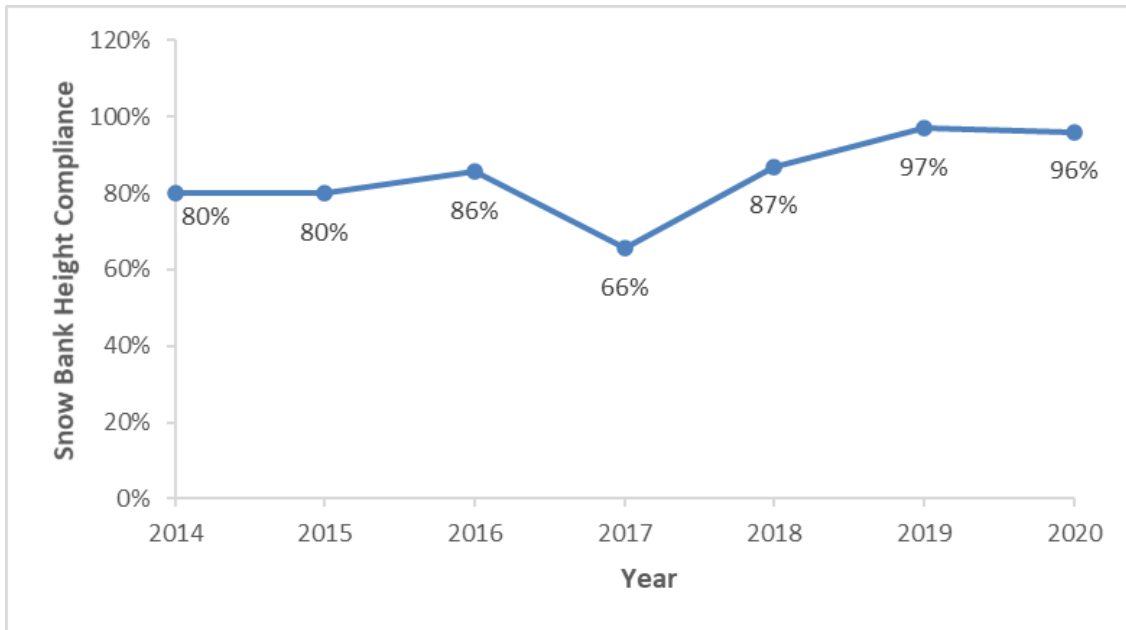
All documentation and reporting protocols have been developed. Baffinland maintains records of all wildlife interactions and mortalities via mandatory reporting protocols. Neither caribou collisions nor caribou mortalities occurred in 2020, nor any other year of Project operation.

### **TRENDS**

#### ***a. Prevention of Caribou Mortality and Injury as a Result of Vehicular Traffic***

Caribou interactions with the Tote Road and vehicles have not occurred; however, training on using the Caribou Decision Tree, snowbank height management, and snow tracking surveys continue. Four (4) incidental caribou observations were recorded from the Tote Road in 2020; caribou were confirmed to have crossed the road successfully in three of these instances. No interaction with vehicles occurred.

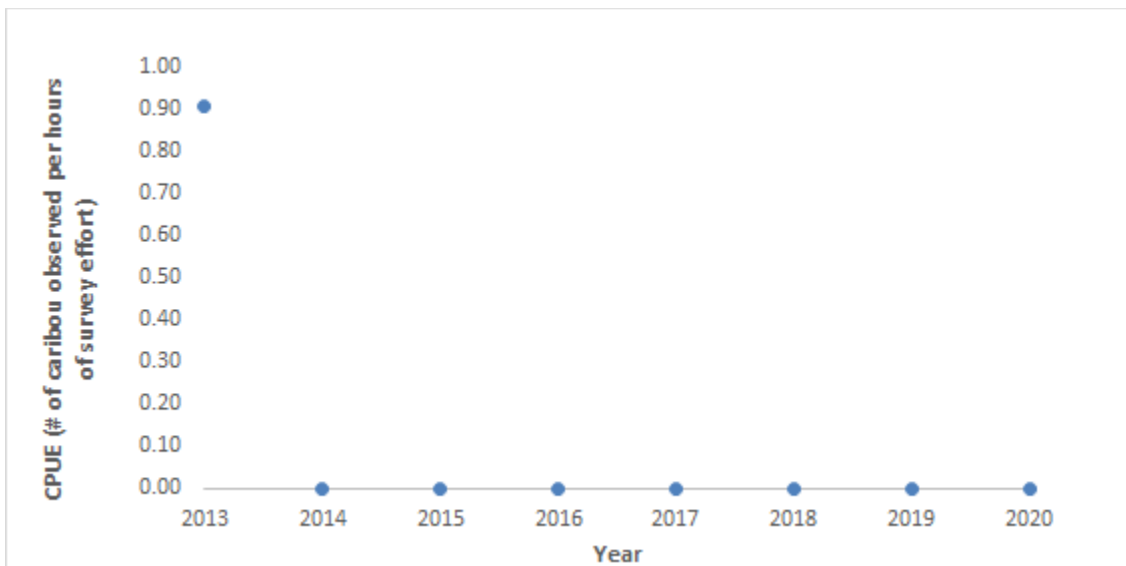
Annual monitoring of snowbank heights along the Tote Road since 2014 indicates a rate of compliance between 66% and 97% (Figure 4.3), with the highest level of compliance achieved in 2019.



**Figure 4.3: Snowbank Height Compliance Monitoring Results from 2014 to 2020 on the Tote Road**

***b. Monitoring and Mitigation Measures***

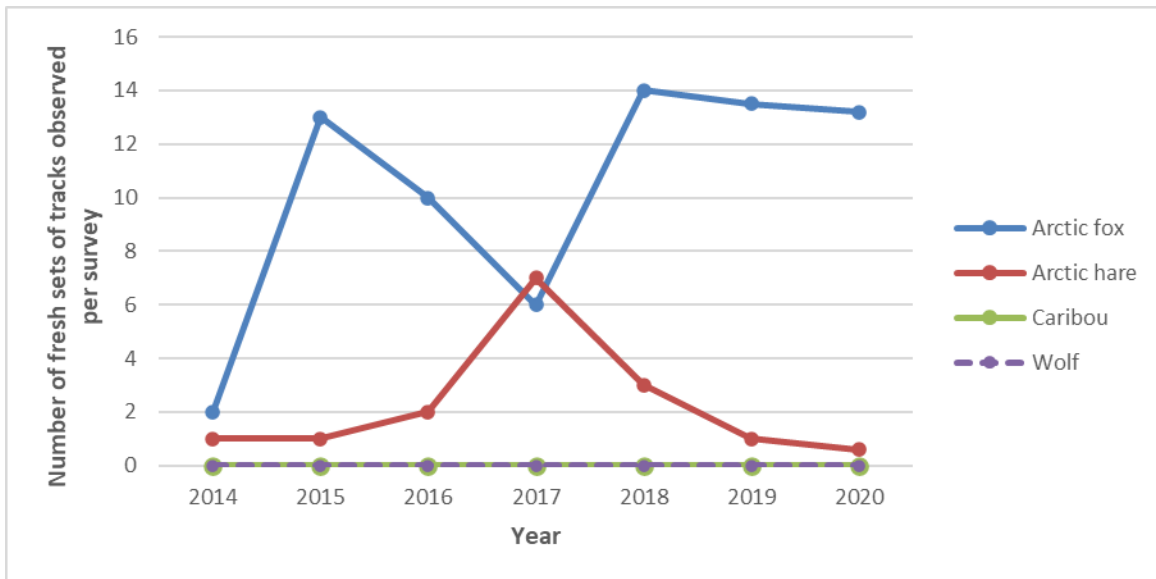
Based on caribou observed per hours of survey effort, there was a decrease in caribou observations during Height of Land surveys from 2013, when the surveys began, to present (Figure 4.4). These data reflect the low regional caribou numbers of the North Baffin Island herd.



**Figure 4.4: Caribou Observations from Height of Land Surveys from 2013 to 2020**

**c. Evaluation of Effectiveness of Caribou Crossings**

No caribou or wolf tracks have been detected during snow tracking surveys along the Tote Road between 2014 and 2020. However, Arctic fox and snowshoe hare tracks were observed during all survey years (Figure 4.5).



**Figure 4.5: Snow Track Survey Trends from 2014 to 2019**

**RECOMMENDATIONS / LESSONS LEARNED**

Snowbank height, snow track, and Height of Land surveys will continue annually to evaluate potential Project effects on caribou and terrestrial wildlife. As regional caribou numbers increase and they interact more frequently on or near the Tote Road, the Caribou Decision Tree will be reviewed for effectiveness. Seasonal migrations of caribou and their interaction with the Tote Road will be considered, and snow track surveys can occur more often by on-site staff. Baffinland will continue to explore options for regional scale caribou monitoring with the TEWG.

The TEWG is engaged regularly to discuss annual monitoring programs for the terrestrial environment. Feedback received from TEWG members is incorporated into annual monitoring reports and updates to the TEMMP where relevant.

## Project Certificate Condition No. 54

Category	Terrestrial Wildlife and Habitat - Caribou
Responsible Parties	The Proponent
Project Phase(s)	Construction - within six (6) months of issuance of Project Certificate
Objective	To Update the Terrestrial Environmental Management and Monitoring Plan.
Term or Condition	<p>The Proponent shall provide an updated Terrestrial Environmental Management and Monitoring Plan which shall include, but not be limited to the following:</p> <ul style="list-style-type: none"> <li>a. Details of the methods and rationale for conducting monitoring prior to the commencement of construction;</li> <li>b. Monitoring for caribou presence and behaviour during railway and Tote Road construction;</li> <li>c. Description and justification of statistical design or other means of determining effect and proposed analyses to support the conclusions drawn from monitoring impacts of the mine and related infrastructure on wildlife;</li> <li>d. Details of monitoring and mitigation activities, which should be established in collaboration with the Terrestrial Environment Working Group and are expected to include:             <ul style="list-style-type: none"> <li>i. Dustfall (fugitive and Total Suspended Particulates), that addresses methods to reduce risk to caribou forage from dustfall;</li> <li>i. Snow track surveys during construction and the use of video-surveillance to improve the predictability of caribou exposure to the railway and Tote Road. Using the result of this information, an early warning system for caribou on the railway and Tote Road shall be developed for operation.</li> <li>ii. Details of monitoring thresholds related to level of mitigation and management; and</li> <li>ii. Details of a comprehensive hunter harvest survey to determine the effect on caribou populations and potential effects on caribou behaviour resulting from increased human access caused by upgrades to the Milne Inlet tote road (and any other roads if they are shifted from private to public use) and increase local knowledge of the mine site, including establishing pre-construction baseline harvesting data.</li> </ul> </li> </ul>
Relevant Baffinland Commitments	N/A
Reporting Requirement	Plan to be submitted to the NIRB and the TEWG within 6 months of issuance of a Project Certificate.
Status of PC Condition	Milne Inlet Tote Road – Active Steensby Rail Corridor – Not Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG), Nunavut Impact Review Board
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2



## METHODS

The TEMMP directly addresses PC Condition No. 54. The TEMMP outlines a detailed rationale and methodology for Baffinland's monitoring and mitigation programs. It is reviewed and updated as needed periodically, though changes may be implemented in advance of formal updates as the need arises. Regarding PC Condition No. 54c, the programs are revised based on statistical analyses of annual data, as reported in the annual reports.

## RESULTS

Specific items outlined in this Project Condition can be found in the following sections in the TEMMP:

### PC Condition No. 54a.

- Section 4 – Monitoring Framework

### PC Condition No. 54b.

- Section 4.5.1 – Caribou Habitat Monitoring
- Section 4.5.2 – Caribou Movement

### PC Condition No. 54c.

- Appendix B – Monitoring Methods and Details

### PC Condition No. 54d.i.

- Section 3.1 – Mitigation Measures: Vegetation
- Appendix B, Section 4-2 – Vegetation Monitoring: Vegetation Health
- Appendix B, Section 4-3 – Vegetation Monitoring: Dustfall

### PC Condition No. 54d.ii.

- Section 4.5.2 – Caribou Movement
  - This section outlines Baffinland's plan to use remote motion-sensing cameras to observe caribou behaviour at crossing points along the Tote Road and railway. Currently, caribou population density is too low for this method to be effective. This program will be revisited when caribou population density increases to a level that allows robust experimental design and statistical analysis.
- Appendix B, Section 4-9 – Caribou Monitoring: Movement

### PC Condition No. 54e.

- Thresholds are described throughout Section 4 – Monitoring Framework and Appendix B – Monitoring Methods and Details

### PC Condition 54f.

- Section 4.5.3 – Caribou Mortality
- Section 4.5.4 – Caribou Health

## TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Regarding PC Condition No. 54b, Baffinland discussed additional caribou monitoring methods with the TEWG during 2020 meetings (i.e., aerial surveys, GPS collaring, and remote camera monitoring). These methods can be used to evaluate caribou movement in response to the Tote Road and proposed rail line at the RSA scale to assess potential population-level effects when caribou population density increases. When finalized, these methods and details will be added to the TEMMP.

## Project Certificate Condition No. 55

Category	Terrestrial Wildlife and Habitat - Wolves
Responsible Parties	The Proponent, Government of Nunavut Department of Environment
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate potential impacts to wolves.
Term or Condition	<p>The Proponent shall develop an adaptive management plan applicable to wolves and wolf habitat in collaboration with the Government of Nunavut- Department of Environment (GN-DOE) to ensure compliance with the <i>Nunavut Wildlife Act</i>. Consideration must be given to the following:</p> <ol style="list-style-type: none"> <li>Monitoring for active wolf dens within a 10 Km radius from the mine site, under the direction and prior approval of the GN DOE, and reporting the results through NIRB's Annual Reports on terrestrial wildlife in the Project Development Area (PDA);</li> <li>Estimating the available (glacio-fluvial materials) esker habitat within the Regional Study Area/PDA and identifying such habitat as ecologically sensitive;</li> <li>Developing "wolf indices" for presence/abundance of wolves (by conducting studies) to set a baseline pre-construction baseline; and</li> <li>Ensuring that wolf monitoring is capable of determining the relative abundance and distribution of wolves in the PDA over time.</li> </ol>
Relevant Baffinland Commitments	57, 74
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	<p>Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland 2016a)</p> <p>2020 TEWG Meeting Records</p> <p>Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)</p>
Ref. Document Link	<p><a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a></p> <p>Appendix C.2</p> <p>Appendix G</p>

### METHODS

As a result of low caribou numbers, wolf numbers in the region have also declined (i.e., no wolves incidentally observed in or around the PDA throughout 2020). Wolf monitoring programs will be re-initiated when wolves and/or caribou are observed near the Project area consistently (e.g., based on trends observed from the Height of Land monitoring data or incidental monitoring data) or on observations of local harvesters and as reported to Baffinland or the TEWG. Monitoring of carnivore dens will continue to be discussed within the TEWG based on discussions within the group, and when deemed necessary, Baffinland will re-initiate carnivore den monitoring.

### RESULTS

Not Applicable.

**TRENDS**

Not Applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Not Applicable.

## Project Certificate Condition No. 56

Category	Terrestrial Wildlife and Habitat - Wildlife Habitat
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure progressive reclamation of disturbed wildlife habitat.
Term or Condition	The Proponent shall develop a strategy for the recovery of terrestrial wildlife habitat in a progressive manner that is consistent with the Nunavut Wildlife Act. Overall, this will require the integration of a decision-making process and the identification of mitigation responses to cumulative impacts on caribou survival, breeding propensity, and population dynamics.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Water Board, Indigenous and Northern Affairs Canada
Reference	Interim Closure and Reclamation Plan (Baffinland, 2018a) Revegetation Survey & Preliminary Reclamation Trail (EDI, 2020b) Implications for Reclamation Practices & Trials at the Mary River Project (EDI, 2019) 2020 TEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

As described in the ICRP, a Reclamation Research program was proposed to identify best practices for promoting natural revegetation that will inform the progressive revegetation program for disturbed areas no longer required for operations. The objective is to achieve a sustainable vegetation cover and a vegetation cover to enhance physical stability and/or achieve the desired aesthetic conditions for the Project site at closure. Refer to response to PC Condition No. 39 for further details and status of compliance.

The development of the strategy to recover terrestrial wildlife habitat is still at the pre-feasibility phase. Methods and approaches have yet to be determined. Baffinland will be organizing a Mine Closure Working Group (timing/schedule to be determined) to evaluate the implementation and results of reclamation research programs and progressive reclamation projects at Mary River. The establishment of the Mine Closure Working Group was deferred due to the COVID-19 Pandemic, however Baffinland will be looking to advance this initiative in 2021. The intention is that the working group, in coordination with the TEWG, can assess and evaluate the current study design, seek input on the integration of Inuit Qaujimagatuqangit (IQ) into the study design, and establish a path forward for implementing the research program as it pertains to PC Condition No. 56.

**RESULTS**

Not applicable

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Continue developing the Mine Closure Working Group to evaluate the implementation and results of reclamation research programs and progressive reclamation projects at Mary River, considering caribou survival, population dynamics, and incorporating IQ where possible.

## Project Certificate Condition No. 57

Category	Terrestrial Wildlife and Habitat - Reporting
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate and monitor for impacts to wildlife.
Term or Condition	<p>The Proponent shall report annually regarding its terrestrial environment monitoring efforts, with inclusion of the following information:</p> <ol style="list-style-type: none"> <li>Description of all updates to terrestrial ecosystem baseline data;</li> <li>A description of the involvement of Inuit in the monitoring program;</li> <li>An explanation of the annual results relative to the scale of the natural variability of Valued Ecosystem Components in the region, as described in the baseline report;</li> <li>A detailed presentation and analysis of the distribution relative to mine structures and activities for caribou and other terrestrial mammals observed during the surveys and incidental sightings;</li> <li>Results of the annual monitoring program, including field methodologies and statistical approaches used to support conclusions drawn;</li> <li>A summary of the chronology and level of mine activities (such as vehicle frequency and type);</li> <li>An assessment and presentation of annual environmental conditions including timing of snowmelt, green-up, as well as standard weather summaries;</li> <li>A discussion of any proposed changes to the monitoring survey methodologies, statistical approaches or proposed adaptive management stemming from the results of the monitoring program.</li> </ol>
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board, Terrestrial Environment Working Group (TEWG)
Reference	<p>Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a)</p> <p>2020 TEWG Meeting Records</p> <p>Draft 2020 Terrestrial Environment Annual Monitoring Report (TEAMR; EDI, 2021)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS AND RESULTS

The TEMMP is the primary guidance document for mitigation and monitoring at the Mary River Mine; the TEAMR is the primary source for terrestrial environment summary reporting. For brevity, the following responses highlight summary findings and notable outcomes from the TEMMP and TEAMR in relation to PC Conditions. Refer to the TEMMP and TEAMR for comprehensive descriptions of study design, data capture, analytical methods (including assessment limitations and assumptions), and annual monitoring results.

- a. Updates to and descriptions of all baseline data are summarized annually in the TEAMR.
- b. Baffinland regards engagement and consultation with Inuit and incorporation of Inuit in field monitoring as an important aspect of the programs. Inuit have been involved in various components of the terrestrial environment monitoring program, including: hiring and training Inuit to work on terrestrial monitoring programs; supporting the participation of the MHTO in the TEWG; funding for two full-time on-site Environmental Monitors that are appointed and solely employed by QIA but fully integrated into the Site Environment team; and the implementation of a community-based monitoring program through the Mary River IIBA. Inuit are involved in all terrestrial environment annual monitoring programs conducted by Baffinland's consultant when possible. This has included participation in snow track surveys, Height of Land surveys, vegetation monitoring, and raptor monitoring.
- c. In 2020, the COVID-19 Pandemic imposed significant health and safety restrictions on Inuit engagement. Inuit involvement as research assistants in the terrestrial environment monitoring program decreased compared with previous field assessment seasons. Baffinland secured involvement opportunities for two Inuit staff members who were living outside of Nunavut in 2020 to join the Height of Land surveys and raptor monitoring surveys when available. Additionally, a QIA Environmental Monitor participated in some of the vegetation and soil base metals sampling and noise monitoring fieldwork.
- d. Where relevant, the TEAMR discusses near-site wildlife observations concerning available knowledge about regional populations. It compares measured wildlife data (e.g., vegetation abundance data, cliff-nesting raptor data, caribou observations) to previous years' data and baseline data as an indicator of natural variability. Bird monitoring survey data that derived density estimates were compared to regionally available density values. The low numbers of caribou and wolf observations near site reflect low numbers reported throughout the North Baffin Island region by the GN. In 2020, Baffinland initiated an assessment of regional caribou monitoring options, including aerial surveys, GPS collaring, and remote camera monitoring. These methods can be used to evaluate caribou distribution and movement relative to Project infrastructure and activities to assess potential population-level effects when caribou population density increases to a level that allows effective monitoring.

A total of eleven (11) caribou from seven (7) groups were reported from incidental observations in 2020. Most of the caribou were observed in exploration areas southeast of the Project in summer. Four (4) separate observations of a single caribou were recorded from the Tote Road in January. The observed caribou was confirmed to have crossed the Tote Road in three (3) of these four (4) instances, suggesting that the road did not act as a barrier to movement. No caribou were identified during the Height of Land surveys. Caribou have not been observed directly in the PDA during Height of Land surveys between 2014 and 2020. Caribou abundance surveys conducted in 2014 and 2018 by the Government of Nunavut also reported low abundance throughout Baffin Island.

- e. Project Certificate Condition No. 57(d) is addressed in the TEAMR by reporting the results of the Height of Land surveys, snow tracking surveys, incidental observation logs, wildlife mortalities log, and reference to regional conditions from other publications and documents.
- f. No caribou were observed during the 2020 Height of Land surveys. Snow tracking surveys were conducted in March, April, May, and October 2020. As in previous years of surveys, most tracks observed were from Arctic foxes and Arctic hares, and no caribou or wolf tracks were observed. Similar numbers of tracks were



observed in previous years (i.e., an average of approximately 13 fox tracks and one hare track per survey in 2020, plus occasionally observed species such as ermine, lemming, and ptarmigan). Approximately half of the tracks detected were from animals crossing, a third from travelling along, and 15% deflecting from the Tote Road

- g. Incidental observations within and outside of the PDA are described in detail in the Draft 2020 TEAMR and included; 39 Arctic hares, 193 Arctic foxes, 13 red foxes, ten (10) lemmings, one (1) ermine, 11 caribou, 250 narwhal, eight (8) seals, and eight (8) polar bears. These numbers represent the total number of animals reported in the log, but may include multiple observations for the same individual(s) (e.g., multiple observations of the same Arctic fox living near a camp). Four (4) of the reported caribou were observed from the Tote Road in January 2020.
- h. All results of the monitoring programs, including methods and approaches to statistics, are included in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021), which has been released to the Working Group for review and comment.
- i. Mine activity in 2020 was consistent with the extension to the temporary production increase approved in 2018. In 2020, approximately 6.0 Mt of iron ore was hauled from the Project to the Milne Port stockpile, and approximately 5.5 Mt of iron ore was shipped out of Milne Port. Construction in 2020 was limited: the Run of Mine stockpile pad and associated water management infrastructure were developed at KM 106, a new access road and water collection ditch were created at the 560 Hillside Road, and a laydown was expanded at the 110 communication tower. At the end of 2020, the total Project footprint was 556 ha.
- j. The Draft 2020 TEAMR summarizes mine traffic activity as it correlates to dustfall monitoring. All non-haul vehicle traffic on the Tote Road is recorded by Baffinland security. This type of vehicle traffic includes road maintenance mobile equipment, mechanical maintenance/fueling trucks, pick-up trucks, etc. Mine Operations Dispatch tracks the number of trucks hauling ore on the Tote Road each day.
- k. The average number of ore haul transits per day in 2020 was 243.3; this represents a slight increase in the average daily number of ore haul transits in 2020 compared with 2019 (238.0 ore haul transits per day), and a continuation of an increasing trend in ore haul transits since operations began. As seen in previous years, there were periodic full or partial closures of the Tote Road associated with adverse weather conditions (freeze/thaw, poor visibility, etc.). However, these closures and corresponding decreases in ore haul transits were short-lived, and the average daily number of transits was steady through the 2020 calendar year. Other non-haul truck traffic had an annual average of 28.4 vehicle transits per day, which was lower than the previous three years, ranging from 32.3 to 43.0 transits per day. The average daily total vehicle transits (haul and other) on the Tote Road in 2020 was 271.1 vehicle transits per day, slightly below the 2019 average of 280.9 transits per day. Ore haul transits are depicted below in Figure 4.6.
- l. A summary of annual weather conditions is included in the Draft 2020 Terrestrial Environment Annual Monitoring Report, which has been released to the Working Group for review and comment. In 2020, mean monthly air temperatures at the Mine Site rose above zero in May, were consistently above zero by early June, reached an annual monthly high of 14.1°C in July, and remained above zero through September. Mean monthly air temperatures at Milne Port rose above zero in June, reached the annual monthly high of 11.5°C in July, and then fell below zero once again in September. The timing and magnitude of mean monthly air temperatures at Mine Site and Milne Port were fairly consistent with baseline and post-baseline periods.

The Mine Site experienced a lower frequency of rain than most previous years but a greater overall quantity of rain, most notably during a 16-day rainy period in May. However, this precipitation anomaly is likely due to a sensor error. In general, 2020 was a drier year than average at Milne Port, with a notable lack of rain in July and August. Wind speed and direction at the Mine Site were consistent with past years (generally a southeast wind). Milne Port generally experienced north-northeast winds off of Milne Inlet, and southeast winds.

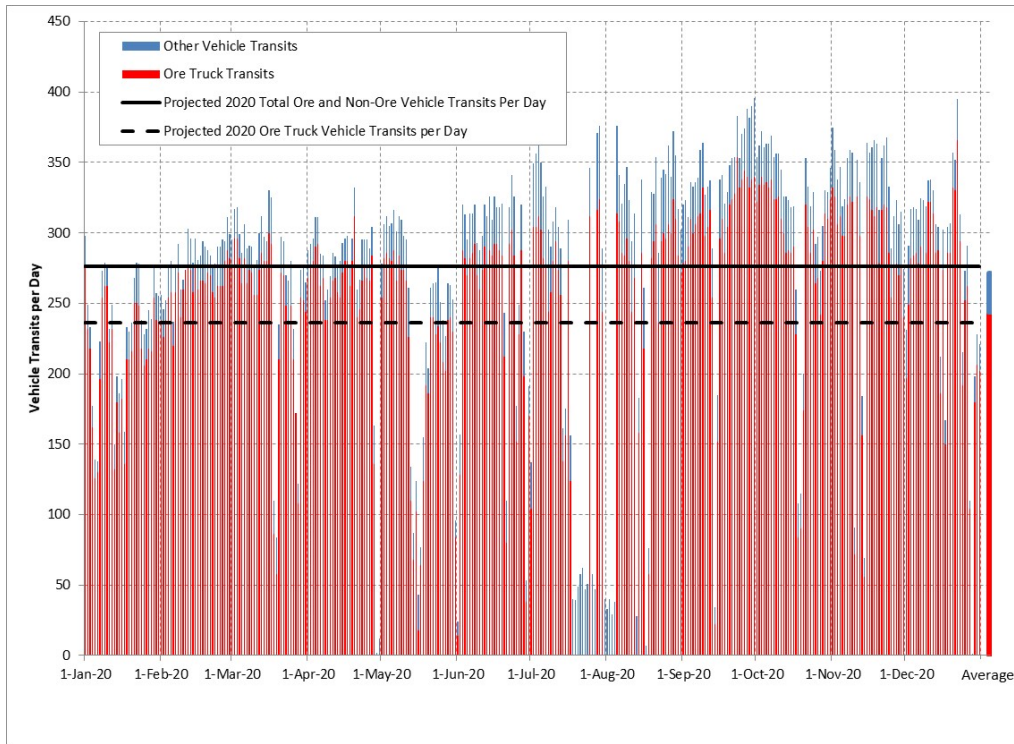
- m. Satellite imagery analysis using Normalized Difference Vegetation Index was introduced in 2020 in response to a request by the TEWG to verify that vegetation monitoring fieldwork occurred during the peak growing season (i.e., within “green-up” dates). The Normalized Difference Vegetation Index (NDVI) uses near-infrared reflectance and red reflectance to estimate the area covered by live vegetation from multispectral images. Satellite imagery from 2014 to 2019 was included in this analysis. Results showed that mean NDVI was highest, and the growing season was longest in 2019. The lowest NDVI and shortest growing season occurred in 2017. In general, NDVI begins to increase in the last week of May. Across years, NDVI reaches a plateau in the first week of July (Day-of-Year [DOY] = 188) and then begins to decline again after the first week of September (DOY = 251). Peak growing season was identified as the first week of July to the first week of September, encompassing all past vegetation monitoring fieldwork up to 2019.
- n. The TEMMP addresses PC Condition No. 57(h). All versions of the TEMMP have been included in the revision table contained within the document. Ongoing updates and changes to monitoring programs are also discussed in the Terrestrial Environment Annual Monitoring Reports and TEWG meetings. This PC Condition is seemingly identical to PC Condition No. 58(e).

## TRENDS

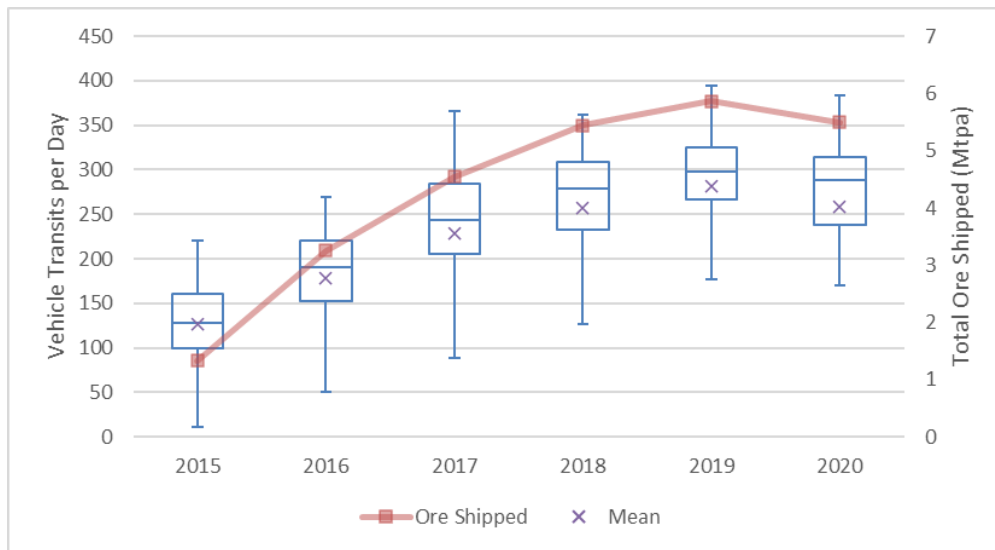
- a. No trends reported.
- b. No trends reported.
- c. No trends reported. Wolf and caribou observations on-site follow the trends of regional observations; very low abundance. The low bird densities near the site reflect low densities in the North Baffin Island region.
- d. No trends reported.
- e. No trends reported.
- f. The annual mean ore haul transits and non-haul transits per day increased between 2015 and 2019, then decreased slightly in 2020 (Figure 4.7).
- g. Summaries of 2020 climate data at the Mite Site and Milne Port compared with baseline and post-baseline periods are included in Figure 4.8 and Figure 4.9. The annual estimation of green-up dates from 2014 to 2019 are included in Figure 4.10.
- h. No trends reported.

## RECOMMENDATIONS / LESSONS LEARNED

The TEWG is engaged regularly to discuss annual monitoring programs for the terrestrial environment. Feedback received from TEWG members is incorporated into annual monitoring reports and updates to the TEMMP where relevant.



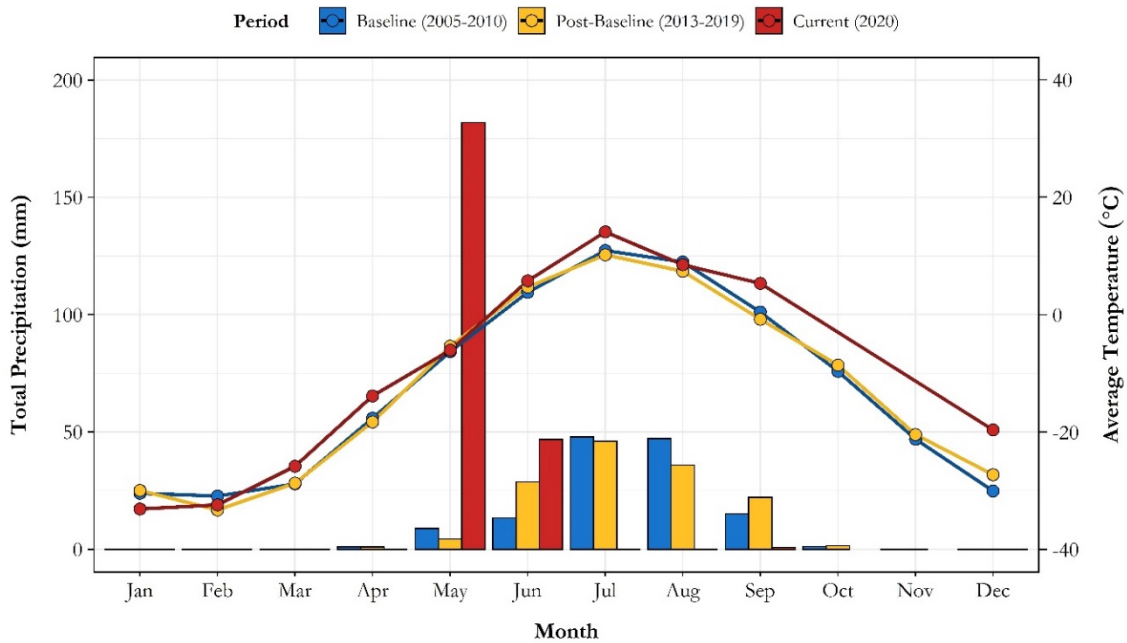
**Figure 4.6: Daily Vehicle Transits on the Tote Road in 2020**



**Figure 4.7: Trends in Vehicle Transits on the Tote Road from 2015 to 2020**

**Notes:**

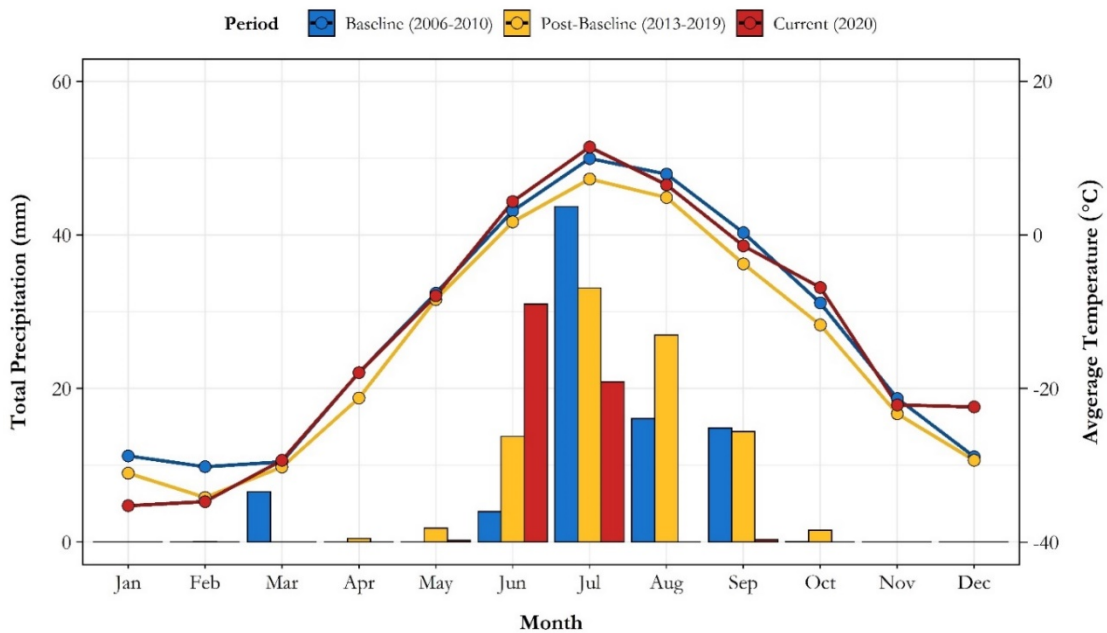
1. Includes ore haul traffic and other traffic combined.
2. The 'x' in the centre of each box marks the annual mean value, the box displays median, 25th and 75th quartiles, and the whiskers represent the minimum and maximum values.
3. The red line indicates the total annual amount of ore shipped.



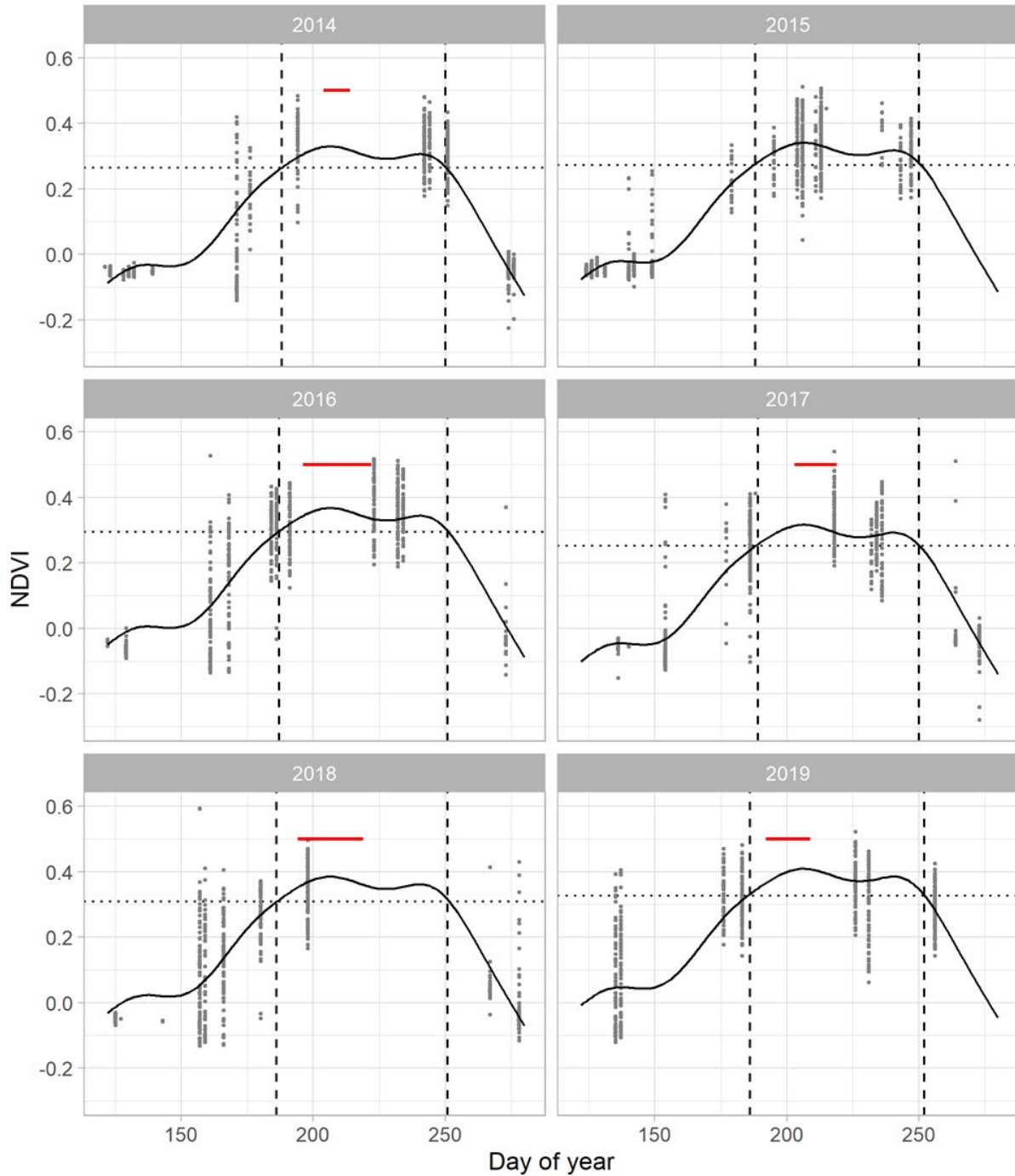
**Figure 4.8: Mine Site Monthly Average Air temperatures\* (lines, °C) and Total Precipitation\* (bars, mm) During The Current (2020), Post-Baseline (2013–2019), and Baseline (2005–2010) Periods**

**Notes:**

\*Temperature results for 2020 are based on alternative data collected at the Mary River Camp. Precipitation results for 2020 may be erroneous and should be interpreted with caution.



**Figure 4.9: Milne Port Monthly Average Air Temperatures (lines, °C) and Total Precipitation (bars, mm) During The Current (2020), Post-Baseline (2013–2019), and Baseline (2005–2010) Periods**



**Figure 4.10: The Estimate of Green Vegetation Proximal to the Mary River Project Long-Term Vegetation Monitoring Plots**

**Notes:**

Solid black lines show the estimated mean NDVI; small grey points show mean NDVI within 100 m of individual vegetation plots from Landsat 8 imagery. Dotted horizontal lines show 80% of peak NDVI, and dashed vertical lines show the start and end of the peak growing season (dashed vertical lines). Red horizontal line segments show the range of sampling dates for long-term vegetation monitoring plots; no vegetation sampling was done in 2015.

## Project Certificate Condition No. 58

Category	Terrestrial Wildlife and Habitat - Reporting
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate and monitor for impacts to wildlife.
Term or Condition	<p>Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes:</p> <ol style="list-style-type: none"> <li>An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting;</li> <li>A detailed analysis of wildlife responses to operations with emphasis on calving and post-calving caribou behaviour and displacements (if any), and caribou responses to and crossing of the railway, the Milne Inlet Tote Road and associated access roads/trails;</li> <li>A description of the extent of dustfall based on measured levels of dustfall (fugitive and finer particles such as TSP) on lichens and blueberries, and ash content of caribou fecal pellets;</li> <li>A demonstration and description of how the monitoring results, including the railway, road traffic, air traffic and dustfall contribute to cumulative effects of the Project;</li> <li>Any proposed changes to the monitoring survey methodologies, statistical approaches or proposed adaptive management stemming from the results of the monitoring program;</li> <li>Any updates to information regarding caribou migration trails. Maps of caribou migration trails, primarily obtained through any new collar and snow tracking data, shall be updated (at least annually) in consultation with the Qikiqtani Inuit Association and affected communities, and shall be circulated as new information becomes available.</li> </ol>
Relevant Baffinland Commitments	60, 71
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Milne Inlet Tote Road – Active Steensby Rail Corridor – Not Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board, Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

## METHODS AND RESULTS

The TEMMP is the primary guidance document for environmental mitigation and monitoring at the Mary River Mine; the TEAMR is the primary source for terrestrial environment summary reporting. For brevity, the following responses highlight summary findings and notable outcomes from the TEMMP and TEAMR in relation to PC Conditions. Refer to the TEMMP and TEAMR for comprehensive descriptions of study design, data capture, analytical methods (including assessment limitations and assumptions), and monitoring results.

- a. Baffinland does not conduct any regional terrestrial environmental monitoring beyond the scope of the TEMMP. That said, Baffinland contributes to and actively supports monitoring programs implemented by the Government of Nunavut and Environment and Climate Change Canada; findings from these peripheral/ancillary programs are considered during discussions with TEWG.
- b. As per the response to PC Condition No. 57, this Sub-Condition is addressed by the TEMMP under Height of Land surveys, snow track surveys, and incidental wildlife observations. All assessment findings are comprehensively presented in the TEAMR:
  - Twenty-four Height of Land stations were visited at least once during 2020 surveys in early June; 21 were visited twice. During 18.3 hours of Height of Land observation time in 2020, no caribou were observed, and caribou displacement was not observed on-site.
  - Five snow track surveys were conducted in 2020: three in spring (March 17, April 27, May 17) and two in winter (October 13 and 22). Consistent with previous survey outcomes, most tracks were associated with Arctic foxes and Arctic hares, no caribou tracks were observed. Approximately half of the tracks detected were from animals crossing, a third from travelling along, and 15% deflecting from the Tote Road.
  - Incidental observations within and outside of the PDA included 39 Arctic hares, 193 Arctic foxes, 13 red foxes, ten (10) lemmings, one (1) ermine, 11 caribou, 250 narwhal, eight (8) seals, and eight (8) polar bears. Four of the reported caribou were observed from the Tote Road in January 2020. Caribou were confirmed to have crossed the Tote Road in three of these observations, suggesting that the road did not act as a barrier to movement.
- c. The TEMMP addresses this Sub-Condition under dustfall monitoring and vegetation and soil base metals monitoring. All assessment findings are comprehensively presented in the TEAMR:
  - In 2020, a total of 39 dustfall monitoring stations were sampled: nine dustfall monitors located at the Mine Site; six dustfall monitors located at Milne Port; 22 dustfall monitors along the length of the Tote Road at varying distances from the centreline, and two Reference dustfall samplers located 14 Km southwest of the Tote Road. Sampling was completed year-round (26/39 sites) or strictly during summer (13/39 sites), depending on access. Data were analyzed to differentiate Spatio-temporal trends and calculate total annual deposition.
    - Dustfall sampling was conducted year-round; however, the winter sampling program was limited to a subset of the sampling sites (26 out of 39 in the 2020 season) because access to remote sites was restricted and unsafe during the winter months. Data analysis investigated differences between Near, Far, and Reference sites, seasonal differences, and total annual deposition calculations.

- a. The magnitude of annual dustfall at the Mine Site sample locations was comparable with 2018. However, in 2019 dustfall was highest near the ore haul road, downwind of the ore deposit, while dustfall near the airstrip and the crusher decreased in 2019 compared to 2018. In all previous years, the highest dustfall in the Mine area was associated with the airstrip.
  - b. Dustfall at Milne Port has remained constant in most monitoring locations in recent years, (2018 – 2020). However, the 2019 relocation of site DF-P-01 to DF-P-08 to expand the ore stockpile footprint resulted in a decreased short-term ability to measure trends in dustfall associated with the ore stockpile. In the future, data collected at DF-P-08 will allow accurate monitoring of dustfall from the ore stockpile moving off the Project Area. Dustfall at Milne Port was elevated in early spring (March, April) and early fall (September), with lower dustfall measured in winter and summer months.
  - c. Along the Tote Road in 2020, dustfall increased at monitors at the north and south end of the road compared to past monitoring years. In all areas, dustfall was highest from April through September and was significantly lower from January through March and October through December. Consistent with previous years, dustfall at the south crossing (KM 78) was higher than the north crossing (KM 28). Higher dustfall at the south crossing is believed to be associated with local topography (there is a wide valley at km 78 where there are often high winds) and vehicles accelerating as they exit a stream crossing bridge structure.
  - d. Annual Total Suspended Particulates (TSP) deposition levels were predicted to exceed  $50 \text{ g/m}^2/\text{year}$  within the PDA, with TSP levels decreasing to background outside of the PDA. The 2020 dustfall results are consistent with predictions that the highest dustfall would be limited to the PDA.
- Following recommendations from the TEWG, a satellite imagery analysis was conducted to assess winter dustfall extent around the Project from 2014 to 2020 using Landsat and Sentinel-2 imagery. Dustfall extent and relative magnitude were extracted from Landsat and Sentinel-2 satellite images collected between mid-March and mid-May using the reflective differences between dust and snow within a 20 km buffer of the Project Development Area. Dustfall patterns and distributions are comprehensively presented in the TEAMR:
    - a. Dustfall extended approximately 5 km to the south and 8 km to the northwest around the Mine Site in 2020, with high relative dustfall magnitudes within 500 m of the mine infrastructure.
    - b. Dustfall extended from either side of the Tote Road to a distance of approximately 500 m in 2020, with high relative magnitudes within 100 m. The dustfall extent along the Tote Road was greatest around the south crossing (KM 78) in 2020.
    - c. Satellite image-derived dustfall extent was greatest at Milne Port in 2020. Dustfall extended approximately 12 km north of Milne Port over Milne Inlet. Dustfall also extended approximately 4 km southwest of Milne Port. The highest relative magnitudes were found within 2 km of Milne Port.



- In 2020, soil-metal and lichen-metal concentrations were sampled at 60 locations spanning the entire PDA. Sampling was conducted at three distances/locations from the PDA (Near: 0-100m, Far: 101–1,000m, and Reference: >1,000 m).
  - a. Soil and lichen metal concentrations at the Project mainly indicated no significant increases compared with Baseline values. Some discrete increases in CoPC metal concentrations have been identified, but all values were either below or within an acceptable range.
  - b. Following recommendations from the TEWG and as per the response to PC Condition No. 38, efforts have been made to align the study design of the vegetation and soil base metals monitoring program with the dustfall monitoring program to facilitate direct comparison between Project-related effects assessed by these programs. Sampling distances and /locations have been informed by the dustfall monitoring program; where possible, vegetation and soil sample sites were paired in proximity to permanent dustfall locations. As such, preliminary investigations have examined the relationship between dustfall and soil-metals and lichen-metals, although no cohesive trends have emerged so far.
- No assessments on the ash content of caribou fecal pellets have been completed so far. Regional and Project-focused caribou abundance has been too low to obtain an adequate sample collection.
- d. The TEMMP addresses this Sub-Condition under dustfall monitoring, vegetation and soil base metals monitoring, road traffic, and helicopter overflights. All assessment findings are comprehensively presented in the TEAMR. These findings may contribute to cumulative effects of the Project:
  - Summary findings relating to dustfall monitoring are presented in response to PC Condition No. 58(c); summary findings relating to vegetation and soil base metals monitoring are presented in response to PC Condition No. 34; summary findings relating to road traffic are presented in response to PC Condition No. 57(f).
  - A total of 1,863 helicopter transits were flown from May to September 2020, for a total flight time of 852.3 hours. To minimize potential effects to wildlife, pilots follow the flight height requirements outlined in PC Conditions No. 59 and 71. Overall compliance with these requirements in all areas for all months in 2020 was 96.4%. Additional details of these analyses and results are described PC Conditions No. 59 and 71.
  - The terrestrial environment monitoring program is designed to provide a holistic and multi-disciplinary assessment of potential Project effects and cumulative effects on numerous inter-related valued ecosystem components. Monitoring programs are designed to complement each other and provide a greater understanding of ecosystem-wide responses and pathways than any single program. Traffic, dustfall, and helicopter data, along with other monitoring data such as noise and weather, contribute to a greater overall understanding of potential Project-related disturbances and cumulative effects on the north Baffin Island landscape.
- e. As per the response to PC Condition No. 50, Baffinland has developed an adaptive management strategy to facilitate annual review of all monitoring information and monitoring programs developed under its TEMMP and adjust these based on monitoring outcomes and recommendations from applicable Working Groups. As documented in the TEAMR, minor modifications about the refinement of sampling locations and sample

design (i.e., sampling intensity) to optimize statistical analyses in support of interpretations are made. Emphasis has also been made to align sampling locations across various monitoring programs to facilitate cross-disciplinary comparisons.

- f. There is no new information on caribou migration trails since the data collection was summarized for the FEIS baseline report completed in 2012. By the end of 2020, there had been no new collar data collected. These results are reviewed with the TEWG, within which the QIA participates.
- g. Caribou tracks (and individual caribou) were observed incidentally near km 94 of the Tote Road in January 2020; these tracks did cross the road multiple times but did not constitute a caribou migration trail. No caribou were identified during the Height of Land surveys. Caribou have not been observed directly in the PDA during Height of Land surveys between 2014 and 2020. Caribou abundance surveys conducted in 2014 and 2018 by the Government of Nunavut also reported low abundance throughout Baffin Island.
- h. In 2020, Baffinland explored options for regional scale caribou monitoring. Aerial surveys, GPS collaring, and remote camera monitoring were discussed as potential methods for monitoring caribou distribution, movement, and behaviour at the RSA scale, including in calving areas, with a focus on the Tote Road and proposed railway acting as barriers to movement. These data would also contribute to the identification of caribou migration patterns and trails.

## TRENDS

Refer to PC Condition No. 53 for trends related to wildlife response (as indicated by outcomes from Height of Land surveys, snow track surveys, and incidental observations).

Refer to PC Condition No. 34 for trends related to vegetation and soil base metals monitoring.

Trends for dustfall:

- From 2014 to 2016, dustfall across the PDA increased commensurately with mine production. From 2016 to 2020, dustfall generally plateaued with only modest increases in some Project areas. Trends at each Project site are summarized below and are presented in Figure 4.11.
  - Mine Site (DF-M Monitors) — There was a modest increase in dustfall at the Mine Site dustfall monitoring sites, largely driven by an increase in DF-M-01, which is located nearest to the air strip.
  - Milne Port (DF-P Monitors) — Following some modest increases in 2017, dustfall has remained constant at the Milne Port Sites.
  - Tote Road North (DF-RN Monitors) — There was a modest increase at all annual monitoring stations in 2020, which comes after a period of constant or decreasing dustfall that lasted from 2017 to 2019.
  - Tote Road South (DF-RS Monitors) — After decreasing from 2016 through 2018, dustfall deposition at the sites closest to the Tote Road have increased from 2018 to 2020.
- Analysis of satellite imagery compared dustfall extents from 2014 to 2020. Trends generally aligned with an/or confirmed the outcomes from the dustfall field monitoring program.
  - The dustfall extent around the Mine Site generally increased from 2014 to 2019, except for 2015, which was more extensive than all years before 2019. 2020 showed a decrease in dustfall extent from 2019.

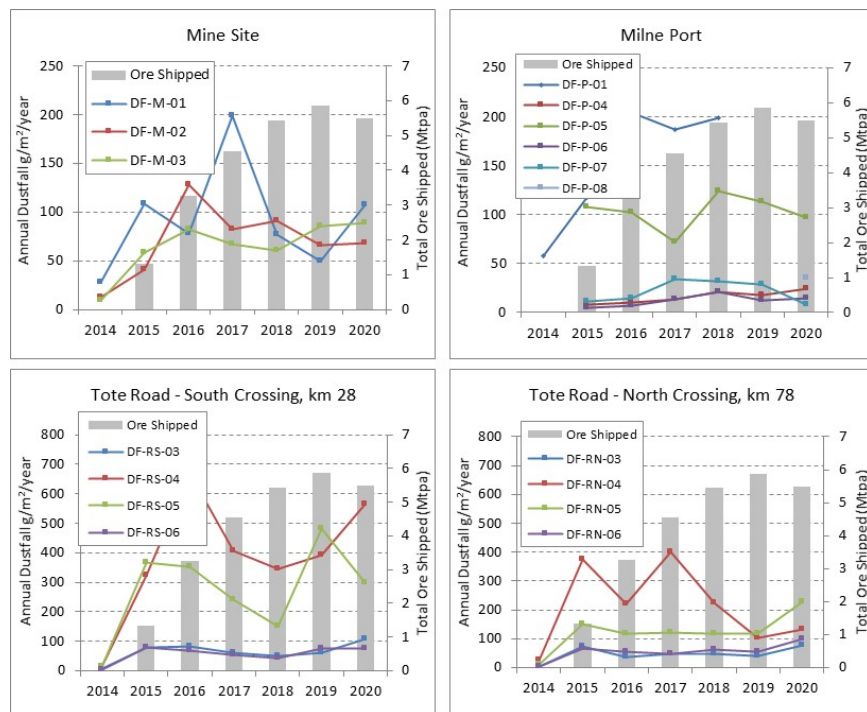
- Dustfall extent around the Tote Road was consistently restricted to within 500 m of the road, with high relative magnitudes within 100 m, in all years of operations (2014 – 2020). The dustfall extent along the Tote Road was greatest around the south crossing (KM 78) in 2015, 2019, and 2020.
- Dustfall extent around Milne Port generally increased from 2014 to 2019, primarily northward along Milne Inlet. The 2020 dustfall extent was less than the 2019 extent.

**RECOMMENDATIONS / LESSONS LEARNED**

Refer to response to PC Condition No. 53 for recommendations related to wildlife response (as indicated by outcomes from Height of Land surveys, snow track surveys, and incidental observations).

Refer to response to PC Condition No. 34 for recommendations related to vegetation and soil base metals monitoring.

- Recommendations for dustfall:
  - Dustfall currently presents a low risk to environmental and human health and safety; however annual monitoring should continue.
  - The TEWG and land users have raised concerns about dustfall. To address this, more in-depth data analyses were applied (including spatio-temporal and inter-annual comparisons) to tease out potential trends and tendencies; analyses of satellite imagery were also completed to further define spatial extents of dustfall. It is recommended that these investigations are continued.
  - Baffinland is committed to mitigating the generation of dust at the Project by improving and refining its approaches to dust suppression, including the application of dust suppressants on the Tote Road, Air Strip Milne Port Stockpile throughout 2021.



**Figure 4.11: Annual Dustfall and Ore Shipping Trends from 2014 to 2020**

## Project Certificate Condition No. 59

Category	Terrestrial Wildlife and Habitat – Aircraft Disturbances
Responsible Parties	The Proponent
Project Phase(s)	Construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate aircraft disturbance to wildlife and Inuit harvesting.
Term or Condition	The Proponent shall ensure that aircraft maintain, whenever possible (except for specified operational purposes such as drill moves, take offs and landings), and subject to pilot discretion regarding aircraft and human safety, a cruising altitude of at least 610 metres during point to point travel when in areas likely to have migratory birds, and 1,000 metres vertical and 1,500 metres horizontal distance from observed concentrations of migratory birds (or as otherwise prescribed by the Terrestrial Environment Working Group) and use flight corridors to avoid areas of significant wildlife importance. The Proponent, in collaboration with the Terrestrial Environment Working Group shall develop a program or specific measures to ensure that employees and subcontractors providing aircraft services to the Project are respectful of wildlife and Inuit harvesting that may occur in and around Project areas.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

There is a discrepancy between Project Condition No. 59 and 71, Project Condition No. 59, suggesting that minimum flight height should be 610 meters above ground level (magl) in all areas, while Project Condition No. 71 prescribes a minimum flight height of 650 magl. Considering that most, if not all, areas where Baffinland operated in June through September were likely to have migratory birds, the default minimum altitude for helicopter overflights was the more conservative 650 magl (during point-to-point travel).

In consultation with the TEWG, Baffinland implemented a requirement for all helicopter pilots to complete a daily pilot timesheet to track flight data, reason for flight and rationale for lower flight altitudes, when required. Descriptions of the rationales recorded in the daily pilot timesheets are listed in **Error! Reference source not found..** Pilots were also given the spatial boundaries of any identified concentrations of migratory birds, buffered by the required 1,500 m horizontal avoidance distance. Pilots were then asked to avoid flying in these areas.

**Table 4.18: Descriptions of Pilot Rationales Given for Low-Level Flights**

Rationale	Description
Drop off/pick up	The distance between take-off and landing sites does not allow enough time to gain 650 magl; the topography between sites, particularly around the drill locations, has large elevation changes over a short distance that does not allow the helicopter to reach 650 magl, or it is not practical for the helicopter to climb to 650 magl (e.g., when descending from Nuluujaak Mountain).
Survey	Surveys can involve short duration flights between survey points that do not allow enough time to gain 650 magl; some surveys require low level flying as part of the survey methodology such as flying a low-level grid pattern for a geotechnical survey, keeping a sensor at a constant elevation relative to the ground.
Slinging	Helicopters slinging heavy loads fly low for safety purposes; if necessary, the load can be quickly lowered to the ground in a controlled manner or dropped and maintain visual reference of the landing location.
Short distance	The short distance between take-off and landing sites does not allow enough time to gain 650 magl.
Sampling	Sampling can involve short duration flights between sampling points that does not allow enough time to gain 650 magl.
Staking	Very low-level flying is required while staking out a grid as stakes are deployed from the helicopter during transit and crew members are in and out of the helicopter at grid corners.
Weather	Poor visibility associated with low cloud restricts pilots to flying below the cloud line, which is under 650 magl; high winds and/or flat light conditions (reduces a pilot's depth-of-field causing poor ground reference) can make it difficult to maintain a consistent 650 magl flight height.
Mobilization/ Demobilization	Ferrying of the aircraft to and from the Project where operational constraints (e.g., fuel capacity and flight range) are a factor.
Other	The nature of the flight requires low-level flying or short distances/durations (e.g., tours, maintenance flights, evacuations, and search and rescue).

Canadian Helicopters provided flight tracklog data (GPS points along the flight path). Baffinland provided a compliance database using daily pilot timesheets (with flight details) from May to September 2020, when the helicopters were active and on-site, for analysis. This analysis included all travel related to Baffinland, including Ege Bay Exploration. The methods used to calculate flight altitudes above ground level are described in detail in the TEAMR.

Data were split into two categories: 1) those data within the Snow Goose area during the 2020 moulting season (July and August) related to the 1,100 magl elevation requirement and 2) those data outside the Snow Goose area during the 2020 moulting season and in all areas in all other months related to 650 magl elevation requirement. The data sets were then analyzed separately to assess specific flight height allowances using the different areas and elevation values. Using the pilot rationale, any flight data with justifications for flying at lower elevations than required was considered compliant with rationale. When no justification was provided, entries defaulted to non-compliant. For this reason, the proportion of compliant flights was considered conservative. Based on this analysis, flight data were organized into the following six categories:

1. Those data within the Snow Goose area in July and August, where the 1,100 magl elevation requirement was achieved (compliant);
2. Those data within the Snow Goose area in July and August where the 1,100 magl elevation requirement was not achieved, but low-level flying was justified by pilots (compliant with rationale);
3. Those data within the Snow Goose area in July and August where the 1,100 magl elevation requirement was not achieved and no justification for low-level flying was given (non-compliant);
4. Those data outside the Snow Goose area during moulting season and in all areas in all other months where the 650 magl elevation requirement was achieved (compliant);
5. Those data outside the Snow Goose area during moulting season and in all areas in all other months where the 650 magl elevation requirement was not achieved, but lower elevation flying was justified by pilots (compliant with rationale); and
6. Those data within and outside the Snow Goose area during moulting season and in all areas in all other months where the 650 magl elevation requirement was not achieved and no justification for low level flying was given (non-compliant).

Additional details concerning helicopter pilot rationale and flight time were requested during 2020 TEWG meetings. The 2020 analysis was based on helicopter flight time, not the number of points as was previously done to address these requests. Compliant and compliant with rationale categories were reported separately, and flight time was reported for each pilot rationale in the compliance database.

## RESULTS

There were no identified “observed concentrations of migratory birds” in 2020 or areas prescribed explicitly by the TEWG to avoid migratory birds outside the established Snow Goose area. Pilots made efforts to avoid the Snow Goose area during the moulting season when possible in 2020. Out of 1,863 transits flown from May to September, 77 (4%) intersected the Snow Goose area during moulting season, and only 15.05 hours (1.77%) of a total flight time of 852.34 hours were flown within the Snow Goose area during moulting season. Most transits over the Snow Goose area also appeared to be direct flights between the Project and Steensby Port, which only skirted the eastern edge of the Snow Goose area boundary. Most flights near the boundary were within a well-defined track, away from the core of the Snow Goose area identified as having higher concentrations of geese.

After considering pilot rationale in 2020, compliance for flight time within the Snow Goose area during the moulting season was 89.49%, with 20.01% compliant and 69.48% compliant with rationale. Compliance outside the Snow Goose area during the moulting season and in all areas in all other months was 96.50%, with 27.77% compliant and 68.73% compliant with rationale. No known public complaints occurred about helicopter overflights in 2020.

2020 was the fourth consecutive year that flight height data were cross-referenced with compliance data from daily pilot timesheets. For analytical purposes, flight line segments and the associated flight time were designated “compliant” when elevation requirements were followed, “compliant with rationale” where elevation requirements were not met, but pilot’s discretionary rationale for deviating from flight heights was provided, and “non-compliant”, if they did not meet elevation requirements and no explanation, was provided. A summary of 2020 low-level flights and rationale is provided in **Error! Reference source not found..**

**Table 4.19: Helicopter Flight Hours Summarized According to the Pilot Rationale for Flights Within The  $\geq 1,100$  magl and  $\geq 650$  magl Flight Height Requirements, May 1 – September 30, 2020**

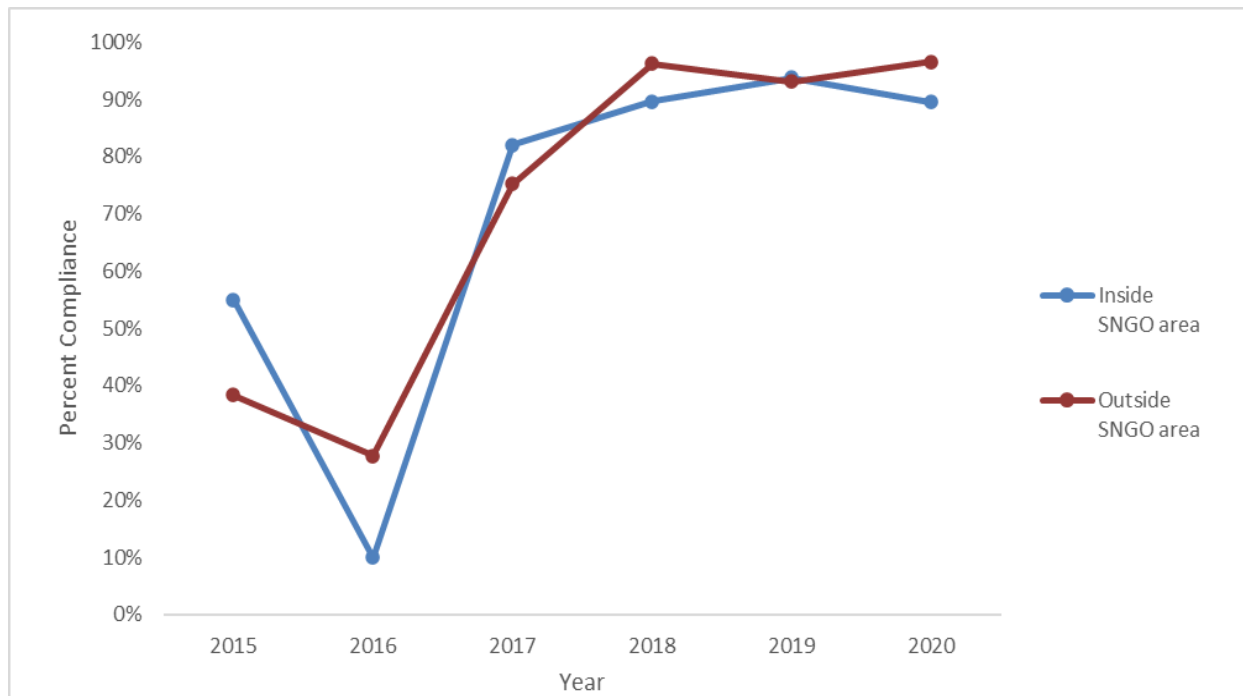
Rationale	Flight Hours	% of Total Flight Hours	$\geq 1,100$ magl Flight Height Requirement		$\geq 650$ magl Flight Height Requirement	
			Flight Hours	% of Total Flight Hours	Flight Hours	% of Total Flight Hours
Slinging	292.0	34.3	2.9	0.34	289.1	33.9
Drop off/Pick up	132.3	15.5	4.1	0.49	128.1	15.0
Survey	67.5	7.9	1.6	0.19	66.0	7.7
Short Distance	48.9	5.7	0.5	0.06	48.3	5.7
Weather	39.3	4.6	1.3	0.15	38.0	4.5
Sampling	3.3	0.4	0.00	0.00	3.3	0.4
Other	2.7	0.3	0.00	0.00	2.7	0.3
<b>Total</b>	<b>586.0</b>	<b>68.8</b>	<b>10.5</b>	<b>1.23</b>	<b>575.5</b>	<b>67.5</b>

Results showed that most low-level flight line segments were compliant when considering the rationale provided by pilots for low-level flying. Flights with rationale from pilot logs accounted for 68.75% of the total flight hours. Within the Snow Goose area during moulting season, where the flight height requirement is  $\geq 1,100$  magl, 1.23% of the total flight hours were compliant with rationale. Outside the Snow Goose area during moulting season and in all areas in all other months where the flight height requirement is  $\geq 650$  magl, 67.52% of total flight hours were compliant with rationale. The percentage of low-level compliant with rationale flights was similar to what was observed in 2018 and higher than in 2019. Low-level flights with rationale will likely continue in future years as most helicopter work conducted at the Project requires either low-level flying for safety/operational reasons (e.g., slinging, surveys), or involves multiple short-distance flights whereby helicopters cannot reach the required elevations between take-off and landing sites (e.g., staking, sampling, drop-offs/pickups). In 2020, the most common reasons stated by pilots for flying below the elevation requirements were slinging, drop off/pick up, and surveys.

Additional details and analysis concerning pilot rationale and flight time are included in the 2020 Terrestrial Annual Report, along with a reanalysis of the 2017, 2018, and 2019 data.

#### TRENDS

Flights inside the Snow Goose area during the moulting period have decreased over the last four years, from 15% of transits and 5.94% of flight hours in 2017 down to 4% of transits and 1.77% of flight hours in 2020. Helicopter flight height compliance inside the Snow Goose area during moulting period was 89.49% in 2020, which was similar to 2018 (89.60%), higher than 2017 (82.02%), but lower than 2019 (93.80%). Compliance for 2020 was considerably higher than 2015 (55%) and 2016 (10%) (Figure 4.12). Helicopter flight height compliance outside the Snow Goose area during moulting season and in all areas in all other months for 2020 (96.5%) was similar to 2018 (96.1%) and 2019 (93.0%) and was higher than all other previous years. This high compliance was due mainly to a TEWG-requested re-analyses of the last four years of data, which considered justifications provided by pilots for many of the transits flown below the elevation requirements. It also considered improved documentation of the pilot's rationale for low-level flights over the past few years.



**Figure 4.12: Percent (%) Compliance (Compliant and Compliant with Rationale) of Flights Inside the Snow Goose (SNGO) Area During the Moulting Season and Outside the Snow Goose Area During the Moulting Season and in all Areas in all Other Months (2015 to 2020)**

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to work with their helicopter provider to improve flight height compliance by communicating elevation requirements and improving the rationale for not meeting the requirements. Helicopter flight height analysis based on flight line segments and flight time, including rationale from pilot timesheets, will continue in 2021.



## Project Certificate Condition No. 60

Category	Terrestrial Wildlife and Habitat - Explosives
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To mitigate impacts to wildlife from explosives.
Term or Condition	Prior to construction, the Proponent shall develop a detailed blasting program to minimize the effects of blasting on terrestrial wildlife that includes, but is not limited to the restriction of blasting when migrating caribou, sensitive local carnivores or birds may be negatively affected.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Quarry Blasting Operations Management Plan (Baffinland, 2013b) Borrow Pit and Quarry Management Plan (Baffinland, 2014b) Environmental Protection Plan (Baffinland, 2016b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland submitted a Borrow Pit and Quarry Management Plan to the Nunavut Water Board in 2013. That plan accompanied a broader Environmental Protection Plan that included the requirement to scan for and report wildlife presence on a wildlife sightings log and that blasting does not occur if wildlife is present and could be harmed by the activity.

### RESULTS

No wildlife has been knowingly harmed or disturbed by blasting activities during construction.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 61

Category	Terrestrial Wildlife and Habitat - Operations (General)
Responsible Parties	The Proponent, TEWG
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate Project impacts to wildlife.
Term or Condition	Whenever practical and not causing a human safety issue, a stop work policy shall be implemented when wildlife in the area may be endangered by the work being carried out. An operational definition of 'endangered' shall be provided by the Terrestrial Environment Working Group.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Environmental Protection Plan (Baffinland, 2021d) Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

The Environmental Protection Plan outlines the 'stop work' procedure when wildlife is in the area policy.

### RESULTS

Whenever practical and not presenting a risk to human safety, a stop work policy shall be implemented when wildlife in the area may be endangered (at risk of immediate injury or death) by work being conducted.

The term "endangered" was defined by the TEWG as: at risk of physical injury or death.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 62

Category	Terrestrial Wildlife and Habitat - Operations (General)
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent increased harvesting pressure on wildlife.
Term or Condition	The Proponent shall prohibit project employees from transporting firearms to site and from operating firearms in project areas for the purpose of wildlife harvesting.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Weapons on Site Policy (Baffinland, 2019b) Hunting and Harvesting Policy (Baffinland, 2013c)
Ref. Document Link	N/A

### METHODS

Baffinland implements its Weapons on Site Policy (Baffinland, 2019b) which prohibits employees from transporting firearms to site. Site orientation includes cultural awareness and reviews the policies outlined in the Hunting and Fishing (Harvesting) Policy (Baffinland, 2013c). The policy states that no employee or contractor will be permitted to hunt or fish (harvest) on lands leased to Baffinland. Baffinland does not interfere with rights of public hunting or fishing near or within the PDA. All visitors and visitor activities are tracked through a visitor access log, provided in the terrestrial annual monitoring reports.

### RESULTS

No incidences of Project personnel hunting or fishing within the Impact Area leased to Baffinland and/or PDA occurred in 2020.

### TRENDS

No Project personnel have participated in hunting or fishing on the PDA unless approved by scientific permit and have not interfered with public rights to fish or hunt in or near the PDA.

Baffinland continues to accommodate all hunting parties and other visitors that travel to the Project.

### RECOMMENDATIONS / LESSONS LEARNED

The Weapons on Site Policy has been successful in eliminating firearms from the workplace.

Baffinland continues to monitor and implement the policy banning all employees and contractors from hunting and fishing within the PDA, and accommodating all hunting parties.

## Project Certificate Condition No. 63

Category	Terrestrial Wildlife and Habitat - Public Engagement
Responsible Parties	The Proponent, local Hunters and Trappers Organizations
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To keep communities up to date with Project operations.
Term or Condition	The Proponent shall liaise with local Hunters and Trappers Organizations in advance of carrying out terrestrial wildlife surveys. At a minimum, The Proponent shall also meet annually in person with Hunters and Trappers Organizations to discuss wildlife monitoring and mitigation plans and address community concerns regarding wildlife interactions. The Proponent may be required to facilitate these meetings through payment of honoraria and meeting costs.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG) and with local Hunter and Trappers Organizations (HTOs)
Reference	2020 Community Engagement Records 2020 TEWG Meeting Records
Ref. Document Link	Appendix B Appendix C.2

### METHODS

The Mittimatalik Inlet Hunters' and Trappers' Organization (MHTO) became a member of the TEWG in 2016. The TEWG meets twice in-person annually or more often as required via conference call. Baffinland facilitates these meetings through the provision of honoraria and meeting costs for MHTO members' participation.

In addition to the MHTO's participation in the Working Groups, Baffinland met with the MHTO on a number of occasions, as well as with other North Baffin HTOs throughout the year to provide an update on the Project and the Phase 2 Proposal. These meetings are listed in Table 2.1.

### RESULTS

Wildlife monitoring and mitigation programs and wildlife surveys are reviewed at the TEWG meetings. In addition, draft annual monitoring reports are provided to TEWG members for review and comment prior to finalization and for input into the following years monitoring programs.

2020 monitoring for mammals included a number of surveys designed to enhance baseline data and monitor the effects of construction activities on caribou. Specific surveys included:

- Snow track surveys;
- Snow bank height monitoring;
- Terrestrial wildlife noise monitoring

- Height of Land caribou surveys; and
- Incidental observations and wildlife log.

The 2020 surveys were informed by input previously received from MHTO members who had participated in the Height of Land surveys.

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to work with the MHTO at TEWG meetings and other meetings organized between Baffinland and the local HTOs.

## Project Certificate Condition No. 64

Category	Terrestrial Wildlife and Habitat - Waste Management
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent human-carnivore interactions.
Term or Condition	<p>The Proponent shall ensure that its Environment Protection Plan incorporates waste management provisions to prevent carnivores from being attracted to the Project site(s). Consideration must be given to the following measures:</p> <ol style="list-style-type: none"> <li>a. Installation of an incinerator beside the kitchen that will help to keep the food waste management process simple and will minimize the opportunity for human error (i.e. storage of garbage outside, hauling in a truck (odours remain in truck), hauling some distance to a landfill site, incomplete combustion at landfill, fencing of landfill, etc.); and</li> <li>b. Installation of solid carnivore-proof skirting on all kitchen and accommodation buildings (i.e., heavy-duty steel mesh that would drop down from the edge of the buildings/trailers and buried about a half meter into the ground to prevent animals from digging under the skirting).</li> </ol>
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment Climate Change Canada, Qikiqtani Inuit Association, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board.
Reference	<p>Environmental Protection Plan (Baffinland, 2021d)</p> <p>Waste Management Plan (Baffinland, 2020d)</p> <p>2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020a)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

Waste management buildings are situated at both the Mine and Port sites. The waste management buildings house a dual chamber incinerator designed for optimal incineration of approved specific wastes, including food wastes. Design constraints at the Project site limited the ability to situate the Waste Management Building(s) directly beside complex kitchens, however Baffinland employs procedures to minimize animal attractants and interaction of carnivores with food or food wastes as described in the Environmental Protection Plan (EPP) and the Waste Management Plan (which includes the Incinerator Operation Procedure as an appendix). Employees are trained on animal attractant policies upon arrival at Site.

The specific measures implemented to mitigate attractants and animal interactions include; double bagging food and food wastes, storage in closed top bins or sealed seacans, and prompt removal for incineration inside the enclosed Waste Management Building(s). Food wastes are incinerated under stipulated conditions, and ash is visually inspected and tested under applicable Nunavut guidelines for landfilling. Ash deposited in the designated

landfill is promptly covered with a layer of material to mitigate animal attraction. Metal Skirting has also been installed on kitchen and accommodation buildings on the Project site to prevent carnivores accessing under buildings. In 2018 Baffinland began construction of the new Sallivik camp accommodations complex at the Mine Site. Installation of metal skirting to comprehensively cover the complex was completed in 2019.

## RESULTS

Both the Environmental Protection Plan and Waste Management Plan incorporate carnivore interaction and attractant mitigation measures and policies, which continued to be implemented in 2020. Food and food wastes were stored as designated by the aforementioned plans, incinerated in the waste management buildings and ash promptly disposed of and covered in the designated landfill. The Mine Site Landfill Facility continued to only accept inert, non-hazardous waste materials in 2020, with all animal attractants (food scraps, wrappers, etc.) diverted to the incineration units. While landfill fencing was completed in 2019 and may result in some additional wildlife deterrence, the primary mitigation measure to reduce animal interactions at the landfill remains the diversion of all animal attractants from placement in the landfill.

In January 2020, the Environment Department assessed the life cycle of waste from source control to segregation and final disposal of products across the Project. Through the assessment, items requiring corrective action were identified and follow up actions implemented. Findings from the waste assessment were shared with employees across site through the departmental bi-weekly safety meetings. Ongoing employee educations around proper waste sorting continues to be conducted to ensure site-wide adherence to the Waste Management Plan. In addition to ongoing employee education, routine inspections of Landfill Facility operations are completed with a focus on waste volume, composition and overall conformance to the Project's Waste Sorting Guidelines, which were recently updated.

Carnivore interactions have been minimized however still do occur with Arctic fox. Arctic fox site habituation has proven to be a challenge even while mitigating animal attractants on site. Animal interactions are documented and discussed in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021), which has been released to the Working Group for review and comment.

Metal skirting installation on the new Sallivik accommodations complex was completed in 2019. In 2020, metal skirting on accommodation and kitchen complexes continued to be repaired and maintained as needed.

## TRENDS

Carnivore and/or Arctic Fox interactions have gradually increased over the life of the Project as it grows in scale. In 2020, the number of interactions with carnivore and/or Arctic Fox remained consistent compared to the number of interactions in 2019 and 2018 validating the continued success of improved waste management practices implemented on site. Incineration, employee training, animal attractant mitigation measures and metal skirting maintenance continue to be implemented.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland continues to mitigate wildlife interactions at the Project area by training, enforcing, and monitoring waste management practices and guidelines. Management attend mandatory Environment Protection Plan training, which is then passed on to all employees. Included in the EPP are wolf, polar bear, fox, and caribou protection measures and waste management guidelines that are continually updated and implemented. Incineration and proper waste sorting are the most prominent deterrents used. Wildlife attractants such as food scraps and human waste are sorted

and sealed in animal proof containers and incinerated on site. Posted around each site are waste sorting guidelines, which were reviewed and updated in 2020, that clearly define where food and other attractants should be placed. Another deterrent used is metal skirting to minimize wildlife entry under buildings. Wire skirting is used under the main camps at both sites to ensure no wildlife such as foxes or hares den underneath. Feeding of wildlife is strictly prohibited and non-compliance is dealt with accordingly.



4.6.9 Birds (PC Conditions 65 through 75)

Eleven (11) PC conditions focus on the potential impacts of the Project on birds. Most of these conditions relate to the implementation of mitigation measures within the TEMMP to protect birds in consultation with relevant organizations. Baffinland is also required to report on the amount of terrestrial habitat loss annually.

**Inuit & Stakeholder Feedback**

The Canadian Wildlife Service of Environment and Climate Change Canada (CWS-ECCC) has legislated responsibility for migratory birds under the *Migratory Birds Convention Act* and associated regulations. The Government of Nunavut (GN) is responsible for species at risk within Nunavut, pursuant to the *Wildlife Act* (GN, 2005). During the Project reviews, the focus was primarily on species at risk. Both agencies participate in the TEWG, and as such, Baffinland engages with these agencies bi-annually on the mitigation and monitoring of Project effects on birds through the TEWG.

**Monitoring**

Baffinland’s bird monitoring program included the following in 2020:

- Active migratory bird nest surveys (AMBNS); and
- Cliff-nesting raptor occupancy and productivity surveys.

The CWS-ECCC has also conducted seabird monitoring programs that contribute to regional bird distribution data.

To the extent that Project impacts on the terrestrial environment can be evaluated, the Project's effects appear to be within FEIS predictions. **Error! Reference source not found.** summarizes the main activities in 2020 in relation to the birds and an impact evaluation compared to the predictions outlined in the FEIS and FEIS Addendum.

**Table 4.20: Birds Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Bird Indicator Species/Species at Risk	Destruction of nests due to development in the project footprint	Pre-clearing nest surveys are completed at applicable locations. One Snow Bunting nest was found in 2020, and construction was postponed until the chicks had fledged. Surveys will continue to be required whenever clearing vegetation within the migratory bird nesting season.	The effect did not occur
	Habitat loss: direct habitat loss due to the Project footprint; and indirect habitat loss due to sensory disturbances	Cliff-nesting raptor occupancy and productivity survey; cliff-nesting raptor nest site management and effects monitoring. No effect on cliff-nesting raptor nest occupancy rates since 2011. Distance to disturbance analysis suggests there is no adverse effect on monitored raptor nesting.	Effect negligible, within FEIS predictions
	Influences on health	Helicopter flight height compliance inside the Snow Goose area during the moulting period (July to August) remained high (89%) in 2020, and also high overall months (May-September) of analysis (96%).	Consistent with FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
	Mortality	Four (4) bird mortalities were observed in 2020: American Pipit (1), Common Raven (1), Snow Goose (1), and Red-throated Loon (1). Two (2) of these mortalities involved collisions with vehicles, and two (2) were accidental bycatch from other wildlife monitoring programs.	Four (4) mortalities were observed, but this is within FEIS predictions

**Path Forward**

Baffinland will remain vigilant about the mitigation and monitoring activities that are in place to protect birds, including for species at risk. Baffinland will continue to seek input and review monitoring results trends from technical members of the TEWG. Baffinland will continue to support regional shorebird monitoring, including species at risk in conjunction with CWS-ECCC, as opportunities arise. Active migratory bird nest surveys will continue in future years prior to any proposed land disturbance and/or clearing during the breeding bird window, and raptor monitoring will continue to focus on multiple nesting territory visits in survey years. Baffinland is also partnering on a three-year initiative (though extended due to COVID-19) with CWS-ECCC and multiple universities (McGill, Windsor, and Carleton) entitled “Using cutting-edge biologging and physiological tools to map environmental sensitivities in the Arctic: application to shipping associated with Baffinland Iron Mines.” This partnership followed a successful Natural Sciences and Engineering Research Council of Canada (NSERC) Collaborative Research and Development (CRD) grant application in December 2019. This initiative aims to develop innovative techniques to study the potential impacts of marine shipping on seabirds, and the effects of mining activities on terrestrial birds near the Project. No field work was possible in 2020 due to COVID-19 travel restriction, and as a result the period over which the program will run will be extended to future years.

## Project Certificate Condition No. 65

Category	Birds - Awareness
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent disturbance to birds and bird habitat.
Term or Condition	The Proponent shall ensure all employees working at project sites receive awareness training regarding the importance of avoiding known nests and nesting areas and large concentrations of foraging and moulting birds.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Impact Review Board, Terrestrial Environment Working Group (TEWG)
Reference	Environmental Protection Plan (EPP; Baffinland, 2021d) 2020 TEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2

### METHODS

Section 4.13 (Bird Protection Measures) of the EPP is the relevant document that deals with Bird Awareness training delivered to employees.

In 2020, on-site training of pre-clearing Bird Nest Surveys was performed by EDI to the Baffinland Site Environment Department. Training included nest searching methods and identification of common species known in the area.

Baffinland endeavours to perform construction activities outside of the bird nesting season. If construction activity is required in undisturbed areas during bird nesting seasons (e.g. between May 31 and August 5), active migratory bird nest surveys are conducted in accordance with the *Migratory Birds Convention Act, 1994*. Construction has five (5) days to commence from the time that a migratory bird presence survey is conducted. A new survey is completed if construction does not commence in this five-day timeline. The results of these surveys are provided to the TEWG for review on a yearly basis.

### RESULTS

In 2020, Baffinland continued to monitor all new construction activities around development areas prior to conducting any ground disturbance. A total of 11.2 hectares were surveyed between June 11 and August 6, 2020. One Snow Bunting nest was found, and construction was subsequently postponed in the area until the chicks had fledged. No disturbance or destruction of migratory bird nests or their young were recorded.

**TRENDS**

Baffinland Site Environment Department employees have continued to receive annual training on performing bird surveys through its consultant, EDI. Baffinland Site Environment Department employees have also continued to raise awareness of all Baffinland employees and contractors on the importance of preventing the disturbance of all wildlife and habitats at all Project sites through EPP training.

**RECOMMENDATIONS / LESSONS LEARNED**

Continue to minimize disturbance (clearing) or other industrial activities in previously undisturbed areas during the nesting season between May 31 and August 5.

## Project Certificate Condition No. 66

Category	Birds - Species at Risk
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to sensitive bird species.
Term or Condition	If Species at Risk or their nests and eggs are encountered during Project activities or monitoring programs, the primary mitigation measure must be avoidance. The Proponent shall establish clear zones of avoidance on the basis of the species-specific nest setback distances outlined in the Terrestrial Environment Management and Monitoring Plan.
Relevant Baffinland Commitments	75
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2

### METHODS

Baffinland concentrates new ground disturbance outside of the breeding bird season and conducts active migratory bird nest surveys in areas that are disturbed in the breeding season, prior to disturbance. Surveys are conducted a maximum of five (5) days before clearing using the rope-drag method, as recommended by CWS-ECCC. Surveys are conducted with a minimum of three observers by walking slowly through the area with the rope drag, looking for nests and birds displaying nesting behaviour. When bird nests are found, Baffinland establishes clear zones of avoidance based on species-specific nest setback distances included in Table 3-1 in the TEMMP.

### RESULTS

No Species at Risk nests or eggs have been encountered during Project activities.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to avoid Species at Risk nests and eggs when encountered by conducting pre-clearing active migratory bird nest surveys and following established guidelines for setback distances.

## Project Certificate Condition No. 67

Category	Birds - Species at Risk
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to sensitive bird species.
Term or Condition	The Proponent shall ensure that the mitigation and monitoring strategies developed for Species at Risk are updated as necessary to maintain consistency with any applicable status reports, recovery strategies, action plans and management plans that may become available during the duration of the Project.
Relevant Baffinland Commitments	75
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG), Environment and Climate Change Canada (ECCC)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

Environment and Climate Change Canada (ECCC) provides input to the development of mitigation and monitoring strategies for Species at Risk via participation in the TEWG. Section 3 of the TEMMP identifies mitigation and monitoring strategies relevant to all wildlife that could interact with the Project, including Species at Risk.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue coordinating with ECCC through the TEWG to address mitigation and monitoring strategies related to Species at Risk.

In 2019, Baffinland deployed nine (9) passive Autonomous Recording Units (ARUs) to detect Red Knot vocalizations in collaboration with CWS-ECCC. No Red Knot were detected during 2019, and in February of 2020 CWS-ECCC concluded that ARU monitoring was not necessary for the 2020 season. Upon the recommendation of CWS-ECCC, Red Knot monitoring using ARUs will resume before increasing activities in the southern transportation corridor.

## Project Certificate Condition No. 68

Category	Birds - Project Infrastructure
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent potential injuries to birds.
Term or Condition	The Proponent shall ensure flashing red, red strobe or white strobe lights and guy-wire deterrents are used on communications towers established for the Project. Consideration should also be given to reducing lighting when possible in areas where it may serve as an attractant to birds or other wildlife.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment and Climate Change Canada (ECCC), Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Through discussions with ECCC in 2013, Baffinland installed reflectors on guy wires at the communication towers established for the Project and will continue to do so on any new infrastructure as required. It was determined that strobe lights were not a relevant mitigation measure as most birds are in the area during the summer when there is 24 hours of light. Consideration has been given to reducing lighting where possible if it does not present any risks to operating the Project safely.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Strobe lights were found not to be a relevant mitigation measure because birds are mostly present when the Project experiences 24 hours of daylight. Baffinland will maintain the reflectors installed on the guy wires of the Project's communication towers and will continue to use this method on any new infrastructure as required.

## Project Certificate Condition No. 69

Category	Birds - Construction/Clearing Activities
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent nesting by birds in active Project areas.
Term or Condition	Prior to bird migrations and commencement of nesting, the Proponent shall identify and install nesting deterrents (e.g. flagging) to discourage birds from nesting in areas likely to be disturbed by construction/clearing activities taking place during the nesting season.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

Baffinland prepared a bird deterrence review discussed at the TEWG meeting held on May 21, 2013. There was no feedback from the group on what would prove to be practical solutions before the 2014 construction season. Although active migratory bird nest surveys were completed, deterrents were not erected. Baffinland conducts clearing activities outside of the breeding bird season whenever possible to discourage birds from nesting in these areas and to minimize the potential for nests to be disturbed by clearing or construction.

### RESULTS

In 2020, there were no apparent nesting attempts by birds in the previously cleared areas, and one nest was found in a previously undisturbed area. No deterrents were used. In 2020, approximately 125,509 m<sup>2</sup> (12.5 hectares [ha]) of land was newly disturbed for Project infrastructure. Of these areas, 32% were disturbed outside of the breeding bird window. During the breeding bird window, approximately 85,192 m<sup>2</sup> (8.5 ha) of land was cleared, while 111,682 m<sup>2</sup> (11.2 ha) was surveyed through active migratory bird nest surveys. One Snow Bunting nest was found, and construction was subsequently postponed in the area until the chicks had fledged.

### TRENDS

Not applicable.



**RECOMMENDATIONS / LESSONS LEARNED**

Given that the areas cleared during the breeding season are managed by active migratory bird nest surveys prior to disturbance, deterrents have not been required. Avoidance has been the primary method used to prevent disturbances to nesting birds. The TEWG has made no recommendations that an alternative method would be more successful or necessary.

## Project Certificate Condition No. 70

Category	Birds - Construction/Clearing Activities
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to birds and nesting areas.
Term or Condition	The Proponent shall protect any nests found (or indicated nests) with a buffer zone determined by the setback distances outlined in its Terrestrial Environment Mitigation and Monitoring Plan, until the young have fledged. If it is determined that observance of these setbacks is not feasible, the Proponent will develop nest-specific guidelines and procedures to ensure bird's nests and their young are protected.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.2 Appendix G

### METHODS

Active migratory bird nest surveys are conducted in areas scheduled for clearing disturbance during the breeding bird season. Surveys are conducted a maximum of five days prior to clearing using the rope-drag method, as recommended by CWS-ECCC. Surveys are conducted with a minimum of three (3) observers by walking slowly through the area with the rope drag, looking for nests and birds displaying nesting behaviour. When bird nests are found, Baffinland establishes clear zones of avoidance based on the species-specific nest setback distances are included in Table 3-1 of the TEMMP.

### RESULTS

Thirteen pre-clearing surveys were conducted between May 31 and August 5, 2020, consisting of 17.85 hours and 111,682 m<sup>2</sup> (11.2 ha) surveyed at the Mine Site, Tote Road, and Milne Port development areas. One Snow Bunting nest was detected during the 2020 AMBNS at the 560 Hillside; a no-disturbance buffer based on the recommended setback distance for songbirds was created to protect the nest, and construction was postponed in the area until the chicks had fledged and left the area. Baffinland Environmental staff noted numerous songbirds during surveys, but no other indications of nesting behavior were observed (e.g., carrying food, carrying nesting material).

### TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to avoid new ground disturbance during the nesting season where possible and continue to conduct Active Migratory Bird Nest Surveys throughout the breeding bird season in areas that need to be cleared.

## Project Certificate Condition No. 71

Category	Birds - Flight Altitude Requirements
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate aircraft disturbance to birds.
Term or Condition	<p>Subject to safety requirements, the Proponent shall require all Project related aircraft to maintain a cruising altitude of at least:</p> <ul style="list-style-type: none"> <li>• 650 m during point to point travel when in areas likely to have migratory birds;</li> <li>• 1,100 m vertical and 1,500 m horizontal distance from observed concentrations of migratory birds; and</li> <li>• 1,100 m over the area identified as a key site for moulting snow geese during the moulting period (July-August), and if maintaining this altitude is not possible, maintain a lateral distance of at least at least 1,500 m from the boundary of this site.</li> </ul>
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	<p>Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a)</p> <p>2020 TEWG Meeting Records</p> <p>Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)</p>
Ref. Document Link	<p><a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a></p> <p>Appendix C.2</p> <p>Appendix G</p>

### METHODS / RESULTS

Refer to PC Condition No. 59. Reporting on PC Condition No. 71 is identical to that of PC Condition No. 59.

## Project Certificate Condition No. 72

Category	Birds - Flight Altitude Requirements
Responsible Parties	The Proponent, Transport Canada
Project Phase(s)	Construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate aircraft disturbance to birds.
Term or Condition	The Proponent shall ensure that pilots are informed of minimum cruising altitude guidelines and that a daily log or record of flight paths and cruising altitudes of aircraft within all Project Areas is maintained and made available for regulatory authorities such as Transport Canada to monitor adherence and to follow up on complaints.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Impact Review Board, Transport Canada, Terrestrial Environment Working Group (TEWG)
Reference	Environmental Protection Plan (Baffinland, 2016b) Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
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### METHODS

Flight height requirements are included in all aviation contracts and flight paths are recorded using the software Skytracker. To comply with horizontal guidelines, pilots are given the spatial boundaries of any identified concentrations of migratory birds, which are buffered by the required 1,500 m horizontal avoidance distance. Pilots are then asked to avoid flying in these areas. Pilots are made aware of flight height requirements in 'toolbox' talks given at the beginning of each season and daily toolbox talks are held within each department. In addition, flight height compliance was incorporated into the helicopter contract Baffinland holds with Canadian Helicopters. Random audits of flight-logs were also completed throughout the season to help ensure compliance with requirements.

### RESULTS

Refer to PC Condition No. 59.

### TRENDS

Refer to PC Condition No. 59.

**RECOMMENDATIONS / LESSONS LEARNED**

Refer to PC Condition No. 59.

## Project Certificate Condition No. 73

Category	Birds
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To monitor Project-related effects on migratory birds.
Term or Condition	The Proponent shall develop detailed and robust mitigation and monitoring plans for migratory birds, reflecting input from relevant agencies, the Qikiqtani Inuit Organization and communities as part of the Terrestrial Environment Working Group and to the extent applicable the Marine Environment Working Group.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG), Marine Environment Working Group (MEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
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### METHODS

Since 2011, Baffinland has continued to monitor cliff-nesting raptor site occupancy and productivity. This is an established monitoring program with the statistical power and robust design required to detect nesting raptor response to disturbances associated with the Project. That program has evolved since 2012 to accommodate statistical data requirements and is described in the TEMMP and terrestrial environment annual monitoring reports. Since 2018, small mammal monitoring was incorporated into the raptor monitoring program to address whether occupancy and reproductive success of rough-legged hawk cycles with small mammal abundance.

Starting in 2012, Baffinland has provided support to ECCC's breeding bird PRISM plot surveys and seabird research programs in the region. The last PRISM plot surveys were completed in 2018; they are next scheduled for 2023. The Ship Board Observer (SBO) program did not run in 2020 due to limitations for ship boarding associated with COVID-19 Pandemic public health restrictions, which were put in place to ensure the health and safety of Nunavummiut. The ongoing research results of the PRISM program are reported separately by ECCC's National Research Centre. In 2019, Baffinland deployed nine passive Autonomous Recording Units (ARUs) to detect red knot vocalizations in collaboration with CWS-ECCC. No Red Knot were detected during 2019, and CWS-ECCC concluded that ARU monitoring was not necessary for 2020. Upon recommendation of CWS-ECCC, Red Knot monitoring using ARUs will resume before increasing activities in the southern transportation corridor.

Since the start of the construction phase, Baffinland has conducted active migratory bird nest surveys for planned disturbance areas. Pre-clearing nest surveys were conducted by Baffinland Environment staff over the 2020 nesting season. At the beginning of the migratory bird nesting season, Baffinland Environment staff were trained on methods to conduct nest searching surveys and identify common species found in the area. In compliance with CWS input provided in 2015 at the TEWG meeting, Baffinland acquired two rope drags (for Mary River and Milne sites) to use during pre-clearing surveys to increase the likelihood of nest/nesting adult detection. Rope drags were constructed following the template provided by CWS (Rausch, 2015). More detail on the active migratory bird nest surveys can be found in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021; Section 9.1).

Baffinland is also contributing to an industry NSERC research program, effective December 2019. Fieldwork was to begin in 2020 to support this initiative but was cancelled due to COVID-19 travel restrictions. This program intends to use biologging and physiological tools to map environmental sensitivities in the Arctic, applied to shipping associated with the Project. This is a collaboration with multiple researchers from various universities including McGill University, University of Windsor, Carleton University, and ECCC. The period over which the program was initially intended to occur will be extended into future years due to the delays associated with COVID-19 Pandemic restrictions.

#### **RESULTS**

Not applicable.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue the monitoring programs as described in the TEMMP and will continue to collect opportunistic information when technical experts are at the Project site. Modifications, improvements, and additions to these monitoring and mitigation programs are regularly discussed at TEWG meetings. Updates to the TEMMP will continue to reflect input from relevant agencies, the QIA, and communities as part of the Terrestrial Environment Working Group and the extent applicable to the Marine Environment Working Group. Future updates on the industry NSERC research program will be provided as they become available.



## Project Certificate Condition No. 74

Category	Birds - Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To develop appropriate mitigation and monitoring of impacts to birds.
Term or Condition	The Proponent shall continue to develop and update relevant monitoring and management plans for migratory birds under the Proponent's Environmental Management System, Terrestrial Environment Mitigation and Monitoring Plan prior to construction. The key indicators for follow up monitoring under this plan will include peregrine falcon, gyrfalcon, common and king eider, red knot, seabird migration and wintering, and songbird and shorebird diversity.
Relevant Baffinland Commitments	57, 77
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland 2016a) 2020 TEWG Meeting Records Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
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### METHODS

Since 2011, Baffinland has continued to monitor cliff-nesting raptor site occupancy and productivity. This is an established monitoring program with the statistical power and robust design required to detect nesting raptor response to disturbances associated with the Project. That program has evolved since 2012 to accommodate statistical data requirements and is described in the TEMMP and terrestrial environment annual monitoring reports. Since 2018, small mammal monitoring was incorporated into the raptor monitoring program to address whether occupancy and reproductive success of rough-legged hawk cycles with small mammal abundance.

Starting in 2012, Baffinland has provided financial support to ECCC's breeding bird PRISM plot surveys and seabird research programs in the region. The last PRISM plot surveys were completed in 2018; they are next scheduled for 2023. The Ship Board Observer (SBO) program did not run in 2020 due to limitations for ship boarding associated with COVID-19 Pandemic public health restrictions, which were put in place to ensure the health and safety of Nunavummiut. The ongoing research results of the PRISM program are reported separately by ECCC's National Research Centre. In 2019, Baffinland deployed nine passive Autonomous Recording Units (ARUs) to detect red knot vocalizations in collaboration with CWS-ECCC. No Red Knot were detected during 2019, and CWS-ECCC concluded that ARU monitoring was not necessary for 2020. Upon the recommendation of CWS-ECCC, Red Knot monitoring using ARUs will resume before increasing activities in the southern transportation corridor.

Since the start of the construction phase, Baffinland has conducted active migratory bird nest surveys for areas of planned disturbance. Pre-clearing nest surveys were conducted by Baffinland Environment staff over the 2020 nesting season. At the beginning of the migratory bird nesting season, Baffinland Environment staff were trained on methods to conduct nest searching surveys and identify common species found in the area. In accordance with CWS input provided in 2015 at the TEWG meeting, Baffinland acquired two rope drags (for Mary River and Milne sites) to use during pre-clearing surveys to increase the likelihood of nest/nesting adult detection. Rope drags were constructed following the template provided by CWS (Rausch, 2015). More detail on the active migratory bird nest surveys can be found in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021: Section 9.1).

Baffinland is also contributing to an industry NSERC research program, effective December 2019. Fieldwork was to begin in 2020 to support this initiative but was cancelled due to COVID-19 travel restrictions. This program intends to use biologging and physiological tools to map environmental sensitivities in the Arctic, applied to shipping associated with the Project. This is a collaboration with multiple researchers from various universities including McGill University, University of Windsor, Carleton University, and ECCC. The period over which the program was initially intended to occur will be extended into future years due to the delays associated with COVID-19 Pandemic restrictions. Bird monitoring and survey programs are conducted as follows:

***Peregrine falcon, rough-legged hawk, and gyrfalcon:***

- Known nest sites have been surveyed annually since 2011. As part of these surveys, crews also attempt to locate new nest sites in suitable areas. All nesting sites are categorized into distance bins from the Project infrastructure to assess the potential effects of disturbance.
- Spring occupancy surveys (indicates the number of pairs that attempt to breed) and summer productivity surveys (to measure nesting success by counting the number of young that reach fledging age) are used to collect demographic information on raptor populations.

***Common and king eider as well as shorebird diversity:***

- Shoreline Surveys (2012 and 2013).
  - Shoreline surveys were conducted to detect which species were present in the area, locations of nests, and their proximity to the shoreline to assess potential effects of ship wakes. Surveys consisted of beach sweeps scanning for birds, bird activity, and potential nest sites. All shore types were surveyed regardless of perceived shorebird and waterbird nesting potential.
  - In 2012, 104 kilometres of shoreline along Steensby Inlet were surveyed. Surveys were conducted north of the proposed Steensby Port area, the port area itself, and south of the port to the mainland area adjacent to the islets at the mouth of Steensby Inlet.
  - In 2013, 135 kilometres of shoreline along Milne Inlet were surveyed.
- East Bay Island migratory bird research (2018).
- Regional studies conducted by ECCC on the influence of climate change and resource development on arctic marine birds, particularly eiders.

***Songbird and shorebird diversity:***

- Baseline bird surveys were conducted from 2006 to 2008, resulting in 32 species being identified in the area.
- PRISM Plot Surveys (2012, 2013, and 2018).

- In 2012 and 2013, 80 and 13 (respectively), 300 m x 400 m PRISM plots were selected and surveyed. A total of 93 plots (11.2 km<sup>2</sup>) were surveyed in the two years.
- In 2018, CWS conducted 14 PRISM plot surveys within a 100 Km radius of the Mary River Mine Site and another 24 plots in other areas of North Baffin Island.
- PRISM surveys were conducted using two or three crew members walking along north-south transects with a 25-metre spacing. The average survey intensity was 51 minutes per plot.
- Each plot was ground-truthed and classified as having either good, medium or poor suitability based on the classification methods used for PRISM plots. Good plots are those containing greater than 50% of wetland habitat types; poor plots were those containing greater than 50% of sparsely vegetated uplands, barren areas, and bare gravel; and medium plots were those habitats containing a mix of vegetated uplands, heaths, and drier grasslands.
- Bird Encounter Transects (2013).
  - Bird encounter transects were conducted to monitor Project effects on tundra breeding songbirds and shorebirds.
  - Conducted 45 transects extending 1.5 km perpendicular from the PDA. Transects were divided into 100 m segments, and all birds seen or heard along a segment were recorded.

**Red Knot:**

- Red Knot, a Species at Risk, were identified as a species that may be found on-site, and observers were aware of their potential presence during all surveys. Targeted red knot surveys were conducted in 2014 & 2015 along Phillips Creek and the shoreline around Milne Port.
- In 2019, Baffinland collaborated with CWS to deploy nine passive ARUs in suitable Red Knot habitat to detect Red Knot vocalizations throughout the summer and fall seasons.

**Seabird migration and wintering:**

- Staging Waterfowl and Waterbird Surveys at Milne Inlet (2015).
  - Staging surveys were conducted to determine species composition, abundance and use of river mouths by staging waterfowl and waterbirds.
  - Phillips Creek and Tugaat River are close to the shipping routes and were chosen as investigation sites, while Robertson River was selected as a control site since no shipping activity was proposed nearby.
  - Staging surveys involved three observers at each site using binoculars and spotting scopes to scan the water and nearby upland sites for birds and other wildlife.

**Seabird research on shipping routes:**

- Marine habitat use by thick-billed murres on Coats Island (2018-2020).
  - Long-term changes in the timing, nestling diet and growth, and population size of Coats Island murre colony has been recorded since the 1980s.
  - ECCC sampling in 2018-2019 included: breeding timing, reproductive success, and diet to assess future impacts of planned shipping activity and climate change.
  - All field work was suspended in 2020 due to the COVID-19 pandemic.
- East Bay Island migratory bird research (2018-2020).

- ECCC research included: investigating relationships between polar bears, eiders, and diminishing sea ice; identifying key seabird marine habitats, particularly in shipping areas; physiological mechanisms linking climate variability, reproduction, and survival of arctic-breeders; investigating effects on changing sea ice regimes on eider reproduction and population dynamics; and tracking bird migration patterns to better understand coastal and offshore marine habitat use.
- All field work was suspended in 2020 due to the COVID-19 pandemic.
- Ship-based Observer program (2013 to 2015, 2018 and 2019).
  - SBO research included collecting observational data on seabirds using the CWS Eastern Canada Seabirds at Sea protocols while aboard the MSV *Botnica* to document abundance and distribution.

## RESULTS

### ***Peregrine falcon, rough-legged hawk, and gyrfalcon:***

- Arctic Raptors Inc. conducted raptor surveys in 2011 and 2012 as part of the Project's terrestrial baseline surveys and have conducted annual raptor monitoring surveys since 2013. Results are reported in detail in the Annual Monitoring Reports.
- In 2020, site occupancy, brood size, and nest success were monitored for all known nest sites within 10 km from the PDA (the Raptor Monitoring Area). Areas with high nest-site suitability for cliff-nesting raptors located between known nest sites were also surveyed.
- A total of 175 nesting sites have been detected in the Raptor Monitoring Area to date; all 175 nesting sites were monitored in 2020.
- 89 sites were occupied by raptors in 2020: 42 by peregrine falcon and 47 by Rough-Legged Hawk.
- In 2020, small mammal abundance monitoring was conducted to confirm the cyclical occupancy of Rough-Legged Hawks in conjunction with the small mammal cycle. Eight lemmings were captured over a total of 1,440 trap-nights over two, 3-night trapping sessions in 2020, indicating higher lemming abundance than previous years of trapping.

### ***Common and king eider as well as shorebird diversity:***

- Steensby Inlet Shoreline Surveys (2012).
  - A total of 40 nests were found, representing six species (Canada goose, semipalmated plover, herring gull, American pipit, Lapland longspur, and snow bunting).
  - No colonies of waterfowl or other birds were observed during the surveys, ferrying flights, or transit between transects.
  - Numerous other bird species were documented but none displayed nesting behaviour within the shoreline study area.
- Milne Inlet Shoreline Surveys (2013).
  - Two nesting colonies - one glaucous gull, the other mixed glaucous and Thayer's gulls were located. Outside of the nesting colonies, nest densities were lower than those observed at Steensby Inlet in 2012. One site with two potential eider nests from the previous year was located. No active eider or other seabird nests were located.

- A total of 1,016 birds, representing 23 different species were observed during the survey. The most common species included long-tailed duck, king eider, and glaucous gull.

***Songbird and shorebird diversity:***

- PRISM Plot Surveys:
  - In 2012, 80 rapid PRISM plots were completed, and a total of 507 individual birds from 13 different species were observed.
  - In 2013, 13 rapid PRISM plots were completed in the northern sections of the RSA and a total of 90 individual birds from 7 different species were observed.
  - Similar species composition and densities were detected in the 2012 and 2013 surveys.
  - Shorebird densities were relatively low compared to those observed at other nearby study sites.
  - In 2018, CWS conducted 14 PRISM plot surveys within a 100 Km radius of the Mary River Mine Site and another 24 plots in other areas of North Baffin Island. No new species were observed during the surveys that haven't been reported during other monitoring at Mary River. Some of the plots surveyed were considered suitable red knot habitat; however, no red knot were observed. Preliminary results provided by CWS indicated that 2018 was a low productivity year for shorebirds in the Mary River area and densities appeared lower than previous surveys in 2012/2013.
- Bird Encounter Transects:
  - 424 birds of 18 species were observed.
  - No evidence of a relationship between distance from the road/PDA and the number of birds was detected.
- Power analysis based on 2013 results indicated that songbird and shorebird densities were low and that any monitoring program would be unlikely to detect an effect of disturbance; discussion with the TEWG and CWS concluded that effects monitoring for tundra breeding birds could be discontinued but that Baffinland would commit to completing 20 PRISM plots every five years as a contribution to regional monitoring efforts.

***Red knot:***

- Red knot were observed incidentally by Wayne Renaud in 2007 at Camp Lake, Mary River.
- Red knot were not detected during targeted surveys in 2014 and 2015, but biologists and Baffinland Environment continue to be aware of their potential presence while on site.
- In 2019, Baffinland deployed nine (9) passive ARUs to detect red knot vocalizations in collaboration with CWS-ECCC. No Red Knot were detected during ARU monitoring in 2019, and based on available data, in February 2020 CWS-ECCC advised that additional years of data collection along the northern transportation corridor was not necessary.

***Seabird migration and wintering:***

- Staging waterfowl surveys.
  - Fifteen staging waterfowl surveys were completed at three sites between June 10 and 15, 2015.
  - 411 individuals of 20 different bird species were observed.
  - All species observed had previously been documented within the RSA.
  - Species diversity and abundance were greatest at the Phillips Creek site with 15 species and lowest at the Tugaat River mouth with 11 species.

**Seabird research on shipping routes:**

- Marine habitat use by thick-billed murres (2018-2020):
  - Since 2010, counts of thick-billed murres on Coats Island have been lower than the long-term average, suggesting a decline. A similar decline had been observed at Digges Island colony, 200 km to the east suggesting similar factors may be negatively influencing both of these thick-billed murre colonies in Hudson Strait. In 2018 and 2019, numbers seem to have rebounded to those of the late 1990s and 2000s.
  - Shifts in prey species (capelin replacing Arctic cod as primary prey species) since the 1990s may be due to reduced summer ice cover.
  - Changes in colony size may be related to offspring-related mortality. Bears have accessed the colony, sometimes resulting in up to 30% of the colony failing reproductively.
  - Data on distribution, habitat use, foraging behaviour, foraging range, and energetics continues to be collected (though no field work was possible in 2020), with analyses continuing throughout 2020.
    - The annual range of murres may have shifted over the past 38 years of data collection. Specifically, it has been noted that murres may be spending more time in Hudson Bay in the fall prior to their outmigration from the area, due to the later onset of ice formation in recent years. In addition, the range has shifted to the north and west in comparison to 1982.
    - Murres also tend to lay their eggs earlier in years when spring sea-ice concentrations are lower. They also tend to breed earlier than three decades ago.
- East Bay Island migratory bird research (2018-2020):
  - Shifts in sea ice extent in Foxe Basin result in polar bears arriving at East Bay Island early, allowing bears to opportunistically forage on common eider eggs.
  - It is predicted that Endocrine Disruption Chemicals (EDCs) in eiders, combined with climate change, may produce a decline in nest attentiveness, causing impacts to duckling health.
  - Eiders can use different foraging strategies, which may help eiders adapt to changing sea ice conditions, though further studies are needed.
  - Eider hens with key energetic hormones have larger clutches and higher duckling survival rates.
  - Due to their migration between marine and terrestrial ecosystems, eiders deliver nutrients resulting in altered water quality by enriching waterbodies (ponds) with marine-derived nutrients.
  - Based on Common eiders that were known to overwinter in distinct areas with different winter conditions, it was determined that these birds may be able to compensate for poor winter conditions during the spring pre-breeding period.
- Ship-based Observer program (2019) (Golder, 2020d)
  - Observations were completed in July and October 2019.
  - Six seabird species (127 individuals) were observed during summer surveys.
  - Nine seabird species (420 individuals) were observed during fall surveys.

**TRENDS**

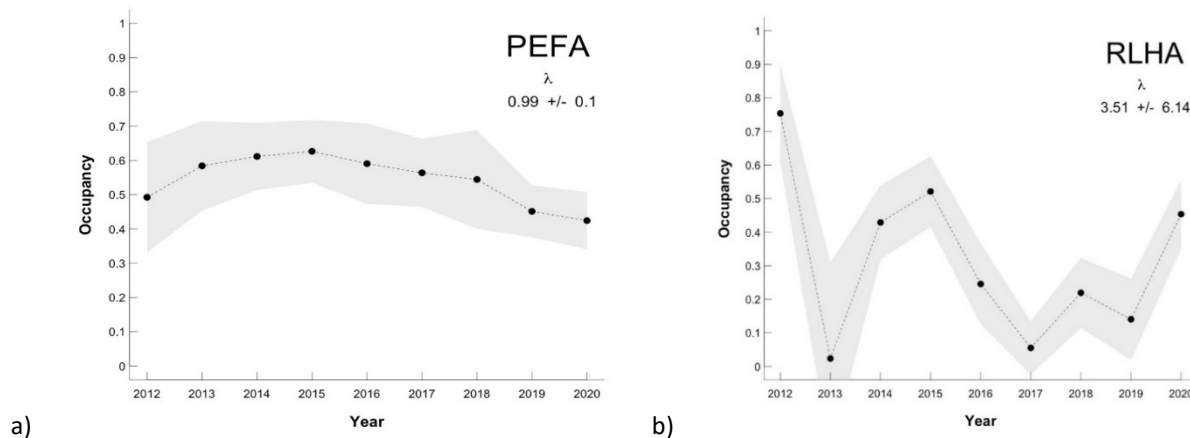
Annual variation in productivity for Peregrine Falcons and Rough-legged Hawks has been apparent (Figure 4.13, Table 4.21); however, this is most likely representative of natural

variability associated with variation in prey availability and weather conditions rather than due to any influence of anthropogenic disturbance. This analysis is supported by a comparatively higher abundance of lemmings in 2020 coinciding with increased Rough-legged Hawk occupancy and productivity. Occupancy of potential nesting sites by Gyrfalcons in the Raptor Monitoring Area (RMA) has been too low to monitor annual trends. At the population level, on-going monitoring suggests that distance to disturbance and distance to nearest neighbour (individually and as an interaction) have no adverse effect on occupancy or reproductive success for Peregrine Falcons and Rough-legged Hawks. Future monitoring will continue to focus on multiple nesting territory visits.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue the monitoring programs as described in the TEMMP and will continue to collect opportunistic information when qualified biologists are on site. Monitoring to date has found that bird densities of most species are not sufficient to monitor Project effects (i.e., songbirds, shorebirds, eiders, Red Knot, and Gyrfalcon). To date, trend analysis has only been conducted for cliff-nesting raptors. As populations of cliff-nesting raptors have appeared stable throughout multiple years of surveys with no evidence of Project-related effects, raptor monitoring is recommended to be paused for 2021.

Baffinland has previously contributed funds to marine bird research on southern shipping routes. Baffinland will continue to support marine bird research (thick-billed murre, common eider) conducted by ECCC in the northern (Cape Graham Moore) and southern shipping routes (Digges Sound, East Bay, and Hudson Strait). PRISM plot surveys are next scheduled for 2023. Baffinland will also continue to support the industry NSERC research program to map environmental sensitivities associated with the Project. Upon the recommendation of CWS-ECCC, Red Knot monitoring using ARUs will resume before increasing activities in the southern transportation corridor.



**Figure 4.13: Annual Estimates of Peregrine Falcon (PEFA) and Rough-legged Hawk (RLHA) Nesting Territory Occupancy (2012 to 2020)**

**Notes:**  
Annual Estimates include ± standard errors.

**Table 4.21: Summary Statistics for Raptor Survey Effort and Detections at Known Raptor Nesting Sites within the Raptor Monitoring Area (RMA; 2011 to 2020)**

Variable		Year									
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Effort	Total nesting sites known annually	96	107	108	127	159	162	167	169	169	175
	New sites found annually	0	11	1	19	32	3	5	2	0	6
	Count of sites checked	87	107	90	125	147	142	166	166	165	175
	% known sites checked	91%	100%	83%	98%	92%	88%	99%	98%	98%	100%
	Count of checked sites occupied	56	76	30	77	99	70	63	63	55	89
	% checked sites occupied	64%	71%	33%	62%	67%	49%	38%	38%	33%	51%
	Count of sites checked twice annually	4	50	35	90	113	99	158	164	1642	175
Detections <sup>1</sup>	Count of sites no raptors detected	31	31	60	48	48	72	103	103	110	86
	Count of sites PEFA detected	27	29	29	43	50	48	50	49	43	42
	Count of sites no raptors detected	31	31	60	48	48	72	103	103	110	86
	Count of sites PEFA detected	27	29	29	43	50	48	50	49	43	42
	Count of sites RLHA detected	26	45	1	31	47	18	5	12	11	47
	Count of sites GYRF detected	3	0	0	1	1	2	2	1	1	0
	Count of sites CORA detected	0	1	0	1	0	1	6	1	0	0
	Count of sites GLGU detected	0	1	0	0	1	1	0	0	0	0
	Count of sites SNOW detected	0	0	0	1	0	0	0	0	0	0

**Note:**

1. Peregrine falcon (PEFA), rough-legged hawk (RLHA), gyrfalcon (GYRF), common raven (CORA), glaucous gull (GLGU), snowy owl (SNOW). These sites were checked three times in 2020.



## Project Certificate Condition No. 75

Category	Birds - Monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To assess the extent of terrestrial habitat loss.
Term or Condition	The Proponent's monitoring program shall assess and report, on annual basis, the extent of terrestrial habitat loss due to the Project to verify impact predictions and provide updated estimates of the total Project footprint.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be provided within the Annual Report to the NIRB.
Status of PC Condition	Active
Status	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Impact Review Board, Terrestrial Environment Working Group (TEWG)
Reference	Environmental Protection Plan (Baffinland, 2016b) Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

Prior to construction on undisturbed land, the appropriate approvals must be obtained, and construction plans must adhere to the Environment Protection Plan. Baffinland also restricts any overland movement of equipment or personnel which are required to operate to existing site roads and laydowns, to minimize the overall Project footprint; any unauthorized land disturbance or deviation from the PDA is reported as an incident and is investigated.

### RESULTS

As of the end of 2020, the total Project footprint is 556 ha, which is less than what was assessed in the FEIS (7,618 ha), which assumed the entire PDA would be disturbed. To date, all of Baffinland's construction activities for the Project have occurred within the Project Development Area (PDA). Baffinland also restricts any overland movement of equipment or personnel required to operate to existing site roads and laydowns. Any unauthorized land disturbance or deviation from the PDA is reported as an incident and is investigated. Overburden that is removed from an area to be disturbed is stockpiled for the remediation of the area, wherever possible and materials are suitable for re-use. No unauthorized land disturbance occurred in 2020, and all disturbed land is reported in the Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021), which has been released to the Working Group for review and comment.

### TRENDS

To-date, construction activities for the Project have remained within the PDA.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to monitor terrestrial habitat loss due to disturbance and maintain the limits of the Potential Development Area, and restrict overland movement and traffic to existing roads, pads, and walkways.

#### 4.6.10 Marine Environment (PC Conditions 76 through 98)

Twenty-four (24) PC conditions relate to the potential impacts of the Project on the marine environment. These conditions encompass the development of a comprehensive environmental effects monitoring program and the establishment of the Marine Environment Working Group (MEWG).

##### **Inuit & Stakeholder Feedback**

The marine environment has been a key focus of Inuit and stakeholder interest and concern. Concerns have primarily been centred on the potential for impacts of Milne Port operations on the marine environment, including water quality, sediment, fish and fish habitat, the potential for introduction of invasive species as a result of ballast water discharge and hull fouling, and impacts on marine mammals. Baffinland has continued to engage regulators who have jurisdictional responsibilities and authorities over this component of the Project, including ECCC, DFO and TC on these issues, as well as the QIA and Inuit community members through regular engagement (Appendix B) and meetings of the MEWG (Appendix C). Additionally, in 2020 NIRB once again held their annual Marine Monitoring and Marine Mitigation Workshop in Pond Inlet. The Workshop provided an opportunity for participants to provide their feedback on marine management, mitigation and monitoring. Many elders and community members were able to actively participate in the workshop, and share their experiences and IQ with the NIRB staff and other workshop participants (NIRB, 2019a). Numerous topics were discussed including effects from Project-related activities including: water quality, dust, shipping impacts to marine mammals (e.g., narwhal, bowhead, seals) and fish, the need for effective monitoring, ballast water and invasive species risk, and general vessel management. These key topics were also reflected during 2020 consultation activities (Appendix B). Subsequent to the Marine Monitoring and Marine Mitigation Workshop, Baffinland provided responses to three (3) Board recommendations, which addressed how Baffinland is managing dust at Milne Port, monitoring for the health of marine mammals and their habitat and ballast water mitigation and monitoring conducted by Baffinland to minimize the potential for the introduction of AIS/NIS.

##### **Monitoring**

Marine biota and the physical environment (water and sediment quality) is subject to a marine EEM program, which includes the following components:

- Benthic Habitat - Underwater videography to characterize benthic habitat substrate type/class and detect changes over time.
- Sediment - Sampling sediment for particle size analysis (to detect changes in sediment composition) the presence of hydrocarbons, and iron concentrations as a function of distance from the ore dock.
- Water Quality - Sampling measuring total suspended solids, salinity, temperature, pH, metals, nutrients and hydrocarbon concentrations over time.
- Epibenthic Community - Underwater videography to enumerate benthic epifauna and compare changes over time.
- Fish - Opportunistic sampling of contaminants in fish flesh of both sculpin species and Arctic char, and shellfish species.
- Aquatic Invasive Species (AIS) - Sampling for the presence/absence of aquatic organisms (zooplankton, benthic infauna, benthic infauna, macroflora, encrusting epifauna, fish).
- Ballast Water Monitoring - Monitoring of salinity levels in ballast water to verify exchange of ballast in accordance with Ballast Water Management Regulations.

Table 4.22 provides an evaluation of the Project's impacts on the marine environment, based on monitoring activities completed in 2019, relative to predictions presented in the FEIS and FEIS Addendum.

To the extent that Project impacts on the marine environment can be evaluated, the effects of the Project are within FEIS predictions.

**Table 4.22: Marine Environment Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Water and Sediment Quality	Changes in water and sediment quality due to prop wash, ballast water discharge, and ore dust deposition	The marine EEM program did not detect any meaningful changes in water quality. Metal concentrations in sediment samples collected in 2020 generally correlated with sediment physical composition.	Effect within FEIS predictions
	Changes in water and sediment quality due to sewage effluent discharge	Monitoring of effluent as required by water licence. Monitoring results for discharge to the Marine environment complied with all water licence limits.	Effect within FEIS predictions
	Accidental fuel spill from marine shipping of fuel and other supplies	Inspections and visual monitoring during ship to land fuel transfers and sealift deliveries. No accidents or malfunctions occurred that had the potential for effects.	Effect did not occur
Marine Habitat	Disruption and loss of marine coastal habitat due to dock structure	Ore Dock and Freight Dock offset monitoring program indicates that offset habitat is functioning as intended.	Effect within FEIS predictions
Marine Biota	Potential changes to marine biota from the introduction of aquatic invasive species due to shipping (ballast water discharges, etc.)	Out of 369 benthic invertebrate taxa identified during NIS/AIS sampling in 2020 at Milne Port and Ragged Island, eight (8) benthic taxa were sent for independent verification of the taxonomic identification, which included three (3) taxa that had also been flagged in 2019. While two of the newly identified taxa ( <i>Hesperonoe</i> sp. and <i>Amphitrite birulai</i> ) do not have clear records of occurrence in the Canadian Arctic, neither are listed on AiS databases; accordingly, these two taxa are considered "Low Risk" and have been placed on a 'Watchlist'. Additionally, 2020 benthic samples included three taxa ( <i>Pseudofabricia aberrans</i> , <i>Sosane wireni</i> and <i>Marenzelleria viridis</i> ) that had been flagged in previous years due to a range uncertainties or presence on AIS databases. Once again, these specimens were sent to Université Laval for independent verification and remain on the Watchlist as Low Risk ( <i>P. aberrans</i> and <i>S. wireni</i> ) and High Risk taxa ( <i>M. viridis</i> ). Additional specimens of <i>P. aberrans</i> were also sent for DNA verification by	Effect within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
		the Canadian Centre for DNA Barcoding at the University of Guelph; however, results are not yet available.	

### Path Forward

Baffinland will remain vigilant about the mitigation and monitoring activities that are in place to protect the marine environment. Baffinland will continue to seek input and review monitoring results trends from technical members of the MEWG, in addition to gathering feedback through separate forums such as annual pre-shipping and post-shipping meetings led by Baffinland with representatives of relevant HTOs (e.g., MHTO) and communities (e.g. Pond Inlet). Reporting on each PC condition follows.

## Project Certificate Condition No. 76

Category	Marine Environment - General
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To mitigate potential impacts to the marine environment.
Term or Condition	The Proponent shall develop a comprehensive Environmental Effects Monitoring Program to address concerns and identify potential impacts of the Project on the marine environment.
Relevant Baffinland Commitment	40, 51, 84, 85, 79
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Marine Biological and Environmental Baseline Surveys Milne Inlet 2014 (SEM, 2015) 2015 MEEMP Report (SEM, 2016a) 2015 AIS Monitoring Report (SEM, 2016b) 2016 MEEMP and AIS Monitoring Report (SEM, 2017a) 2017 MEEMP and AIS Monitoring Report (Golder, 2018b) 2018 MEEMP and AIS Monitoring Report (Golder, 2019a) 2019 MEEMP and AIS Monitoring Report (Golder, 2020a) Draft 2020 MEEMP and NIS/AIS Monitoring Report (Golder, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C Appendix G

### METHODS

The Marine Environmental Effects Monitoring Program (MEEMP) was developed in 2015 following completion of marine biological baseline studies at Milne Port during 2010, 2013 and 2014. The MEEMP includes annual monitoring to detect potential Project-related effects on marine water and sediment quality, benthic invertebrates, substrate and macroflora, fish health, and fish tissue chemistry. The MEEMP sampling design is generally based on Environmental Effects Monitoring (EEM) guidance from Environment Canada (2012) and includes statistical approaches to detecting potential Project-induced impacts on the marine environment. Baffinland's Aquatic Invasive Species (AIS) monitoring program was developed in 2015 as part of the MEEMP to detect non-indigenous species (NIS) and AIS potentially introduced to Milne Inlet via ballast water discharges or hull biofouling. Non-indigenous Species and Aquatic Invasive Species (NIS/AIS) surveys target multiple trophic levels, including zooplankton, benthic infauna, epifauna and fish.

Detailed information on study design and sampling methodology is available in the annual monitoring reports for the MEEMP and NIS/AIS monitoring programs (SEM 2016a, 2017a; Golder 2018b, 2019a, 2020a, 2021a).

## RESULTS

Overall, MEEMP and NIS/AIS sampling results from 2020 do not suggest degradation or impairment of the marine physical or biological environment (i.e., water and sediment quality, marine fish and benthic communities, fish health) associated with the construction and operation of Milne Port. Detailed sampling results are available in the Draft Annual Monitoring Report for the MEEMP and NIS/AIS monitoring programs (Golder, 2021a). Monitoring completed to date as part of the MEEMP reflects concordance with the applicable Terms and Conditions of PC No. 005, including PC Conditions No. 1, 76, 83, 83(a), 85, 87, 91, 99, 99(b), 113, 114 and 126. Based on MEEMP results collected to date, no additional mitigation measures are warranted at this time.

### ***Marine Physical Environment:***

#### *Marine Water Quality*

All relevant water quality parameters analyzed in 2020 were below applicable CCME Water Quality Guideline (WQG; CCME, 2014) or, for parameters without a guideline (such as iron), consistent with concentrations documented in previous years. Marine water quality monitoring undertaken to date indicates that mitigation measures for site drainage and treated effluent discharges are functioning as intended and that the construction and operation of Milne Port does not appear to have negatively affected water quality in Milne Inlet.

#### *Marine Sediment Quality:*

Analysis of the physical and chemical composition of sediments determined that, in general, concentrations of metals, volatile organic compounds, hydrocarbons, and PAHs were determined to be less than applicable sediment quality guidelines, consistent with previous years, and do not show spatial patterns attributable to the Project with few exceptions that reflect regional background. No significant change in marine sediment quality has been observed between survey years at Milne Port. Monitoring results remained within original FEIS predictions, which forecasted no significant residual effects on sediment quality but indicated the potential for minor localized increases in nutrient, metal, or hydrocarbon concentrations that would not exceed CCME sediment quality guidelines. Marine sediment quality monitoring undertaken to date suggests that the construction and operation of Milne Port does not appear to have negatively affected sediment quality in Milne Inlet.

Marine sediment data collected to date does not suggest an accumulation of hydrocarbons or VOCs in Milne Port sediments within the study area due to the Project. Baseline data for Milne Port sediments suggest that detectable or low concentrations of hydrocarbons or VOCs were present prior to the Project. Baffinland notes that it operates under various management plans, including the Environmental Protection Plan (Baffinland 2016a), which includes a description of potential pathways of effects through which hydrocarbons may enter water bodies and the types of mitigation measures that have been developed to avoid/reduce this risk. Similarly, the MEEMP (Baffinland 2016b; e.g., in sections 3.1 and 3.2.2) also describes potential pathways of effects leading to increases in hydrocarbons, based on predicted effects to the marine environment as identified through the environmental assessment process. This information addresses NIRB's recent recommendation in its 2019/2020 Annual Monitoring Report that Baffinland provide a summary of the measured 'concentrations of benzene, toluene, and PAHs in Milne Port, and discuss their possible origin in the marine sediments of the northern transect and describe what strategies are in place and/or under development to prevent any negative effects to benthic macroinvertebrate and sediment communities'. As there is currently no evidence of Project-related increases in either hydrocarbons (e.g., benzene and toluene) or PAHs in Milne Port including along the northern transect, there is no requirement or need at this

time to develop mitigation or management measures that aim to prevent or minimize adverse effects on marine benthic communities from these sources.

*Physical Oceanography:*

Measurements of currents and temperature and salinity in Milne Inlet near Milne Port continued in 2020. The tide gauge was reinstalled at Milne Ore Dock in 2020. Analysis of tide gauge data indicates typical fluctuations resulting from tidal forcing. During the measurement period, a total of five neap-spring tidal cycles were observed and no observable storm surges, indicating that the current approach for monitoring relative sea levels and storm surges is effective.

In 2020 the physical oceanography continued measurements of currents, water levels, and temperature and salinity in Milne Inlet near Milne Port. Collected data has been archived for potential future analyses.

**Marine Biological Environment:**

*Benthic Infauna:*

The benthic infaunal sampling program was successfully implemented in 2020, with detailed results presented in Golder (2021a). A brief summary is provided below.

In 2020, benthic infaunal communities were diverse throughout the study area and well established in both habitat types. There were no consistent differences (i.e., trends, or directional change) between years (2020 vs 2019, or between 2020 vs 2018/2019) in benthic community indicators along each of the four transects. Isolated instances where indicators were significantly different between years did occur; however, in these cases, densities, diversity, and evenness were higher in 2020, with lower richness in 2020 compared to 2019 but not 2018. Statistical differences also tended to occur with greater distance from the Ore Dock rather than closer to the dock. These results do not suggest there is a community response pattern typical of a toxicological impairment due to contaminant exposure (i.e., a significant decrease in both density and richness) occurring. The 2020 results are more consistent with expected natural variability for these benthic habitat types within Milne Inlet and there is no evidence to suggest that benthic infaunal communities have been affected by the Project. A lack of adverse effects on local benthic communities that can be linked to the Project is consistent with FEIS predictions of no significant adverse residual effects to arctic char habitat. In 2020, mitigation measures appeared to be functioning as intended and Project operational activities were being managed in a way that did not adversely affect benthic infauna at Milne Port.

Based on three years of comprehensive data analysis, monitoring results indicate that the Project has not adversely impacted benthic communities in Milne Port. Evidence for this conclusion is supported by the evaluation of community effect indicators that show benthic communities are healthy and not demonstrating responses indicative of disturbance or contamination. Spatial variability observed in 2020 is to be expected in the coastal and offshore benthic habitats present at Milne Port and remained within the range of variation documented in previous years.

*Epibenthic Community:*

In 2020, underwater video surveys were used to monitor for Project effects on epibenthic communities (macroflora and epifauna) for the third consecutive year, with detailed results presented in Golder (2021a). Permanent quadrats were installed at Site in 2020 to replace previously surveyed belt transects that were damaged during the winter. Quadrats were placed in both an exposure and reference area in the Milne Port area. Diver-based surveys were



added in 2020 to assist in better taxonomic resolution through in situ observation and specimen collection (in addition to ROV-based surveys). Given the change in survey design in 2020, a quantitative comparison between 2020 surveys and previous years was not possible. The 2020 quadrat survey results will serve as a baseline for quantitative comparisons to future survey years.

Qualitative and quantitative comparisons of community indices (species richness, diversity and abundance) between impact and reference areas in 2020 provided no evidence of spatial or temporal trends that might be associated with the construction and operation of Milne Port.

#### *Marine Fish:*

The marine fish sampling program at Milne Port was successfully implemented in 2020, with detailed results presented in Golder (2021a). Fish captures in 2020 were higher relative to previous years, which was attributed to the increased length of the sampling program, and higher effort. The 2020 fish sampling program yielded a similar proportional representation of dominant fish species in Milne Port (Arctic Char, Fourhorn Sculpin and Shorthorn Sculpin) to previous years, with no indication of Project-related impacts on the local fish community in Milne Port.

Relative taxonomic composition and length-weight relationships of captured fish indicated no significant impacts to fish community composition and health in association with the construction and operation of Milne Port. Concentrations of metals in arctic char tissue analyzed for body burden in 2020 were generally consistent with those reported in previous years (2010 to 2019). Statistically significant increases have been observed since 2018 for some contaminants of potential concern in arctic char (e.g., aluminum and magnesium); however, differences were small and often inconsistent, likely reflecting natural variability in both the bioavailability and subsequent uptake of metals, reflected in the reported tissue concentrations. All tissue samples for Arctic Char, Fourhorn Sculpin and H. arctica collected from 2018 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline (Health Canada, 2015) and below the British Columbia Ministry of Environment fish tissue guidelines for selenium (BC MOE, 2014).

Impact predictions in the original FEIS (Baffinland, 2012) forecasted the potential for low magnitude changes in some ecological parameters, such as arctic char tissue chemistry, but characterized these changes as not significant. Overall, monitoring data from 2020 align with these predictions, as any observed changes have generally been minor, either within established guidelines or consistent with baseline conditions. At present, monitoring indicates that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not resulted in adverse effects on the marine ecosystem. To date, construction and operational activities at Milne Port do not appear to have negatively affected fish health or tissue chemistry in the Milne Port area.

#### ***NIS/AIS Monitoring Program:***

In 2020, a total of 67 species were reported that had not been identified previously at Milne Port during baseline, MEEMP and NIS/AIS sampling. An analysis of the available literature and species databases indicated that most of the newly identified taxa had known ranges that include Arctic waters or had unknown northern limits with ranges that could extend to Arctic waters. Specimens from eight taxa were sent to secondary laboratories for independent review, including three species that were first identified in 2019, were reidentified in 2020 samples and sent for re-evaluation and two specimens sent for DNA analysis. These serve as evidence that this program is functioning as intended, and that no invasions of NIS/AIS taxa have occurred through project-related vectors.

## TRENDS

With relatively few exceptions, the 2020 MEEMP study design and data collection methodology followed the same approach utilized in previous years to provide technical continuity and repeatability of the program and to allow for inter-annual comparisons of the multi-year dataset.

Five years of AIS monitoring has yielded a relatively large inventory of marine organisms residing in Milne Port and Milne Inlet. Further investigations into the status of several new species identified during the AIS program are in progress in consultation with DFO and other external experts, with representative specimens sent to secondary laboratories for confirmatory taxonomic and DNA analyses.

Overall, MEEMP sampling results from 2020 do not suggest degradation or impairment of the marine physical or biological environment (i.e., marine water and sediment quality, benthic infauna, epibenthic communities, fish and fish health, physical oceanography) associated with the construction and operation of Milne Port.

Monitoring completed to date as part of the MEEMP reflects concordance with this Condition (No.76) of Project Certificate No. 005, in addition to the other following relevant Conditions: No. 1, 83, 83(a), 85, 87, 91, 99, 99(b), 113, 114 and 126. Based on MEEMP results collected to date, no additional mitigation measures are recommended at this time.

## RECOMMENDATIONS / LESSONS LEARNED

The MEEMP study design, data collection methodology and results are reviewed yearly with the MEWG. Recommendations from the MEWG assist in refinements to the program, enhancement of existing mitigation measures, and development of adaptive management measures (when and where applicable).

AIS and MEEMP results will continue to be presented to the MEWG on an annual basis, and recommended adjustments to the programs will be considered by Baffinland and implemented as deemed necessary and relevant for detecting potential Project-related impacts.

The following is a list of 2020 Golder recommendations for the MEEMP - presented by study component:

### *Marine Water Quality*

Marine water quality monitoring at Milne Port is recommended to continue annually to enable evaluation of potential changes in downstream water chemistry from Site operations and to provide continuity in the established time series for the MEEMP.

### *Marine Sediment Quality*

Sediment monitoring to date suggests that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not adversely affected marine sediment within the Milne Inlet study area. Given this, the data suggest that monitoring of sediment quality is not required annually. Moving forward, it is recommended that monitoring of sediment quality within the study area should continue, but at reduced frequency (i.e., every 2-3 years), commensurate with the low magnitude and localized effects of the Project on sediment quality within Milne Inlet.

### *Benthic Infauna*

Monitoring results to date indicate that monitoring of benthic infaunal communities is not required annually. Moving forward it is recommended that monitoring of benthic infaunal communities within the study area should continue,

but at a reduced monitoring frequency (i.e., every 2-3 years), commensurate with the low magnitude and localized effects of the Project on both marine sediment quality and benthic communities within Milne Inlet. The observation at one station that stood out as an anomaly in 2020 will undergo additional follow up and potentially targeted sampling as part of future monitoring efforts.

#### *Epibenthic Communities*

Due to schedule limitations in 2020, quadrats had to be surveyed using a mixture of diver-based and ROV-based surveys. Divers improve the accuracy of counts and the overall taxonomic resolution of observed organisms as vegetation can be moved aside to view the substrate and specimens of uncertain taxa may be collected for subsequent identification. It is recommended that divers continue to be used as a standardized approach for surveying quadrats in both the exposure and reference areas, and that these surveys be implemented again in 2021 to allow for a quantitative comparison to the 2020 results.

#### *Marine Fish and Fish Health*

Gill nets remain the most reliable and effective way for monitoring populations of arctic char in Milne Port and it is recommended that these efforts continue in 2021. Fishing efforts vary each year in number, location, and type, making comparison of Catch-per-unit-effort (CPUE) between survey years difficult; therefore, it is also recommended a repeated survey design be considered for the program, where the same efforts are used every year in the same locations within Milne Port, so that comparisons can be made through time.

Moving forward, continued monitoring of fish health in Milne Port is recommended to ensure continuity in established time series (e.g., arctic char) or to better characterize baseline data (e.g., sculpin and *H. arctica* tissue chemistry).

#### *NIS/AIS Monitoring Program*

It is recommended that sampling across multiple trophic levels continues in 2021, that the taxonomic inventory for Milne Inlet continue to be expanded upon, and that all flagged specimens continue to be screened for known geographic ranges and NIS/AIS status. It is further recommended that increased efforts be made to collect and review genetic evidence for *Marenzelleria viridis* and *Monocorophium* sp. (both flagged as High Risk but not Project-related), including targeted sampling to obtain specimens for DNA barcoding.

## Project Certificate Condition No. 77

Category	Marine Environment - Working Group
Responsible Parties	The Proponent, Environment Canada, Fisheries and Oceans Canada, the Government of Nunavut, the Qikiqtani Inuit Association and interested parties
Project Phase(s)	All Phases
Objective	The MEWG will consult with, and provide advice and recommendations to the Proponent 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. The role of the MEWG is not intended to either duplicate or to affect the exercise of regulatory authority by appropriate government agencies and departments.
Term or Condition	A Marine Environment Working Group (MEWG) shall be established to serve as an advisory group in connection with mitigation measures for the protection of the marine environment, and in connection with the Project Environmental Effects Monitoring program, as it pertains to the marine environment. Membership on the MEWG will include the Proponent, Environment Canada, Fisheries and Oceans Canada, Parks Canada, the Government of Nunavut, the Qikiqtani Inuit Association, the Mittimatalik Hunters and Trappers Organization, and other agencies or interested parties as determined to be appropriate by these key members. Makivik Corporation shall also be entitled to membership on the MEWG at its election. The MEWG members may consider the draft terms of reference for the MEWG filed in the Final Hearing, but they are not bound by them.
Relevant Baffinland Commitment	46, 49, 51
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2020 MEWG Meeting Records Concordance to 2019-2020 Board Recommendations
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix E

### METHODS

Baffinland established a MEWG in 2013. Members include representatives from: Environment and Climate Change Canada, Department of Fisheries and Oceans Canada, Qikiqtani Inuit Association, Government of Nunavut, Parks Canada, Makivik and Baffinland, with technical experts as required. The Mittimatalik Hunters and Trappers Organization joined the group in 2016. The World Wildlife Fund-Canada and Oceans North also participate as observers.

Generally, the Working Group meetings are structured in such a way to include:

- Baffinland to provide a Project update to the members (e.g., includes mining and shipping-related activities such as ore production, and vehicular and vessel traffic);

- Discussion of monitoring program planning including sampling approach (e.g., sampling variables, sites, and data collection methods) in advance of field programs to obtain feedback by MEWG members;
- Discussion of results of monitoring programs to obtain feedback by MEWG members; and
- Various research presentations (given by Baffinland, Baffinland technical consultants and other members).

The group typically schedules two (2) yearly in-person meetings, in addition to hosting two (2) interim teleconferences per year.

Draft technical annual reports and other documentation are provided to the MEWG in advance of meetings to the extent possible and on an on-going basis to allow for review, comment and advice to be provided by all members. Baffinland reviews all comments received on draft reports, makes effort to provide meaningful responses to each comment, and in so doing, takes into consideration the suggestions for improvement of the report and advice provided by MEWG. This mechanism allows MEWG members to provide constructive feedback on annual reporting efforts.

**RESULTS**

In 2020, the MEWG met three times. Due to COVID-19 restrictions only one (1) meeting was held in-person, with the rest of the meetings occurring via teleconference.

A list of the meetings and topics discussed with the MEWG in 2020 is provided in Table 4.23.

**Table 4.23: Marine Environment Working Group Meetings in 2020**

Date	Location	Topics Discussed
<b>MEWG</b>		
February 25, 2020	Ottawa, ON	Baffinland Update <ul style="list-style-type: none"> <li>• 2019 Shipping Season Update               <ul style="list-style-type: none"> <li>○ Vessel traffic</li> <li>○ Mitigation and Management</li> </ul> </li> <li>• Response to 2018-2019 NIRB Recommendations</li> <li>• MEWG Terms of Reference</li> <li>• 2019 Marine Monitoring Draft Report Release Schedule</li> </ul> Early Warning Indicator Development 2019 Marine Monitoring Programs <ul style="list-style-type: none"> <li>• Bruce Head Shore-based Monitoring Program</li> <li>• Ship-Board Observer Program</li> <li>• Acoustic Monitoring</li> <li>• Aerial Surveys</li> <li>• 2018 Narwhal Tagging Memo and Integrated Analysis</li> <li>• Marine Ecological Effects Monitoring Program</li> <li>• Aquatic Invasive Species</li> <li>• Habitat Offset Monitoring</li> <li>• Physical Oceanography</li> </ul>

Date	Location	Topics Discussed
June 25, 2020/ July 10, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>• 2020 Shipping Season Overview</li> <li>• Update on Extension Request to the Production Increase Proposal</li> <li>• Impacts of COVID-19 on 2020 Marine Monitoring Programs</li> <li>• MEWG Terms of Reference update</li> </ul> 2020 Marine Monitoring Programs Overview 2020 Shipping Mitigation Review Early Warning Indicator (EWI) Development Update
December 9, 2020	Teleconference	Baffinland Update <ul style="list-style-type: none"> <li>• 2020 Shipping Season Summary</li> </ul> 2020 Monitoring Program Update 2019 Monitoring Report Comment and Response Summary EWI Technical Memo Submission Summary

As a result of inputs from the MEWG, numerous program modifications have been made since 2015, and increasingly so since 2018, and these changes have been summarized as part of individual terrestrial and marine environment program reports. When suggestions have been made by working group members on specific programs, Baffinland has made the effort in considering these requests in the most expedited and feasible manner. When a change is not implemented, Baffinland has provided rationale as to why the modification cannot immediately be implemented and/or that additional information is required before it can make an informed decision and/or has provided its reasoning for not pursuing specific requests and requesting that alternative methods be suggested.

A summary of key monitoring-related feedback/suggestions provided to Baffinland since 2018 was provided to the NIRB in response to the Board’s 2019-2020 Recommendations (Appendix E). This summary is based on Baffinland’s review of past comments received on monitoring program reports and/or through review of meeting records from working group meetings that took place since 2018. It is noted that when applicable, modifications made to annual programs are typically summarized in program report sections describing changes/modifications to program design from the previous year(s) of study. This summary clearly demonstrates Baffinland’s willingness to consider and incorporate the numerous suggestions provided through working groups on program design modifications, data analyses and interpretation of results.

**TRENDS**

Baffinland, through collaboration with the various members of the MEWG, has successfully developed a robust terrestrial monitoring program that is reviewed and adjusted on an annual basis as deemed relevant and necessary to the objectives of Project Certificate No. 005 terms and conditions.

The MEWG continues to provide a valuable forum for ongoing Project communication and reporting between Baffinland and other interested parties. The MEWG also serves as an advisory group to provide recommendations on appropriate management approaches related to the Project.

The MEWG has guided the development of the annual Marine Monitoring Program designs and adjustments are made to the monitoring program as needed following guidance from the group.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to work with the MEWG to review and guide monitoring programs on an annual basis and develop mitigation measures or action plans as and when deemed necessary based on review of any emerging trends requiring further investigation.

In addition to the annual operational activities of the MEWG outlined above, throughout 2020 Baffinland also continued to engage the Working Group to move forward updates to the Working Group Terms of Reference (ToR). Following a comment period on previous iterations of the ToR, an updated version was provided by Baffinland to the Working Group in October 2020 alongside a concordance table to demonstrate how feedback provided was integrated into the ToR by Baffinland. Baffinland also organized a meeting with the Working Group in November 2020 to discuss the latest draft. Throughout 2021 Baffinland will continue to engage with the Working Groups to finalize updates to the ToRs.

## Project Certificate Condition No. 78

Category	Marine Environment - Ice Breaking and Shipping
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To obtain accurate and current ice information.
Term or Condition	The Proponent shall update the baseline information for land fast ice using a long-term dataset (28 years), and with information on inter-annual variation. The analysis for pack and landfast ice shall be updated annually using annual sea ice data (floe size, cover, concentration) and synthesized and reported in the most appropriate management plan.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Ice and Marine Shipping Assessment - Mary River Iron Ore Project – North Baffin Island – Included in Baffinland 2012 Appendix 3 G (Ice and Marine Shipping Assessment; ENFOTEC, 2011) Ice Conditions and Ship Access to the Milne Inlet Port Site – Mary River Iron Ore Project - Final Report. Amended in 2015 (ENFOTEC, 2015) Ice Conditions and ship access to the Milne Inlet port site – Update included in Technical Supporting Document (TSD) No. 16. – Ice Conditions Report (ENFOTEC, 2016)
Ref. Document Link	N/A

### METHODS

Ice conditions study reports have been commissioned by Baffinland for the Northern Shipping Route on several occasions, including 2011, 2015 and 2016 (ENFOTEC, 2011; ENFOTEC, 2015; ENFOTEC, 2016). Additionally, in support of the Phase 2 Proposal, updated information on the dates for break up and freeze up of landfast ice was provided in Table 1 of a July 2019 memo entitled “Impacts of Icebreaking on Ice (Public Registry ID No. 325731). Ice charts and satellite imagery showing the presence and decay of landfast ice in 2020 were included in Baffinland’s presentation during the 2020 NIRB Marine Workshop (Public Registry ID No. 331227).

Additionally, accurate and current ice information from the Canadian Ice Service and ice navigators on board the MSV Botnica is obtained by Fednav, on behalf of Baffinland’s Shipping Department, on a daily basis during the start and end of the shipping season for the purposes of managing shipping operations safely and within the parameters of the commitments and mitigations made by the Company (i.e., commitment not to break landfast ice and transit restriction mitigations). This information is produced in real-time during active shipping/icebreaking operations. In other words, it cannot be integrated into a management plan in advance of the season to inform planning of shipping operations. However, historical ice data has been integrated into relevant management plans for this purpose.



Ice data is used for the purposes of planning the start and end of each shipping season. As outlined in Sections 5.2 and 5.3 of the Shipping and Marine Wildlife Management Plan (SMWMP; Public Registry ID No. 330780) that was submitted to the NIRB in July 2020 in accordance with the NIRB's May 25 2020 Directive following approval of the PIP Extension Request (Public Registry ID No. 330106) this information is used to inform the procurement of vessels at different times of the shipping season, to ensure vessels have the necessary capacity to sail along the shipping route in varying ice conditions. Lastly, this information is used to provide vessel captains with relevant ice and weather Information for navigational purposes, and is integrated into the Standing Instructions to Masters (SITM), which is referenced in Section 1, 2, 4 and 5 of the SMWMP.

### **RESULTS**

As was noted in the 2019 Annual Report to the NIRB, accurate and current ice information is used for the purposes of planning the start and end of each shipping season. As outlined in Sections 5.2 and 5.3 of the SMWMP (Public Registry ID No. 330780) that was submitted to the NIRB in July 2020 in accordance with the NIRB's May 25, 2020 Directive following approval of the PIP Extension Request (Public Registry ID No. 330106). As outlined in Appendix B (Baffinland Pre-Charter Bulk Carrier Ice Capability Assessment) of the SMWMP, this information is used to inform the procurement of vessels at different times of the shipping season, to ensure vessels have the necessary capacity to sail along the shipping route in varying ice conditions. Lastly, this information is used to provide vessel captains with relevant ice and weather Information for navigational purposes, and is integrated into the SITM, which is referenced in Section 1, 2, 4 and 5 of the SMWMP.

### **TRENDS**

Not applicable.

### **RECOMMENDATIONS / LESSONS LEARNED**

The ice condition report for the Northern Shipping Route (Milne Port) will be updated periodically as new data becomes available. The ice condition study for the Southern Shipping Route (Steensby Inlet) will be updated prior to the construction and operation of the Steensby Port.

## Project Certificate Condition No. 79

Category	Marine Environment - Ice Breaking and Shipping
Responsible Parties	The Proponent, Canadian Hydrographic Services
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To assist in the development of nautical charts for Canadian waters.
Term or Condition	The Proponent shall provide the Canadian Hydrographic Services with bathymetric data and other relevant information collected in support of Project shipping where possible, to assist in the development of nautical charts for Canadian waters.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Canadian Hydrographic Service (CHS)
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland entered into a collaborative cost-sharing agreement with CHS for their nautical charting program. The CHS also collected additional detailed bathymetry around the Existing Ore Dock in 2016. No additional data has been collected since that time, as there have been no substantial deviations in the Northern Shipping Route.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 80

Category	Marine Environment - Ice Breaking and Shipping
Responsible Parties	The Proponent, Canadian Hydrographic Services
Project Phase(s)	Construction
Objective	To identify areas of risk along the shipping route.
Term or Condition	Prior to commercial shipping of iron ore, the Proponent shall conduct a detailed risk assessment for Project-related shipping accidents, noting areas along the ship tracks where vessels may be particularly vulnerable to environmental conditions such as sea ice, and any seasonal differences in risk. This assessment shall inform mitigation and adaptive management plans.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Emergency Response Plan (ERP; Baffinland, 2020f) Oil Pollution Emergency Plan – Milne Inlet (OPEP; Baffinland, 2020i) Oil Pollution Prevention Plan – Milne Inlet (OPPP; Baffinland, 2020j) Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) Spill at Sea Response Plan (SSRP; Baffinland, 2015b) Spill Contingency Plan (Baffinland, 2021i) Diesel Environmental Emergency (E2) Plan - Milne Port (Baffinland, 2020l)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland has developed and maintained appropriate contingency plans to respond to spills on land, at the port, and at sea. The plans outline the equipment to be used in the event of a spill, as well as the roles and responsibilities and training necessary to maintain appropriately trained personnel.

See also summary for PC Condition No. 78 and 92.

### RESULTS

Emergency response plans outline the equipment to be used in the event of a spill, as well as the roles and responsibilities and training necessary to maintain appropriately trained personnel.

See also summary for PC Condition No. 78 and 92.

### TRENDS

Baffinland is committed to conducting regular and annual spill response exercises and training in known and effective techniques for responding to spills and any other Project-related shipping accidents.

See also summary for PC Condition No. 78 and 92.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to conduct routine training exercises and strategically procure resources and equipment to respond to any Project-related shipping accidents in the unlikely event that these occur.

See also summary for PC Condition No. 78 and 92.

## Project Certificate Condition No. 81

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To mitigate potential shoreline effects from shipping.
Term or Condition	The Proponent shall reassess the potential for ship wake impacts to cause coastal change following any further changes to the proposed shipping routes.
Relevant Baffinland Commitment	84
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Not Active
Status of Compliance	Not Applicable
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Mary River Project – FEIS (Baffinland, 2012) Mary River Project – Phase 2 Proposal - TSD No. 22 - Ship Wake and Propeller Wash Assessment (Golder, 2018c)
Ref. Document Link	<a href="https://www.nirb.ca/project/123910">https://www.nirb.ca/project/123910</a>

### METHODS

Ship wake effects on shorelines were assessed in Appendix 8D-2 for the FEIS (Baffinland, 2012) and Technical Supporting Document (TSD) No. 22 for the Phase 2 Proposal (Golder, 2018c). Results indicated that wave energy from wind-generated waves was estimated to exceed ship-generated wave energy during both average and peak wind conditions, and therefore ship wake impacts would be non-measurable relative to existing conditions. These assessments concluded that ship wakes would result in negligible effects on the physical shoreline along the Southern and Northern Shipping Route in comparison to wind-generated waves (i.e. existing condition).

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Should changes to the current shipping routes be proposed, Baffinland will undertake the required assessment.

## Project Certificate Condition No. 82

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To mitigate potential shoreline effects from shipping.
Term or Condition	The Proponent is strongly encouraged to have its ore carriers subjected to sea trials to measure wake characteristics at various vessel speeds and distances from the vessel.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Not Active
Status of Compliance	Not Applicable
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Mary River Project – FEIS (Baffinland, 2012)
Ref. Document Link	<a href="https://www.nirb.ca/project/123910">https://www.nirb.ca/project/123910</a>

### METHODS

Baffinland understands that the intent of this condition was to address concerns related to potential erosional effects of ship wakes from purpose-built Baffinland ore carriers on shorelines along the Southern Shipping Route. Ship wake effects on shorelines along the Southern Shipping Route were assessed in Appendix 8D-2 for the FEIS (Baffinland, 2012). Results indicated that wave energy from wind generated waves is estimated to exceed ship-generated wave energy and ship waves are unlikely to cause any measurable erosion or habitat alteration along the Southern Shipping Route.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 83

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	All phases
Objective	To provide data on tide levels and storm surges.
Term or Condition	The Proponent shall install tidal gauges at Steensby and Milne Port to monitor sea levels and storm surges.
Relevant Baffinland Commitment	N/A
Reporting Requirement	The Proponent shall summarize and supply these monitoring results to NIRB in the annual Project report.
Status of PC Condition	Steensby Port - Not Active Milne Port - Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Oceanographic Data Processing – Baffinland Ballast Water Study, Milne Inlet 2014-15 (ASL, 2015) Tide Gauge Collection at Milne Port During 2017 Open-water Season (Golder, 2018a) 2018 Milne Inlet Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2019a) 2019 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2020a) Baffinland Milne Port Tide Gauge Data Collection – 2020 Ice Free Season (Golder, 2021b)
Ref. Document Link	N/A

### METHODS

In 2020, tide monitoring continued at Milne Port using an RBRconcerto CTD (RBR) sensor programmed to continuously measure pressure, temperature, and conductivity. Detailed methods are provided in Golder (2021b), which is included as Appendix 1A in Golder (2021a).

No tidal gauge systems were installed at Steensby Port as that component of the Project is currently inactive.

### RESULTS

A continuous time-series of water level, temperature, and conductivity data was collected and is provided in Golder (2021b). Water level data recorded at Milne Port indicated typical fluctuations resulting from tidal forcing. During the measurement period, a total of five neap-spring tidal cycles were observed and there were no observable storm surges.

### TRENDS

Results indicate that the current approach for monitoring relative sea levels and storm surges is effective.

**RECOMMENDATIONS / LESSONS LEARNED**

To support future trends analyses, Baffinland plans to reinstall the tide gauge in 2021 at Milne Port and extend the multi-year trends analysis of sea level rise at Milne Port (Golder, 2021a).



### Project Certificate Condition No. 83 (a)

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To identify potential for and conduct monitoring to identify effects of sediment redistribution associated with construction and operation of the Milne Port.
Term or Condition	The Proponent shall conduct hydrodynamic modelling in the Milne Inlet Port area to determine the potential impacts arising from disturbance to sediments including re-suspension and subsequent transport and deposition of sediment. The modelling results shall be used to update the marine water and sediment quality monitoring and mitigation program to include activities associated with the construction and operation of the Milne Inlet Port. The monitoring program shall include an ongoing assessment of the potential introduction of metals that bio-accumulate in the marine food chain.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Mary River Project – FEIS (Baffinland, 2012) Mary River Project – Addendum to the FEIS (Baffinland, 2013a) 2017 MEEMP and AIS Monitoring Program Report (Golder, 2018b) TDS #20 - Hydrodynamic Modelling Report - Milne Port (Golder, 2018d) 2018 MEEMP and AIS Monitoring Program Report (Golder, 2019a) 2020 Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) 2019 MEEMP and AIS Monitoring Program (Golder, 2020a) Draft 2020 MEEMP and AIS Monitoring Program (Golder, 2021a) Environmental Protection Plan (Baffinland, 2016b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

#### METHODS

In the FEIS (Baffinland, 2012) and the FEIS Addendum for the ERP (Baffinland, 2013a), it was predicted that installation of the existing ore dock would have minimal effect on local sediment transport and that Project operations were not likely to result in significant adverse effects on water or sediment quality. These impact predictions were used to inform the current MEEMP sampling design (2014 through to 2020) including the selection of sample locations and analytical parameters. To meet the overall objective of assessing and monitoring for potential sediment redistribution associated with Milne Port-related activities, in addition to assessing the potential introduction of metals, Baffinland has implemented the following study components:

#### **Hydrodynamic Modelling:**

In 2018, Golder conducted hydrodynamic and sediment transport modelling at the head of Milne Inlet near Milne Port to support the Phase 2 Proposal (Golder, 2018b). This included an assessment of the potential changes in

currents, waves, and sediment transport from the existing ore dock configuration to the proposed Phase 2 ore dock expansion. Results indicated little to no change in current, wave, and sediment transport conditions seaward from the existing ore dock configuration to the proposed Phase 2 ore dock expansion for areas seaward and outside the direct vicinity of the ore dock. The largest changes in current, wave, and sediment transport conditions were observed in the areas behind the proposed Phase 2 ore dock expansion which would be isolated from the rest of Milne Inlet.

No additional hydrodynamic modelling was undertaken in 2020.

***Review of Hydrology and Geomorphology of Phillips Creek:***

In 2019, Golder conducted a background review of hydrology and geomorphology in Phillips Creek estuary to better understand fluvial processes and whether observed changes in sediment conditions along the West Transect stem from underlying natural or Project-related causes (Golder, 2020a). This included a literature review of Arctic hydrology and sediment regime, analysis of historical air photographs of Phillips Creek estuary and delta, and a review of collected Milne Inlet sediment data from 2014 to 2017. Results suggest that Phillips Creek Delta is a dynamic environment that migrates because of Phillips Creek sediment deposition and coastal processes and the size of sediment that is deposited by Phillips Creek on the delta will change from year to year due to annual variability in sediment load, coastal forcing, and other natural processes. It is suggested that the position of the West Transect from Milne Port Ore Dock towards the Phillips Creek delta means the sediment data may demonstrate large spatial and temporal variabilities. This suggests the measured 2014 to 2017 samples along the West Transect are within the expected range of natural variability.

***MEEMP:***

Baffinland's monitoring efforts at Milne Port include an ongoing assessment of potential Project-related introductions of metals to the marine environment that would have the potential to bio-accumulate in the marine food chain. The 2020 MEEMP (Year 6 of the Program) included marine water and sediment quality sampling, as well as various levels of biological sampling including fish tissue collection for analysis of metals (body burden). The marine water quality monitoring program was designed to monitor for potential changes to water quality due to site drainage discharge (including iron ore stockpile run-off) to the marine environment at Milne Port. Water quality samples were analyzed for a variety of parameters that included total and dissolved metals, screening against CCME Water Quality Guidelines (WQG) where applicable.

Consistent with previous years, the sampling design for the 2020 marine sediment program was based on a radial gradient pattern originating at the Milne ore dock. The radial pattern is designed to detect potential Project-related effects based on a gradient of key components with numerical indicators (e.g., marine sediment quality), with increasing distance from the point source (ore dock and effluent discharge). From the point source, stations are established along the distance gradient which allows for changes to be assessed spatially. In 2020, the physical and chemical composition of marine sediments was analyzed for samples collected from a total of 60 stations, as well as at two additional non-transect stations included for consistency to previous MEEMP programs. In general, concentrations of metals were determined to be less than applicable sediment quality guidelines, with few exceptions. Sediment samples were analyzed for a variety of parameters including particle size, organic carbon, nutrients, metals, and hydrocarbons, to assess the potential for environmental effects from the Project. Measured concentrations were screened against the CCME Interim Sediment Quality Guidelines (ISQGs) and Probable Effect Level (PEL) guidelines for sediment.

In order to assess for the potential introduction of metals that bio-accumulate in the marine food chain, incidental fish mortalities (arctic char) are retained each year for analysis of metal concentrations in tissue (body burden). Targeted captures of resident Fourhorn Sculpin and shellfish species *Hiatella arctica* tissue for body burden were added to the MEEMP in 2020 and 2018, respectively, in the event migratory species (arctic char) were sampled in insufficient numbers to adequately support statistical analyses. Mercury concentrations in fish and *Hiatella* muscle tissue were compared to the Canadian Food Inspection Agency (CFIA) commercial guideline of 0.5 milligrams per kilogram wet weight (mg/kg ww) and the British Columbia Ministry of Environment and Climate Change Strategy (BC MOE) fish tissue guidelines for selenium.

Detailed information on study design and sampling methodology is available in the Draft 2020 Annual Report for the MEEMP and AIS Monitoring Program (Golder, 2021a), which has been released to the Working Group for review and comment.

## RESULTS

### ***Hydrodynamic Modelling:***

Not applicable in 2020.

### ***Review of Hydrology and Geomorphology of Phillips Creek:***

Not applicable in 2020.

### ***MEEMP:***

Results from marine water and sediment quality sampling and fish toxicological analyses are presented in the Draft 2020 MEEMP and NIS/AIS Monitoring Report (Golder, 2021a), with a brief summary provided below.

Concentrations of water quality parameters including major ions, nutrients, metals, hydrocarbons, and polycyclic aromatic hydrocarbons (PAH), were less than applicable CCME WQGs (CCME, 2014) in the marine environment downstream of Site drainage and treated effluent discharge sites. For some metals, where total concentrations were detected, dissolved concentrations were below detection and so they were mostly present in particulate form (i.e., aluminum, chromium, iron, nickel, tellurium, and zinc). Iron concentrations in water samples collected in 2020 remained within the range measured in previous years. Hydrocarbons, PAHs, and fecal coliform bacteria were not detected.

Analysis of the physical and chemical composition of marine sediments determined that, in general, concentrations of metals, volatile organic compounds, hydrocarbons, and PAH were less than applicable sediment quality guidelines, with few exceptions. No significant change in marine sediment quality has been observed between survey years at Milne Port. Sediment quality monitoring undertaken to date suggests that the construction and operation of Milne Port does not appear to have negatively affected sediment quality in Milne Inlet.

In 2020, no organic parameters measured in sediments sampled during the 2020 sediment program exceeded sediment quality guidelines. Sediment volatile organic compounds (VOCs), extractable petroleum hydrocarbons, and PAHs were, with few exceptions, determined to be less than their respective analytical detection limits. The infrequent instances where a VOC was detected was limited to three compounds and the measured concentrations were considered to be low and close to detection limits. Similar to previous MEEMP years, VOCs and hydrocarbons have been largely below detection in marine sediments at Milne Port, with only sporadic detected low concentrations that have rarely been above conservative guidelines. Prior to Baffinland shipping operations in Milne

Inlet, shipping activities in Milne Inlet occurred periodically during the summer season. During baseline data collection (pre- Project shipping), some organic parameters were detected in sediments within the Milne Port area, including: oil and grease, naphthalene, hydrocarbons C10-16 and C16-C34, and toluene. These baseline data suggest that detectable or low concentrations of hydrocarbons or VOCs were present in Milne Port sediments prior to the Project, similar to what has been measured in sediments collected under the MEEMP since 2014. This information addresses NIRB's recent recommendation in its 2019/2020 Annual Monitoring Report that Baffinland provide a summary of the measured 'concentrations of benzene, toluene, and PAHs in Milne Port, and discuss their possible origin in the marine sediments of the northern transect and describe what strategies are in place and/or under development to prevent any negative effects to benthic macroinvertebrate and sediment communities'. As there is currently no evidence of Project-related increases in either hydrocarbons (e.g., benzene and toluene) or PAHs in Milne Port including along the northern transect, there is no requirement or need at this time to develop mitigation or management measures that aim to prevent or minimize adverse effects on marine benthic communities from these sources.

Concentrations of metals in fish and *Hiatella arctica* tissue analyzed for body burden in 2020 were generally consistent with available data reported in previous years. Significant differences were observed for some metals between 2018 and 2020. For arctic char, the differences were small and within the range of variability observed since 2010. Baseline data were not available for Fourhorn Sculpin or *Hiatella arctica*; however, differences between 2018 and 2020 were small and appeared to reflect natural variability. No samples (i.e., arctic char, sculpin or *H. arctica*) exceeded the CFIA commercial consumption guideline of 0.5 mg/kg wwT mercury or BC MOE guidelines for selenium of 4 mg/kg dry weight for selenium.

## TRENDS

### **Hydrodynamic Modelling:**

Not applicable.

### **Review of Hydrology and Geomorphology of Phillips Creek:**

Not applicable.

### **MEEMP:**

Collectively, marine water quality monitoring undertaken to date indicates that the construction and operation of Milne Port does not appear to have negatively affected marine water quality in Milne Inlet, as the reported analytical results for water quality parameters measured in 2020 were below applicable CCME WQG, or were generally within range of conditions observed in previous MEEMP surveys (2015 to 2019). With respect to iron, which is of primary concern for the Project, laboratory analyses have not revealed a trend of increased concentrations between 2014 and 2020. Monitoring results remain within original FEIS predictions, which forecasted no significant residual effects on water quality but indicated the potential for minor localized increases in TSS, nutrient, metal, and hydrocarbon concentrations.

For marine sediments, no clear long-term trends have been established with respect to sediment accumulation or iron concentrations in the marine receiving environment. Relative composition of fine sediment and metal concentrations in the sediments show no significant effect of distance from the ore dock and between monitoring years. Monitoring results remain within original FEIS predictions, which forecasted no significant residual effects on marine sediment quality but indicated the potential for minor localized increases in nutrient, metal, or hydrocarbon

concentrations. In 2020, no organic parameters measured in marine sediments sampled during the 2020 MEEMP program exceeded marine sediment quality guidelines. Sediment volatile organic compounds, extractable petroleum hydrocarbons, and PAHs were, with few exceptions, determined to be less than their respective analytical detection limits, similar to previous MEEMP years.

Marine sediment data collected to date does not suggest an accumulation of hydrocarbons or VOCs in Milne Port sediments within the study area due to the Project. Baseline data for Milne Port sediments suggest that detectable or low concentrations of hydrocarbons or VOCs were present prior to the Project. Baffinland notes that it operates under various management plans, including the Environmental Protection Plan (Baffinland, 2016b), which includes a description of potential pathways of effects through which hydrocarbons may enter water bodies and the types of mitigation measures that have been developed to avoid/reduce this risk. Similarly, the Marine Environmental Effects Monitoring Plan (Baffinland, 2020m); e.g., in Sections 3.1 and 3.2.2) also describes potential pathways of effects leading to increases in hydrocarbons, based on predicted effects to the marine environment as identified through the environmental assessment process.

Variance in metal concentrations has been observed in arctic char tissues since baseline years, and samples collected in 2020 were generally within range of measured values reported since 2010. Noting the difficulty in making direct comparisons due to differing detection limits, iron concentrations in arctic char tissue appear to be decreasing over time, as baseline data collected from arctic char in 2010 exhibited greater concentrations of iron than have been observed in recent years. For *H. arctica* and Fourhorn Sculpin, metal concentrations were largely comparable to recent survey years, however statistically significant differences were observed for some metal concentrations compared to concentrations in 2018. Differences were small and inconsistent and are assumed to reflect natural variability in the bioavailability and subsequent uptake of metals. However, data are not available prior to 2018 in order to conclusively determine if the increase is within the natural variance.

Monitoring of marine sediment quality within the study area will continue in 2020 to continue to evaluate the noted variability and the potential for Project-related effects.

## **RECOMMENDATIONS / LESSONS LEARNED**

### ***Hydrodynamic Modelling:***

Not applicable.

### ***Review of Hydrology and Geomorphology of Phillips Creek:***

Not applicable.

### ***MEEMP:***

All marine water quality samples collected in 2020 were below the applicable WQG for all tested parameters, including iron, and were within the range of previous survey years. Temporal and spatial variability were generally low among water samples collected in 2020. Marine water quality sampling should be repeated in 2021 following the same procedures outlined in the Draft MEEMP Annual Monitoring Report (Golder, 2021a).

The successful implementation of the fully expanded marine sediment sampling program in 2020 indicated that the Project has not significantly impacted local marine sediment quality in 2020 or years previous. Evidence for this conclusion is validated from the continued measurement of key sediment parameters that are shown to be below applicable guidelines, and/or are reflective of naturally occurring background conditions. No long-term trends of

changes in iron concentrations in marine sediments have been observed and the 2020 MEEMP demonstrated that the distribution of fine sediment (which closely correlates with concentrations of sediment metals) in Milne Inlet is not influenced by Project activities but, rather by natural coastal processes. Sediment monitoring to date suggests that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not adversely affected marine sediment within the Milne Inlet study area. It is recommended that monitoring of marine sediment quality within the study area should continue, but is not required annually, commensurate with the low magnitude and localized effects of the Project on sediment quality within Milne Inlet.

Body burden analysis is recommended to continue for incidental fish mortalities and targeted species. Fourhorn Sculpin, arctic char and *H. arctica* remain recommended sentinel species for body burden analysis.

As the MEEMP evolves and additional data become available for analyses, the design and approach to analyses will be continuously revisited to optimize the statistical power for detecting change.

## Project Certificate Condition No. 84

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To prevent sediment redistribution along the shipping route
Term or Condition	The Proponent shall update its sediment redistribution modeling once ship design has been completed and sampling should be undertaken to validate the model and to inform sampling sites and the monitoring plan.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Not Active
Status of Compliance	Not Applicable
Stakeholder Review	None
Reference	Mary River Project – FEIS (Baffinland, 2012) Mary River Project – Phase 2 Proposal - TSD No. 22 - Ship Wake and Propeller Wash Assessment (Golder, 2018c)
Ref. Document Link	N/A

### METHODS

Baffinland understands that the intent of this condition was to address concerns related to potential ship-induced sediment redistribution from propeller wash and ship wake effects for shipping operations using purpose-built vessels for use along the Southern Shipping Route (i.e., Steensby Port). Ship wake effects on shorelines along the Southern Shipping Route were assessed in Appendix 8D-2 for the FEIS (Baffinland, 2012) and along the Northern Shipping Route in Appendix 8D-2 for the FEIS (Baffinland, 2012) and TSD No. 22 (Golder, 2018c). Additionally, propeller wash effects on sediment redistribution in direct vicinity of the proposed Phase 2 ore dock were assessed in TSD No. 22 (Golder, 2018c). Given that the Southern Shipping Route of the Project is not active, and Baffinland has not constructed or utilized any built-for-purpose vessels, the designation is considered Not Applicable to the Northern Shipping Route shipping operations.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 85

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To prevent sediment redistribution along the shipping route.
Term or Condition	The Proponent shall develop a monitoring plan to verify its impact predictions associated with sediment redistribution resulting from propeller wash in shallow water locations along the shipping route. If monitoring detects negative impacts from sediment redistribution, additional mitigation measures will need to be developed and implemented.
Relevant Baffinland Commitment	84
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Not Active
Status of Compliance	Not Applicable
Stakeholder Review	None
Reference	Mary River Project – Phase 2 Proposal - TSD No. 22 - Ship Wake and Propeller Wash Assessment (Golder, 2018c)
Ref. Document Link	N/A

### METHODS

Baffinland understands that the intent of this condition was to address concerns related to potential ship and/or tug propeller wash effects in shallow-water areas along the Southern Shipping Route. Propeller wash effects on sediment redistribution in the direct vicinity of the proposed Phase 2 ore dock were assessed in TSD No. 22 (Golder, 2018c). Given that the Southern Shipping Route of the Project is not active, and Baffinland has not constructed or utilized any built-for-purpose vessels, the designation is considered Not Applicable to the Northern Shipping Route shipping operations.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will develop a monitoring plan to verify predictions of sediment redistribution resulting from propeller wash in shallow locations along the Southern Shipping Route if and/or when ore carriers are commissioned for the Southern Shipping Route.



## Project Certificate Condition No. 86

Category	Marine Environment - Ballast Water
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To update ballast water discharge impact predictions.
Term or Condition	Prior to commercial shipping of iron ore, the Proponent shall use more detailed bathymetry collected from Steensby Inlet and Milne Inlet to model the anticipated ballast water discharges from ore carriers. The results from this modeling shall be used to update ballast water discharge impact predictions and should account for density dependent flow and annual timescales over the project life. Additional sampling should also be undertaken to validate the model and to inform sampling sites and the monitoring plan.
Relevant Baffinland Commitment	85
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	<p>Oceanographic Data Processing – Baffinland Ballast Water Study, Milne Inlet 2014-15 (ASL, 2015)</p> <p>Ocean Circulation and Ballast Water Dispersal in Milne Inlet, Baffin Island (CORI, 2014)</p> <p>Data Report for the 2015-2016 Observational Oceanography Program in Milne Inlet (CORI, 2016)</p> <p>Tide Gauge Collection at Milne Port During 2017 Open-water Season (Golder, 2018a)</p> <p>TDS 18 - Ballast Water Dispersion Modelling Report (Golder, 2018e)</p> <p>2015 MEEMP Report (SEM, 2016a)</p> <p>2016 MEEEMP and AIS Monitoring Report (SEM, 2017a)</p> <p>2017 MEEMP and AIS Monitoring Report (Golder, 2018b)</p> <p>2018 MEEMP and AIS Monitoring Report (Golder, 2019a)</p> <p>Ballast Water Model Validation Report (Golder, 2019d)</p> <p>Response to DFO Ballast Water Modelling Concerns (Golder, 2020e)</p> <p>Ballast Water Dispersion Sensitivity Simulations (Golder, 2019e)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Ballast water dispersion modelling was initially undertaken in 2014 by Coastal and Ocean Resources Inc. (CORI) on behalf of Baffinland prior to the start of commercial shipping of iron ore at Milne Port (CORI 2014; 2016). Oceanographic data collected in the model region, including Conductivity-Temperature-Depth (CTD) data, ocean current data (via deployment of Acoustic Doppler Current Profilers or ADCPs), hydrology data, atmospheric data, and bathymetric data, were used to determine basic ocean conditions and to prepare gridded fields for the initial and boundary conditions for the model. The model was validated using ADCP and CTD data collected in Milne Inlet

in 2014. Modelling results were used to inform sampling sites for Baffinland's AIS monitoring program in 2015 and 2016.

In 2018, Golder was retained to perform updated ballast water dispersion modelling in Milne Inlet. The Ballast Water Dispersion Modelling Report for the Phase 2 Proposal was included as a Technical Supporting Document (TSD) No. 18; Golder, 2018e) in Baffinland's FEIS Addendum for the Phase 2 Proposal (Baffinland, 2018b). A three-dimensional hydrodynamic model was developed in the MIKE3 suite to assess the discharge of ballast water in Milne Inlet. This included modelling of ballast water discharges under the present Project (Early Revenue Phase), as well as under Phase 2 operations. The model was calibrated and validated to oceanographic data collected in the model region in 2014 by CORI (CORI, 2014). This included CTD data, ocean current data (via deployment of ADCPs), hydrology data, atmospheric data, and bathymetric data. However, data near Milne Port was not available.

In 2019, in response to comments from NIRB, the QIA, DFO and Parks Canada, Golder validated the ballast water dispersion model to observed 2018 oceanographic data and updated the model with improved wind data, estimates of discharge from Phillips Creek, and more spatially resolved heat-flux inputs. This involved running the ballast water dispersion model for the 2018 open-water season with measured 2018 ballast water discharge volumes, temperature, and salinity. Golder also assessed the sensitivity of ballast water dispersion to variations in ballast water salinity and temperature through six model sensitivity simulations (Golder, 2019d; 2020e). Additionally, Golder developed a box model analysis to assess the potential increase and/or decrease in temperature and salinity in distinct water masses due to ballast water discharge at the end of the 2018 open water season.

No additional ballast water modelling was undertaken in 2020.

Additional oceanographic data were collected in Milne Inlet, specifically near Milne Port in 2018, 2019, and 2020 as follows:

- Oceanographic data (ocean currents and CTD measurements) were collected by Golder in 2018, 2019, and 2020 (Golder, 2019a; 2020a) for the purpose of providing ocean current, water level and CTD data needed to validate the improved ballast water model. Oceanographic data was collected near Milne Port and Bruce Head in 2018 and 2019, and in Milne Port only in 2020. The 2020 oceanographic data has not been processed or analyzed; this dataset will be archived for potential future ballast water model validation, if and when needed.

In addition, the following oceanographic data have been collected to address other NIRB Conditions and assist with ballast water dispersion model validation:

- Water level data were collected at a tide gauge installed at the Milne Port ore dock by Golder between 2017 and 2020 (Golder, 2018d; 2019a; 2020a).
- CTD data has been collected annually as part of the MEEMP between 2014 and 2019 (SEM, 2016a; 2017a; Golder, 2018b; 2019a; 2020a).

## RESULTS

Results of the updated modelling undertaken indicate that under a worst-case scenario the furthest distance a single molecule of ballast water discharged at Milne Port could travel up Milne Inlet is near Ragged Island. Accordingly, Baffinland has focused its 2020 AIS/NIS monitoring program at sampling locations near Milne Port as well as established AIS/NIS sampling locations at Ragged Island.

**TRENDS**

In 2020, a total of 67 species were reported that had not been identified previously at Milne Port during baseline, MEEMP and NIS/AIS sampling. An analysis of the available literature and species databases indicated that most of the newly identified taxa had known ranges that include Arctic waters or had unknown northern limits with ranges that could extend to Arctic waters. Specimens from eight taxa were sent to secondary laboratories for independent review, including three species that were first identified in 2019, were re-identified in 2020 samples and sent for re-evaluation and two specimens sent for DNA analysis. These results serve as evidence that this program is functioning as intended, and that no invasions of NIS/AIS taxa have occurred through Project-related vectors. There is no indication that further expansion of this program is required based on monitoring results to-date or updated ballast water modelling conducted.

**RECOMMENDATIONS / LESSONS LEARNED**

Not applicable.

## Project Certificate Condition No. 87

Category	Marine Environment - Ballast Water
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent invasive species introductions resulting from Project shipping.
Term or Condition	The Proponent shall develop a detailed monitoring program at a number of sites over the long term to evaluate changes to marine habitat and organisms and to monitor for non-native introductions resulting from Project-related shipping. This program needs to be able to detect changes that may have biological consequences and should be initiated several years prior to any ballast water discharge into Steensby Inlet and Milne Inlet to collect sufficient baseline data and should continue over the life of the Project.
Relevant Baffinland Commitment	85
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	2015 AIS Monitoring Report (SEM, 2016b) 2016 MEEEMP and AIS Monitoring Report (SEM, 2017a) 2016 Milne Ore Dock Fish Offset Monitoring Report (SEM, 2017b) 2018 MEEMP and AIS Monitoring Report (Golder, 2019a) 2019 MEEMP and AIS Monitoring Report (Golder, 2020a) Draft 2020 MEEMP and NIS/AIS Monitoring Report (Golder, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland's Non-Indigenous Species and Aquatic Invasive Species (NIS/AIS) Monitoring Program was developed in 2015 as part of the MEEMP to detect potential NIS/AIS introduced to Milne Inlet via high-risk Project related vectors such as ballast water discharges or hull biofouling. NIS/AIS surveys targeted lower trophic levels, including zooplankton, benthic infauna, epifauna and fish, using direct sampling methods in addition to considering all species observed during the MEEMP and NIS/AIS surveys.

All newly observed taxa were checked for NIS/AIS status through a detailed literature review of species descriptions and collection records to determine their documented and presumed ranges. All taxa were compared against various databases of known and flagged NIS/AIS. Any taxa flagged as potential NIS/AIS or with uncertainties in their ranges were sent to a DFO-endorsed Benthic Ecology Lab at Université Laval (Quebec) for independent verification of the taxonomic identification. Due to closures related to the COVID-19 Pandemic, independent review was not completed for all flagged specimens in 2019, as discussed in the 2020 report (Golder, 2021a). In 2020, the Canadian Centre for DNA Barcoding at the University of Guelph was added as a secondary independent verification lab for identification of species through DNA analysis.

Detailed information on study design and sampling methodology is available in the annual monitoring reports for the MEEMP and NIS/AIS monitoring programs (SEM, 2016a, 2017a; Golder, 2018b, 2019a, 2020a, 2021a).

## RESULTS

Detailed results of the 2020 NIS/AIS Monitoring Program are presented in the Draft 2020 MEEMP and NIS/AIS Monitoring Report (Golder, 2021a), with a summary provided below.

The majority of identified taxa in benthic infauna samples collected at Milne Port and Ragged Island were not considered NIS or AIS. Out of 369 benthic invertebrate taxa identified during NIS/AIS sampling in 2020 at Milne Port and Ragged Island, eight (8) benthic taxa were sent for independent verification of the taxonomic identification, which included three (3) taxa that had also been flagged in 2019. While two of the newly identified taxa (*Hesperonoe* sp. and *Amphitrite birulai*) do not have clear records of occurrence in the Canadian Arctic, neither are listed on AIS databases; accordingly, these two taxa are considered “Low Risk” and have been placed on a ‘Watchlist’. Additionally, 2020 benthic samples included three taxa (*Pseudofabricia aberrans*, *Sosane wireni* and *Marenzelleria viridis*) that had been flagged in previous years due to a range uncertainties or presence on AIS databases. Once again, these specimens were sent to Université Laval for independent verification and remain on the Watchlist as Low Risk (*P. aberrans* and *S. wireni*) and High Risk taxa (*M. viridis*). Additional specimens of *P. aberrans* were also sent for DNA verification by the Canadian Centre for DNA Barcoding at the University of Guelph; however, results are not yet available.

Eight macroflora, benthic epifauna, and zooplankton taxa that had not been identified previously in surveys at Milne Port were captured in 2020 surveys. All newly observed taxa have described ranges that include the Canadian Arctic and none are listed on AIS databases, and therefore are not considered to be of concern for Milne Inlet.

Presence of an NIS fish taxa, the Pacific Sandlance (*Ammodytes hexapterus*), was confirmed through genetic analysis; however, scientific literature indicates this is a range expansion induced by climate change (Falardeau et al., 2017) rather than a Project-related introduction via vectors such as biofouling and ballast water.

Underwater video surveys of three (3) ore carriers indicated that the ship hulls had extensive biofouling (i.e., growth) compared to observations in previous years. Indeterminate barnacles were the most common biofouling taxa on all three vessels, along with indeterminate calcareous tube worms and an indeterminate filamentous taxon. The taxonomic resolution of biofouling organisms did not improve in the third year of monitoring, despite the inclusion of a high-resolution camera. Many taxa were not resolved to species level due to the difficulty of identification without a specimen.

Overall, the identification and flagging of individual taxa out of the hundreds identified in Milne Inlet indicate the NIS/AIS surveillance program is effective and functioning as intended.

## TRENDS

Six (6) years of monitoring during Project operations has yielded a comprehensive inventory of marine organisms residing in Milne Port and Milne Inlet. Further investigations into the status of several new species identified during the NIS/AIS program are in progress in consultation with DFO and other external experts, with representative specimens sent to secondary laboratories for confirmatory taxonomic and DNA analysis. Additional years of monitoring will provide for a more comprehensive NIS/AIS database to serve as a basis for determining whether changes are occurring as a result of Project-related activities.

**RECOMMENDATIONS / LESSONS LEARNED**

NIS/AIS results will continue to be presented to the MEWG on an annual basis, and adjustments to the programs will be made as needed.

## Project Certificate Condition No. 88

Category	Marine Environment - Ballast Water
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent invasive species introductions resulting from Project shipping.
Term or Condition	<p>Prior to commercial shipping of iron ore and in conjunction with the Marine Environment Working Group, the Proponent shall provide an updated risk analysis regarding ballast water discharge to assess the adequacy of treatment and implications on the receiving environment. This risk analysis shall consider, but not be limited to:</p> <ol style="list-style-type: none"> <li>Invasive species</li> <li>Seasonal oceanography</li> <li>Ballast water quality and quantity</li> <li>Receiving water quality;</li> <li>Residual physical, chemical, and/or biological effects; and</li> <li>Any risk assessment analysis regarding ballast water exchange and treatment efficacy in arctic waters</li> </ol>
Relevant Baffinland Commitment	85, 86
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Work Group (MEWG)
Reference	<p>Risk assessment for ship-mediated introductions of aquatic nonindigenous species to the Canadian Arctic (Chan et al., 2012)</p> <p>Mary River Project - Addendum to the FEIS. June 2013 (Baffinland, 2013a)</p> <p>Risk Assessment for Potential Introduction of Aquatic Nonindigenous Species through Ballast Water Discharge at Milne Port (SEM, 2013)</p> <p>International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (Convention; IMO 2017)</p> <p>Ballast Water Control and Management Regulations (SOR/2011-237) (Transport Canada, 2020)</p> <p>Ballast Water Management Plan (Baffinland, 2019c)</p> <p>Draft 2020 MEEMP NIS/AIS Report (Golder, 2021a)</p> <p>2019 MEWG Meeting Records</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

In order to establish the relative risk of introduction of AIS through ballast water exchange and ship hull biofouling, the Milne Port activities associated with the ERP were subjected to a semi-quantitative risk assessment using methods developed by DFO (Chan et al., 2012). The results, as presented in Appendix 8B-4 in the ERP Addendum to the FEIS (Baffinland, 2013), indicated that the risk of AIS introductions at Milne Port due to ERP shipping operations was low (Invasion Risk categorized as 'Lowest') based on the following combined risk rankings:

- Probability of Arrival = Highest

- Probability of Survival = Lower
- Probability of Introduction = Lower
- Magnitude of Consequence = Lowest

Under the 6 Mtpa scenario (PIP Extension Request), the number of yearly ballast water discharge events would increase from 53 (as assumed in Appendix 8B-4) to 84 vessels. This would increase the total volume of ballast water discharged per year in the marine environment from 662,000 tonnes to 1,025,000 tonnes. Following application of a correction factor (0.10) to estimate for propagule supply (Chan et al., 2012), the corrected volume of discharged ballast water (102,500 tonnes) under a 6 Mtpa scenario would end up resulting in the same probability and consequence rankings as those described above for 4.2 Mtpa, continuing to result in a low AIS invasion risk overall.

Ballast water exchange has been shown to be an effective method for preventing the introduction of AIS in Milne Inlet under current shipping volumes (5.45 Mtpa), which is substantially similar to the volume proposed in the Extension Application (6 Mtpa). While risks relating to NIS will continue to be low if the permitted 6 Mtpa is extended through 2020, Baffinland has recently committed for ore carriers to undertake both exchange and treatment (in that order, for vessels subject to the D-2 standard) prior to discharge. This commitment serves to further address any the potential risks for AIS introductions to the marine environment from ballast water discharges under a 6 Mtpa scenario.

In addition to federally-mandated ballast water regulations, Baffinland, as part of its Ballast Water Management Plan (Baffinland, 2019c) exceeds federal ballast water regulatory requirements by voluntarily conducting ballast water compliance monitoring in one randomly sampled ballast tank on all ore carriers arriving at Milne Port prior to ballast water discharge as a part of its compulsory ship inspections to verify their compliance with the Ballast Water Control and Management Regulations and International Maritime Organization's (IMO's) D-1 standards.

In 2019, the ballast water simulation was re-run for the 2018 shipping season (mid-July to mid-October) using 2018 oceanographic data for comparison and direct observations of ballast water as input. This allowed a second comparison of the model with direct measurements; this time with measurements near Milne Port and near Bruce Head and actual ballast water measurements as input.

## RESULTS

Under the 6 Mtpa scenario (PIP Extension Request), the number of yearly ballast water discharge events would increase from 53 (as assumed in Appendix 8B-4) to 84 vessels. This would increase the total volume of ballast water discharged per year in the marine environment from 662,000 tonnes to 1,025,000 tonnes. Following application of a correction factor (0.10) to estimate for propagule supply (Chan et al., 2012), the corrected volume of discharged ballast water (102,500 tonnes) under a 6 Mtpa scenario would end up resulting in the same probability and consequence rankings as those described above for 4.2 Mtpa, continuing to result in a low AIS invasion risk overall.

In 2020, 18 of the 36 ore carriers (50%) that serviced Milne Port had IMO-approved D-2 ballast water treatment systems installed onboard. All of the vessels with a D-2 system on board completed an exchange in addition to treating their ballast water prior to discharge at Milne Port. This included the Admiral Schmidt, Despina V, Flag Mette, Gebe Oldendorff, Georg Oldendorff, Gisela Oldendorff, Golden Opal, Golden Ruby, Kumpula, Nordic Oasis, Nordic Odin, Nordic Olympic, Nordic Oshima, NS Energy, NS Yakutia, Rio Grita, Rio Tamara, and Vitus Bering. As most of these vessels conducted repeat voyages to Milne Port during the 2020 shipping season, this resulted in 42 of the



72 ore carrier voyages having completed both ballast water exchange and treatment methods prior to releasing their ballast water in the RSA (i.e., representing 50% of all ore carriers that called to Port and 58% of all voyages in 2020).

NIS/AIS monitoring in 2020 identified nine (9) taxa flagged for further review/investigation due to uncertainties in each species' natural range and known biological distribution. This included re-identification of *Marenzelleria viridis*, a spionid polychaete listed in the National Risk Assessment as a species of concern for Canadian and Arctic waters, with a primary invasion vector through ballast water. However, there is substantive biogeographic evidence that this species was present in Arctic waters prior to Project-related shipping operations and that the accepted geographic range on record may be incomplete. Further review is ongoing to determine NIS/AIS status for this species and the other taxa flagged in 2020. More information is presented in the response to PC Condition No. 87, and in the Draft 2020 MEEMP and NIS/AIS Monitoring report (Golder, 2021a), which has been released to the Working Group for review and comment.

Ballast water concentrations are low to undetectable within a short distance of the discharge location. Ballast water has little to no impact on the temperature and salinity of the waters in Milne Inlet. Even near the discharge location, the change in temperature and salinity caused by ballast water is negligible and generally not measurable. This is in part due to the small ballast water volume to ambient water volume ratio and in part due to the similarity between physical characteristics of ballast water and ambient water in Milne Inlet.

Even by arbitrarily increasing or decreasing temperature by 110% and salinity by 17%, which is more than would be expected in reality, the model continued to show that natural temperature and salinity conditions would not be affected. Note that 2018 measurements show ballast water had an average salinity of 33 Practical Salinity Unit (PSU).

#### **TRENDS**

Six (6) years of NIS/AIS monitoring has yielded a relatively large dataset of marine organisms residing in Milne Port and Milne Inlet. Further investigations into the status of several new species identified during the 2020 NIS/AIS program are in progress in consultation with DFO and other external experts, with representative specimens sent to a second laboratory for confirmatory taxonomic analysis.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Ongoing annual NIS/AIS monitoring will add to the current AIS dataset for determining whether changes are occurring as a result of Project-related activities that could have biological consequences on marine ecosystem health in Milne Inlet. NIS/AIS results will continue to be presented to the MEWG on an annual basis, and adjustments to the programs will be made as needed.

Baffinland has also recently committed to collaborate with DFO to develop a risk-based approach for ballast water sampling with the pilot program starting in 2021 (if there are no impeding boarding restrictions associated with the COVID-19 Pandemic).

## Project Certificate Condition No. 89

Category	Marine Environment - Ballast Water
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine water quality resulting from ballast water exchange.
Term or Condition	The Proponent shall develop and implement an effective ballast water management program that may include the treatment and monitoring of ballast water discharges in a manner consistent with applicable regulations and/or exceed those regulations if they are determined to be ineffective for providing the desired and predicted results. The ballast water management program shall include, without limitation, a provision that requires ship owners to test their ballast water to confirm that it meets the salinity requirements of the applicable regulations prior to discharge at the Milne Port, and a requirement noting that the Proponent, in choosing shipping contractors will, whenever feasible, give preference to contractors that use ballast water treatment in addition to ballast water exchange.
Relevant Baffinland Commitment	57,87
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Transport Canada, Marine Environmental Working Group (MEWG)
Reference	Ballast Water Management Plan (BWM; Baffinland, 2019c) International Convention for the Control and Management of Ships' Ballast Water and Sediments (IMO, 2017) Discussion paper: Canadian implementation of the ballast water convention (Transport Canada, 2012)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> <a href="http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-(BWM).aspx">http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-(BWM).aspx</a>

### METHODS

In response to the threat of the introduction and spread on non-native species through ballast water, the International Maritime Organization (IMO) adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments (i.e., the BWM Convention). The BWM Convention was ratified and entered into force on 8 September 2017. Under the BWM Convention, all ships are required to have an International Ballast Water Management Certificate, their own Ballast Water Management Plan (BWMP), and a comprehensive record of ballast water exchange and monitoring results recorded in an on-board ballast water record book (with a detailed record of when ballast water is taken on board, when it is circulated or treated for BWM purposes, and when it is discharged into the ocean). Ships also need to record accidental or other exceptional discharges of ballast water to the marine environment.

The BWM Convention includes two performance standards for the discharge of ballast water: D-1 and D-2. The D-1 standard concerns ballast water exchange, which must be undertaken within open ocean areas, defined as waters >200 nautical miles from land and in seas >2,000 m deep. The D-2 standard covers approved ballast water treatment systems. All ships entering Canadian waters must currently meet the D-1 standard. The D-2 standard will come into force over a phased time period depending on each ship's date of construction and the timing of its International Oil Pollution Prevention (IOPP) certificate renewal survey, which is required every five years. All new build ships must meet the D-2 (treatment) standard after entry into force (8 September, 2017). For existing ships, the BWM Convention requires that either the D-1 (exchange) or D-2 (treatment) standard is met after entry into force (8 September, 2017). However, as ballast water exchange (D-1) is not considered an ideal method of ballast water management, the BWM Convention requires compliance with D-2 (treatment) upon a ship's first IOPP Certificate renewal survey occurring after 8 September 2017.

The D-2 standard (treatment) specifies a maximum number of organisms and indicator microbes that are allowed to be discharged to the receiving marine environment according to the schedule set by the IMO. At this point in time, sampling and analysis methodologies to test for compliance with the D-2 standard have not been fully developed by the IMO yet. It is acknowledged in the IMO guidelines that although significant technical advances and refinements have been made in this area since the adoption of the Convention, there are still numerous issues to be resolved. Administrations are still undertaking research to define the most appropriate methods to test for compliance, and the best way to collect, handle and analyze samples. However, it is expected that in due course, appropriate guidance will become available once full compliance testing regimes are developed and the applicable regulators have had time to gain experience and develop best practice in ballast water sampling and analyses.

Baffinland has developed a comprehensive, stand-alone BWMP that is reflective of its current (ERP) and future shipping operations under the Phase 2 Proposal (Baffinland, 2019c). The BWMP includes information on applicable legislation, BWMP program objectives, monitoring responsibilities, sampling equipment specifications, detailed technical procedures for sampling and analyses, comprehensive QA/QC procedures, and adaptive management measures for implementation during non-compliance events. The BWMP identifies procedures to manage and monitor ship ballast water in a manner consistent with applicable regulations, guidelines, and terms and conditions of the Project Certificate. The BWMP includes a Standard Operating Procedure (SOP) which provides detailed instructions for salinity testing of ballast water tank on carriers calling at Milne Port, including directives for accessing on-board ballast tanks, selecting ballast tanks for testing, equipment set-up and deployment, detailed sampling and data entry procedures, guidance on instrument calibration, maintenance, and storage, and reporting requirements.

As a matter of due diligence, Baffinland, as stipulated in its Ballast Water Management Plan (Baffinland, 2019c), conducts voluntary ballast water sampling in one randomly selected ballast water tank on all ore carriers arriving at Milne Port prior to ballast water discharge to verify their compliance with the Regulations and the IMO's D-1 standard.

In 2020, all bulk carriers that called at Milne Port during the shipping season were boarded by a Baffinland representative trained in the procedure detailed in the BWMP, that conducted salinity testing of the ship's ballast water before it was approved for release in Milne Port and before loading of the carrier could begin. In these instances, a single ballast tank on the vessel was tested for salinity concentration using a calibrated water quality meter (i.e., YSI Pro 30) to confirm that ballast water salinity levels were above 30 ‰ (parts per thousand), prior to being authorized by the port captain to discharge in Milne Port. Salinity levels were consistent with mid-ocean

exchange requirements for vessels conducting a transoceanic voyage (salinity of mid-Atlantic seawater, where open-water exchange takes place, is typically in the range of 34-35‰).

It is important to note that the ship operators/owners are the responsible party for ensuring their ships are compliant with federal ballast water regulations and the BWM Convention. To facilitate the administration of ballast water management and treatment procedures on board each bulk carrier, a responsible officer is designated to ensure the maintenance of appropriate records and to ensure that ballast water management and/or treatment procedures are followed, recorded, and reported in accordance with the regulations. There are no specific legal obligations on the part of port and harbour authorities in relation to overseeing ballast water management or treatment procedures on behalf of the ship owner/operators, including for testing of ballast water or reporting ballast water readings to the federal authority. Baffinland's voluntary measure of testing a ballast water tank on each bulk carrier to confirm that salinity is at least 30 ‰ prior to discharge in the RSA, represents a level of monitoring that exceeds all federal (Transport Canada) and international (IMO) regulatory requirements related to ballast water management, and surpasses management practices currently implemented at any marine port in Canada.

## RESULTS

In 2020, 18 of the 36 ore carriers (50%) that serviced Milne Port had IMO-approved D-2 ballast water treatment systems installed onboard. This included the Admiral Schmidt, Despina V, Flag Mette, Gebe Oldendorff, Georg Oldendorff, Gisela Oldendorff, Golden Opal, Golden Ruby, Kumpula, Nordic Oasis, Nordic Odin, Nordic Olympic, Nordic Oshima, NS Energy, NS Yakutia, Rio Grita, Rio Tamara, and Vitus Bering. As most of these vessels conducted repeat voyages to Milne Port during the 2020 shipping season, this resulted in 42 of the 72 ore carrier voyages having completed both ballast water exchange and treatment methods prior to releasing their ballast water in the RSA (i.e., representing 50% of all ore carriers that called to Milne Port and 58% of all voyages in 2020).

All bulk carriers servicing Milne Port, including those during the 2020 shipping season, conducted mid-ocean ballast water exchange as required by federal Ballast Water Control and Management Regulations (D-1 standard). Vessels with D-2 treatment systems completed both a ballast water exchange and treatment prior to releasing ballast waters.

Ballast water salinity was measured in all ore carriers (n=72) that called to Milne Port in 2020. Results are presented in Table 4.24. Salinity measurements for most carriers ranged between 30.2‰ to 35.6‰, which was compliant with federal Ballast Water Regulations (>30.0‰). One exception occurred on September 5, 2020 where ballast water tested on the Rio Grita measured 29.6‰. Baffinland confirmed that the Port of Origin for this vessel was Port Alfred, Quebec, Canada and that the ballast water could be discharged in Milne Port as the vessel was coming directly from another Canadian Port located within the Canadian Exclusive Economic Zone (i.e., it did not arrive at Milne Port directly from international waters).

**Table 4.24: 2020 Ship Ballast Water Salinity Test Results Prior to Discharge in Milne Port**

Vessel	Date	Salinity (‰)	Tank Tested
Nordic Oasis Voyage 1 <sup>D-2</sup>	July 22, 2020	35.0	WBT No. 5/6 PS
Nordic Oshima Voyage 1 <sup>D-2</sup>	July 22, 2020	34.5	WBCH4
Nordic Olympic Voyage 1 <sup>D-2</sup>	July 24, 2020	33.8	WBT No. 1 PS
Nordic Odyssey Voyage 1	July 24, 2020	34.1	WBCH4

Vessel	Date	Salinity (‰)	Tank Tested
Admiral Schmidt Voyage 1 <sup>D-2</sup>	July 26, 2020	34.6	WBCH4
Nordic Odin Voyage 1 <sup>D-2</sup>	July 26, 2020	34.2	WBCH4
Vitus Bering Voyage 1 <sup>D-2</sup>	July 28, 2020	32.9	WBCH4
Gisela Oldendorff Voyage 1 <sup>D-2</sup>	July 28, 2020	32.8	WBCH4
NS Yakutia Voyage 1 <sup>D-2</sup>	July 30, 2020	32.0	WBT No. 5 STBD
Golden Brilliant Voyage 1	July 30, 2020	32.2	WBT No. 4 PS
Rio Tamara Voyage 1 <sup>D-2</sup>	August 1, 2020	30.3	WBT No 5. STBD
Golden Ruby Voyage 1 <sup>D-2</sup>	August 1, 2020	31.9	WBT No. 4 PS
Pabal Voyage 1	August 2, 2020	33.1	WBT No. 5 PS
Gebe Oldendorff Voyage 1 <sup>D-2</sup>	August 3, 2020	33.6	WBCH4
Flag Mette Voyage 1 <sup>D-2</sup>	August 4, 2020	33.0	WBT No. 4 PS
Nordic Orion Voyage 1	August 4, 2020	31.7	WBCH4
Sagar Samrat Voyage 1	August 5, 2020	31.6	#4CH
Golden Opportunity Voyage 1	August 6, 2020	30.5	4 Port
Pabur Voyage 1	August 7, 2020	33.5	WBT5/6P
Golden Saguenay Voyage 1	August 11, 2020	31.7	3TSWBT PORT MANHOLE
NS Energy Voyage 1 <sup>D-2</sup>	August 12, 2020	34.2	TSBD 3P/S
Golden Bull Voyage 1	August 12, 2020	32.9	3 Port
Golden Ice Voyage 1	August 13, 2020	33.2	DB/TS 3P
Golden Opal Voyage 1 <sup>D-2</sup>	August 15, 2020	32.7	DBT#3 Port
Nordic Oasis Voyage 2 <sup>D-2</sup>	August 16, 2020	33.7	#4CH
Sea Pluto Voyage 1	August 17, 2020	35.6	DBT#3 Port
Nordic Oshima Voyage 2 <sup>D-2</sup>	August 20, 2020	32.9	WB CH. No. 4
George Oldendorff Voyage 1 <sup>D-2</sup>	August 20, 2020	33.4	WBCHNo.4
Nordic Odyssey Voyage 2	August 21, 2020	32.8	WBCHNo.4
Vitus Bering Voyage 2 <sup>D-2</sup>	August 21, 2020	31.4	WBTNo.3 Port
Admiral Schmidt Voyage 2 <sup>D-2</sup>	August 23, 2020	32.3	3 STB WBT
Nordic Odin Voyage 2 <sup>D-2</sup>	August 23, 2020	32.3	#4 CH
NS Yakutia Voyage 2 <sup>D-2</sup>	August 25, 2020	31.7	WB No.3 Port
Rio Tamara Voyage 2 <sup>D-2</sup>	August 26, 2020	32.2	3 Port WBT
Golden Ruby Voyage 2 <sup>D-2</sup>	August 27, 2020	31.9	WBT No. 4 PS
Golden Brilliant Voyage 2	August 28, 2020	30.2	WBT No. 3 PS
Nordic Olympic Voyage 2 <sup>D-2</sup>	August 29, 2020	32.5	WBT No. 3 PS
Flag Mette Voyage 2 <sup>D-2</sup>	August 31, 2020	33.4	WBT No. 3 PS
Bulk Destiny Voyage 1	August 30, 2020	30.9	WBT No. 4 PS
Despina V Voyage 1 <sup>D-2</sup>	September 1, 2020	32.9	WBT No. 3 PS
Nordic Orion Voyage 2	September 2, 2020	31.1	WB CH. No. 4
AM Quebec Voyage 1	September 4, 2020	32.4	WBT No. 3 PS

Vessel	Date	Salinity (‰)	Tank Tested
Rio Grita Voyage 1 <sup>D-2</sup>	September 5, 2020	29.6*	WBT No. 2/3 PS
Sagar Samrat Voyage 2	September 6, 2020	34.6	No. 4 CH
Sea Express Voyage 1	September 7, 2020	34.0	DB 4S
Golden Amber Voyage 1	September 8, 2020	33.2	WBT No 3. PS
Golden Rose Voyage 1	September 9, 2020	31.0	WBT No. 3 PS
Golden Diamond Voyage 1	September 9, 2020	32.1	TS DB 3 Port
Nordic Oasis Voyage 3 <sup>D-2</sup>	September 11, 2020	34.2	No. 4 CH
Pabur Voyage 2	September 12, 2020	33.9	WBT No. 3 PS
NS Energy Voyage 2 <sup>D-2</sup>	September 13, 2020	33.1	TS DB 3 PS
Gisela Oldendorff Voyage 2 <sup>D-2</sup>	September 14, 2020	34.8	No. 4 CH
Golden Opportunity Voyage 2	September 15, 2020	33.6	WBT No. 5 PS
Sea Neptune Voyage 1	September 16, 2020	32.6	TS PS No. 3
Golden Saguenay Voyage 2	September 17, 2020	32.1	DB/TS 4P
Golden Ice Voyage 2	September 19, 2020	30.8	DB/TS 3P
Golden Opal Voyage 2 <sup>D-2</sup>	September 20, 2020	34.2	DB TS 3P
Rio Tamara Voyage 3 <sup>D-2</sup>	September 22, 2020	33.5	WBT No. 2 PS
Golden Ruby Voyage 3 <sup>D-2</sup>	September 24, 2020	33.5	TS/DB 3 Port MH
Nordic Oshima Voyage 3 <sup>D-2</sup>	September 24, 2020	33.7	DB/TS 2/3 Port
Kumpula Voyage 1 <sup>D-2</sup>	September 25, 2020	34.0	WBT No. 2 PS
Nordic Odin Voyage 3 <sup>D-2</sup>	September 26, 2020	33.2	WBT No. 2/3 PS
Vitus Bering Voyage 3 <sup>D-2</sup>	September 27, 2020	33.1	WBT No. 2 PS
Nordic Odyssey Voyage 3	September 28, 2020	32.7	No. 4 CH
Golden Bull Voyage 2	September 29, 2020	32.8	DB/TS 4S
Golden Brilliant Voyage 3	October 1, 2020	31.7	#3 Port DB/TS
Admiral Schmidt Voyage 3 <sup>D-2</sup>	October 1, 2020	32.5	3 Port
NS Yakutia Voyage 3 <sup>D-2</sup>	October 2, 2020	31.7	3 P/S
Nordic Orion Voyage 3	October 4, 2020	31.5	2/3 Port
Nordic Olympic Voyage 3 <sup>D-2</sup>	October 6, 2020	30.9	WBT2/3 P
NS Energy Voyage 3 <sup>D-2</sup>	October 10, 2020	31.4	#3 Port
Nordic Oasis Voyage 4 <sup>D-2</sup>	October 10, 2020	31.9	CH#4

**Notes:**

\* Rio Grita originated from a port within Canadian waters and was not required to exchange prior to arrival at Milne Port under the D-1 standard (and did not exchange on this occasion on a voluntary basis).

<sup>D-2</sup> Vessels that called to Milne Port that had an IMO-approved ballast water treatment system installed, and that undertook both ballast water exchange and treatment in the RSA prior to releasing ballast water.

**TRENDS**

All ships arriving at Milne Port in 2020 were compliant with the D-1 standard of the BWM Convention. An increase in the number of vessels calling to Milne Port with the approved D-2 treatment systems installed onboard occurred

since 2019 (58% of carrier voyages compared to 26% in 2019). Actions implemented to date based on compliance monitoring data indicate that the current ballast water management measures, as outlined in Baffinland's BWMP, are shown to be effective in protecting the marine environment.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to implement and, as necessary, update the BWMP to maintain compliance with Canadian and international ballast water regulations.

## Project Certificate Condition No. 90

Category	Marine Environment - Ballast Water
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to marine water quality resulting from ballast water exchange.
Term or Condition	The Proponent shall incorporate into its Shipping and Marine Mammal 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 Canadian Ballast Water and Control Regulations as may be amended from time to time.
Relevant Baffinland Commitment	57
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Transport Canada, Marine Environment Working Group (MEWG)
Reference	Ballast Water Management Plan (Baffinland, 2019c) Shipping and Marine Wildlife Management Plan (Baffinland, 2020k). Ballast Water Control and Management Regulations (SOR/2011-237) (Transport Canada, 2020)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland's stand-alone Ballast Water Management Plan (BWMP, Baffinland 2019c), which is one component of Baffinland's overall Shipping and Marine Wildlife Management Plan (SMWMP; Baffinland, 2020k) describes Baffinland's commitment and steps taken to verify that vessels calling at Milne Port meet the legal requirements for ballast water management, including IMO Ballast Water Convention Regulation D-1, and Section 6(1) of the Canadian Ballast Water Control and Management Regulations under the *Canada Shipping Act* (SOR/2011-237; Transport Canada, 2020). The Milne Port BWMP includes voluntary on-board inspection of ship logs by a Baffinland representative to re-confirm mid-ocean ballast water exchange has occurred, and on-board testing of ballast water in a single random tank for each ship calling at Milne Port to verify that it meets the regulation for salinity (at least 30 ppt) prior to discharge. Baffinland has implemented these procedures, which exceed federally mandated regulations, to further mitigate potential impacts from Project-related activities.

In addition to federally-mandated ballast water regulations, Baffinland, as part of its BWMP (Baffinland, 2019c) exceeds federal ballast water regulatory requirements by voluntarily conducting ballast water compliance monitoring in one randomly sampled ballast tank on all ore carriers arriving at Milne Port prior to ballast water discharge as a part of its compulsory ship inspections to verify their compliance with the Ballast Water Control and Management Regulations and IMO's D-1 standards and requires ore carriers that are D-2 compliant to undertake both exchange and treatment (in that order, for vessels subject to the D-2 standard) prior to discharge.



## RESULTS

In 2020, 18 of the 36 ore carriers (50%) that serviced Milne Port had IMO-approved D-2 ballast water treatment systems installed onboard. This included the Admiral Schmidt, Despina V, Flag Mette, Gebe Oldendorff, Georg Oldendorff, Gisela Oldendorff, Golden Opal, Golden Ruby, Kumpula, Nordic Oasis, Nordic Odin, Nordic Olympic, Nordic Oshima, NS Energy, NS Yakutia, Rio Grita, Rio Tamara, and Vitus Bering. As most of these vessels conducted repeat voyages to Milne Port during the 2020 shipping season, this resulted in 42 of the 72 ore carrier voyages having completed both ballast water exchange and treatment methods prior to releasing their ballast water in the RSA (i.e., representing 50% of all ore carriers that called to Port and 58% of all voyages in 2020).

Ballast water salinity was measured in all ore carriers (n=72) that called to Milne Port in 2020. Results are presented in Table 4.2424 (PC Condition No. 89). Salinity measurements for most carriers ranged between 30.2‰ to 35.6‰, which was compliant with federal Ballast Water Regulations (>30.0‰). One exception occurred on September 5, 2020 where ballast water tested on the Rio Grita measured 29.6‰. Baffinland confirmed that the Port of Origin for this vessel was Port Alfred, Quebec, Canada and that the ballast water could be discharged in Milne Port as the vessel was coming directly from another Canadian Port located within the Canadian Exclusive Economic Zone (EEZ; i.e., it did not arrive at Milne Port directly from international waters).

## TRENDS

Not applicable.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to implement and, as necessary, update the BWMP to maintain compliance with Canadian and international regulations. With Canada's ratification of the International Convention for the Control and Management of Ships' Ballast Water and Sediments (IMO, 2017) that entered into force on September 8, 2017, ships are required to incorporate on-board ballast water treatment to meet D-2 performance standards. Newly built ships must immediately meet the D-2 standard, while requirements for existing ships will be phased over a period up to 2024 in coordination with the renewal of each ship's International Oil Pollution Prevention Certificate (IOPPC). Until then, all ships will continue ballast water exchange outside the Canadian EEZ.

## Project Certificate Condition No. 91

Category	Marine Environment - Ballast Water
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to marine water quality in Steensby Inlet and Milne Inlet.
Term or Condition	The Proponent shall develop a detailed monitoring plan for Steensby Inlet and Milne Inlet for fouling that complies with all applicable regulatory requirements and guidelines as issued by Transport Canada, and includes sampling areas on ships where antifouling treatment is not applied such as the areas where non-native species are most likely to occur.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Transport Canada, Marine Environmental Working Group (MEWG)
Reference	Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) Draft 2020 MEEMP and AIS Monitoring Report (Golder, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Mitigation for hull fouling is implemented for all vessels calling on Milne Inlet and for all international vessels. As outlined in the Shipping and Marine Wildlife Management Plan (SMWMP, Baffinland, 2020k), 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 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
- 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.

To specifically address the monitoring requirement outlined in PC Condition No. 91, Baffinland developed a detailed ship full biofouling monitoring plan in 2018 as part of its Draft 2020 MEEMP and AIS Monitoring Program (Golder, 2021a). 2020 represented the third consecutive year of monitoring of ship hull biofouling at Milne Port. Detailed information on study design and sampling methodology is available in the annual monitoring report for the MEEMP and NIS/AIS Monitoring Program (Golder, 2021a).

As outlined in the update for PC Conditions No. 76 and 87, in addition to ship hull monitoring, multi-trophic NIS/AIS monitoring (zooplankton, macroflora, benthic epifauna and infauna, and fish) has been conducted every shipping season in Milne Port and at Ragged Island (2020 inclusive) since 2014. AIS surveys conducted as part of the MEEMP are designed to detect potential NIS/AIS introductions primarily from ship ballast water releases but also from ship hull fouling.

## RESULTS

Detailed results of the ship hull surveys are presented in the Draft 2020 MEEMP and NIS/AIS Monitoring Report (Golder, 2021a) which has been released to the Working Group for review and comment, with a summary provided below.

As shown in Table 4.25, a total of three (3) ROV surveys were conducted alongside three (3) ore carriers, one docked and two at anchorage in Milne Port between July 31 and August 2, 2020 (this included the *Golden Brilliant*, *Pabal*, and *Golden Ruby*).

Overall, biofouling on vessels was higher than observed in previous years, with fouling observed below the waterline on all areas surveyed on each vessel. The taxonomic resolution of biofouling organisms did not improve in the third year of monitoring, despite the inclusion of a high-resolution camera and better lighting system. Many taxa were not resolved to species level due to the difficulty of identification of encrusting taxa without a specimen. Due to the safety considerations with respect to diver access on the ore carriers, specimen collection was not possible.

## TRENDS

In contrast to surveys in 2018 and 2019, the underwater video ship hull surveys of the five (5) ore carriers showed that most of the hull areas inspected had high levels of biofouling rather than being limited to small areas on the sterns as seen in the two previous years. Barnacles (unidentifiable to species) were the most commonly observed biofouling taxa.

Six (6) years of NIS/AIS monitoring has yielded a relatively large dataset of marine organisms residing in Milne Port and Milne Inlet. Based on the level of NIS/AIS monitoring completed to date, several organisms have been flagged as potential NIS/AIS organisms in Milne Port, demonstrating that the NIS/AIS Monitoring Program is working effectively as a surveillance-based monitoring program for early detection of NIS/AIS. Further investigations into the status of these newly identified species are in progress in consultation with DFO, with representative specimens sent to a second laboratory for confirmatory taxonomic analysis. Additional years of NIS/AIS monitoring will provide for a more comprehensive NIS/AIS database to serve as a basis for determining whether changes are occurring as a result of Project-related activities.

**Table 4.25: Ship Hull Biofouling Monitoring Effort in 2020**

Date	Carrier	Location of Survey	Maximum Depth (m)	Survey Effort (h:min:sec)	Evidence of Biofouling
31 July	<i>Golden Brilliant</i>	Starboard Stern	-6	0:35:22	Barnacles observed on the rudder; Unidentified calcareous tube worms observed on the draft marks, rudder, propeller grooves and bolts, side of the hull, and water intake port; Unidentified biofouling organisms observed on the side of the hull
2 August	<i>Pabal</i>	Port Bow to Port Stern	-4.4	1:36:00	Barnacles observed on the bow hull and on the propeller bolts; Unidentified calcareous tube worms observed on the bow hull; Unidentified biofouling organisms observed on the side of the hull; Unidentified filamentous taxa observed on the side of the hull
2 August	<i>Golden Ruby</i>	Starboard Bow to Starboard Stern	-8.8	0:41:36	Barnacles observed on the side of the hull from bow to stern and around the propeller; Unidentified filamentous taxa observed on the hull adjacent to the propeller

#### RECOMMENDATIONS / LESSONS LEARNED

As part of Baffinland's commitments to DFO associated with the Phase 2 Proposal, starting in 2021, Baffinland will confirm that vessels are adhering to IMO International Guidelines for Biofouling Management (and any associated updates to these Guidelines) by including adherence to these Guidelines as a requirement in vessel procurement contracts. Specifically, the following commitments have been made by Baffinland for implementation starting in 2021.

- Baffinland will include in its contracts with ship owners a requirement to follow IMO Guidelines for Biofouling Management
- Baffinland will require each vessel to maintain a Biofouling Management Plan and Biofouling Record Book consistent with Appendix 1 and 2 of the IMO Guidelines
- Baffinland will provide a copy of the management plans and record books for each vessel in its Annual Report to the MEWG.

To the best of our knowledge, Milne Port is the only marine port in Canadian Waters that currently undertakes annual ship hull biofouling monitoring as part of its operations. Baffinland remains committed to conducting ship hull biofouling monitoring surveys on a yearly basis using the best available technology for remote data collection. The projected number of ore carriers that will be sampled annually will be determined in consultation with the MEWG.

## Project Certificate Condition No. 92

Category	Marine Environment - Spill Prevention
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure adequate spill response capacity.
Term or Condition	The Proponent shall ensure that it maintains the necessary equipment and trained personnel to respond to all sizes of potential spills associated with the Project in a self-sufficient manner.
Relevant Baffinland Commitment	10, 108, 110
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Emergency Response Plan (Baffinland, 2020f) Spill Contingency Plan (Baffinland, 2021h) Oil Pollution Emergency Plan – Milne Inlet (Baffinland, 2020i) Spill at Sea Response Plan (Baffinland, 2015b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland has developed and maintained appropriate contingency plans to respond to spills on land, at Milne port, and at sea. The plans outline the equipment to be used in the event of a spill, as well as the roles and responsibilities and training necessary to maintain appropriately trained personnel. Oil Pollution Emergency Response training and spill response exercises are conducted annually. Timing of the training corresponds with ship-to-shore fuel transfer events at Milne Port. In 2020, training of Baffinland staff on its Oil Pollution Prevention Plan (OPPP) and Oil Pollution Emergency Plan (OPEP) was conducted by spill response consultant Navenco Marine on July 11 to 19, 2020. The training encompassed classroom and hands-on spill response techniques including a mock exercise for potential port oil spills during ship-to-shore transfer. The training also included an audit to confirm that Baffinland's spill response equipment and training requirements were in compliance with the OPEP and Transport Canada regulations for Baffinland's Class 2 Oil Handling Facility. General land-based spill response training is periodically reviewed with the Mine Rescue Team; however, this does not apply to the OPEP. Baffinland also maintains a contract with Oil Spill Response Ltd. (OSRL) for emergency response in the event of a marine spill.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Annual spill response training will be continued prior to the arrival of fuel vessels and unloading of fuels.

### Project Certificate Condition No. 93

Category	Marine Environment - Spill Prevention
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to the marine environment at Steensby Inlet.
Term or Condition	Prior to construction, based on vessel selection and if so required, the Proponent shall reassess the risk analysis of using vessel-based fuel storage, including the potential environmental impacts of containment failure under a range of winter ice conditions, how a spill might spread and the impact of fuel if it does not volatilize to the atmosphere.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby - Not Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

Not Applicable. The use of vessel-based fuel storage is not currently proposed.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 94

Category	Marine Environment - Spill Prevention
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To promote public awareness of Project activities.
Term or Condition	The Proponent shall consult directly with affected communities regarding its plans for over-wintering of fuel in Steensby Inlet, with discussion topics to include descriptions of the duration of proposed activities, vessel type, spill preparedness and emergency response protocols, environmental impact predictions and answers to community member questions.
Relevant Baffinland Commitment	106
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby - Not Active
Status of Compliance	Not Applicable
Stakeholder Review	Communities of Sanirajak and Igloolik
Reference	N/A
Ref. Document Link	N/A

### METHODS

Not Applicable in 2020. Overwintering of fuel in Steensby Inlet is not currently proposed.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

This condition will be re-visited if overwintering of fuel at Steensby Inlet is proposed.



## Project Certificate Condition No. 95

Category	Marine Environment - Spill Prevention
Responsible Parties	The Proponent, Transport Canada
Project Phase(s)	Construction
Objective	To prevent impacts to the marine environment at Steensby Inlet.
Term or Condition	The Proponent shall meet or exceed all regulatory regulations and requirements as apply to the practice of overwintering a fuel vessel at Steensby Inlet, with reporting to the NIRB and Transport Canada.
Relevant Baffinland Commitment	8
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby - Not Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

Not Applicable in 2020. Overwintering of fuel in Steensby Inlet is not currently proposed.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

This condition will be re-visited if overwintering of fuel in Steensby Inlet is proposed.

## Project Certificate Condition No. 96

Category	Marine Environment - Spill Prevention
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To ensure adequate oversight of Project activities is occurring.
Term or Condition	The Proponent will update the NIRB on the results of all compliance monitoring and site inspections undertaken by government agencies for the overwintering of a fuel vessel in Steensby Inlet.
Relevant Baffinland Commitment	8
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby - Not Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

Not Applicable in 2020. Overwintering of fuel in Steensby Inlet is not currently proposed.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

This condition will be revisited if overwintering of fuel in Steensby Inlet is proposed.

## Project Certificate Condition No. 97

Category	Marine Environment - Spill Prevention
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to the marine environment along the shipping route.
Term or Condition	<p>Prior to the commercial shipping of iron ore, the Proponent shall conduct fuel spill dispersion modeling that will, at a minimum, consider:</p> <ol style="list-style-type: none"> <li>a. Modeling of oil spills for both the Northern and Southern Shipping Routes, in representative locations, identified by the Proponent, in consultation with the Marine Environment Working Group along both Shipping Routes, and including:           <ol style="list-style-type: none"> <li>i. Pinch points;</li> <li>iii. The approaches into Steensby Inlet and Milne Inlet;</li> <li>iv. Shallow water and shorelines; and,</li> <li>v. Areas that have been identified as having high flows and/or high concentrations of marine mammals, marine fish or seabirds.</li> </ol> </li> <li>b. Open water and, where applicable, ice-covered conditions           <ol style="list-style-type: none"> <li>i. Spill volumes up to and including loss of a full tanker cargo</li> <li>vi. Differences in the quantity and properties of each type of bulk fuel transported by vessels when they are at, or in transit to, the ports at Steensby Inlet and Milne Inlet</li> </ol> </li> </ol>
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Transport Canada Marine Safety. Canadian Coast Guard
Reference	<p>Milne Inlet Spill Modelling Report Fuel Spill Modelling: Northern Shipping Route Open Water Season – Milne Inlet, Eclipse Sound, Pond Inlet (AMEC Foster Wheeler, 2015)</p> <p>Spill at Sea Response Plan (Baffinland, 2015c)</p> <p>Emergency Response Plan (ERP; Baffinland, 2020f)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Revised oil spill modelling was conducted for shipping from Milne Port in 2015. Leading up to this modelling, a fuel spill preparedness workshop was held in April 2014 with Transport Canada and the Canadian Coast Guard. This workshop established the following credible spill scenarios for modelling:

- For arctic diesel - two (2) compartments of a double-hull, multi-compartment fuel tanker, which amounts to 4,000 m<sup>3</sup> (4 mL). The expected maximum size of the fuel tanker is 15 mL.
- For IFO - half of the Intermediate Fuel Oil (IFO) fuel remaining in the ship when sailing into Milne Inlet which amounts to 2,000 m<sup>3</sup> (2 mL) of IFO.

The spill assessment considered the open water season, and the month of September was selected as representative in terms of meteorological and oceanographic conditions. Five potential spill locations along the shipping route were selected considering community recommendations.

Two (2) scenarios were modelled at each of the five (5) locations using the software OST, which computes spill probability distributions to indicate geographical regions (e.g., Pond Inlet, Eclipse Sound, Navy Board Inlet and Milne Inlet) which might be affected as a result of a spill, how frequently and how soon.

In addition, ten (10) (two fuel types x five locations) simulations were run with a September 'P50' wind condition defined as the average wind speed conditions and the associated most frequent wind direction. Finally, a sensitivity run considering a full fuel tanker loss of 15 mL arctic diesel cargo at a location in Eclipse Sound was also prepared. For these scenarios, RPS ASA's OILMAP was used to provide additional estimation of spill weathering and fate. This includes slick characteristics, estimate of fuel concentrations in the surface layer, amounts evaporated and that have reached shore, and remaining amounts of fuel, and fuel and water (mousse) volume. The spill modelling completed in this study assumes no intervention, response or containment and that the slick is assumed to freely discharge (during a very short duration) from the damaged vessel.

The OILMAP oil spill model and response system introduced above was used to provide additional estimates of spilled fuel fate, in particular, slick characteristics and weathering. OILMAP calculates the evaporation, dispersion and remaining percentage for a given spill scenario where the user defines a fuel product type, weather conditions, properties of the receiving water, and the amount of fuel released.

The fate or weathering processes considered were; evaporation, the conversion of liquid fuel into gaseous component; and natural dispersion, the breakup of a fuel slick into small droplets that are mixed into the sea by wave action. These are two important weathering processes that typically occur over the first five days following a spill and act to remove fuel from the sea surface. Fuel will also be brought to shore depending on the prevailing currents and winds at the time as well as the type and amount of fuel, and type of shoreline. Consideration of the amounts lost due to these processes yields an estimate of the remaining amount of fuel on the surface at any time. These are the key fates modeled and tracked by OILMAP. No containment or recovery of spilled fuel was assumed in the simulations.

## **RESULTS**

The modelling results from the 2015 report were presented in a series of figures showing expected spill trajectories after 1 day and 5 days. The spill model informed the development of Baffinland's Spill at Sea Response Plan (Baffinland, 2015c).

## **TRENDS**

Not applicable.

## **RECOMMENDATIONS / LESSONS LEARNED**

The spill modelling results highlight the importance of spill prevention, the Oil Pollution Prevention Plan and the Spill at Sea Response Plan preparedness to minimize any adverse effects in the unlikely event of a fuel release of any size during vessel traffic into Milne Inlet.

Management plans, including the Spill at Sea Response Plan (Baffinland, 2015c) and the Emergency Response Plan (Baffinland, 2020f) are being updated as part of the Phase 2 Proposal Environmental Impact Statement (EIS)

regulatory process to incorporate the updated fuel spill dispersion modelling that was completed in support of the Phase 2 Proposal. Versions of the aforementioned management plans that are currently operational will remain in effect until anticipated approval of the Phase 2 Proposal is received. The OPPP and OPEP for ship to shore fuel transfers at Milne Port are updated on an annual basis and approved by Transport Canada.

## Project Certificate Condition No. 98

Category	Marine Environment - Spill Prevention
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to the marine environment along the shipping route.
Term or Condition	The Proponent shall incorporate the results of revised fuel spill dispersion modeling into its impact predictions for the marine environment and its spill response and emergency preparedness plans.
Relevant Baffinland Commitment	11, 106
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Transport Canada Marine Safety, Canadian Coast Guard
Reference	Milne Inlet Spill Modelling Report Fuel Spill Modelling: Northern Shipping Route Open Water Season – Milne Inlet, Eclipse Sound, Pond Inlet (AMEC Foster Wheeler, 2015) Spill at Sea Response Plan (Baffinland, 2015c) Emergency Response Plan (ERP; Baffinland, 2020f)
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### METHODS

Revised oil spill modelling was conducted for shipping from Milne Port in 2015. Leading up to this modelling, a fuel spill preparedness workshop was held in April 2014 with Transport Canada and the Canadian Coast Guard. This workshop established the following credible spill scenarios for modelling:

- For arctic diesel - two (2) compartments of a double-hull, multi-compartment fuel tanker, which amounts to 4,000 m<sup>3</sup> (4 mL). The expected maximum size of the fuel tanker is 15 mL.
- For IFO - half of the IFO fuel remaining in the ship when sailing into Milne Inlet which amounts to 2,000 m<sup>3</sup> (2 mL) of IFO.

The spill assessment considered the open water season, and the month of September was selected as representative in terms of meteorological and oceanographic conditions. Five potential spill locations along the shipping route were selected considering community recommendations.

Two (2) scenarios were modelled at each of the five (5) locations using the software OST, which computes spill probability distributions to indicate geographical regions (e.g., Pond Inlet, Eclipse Sound, Navy Board Inlet and Milne Inlet) which might be affected as a result of a spill, how frequently and how soon.

In addition, ten (10) (two fuel types by five locations) simulations were run with a September 'P50' wind condition defined as the average wind speed conditions and the associated most frequent wind direction. Finally, a sensitivity run considering a full fuel tanker loss of 15 mL arctic diesel cargo at a location in Eclipse Sound was also prepared. For these scenarios, RPS ASA's OILMAP was used to provide additional estimation of spill weathering and fate. This

includes slick characteristics, estimate of fuel concentrations in the surface layer, amounts evaporated and that have reached shore, and remaining amounts of fuel, and fuel and water (mousse) volume. The spill modelling completed in this study assumes no intervention, response or containment and that the slick is assumed to freely discharge (during a very short duration) from the damaged vessel.

The OILMAP oil spill model and response system introduced above was used to provide additional estimates of spilled fuel fate, in particular, slick characteristics and weathering. OILMAP calculates the evaporation, dispersion and remaining percentage for a given spill scenario where the user defines a fuel product type, weather conditions, properties of the receiving water, and the amount of fuel released.

The fate or weathering processes considered were evaporation, the conversion of liquid fuel into gaseous component, and natural dispersion, the breakup of a fuel slick into small droplets that are mixed into the sea by wave action. These are two important weathering processes that typically occur over the first five days following a spill and act to remove fuel from the sea surface. Fuel will also be brought to shore depending on the prevailing currents and winds at the time as well as the type and amount of fuel, and type of shoreline. Consideration of the amounts lost due to these processes yields an estimate of the remaining amount of fuel on the surface at any time. These are the key fates modeled and tracked by OILMAP. No containment or recovery of spilled fuel was assumed in the simulations.

## **RESULTS**

The modelling results from the 2015 report were presented in a series of figures showing expected spill trajectories after 1 day and 5 days. The spill model informed the development of Baffinland's Spill at Sea Response Plan (Baffinland, 2015c).

## **TRENDS**

Not applicable.

## **RECOMMENDATIONS / LESSONS LEARNED**

The spill modelling results highlight the importance of spill prevention, the Oil Pollution Prevention Plan and the Spill at Sea Response Plan preparedness to minimize any adverse effects in the unlikely event of a fuel release of any size during vessel traffic into Milne Inlet.

Management plans, including the Spill at Sea Response Plan (Baffinland, 2015c) and the Emergency Response Plan (Baffinland, 2020f) are being updated as part of the Phase 2 EIS regulatory process to incorporate the updated fuel spill dispersion modelling that was completed in support of the Phase 2 Proposal. Versions of the aforementioned management plans that are currently operational will remain in effect until anticipated approval of the Phase 2 Proposal is received. The Oil Pollution Prevention Plan (OPPP) and Oil Pollution Emergency Plan (OPEP) for ship to shore fuel transfers at Milne Port are updated on an annual basis and approved by Transport Canada.

#### 4.6.11 Marine Wildlife (PC Conditions 99 through 128)

Thirty-one (31) PC conditions (including 125 and 125a) relate to the potential effects of the Project on marine wildlife. These conditions provide direction on mitigation and monitoring programs and identify shipping information to be communicated to potentially affected communities regarding shipping activities.

##### **Inuit & Stakeholder Feedback**

The potential effects of increased shipping on marine mammals (particularly narwhal, seal, bowhead) continues to be brought forward to Baffinland during community engagement sessions (Appendix B), through the MEWG (Appendix C) and by NIRB (Appendix E). Underwater noise from shipping and its potential impact on marine mammal migration and other disturbances (e.g., impacts to calving grounds, traditional shipping activities) has been consistently raised as key concerns. Additionally, throughout 2020, stakeholders raised concerns regarding the health of marine mammals with questions to Baffinland regarding how this is being addressed in the marine monitoring programs. Baffinland was also provided feedback from Inuit community members regarding the need for increased monitoring of ringed seal. Baffinland intends to address this through the implementation of a Ringed Seal monitoring program in 2021. Community members also provided feedback regarding vessels anchoring at Ragged Island and land use conflicts that are occurring as a result. In response, Baffinland conducted an alternatives analysis on different locations suggested by the MHTO. Unfortunately at present, Ragged Island remains the only viable anchorage locations along the Northern Shipping Route. To mitigate land use impacts, Baffinland will continue to make ship track information available to members of the public and will maintain its commitment to limit the number of Project vessels anchored at Ragged Island to a maximum of three vessels. Additionally, in response to feedback provided by the MHTO following the 2019 shipping season, in 2020, Baffinland made a slight modification to the nominal Shipping Route. Ultimately this resulted in vessels moving slightly eastward when passing Bruce Head where several hunting camps are located.

##### **Monitoring**

Throughout 2020, Baffinland once again implemented a robust suite of marine mammal monitoring programs designed to assess the noise of vessels relative to acoustic disturbance thresholds for marine mammals, the behavioural responses of narwhals when Project vessels were both absent and present and the relative abundance and distribution of marine mammals in the Project area. A list of the 2020 marine mammal monitoring programs is as follows:

- Ship-based Observer Monitoring Program – augmented by the Marine Mammal Observer Network Monitoring Program due to boarding restrictions associated with the COVID-19 Pandemic in 2020;
- Marine Mammal Aerial Surveys (Eclipse Sound and Admiralty Inlet);
- Bruce Head Shore-based Monitoring Program;
- Shoulder Season Passive Acoustic Monitoring Program;

In addition, Baffinland undertook the Marine Environmental Effects Monitoring Program (see Section 4.6.10 for more details) to assess how the Project, if at all, is affecting the quality of marine habitat which marine mammals rely on.

Table 4.26 provides an evaluation of the Project's impacts on the marine environment, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.



**Table 4.26: Marine Mammals Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Ringed Seals, Bearded Seals, Walrus, Beluga Whales, Narwhal, Bowhead Whales, Polar Bear	Habitat change resulting from icebreaking and/or ice management of landfast ice	There is no breaking of landfast ice associated with the current phase of the Project.	Not applicable in 2020
	Hearing impairment and/or damage caused by sound from construction activities	No constructions activities occurred at Milne Port in 2020 that would have the potential to cause hearing impairment.	Not Applicable in 2020.
		Multiple years of acoustic monitoring of shipping noise demonstrate that there is no potential for acoustic injury as a result of Project-related shipping.	Effects within FEIS predictions.
	Disturbance caused by airborne and/or underwater sound from construction, shipping and aircraft	<p>In 2020, there was a statistically significant decrease in the abundance of the Eclipse Sound narwhal stock in 2020 that requires further investigation. Potential contributing factors to the observed lower numbers of narwhal in the RSA during 2020 include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA. At present, it is understood that these may have acted independently, or in a cumulative or additive manner.</p> <p>Acoustic monitoring results and narwhal behavioural data (collected via the 2017-2018 Narwhal Tagging Study and the Bruce Head Shore-based Monitoring Program) available to date have demonstrated that shipping noise in the RSA is lower than predicted in the FEIS and that behavioural effects from shipping on narwhal are limited to low-level disturbance effects that are localized and temporary in nature. This indicates that current mitigation measures (e.g., 9 knot speed restriction, 40-km buffer area at entrance of RSA, limited transits during early shoulder season, etc.) are effective at managing Project incremental effects from shipping on narwhal in the RSA.</p>	<p>Potential contributing factors to the observed lower numbers of narwhal in the RSA during 2020 include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA. At present, it is understood that these may have acted independently, or in a cumulative or additive manner.</p> <p>Acoustic monitoring and behavioural observations of marine mammal response to shipping activities remain within FEIS predictions.</p>

Component	Effects	Monitoring Program	Impact Evaluation
Narwhal	Masking of environmental sounds caused by vessel and construction sound	Three (3) h underwater acoustic monitoring stations were deployed near Bruce Head, Ragged Island and Bylot Island in 2020. Acoustic monitoring results confirm that acoustic modelling undertaken for the Project was conservative.	Effects within FEIS predictions
Bowhead Whales	Mortality from collisions with vessels and blasting during construction	No collisions were noted by ship crew in 2020.	Effects within FEIS predictions
Polar Bears	Mortality from human-bear interactions	Polar bear monitors look for polar bears entering camps and remote work areas. No polar bear incidents occurred in 2020..	Effects within FEIS predictions

### Path Forward

Baffinland will remain vigilant about the mitigation and monitoring activities that are in place to protect marine mammals. Baffinland will continue to seek input and review monitoring results trends with Inuit community members and the MEWG. Reporting on each PC condition follows.

### Project Certificate Condition No. 99

Category	Marine Environment - Supplemental Baseline Assessments
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction
Objective	To supplement baseline information and improve predictions for potential impacts to marine wildlife.
Term or Condition	<p>The Proponent, working with the Marine Environment Working Group, shall consider and identify priorities for conducting the following supplemental baseline assessments:</p> <ol style="list-style-type: none"> <li>a. Establish shipping season, inter-annual baseline in Steensby Inlet and Milne Inlet that enables effective monitoring of physical and chemical effects of ballast water releases, sewage outfall, and bottom scour by ship props, particularly downslope and downstream from the docks. This shall include the selection and identification of physical, chemical, and biological community/indicator components. The biological indicators shall include both pelagic and benthic species but with emphasis on relatively sedentary benthic species (e.g., sculpins).</li> <li>b. The collection of additional baseline data:             <ol style="list-style-type: none"> <li>i. In Steensby Inlet on walrus, beluga, bearded seal anadromous arctic char abundance, distribution ecology and habitat use.</li> <li>ii. In Milne Inlet on narwhal, bowhead and anadromous arctic char abundance, distribution ecology and habitat use.</li> </ol> </li> <li>c. Enhance baseline data on marine wildlife (fish, invertebrates, birds, mammals, etc.) and to provide more details on species abundance and distribution found in the Project area. This shall include, but not be limited to the following:             <ol style="list-style-type: none"> <li>iii. Aerial surveys for basking ringed seals throughout the landfast ice of Steensby Inlet and at an appropriate control location</li> <li>iv. Shore-based observations of pre-Project narwhal and bowhead whale behavior in Milne Inlet that continues at an appropriate frequency throughout the Early Revenue Phase and for not less than three consecutive years</li> </ol> </li> <li>d. Enhance the baseline for affected freshwater systems, which includes control sites to detect Project-related changes before they cause significant harm.</li> </ol>
Relevant Baffinland Commitment	81
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Inlet – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Marine Environmental Effects Monitoring Plan. (MEEMP; Baffinland, 2020x)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

**METHODS**

This PC Condition applies to the pre-construction phase of the Project and completion of supplemental baseline assessments. The Project is currently in the Early Revenue Phase with the temporary Production Increase, and supplemental baseline assessments are now complete (pre-2020). These have been submitted to NIRB and are also available on Baffinland's Document Portal.

Current effort is focused on environmental effects monitoring (EEM) using a number of different EEM programs that focus on detection of potential Project effects on marine mammals and the marine environment. Detailed information on EEM study design and sampling methodology are available in Baffinland's Marine Environmental Effects Monitoring Plan (Baffinland, 2016c).

**RESULTS**

Not applicable.

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baseline information for Steensby Inlet will be updated prior to the construction and operation of the Steensby Port through supplemental baseline studies. Studies will be based on ongoing monitoring methodologies as part of the EEM Program at Milne Port.

## Project Certificate Condition No. 100

Category	Marine Environment - Supplemental Baseline Assessments
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction
Objective	To supplement baseline information and improve predictions for potential impacts to marine wildlife.
Term or Condition	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 the winter months, with consideration for the impact of spilled fuel on marine mammals when they might be less mobile or able to avoid contact with spilt fuel or fumes.
Relevant Baffinland Commitment	57
Reporting Requirement	To be developed following approval of the Project by the Minister.
Responsible Party	Baffinland
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Shipping and Marine Wildlife Management Plan (Baffinland, 2020k)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

#### *Fuel Spills*

As outlined in Section 1.2 and Section 3 of the SMWMP, the SMWMP should be reviewed in relation to other management plans, including the Spill at Sea Response plan (SSRP). Section 7 of the SSRP addresses spill management during the end and start of the shipping season (i.e., July and October). Additionally, Baffinland notes that all vessels contracted by the Company are required under MARPOL to have a Shipboard Oil Pollution Emergency Plan (SOPEP). For clarity, the spill and emergency responses management measures are the mitigation for efficiently and effectively dealing with unforeseen effects of the Project, such as a fuel spill during the shoulder season.

#### *Avoidance of the North Water Polynya*

Baffinland understands the North Water Polynya is more or less defined with geographic boundaries at the top of Baffin Bay between Northwest Greenland (Avanersuaq) and Ellesmere Island and Devon Island on the Canadian Coast (Hastrup et al, 2018). At its peak, the general area covered by this polynya is between 76°N and 79°N and 70°W and 80°W.

Vessels generally follow a route below 75 °N through Baffin Bay, and so, ore carriers will not normally enter the area the polynya is known to occur. See Appendix G.19 for a copy of the Daily Ship Tracks with Ice Imagery as supporting evidence. Additionally, in July of 2019, Baffinland submitted mapping/ice charts to the NIRB that show the condition of the North Water Polynya relative to the shipping route in early July between 2014 and 2018 (Public Registry ID No. 325730). As shown in Figures 2 through 6 of that document, there are safe navigable routes across Baffin Bay in areas south of the polynya even during the shoulder season. Therefore, this component of Term and Condition

No. 100 is not applicable to the current phase of the Project as the Northern Shipping Route does not overlap with the North Water Polynya at any point during shipping operations in Baffin Bay. This is because the sea ice boundaries separating the North Water Polynya from the rest of Baffin Bay are melted away or broken up by June of each year at which point the polynya is indiscernible from adjacent areas during July and because of the designated shipping route.

*Mitigations for Marine Mammals that might be “less mobile”*

Baffinland has developed mitigation measures for the shoulder seasons, as outlined in Section 6.2, Table 2 of the SMWMP, that are specific to circumstances when marine mammals would be “less mobile”, or in heavier ice conditions. These include:

- 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 are provided with standard instructions to not approach within 300 m of a walrus or polar bear observed on sea ice;
- All Project vessels are 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; and
- Baffinland will place Marine Wildlife Observers (MWOs) on icebreaking vessels during the shoulder seasons that will be responsible for recording relative abundance, group composition and behaviour of marine mammals relative to icebreaker transits along the Northern Shipping Route. MWOs will also be responsible for recording any incidences of marine mammal strikes or near misses with Project vessels, including icebreaker vessels.

Baffinland notes that this above list does not account for all mitigations outlined in Section 6.2 (Table 2) of the SMWMP and would refer the NIRB to that for a complete list of all mitigation measures employed by Baffinland to reduce potential effects on marine mammals associated with shipping while ice is present.

## RESULTS

In 2020 there were no fuel spills during shoulder season shipping, no interactions with the North Water Polynya and no ship strikes on marine mammals.

## TRENDS

Shipping during the shoulder seasons has not resulted in large-scale fuel spills along the shipping route, interactions with the North Water Polynya or ship strikes on marine mammals.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland will update the Shipping and Marine Wildlife Management Plan prior to any winter shipping. Furthermore, this condition is relevant only to the Construction phases of the project.

### Project Certificate Condition No. 101

Category	Marine Environment – Monitoring
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operations
Objective	To monitor for potential impacts to marine wildlife and marine habitat.
Term or Condition	<p>The Proponent shall incorporate into the appropriate monitoring plans the following items:</p> <ol style="list-style-type: none"> <li>a. A monitoring program that focuses on walrus use of Steensby Inlet and their reaction to disturbance from construction activities, aircraft, and vessels;</li> <li>b. Efforts to involve Inuit in monitoring studies at all levels;</li> <li>c. Monitoring protocols that are responsive to Inuit concerns;</li> <li>d. Marine monitoring protocols are to consider the use of additional detecting devices to ensure adequate monitoring through changing seasonal conditions and daylight;</li> <li>e. Schedule for periodic aerial surveys as recommended by the Marine Environment Working Group;</li> <li>f. Periodic aerial surveys for basking ringed seals throughout the landfast ice of Steensby Inlet, and a suitable control location. Surveys shall be conducted at an appropriate frequency to detect change inter-annual variability;</li> <li>g. Shore-based observations of pre-Project narwhal behavior in Milne Inlet, that continues at an appropriate frequency throughout the Early Revenue Phase (not less than three years);</li> <li>h. Conduct landfast ice monitoring for the duration of the Project Operations phase, which will include: <ol style="list-style-type: none"> <li>i. The number of ship transits that are able to use the same track;</li> <li>ii. The area of landfast ice disrupted annually by ship traffic; and</li> <li>iii. Monitoring strategy focused on assessing and mitigating interaction between humans and wildlife at the port site(s).</li> </ol> </li> </ol>
Relevant Baffinland Commitment	Not Applicable
Reporting Requirement	To be provided in the Annual Report to the NIRB.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG), Nunavut Impact Review Board
Reference	<p>Draft 2020 Marine Mammal Aerial Survey Report (Golder, 2021d)</p> <p>Draft 2020 Bruce Head Shore-based Monitoring Report (Golder, 2021e)</p> <p>2020 Underwater Acoustic Monitoring BIM Shoulder Season Shipping 2019-2020 (Austin and Dofher, 2020)</p> <p>2020 MEWG Meeting Records</p> <p>Preliminary Summary of 2020 Narwhal Monitoring Programs (Golder, 2021f)</p> <p>MHTO Letters of Support for 2019 Monitoring Programs</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

## METHODS

- a. No activity took place at Steensby Port in 2020. This phase of the project is currently inactive.
- b. As part of yearly planning and review of upcoming field programs, Baffinland provides its annual monitoring results to MEWG members (which include Inuit representation through the MHTO and QIA) for comment, and also presents plans for monitoring for the upcoming year during MEWG meetings. During the in-person MEWG meeting in Ottawa on 25 February, 2020, Baffinland presented the results from its 2019 monitoring programs, discussed upcoming 2020 monitoring programs and continued to engage the MEWG in the development of Early Warning Indicators. Baffinland also held virtual meetings with the MEWG, including the MHTO and QIA, on 25 June and 9 December, 2020 to discuss 2020 marine monitoring programs and Early Warning Indicators. Pre-shipping meetings were held with the MHTO on 8 and 15 July, 2020. Letters of Support from the MHTO were received on 5 June, 2020.
- c. Baffinland's ongoing development and refinement of monitoring programs and protocols considers input from local community members (e.g., concerns that are communicated through community workshops) as well as discussions with the MEWG, in which Inuit organizations actively participate. Furthermore, Baffinland meets directly with the MHTO multiple times each year and requests letters of support on an annual basis from the MHTO prior to program implementation.

Prior to the start of the 2020 shipping season and monitoring programs, meetings were held with the MHTO on 8 and 15 July 2020. Prior to restrictions put in place as a result of the COVID-19 Pandemic, Inuit program participants participated in end of program interviews to review and discuss preliminary monitoring results, and to solicit input on program design and program planning for future Monitoring Programs. It is expected that these post-program consultations will resume once restrictions are lifted and Inuit from local communities are once again able to participate in field programs. Baffinland's monitoring programs strive to actively involve local participation and take into account community concerns in the development and adaptation of its monitoring programs. Monitoring results are reviewed and discussed annually by MEWG members, including Inuit participants, and by the MHTO during meetings in Pond Inlet.

- d. Baffinland understands that the intent of Condition No. 101(d) is to address concerns related to the efficacy of Project effects monitoring along the Southern Shipping Route which would involve year-round shipping operations and would therefore require year-round effects monitoring including monitoring during periods of 24-h darkness and extensive land-fast ice coverage, when standard visual-based monitoring techniques are not as effective. This condition is not currently relevant to the Project as no activities took place along the Southern Shipping Route or in Steensby Inlet during 2020 - this phase of the project is currently inactive. Shipping operations in 2020 were limited to the Northern Shipping Route between the period of July to October. Daylight and ice conditions during this period do not impede visual-based monitoring techniques and therefore additional detecting devices are not presently required to ensure adequate monitoring through changing seasonal and daylight conditions under current shipping operations.
- e. In 2020, marine mammal aerial surveys were conducted in the North Baffin area during the early shoulder season (July) and the peak open-water season (August) as part of the 2020 Marine Mammal Aerial Survey Program (MMASP). Two (2) different aerial surveys were performed in 2020. 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 specific to available ice conditions at that time of year. 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 letter of support for the 2020 MMASP was provided by the MHTO and DFO and other MEWG members were actively consulted on the study design and data collection methods during 2020 MEWG meetings (Appendix C.1). Input and recommendations provided by these parties were incorporated into the program. Detailed methodology and analytical procedures of the 2020 MMASP are presented in Golder (2021d).

- f. No activity took place at Steensby Inlet in 2020. This phase of the project is currently inactive.
- g. Baffinland undertook a shore-based narwhal monitoring program at Bruce Head from 2013–2017<sup>1</sup> and again in 2019 and 2020<sup>2</sup>. The objective of the Bruce Head shore-based monitoring study is to investigate narwhal response to shipping activities along the Northern Shipping Route in Milne Inlet. During the open-water season of 2020, visual survey data were collected from a cliff-based observation platform at Bruce Head overlooking the nominal shipping route. Data was collected systematically on the relative abundance and distribution (RAD) and group composition of narwhal. Additional data were 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 that may also affect narwhal behaviour. Data were also collected via Unmanned Aerial Vehicle (UAV) surveys to: 1) evaluate narwhal detection ability by the shore-based visual observers across the variable strata distances, and; 2) to undertake focal follows of individual narwhal groups to better assess narwhal behavioural responses to vessel presence. Detailed methodology and analytical procedures of the 2020 Bruce Head Shore-based Monitoring Program are presented in Golder (2021e).
- h. Baffinland understands that the intent of Condition 101(h) is to address concerns related to icebreaking of land-fast ice in support of shipping operations along the Southern Shipping Route and in Steensby Port. This phase of the project is currently inactive. Baffinland has not undertaken icebreaking of land-fast ice along the Northern Shipping Route. The break-up of landfast ice is confirmed at the start of the shipping season each year via satellite imagery and the Canadian Ice Service daily ice charts. Additionally, Baffinland's current shipping operations are limited to when the floe edge is no longer being used by Pond Inlet land users. To ensure the implementation of this, prior to the start of the shipping season, Baffinland receives formal written confirmation from the MHTO that the floe edge has been closed for harvesting.

## RESULTS

- a. Not applicable in 2020.
- b. Due to restrictions relating to the COVID-19 Pandemic, Inuit from local communities were not able to participate in 2020 field monitoring programs. Inuit were, however, actively involved in the planning of the 2020 monitoring programs (MEEMP and NIS/AIS Monitoring Program, Habitat Offset Monitoring Program at Milne Port, Bruce Head Shore-based Monitoring Program, Marine Mammal Aerial Survey Program, Passive Acoustic Monitoring Program).

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<sup>1</sup> 2013 represented a pilot study year for the shore-based monitoring program.

<sup>2</sup> A Bruce Head vessel-based narwhal monitoring program pilot study was conducted in 2018 instead of a shore-based study due to safety concerns following a damaged observation platform that prevented safe implementation of the land-based program.

- c. In 2020, Leg 3 of the marine mammal aerial survey program aimed at assessing the potential risk of marine mammal ice entrapment was not conducted, following engagement with the MHTO in the days prior to the start of the Leg 3 aerial surveys. The MHTO indicated that with the absence of ice at the end of the 2020 shipping season, there was little use for an entrapment monitoring survey and that it would be preferable to not conduct the survey and, as such, minimize the potential disturbance to marine mammals from a plane flying over the RSA. Baffinland shared this input with Fisheries and Oceans Canada and both parties agreed to follow the MHTO's advice in this matter.

Based on feedback provided by the MHTO and the QIA in 2020, Baffinland will also be implementing a ringed-seal aerial survey in the spring of 2021 to assess relative density of ringed seal in the Project area.

- d. Not applicable in 2020.
- e. A total of eleven (11) different species of marine mammals were observed during the 2020 aerial surveys: narwhal, bowhead whale, beluga whale, killer whale, sperm whale, ringed seal, harp seal, bearded seal, hooded seal, walrus, and polar bear.

Results from the Leg 1 survey (early shoulder season) indicated that prior to the start of icebreaking in 2020, few narwhal had progressed into Milne Inlet due to a large consolidated ice field present in Western Eclipse which appeared to impede southbound access. Narwhal were largely concentrated within this ice field amongst several prominent ice leads when icebreaking began. This differed from 2019, when more narwhal had progressed into Milne Inlet prior to the start of icebreaking due to lighter ice conditions that year. In both years, narwhal were also present in northern Navy Board Inlet and east of Pond Inlet prior to the start of icebreaking. Detailed results for Leg 1 are presented in Golder (2021d).

Results from the Leg 2 survey (i.e., the systematic marine mammal abundance survey conducted during the open-water season) indicated that: i) narwhal abundance in Eclipse Sound was statistically lower in 2020 than observed in previous years when aerial surveys were conducted (i.e., 2013, 2016 and 2019), and ii) the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was similar in 2020 to that observed in previous years (2013 and 2019). These results suggest either a potential displacement of a portion of the Eclipse Sound stock to the Admiralty Inlet summering ground during the summer of 2020, a potential displacement of these animals to another area (e.g., Eastern Baffin Bay summering ground), or a potential decrease in the Eclipse Sound summer stock. Detailed results for Leg 2 are presented in Golder (2021d).

In consideration of the above findings, it is evident that there was a statistically significant decrease in the abundance of the Eclipse Sound narwhal stock in 2020 that requires further investigation. Potential contributing factors to the observed lower numbers of narwhal in the RSA during 2020 include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA. At present, it is understood that these may have acted independently, or in a cumulative or additive manner. A preliminary analysis of these factors is provided in Golder (2021f).

- f. Not applicable in 2020.
- g. Results from the 2020 shore-based monitoring at Bruce Head indicate a lower relative abundance of narwhal in the study area than in previous years (2014-2017 and 2019). This aligns with 2020 aerial survey results indicating a lower abundance of the Eclipse Sound summer stock in 2020 (see update provided in

101-e). However, narwhal calf ratio (i.e., a proxy for reproductive success) was shown to remain consistent with pre-shipping conditions, despite year-over-year increases in shipping in the RSA from 2014-2019.

The observed finding of a lower relative abundance of narwhal at Bruce Head in 2020, coincident with the 2020 MMASP finding of a significant decrease in the abundance of the Eclipse Sound narwhal stock in the RSA, has triggered further detailed investigation on the root cause and implementation of precautionary based mitigation measures for application in 2021, as described in 101-d and Golder (2021f).

Other results from the 2020 Bruce Head shore-based monitoring program are as follows:

- A statistically significantly lower number of narwhal sightings occurred in the Bruce Head stratified study area (SSA) during a vessel transit, but only when vessels occurred in close proximity to narwhal (i.e., 1–2 km from vessel for northbound vessels, and 3–4 km for southbound vessels).
- The integrated multi-year dataset for narwhal group composition and behaviour indicated that vessel traffic and associated noise did not result in a significant change in any of the response variables considered (i.e., group size, group composition, group spread, group formation, group direction, travel speed, and distance from shore).
- In 2020, a total of 84 narwhal focal follow surveys were successfully undertaken in the RSA (near Bruce Head and Koluktoo Bay) using a UAV-based video system (representing 7.3 h of recorded behaviour). This included 16 focal follows when ships were present (representing 1.3 h of recorded behaviour) and 68 focal follows when ships were absent (representing 6.0 h of recorded behaviour). Primary behaviors assessed included travelling (i.e., directional movement), milling (i.e., non-directional movement), resting (i.e., not moving/logging or moving slightly), and social behavior (i.e., clear interaction between individuals with physical contact). Of the followed groups, narwhal spent the majority of time travelling (65% of the time), followed by milling (20% of the time), resting (12% of the time) and social behaviours (3% of the time). The proportion of time groups spent travelling was similar when vessels were present compared to when vessels were absent (71% and 64%, respectively). Similarly, narwhal spent a similar proportion of time resting, milling and performing social behaviours when vessels were present (17%, 10% and 1%, respectively) compared to when vessels were absent (10%, 22% and 4%, respectively). While narwhal groups were shown to spend similar proportions of time in “loose” and “tight” group formation (i.e., 48% and 51%, respectively), the proportion of time that groups spent in tight formation was slightly higher when a vessel was present (57% of the time) compared to periods when no vessels were present (46% of the time). In terms of relative position of mother to offspring, immature narwhal were most commonly observed below their mother (compared to beside, behind or above their mother), in both presence and absence of shipping. The proportion of time immature narwhal maintained this position was slightly higher when vessels were present compared to when no vessels were present (69% and 53%, respectively). However, the proportion of time that mothers and their dependent young were tightly associated with one another was similar in the presence of vessels (79%) compared to periods when no vessels were present (76%). Additional monitoring is required to increase the sample size of focal follow surveys conducted in the presence of vessel traffic (give the current sample size is limited to 1.3 h of observational data only).

- Multiple observations of nursing behaviour in the Bruce Head area in 2020 offers some evidence that female narwhal with dependent young continue to carry out critical life functions in the presence of vessel traffic during the open-water season.

Detailed results of the 2020 Bruce Head Shore-based Monitoring Program are presented in Golder (2021e).

- h. Not applicable in 2020.

## TRENDS

- a. Not applicable in 2019.
- b. Inuit have been involved in monitoring studies at all levels since the inception of the program, with the exception of active involvement in 2020 field programs given restrictions associated with the COVID-19 Pandemic. The addition of the MHTO as members of the MEWG in 2016 and the hiring of Inuit participants from Inuit outfitting companies based in Pond Inlet has increased the participation of Inuit in this process. Inuit participation in Baffinland's monitoring programs increased in 2019 compared to 2017 and 2018 (from 2,265 hours / 12 participants in 2017 and 1,610 hours / 9 participants in 2018 to 6,500 hours / 23 participants in 2019). Inuit engagement has progressed to include training in data analysis and reporting in 2019.
- c. Engagement with Inuit community members on the design and reporting of the marine monitoring programs has continued to increase on an annual basis, with the exception of active involvement in 2020 field programs given restrictions associated with the COVID-19 Pandemic. End of program interviews were newly implemented in 2019 to review and discuss preliminary monitoring results, and to solicit input on program design and planning for Baffinland to consider during subsequent year monitoring activities.
- d. Not applicable in 2020.
- e. Preliminary results from the 2020 MMASP indicate that i) narwhal abundance in Eclipse Sound was statistically lower in 2020 than in previous aerial survey years undertaken in the RSA (2013, 2016 and 2019), and ii) the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was similar in 2020 to that observed in previous years (2013 and 2019). These results suggest either potential displacement of a portion of the Eclipse Sound stock to the Admiralty Inlet summering ground during the summer of 2020, a potential displacement of these animals to another area (e.g., Eastern Baffin Bay or Somerset summering ground), or a potential decrease in the Eclipse Sound summer stock.

The observed statistically significant decrease in the abundance of the Eclipse Sound narwhal stock in 2020 requires further investigation. Potential contributing factors include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA.

- f. Not applicable in 2020.
- g. The relative abundance of narwhal at Bruce Head was lower in 2020 compared to all previous survey years. The mean proportion of calves recorded in 2020 suggests that calf presence at Bruce Head is still occurring at a rate that is consistent with pre-shipping conditions, despite year-over-year increases in shipping in the RSA. An integrated analysis of the 2014-2020 Bruce Head data identified a significant decrease in narwhal sightings in the SSA compared to when no vessels were present, but only when vessels were in close

proximity (1-2 km from vessel for northbound vessels, and 3-4 km for southbound vessels). No significant changes were observed in narwhal group composition or behaviour following vessel exposure. These results support impact predictions made in the FEIS Addendum for the ERP, in that vessel noise effects on narwhal will be limited to temporary, short-term avoidance behaviour, consistent with low to moderate severity responses.

Results from the six-year shore-based monitoring study at Bruce Head indicate the following trends:

- The overall relative abundance of narwhal in the SSA, inferred from sighting rate, was relatively constant between 2014 and 2019 despite a gradual increase in iron ore shipping along the Northern Shipping Route during this period. However, in 2020, the relative abundance of narwhal in the SSA was shown to significantly decrease compared to all previous survey years.
- Narwhal group composition in 2020 was similar to previous years (2014–2017, 2019), with the majority of the sightings consisting of adult whales, followed by juveniles, calves, and yearlings. The mean proportion of narwhal calves recorded in 2020 (11.3%) was higher than three of the previous years (2014 = 10.7%, 2016 = 10.5%, 2017 = 9.5%), but lower than 2015 and 2019 when a mean annual proportion of 12.9% and 11.6% was recorded, respectively. This suggests that calf presence (calving success) at Bruce Head is still occurring at a rate that is consistent with pre-shipping conditions, despite a relatively steady increase in shipping in the RSA.
- A statistically significantly lower number of narwhal sightings occurred in the Bruce Head SSA during a vessel transit, but only when vessels occurred in close proximity to narwhal (i.e., 1–2 km from vessel for northbound vessels, and 3–4 km for southbound vessels).
- The integrated multi-year dataset for narwhal group composition and behaviour indicated that vessel traffic and associated noise did not result in a significant change in any of the response variables considered (i.e., group size, group composition, group spread, group formation, group direction, travel speed, and distance from shore).

h. Not applicable in 2020.

#### RECOMMENDATIONS / LESSONS LEARNED

- a. Not applicable in 2019.
- b. Marine monitoring programs will be reviewed with the MEWG and MHTO in 2021 in consideration of increasing Inuit involvement in field monitoring and data reporting if possible, though it is conceivable that continued COVID-19 travel restrictions may limit in-person involvement in 2021 monitoring programs by local Inuit.
- c. Marine monitoring programs will be reviewed with the MEWG and MHTO in 2021, with the intention of increasing responsiveness to Inuit concerns. Continuous communication with the MHTO and Inuit communities will continue in 2021, with consideration to restrictions associated with the COVID-19 Pandemic. Based on feedback provided by the MHTO and the QIA in 2020, Baffinland will also be implementing a ringed-seal aerial survey in the spring of 2021 to assess relative density of ringed seal in the Project area.
- d. Not applicable in 2020.

- e. Acoustic monitoring results and narwhal behavioural data (collected via the 2017-2018 Narwhal Tagging Study and the Bruce Head Shore-based Monitoring Program) available to date have demonstrated that shipping noise in the RSA is lower than predicted in the FEIS and that behavioural effects from shipping on narwhal are limited to low-level disturbance effects that are localized and temporary in nature. This indicates that current mitigation measures (e.g., 9 knot speed restriction, 40-km buffer area at entrance of RSA, limited transits during early shoulder season, etc.) are effective at managing Project incremental effects from shipping on narwhal in the RSA. However, the observed decrease in narwhal abundance in the RSA during 2020 is of concern to Baffinland, and further investigation is recommended with respect to the potential cause of this observed decrease. As previously noted above and in Golder (2021f), potential contributing factors include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA.

The enhanced mitigation measures being proposed by Baffinland for the 2021 shipping season align with the options presented by Golder (Golder, 2021f). Baffinland will delay shipping in 2021 until there is a continuous path between the entrance of Eclipse Sound and Milne Port of less than 9/10ths ice concentrations. This requirement will avoid impacting narwhal that concentrate in leads, as the leads are unlikely to exist in less than 9/10 ice concentrations. This will also minimize icebreaking noise, as it eliminates breaking of the thickest ice over a continuous period. Based on historical ice conditions, the average date less than 9/10ths ice has been continuous along the entire shipping route is July 27th, which is 8 days later than the average date landfast ice is completely broken (July 19th) and shipping would regularly be able to commence. The exact date the 2021 shipping season will commence will continue to be subject to variability in ice conditions. These newly proposed management measures will be communicated to the MEWG and the community of Pond Inlet as they are further developed.

The proposed additional mitigation being put forward aim to avoid and/or further minimize cumulative impacts on narwhal from Project icebreaking, even if the underlying causal factor(s) for the observed decrease in narwhal abundance in Eclipse Sound is unconfirmed. This precautionary approach will allow for a simultaneous investigation of potential causal factors of the observed change while adjusting current shipping operations to reliably manage impacts from icebreaking on narwhal in the RSA.

To better understand potential short-term, long-term and cumulative effects of icebreaker noise on narwhal during the early shoulder season and to assess the efficacy of existing and newly introduced mitigation measures in 2021, Baffinland will implement the following follow-up monitoring programs starting in 2021:

- 2021 MASP
- 2021 Bruce Head Shore-based Monitoring Program
- 2021 PAM Program

Baffinland also intends to prioritize in 2021 planning for a 2022 early shoulder season narwhal tagging study to be designed in consultation with the MHTO, DFO and MEWG.

- f. Although the current phase of the Project does not involve breaking of landfast ice Baffinland acknowledges recent feedback from hunters indicating they are observing local changes in seal abundance and distribution along the Northern Shipping Route, with carry-over effects on seal harvesting. In response to

this feedback, Baffinland has committed to undertaking targeted ringed seal monitoring along the Northern Shipping Route. This will comprise a dedicated ringed seal aerial survey program to be implemented in June 2021 to monitor for potential Project-induced changes in ringed seal distribution and relative abundance (i.e., density and seal hot spots) in the RSA. The 2021 survey results will be compared to ringed seal baseline aerial surveys undertaken by Baffinland in the RSA in 2006, 2007, 2008 and 2014, as well as to surveys undertaken by DFO in 2016 and 2017 during the ERP (Yurkowski et al., 2019).

- g. Further investigation, and implementation of precautionary mitigation measures during the pending investigation, are recommended with respect to the potential cause of the observed decrease in narwhal numbers in the RSA during 2020, as discussed in 101-d.

In the interim, shore-based monitoring of narwhal in 2021 is recommended to determine if the relative abundance of narwhal near Bruce Head increases from levels observed in 2020 (Golder, 2021e). As part of this program, additional UAV-based focal follow surveys are recommended to increase the sample size obtained in 2020 in order to allow for a quantitative analysis of narwhal behaviour between shipping exposure and non-exposure period.

- h. Not applicable in 2020.

## Project Certificate Condition No. 102

Category	Marine Environment - Traffic Log and Shipping Information
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To promote public awareness of Project shipping activities for the general public.
Term or Condition	The Proponent shall ensure that routing of Project vessels is tracked and recorded for both the southern and northern shipping routes, with data made accessible in real time to communities in Nunavut and Nunavik.
Relevant Baffinland Commitment	30, 36
Reporting Requirement	To be provided in the Annual Report to the NIRB.
Status of PC Condition	Steensby – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Baffinland Corporate Website – Operation – Shipping and Monitoring
Ref. Document Link	<a href="https://www.baffinland.com/operation/shipping-and-monitoring/">https://www.baffinland.com/operation/shipping-and-monitoring/</a>

### METHODS

Baffinland has contracted exactEarth®, a global vessel monitoring and tracking service based on AIS (Automatic Identification System) data from polar orbiting satellites to track and report on vessel movements. The vessel tracking information is available throughout the entire duration of the shipping season on Baffinland’s website (<https://www.baffinland.com/operation/shipping-and-monitoring/>) to allow communities to check on vessel coordinates, which direction the vessel is moving, and its destination.

Although the vessel locations plotted on the online map are available 24 hours a day, 7 days a week over the entire duration of the shipping season, they are not available “real-time” per se on a minute by minute basis, but do provide regularly updated snapshot of latest vessel position in the North Baffin region approximately every 30 minutes. Data is immediately uploaded to the website once the data, as captured by satellites, are made available through the software.

Following on the success of the 2019 efforts to enhance communications regarding Baffinland’s daily shipping activities in the community of Pond Inlet as requested through feedback received by the MHTO, Baffinland continued its “guardian program” (Shipping Monitors) which consists of hiring a minimum of two full-time employees to actively track daily Project vessel movements in the RSA through tracking of data available through exactEarth®, and in relation to reported marine mammal sightings (as shared by residents of Pond Inlet through marine VHF radio and Baffinland monitoring teams. One of the primary roles of the Shipping Monitors is to provide direct liaison between the community of Pond Inlet, hunters and Baffinland. They work directly out of the Baffinland office situated on the second floor of the MHTO office building in Pond Inlet. Through this role, Shipping Monitors provide updates on Baffinland’s shipping activities using a variety of communication methods including local public radio, marine VHF radio (for hunters on the water) and through social media (e.g., Facebook posts). Shipping monitors are also available to track any comments/questions that are communicated by residents, and provide answers as needed.



## RESULTS

Baffinland trained and hired seven (7) shipping monitors in 2020, consisting of 2 full-time, 3 part-time and 2 summer students (see Photo 25 and 26 in Appendix D). Four (4) of the shipping monitors had previously worked with Baffinland in 2019 as shipping monitors or as summer students in Baffinland's Pond Inlet office. Baffinland has made vessel routing accessible to the public via the Baffinland website. Baffinland continues to maintain an Automatic Information System tracker system in Baffinland's Shipping Monitor office located in the second floor of the MHTO building on a dedicated laptop and wall-mounted monitor (See Photo 27 in Appendix D). This provides live continuous monitoring of vessels active in the Northern Shipping Route to all office visitors during office hours (8am to 5pm). Baffinland notes that due to COVID-19 Pandemic public health restrictions, the office was regrettably closed to visitors for the majority of the shipping season, and as a result viewing of vessels could only be possible by accessing the website through individual access points. Baffinland also created a dedicated "Baffinland Shipping" Facebook page to further enhance regular communications over the shipping season, attracting hundreds of followers during the active shipping season; a Facebook Baffinland Shipping group was also created for those particularly interested in most up to date information on vessel locations. Key information was posted including maps showing the Northern Shipping Route extending from Baffin Bay to Milne Port, contact information of shipping monitors including direct cell phone line and email, and a link to the live vessel tracking available on the Baffinland website.

## TRENDS

Not applicable.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland has found the use of exactEarth® to be beneficial in providing information related to ship routing to the public. Baffinland will continue to use this service. Furthermore, it is Baffinland's intent to continue providing live viewing of vessel tracks through its Pond Inlet Office in 2021, and to continue the hiring of Shipping Monitors over the entire duration of the shipping season.

### Project Certificate Condition No. 103

Category	Marine Environment - Traffic Log and Shipping Information
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To monitor effectiveness of mitigation of shipping impacts to marine wildlife.
Term or Condition	<p>The Proponent shall report annually to the NIRB regarding project-related ship track and sea ice information, including:</p> <ol style="list-style-type: none"> <li>A record of all ship tracks taken along both shipping routes covering the entire shipping season;</li> <li>When employing ice-breaking, an overlay of ship tracks onto ice imagery to determine whether ships are effectively avoiding shore leads and polynyas;</li> <li>A comparison of recorded ship tracks to the expected nominal shipping route, and probable (if any) extent of year-round shipping during periods of ice cover and open-water;</li> <li>An assessment of the level of adherence to the nominal shipping route and the spatial extent of the shipping zone of influence; and</li> <li>When employing ice-breaking, marine bird and mammal species and number of individuals attracted to ship tracks in ice.</li> </ol>
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be provided in the Annual Report to the NIRB.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board
Reference	<p>Daily Ice Charts (Canadian Ice Service, 2020)</p> <p>Draft 2020 Marine Mammal Aerial Survey (Golder, 2021d)</p> <p>All Project-related Vessel Transits Along the Northern Shipping Route During 2020 2020 Shoulder Season Project Vessel Traffic Relative to Ice Coverage</p>
Ref. Document Link	<p><a href="https://www.baffinland.com/operation/shipping-and-monitoring/">https://www.baffinland.com/operation/shipping-and-monitoring/</a></p> <p><a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a></p> <p>Appendix G.19</p>

#### METHODS

- Project-related vessel tracks and associated speeds along the Northern Shipping Route are recorded throughout the shipping season using the Automatic Identification System (AIS), which tracks the movement of each vessel using an onboard AIS transceiver with integrated Global Positioning System (GPS). The AIS signals in the Project area are recorded by base stations set up at Pond Inlet and Bruce Head; and when out of range of the base stations, through satellite based AIS receivers (exactEarth® AIS archive). Vessel tracks are publicly accessible through the Baffinland website during the shipping season and at the Baffinland office located in the Mittimatalik Hunters and Trappers Organization (MHTO) building on a large wall-mounted monitor.

- b. Daily maps are prepared showing Project vessel tracks (including the MSV *Botnica* and vessels under escort) on all days when ice concentrations were 1/10 or greater. These vessel track maps include an overlay of daily sea ice concentration (i.e., coverage) provided by the Canadian Ice Service (2020) showing vessels transiting in open water whenever possible, while avoiding shore leads and polynyas.
- c. See (a) and b) above.
- d. See (a) and (b) above.
- e. In 2020 the Ship-based Observer (SBO) Program could not be implemented due to boarding restrictions related to the COVID-19 global pandemic. As an alternative, Baffinland partnered with the Marine Mammal Observation Network (MMON) to pilot a marine mammal incidental sighting programs through the participation of vessels contracted by Baffinland, the MSV *Botnica* and Nordic Bulk Carriers. The consideration of Baffinland partnering with MMON was first suggested during a MEWG meeting on June 6, 2018 since Groupe Desgagnés Inc. (including subsidiary Nunavut Sealink & Supply Inc.), a cargo sealift contractor to Baffinland, had been an active member of the program (Baffinland, 2019d). Virtual training was provided to participating vessel representatives in collaboration with Green Marine and MMON, which included instructions on how to report whale strikes should they occur, and recording of marine mammal sightings.

## RESULTS

- a. Recorded 2020 Project-related vessel tracks are plotted in Figure 4.14.
- b. Figures showing an overlay of daily vessel tracks onto ice imagery for both 2020 shoulder seasons (21 to 29 July and 2 to 30 October) are presented in Appendix G.19. The figures demonstrate that vessels are effectively avoiding shore leads and polynyas during icebreaker escort transits in Baffin Bay and the RSA.
- c. There were no significant deviations from the nominal shipping route in 2020 by Project vessels (see Figure 4.14).
- d. See update to (c) above.
- e. A total of seven (7) vessels participated in the MMON pilot program (Table 4.27). The majority of sightings (83%) were made by the MSV *Botnica*. Most sightings consisted of various seal species (Table 4.28). Three (3) whale species were observed including: bowhead whale (second year of sighting), sperm whale, and killer whale.

Appendix G.19 includes locations of marine mammals sightings in the RSA between during months of July to October, 2020.

## TRENDS

No significant deviations from the nominal Northern Shipping Route have occurred by Project vessels in the RSA during the first six years of iron ore shipping in this area (2015 to 2020).

**Table 4.27: Number of Marine Mammal Sightings in the Regional Study Area by Participating Vessel, July to October, 2020**

Vessel Name	No. of Sightings
MSV Botnica	24
Nordic Oasis	3
Nordic Odin	1
Nordic Odyssey	1
Nordic Olympic	0
Nordic Orion	0
Nordic Oshima	0
<b>Total</b>	<b>29</b>

**Table 4.28: Summary of Marine Mammal Sightings in the Regional Study Area, July to October, 2020**

Species	Species
Bowhead Whale	1
Sperm Whale	2
Killer Whale	1
Polar Bear	1
Bearded Seal	8
Harp Seal	1
Ringed Seal	3
Unidentified Whale	1
Unidentified Seal	11
<b>Total</b>	<b>29</b>

#### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to monitor vessel movements using the shore-based AIS stations at Pond Inlet and Bruce Head, and satellite-based AIS using the exactEarth® archive. Baffinland will also continue to communicate expectations to Masters with regards to avoiding deviations from the nominal Northern Shipping Route when vessels are under contract to Baffinland, and will maintain active tracking through use of notification alerts.



## Project Certificate Condition No. 104

Category	Marine Environment - Traffic Log and Shipping Information
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To prevent impacts to marine wildlife from Project shipping activities.
Term or Condition	<p>Subject to safety considerations and the potential for conditions as determined by the crew of transiting vessels, to result in route deviations:</p> <ol style="list-style-type: none"> <li>a. 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 monitors.</li> <li>b. 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 the FEIS and FEIS Addendum to the NIRB annually, with corresponding discussion regarding justification for deviations and any observed environmental impacts.</li> </ol>
Relevant Baffinland Commitment	Not Applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

- a. Not applicable
- b. Project-related vessel tracks and associated speeds along the Northern Shipping Route are recorded throughout the shipping season using the Automatic Identification System (AIS), which tracks the movement of each vessel using an onboard AIS transceiver with integrated Global Positioning System (GPS). The AIS signals in the Project area are recorded by base stations set up at Pond Inlet and Bruce Head; and when out of range of the base stations, through satellite based AIS receivers (exactEarth® AIS archive). Vessel tracks are publicly accessible through the Baffinland website during the shipping season and at the Baffinland office located in the Mittimatalik Hunters and Trappers Organization (MHTO) building on a large wall-mounted monitor.

### RESULTS

- a. Not applicable.

- b. There were no major deviations from the nominal shipping route in 2020 by Project vessels (see Figure 4.14).

**TRENDS**

- a. Not applicable in 2020.
- b. No major deviations from the nominal Northern Shipping Route have occurred by Project vessels in the RSA during the first five years of iron ore shipping in this area (2015 to 2020).

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to monitor vessel movements using the shore-based AIS stations at Pond Inlet and Bruce Head, and satellite-based AIS using the exactEarth® archive. Baffinland will also continue to communicate expectations to Masters with regards to avoiding deviations from the nominal Northern Shipping Route when vessels are under contract to Baffinland, and will maintain active tracking through use of notification alerts.

### Project Certificate Condition No. 105

Category	Marine Environment - Traffic Log and Shipping Information
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To prevent impacts to marine wildlife from Project shipping activities.
Term or Condition	<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"> <li>a. 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.</li> <li>b. Reduced shipping speeds where ship-marine mammal interactions are most likely.</li> <li>c. 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.</li> </ul>
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Seensby Port – Not Active Milne Port - Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	<p>Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port (Fednav, 2020a)</p> <p>Standing Instructions and General Information for Masters of Vessels Sailing to Milne Inlet Port (Fednav, 2020b)</p> <p>Draft 2020 Marine Mammal Aerial Survey Report (Golder, 2021d)</p> <p>Draft 2020 Bruce Head Shore-based Monitoring Report (Golder, 2021e)</p> <p>Draft 2019-2020 Underwater Acoustic Monitoring during Shoulder Season Shipping (Austin and Dofher, 2021)</p> <p>Shipping and Marine Wildlife Management Plan (Baffinland, 2020k)</p> <p>Preliminary Summary of 2020 Narwhal Monitoring Program (Golder, 2021f)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C Appendix G

#### METHOD

- a. Several mitigations, including those relevant to shipping operations and icebreaking activities associated with the current Project committed to by Baffinland to avoid and/or minimize adverse effects from shipping



on marine mammals along the Northern Shipping Route are adhered to by Baffinland and identified in Baffinland's Shipping and Marine Wildlife Management Plan including:

- Defined shipping lane throughout RSA.
- Maintain constant speed and course when possible.
- No breaking of landfast ice.
- Between the period of 01 July and 30 July, a maximum of one icebreaker transit (with escorted vessels) will occur per 24-hour period where ice concentrations of 6/10 or greater cannot be avoided along the shipping route.
- Between the period of 01 July and 30 July, a maximum of two icebreaker transits (with escorted vessels) will occur per 24-hour period where ice concentrations of 3/10 or greater cannot be avoided along the shipping route.
- All Project vessels will reduce speeds to a voluntary maximum of 9 knots when travelling within the RSA.
- Establishment of a 40-km buffer zone (set-back area) at the floe-edge (extending from the Nunavut Settlement Boundary).
- All icebreaking activities will be conducted outside of the period of ringed seal denning, pupping, nursing and breeding/mating periods.
- 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 not approach within 300 m of a walrus or polar bear observed on sea ice.
- 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.
- Baffinland will place Marine Wildlife Observers (via the Ship-based Observer program) on icebreaking vessels during the shoulder season that will be responsible for recording relative abundance, group composition and behavior of marine mammals, and if relevant any incidences of marine mammal strike of near misses with Project vessels.
- Posting of ice analyst on board icebreaking vessels.
- Project aircrafts (helicopter and airplanes) will maintain an altitude of 450 m over marine waters when possible.
- Establishment of restricted "no-go" zones to avoid key sensitive areas and hunting camp areas (Koluktoo Bay, Tremblay Sound, western shoreline of Milne Inlet).
- No drifting in Eclipse Sound.
- Maximum of three (3) vessels anchored at Ragged Island.
- Limiting vessel idling.

It is important to note that several of these mitigation measures have been implemented on a voluntary basis by Baffinland and exceed any applicable regulatory requirements in Canada. This suite of measures represents a more conservative practice of vessel traffic management than is demonstrated by any other industrial/commercial shipping operator or government vessel in the RSA (i.e., Canadian Coast Guard, DFO). Additionally, since receiving

approval from the NIRB on the Extension Request, Baffinland has worked with DFO to update Baffinland's commitments on the transit restrictions mitigations, which will apply beginning in summer 2021. The commitments are as follows:

1. Apply spring transit restriction mitigations as long as ice concentrations, as defined by the Canadian Ice Service, of greater than 3/10 persist along the Northern Shipping Route, or meet the obligations of applicable commitments to others if more conservative, to determine the earliest date for commencing the shipping season. Initiation of this commitment will begin in 2021.
2. Beginning in 2021, apply the following transit restriction mitigations in the fall:
  - When a continuous sailing route of open water and/or new ice (<10 cm) occurs between the entrance of Pond Inlet and Milne Port, then icebreaker transits and other unescorted vessels in the RSA may proceed under open-water operating conditions.
  - A maximum of two (2) transits or four (4) half transits will occur per day (24-h period) where grey ice (10 to 15 cm) cannot be avoided along the shipping route.
  - No breaking of landfast ice along the shipping route.

A supplementary table on Project mitigations and monitoring was also provided in response to FWS Comments from DFO on the PIP Extension Request. This table outlined how, for each potential effect associated with the shipping operations for the Project, a mitigation to minimize or eliminate the effect has been applied by Baffinland and also described associated monitoring results that support conclusions about the efficacy of those mitigations to the time of submission.

Mitigation measures currently implemented by Baffinland to manage adverse effects on marine mammals from shipping are routinely evaluated as part of the ongoing marine mammal monitoring programs. In 2020, monitoring programs included the 2020 Bruce Head Shore-based Monitoring Program (Golder, 2021e), the 2020 MMASP (Golder, 2021d), the 2019-2020 Underwater Acoustic Monitoring during Shoulder Season Shipping (Austin and Dofner, 2021) and the 2020 Passive Acoustic Monitoring (PAM) Program. The Ship-based Observer (SBO) Program could not be conducted in 2020 because of boarding restrictions for international vessels related to the COVID-19 Pandemic.

- a. Baffinland's Standing Instructions to Masters (SITM) (Fednav, 2020a; 2020b) identifies a "maximum vessel speed limit of 9 knots over ground beginning at the entrance to Pond Inlet (at 74 degrees longitude) through Eclipse Sound and throughout Milne Inlet". Project vessel speeds are tracked in real-time using the satellite-based Automatic Identification System (AIS), supported by two shore-based AIS base stations installed along the Northern Shipping Route (at Bruce Head and Pond Inlet).
- b. Not applicable in 2020 as the Southern Route is not active.

## RESULTS

- a. Mitigations outlined in the methods section above were successfully implemented by Baffinland in 2020.
- b. Table 4.29 presents vessel speed information for all Project-related vessels calling at Milne Port in 2020. A total of 72 ore carrier voyages (comprising 36 ore carrier vessels), 8 freight vessels/tanker voyages (comprising 5 vessels), 2 tugs, and 1 icebreaker called to Milne Port during the 2020 shipping season. Project vessels traveled below the 9-knot speed limit for 99.0% of their transit period in the RSA (Table 4.30). The

maximum recorded travel speed for an ore carrier in 2020 was 11.9 knots. The maximum recorded speed for a freight / fuel tanker in 2020 was 9.1 knots. The proportional breakdown of vessel travel speed in the RSA during the 2020 shipping season is presented for all vessels combined (ore carriers and cargo/fuel vessels) in Figure 4.15.

- c. Not applicable in 2020 as the Southern Shipping Route is not active.

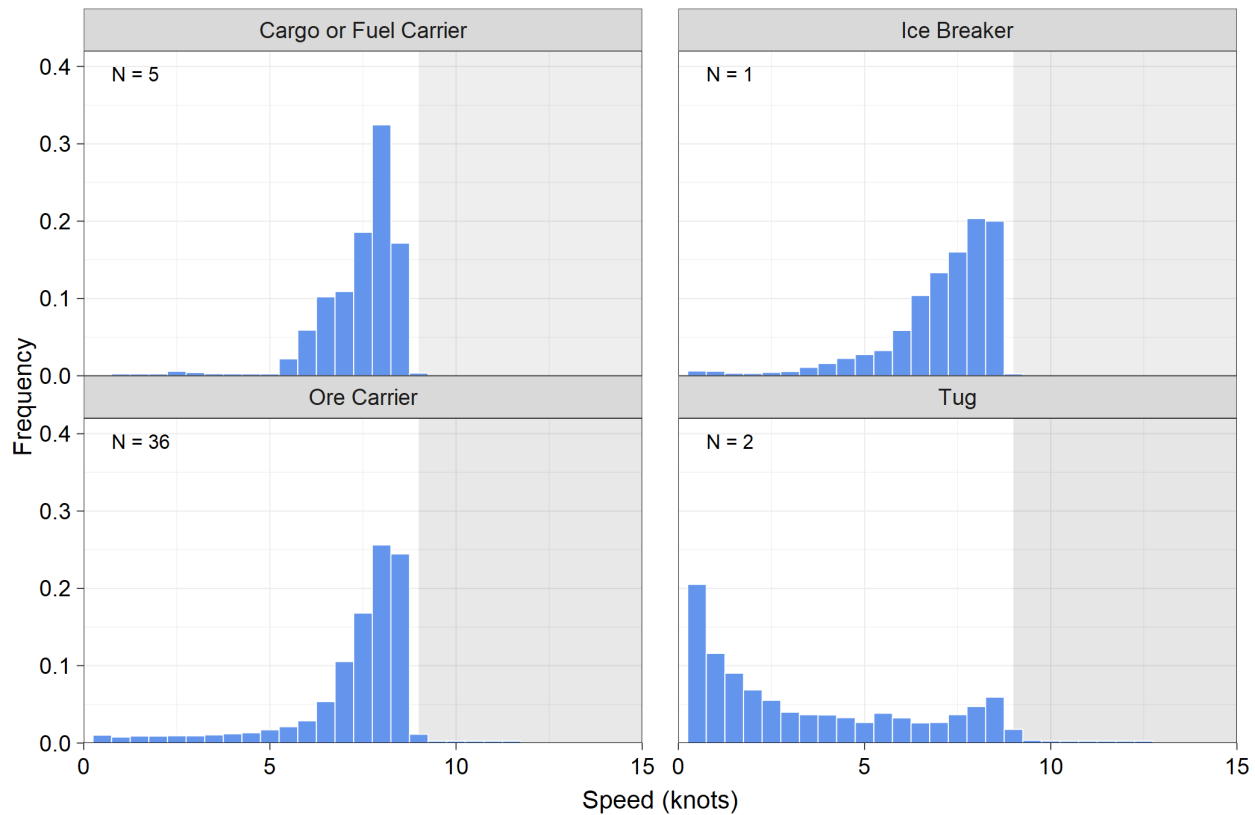
**Table 4.29: Recorded Speeds of Project Vessels transiting along Northern Shipping Route, 2020**

Vessel Name	No. of Round Trips	Vessel Type	Max Speed	Median Speed	% of travel >9knots	% of travel >10 knots
ADMIRAL SCHMIDT	3	Ore Carrier	11.9	8.5	8.92	8.05
AM QUEBEC	1	Ore Carrier	8.8	6.7	0	0
BULK DESTINY	1	Ore Carrier	8.9	7.5	0	0
DESPINA V	1	Ore Carrier	8.9	7.3	0	0
FLAG METTE	2	Ore Carrier	9.4	8	0.06	0
GEBE OLDENDORFF	1	Ore Carrier	9.7	8.2	0.47	0
GEORG OLDENDORFF	1	Ore Carrier	9.2	8.6	0.27	0
GISELA OLDENDORFF	2	Ore Carrier	8.9	8.1	0	0
GOLDEN AMBER	1	Ore Carrier	8.8	7.6	0	0
GOLDEN BULL	2	Ore Carrier	9.5	8.4	0.39	0
GOLDEN DIAMOND	1	Ore Carrier	8.9	7.3	0	0
GOLDEN ICE	2	Ore Carrier	9.3	8.3	0.07	0
GOLDEN OPAL	2	Ore Carrier	9.6	7.6	0.76	0
GOLDEN OPPORTUNITY	2	Ore Carrier	10	7.7	0.71	0
GOLDEN ROSE	1	Ore Carrier	9.1	7	0.01	0
GOLDEN RUBY	3	Ore Carrier	9.3	8.3	0.79	0
GOLDEN SAGUENAY	2	Ore Carrier	9	7.8	0	0
KUMPULA	1	Ore Carrier	9	8	0	0
M.V. GOLDEN BRILLIANT	3	Ore Carrier	10.8	8.1	0.85	0.15
NORDIC OASIS	4	Ore Carrier	9	7.4	0	0
NORDIC ODIN	3	Ore Carrier	9.1	8.5	0.05	0
NORDIC ODYSSEY	3	Ore Carrier	9	7.8	0	0
NORDIC OLYMPIC	3	Ore Carrier	8.9	8	0	0
NORDIC ORION	3	Ore Carrier	9.2	7.8	0.07	0
NORDIC OSHIMA	3	Ore Carrier	8.9	7.7	0	0
NS ENERGY	3	Ore Carrier	9.1	7.7	0.07	0
NS YAKUTIA	3	Ore Carrier	9.5	7.9	1.54	0
PABAL	1	Ore Carrier	9	8	0	0
PABUR	2	Ore Carrier	9.4	8.3	0.51	0
RIO GRITA	1	Ore Carrier	9.1	7.7	0.61	0

Vessel Name	No. of Round Trips	Vessel Type	Max Speed	Median Speed	% of travel >9knots	% of travel >10 knots
RIO TAMARA	3	Ore Carrier	10.1	8.1	0.64	0.01
SAGAR SAMRAT	2	Ore Carrier	9.3	8	0.85	0
SEA EXPRESS	1	Ore Carrier	9	8.4	0	0
SEA NEPTUNE	1	Ore Carrier	9.1	7.8	0.15	0
SEA PLUTO	1	Ore Carrier	9.5	8.5	4.92	0
VITUS BERING	3	Ore Carrier	9.4	8.5	0.40	0
DARA DESGAGNES	1	Cargo/Fuel	8.8	7.9	0	0
SARAH DESGAGNES	3	Cargo/Fuel	8.9	8	0	0
CLAUDE A. DESGAGNES	1	Cargo/Fuel	8.9	7.7	0	0
MIENA DESGAGNES	1	Cargo/Fuel	9.1	8.8	0.42	0
TAIGA DESGAGNES	2	Cargo/Fuel	9	7.2	0	0
MSV BOTNICA	Escort vessel	Ice Breaker	9.3	7.7	0.05	0
OCEAN RAYNALD T	1	Tug	12.7	2.5	2.18	0.42
OCEAN TAIGA	1	Tug	12.6	2.7	1.48	0.33

**Table 4.30: Proportion of Travel Time in RSA Relative to Speed Restriction – 2020 Shipping Season**

Project Vessel Type	% of travel in the RSA <9 knots	% of travel in the RSA <10 knots
Ore carriers	98.5	99.7
Cargo / freight vessels	99.9	100
Fuel tankers	100	100
Tugs	97.4	99.6
MSV Botnica	99.8	100
<b>Total</b>	<b>99.0</b>	<b>99.6</b>



**Figure 4.15: Proportional Ship Travel Speed for all Project-related Vessels - 2020 Shipping Season**

**Notes:**

All vessel speeds <0.5 knots were excluded from the analysis as it was assumed vessels were moored/anchored at this time.

**TRENDS**

- a. Underwater acoustic monitoring results and narwhal behavioural data collected to date have demonstrated that shipping noise in the RSA is lower than predicted in the FEIS and that behavioural effects from shipping on narwhal are limited to low-level disturbance effects that are localized and temporary in nature. This gives Baffinland confidence that its current mitigation measures (e.g., 9 knot speed restriction, 40-km buffer area at entrance of RSA, limited transits during early shoulder season, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA. However, the observed decrease in narwhal abundance in the RSA during 2020 is of concern to Baffinland, and further investigation is recommended with respect to the potential cause of this observed decrease. As previously noted above and in Golder (2021f), potential contributing factors include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA.
- b. There has been a marked improvement by Project vessel operators over the last three years in terms of adherence to the 9-knot speed restriction in the RSA. This has been largely the result of better communication between the Port Master/Baffinland Shipping and the vessel owners/operators, substantial updates made to the SITM regarding updated mitigation measures required by all Project vessels, the use

of a real-time AIS-based alert system that immediately informs the Port Master and Baffinland Shipping personnel of a non-compliance event such as a speed exceedance so that the issue can be quickly resolved, and the use of shipping monitors in Pond Inlet that actively track Project vessel movements in the RSA in real-time.

Table 4.31 provides the proportion of time Project vessels transited under 9 knots in the RSA for the 2018 to 2020 shipping seasons.

**Table 4.31: Proportion of Travel Time in RSA Relative to 9-knot Speed Restriction – 2018 to 2020 Shipping Seasons**

Project Vessel Type	2018	2019	2020
Ore carriers	93.7	99.3	98.5
Cargo / freight vessels	79.0	93.6	99.9
Fuel tankers	79.0	98.2	100
Tugs	85.7	94.5	97.4
MSV Botnica	92.5	99.7	99.8
<b>TOTAL</b>	<b>92.2</b>	<b>97.8</b>	<b>99.0</b>

- c. Not applicable in 2020 as the Southern Route is not active.

## RECOMMENDATIONS / LESSONS LEARNED

- a. The enhanced mitigation measures being proposed by Baffinland for the 2021 shipping season align with the options presented by Golder (2021f). Baffinland will delay shipping in 2021 until there is a continuous path between the entrance of Eclipse Sound and Milne Port of less than 9/10ths ice concentrations. This requirement will avoid impacting narwhal that concentrate in leads, as the leads are unlikely to exist in less than 9/10 ice concentrations. This will also minimize icebreaking noise, as it eliminates breaking of the thickest ice over a continuous period. Based on historical ice conditions, the average date less than 9/10ths ice has been continuous along the entire shipping route is July 27th, which is 8 days later than the average date landfast ice is completely broken (July 19th) and shipping would regularly be able to commence. The exact date the 2021 shipping season will commence will continue to be subject to variability in ice conditions. These newly proposed management measures will be communicated to the MEWG and the community of Pond Inlet as they are further developed.

The proposed additional mitigation being put forward aim to avoid and/or further minimize cumulative impacts on narwhal from Project icebreaking, even if the underlying causal factor(s) for the observed decrease in narwhal abundance in Eclipse Sound is unconfirmed. This precautionary approach will allow for a simultaneous investigation of potential causal factors of the observed change while adjusting current shipping operations to reliably manage impacts from icebreaking on narwhal in the RSA. Current mitigation measures are still deemed to be important, meaningful, valuable.

To better understand potential short-term, long-term and cumulative effects of icebreaker noise on narwhal during the early shoulder season and to assess the efficacy of existing and newly introduced mitigation measures in 2021, Baffinland will implement the following follow-up monitoring programs starting in 2021:

- 2021 MMASP
- 2021 Bruce Head Shore-based Monitoring Program
- 2021 PAM Program

Baffinland also intends to prioritize in 2021 planning for a 2022 early shoulder season narwhal tagging study to be designed in consultation with the MHTO, DFO and MEWG.

- b. In 2021, all Project vessels will continue to be provided with standing instructions to travel along the Northern Shipping Route at speeds not exceeding 9 knots. Baffinland will continue to monitor ship tracks and ship speeds using shore-based AIS stations installed at Pond Inlet and Bruce Head, and satellite-based ship tracking using the exactEarth® archive and alerts will be sent to vessels exceeding speed limits.
- c. Not applicable in 2020 as the Southern Shipping Route is not active.

## Project Certificate Condition No. 106

Category	Marine Environment - Shipboard Observers
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure that interactions with marine mammals and Project shipping activities are effectively monitored.
Term or Condition	The Proponent shall ensure that shipboard observers are employed during seasons where shipping occurs and provided with the means to effectively carry out assigned duties. The role of shipboard observers in shipping operations should be taken into consideration during the design of any ore carriers purpose-built for the Project, with climate controlled stations and shipboard lighting incorporated to permit visual sightings by shipboard observers during all seasons and conditions. Any shipboard lighting incorporated should be in accordance with the Canada Shipping Act, 2001's Collision Regulations, and should not interfere with safe navigation of the vessel.
Relevant Baffinland Commitment	N/A
Reporting Requirement	As-needed.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Marine Mammal Sightings by Vessel Type, June to October 2020 2018 MEWG Meeting Records (Baffinland, 2019d) 2020 MEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G.13

### METHODS

The Ship-based Observer (SBO) Program could not be implemented in 2020 due to boarding restrictions associated with the COVID-19 Pandemic. These measures were taken to ensure the health and safety of Nunavummiut, Baffinland staff and ship staff. As an alternative, Baffinland partnered with the Marine Mammal Observation Network (MMON) to pilot a marine mammal incidental sightings program through the participation of vessels contracted by Baffinland, the MSV Botnica and Nordic Bulk Carriers. The consideration of Baffinland partnering with MMON was first suggested during a MEWG meeting on June 6, 2018 since Groupe Desgagnés Inc. (including subsidiary Nunavut Sealink & Supply Inc.), a cargo sealift contractor to Baffinland, had been an active member of the program (Baffinland, 2019d). Virtual training was provided to participating vessel representatives in collaboration with Green Marine and MMON, which included instructions on how to report whale strikes should they occur, and recording of marine mammal sightings using MMON data collection protocols.

Previously, in order to ensure that interactions with marine mammals and Project shipping activities are effectively monitored, Baffinland developed the SBO Program to primarily monitor for potential ship strikes on marine



mammals and seabirds in the RSA, and secondarily to collect observational data on the presence, relative abundance and distribution of marine mammals and seabirds within the boundaries of the RSA relative to Project vessel operations. The SBO program is not structured as a systematic behavioural effects study and is not designed for assessing the behaviour of marine mammals around project vessels before, during and after exposure as there is no control. Baffinland has other monitoring programs designed for this purpose, such as the narwhal tagging program and the Bruce Head shore-based monitoring program.

The SBO Program was first run in 2013 to 2015 and was subsequently resumed in 2018 and 2019. The 2013 to 2015 SBO Program took place during the construction phase at Milne Port (2013 and 2014) and during Year 1 of shipping operations (2015). Baffinland has not designed or constructed purpose-built ore carriers as originally envisioned, therefore Baffinland relied on placing the observers aboard market vessels in order to conduct the monitoring. Fuel tanker and sealift vessel traffic in and out of Milne Port served as the SBO observation platform during the 2013 to 2015 program. Observers boarded the ship in Pond Inlet, disembarked at Milne Port and returned to Pond Inlet via community charter flight for the subsequent vessel boarding. The SBO Program was put on hold in 2016 due to concerns regarding safe onboarding of the observers on the vessels in Pond Inlet (as boarding occurred at sea).

In 2018–2019, the survey platform for the SBO Program was the MSV *Botnica*, an icebreaker that was commissioned by Baffinland to serve as an escort vessel to ore carriers at the beginning and end of the shipping season. The MSV *Botnica* provided a safe climate-controlled viewing platform 20 m above sea level, where Marine Wildlife Observers (MWOs) could comfortably and more effectively observe marine wildlife and environmental conditions (compared to onboard the industry platforms used in 2013 to 2015). Seabirds were monitored using the Canadian Wildlife Service (CWS)'s Eastern Canada Seabirds at Sea (ECSAS) protocol (Gjerdrum et al., 2012).

## RESULTS

Virtual training was successfully provided to representatives of the MSV *Botnica* and Nordic Ore Carriers on July 21, 2021.

A total of seven (7) vessels participated in the MMON pilot program (Table 4.27 in PC Condition No. 103). The majority of sightings (83%) were made by the MSV *Botnica*. Most sightings consisted of various seal species (Table 4.28 in PC Condition No. 103). Three (3) whale species were observed, including: bowhead whale, sperm whale, and killer whale.

Appendix G.13 includes locations of marine mammals sightings in the RSA between during months of July to October, 2020.

## TRENDS

No ship strikes on marine mammals have been recorded to date through any of the previously run SBO programs. Similarly, no ship strikes on marine mammals have been reported by ship operators since the start of the Project, including ore carriers, fuel/cargo ships and support tugs, and during reporting year 2020. The only seabird strike reported over six years of monitoring occurred during the 2019 SBO Program.

## RECOMMENDATIONS / LESSONS LEARNED

Safety concerns that were raised regarding the initial SBO program (that led to the postponement of the program in 2016) were mitigated through the use of the MSV *Botnica* as the survey platform and boarding the vessel in Milne Port in 2018 and 2019. This included on-board accommodation for Inuit observers to allow for regular wildlife

surveys over consecutive days. In doing so, the need to conduct at-sea boarding of observers on different survey vessels throughout the shipping season was no longer considered necessary.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2021 should COVID-19 Pandemic-related vessel boarding restrictions be lifted. Regardless of boarding restrictions still being in effect during the 2021 shipping season, Baffinland will continue with its incidental marine mammals sightings program in collaboration with MMON.

## Project Certificate Condition No. 107

Category	Marine Environment - Shipboard Observers
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To determine the presence of, and ensure that interactions with marine mammals, seabirds and seabirds are effectively monitored for, along the northern and southern shipping routes, as applicable.
Term or Condition	The Proponent shall revise the proposed “surveillance monitoring” to improve the likelihood of detecting strong marine mammal, seabird or seabird responses occurring too far ahead of the ship to be detectable by observers aboard the ore carriers. A baseline study early in the shipping operations could employ additional surveillance to detect potential changes in distribution patterns and behavior. At an ambitious scope, this might be achieved using unmanned aircraft flown ahead of ships, or over known areas of importance for seabirds or haul-out sites in the case of walrus, in accordance with the requirements of their Special Flight Operations Certificate.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2020 MEWG Meeting Records Draft 2020 Bruce Head Shore-based Monitoring Program (Golder, 2021e) Draft 2020 Marine Mammal Aerial Surveys (Golder, 2021d)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

### METHODS

In order to ensure that interactions with marine wildlife and Project shipping activities are effectively monitored, Baffinland developed the Ship-based Observer (SBO) Program to primarily monitor for potential ship strikes on marine mammals and seabirds in the RSA, and secondarily to collect observational data on the presence, relative abundance and distribution of marine mammals and seabirds within the boundaries of the RSA relative to Project vessel operations. The SBO program is not structured as a systematic behavioural effects study and is not designed for assessing the behaviour of marine mammals around project vessels before, during and after exposure as there is no control.

The Ship-based Observer (SBO) Program could not be implemented in 2020 due to boarding restrictions associated with the COVID-19 Pandemic. These measures were taken to ensure the health and safety of Nunavummiut, Baffinland staff and ship staff. As an alternative, Baffinland partnered with the Marine Mammal Observation Network (MMON) to pilot a marine mammal incidental sighting programs through the participation of vessels contracted by Baffinland, the MSV Botnica and Nordic Bulk Carriers. The consideration of Baffinland partnering with

MMON was first suggested during a MEWG meeting on June 6, 2018 since Groupe Desgagnés Inc. (including subsidiary Nunavut Sealink & Supply Inc.), a cargo sealift contractor to Baffinland, had been an active member of the program (Baffinland, 2019d). The SBO Program was first run in 2013 to 2015 and was subsequently resumed in 2018 and 2019. The 2013 to 2015 SBO Program took place during the construction phase at Milne Port (2013 and 2014) and during Year 1 of shipping operations (2015). As Baffinland had not designed or constructed purpose-built ore carriers as originally planned, there was reliance on placing the observers aboard market vessels in order to conduct the monitoring. Fuel tanker and sealift vessel traffic in and out of Milne Port served as the SBO observation platform during the 2013 to 2015 program. Observers boarded the ship in Pond Inlet, disembarked at Milne Port and returned to Pond Inlet via community charter flight for the subsequent vessel boarding. The SBO Program was put on hold in 2016 due to concerns regarding safe onboarding of the observers on the vessels in Pond Inlet (as boarding occurred at sea).

In 2018 to 2019, the survey platform for the SBO Program was the MSV *Botnica*, an icebreaker that was commissioned by Baffinland to serve as an escort vessel to ore carriers at the beginning and end of the shipping season. The MSV *Botnica* provided a safe climate-controlled viewing platform 20 m above sea level, where Marine Wildlife Observers (MWOs) could comfortably and more effectively (compared to onboard the industry platforms used in 2013 to 2015) observe marine wildlife and environmental conditions. Seabirds were monitored using the Canadian Wildlife Service (CWS)'s Eastern Canada Seabirds at Sea (ECSAS) protocol (Gjerdrum et al., 2012).

The establishment of surveillance monitoring programs other than SBO are capable of better understanding potential changes in marine mammal distribution patterns and behaviour, and in so doing improve the likelihood of detecting and understanding potential strong marine mammal responses occurring too far ahead of the ship to be detectable by observers aboard the carriers. These programs include the Bruce Head Shore-based Monitoring Program, the Underwater Acoustic Monitoring Program, and the marine mammal aerial surveys. Additional information is available in PC Condition Nos. 99, 101, 105, 109, 110, and 111.

In addition to monitoring conducted from vessels, Baffinland has also contributed funding to various research programs seabird ecology led through partnerships with ECCC-CWS and various universities (Baffinland, 2020n). The most recent three-year research initiative, "Using cutting-edge biologging and physiological tools to map environmental sensitivities in the Arctic: application to shipping associated with Baffinland Iron Mines", funded through an Natural Science and Engineering Research Council (NSERC)-Collaborative Research and Development Grant (CRDG) became effective in December 2019 aims, in part, to develop innovative techniques to study the potential impacts of marine shipping on seabirds.

## RESULTS

Detailed results for the 2020 Incidental Marine Mammals Sightings Pilot Program are presented as part of Summary Sheet for PC Condition No. 106. A total of seven (7) vessels participated in the MMON pilot program (Table 4.27 in PC Condition No. 103) in 2020. The majority of reported sightings (83%) were made by the MSV *Botnica*. Most sightings consisted of various seal species (Table 4.28 in PC Condition No. 103). Three whale species were observed including bowhead whale, sperm whale, and killer whale.

Seabird sightings using the ECSAS protocol were not possible in 2020 since the SBO program did not run.

Field work related to the NSERC-CRDG research program was not possible due to travel restrictions related to the COVID-19 Pandemic.

Baffinland completed early shoulder season marine mammal aerial surveys just prior and during first days of the shipping season being initiated in July 2020. The aim of these reconnaissance surveys was to collect data on the presence/absence and distribution of marine mammals in the RSA in relation to ice conditions (for additional information refer to Summary Sheet for PC Condition No. 101, and 109). The information gathered on marine mammal distribution was communicated during daily shipping briefings with representatives from Baffinland's Shipping, Sustainable Development, Operations teams, and Fednav (including ice analysts). Sightings information was subsequently relayed to vessel captains so that they were made aware of locations of marine mammals in the area during their transit through the RSA in the presence of ice.

#### **TRENDS**

No ship strikes on marine mammals have been recorded to date through any of the previously run SBO programs. Similarly, no ship strikes on marine mammals have been reported by ship operators since the start of the Project, including ore carriers, fuel/cargo ships and support tugs, and during reporting year 2020. The only seabird strike reported over six years of monitoring occurred during the 2019 SBO Program.

Results from past SBO Programs (i.e., pre-2020) suggest that marine mammals in the RSA are not demonstrating large-scale displacement or abandonment from the RSA during or following icebreaking operations, and that mitigation measures implemented during previous early shoulder season had demonstrated to be effective.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Safety concerns that were raised regarding the initial SBO program (that led to the postponement of the program in 2016) were mitigated through the use of the MSV *Botnica* as the survey platform and boarding the vessel in Milne Port in 2018 and 2019. This included on-board accommodation for Inuit observers to allow for regular wildlife surveys over consecutive days. In doing so, the need to conduct at-sea boarding of observers on different survey vessels was no longer necessary.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2021 should COVID-19 Pandemic-related vessel boarding restrictions be lifted. Regardless of boarding restrictions still being in effect during the 2021 shipping season, Baffinland will continue with its incidental marine mammals sightings program in collaboration with MMON.

As work progresses by ECCC-CWS and various university researchers over the next few years on the newly funded seabird ecology and shipping research projects, Baffinland will include seabird data that is relevant to the Project's shipping operations.

## Project Certificate Condition No. 108

Category	Marine Environment - Shipboard Observers
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations
Objective	To ensure that interactions with marine mammals, seabirds, and seaducks are effectively monitored for along the southern and northern shipping routes, as applicable.
Term or Condition	The Proponent shall ensure that data produced by the surveillance monitoring program is analysed rigorously by experienced analysts (in addition to being discussed as proposed in the FEIS) to maximize their effectiveness in providing baseline information, and for detecting potential effects of the project on marine mammals, seabirds and seaducks in the Regional Study Area. It is expected that data from the long-term monitoring program be treated with the same rigor.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Southern Route – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2020 MEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

### METHODS

In order to ensure that interactions with marine mammals and Project shipping activities are effectively monitored, Baffinland developed the SBO Program to primarily monitor for potential ship strikes on marine mammals and seabirds in the RSA, and to secondarily collect observational data on the presence, relative abundance and distribution of marine mammals and seabirds within the boundaries of the RSA relative to Project vessel operations. The SBO program is not structured as a systematic behavioural effects study and is not designed for assessing the behaviour of marine mammals around project vessels before, during and after exposure as there is no control.

All data that are collected as part of Baffinland's numerous monitoring programs and subsequent data analysis and interpretation are completed by experienced analysts capable of running statistical analyses and interpreting data. Baffinland hires third-party experts to implement its monitoring programs that are specialized in various topics related to marine wildlife and statistical analysis. Completed reports included credential of lead authors, professional designations (e.g., Registered Professional Biologist) and academic formation (e.g., Master of Science [MSc], Doctorate of Philosophy [PhD]). Alternatively, Baffinland has partnered with governmental agencies (e.g., ECC-CWS) and academic researchers from various universities to complete work, which includes data analysis and interpretation by experienced analysts.

Unlike years prior to 2020 (more details on monitoring programs previously implemented provided below), the Ship-based Observer (SBO) Program could not be implemented due to boarding restrictions related to the COVID-19

Pandemic. As an alternative, Baffinland partnered with the Marine Mammal Observation Network (MMON) to pilot a marine mammal incidental sighting programs through the participation of vessels contracted by Baffinland, the MSV *Botnica* and Nordic Bulk Carriers. The consideration of Baffinland partnering with MMON was first suggested during a MEWG meeting on June 6, 2018 since Groupe Desgagnés Inc. (including subsidiary Nunavut Sealink & Supply Inc.), a cargo sealift contractor to Baffinland, had been an active member of the program (Baffinland, 2019d). The SBO Program was first run in 2013 to 2015 and was subsequently resumed in 2018 and 2019. The 2013 to 2015 SBO Program took place during the construction phase at Milne Port (2013 and 2014) and during Year 1 of shipping operations (2015). As Baffinland had not designed or constructed purpose-built ore carriers as originally planned, there was reliance on placing the observers aboard market vessels in order to conduct the monitoring. Fuel tanker and sealift vessel traffic in and out of Milne Port served as the SBO observation platform during the 2013 to 2015 program. Observers boarded the ship in Pond Inlet, disembarked at Milne Port and returned to Pond Inlet via community charter flight for the subsequent vessel boarding. The SBO Program was put on hold in 2016 due to concerns regarding safe onboarding of the observers on the vessels in Pond Inlet (as boarding occurred at sea).

In 2018 to 2019, the survey platform for the SBO Program was the MSV *Botnica*, an icebreaker that was commissioned by Baffinland to serve as an escort vessel to ore carriers at the beginning and end of the shipping season. The MSV *Botnica* provided a safe climate-controlled viewing platform 20 m above sea level, where Marine Wildlife Observers (MWOs) could comfortably and more effectively (compared to onboard the industry platforms used in 2013 to 2015) observe marine wildlife and environmental conditions. The MSV *Botnica* provided a safe climate-controlled viewing platform 20 m above sea level, where MWOs could comfortably and effectively observe marine wildlife and environmental conditions. Seabirds were monitored using the Canadian Wildlife Service (CWS)'s Eastern Canada Seabirds at Sea (ECSAS) protocol. Following completion of the field program, the marine mammal and seabird sightings data collected in the RSA as part of the SBO surveillance monitoring program is analysed rigorously by experienced marine mammal and seabird data analysts using industry best practice methodology (Thomas et al., 2010; Gjerdrum et al., 2012; Bolduc and Fifield, 2017; OBIS, 2019).

In addition to monitoring conducted from vessels, Baffinland has also contributed funding to various research programs seabird ecology led through partnerships with ECCC-CWS and various universities (Baffinland, 2020n). The most recent three-year research initiative, “Using cutting-edge biologging and physiological tools to map environmental sensitivities in the Arctic: application to shipping associated with Baffinland Iron Mines”, funded through an Natural Science and Engineering Research Council-Collaborative Research and Development Grant became effective in December 2019 (though will be extended due to inability of completing field work in 2020 and 2021 because of COVID-19 Pandemic restrictions) aims, in part, to develop innovative techniques to study the potential impacts of marine shipping on seabirds.

## RESULTS

Detailed results for the 2020 Incidental Marine Mammals Sightings Pilot Program are presented as part of Summary Sheet for PC Condition No. 106. A total of seven (7) vessels participated in the MMON pilot program (Table 4.27 in PC Condition No. 103). The majority of sightings (83%) were made by the MSV *Botnica*. Most sightings consisted of various seal species (Table 4.28 in PC Condition No. 103). Three whale species were observed including bowhead whale (second year of sighting), sperm whale, and killer whale.

Seabird sightings using the ECSAS protocol were not possible in 2020 since the SBO program did not run.

Field work related to the Natural Science and Engineering Research Council (NSERC)-Collaborative Research and Development Grant (CRDG) was not possible due to travel restrictions related to the COVID-19 Pandemic.

### **TRENDS**

No ship strikes on marine mammals have been recorded to date through any of the previously run SBO programs. Similarly, no ship strikes on marine mammals have been reported by ship operators since the start of the Project, including ore carriers, fuel/cargo ships and support tugs, and during reporting year 2020. The only seabird strike reported over six years of monitoring occurred during the 2019 SBO Program.

Results from past SBO Programs (i.e., pre-2020) suggest that marine mammals in the RSA are not demonstrating large-scale displacement or abandonment from the RSA during or following icebreaking operations, and that mitigation measures implemented during previous early shoulder season (i.e., 2019) had demonstrated to be effective.

### **RECOMMENDATIONS / LESSONS LEARNED**

Safety concerns that were raised regarding the initial SBO program (that led to the postponement of the program in 2016) were mitigated through the use of the MSV *Botnica* as the survey platform and boarding the vessel in Milne Port in 2018 and 2019. This included on-board accommodation for Inuit observers to allow for regular wildlife surveys over consecutive days. In doing so, the need to conduct at-sea boarding of observers on different survey vessels was no longer necessary.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2021 should COVID-19 Pandemic-related vessel boarding restrictions be lifted. Regardless of boarding restrictions still being in effect during the 2021 shipping season, Baffinland will continue with its incidental marine mammals sightings program in collaboration with MMON.

As work progresses by ECCC-CWS and various university researchers over the next few years on the newly funded seabird ecology and shipping research project, Baffinland will include seabird data that is relevant to the Project's shipping operations.



## Project Certificate Condition No. 109

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To prevent impacts to marine mammals from Project shipping activities.
Term or Condition	The Proponent shall conduct a monitoring program to confirm the predictions in the FEIS with respect to disturbance effects from ships noise on the distribution and occurrence of marine mammals. The survey shall be designed to address effects during the shipping seasons, and include locations in Hudson Strait and Foxe Basin, Milne Inlet, Eclipse Sound and Pond Inlet. The survey shall continue over a sufficiently lengthy period to determine the extent to which habituation occurs for narwhal, beluga, bowhead and walrus.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port - Not Active Milne Port - Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	2019 PAM Program Report (Frouin-Mouy et al., 2020) Draft 2020 Marine Mammal Aerial Survey Report (Golder, 2021d) Draft 2020 Bruce Head Shore-based Monitoring Program (Golder, 2021e) Draft 2019-2020 Underwater Acoustic Monitoring during Shoulder Season Shipping (Austin and Dofher, 2021) 2020 MEWG Meeting Records 2017/2018 Narwhal Tagging Study Report (Golder, 2020f) Preliminary Summary of 2020 Narwhal Monitoring Programs (Golder, 2021f)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

### METHODS

No studies were conducted along the Southern Shipping Route (e.g., Hudson Strait or Foxe Basin), as this phase of the Project is currently inactive.

Monitoring programs conducted along the Northern Shipping Route and corresponding analyses undertaken in 2020 used a 'multiple lines of evidence' approach to confirm predictions in the FEIS with respect to disturbance effects from ships noise on the distribution and occurrence of marine mammals along the Northern Shipping Route. In the FEIS, it was predicted that marine mammal behavioural responses to ship noise would be limited to temporary, short-term avoidance behaviour, consistent with low to moderate severity responses. No large-scale avoidance behaviour, displacement effects, or abandonment of the summering grounds (high severity responses) are predicted to occur.

In 2020, monitoring programs used visual, acoustic and remote sensing techniques to assess changes in marine mammal distribution and abundance within the RSA, and behavioural responses of narwhal and other marine mammals to ship noise. The 2020 monitoring programs included the 2020 Bruce Head Shore-based Monitoring Program, the 2020 MMASP, the 2019-2020 Underwater Acoustic Monitoring of Shoulder Season Shipping Program, the 2020 PAM Program, and the 2020 Incidental Marine Mammals Sightings Pilot Program. No narwhal tagging was conducted in 2020 but results from past narwhal tagging programs continue to inform ongoing monitoring programs and adaptive management for the Project, including information on potential habituation of shipping by narwhal. Collectively, these multi-year monitoring programs provide for a comprehensive evaluation of potential ship noise effects on marine mammals during the entire shipping period and throughout the life of the Project.

Detailed methodology and analytical procedures of the 2020 monitoring programs are available in the respective 2020 annual monitoring reports (Golder, 2021d, 2021e; Austin and Dofher, 2021), with a brief overview provided below (by monitoring program).

#### **2020 MMASP:**

In 2020, marine mammal aerial surveys were conducted in the North Baffin area during the early shoulder season (July) and the peak open-water season (August) as part of the 2020 Marine Mammal Aerial Survey Program (MMASP). Two different aerial surveys were performed in 2020. 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 specific to available ice conditions at that time of year. 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.

The 2020 MMASP was approved by the MHTO. DFO and other MEWG members were actively consulted on the study design and data collection methods during 2020 MEWG Meetings (Appendix C.1). Input and recommendations provided by these parties were incorporated into the program. Detailed methodology and analytical procedures of the 2020 MMASP are presented in Golder (2021d).

#### **2020 Bruce Head Shore-based Monitoring Program:**

Baffinland undertook a shore-based narwhal monitoring program at Bruce Head from 2013–2017<sup>3</sup> and again in 2019 and 2020<sup>4</sup>. The objective of the Bruce Head shore-based monitoring study is to investigate narwhal response to shipping activities along the Northern Shipping Route in Milne Inlet. During the open-water season of 2020, visual survey data were collected from a cliff-based observation platform at Bruce Head overlooking the nominal shipping route. Data was collected systematically on the relative abundance and distribution (RAD) and group composition of narwhal. Additional data were 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 that may also affect narwhal behaviour. Data were also collected via Unmanned Aerial Vehicle (UAV) surveys to 1) evaluate narwhal detection ability by the shore-based visual observers across the variable strata distances, and 2) to undertake focal follows of individual narwhal groups to better assess narwhal behavioural

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<sup>3</sup> 2013 represented a pilot study year for the shore-based monitoring program.

<sup>4</sup> A Bruce Head vessel-based narwhal monitoring program pilot study was conducted in 2018 instead of a shore-based study due to safety concerns following a damaged observation platform that prevented safe implementation of the land-based program.

responses to vessel presence. Detailed methodology and analytical procedures of the 2020 Bruce Head Shore-based Monitoring Program are presented in Golder (2021e).

***2019-2020 Underwater Acoustic Monitoring during Shoulder Season Shipping:***

Two (2) underwater acoustic recorders were deployed along the Northern Shipping Route on 29 September 2019 to record sound generated from the icebreaker MSV *Botnica* during the late shoulder season. One acoustic recorder was deployed in Eclipse Sound, near the southwest end of Bylot Island, and the other was deployed in northern Milne Inlet near Ragged Island. To extend their battery life, the recorders were programmed to stop recording through the winter, from 12 October 2019 to 17 July 2020, so they could continue to record noise from icebreaker transits during the 2020 ‘early shoulder’ season. The recorders were retrieved on 5 September 2020 for data analysis.

Sound pressure levels (SPLs) were recorded during each of the analyzed icebreaker transits, both with and without vessels under escort. Two standard metrics of vessel noise emissions, radiated noise levels and monopole source levels, were estimated for each transit of the MSV *Botnica*. Also computed was the 90th percentile distance between the MSV *Botnica* and the recorder at which sound levels exceeded the 120 Decibels (dB) re 1  $\mu$ Pa disturbance threshold, and the corresponding exposure duration.

Detailed methodology on data collection and analytical procedures for the 2020 Passive Acoustic Monitoring Program are presented in Austin and Dofher (2021).

***2020 PAM Program:***

In 2020, an underwater acoustic recorder was deployed in the Behavioural Study Area (BSA) at Bruce Head. The objective was to collect acoustic data during the open water season concurrent with visual observer data collected as part of the 2020 Bruce Head Shore-based Monitoring Program. Detailed methodology on data collection procedures for the 2020 PAM Program are similar to that employed for the 2019 PAM Program, as presented in Frouin-Mouy et al. (2020). The 2020 PAM data is presently being archived for possible future analyses as required for the Project.

***2020 Incidental Marine Mammals Sightings Pilot Program:***

In order to ensure that interactions with marine mammals and Project shipping activities are effectively monitored, Baffinland developed the Ship-based Observer (SBO) Program to monitor for potential ship strikes on marine mammals and seabirds in the RSA and to collect observational data on the presence, relative abundance and distribution of marine mammals and seabirds within the boundaries of the RSA relative to Project vessel operations.

The SBO Program was first run in 2013–2015 and was subsequently resumed in 2018 and 2019. In 2018–2019, the survey platform for the SBO Program was the MSV *Botnica*, an icebreaker that was commissioned by Baffinland to serve as an escort vessel to ore carriers at the beginning and end of the shipping season. The MSV *Botnica* provided a safe climate-controlled viewing platform 20 m above sea level, where Marine Wildlife Observers (MWOs) could comfortably and effectively observe marine wildlife and environmental conditions. Seabirds were monitored using the Canadian Wildlife Service (CWS)’s Eastern Canada Seabirds at Sea (ECSAS) protocol (Gjerdrum et al., 2012).

Because of health concerns related to the COVID-19 Pandemic, external observers were not allowed to board the Baffinland vessels in 2020. As such, Baffinland entered in an agreement with the Marine Mammal Observation Network (MMON) to conduct a pilot project for tracking incidental sightings through the MSV *Botnica* and six Nordic ore carrying vessels. A training session was provided to vessel representatives by Green Marine/MMON on

21 July, 2020. Vessel operators were responsible for collecting marine mammal incidental sightings data between July and October 2020 using data protocols developed by MMON.

### ***Determination of Habituation***

With respect to the third component of this condition (PC Condition No. 109), which states that “The survey shall continue over a sufficiently lengthy period to determine the extent to which habituation occurs for narwhal, beluga, bowhead and walrus.” This statement implies that shipping will undisputedly trigger an initial measurable reaction in a marine mammal, and that the elicited reaction will either be re-demonstrated during each subsequent exposure or that the reaction will soften over time. As written, there is no consideration of the possibility that the initial reaction of an animal could be either ‘no reaction’ or minor enough that habituation is not biologically warranted or necessary. The underlying assumption is that habituation is a net benefit to the animal given the nature of the effect, regardless of the type of response marine mammals in the RSA may demonstrate to shipping. If the proposed behavioral response of marine mammals to shipping is limited to a low-level response (i.e., localized and temporary avoidance), as predicted in the FEIS and FEIS Addendum for the ERP, and as observed for narwhal in the integrated monitoring programs, then the Project Certificate requirement for a receptor species to demonstrate habituation is unsubstantiated. For example, the upper extent of behavioural response shown by narwhal to shipping based on monitoring results to date consists of a temporary reversible change in movement (limited to several response variables) that only occurs in close proximity to vessels (up to a maximum of 5 km) and occurs over a maximum period of 34 min per vessel transit (Golder, 2020f). Any further ‘softening’ in this type of low-level behavioural response to shipping would have the potential to introduce a new threat to the animal such as a ship strike because animals would not be moving out of the way of vessels. There is no ‘biological rule’ that an animal will demonstrate measurable habituation to a given stimuli. One needs to take into account the contextual aspects of the interaction (e.g., the nature of the response observed, the behavioural state of the animal during exposure, the degree of familiarity with the stimuli, the proximity of the source, the overall level of perceived threat presented by the stimuli, etc.). This is consistent with the most current understanding of this topic within the scientific community, that context is an important factor when predicting the probability of behavioural effects (Williams et al., 2014; Gomez et al., 2016; Southall et al., 2007; 2019; Finneran et al., 2017).

### **RESULTS**

Detailed results of the 2020 monitoring programs are available in the respective 2020 annual monitoring reports (Golder, 2021d, 2021e; Austin and Dofher, 2021), with a brief overview provided below (by monitoring program).

#### ***2020 MMASP:***

- a. A total of eleven different species of marine mammals were observed during the 2020 aerial surveys: narwhal, bowhead whale, beluga whale, killer whale, sperm whale, ringed seal, harp seal, bearded seal, hooded seal, walrus, and polar bear.

Results from the Leg 1 survey (early shoulder season) indicated that prior to the start of icebreaking in 2020, few narwhal had progressed into Milne Inlet due to a large consolidated ice field present in Western Eclipse which appeared to impede southbound access. Narwhal were largely concentrated within this ice field amongst several prominent ice leads when icebreaking began. This differed from 2019, when more narwhal had progressed into Milne Inlet prior to the start of icebreaking due to lighter ice conditions that year. In both years, narwhal were also present in northern Navy Board Inlet and east of Pond Inlet prior to the start of icebreaking. Detailed results for Leg 1 are presented in Golder (2021d)

Results from the Leg 2 survey (i.e., the systematic marine mammal abundance survey conducted during the open-water season) indicated that: i) narwhal abundance in Eclipse Sound was statistically lower in 2020 than observed in previous years when aerial surveys were conducted (i.e., 2013, 2016 and 2019), and ii) the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was similar in 2020 to that observed in previous years (2013 and 2019). These results suggest either a potential displacement of a portion of the Eclipse Sound stock to the Admiralty Inlet summering ground during the summer of 2020, a potential displacement of these animals to another area (e.g., Eastern Baffin Bay summering ground), or a potential decrease in the Eclipse Sound summer stock. Detailed results for Leg 2 are presented in Golder (2021d).

In consideration of the above findings, it is evident that there was a statistically significant decrease in the abundance of the Eclipse Sound narwhal stock in 2020 that requires further investigation. Potential contributing factors to the observed lower numbers of narwhal in the RSA during 2020 include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA. At present, it is understood that these may have acted independently, or in a cumulative or additive manner. A preliminary analysis of these factors is provided in Golder (2021f).

#### **2020 Bruce Head Shore-based Monitoring Program:**

Results from the 2020 shore-based monitoring at Bruce Head indicate a lower relative abundance of narwhal in the study area than in previous years (2014-2017 and 2019). This aligns with 2020 aerial survey results indicating a lower abundance of the Eclipse Sound summer stock in 2020 (see update provided in 101-e). However, narwhal calf ratio (i.e., a proxy for reproductive success) was shown to remain consistent with pre-shipping conditions, despite year-over-year increases in shipping in the RSA from 2014 to 2019.

The observed finding of a lower relative abundance of narwhal at Bruce Head in 2020, coincident with the 2020 MMASP finding of a significant decrease in the abundance of the Eclipse Sound narwhal stock in the RSA, has triggered further detailed investigation on the root cause and implementation of precautionary based mitigation measures for application in 2021, as described above, as well as in Condition No. 101 and in Golder (2021f).

Other results from the 2020 Bruce Head shore-based monitoring program are as follows:

- A significantly lower number of narwhal sightings occurred in the Bruce Head stratified study area (SSA) during a vessel transit, but only when vessels occurred in close proximity to narwhal (i.e., 1–2 km from vessel for northbound vessels, and 3–4 km for southbound vessels).
- The integrated multi-year dataset for narwhal group composition and behaviour indicated that vessel traffic and associated noise did not result in a significant change in any of the response variables considered (i.e., group size, group composition, group spread, group formation, group direction, travel speed, and distance from shore).
- In 2020, a total of 84 narwhal focal follow surveys were successfully undertaken in the RSA (near Bruce Head and Koluktoo Bay) using a UAV-based video system (representing 7.3 h of recorded behaviour). This included 16 focal follows when ships were present (representing 1.3 h of recorded behaviour) and 68 focal follows when ships were absent (representing 6.0 h of recorded behaviour). Primary behaviors assessed included travelling (i.e., directional movement), milling (i.e., non-directional movement), resting (i.e., not moving/logging or moving slightly), and social behavior (i.e., clear interaction between individuals with

physical contact). Of the followed groups, narwhal spent the majority of time travelling (65% of the time), followed by milling (20% of the time), resting (12% of the time) and social behaviours (3% of the time). The proportion of time groups spent travelling was similar when vessels were present compared to when vessels were absent (71% and 64%, respectively). Similarly, narwhal spent a similar proportion of time resting, milling and performing social behaviours when vessels were present (17%, 10% and 1%, respectively) compared to when vessels were absent (10%, 22% and 4%, respectively). While narwhal groups were shown to spend similar proportions of time in “loose” and “tight” group formation (i.e., 48% and 51%, respectively), the proportion of time that groups spent in tight formation was slightly higher when a vessel was present (57% of the time) compared to periods when no vessels were present (46% of the time). In terms of relative position of mother to offspring, immature narwhal were most commonly observed below their mother (compared to beside, behind or above their mother), in both presence and absence of shipping. The proportion of time immature narwhal maintained this position was slightly higher when vessels were present compared to when no vessels were present (69% and 53%, respectively). However, the proportion of time that mothers and their dependent young were tightly associated with one another was similar in the presence of vessels (79%) compared to periods when no vessels were present (76%). Additional monitoring is required to increase the sample size of focal follow surveys conducted in the presence of vessel traffic (give the current sample size is limited to 1.3 h of observational data only).

- Multiple observations of nursing behaviour in the Bruce Head area in 2020 offers some evidence that female narwhal with dependent young continue to carry out critical life functions in the presence of vessel traffic during the open-water season.

Detailed results of the 2020 Bruce Head Shore-based Monitoring Program are presented in Golder (2021e).

#### ***2019-2020 Underwater Acoustic Monitoring during Shoulder Season Shipping:***

Underwater noise was analyzed for a total of 17 one-way transits of the MSV Botnica in Eclipse Sound (8 in the 2019 late shoulder season and 9 in the 2020 early shoulder season) and 18 one-way transits in northern Milne Inlet (7 in the 2019 late shoulder season and 11 in the 2020 early shoulder season). All transits recorded during the 2019 fall shoulder season occurred in open water (0/10 ice concentration). Transits recorded during the 2020 early shoulder season included both open-water and ice-covered conditions, with ice concentrations ranging between 0/10 and 9/10. During the analyzed transits, the MSV Botnica either transited alone or with 1 to 4 other vessels in escort (including ore carriers and tugs).

Although the MSV Botnica was shown to periodically generate high intensity sound while transiting through ice, findings suggest that these periods are brief and intermittent (i.e., on the order of minutes or less). Furthermore, the spatial extent of the noise field and the duration of exposure associated with disturbance effects (>120 dB re 1 uPa RMS) was shown to increase by only a small amount when additional vessels were added to the convoy, and when ice concentration increased, but by no more than the variability observed of the MSV Botnica in varying conditions on its own.

The results of this analysis were also compared with modelling estimates that were calculated as part of the icebreaking assessment (Golder, 2019a) and confirmed that the assumptions used in the acoustic modeling led to overestimates of the real sound levels experienced by narwhal, as the modelling was intentionally conservative. Results demonstrated that the measured per-transit noise exposure periods exceeding 120 dB re 1  $\mu$ Pa were approximately 80-90% lower than modelling estimates when the icebreaker was actively breaking ice (3/10 to 9/10),

and > 60% lower than modelled estimates when the icebreaker was traveling in open water. Based on the acoustic modelling results of shoulder season shipping, a stationary narwhal in Eclipse Sound was predicted to experience sounds  $\geq 120$  dB re 1  $\mu$ Pa for between 0.7 and 9.5 hours per vessel transit, dependent on transit scenario and ice concentration (Quijano et al., 2019), while measured exposure durations have since been shown to range between only 0.17 and 1.08 hours (Austin and Dofher, 2021). The maximum exposure duration calculated  $\geq 120$  dB re 1  $\mu$ Pa (i.e., 1.08 hours) occurred on 22 July 2020 during which time the MSV Botnica was transiting at 7.3 knots through 9/10 ice concentration with no vessels in escort.

#### **2020 Incidental Marine Mammals Sightings Pilot Program:**

Detailed results for the 2020 Incidental Marine Mammals Sightings Pilot Program are presented in Tables 4.27 and 4.28 of PC Condition No. 103. Overall, 29 marine mammal sightings representing seven different species were reported from seven project-related vessels in the RSA in 2020.

#### **TRENDS**

Acoustic monitoring results and narwhal behavioural data available to date have demonstrated that shipping noise in the RSA is lower than predicted in the FEIS and that behavioural effects from shipping on narwhal are limited to low-level disturbance effects that are localized and temporary in nature. This gives Baffinland confidence that its current mitigation measures (e.g., 9 knot speed restriction, 40-km buffer area at entrance of RSA, limited transits during early shoulder season, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA. However, the observed decrease in narwhal abundance in the RSA during 2020 is of concern to Baffinland, and further investigation is recommended with respect to the potential cause of this observed decrease. As previously noted above and in Golder (2021f), potential contributing factors include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA.

#### **RECOMMENDATIONS / LESSONS LEARNED**

To better understand potential short-term, long-term and cumulative effects of icebreaker noise on narwhal during the early shoulder season and to assess the efficacy of existing and newly introduced mitigation measures in 2021, Baffinland will implement the following follow-up monitoring programs starting in 2021:

- 2021 MMASP
- 2021 Bruce Head Shore-based Monitoring Program
- 2021 Passive Acoustic Monitoring (PAM) Program

Baffinland also intends to prioritize in 2021 planning for a 2022 early shoulder season narwhal tagging study to be designed in consultation with the MHTO, DFO and MEWG.

Given the success of the recently modified SBO program, a similar program as completed in 2018–2019 remains under consideration for implementation in 2020, though recent COVID-19 travel restrictions may limit in-person involvement in this program by local Inuit and contracted MWOs.

## Project Certificate Condition No. 110

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operations
Objective	To prevent impacts to marine mammals from Project shipping activities.
Term or Condition	The Proponent shall immediately develop a monitoring protocol that includes, but is not limited to, acoustical monitoring, to facilitate assessment of the potential short term, long term, and cumulative effects of vessel noise on marine mammals and marine mammal populations. The Proponent is expected to work with the Marine Environment Working Group to determine appropriate early warning indicator(s) that will ensure rapid identification of negative impacts along the southern and northern shipping routes.
Relevant Baffinland Commitment	84
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	2019 PAM Program Report (Frouin-Mouy et al., 2020) 2017/2018 Narwhal Tagging Study Report (Golder, 2020h) Draft 2020 Marine Mammal Aerial Survey Report (Golder, 2021d) Draft 2020 Bruce Head Shore-based Monitoring Program (Golder, 2021e) Draft 2020 Underwater Acoustic Monitoring BIM Shoulder Season Shipping 2019-2020 (Austin and Dofher, 2021) Early Warning Indicators for Marine Mammals Technical Memorandum (Golder, 2020g) 2020 MEWG Meeting Records
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### METHODS

#### *Monitoring Protocol*

In order to better understand potential short-term, long-term and cumulative effects of vessel noise on marine mammals, Baffinland has implemented since 2014 a number of marine mammal monitoring programs aimed at evaluating the potential effects on vessel noise on marine mammals and marine mammal populations (e.g., Bruce Head Shore-based Monitoring Program, MMASP, Narwhal Tagging Study, SBO Program, PAM Program). An overview of all the marine mammal monitoring programs completed by Baffinland to date for the Northern Shipping Route is provided in Table 4.32. A summary of the marine mammal monitoring activities undertaken in 2020 is presented in Condition No. 109.



**Table 4.32: Baffinland’s Marine Mammal Monitoring Programs Undertaken for Northern Shipping Route (2006-2020)**

Marine Mammal Monitoring Program	Baseline						ERP (4.2 MPTA)			ERP (6 MPTA)		
	2006	2007	2008	2010	2013	2014 <sup>1</sup>	2015 <sup>1</sup>	2016	2017	2018	2019	2020
Bruce Head shore-based study	—	—	—	—	X	X	X	X	X	—	X	X
Passive acoustic monitoring	—	—	—	—	—	X	X	—	—	X	X	X
Ship-based Observer (SBO) program	—	—	—	—	X	X	X	—	—	X	X	—
Aerial surveys – cetaceans	X	X	X	—	X	X	X	X <sup>2</sup>	—	—	X	X
Aerial surveys - pinnipeds	X	X	X	—	-	X	—	—	—	—	—	—
Narwhal tagging study	—	—	—	—	—	—	—	X	X	—	—	—

**Notes:**

<sup>1</sup> 2014 included baseline data collection and initial evaluation of EEM protocols, 2015 was first full year of EEM implementation, post- Milne Port ore dock construction (ERP Phase).

<sup>2</sup> DFO 2016 aerial survey data analyzed by Baffinland

*Early Warning Indicator*

A description of the selection process, including MEWG and Inuit engagement, of the early warning indicator (EWI) for the Project was provided to the NIRB in response to its 2018-2019 Board Recommendations. The selected EWI is a decrease in the proportion of immature animals. For this purpose, immature animals are being defined as calves and yearling. This was an indicator that was suggested by DFO as part of Baffinland’s initial MEWG engagement in the EWI framework and was identified as being of high importance by the MHTO following an in-person meeting in Pond Inlet. This selection is consistent with best available science, is appropriate to the region (IQ indicates that the RSA an important narwhal calving ground), can be compared to pre-ERP baseline data and can monitored in parallel with the Bruce Head shore-based narwhal monitoring program by Inuit researchers involved in the program.

The EWI threshold to be used to assess whether marine mammals and marine mammal populations are being affected by the effects of vessel noise is a 10% decrease in the proportion of immatures individuals in the population from the lowest natural variability baseline value available (2014 and 2015). The 10% decrease is used to maintain consistency with the threshold level used in the FEIS and FEIS ERP Addendum marine mammal impact assessment. The lowest available baseline value for the proportion of immature narwhals recorded from Bruce Head is 0.152 (recorded in 2014). This means that a threshold level of 0.137 (i.e., a 10% decrease from 0.152) would need to be reached as a proportion of immature narwhal recorded from Bruce Head to trigger EWI adaptive management practices.

## RESULTS

### *Monitoring Protocol*

Detailed results of the 2020 marine mammal monitoring programs are available in the respective 2020 annual monitoring reports (Golder 2021d, 2021e; Austin and Dofher, 2020), with a brief overview provided (by monitoring program) in PC Condition No. 109, as well as in Golder (2021f).

### *Early Warning Indicator*

The proportion of immature narwhal recorded from the Bruce Head Shore-based Monitoring Program in 2020 was 0.143 (284 calves + 148 yearlings / 3012 narwhal of identified life stage; see Table 4.33). This value is above the identified threshold value of 0.137.

**Table 4.33: Proportion of Immature Narwhal as Early Warning Indicator (2014–2020)**

Year	Proportion of Immature Narwhal
2014	0.152
2015	0.163
2016	0.164
2017	0.163
2018	N/A <sup>1</sup>
2019	0.156
2020	0.143

#### Notes:

1 Pilot vessel-based monitoring program replaced the Bruce Head shore-based monitoring program in 2018. The pilot program was not successful in yielding a comparable dataset for inclusion in this analysis.

## TRENDS

### *Monitoring Protocol*

Data trends from marine mammal monitoring programs undertaken to date in the RSA are provided in PC Condition No. 109.

### *Early Warning Indicator*

The EWI threshold for narwhal has not been exceeded to date despite an increase in year-over-year shipping associated with the Project.

## RECOMMENDATIONS / LESSONS LEARNED

### *Monitoring Protocol*

Acoustic monitoring results and narwhal behavioural data available to date have demonstrated that shipping noise in the RSA is lower than predicted in the FEIS and that behavioural effects from shipping on narwhal are limited to low-level disturbance effects that are localized and temporary in nature. This gives Baffinland confidence that its current mitigation measures (e.g., 9 knot speed restriction, 40-km buffer area at entrance of RSA, limited transits

during early shoulder season, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA. However, the observed decrease in narwhal abundance in the RSA during 2020 is of concern to Baffinland, and further investigation is recommended with respect to the potential cause of this observed decrease. As previously noted above and in Golder (2021f), potential contributing factors include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA.

To better understand potential short-term, long-term and cumulative effects of icebreaker noise on narwhal during the early shoulder season and to assess the efficacy of existing and newly introduced mitigation measures in 2021, Baffinland will implement the following follow-up monitoring programs starting in 2021:

- 2021 MMASP;
- 2021 Bruce Head Shore-based Monitoring Program; and
- 2021 PAM Program, which will include one or more of the following acoustic monitoring sites.

Baffinland also intends to prioritize in 2021 planning for a 2022 early shoulder season narwhal tagging study to be designed in consultation with the MHTO, DFO and MEWG.

Given the success of the recently modified SBO program, a similar program as completed in 2018–2019 remains under consideration for implementation in 2020, though recent COVID-19 travel restrictions may limit in-person involvement in this program by local Inuit and contracted MWOs.

*Early Warning Indicator:*

The proportion of immature narwhal will continue to be monitored from the Bruce Head Shore-based monitoring Program in 2021 Baffinland. Baffinland will explore the possibility expanding the monitoring to other regions of the RSA through data collected from the MMASP. Baffinland will continue to engage the MEWG and Inuit organizations in the review of the selected EWI data and consideration of other EWIs for the Project.

## Project Certificate Condition No. 111

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operations
Objective	To prevent impacts to marine mammals from Project shipping activities.
Term or Condition	<p>The Proponent shall develop clear thresholds for determining if negative impacts as a result of vessel noise are occurring. Mitigation and adaptive management practices shall be developed to restrict negative impacts as a result of vessel noise. This shall include, but not be limited to:</p> <ol style="list-style-type: none"> <li>a. Identifications of zones where cumulative noise could be mitigated due to biophysical features (e.g., water depth, distance from migration routes, distance from overwintering areas etc.)</li> <li>b. Vessel transit planning, for all seasons, to determine the degree to which cumulative sound impacts can be mitigated through the seasonal use of different zones</li> </ol>
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	<p>2019 Passive Acoustic Monitoring Program (Frouin-Mouy et al., 2020)</p> <p>2017–2018 Integrated Narwhal Tagging Study (Golder, 2020f)</p> <p>2019 Marine Mammal Monitoring Programs — Updated Preliminary Results (Golder, 2020h)</p> <p>Early Warning Indicators for Marine Mammals Technical Memorandum (Golder, 2020g)</p> <p>Preliminary Summary of 2020 Narwhal Monitoring Programs (Golder, 2021f)</p>
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### METHODS

#### *Project Indicators*

Baffinland’s marine mammal monitoring programs include a number of monitoring indicators and thresholds for determining if adverse impacts on marine mammals are occurring as a result of vessel noise. These include, but are not limited to, the following:

- change in underwater noise level relevant to established acoustic thresholds
- change in absolute abundance (e.g. stock size) relative to pre-shipping numbers and previous survey years
- change in relative abundance and distribution relative to pre-shipping numbers and previous survey years
- change in group composition relative to pre-shipping numbers and previous survey years

- change in reproductive output (i.e., calf ration or calving rate) relative to pre-shipping numbers and previous survey years
- change in behaviour (e.g., for which many different response variables are used as monitoring indicators such as change in animal orientation, travel speed, dive behaviour, etc.) - compared to previous survey years and relative to established behavioural severity indexing (Southall et al., 2007; Finneran et al., 2017).
- Occurrence of ship strikes

For those indicators where established guidelines exist, such as underwater noise (e.g., marine mammal acoustic injury and disturbance criteria), these are used for the basis of the threshold (e.g., proportion of time in a day the disturbance threshold is exceeded, referred to as the daily disturbance period). Where established guidelines do not exist, comparisons are typically made to pre-project baseline years where possible, or to previous monitoring years, with the threshold being statistical significance that is suggestive of a pattern of a Project or shipping-induced effect.

### ***Early Warning Indicator***

A description of the selection process, including MEWG and Inuit engagement, of the early warning indicator (EWI) for the Project is provided in Golder (2020g). The selected EWI is a decrease in the proportion of immature animals. For this purpose, immature animals are being defined as calves and yearling. This was an indicator that was suggested by DFO as part of Baffinland's initial MEWG engagement in the EWI framework and was identified as being of high importance by the MHTO following an in-person meeting in Pond Inlet. This selection is consistent with best available science, is appropriate to the region (IQ indicates that the RSA an important narwhal calving ground), can be compared to pre-ERP baseline data and can monitored in parallel with the Bruce Head shore-based narwhal monitoring program by Inuit researchers involved in the program.

The EWI threshold to be used to assess whether marine mammals and marine mammal populations are being affected by the effects of vessel noise is a 10% decrease in the proportion of immatures individuals in the population from the lowest natural variability baseline value available (2014 and 2015). The 10% decrease is used to maintain consistency with the threshold level used in the FEIS and FEIS ERP Addendum marine mammal impact assessment. The lowest available baseline value for the proportion of immature narwhals recorded from Bruce Head is 0.152 (recorded in 2014). This means that a threshold level of 0.137 (i.e., a 10% decrease from 0.152) would need to be reached as a proportion of immature narwhal recorded from Bruce Head to trigger EWI adaptive management practices.

## **RESULTS**

### ***Project Indicators***

Detailed results associated with each of these monitoring indicators are provided in the Draft MMASP, Draft Bruce Head Shore-based Monitoring Report and the Draft Shoulder Season PAM Report.

### ***Early Warning Indicators***

The proportion of immature narwhal recorded from the Bruce Head Shore-based Monitoring Program in 2020 was 0.143 (284 calves + 148 yearlings / 3012 narwhal of identified life stage; see Table 4.33 in PC Condition No. 110). This value is above the identified threshold value of 0.137.

## TRENDS

### *Project Indicators*

Acoustic monitoring and narwhal behavioural data available to date have demonstrated that shipping noise in the RSA is lower than that predicted in the FEIS and that behavioural effects from shipping on narwhal are limited to low-level disturbance effects that are localized and temporary in nature (consistent with FEIS predictions). This gives Baffinland confidence that current mitigation measures are effective at managing Project incremental effects from shipping on narwhal in the RSA. However, an observed decrease in narwhal abundance in the RSA in 2020 is of concern to Baffinland, and further investigation is recommended with respect to the potential cause of this observed decrease. As previously noted above and in Golder (2021f), potential contributing factors include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA.

Overall, detection of an adverse effect on narwhal in the RSA in 2020 demonstrates that the indicators and thresholds presently in place for marine mammals are functioning as intended (i.e., are capable at measuring effects on marine mammals in the RSA, whether these are Project-induced or not), and that Baffinland's current adaptive management process is also demonstrating to be effective (i.e., has triggered new and appropriate precautionary-based mitigation measures while the source of the impact is being more thoroughly investigated), as described further below.

### *Early Warning Indicators*

The EWI threshold has yet to have been reached despite an increase in shipping associated with the Project.

## RECOMMENDATIONS/LESSONS LEARNED

Acoustic monitoring results and narwhal behavioural data available to date have demonstrated that shipping noise in the RSA is lower than predicted in the FEIS and that behavioural effects from shipping on narwhal are limited to low-level disturbance effects that are localized and temporary in nature. This gives Baffinland confidence that its current mitigation measures (e.g., 9 knot speed restriction, 40-km buffer area at entrance of RSA, limited transits during early shoulder season, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA. However, the observed decrease in narwhal abundance in the RSA during 2020 is of concern to Baffinland, and further investigation is recommended with respect to the potential cause of this observed decrease. As previously noted above and in Golder (2021f), potential contributing factors include acoustic disturbance effects from icebreaking, acoustic disturbance effects from impact pile driving in Pond Inlet, and increased killer whale presence in the RSA.

The enhanced mitigation measures being proposed by Baffinland for the 2021 shipping season align with the options presented by Golder (2021f). Baffinland will delay shipping in 2021 until there is a continuous path between the entrance of Eclipse Sound and Milne Port of less than 9/10ths ice concentrations. This requirement will avoid impacting narwhal that concentrate in leads, as the leads are unlikely to exist in less than 9/10 ice concentrations. This will also minimize icebreaking noise, as it eliminates breaking of the thickest ice over a continuous period. Based on historical ice conditions, the average date less than 9/10ths ice has been continuous along the entire shipping route is July 27th, which is 8 days later than the average date landfast ice is completely broken (July 19th) and shipping would regularly be able to commence. The exact date the 2021 shipping season will commence will continue

to be subject to variability in ice conditions. These newly proposed management measures will be communicated to the MEWG and the community of Pond Inlet as they are further developed.

The proposed additional mitigation being put forward aim to avoid and/or further minimize cumulative impacts on narwhal from Project icebreaking, even if the underlying causal factor(s) for the observed decrease in narwhal abundance in Eclipse Sound is unconfirmed. This precautionary approach will allow for a simultaneous investigation of potential causal factors of the observed change while adjusting current shipping operations to reliably manage impacts from icebreaking on narwhal in the RSA.

To better understand potential short-term, long-term and cumulative effects of icebreaker noise on narwhal during the early shoulder season and to assess the efficacy of existing and newly introduced mitigation measures in 2021, Baffinland will implement the following follow-up monitoring programs starting in 2021:

- 2021 MMASP
- 2021 Bruce Head Shore-based Monitoring Program
- 2021 PAM Program, which will include one or more of the following acoustic monitoring sites:

Baffinland also intends to prioritize in 2021 planning for a 2022 early shoulder season narwhal tagging study to be designed in consultation with the MHTO, DFO and MEWG.

Given the success of the recently modified SBO program, a similar program as completed in 2018–2019 remains under consideration for implementation in 2020, though recent COVID-19 travel restrictions may limit in-person involvement in this program by local Inuit and contracted MWOs.

***Early Warning Indicator:***

The proportion of immature narwhal will continue to be monitored from the Bruce Head Shore-based monitoring Program in 2021 Baffinland. Baffinland will explore the possibility expanding the monitoring to other regions of the RSA through data collected from the MMASP. Baffinland will continue to engage the MEWG and Inuit organizations in the review of the selected EWI data and consideration of other EWIs for the Project.

## Project Certificate Condition No. 112

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operations
Objective	To prevent impacts to marine mammals from Project shipping activities.
Term or Condition	<p>Prior to commercial shipping of iron ore, the Proponent, in conjunction with the Marine Environment Working Group, shall develop a monitoring protocol that includes, but is not limited to, acoustical monitoring that provides an assessment of the negative effects (short and long term cumulative) of vessel noise on marine mammals. Monitoring protocols will need to carefully consider the early warning indicator(s) that will be best examined to ensure rapid identification of negative impacts. Thresholds shall be developed to determine if negative impacts as a result of vessel noise are occurring. Mitigation and adaptive management practices shall be developed to restrict negative impacts as a result of vessel noise. This shall include, but not be limited to:</p> <ol style="list-style-type: none"> <li>Identification of zones where noise could be mitigated due to biophysical features (e.g., water depth, distance from migration routes, distance from overwintering areas etc.).</li> <li>Vessel transit planning, for all seasons.</li> <li>A monitoring and mitigation plan is to be developed, and approved by Fisheries and Oceans Canada prior to the commencement of blasting in marine areas.</li> </ol>
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	<p>Draft 2020 Marine Mammal Aerial Survey Report (Golder, 2021d)  Draft 2020 Bruce Head Shore-based Monitoring Program (Golder, 2021e)  Draft 2020 Underwater Acoustic Monitoring BIM Shoulder Season Shipping 2019-2020 (Austin and Dofher, 2021)  Early Warning Indicators for Marine Mammals Technical Memorandum (Golder, 2020g)  2020 MEWG Meeting Minutes</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

### METHODS

Refer to summary for PC Conditions No 109, 110 and 111.

### RESULTS

Refer to summary for PC Conditions No. 109, 110 and 111.



**TRENDS**

Refer to summary for PC Conditions No. 109, 110 and 111.

**RECOMMENDATIONS/LESSONS LEARNED**

Refer to summary for PC Conditions No. 109, 110 and 111.

### Project Certificate Condition No. 113

Category	Marine Environment - Arctic Char
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine fish in Steensby Inlet and Milne Inlet
Term or Condition	The Proponent shall conduct monitoring of marine fish and fish habitat, which includes but is not limited to, monitoring for arctic char stock size and health condition in Steensby Inlet and Milne Inlet, as recommended by the Marine Environment Working Group
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Draft 2020 MEEMP and AIS Monitoring Program (Golder, 2021a) 2020 MEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

#### METHODS

Monitoring of stock size of arctic char is not undertaken for the Project as this is beyond the current scope of the marine-based monitoring programs. Arctic char occur in the marine environment on a seasonal basis (open-water season) for a period extending up to several months. Individuals recorded in the marine environment are from anadromous (sea-run) stocks likely originating from multiple local freshwater systems in Milne Inlet, including but not limited to Robertson River (Koluktoo Bay), Tugaatt River, Iqaluit River and Phillips Creek. It is probable that on the summer feeding grounds, arctic char from Tugaat Lake/River, Robertson River and Phillips Creek are mixing. For example, it has been documented that arctic char tagged in Tugaat Lake were recaptured in Milne Inlet some 20 km away from the mouth of Tugaat River (Read, 2004).

There are no recent population estimates for arctic char stocks for the aforementioned river systems. It is presently unknown if these individual systems represent genetically discrete stocks, to what degree of migration (gene flow) occurs between these (or other) local river systems, what the summer movements and range limits are for fish originating from these systems, and hence what the proportional stock representation is for fish occurring near Milne Port (as this might involve multiple source stocks). The management of arctic char fisheries in the Canadian Arctic is based on the assumption that each river system supports a discrete fish stock which has a high fidelity rate to the population stock (Kristofferson et al., 1984). DFO Stock Assessment Science advice is structured to be provided on a stock-by-stock basis (not by fishing location). For most of the stocks in the North Baffin region, there is limited or no science information available.

In support of the Project, fish monitoring in the marine environment is undertaken annually during the open-water season to assess fish health condition in the marine receiving environment and to provide a general characterization of the fish community in this area during this period, including Arctic char. The marine fish program was initially developed based on traditional fishing areas (i.e., IQ) and sites adjacent to the Milne Port facility.

Marine fish and fish habitat surveys in the Milne Port area were first conducted in 2010 with monitoring occurring annually from 2013 to 2020. Modifications incorporated to the marine fish program in 2020 (as part of Baffinland's 2020 MEEMP and AIS Monitoring Program) in response to recommendations and feedback provided by the MEWG, DFO, and Inuit stakeholders, included the following:

- Addition of deep sets of hoop/fyke nets to fish sampling program to sample demersal fish species
- Trialing bottom trawls as a potential fish sampling method to target potentially missed species (e.g. Arctic cod).
- Collected Fourhorn Sculpin and *Hiatella arctica* as indicator species for lethal sampling to monitor for effect indicators including measures of growth (energy use), reproduction (energy use), condition (energy storage) and survival, in addition to supporting endpoints including length, body weight, external condition, internal condition, organ weights, stomach fullness, parasite presence/absence, sex, life stage and state-of-maturity.

Detailed information on study design and sampling methodology is available in the annual monitoring reports for the MEEMP program (SEM, 2016a, 2017a; Golder, 2018b, 2019a, 2020a, 2021a)

## RESULTS

Detailed sampling results are available in the annual monitoring report for the Draft 2020 MEEMP and NIS/AIS monitoring programs (Golder, 2021a).

### ***Fish Community***

In 2020 a total of 852 fish belonging to eleven arctic species groups were captured during active fish sampling undertaken in 2020. As in previous survey years, arctic char (*Salvelinus alpinus*), Fourhorn Sculpin (*Myoxocephalus quadricornis*) and Shorthorn Sculpin (*M. Scorpius*) were among the most abundant fish species caught. The remaining fish species captured were as follows; Polar Cod (*Arctogadus glacialis*), Greenland Cod (*Gadus ogac*), Arctic Sculpin (*M. scorpioides*), Arctic Staghorn Sculpin (*Gymnocanthus tricuspis*), *Triglops* sculpin (*Triglops* sp.), Sandlance (*Ammodytes* spp.), Fourline Snakeblenny (*Eumesogrammus parecisus*), and unidentified sculpin (*Cottidae indet.*).

Fishing efforts in 2020 yielded captures greater than previous sample years, likely a reflection of greater sampling efforts compared to previous years. A change in relative taxonomic composition of fish captures was apparent compared to previous sampling years, where Fourhorn Sculpin, Shorthorn Sculpin and arctic char generally comprised over 99% of the total catch. In 2020, these species comprised only 71% of the total catch. This change is likely a reflection of the change in efforts and methodology that led to high captures of species that were rare or unobserved under previous efforts. Greenland Cod had only been caught previously in low numbers in 2010 and 2014, however increased angling efforts targeting coarse rock habitat as well as the introduction of deep-set hoop nets led to a total catch of 57 in 2020. The addition of the trial trawling effort resulted in the capture of a large number of juvenile fish of two previously unobserved species (*Triglops* sp. and Polar Cod) and one previously uncommon species (Arctic Staghorn Sculpin).

### ***Fish Health and Tissue Chemistry***

#### *Size*

In 2020, Fourhorn Sculpin, arctic char and Shorthorn Sculpin were the dominant species captured during the fish community survey. arctic char were the largest of these species, ranging in length from 132 mm to 859 mm and ranging in weight from 10 g to 6,710 g, with similar sizes observed in 2018 and 2019. Fourhorn Sculpin ranged in length from 72 mm to 314 mm and ranged in weight from 2.6 g to 925 g, with similar sizes observed in 2018, while smaller fish (<140 mm) were not captured in 2019. Shorthorn Sculpin ranged in length from 122 mm to 421 mm and ranged in weight from 11.7 g to 1,060 g, while smaller fish captured in 2018 and 2019 (<120 mm) were not observed in 2020.

Length-frequency distributions for Arctic Char were relatively similar among years, with median lengths of 440 mm in 2018, 435 mm in 2019 and 409 mm in 2020. Fourhorn Sculpin were also relatively similar among years, with median lengths of 228 mm in 2018, 211 mm in 2019 and 194 mm in 2020. Shorthorn Sculpin were more variable over time, with a median length of 238 mm in 2018, a median length of 166 mm in 2019, and a median length of 219 mm in 2020.

Condition (i.e., relative weight) of Arctic Char, Fourhorn Sculpin and Shorthorn Sculpin were relatively similar for each species over time, despite significant differences among years. For Arctic Char, significant differences in condition were observed among years (interaction = 0.659;  $P = 0.001$ ), with mean relative weights of 856 g in 2018, 879 g in 2019 and 908 g in 2020. For Fourhorn Sculpin, significant differences in condition were also observed among years (interaction = 0.007;  $P = 0.018$ ), with mean relative weights of 82 g in 2018, 81 g in 2019 and 79 g in 2020. For Shorthorn Sculpin, significant differences in condition were observed among years (interaction = 0.261;  $P = 0.066$ ), with mean relative weights of 115 g in 2018, 109 g in 2019 and 117 g in 2020.

#### *Age*

In 2020, arctic char ranged in age from 2 to 16 years ( $n=43$ ), with a median age of 11. Ages were similar to fish processed in 2019 ( $n=46$ ) and 2018 ( $n=26$ ), which ranged in age from 4 to 19 years with a median age of 12, and 5 to 17 years with a median age of 11, respectively. In 2020, ages for Fourhorn Sculpin ( $n=44$ ) ranged from 4 to 9 years, with a median age of 5, which were similar to results observed in 2019. In 2019, Sculpin ( $n=30$ ) ranged in age from 4 to 8, with a median age of 6. Age data were not available from 2018 for comparison. In 2020, ages were also determined for Greenland Cod ( $n=3$ ), which ranged from 7 to 9 years with a median age of 8. Age data were not available from 2019 or 2018 for comparison.

#### *Stomach Contents*

An analysis of stomach contents for arctic char captured from the Milne Port Area in 2020 ( $n = 45$ ) identified a total of 20 separate taxon. Stomach contents were predominantly Sandlance, accounting for 42% of contents by weight. Other major constituents included indeterminate crustaceans (13%), indeterminate fish (13%), the amphipod *Themisto* sp. (10%), and unidentified tissue (16%). In general, arctic char were primarily piscivorous in 2020, supplementing their diet with small crustaceans. These results contrast observations made in 2019, where indeterminate crustaceans were the primary constituent of arctic char stomach contents, accounting for 41% of contents by weight, while fishes only comprised 4% (Golder, 2020a). This suggests that the diet of arctic char in the Milne Port Area may be flexible and vary over time, potentially influenced by relative prey abundance and catchability.

Stomach contents of Fourhorn Sculpin captured from the Milne Port Area (n = 44) contained a total of 21 separate taxon, primarily consisting of the amphipod *Anonyx* sp., which accounted for 52% of contents by weight. Other major constituents included indeterminate polychaetes of the family Pectinariidae (12%) and unidentified tissue (22%). The diet of Fourhorn Sculpin primarily consisted of crustaceans, with fish comprising less than 1% of stomach contents by weight. These results contrasted with observations from 2019, where fish was the primary constituent of Fourhorn Sculpin stomach contents, accounting for 27% of contents by weight. As with Arctic Char, results suggest the diet of Fourhorn Sculpin in the Milne Port Area may also be flexible and vary over time with the relative abundance and catchability of prey species.

In addition to arctic char and Fourhorn Sculpin, a small number of stomach samples were analyzed for Greenland Cod from the Milne Port Area in 2020 (n=3). From these samples, a total of 10 separate taxon were identified. Stomach contents consisted primarily of indeterminate decapods of the infraorder Caridea, which accounted for 34% of contents by weight. Other major constituents included indeterminate fishes (27%), and *Mysis* sp. (10%).

#### *Fish Health*

A total of 43 Fourhorn Sculpin were processed from the Milne Port area during the 2020 fish health assessment, including 22 females and 21 males. Detailed fish health data were collected for Fourhorn Sculpin and *H. arctica* in 2020 to align fish sampling methods with future monitoring requirements under the Metal and Diamond Mine Effluent Regulations (MDMER; Government of Canada, 2002). Based on internal and external examinations, Fourhorn Sculpin from the Milne Port area appear to be healthy. Sample timing was appropriate for evaluating reproduction in Fourhorn Sculpin; adequate gonad development had occurred to assess gonad endpoints (e.g., gonadosomatic index). The sample timing may not be optimal for *H. arctica* reproductive endpoints, however, because gonad tissue could not be readily collected from the *H. arctica*. As 2020 was the first time detailed fish health data were collected for sentinel species in the Milne Port area, no comparisons to previous years were made.

#### *Fish Tissue Chemistry*

Fish tissue chemistry results for arctic char sampled in 2020 were similar to historic data collected for the Milne Port area since 2010. Results for Fourhorn Sculpin and *H. arctica* were also similar to data collected in recent years for most metals<sup>5</sup>. Statistically significant increases were observed since 2018 for some contaminants of potential concern in arctic char and *H. arctica* (e.g., aluminum and magnesium). Differences were small and often inconsistent, likely reflecting natural variability in both the bioavailability and subsequent uptake of metals, reflected in the reported tissue concentrations.

All tissue samples for Arctic Char, Fourhorn Sculpin and *H. arctica* collected from 2018 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline (Health Canada, 2015) and below the British Columbia Ministry of Environment fish tissue guidelines for selenium (BC MOE, 2014).

To date, construction and operation of the Milne Port does not appear to have negatively affected fish health or tissue chemistry in the Milne Port area.

Detailed information on results is available in the annual monitoring report for the MEEMP program (Golder, 2021a).

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<sup>5</sup> The term metals is used throughout this report and includes non-metals (e.g., selenium) and metalloids (e.g., arsenic).

## TRENDS

### *Fish Community*

- To date, construction and operation of the Milne Port does not appear to have negatively affected fish community structure or body condition.
- Presence and diversity data collected in 2020 was comparable to previous years.
- Weight-length relationships indicated that while statistically significant differences were observed among years (2018-2020) for the species examined, effect sizes were small and likely reflect temporal variability in these populations.
- Monitoring results align with original FEIS predictions, which forecasted that the Project would have no significant effects on marine fish habitat nor would it affect the size of arctic char populations

### *Fish Health*

- Detailed fish health data were collected for Fourhorn Sculpin and *H. arctica* for the first time in 2020 and are anticipated to provide baseline dataset for future interannual comparisons under the MDMER.
- Based on internal and external examinations, Fourhorn Sculpin from the Milne Port area appeared to be healthy at the time of sampling with few abnormalities observed.
- Sample timing appeared to be appropriate for future assessments of reproductive endpoints for Fourhorn Sculpin with all individuals assessed observed to be in the late stages of gonadal recrudescence.
- Sample timing of *H. arctica* may not be optimal for assessing reproductive endpoints, as gonads could not be readily extracted from collected samples.
- As this was the first time these data were collected for the Milne Port area, limited comparisons could be made to previous years.

### *Tissue Chemistry*

- Monitoring results remain within original FEIS predictions, which indicated the potential for non-significant, low magnitude effects on arctic char health and condition that are expected to be reversible.
- For arctic char, tissue concentrations of metals in 2020 were similar to previous concentrations observed for the Milne Port area since 2010. For COPCs, statistical differences were observed between 2018 and 2020 for aluminum, magnesium and selenium; however effect sizes were generally small with concentrations similar to historic data.
- For Fourhorn Sculpin, metal concentrations were generally similar between 2019 and 2020; however, some interannual variability was observed. For CoPCs significant decreases were observed between 2019 and 2020 for aluminum, iron and selenium.
- For *H. arctica*, concentrations of metals were generally similar among years with a few exceptions, such as chromium, nickel and tin that exhibited more variability. For CoPCs, significant differences were observed among years for aluminum, iron, magnesium, mercury and selenium; however, effect sizes were generally small (i.e., <100%).
- Significant differences in concentrations of CoPCs for Arctic Char, Fourhorn Sculpin and *H. arctica* between 2018 and 2020 were generally small and appear to reflect natural variability in these metals. Therefore differences were not considered to be Project-related.

- As observed in 2019, metals concentrations were typically greater in *H. arctica* relative to arctic char and Fourhorn Sculpin, occasionally by orders of magnitude. These differences likely reflect species specific differences in bioaccumulation processes and difference in the tissue types analyzed (i.e., whole body versus muscle), with molluscs accumulating greater concentrations of some metals compared to fish. There is no indication that these concentrations of metals are affecting fish health.
- All tissue samples for Arctic Char, Fourhorn Sculpin and *H. arctica* collected from 2018 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg wet weight and below BC MOE fish tissue guidelines of 4 mg/kg dry weight for selenium. Tissue chemistry results were within FEIS predictions, which indicated the potential for non-significant, low magnitude effects on arctic char fish health and condition.

### RECOMMENDATIONS / LESSONS LEARNED

Overall, MEEMP results do not show any major changes to marine fish assemblages near Milne Port or on fish health as a result of construction and operational activities at Milne Port. The MEEMP study design and data collection methodologies are reviewed yearly with the MEWG. Recommendations from the MEWG assist in refinement of the fish and fish habitat program.

The MEEMP results will continue to be presented to the MEWG on an annual basis, and recommended adjustments to the fish and fish habitat program will be considered by Baffinland and implemented as deemed necessary and relevant for detecting potential Project-related impacts to fish stocks and health conditions in Milne Inlet.

### Project Certificate Condition No. 114

Category	Marine Environment - Arctic Char
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine fish in Steensby Inlet and Milne Inlet.
Term or Condition	In the event of the development of a commercial fishery in the Steensby Inlet area or Milne Inlet-Eclipse Sound areas, the Proponent, in conjunction with the Marine Environment Working Group, shall update its monitoring program for marine fish and fish habitat to ensure that the ability to identify arctic char stock(s) potentially affected by Project activities and monitor for changes in stock size and structure of affected stocks and fish health (condition, taste) is maintained to address any additional monitoring issues identified by the MEWG relating to the commercial fishery.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister
Status of PC Condition	Not Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

In the event a commercial fishery is developed in Steensby Inlet area or Milne Inlet-Eclipse Sound areas, Baffinland will update the MEEMP program for marine fish and fish habitat to ensure that the ability to identify arctic char stock(s) potentially affected by Project activities and monitor for changes in stock size and structure.

No commercial fishery / Schedule V waterbody operated in the vicinity of Milne Port or Steensby Port during 2020.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will adapt its monitoring programs accordingly in the event a commercial fishery is developed in the Steensby Inlet area or Milne Inlet-Eclipse Sound areas.



## Project Certificate Condition No. 115

Category	Marine Environment - Arctic Char
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To prevent impacts to marine fish in Steensby Inlet and Milne Inlet.
Term or Condition	The Proponent is encouraged to continue to explore off-setting options in both the freshwater and marine environment to offset the serious harm to fish which will result from the construction and infrastructure associated with the Project.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Fisheries and Oceans Canada (DFO), Marine Environment Working Group (MEWG)
Reference	2020 Milne Ore Dock Fish Offset Monitoring Report (Golder, 2020c) Year 1 Freight Dock Offset Monitoring Report (Golder, 2021c). TSD No. 23: Conceptual-level Marine Offsetting Plan (Golder, 2018f) 2020 MEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

### METHODS

Baffinland has engaged and conducted comprehensive consultation on the Project as a whole with the five North Baffin communities (Arctic Bay, Clyde River, Sanirajak, Igloolik, and Pond Inlet) prior to, during, and following the environmental reviews of the Project by the NIRB. Specific to fisheries offsetting in the marine environment, Baffinland (with DFO participation) consulted with the community of Pond Inlet in regard to the Ore Dock proposed at Steensby Port and the habitat off-set design for the existing Ore dock and Freight dock at Milne Port for the Early Revenue Phase of the Project (ERP). Early engagement was initiated during the consultation process on the ERP when Baffinland met with members of the MHTO and other community members to discuss the design, offsetting measures, and proposed monitoring with respect to construction of the Ore Dock at Milne Port. Since then, consultation efforts have focused largely on offsetting habitat effectiveness monitoring associated with in-water marine infrastructure.

Baffinland was issued a Fisheries Authorization (Ref No. 14-HCAA-00525) from DFO in 2014 for construction of the Ore Dock at Milne Port. A fish habitat offsetting plan was included with Baffinland's application for an authorization under the *Fisheries Act*. This included fish habitat enhancement measures constructed around the Ore Dock.

Similarly, Baffinland was issued a Fisheries Authorization (Ref No. 18-HCAA-00160) on March 21, 2019 for construction of the Freight Dock at Milne Port. A separate offsetting plan for the Freight Dock was developed which included the addition of coarse rock substrates as offsetting materials around the perimeter of the Freight Dock.

With regards to future expansion plans such as the proposed Phase 2 proposal, Baffinland continues to explore potential offsetting options in both freshwater and marine environments to address potential losses in fish habitat associated with permanent habitat alteration or destruction of fish habitat, which includes community consultation activities in order to help refine candidate offset locations. For freshwater, offsetting may be required to offset proposed in-water infrastructure along the proposed North railway (water crossings, pond encroachment, and stream diversions) and additional water crossings on Tote Road realignments and quarry access roads, in addition to waterbodies identified for water withdrawal. Exploration of potential marine offsetting options are aimed at offsetting in-water works associated with the proposed construction of second Ore Dock.

Various options are being considered for fish habitat offsetting in the freshwater environment including improving lake or stream fish rearing habitat. For marine habitat, enhancement and/or creation of habitat (e.g., rocky reefs) and complementary measures (e.g., financial contributions in-lieu of constructing habitat) are being explored.

Consultation activities related to offsetting in 2020 were delayed in part from logistical and operational restrictions associated with the COVID-19 Pandemic. Focus was geared towards desktop-based exercises and the collection of baseline data in order to gather data for consideration during future consultation efforts.

## RESULTS

A number of potential offsetting options were identified for the marine environment as part of Phase 2 conceptual offsetting planning (Golder, 2018f). Numerous potential freshwater offsetting options located in both lake (e.g., rearing habitat creation and/or improvements to existing) and stream (e.g., rearing habitat creation, removal of natural barriers, improvements to upstream passage) habitats were also identified and further investigated during summer field programs in 2019, and additional investigations continued into 2020.

The following field work was completed in 2020 to collect baseline data on potential freshwater and marine-based offsetting sites as follows:

### *Freshwater*

In 2020, six (6) offsetting locations along the Tote road were assessed to collect new information on juvenile arctic char and to evaluate potential habitat utilization by ninespine stickleback. Streams were sampled using eletrofishing and fish habitat information was collected. An additional six (6) contingency offsetting locations were also sampled should the other sites be considered unsuitable for future offsetting measures. Data analysis remains ongoing.

### *Marine*

In 2020, a review of potential offsite offsetting locations was completed using a desktop-approach and a pre-screening process. Of the nine (9) sites initially identified prior to any collection of on-site data, a further evaluation against six (6) criteria was completed. Following this analysis, six (6) sites were considered suitable for the potential construction of rocky reefs in Milne Inlet and requiring on-site data collection to further validate their suitability. In 2020, baseline data was collected at three (3) of these sites, including a site near Tugaat River. Data collected from the site near Tugaat River is being further analysed for to support the development of a conceptual design for a proposed rocky reef offset site. The conceptual design is intended to provide an example of offsetting habitat that may be suitable to Milne Inlet and can be shared as part of future engagement efforts.

## TRENDS

Results from the six-years of post-construction monitoring of the Milne Port Ore Dock offsetting works have shown the offsetting habitat is effective in supporting biological activity, providing support for the addition of coarse substrates as an effective approach for successful offsetting.

Trends are not yet available for the Freight Dock offset habitat given that year 1 of post-construction monitoring occurred in 2020.

Over the long term, as existing datasets are expanded upon with results from recent offsetting monitoring programs implemented in the region, the suitability of constructing rocky reefs and/or addition of three-dimensional substrates as offset habitat capable of providing stable and functional fish habitat over time will be further validated.

## RECOMMENDATIONS / LESSONS LEARNED

The last year of the 6-year Ore Dock offset monitoring was completed in 2020. Based on the results collected over the 6 years, the offset habitat remained stable; colonization of aquatic vegetation and benthic invertebrates was observed, with percent cover, species richness and abundances generally increasing over the monitoring period from 2015 to 2020, reflecting natural succession patterns. Fish were also shown to use the constructed offset habitat. The results of this monitoring help to further validate the suitability of substrate additions for fish habitat offset measures in the region.

Baffinland will continue to monitor the success of fish habitat offsetting measures associated with the construction of the recently constructed Freight Dock. Baffinland will also continue to provide the results of the annual monitoring program to DFO, the MEWG and other interested parties, as requested.

Baffinland remains committed to exploring potential offsetting options in both freshwater and marine environments to address potential losses in fish habitat associated with permanent habitat alteration or destruction of fish habitat associated with future permitting requirements, as needed. Although engagement activities were not possible in 2020 due to the COVID-19 Pandemic, Baffinland intends to move forward with engagement activities in 2021 in order to get feedback on the progress it has made for identifying suitable locations for the construction of future offset measures.

## Project Certificate Condition No. 116

Category	Marine Environment – Blasting
Responsible Parties	The Proponent, Fisheries and Oceans Canada
Project Phase(s)	Construction
Objective	To prevent impacts to marine fish and fish habitat from explosives.
Term or Condition	Prior to construction, the Proponent shall develop mitigation measures to minimize the effects of blasting on marine fish and fish habitat, marine water quality and wildlife that includes, but is not limited to compliance with the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky 1998) as modified by Fisheries and Oceans Canada for use in the North and as revised from time to time.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Not Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

In the event blasting is required, Baffinland will provide operational control procedures in consultation with the MEWG and DFO that prescribe the requirements for the use of explosives in or near marine water bodies to ensure the activity is carried-out in accordance with DFO guidance and best practice.

### RESULTS

No blasting occurred in the marine environment or in nearshore areas during 2020.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 117

Category	Marine Environment - Blasting
Responsible Parties	The Proponent, Fisheries and Oceans Canada
Project Phase(s)	Construction
Objective	To prevent impacts to marine fish and fish habitat from explosives.
Term or Condition	The Proponent shall ensure that blasting in, and near, marine water shall only occur during periods of open water. Blasting in, and near, fish-bearing freshwaters shall, to the greatest degree possible, only occur in open water. If blasting is required during ice-covered periods, it must meet requirements established by Fisheries and Oceans Canada.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Not Active
Status of Compliance	Not Applicable
Stakeholder Review	Fisheries and Oceans Canada (DFO), Marine Environment Working Group (MEWG)
Reference	Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021g) Environmental Protection Plan (Baffinland, 2021d) Quarry Blasting Operations Management Plan (Baffinland, 2013b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Not Applicable in 2020. Blasting in the marine environment has not occurred on site to date. In the event it is required, Baffinland will provide operational control procedures in consultation with the MEWG that prescribe the requirements for the use of explosives in or near marine water bodies to ensure the activity is carried-out in accordance with DFO guidance and best practice, including the requirement that blasting in, and near, marine water shall only occur during periods of open water.

For freshwaters, Baffinland's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP) and Quarry Blasting Operations Management Plan have been developed to include the requirements for the use of explosives (blasting) in or near freshwater bodies. The requirements were developed in accordance with DFO guidance, including the *Guidelines for Use of Explosives In or Near Canadian Fisheries Water, 1998* (Wright and Hopky, 1998), in order to mitigate possible effects on fish habitat and fish health.

### RESULTS

Blasting in the marine and freshwater environment has not occurred on site to date.

### TRENDS

To date, no blasting has occurred within the required setback distances at the Project.

### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

### Project Certificate Condition No. 118

Category	Marine Environment - Blasting
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To prevent impacts to marine fish and fish habitat from explosives.
Term or Condition	The Proponent shall incorporate into the appropriate mitigation plan prior to construction, thresholds for the use of specific mitigation measures meant to prevent or limit marine wildlife disturbance, such as bubble curtains for blasting, and nitrate removal.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

No marine construction activity occurred at Steenby or Milne Port in 2020.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 119

Category	Marine Environment - Ringed Seals
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction
Objective	To prevent impacts to ringed seals from icebreaking associated with Project shipping.
Term or Condition	The Proponent shall, in conjunction with the Marine Environment Working Group, monitor ringed seal birth lair abundance and distribution for at least two years prior to the start of icebreaking to develop a baseline, with continued monitoring over the life of the Project as necessary to test the accuracy of the impact predictions and determine if mitigation is needed. Monitoring shall also include a control site outside of the Project's zone of influence.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby – Not Active Milne Port – Active
Status of Compliance	Not Applicable
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	N/A
Ref. Document Link	N/A

### METHODS

Not applicable in 2010. Winter shipping has not been required in the Early Revenue Phase of the Project. Baffinland's shipping-related management and mitigation measures takes into consideration key sensitive periods of ringed seal. Specifically, shipping and icebreaking will be conducted outside of key sensitive periods including pupping, nursing and mating periods (i.e., January to May, no temporal overlap with Project-related shipping). In so doing, ringed seal hotspots and pupping grounds will have dissolved as ice conditions deteriorate and by the time shipping begins in mid- to late July. The foraging period following key sensitive periods extends from July to early December when ringed seals disperse as solitary animals or small groups throughout open-water areas or to coastal areas to forage.

Prior to 2020, seal aerial surveys were completed in the Regional Study area in years 2006 (exploratory only), 2007 and 2008 to characterize baseline conditions in support of the FEIS (Baffinland, 2012). Surveys completed in 2007 and 2008 focused on Milne Inlet and Koluktoo Bay. Baffinland later completed surveys in 2014 (draft report never finalized; LGL, 2015) to update baseline data on ringed seal density and distribution in anticipation of the Phase 2 Proposal which previously proposed a winter shipping component that is no longer being considered. DFO subsequently completed surveys in 2016 and 2017 to assess spring distribution and density of ringed seal in Eclipse Sound and Milne Inlet areas (Young et al., 2019; Yurkowski et al., 2019).

### RESULTS

Not applicable in 2020.

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Although the current phase of the Project does not involve breaking of landfast ice Baffinland acknowledges recent feedback from hunters indicating they are observing local changes in seal abundance and distribution along the Northern Shipping Route, with carry-over effects on seal harvesting. In response to this feedback, Baffinland has committed to undertaking targeted ringed seal monitoring along the Northern Shipping Route. This will comprise a dedicated ringed seal aerial survey program to be implemented in June 2021 to monitor for potential Project-induced changes in ringed seal distribution and relative abundance (i.e., density and seal hot spots) in the RSA. The 2021 survey results will be compared to ringed seal baseline aerial surveys undertaken by Baffinland in the RSA in 2006, 2007, 2008 and 2014, as well as to surveys undertaken by DFO in 2016 and 2017 during the ERP (Young et al., 2019).



## Project Certificate Condition No. 120

Category	Marine Environment - Marine Mammal Interactions
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine mammals associated with Project shipping.
Term or Condition	<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> <ol style="list-style-type: none"> <li>a. Wildlife will be given right of way.</li> <li>b. Ships will when possible, maintain a straight course and constant speed, avoiding erratic behavior.</li> <li>c. 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.</li> </ol>
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	<p>Shipping and Marine Wildlife Management Plan (Baffinland, 2020k)</p> <p>Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port (Fednav, 2020a)</p> <p>Standing Instructions and General Information for Masters of Vessels Sailing to Milne Inlet Port (Fednav, 2020b)</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

### METHODS

Several mitigations, including those relevant to shipping operations and icebreaking activities associated with the current Project committed to by Baffinland to avoid and/or minimize adverse effects from shipping on marine mammals along the Northern Shipping Route are adhered to by Baffinland and identified in Baffinland's Shipping and Marine Wildlife Management Plan including:

- Defined shipping lane throughout RSA.
- Maintain constant speed and course when possible.
- No breaking of landfast ice.
- Between the period of 01 July and 30 July, a maximum of one icebreaker transit (with escorted vessels) will occur per 24-hour period where ice concentrations of 6/10 or greater cannot be avoided along the shipping route.

- Between the period of 01 July and 30 July, a maximum of two icebreaker transits (with escorted vessels) will occur per 24-hour period where ice concentrations of 3/10 or greater cannot be avoided along the shipping route.
- All Project vessels will reduce speeds to a voluntary maximum of 9 knots when travelling within the RSA.
- Establishment of a 40-km buffer zone (set-back area) at the floe-edge (extending from the Nunavut Settlement Boundary).
- All ice breaking activities will be conducted outside of the period of ringed seal denning, pupping, nursing and breeding periods.
- 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 not approach within 300 m of a walrus or polar bear observed on sea ice.
- 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.
- Baffinland will place Marine Wildlife Observers (via the SBO program) on ice breaking vessels during the shoulder season that will be responsible for recording relative abundance, group composition and behavior of marine mammals, and if relevant any incidences of marine mammal strike or near misses with Project vessels.
- Posting of ice analyst on board icebreaking vessels.
- Project aircrafts (helicopter and airplanes) will maintain an altitude of 450m over marine waters when possible.
- Establishment of restricted “no-go” zones to avoid key sensitive areas (Koluktoo Bay, Tremblay Sound, Bruce Head shoreline).
- No drifting in Eclipse Sound.
- Maximum of 3 vessels anchored at Ragged Island.
- Limiting vessel idling.

It is important to note that several of these mitigation measures have been implemented on a voluntary basis by Baffinland and exceed any applicable regulatory requirements in Canada. This suite of measures represents a more conservative practice of vessel traffic management than is demonstrated by any other industrial/commercial shipping operator or government vessel in the RSA (i.e., Canadian Coast Guard, Fisheries and Oceans Canada). Additionally, since receiving approval from the NIRB on the Extension Request, Baffinland has worked with DFO to update Baffinland’s commitments on the transit restrictions mitigations, which will apply beginning in summer 2021. The commitments are as follows:

1. Apply spring transit restriction mitigations as long as ice concentrations, as defined by the Canadian Ice Service, of greater than 3/10 persist along the Northern Shipping Route, or meet the obligations of applicable commitments to others if more conservative, to determine the earliest date for commencing the shipping season. Initiation of this commitment will begin in 2021.
2. Beginning in 2021, apply the following transit restriction mitigations in the fall:

- When a continuous sailing route of open water and/or new ice (<10 cm) occurs between the entrance of Pond Inlet and Milne Port, then icebreaker transits and other unescorted vessels in the RSA may proceed under open-water operating conditions.
- A maximum of two (2) transits or four (4) half transits will occur per day (24-h period) where grey ice (10 to 15 cm) cannot be avoided along the shipping route.
- No breaking of landfast ice along the shipping route.

A supplementary table on Project mitigations and monitoring was also provided in response to FWS Comments from DFO on the PIP Extension Request. This table outlined how, for each potential effect associated with the shipping operations for the Project, a mitigation to minimize or eliminate the effect has been applied by Baffinland and also described associated monitoring results that support conclusions about the efficacy of those mitigations to the time of submission.

Project-related vessel tracks and associated speeds along the Northern Shipping Route are recorded throughout the shipping season using the Automatic Identification System (AIS), which tracks the movement of each vessel using an onboard AIS transceiver with integrated Global Positioning System (GPS). The AIS signals in the Project area are recorded by base stations set up at Pond Inlet and Bruce Head; and when out of range of the base stations, through satellite based AIS receivers (exactEarth® AIS archive). Vessel tracks are publicly accessible through the Baffinland website during the shipping season and at the Baffinland office located in the Baffinland/MHTO building on a large wall-mounted monitor. For the shipping season, daily maps are prepared showing Project vessel tracks (including the MSV *Botnica* and vessels under escort) on all days when ice concentrations were 1/10 or greater. These vessel track maps include an overlay of daily sea ice concentration (i.e., coverage) provided by the Canadian Ice Service showing vessels transiting in open water whenever possible while avoiding shore leads and polynyas.

## RESULTS

Project vessel tracks from 2020 are plotted in Figure 4.14 (see PC Condition No. 103). There were no major deviations from the nominal shipping route in 2020 by Project vessels.

Table 4.29 presents vessel speed information for all Project-related vessels calling at Milne Port in 2020 (see PC Condition No. 105). A total of 72 ore carrier voyages (comprising 36 ore carrier vessels), 8 freight vessels/tanker voyages (comprising 5 vessels), 2 tugs, and 1 icebreaker called to Milne Port during the 2020 shipping season. Project vessels traveled below the 9-knot speed limit for the majority (99.0 %) of their transit period in the RSA (Table 4.30). The maximum recorded travel speed for an ore carrier in 2020 was 11.9 knots. The maximum recorded speed for a freight / fuel tanker in 2020 was 9.1 knots. The proportional breakdown of vessel travel speed in the RSA during the 2020 shipping season is presented for all vessels combined (ore carriers and cargo/fuel vessels) in Figure 4.15 (see PC Condition No. 105).

## TRENDS

No major deviations from the nominal Northern Shipping Route have occurred by Project vessels in the RSA during the first six (6) years of iron ore shipping in this area (2015 to 2020).

No ship strikes on marine mammals have been reported by ship operators since the start of the Project, including ore carriers, fuel/cargo ships and support tugs. A single seabird strike was recorded over the five years of SBO monitoring conducted in the RSA. This occurred during the 2019 SBO Program (long-tailed duck).

**RECOMMENDATIONS / LESSONS LEARNED**

To ensure adherence to the SMWMP, Baffinland will continue to monitor vessel tracks and associated speeds using shore-based AIS stations at Pond Inlet and Bruce Head, and satellite-based vessel tracking using the exactEarth® archive.

In 2021, all Project vessels (ore carriers, fuel tankers, cargo ships, tugs, icebreaker) will be subject to the mitigation measures outlined above (as part of the annually updated SITM) when under contract to Baffinland, including standing instructions to travel through Eclipse Sound and Milne Inlet at speeds of no greater than 9 knots and to avoid deviating from the nominal Northern Shipping Route. Baffinland will continue to maintain active vessel tracking using AIS notification alerts.

## Project Certificate Condition No. 121

Category	Marine Environment - Marine Mammal Interactions
Responsible Parties	The Proponent, Fisheries and Oceans Canada, Environment Canada
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine mammals and seabird colonies associated with Project shipping.
Term or Condition	<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"> <li>• Date, time and location of the incident;</li> <li>• Species of marine mammal or seabird involved;</li> <li>• Circumstances of the incident;</li> <li>• Weather and sea conditions at the time;</li> <li>• Observed state of the marine mammal or sea bird colony after the incident; and,</li> <li>• Direction of travel of the marine mammal after the incident, to the extent that it can be determined.</li> </ul>
Relevant Baffinland Commitment	80, 83
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG), Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC)
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland's Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) mandates the recording of any contact that occurs between Project vessels and marine mammals or seabird colonies.

In order to ensure that interactions with marine wildlife and Project shipping activities are effectively monitored, Baffinland developed the SBO Program to monitor for potential ship strikes on marine mammals and seabirds in the RSA and implemented this program in 2018 to 2019 by deploying Marine Wildlife Observers on the MSV *Botnica*, an icebreaker that was commissioned by Baffinland to serve as an escort vessel to ore carriers at the beginning and end of the shipping season. Seabirds were monitored using the Canadian Wildlife Service (CWS)'s Eastern Canada Seabirds at Sea (ECSAS) protocol. Unfortunately, due to boarding restrictions related to the COVID-19 Pandemic, the SBO program could not be implemented as planned in 2020.

As an alternative, Baffinland partnered with the Marine Mammal Observation Network (MMON) to pilot a marine mammal incidental sighting program through the participation of the MSV *Botnica* and Nordic Bulk Carriers. The

consideration of Baffinland partnering with MMON was first suggested during a MEWG meeting on June 6, 2018 since Groupe Desgagnés Inc. (including subsidiary Nunavut Sealink & Supply Inc.), a cargo sealift contractor to Baffinland, had been an active member of the program. Virtual training was provided to participating vessel representatives in collaboration with Green Marine and MMON, which included instructions on how to report whale strikes should they occur.

#### **RESULTS**

There were no marine mammal or seabird strikes reported in 2020, and therefore no notification was required.

#### **TRENDS**

From 2013 through 2020, no notifications of accidental contact with marine mammals or seabirds were required, with the exception of the recent seabird strike that occurred in October 2019. Given that this is the first seabird strike to occur since 2013, there is insufficient data to undertake any type of trend analysis.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Given that only one (1) seabird strike has been recorded to date (from 2019), no additional mitigation measures are deemed necessary based on the very low frequency of occurrences. Additional recommendations will be considered should this be observed on a recurring basis.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2021 should COVID-19 Pandemic-related vessel boarding restrictions be lifted. The implementation of the incidental sighting program in collaboration with MMON is also expected to continue into 2021, regardless of whether activities through the SBO monitoring program resumes.

## Project Certificate Condition No. 122

Category	Marine Environment - Marine Mammal Interactions
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine mammals and seabird colonies associated with Project shipping.
Term or Condition	The Proponent shall summarize and report annually to the NIRB regarding accidental contact by project vessels with marine mammals or seabird colonies through the applicable monitoring report.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be provided in the Annual Report to the NIRB.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Shipping and Marine Wildlife Management Plan (Baffinland, 2020k)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland's Shipping and Marine Wildlife Management Plan (Baffinland 2020) mandates the recording of any contact that occurs between Project vessels and marine mammals or seabird colonies.

In order to ensure that interactions with marine wildlife and Project shipping activities are effectively monitored, Baffinland developed the SBO Program to primarily monitor for potential ship strikes on marine mammals and seabirds in the RSA, implemented this program in 2018 to 2019 by deploying Marine Wildlife Observers on the MSV *Botnica*, an icebreaker that was commissioned by Baffinland to serve as an escort vessel to ore carriers at the beginning and end of the shipping season. Seabirds were monitored using the Canadian Wildlife Service (CWS)'s Eastern Canada Seabirds at Sea (ECSAS) protocol. Unfortunately, due to boarding restrictions related to the global COVID-19 Pandemic, the SBO program could not be implemented in 2020.

As an alternative, Baffinland partnered with the Marine Mammal Observation Network (MMON) to pilot a marine mammal incidental sighting program through the participation of the MSV *Botnica* and Nordic Ore Carriers. Virtual training was provided to participating vessel representatives in collaboration with Green Marine and MMON, which included instructions on how to report whale strikes should they occur.

### RESULTS

There were no notifications of marine mammal or seabird strikes in 2020.

**TRENDS**

From 2013 through 2020, no notifications of accidental contact with marine mammals or seabirds were required, with the exception of the recent seabird strike that occurred in October 2019. Given that this is the first seabird strike to occur since 2013, there is insufficient data to undertake any type of trend analysis.

**RECOMMENDATIONS / LESSONS LEARNED**

Given that only one (1) seabird strike has been recorded to date (from 2019), no additional mitigation measures are deemed necessary based on the very low frequency of occurrences. Additional recommendations will be considered should this be observed on a recurring basis.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2021 should COVID-19 Pandemic-related vessel boarding restrictions be lifted. The implementation of the incidental sighting program in collaboration with MMON is also expected to continue into 2021, regardless of whether activities through the SBO monitoring program resumes.



## Project Certificate Condition No. 123

Category	Marine Environment - Marine Mammal Interactions
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine mammals and seabird colonies associated with Project shipping.
Term or Condition	The Proponent shall provide sufficient marine mammal observer coverage on project vessels to ensure that collisions with marine mammals and seabird colonies are observed and reported through the life of the Project. The marine wildlife observer protocol shall include, but not be limited to, protocols for marine mammals, seabirds, and environmental conditions and immediate reporting of significant observations to the ship masters of other vessels along the shipping route, as part of the adaptive management program to address any items that require immediate action.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	N/A
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

In order to ensure that interactions with marine mammals and Project shipping activities are effectively monitored, Baffinland developed the SBO Program to primarily monitor for potential ship strikes on marine mammals and seabirds in the RSA, and secondarily to collect observational data on the presence, relative abundance and distribution of marine mammals and seabirds within the boundaries of the RSA relative to Project vessel operations.

The SBO Program was first run in 2013 to 2015 and was subsequently resumed in 2018 and 2019. The 2013 to 2015 SBO Program took place during the construction phase at Milne Port (2013 and 2014) and during Year 1 of shipping operations (2015). As Baffinland had not designed or constructed purpose-built ore carriers as originally planned, there was reliance on placing the observers aboard market vessels in order to conduct the monitoring. Fuel tanker and sealift vessel traffic in and out of Milne Port served as the SBO observation platform during the 2013 to 2015 program. Observers boarded the ship in Pond Inlet, disembarked at Milne Port and returned to Pond Inlet via community charter flight for the subsequent vessel boarding. The SBO Program was put on hold in 2016 due to concerns regarding safe onboarding of the observers on the vessels in Pond Inlet (as boarding occurred at sea).

In order to ensure that interactions with marine wildlife and Project shipping activities are effectively monitored, Baffinland developed the SBO Program to monitor for potential ship strikes on marine mammals and seabirds in the RSA and implemented this program in 2018 to 2019 by deploying Marine Wildlife Observers on the MSV *Botnica*, an icebreaker that was commissioned by Baffinland to serve as an escort vessel to ore carriers at the beginning and end of the shipping season. The MSV *Botnica* provided a safe climate-controlled viewing platform 20 m above sea level,

where Marine Wildlife Observers (MWOs) could comfortably and effectively observe marine wildlife and environmental conditions. Seabirds were monitored using the Canadian Wildlife Service (CWS)'s Eastern Canada Seabirds at Sea (ECSAS) protocol (Gjerdrum et al., 2012). Unfortunately, due to boarding restrictions related to the global COVID-19 Pandemic, the SBO program could not be implemented in 2020.

As an alternative, Baffinland partnered with the Marine Mammal Observation Network (MMON) to pilot a marine mammal incidental sighting program through the participation of the MSV *Botnica* and Nordic Bulk Carriers. The consideration of Baffinland partnering with MMON was first suggested during a MEWG meeting on June 6, 2018 since Groupe Desgagnés Inc. (including subsidiary Nunavut Sealink & Supply Inc.), a cargo sealift contractor to Baffinland, had been an active member of the program. Virtual training was provided to participating vessel representatives in collaboration with Green Marine and MMON, which included instructions on how to report whale strikes should they occur.

In years when Baffinland undertakes marine mammal aerial surveys during the shoulder season, data collected by marine mammal observers is communicated with vessel captains through Baffinland's daily shipping calls.

## RESULTS

Detailed results for the 2020 Incidental Marine Mammals Sightings Pilot Program are presented as part of Summary Sheet for PC Condition No. 106.

Seabird sightings using the ECSAS protocol were not possible in 2020.

Baffinland completed early shoulder season marine mammal aerial surveys just prior and during first days of the shipping season being initiated in July 2020. The aim of these reconnaissance surveys was to collect data on the presence/absence and distribution of marine mammals in the RSA in relation to ice conditions (for additional information refer to Summary Sheet for PC Condition No. 101, and 109). The information gathered on marine mammal distribution was communicated during daily shipping briefings with representatives from Baffinland's Shipping, Sustainable Development, Operations teams, and Fednav (including ice analysts). Sightings information was subsequently relayed to vessel captains so that they were made aware of locations of marine mammals in the area during their transit through the RSA in the presence of ice.

## TRENDS

No ship strikes on marine mammals have been recorded to date through any of the previously run SBO programs. Similarly, no ship strikes on marine mammals have been reported by ship operators since the start of the Project, including ore carriers, fuel/cargo ships and support tugs, and during reporting year 2020. The only seabird strike reported over six years of monitoring occurred during the 2019 SBO Program.

## RECOMMENDATIONS / LESSONS LEARNED

Safety concerns that were raised regarding the initial SBO program (that led to the postponement of the program in 2016) were mitigated through the use of the MSV *Botnica* as the survey platform and boarding the vessel in Milne Port in 2018 and 2019. This included on-board accommodation for Inuit observers to allow for regular wildlife surveys over consecutive days. In doing so, the need to conduct at-sea boarding of observers on different survey vessels was no longer necessary.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2021 should COVID-19 Pandemic-related vessel boarding restrictions be lifted. Regardless of boarding

restrictions still being in effect during the 2021 shipping season, Baffinland will continue with its incidental marine mammals sightings program in collaboration with MMON.

## Project Certificate Condition No. 124

Category	Marine Environment - Marine Mammal Interactions
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine mammals and marine fish populations from increased harvesting pressures in Project areas.
Term or Condition	The Proponent shall prohibit project employees from recreational boating, fishing, and harvesting of marine wildlife in project areas, including Steensby Inlet and Milne Inlet. The Proponent is not directed to interfere with harvesting by the public in or near project areas, however, enforcement of a general prohibition on harvesting in project areas by project employees during periods of active employment (i.e. while on site and between work shifts) is required.
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Fisheries and Oceans Canada (DFO), Crown Indigenous Relations and Northern Affairs Canada (CIRNAC), Qikiqtani Inuit Association (QIA), Terrestrial Environment Working Group (TEWG)
Reference	Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021) Hunting and Harvesting Policy (Baffinland, 2013c) Environmental Protection Plan (Baffinland, 2021d)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

As part of the Site orientation and training on the Environmental Protection Plan (EPP) individuals coming onto site participate in cultural awareness training and are provided with an overview of the policies outlined in the Hunting and Fishing (Harvesting) Policy. The policy states that no employee or contractor will be permitted to hunt or fish (harvest) on lands leased to Baffinland. Baffinland does not interfere with rights of public hunting or fishing near or on the Project Development Area. All visitors and visitor activities are tracked through a visitor access log.

Upon approval from DFO, fishing activities and fish population health surveys occur annually for the collection of environmental data and fish population health metrics by trained contracted professionals for aquatic effects assessment. Required scientific permits are applied for and received before sampling or fish population health programs occur. Results are published under various annual reports. Scientific collection permits are intended for non-lethal programs.

### RESULTS

No incidences of Project personnel hunting or fishing within Impact Area lands leased to Baffinland and/or the PDA occurred in 2020.

Consulting groups Minnow Environmental Inc., North South Consultants and Golder Associates Inc. completed various fish surveys over the course of 2020 to collect environmental data and fish population health metrics. The

purpose was to gather information on distribution, relative abundance, size distribution and other biological characteristics to evaluate potential mine related effects as required under *Fisheries Act* Authorizations, licences and applicable management plans.

In 2020, a total of 316 land use visitor person-days were recorded at Project sites, which is a 65% decrease from 2019. The low number of visitor check-ins in 2020 was most likely due to the ongoing COVID-19 Pandemic. Visitors frequenting the area were often hunting, resting, stopping for food, or having snowmobiles serviced. Baffinland provided food, beverages, transportation, tools, construction supplies, fuel and mechanical assistance to hunters and other visitors as requested.

### **TRENDS**

No Project personnel have participated in hunting or fishing on the Project Development Area unless approved by scientific permit and have not interfered with public rights to fish or hunt in or near the Project Development Area.

Baffinland continues to accommodate all hunting parties and other visitors that travel to the Project. However, to prevent potential transfer of the COVID-19 virus to Nunavummiut, all visits to Project facilities by non-project staff were temporary halted during 2020. As a result of the temporary closure, all camps and accommodations were closed to non-Project staff, however, the HTO Cabins remained available for use by hunters/visitors.

To eliminate any potential contact with site personnel during COVID-19, a non-contact Visitor Communication Center was established at each work site (Mary River and Milne Inlet), eliminating the necessity for visitors and Baffinland employees to interact closely. The Visitor Communication Center includes a radio with a dedicated channel for hunters/visitors to contact Security directly. Requests for food and other goods were dropped off at the Visitor Communication Centers at a predetermined drop off time.

During COVID-19, dedicated vehicles have been pre-determined for hunter/visitor transport purposes and are sanitized before and after use. Only personnel who have tested negative to both an initial and subsequent 5-day COVID-19 test provide hunter/visitor transport. A dedicated bus was utilized for transporting visitors across the Tote Road. A roll off trailer was utilized to transport all terrain vehicles on the Tote Road.

Daily public communications via radio occurred at the onset of COVID-19 in Pond Inlet to notify personnel of the temporary closure at site and protocols in place. The BCLO monitored social media and advised Nunavummiut of the COVID-19 protocols in place at the Project. Baffinland also placed COVID-19 signage at the HTO hunting cabins. Hunter and visitor supply requests continued to be accommodated in 2020 based upon supplies available on site.

### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland continues to monitor and implement the policy banning all employees and contractors from hunting and fishing within the Project Development Area and accommodating all hunting parties.

### Project Certificate Condition No. 125

Category	Marine Environment - Public Engagement
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To assess acceptability of acoustic deterrent devices for the general public.
Term or Condition	Prior to use of acoustic deterrent devices, the Proponent shall carry out consultations with communities along the shipping routes and nearest to Steensby Inlet and Milne Inlet ports to assess the acceptability of these devices. Feedback received from community consultations shall be incorporated into the appropriate mitigation plan.
Relevant Baffinland Commitment	41
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

Not applicable. No acoustic deterrents have been required and therefore considered for use on the Project to date.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

### Project Certificate Condition No. 125 (a)

Category	Marine Environment - Public Engagement
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure public acceptability of project vessel anchor sites and reduce potential conflicts between project marine shipping and local harvesting.
Term or Condition	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.
Relevant Baffinland Commitment	35
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Mittimatalik Hunters and Trappers Organization (MHTO)
Reference	Northern Shipping Corridor Anchorage Locations (Baffinland, 2020o) Marine Shipping and Vessel Management Report (Baffinland, 2020p) Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port (Fednav, 2020a) 2020 Community Engagement Records 2020 MEWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

#### METHODS

Baffinland continues to interact with the Hamlet of Pond Inlet and the MHTO to better understand potential concerns associated with its shipping operations, and includes discussions related to anchorage sites. The evaluation on the suitability of alternative anchorage sites for Project-related vessels considers a number of safety, ecological and logistical factors. Accordingly, Baffinland completed an alternative anchorage options analysis in early 2020 that included locations suggested by the MHTO (e.g., Guy's Bight, Erik Harbour; see Figure 1 in Attachment 1 of Baffinland (2020o) submitted to NIRB on June 8, 2020 [NIRB Doc. No. 327657] through previous engagement efforts and discussed these results during the End of 2019 Shipping season meeting in Pond Inlet. Baffinland also presented its analysis during the 2020 Pre-shipping season held in July 2020 (Baffinland, 2020p). As indicated in Baffinland (2020n), alternate locations within the shipping corridor will need to meet the following aspects to be considered a suitable alternative to Ragged Island: (i) is within close proximity to Milne Port, (ii) where depth is no greater than 100 m, (iii) where width allows for safe maneuverability, (iv) that provides refuge during weather events, (v) that allows for three

(3) vessels to be safely anchored at the same time, and (vi) is not considered to be of heightened ecological importance (e.g., Koluktoo Bay or Tremblay Sound).

Baffinland intends to continue to utilize the existing anchorage and drifting zone with the limitation of no more than three (3) vessels present until other acceptable alternatives can be identified in consultation with the MHTO.

#### **RESULTS**

As indicated in Baffinland (2020n), alternate locations within the shipping corridor will need to meet the following aspects to be considered a suitable alternative to Ragged Island: (i) is within close proximity to Milne Port, (ii) where depth is no greater than 100 m, (iii) where width allows for safe maneuverability, (iv) that provides refuge during weather events, (v) that allows for three (3) vessels to be safely anchored at the same time, and (vi) is not considered to be of heightened ecological importance (e.g., Koluktoo Bay or Tremblay Sound).

Baffinland intends to continue to utilize the existing anchorage and drifting zone with the limitation of no more than three (3) vessels present until other acceptable alternatives can be identified in consultation with the MHTO. However, to minimize community concerns expressed Baffinland has limited the number of ships anchored at Ragged Island or drifting in Eclipse Sound to a maximum of three (3) Project-related vessels. Baffinland also committed to restricting vessels drifting to the extent possible in Eclipse Sound (unless warranted for safety reasons) over the entire 2019 shipping season. These management practices were implemented in both 2019 and 2020.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to consult with the MHTO and other key stakeholders throughout the life of the Project to mitigate Project effects on local communities and other resource users to the fullest extent practicable. Baffinland will provide updates as warranted through future annual reporting efforts.



## Project Certificate Condition No. 126

Category	Marine Environment - Public Engagement
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To incorporate local input into monitoring data collection.
Term or Condition	The Proponent shall design monitoring programs to ensure that local users of the marine area in communities along the shipping route have opportunity to be engaged throughout the life of the Project in assisting with monitoring and evaluating potential project-induced impacts and changes in marine mammal distributions.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Responsible Party	Baffinland
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Draft 2020 MEEMP and AIS Monitoring Program (Golder, 2021a) 2019 MEEMP and AIS Monitoring Program (Golder, 2020a) Marine shipping and Vessel Management Report to the Nunavut Impact Board (Baffinland, 2020p) 2020 MEWG Meeting Records MHTO Letters of Support for 2020 Monitoring Programs
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C .1 Appendix G.20

### METHODS

Baffinland's ongoing development and refinement of monitoring programs and protocols considers input from local community members (e.g., concerns that are communicated through community workshops) as well as discussions with the MEWG, in which Inuit organizations actively participate. For example, the Qikiqtani Inuit Association (QIA) has been a member of MEWG since its inception and the Mittimatalik Hunter and Trapper Organization (MHTO) joined the MEWG in 2016.

Unlike previous years, most in-person engagements with the MHTO were not possible in 2020 due to various public health restrictions related to the COVID-19 Pandemic from March 2020 onwards. As an alternative, Baffinland sent summary descriptions (Inuktitut and English) to the MHTO of the anticipated freshwater, marine and terrestrial programs to be implemented in 2020 (Appendix G.20). Letters of support were subsequently provided by the MHTO for the various programs to be implemented (Appendix G.20). Additional discussions were held between Baffinland and representatives of the MHTO, Hamlet of Pond Inlet, and QIA during the pre-shipping season meeting held on July 8 and July 15, 2020 in Pond Inlet and via teleconference (Baffinland, 2020p). Shipping monitors based in Pond Inlet were present in-person during the meetings, while Baffinland staff from Oakville headquarters participated in the meeting via teleconference (see Photo 35 and 36 in Appendix D).

Baffinland's monitoring programs strive to actively involve local Inuit participation and take into account community concerns as well as discussions with the MEWG, in which Inuit organizations actively participate prior to program implementation. Input on the design of the 2020 monitoring programs was also sought from participants of the MEWG during the in-person meeting held in February 2020 in Ottawa, and in June 2020 via a teleconference meeting. Monitoring results are reviewed annually by MEWG members, and by Inuit participants through in-person meetings. In 2020, local Inuit participation in Baffinland's monitoring programs was limited due to public health concerns associated with the COVID-19 Pandemic, and the inability to bring Nunavut-based staff to Site. However, Inuit based in the south were hired to assist with monitoring programs in 2020, and QIA Environmental Monitors at Site were present for some of the monitoring activities in 2020.

Since 2019, Baffinland has implemented a Pond Inlet "guardian program" (Shipping Monitors), which consisted in 2020 of employing a minimum of two (2) full-time Shipping Monitors from the community of Pond Inlet to actively track daily Project vessel movements in the RSA in real-time, and in relation to reported marine mammal sightings (as shared by the community and the monitoring teams). Shipping Monitors track any feedback they receive over the shipping season and answer questions as needed, and provide direct liaison between the community of Pond Inlet, hunters and Baffinland's headquarters, including the Shipping and Sustainable Development departments).

## RESULTS

A total of one Inuk boat operator/field assistant, hired through one Inuit-owned outfitting company based in Pond Inlet was employed to participate in the 2020 marine monitoring programs (MEEMP and AIS Monitoring, and Year 1 Freight Dock Habitat Offset Monitoring programs). This was possible because the individual was residing in Southern Canada at the time of employment and could travel to and from Mary River through the southern flight hub.

When participation is possible (i.e., not during a Pandemic where Nunavummiut employees were not able to work at Mary River), Inuit researchers provide feedback into the marine monitoring programs through in-person end of program interviews. Feedback received through the 2019 end of season interviews included a request to adapt the fish sampling program to allow for donation of fish tissue for use by local community. In 2020, fish dissections were completed in the field whenever possible to do so, and remaining fish tissues were retained as requested.

A total of seven (7) shipping monitoring (full-time and part-time) were hired to support the shipping season in 2020 (see Photo 25 and 26 in Appendix D). Overall, the inclusion of local Inuit land users in the marine monitoring programs has proven to be a successful example of community-based environmental monitoring providing tangible results that contribute to Baffinland's overall marine environment monitoring efforts. The MHTO has also provided invaluable advice regarding marine mammal behaviour through various discussions with Baffinland staff and through formal MEWG meetings.

## TRENDS

Inuit have been involved in marine monitoring studies at all levels since the inception of the program. The addition of the MHTO as members of the MEWG in 2016 and the hiring of Inuit participants from Inuit outfitting companies based in Pond Inlet has increased the participation of Inuit in this process. Inuit participation in Baffinland's monitoring programs increased in 2019 compared to 2017 and 2018 (from 2,265 hours / 12 participants in 2017 and 1,610 hours / 9 participants in 2018 to 6,500 hours / 23 participants in 2019). In 2019, an Inuit participant from Pond Inlet was also involved in the analysis and reporting of the 2019 marine mammal monitoring program. In 2020, Inuit participation was limited in comparison to prior years due to access restrictions related to the COVID-19 Pandemic

public health measures. Baffinland is looking forward to its Inuit workforce to return to Mary River once COVID-19 Pandemic restrictions, as determined by the Nunavut Public Health Officer, are lifted.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Marine monitoring programs will be reviewed with the MEWG and MHTO in 2021 in consideration of increasing Inuit involvement if possible to do so. Shipping monitors will also continue to be hired to provide a direct liaison between the community of Pond Inlet, hunters and Baffinland's headquarters including its Shipping and Sustainable Development departments.

## Project Certificate Condition No. 127

Category	Marine Environment – Public Engagement
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To promote public awareness and engagement with Project shipping activities.
Term or Condition	The Proponent shall ensure that communities and groups in Nunavik are kept informed of Project shipping activities and are provided with opportunity to participate in the continued development and refinement of shipping related monitoring and mitigation plans.
Relevant Baffinland Commitment	27,28
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Mittimatilik Hunter and Trappers Organization, Marine Environment Working Group (MEWG)
Reference	Baffinland website
Ref. Document Link	<a href="https://www.baffinland.com/operation/shipping-and-monitoring/">https://www.baffinland.com/operation/shipping-and-monitoring/</a>

### METHODS

Although this condition is specific to Steensby which is currently not active, Baffinland stills ensures that the public is made aware of shipping-related activities. Accordingly, Baffinland has enlisted exactEarth®, a global vessel monitoring and tracking service based on Automatic Identification System (AIS) data from polar orbiting satellites to track and report on vessel movements. The information is readily available on the Baffinland website over its entire shipping season.

Information on ships such as last reported coordinates of the vessel, whether the vessel is moving, the direction of vessel movement and destination of the vessel are provided.

The vessel locations plotted on the online map provide regularly updated snapshots of vessel movement in the North Baffin region approximately every 30 minutes. Baffinland encourages all land and water users to continue to practice safe boating, hunting, and other travel activities, and be aware of your surroundings at all times.

Although the Steensby portion is currently not active, Makivik is a member of the Marine Environment Working Group where any proposed changes to shipping activities would be discussed.

### RESULTS

Baffinland has made vessel routing accessible to the public via the Baffinland website. Baffinland also installed an AIS tracker system in Baffinland's Shipping Monitor office located on the second floor of the MHTO building on a dedicated laptop and wall-mounted monitor (see Photo 27 in Appendix D) for viewing the live continuous exactEarth® feeds of vessels active in the Northern Shipping Route by all visitors during Baffinland's regular office

hours (8am to 5pm). In 2020, access to the office was limited due to public health restrictions associated with the COVID-19 Pandemic.

In 2020, Baffinland trained and hired 7 shipping monitors from Pond Inlet, consisting of full-time (2), and part-time (3) employees, and two (2) summer students (see Photo 25 and 26 in Appendix D). Shipping Monitors provided updates on Baffinland shipping activity to residents of Pond Inlet via local public radio, marine VHF radio (for hunters on the water) and through social media.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland has found the use of exactEarth® to be beneficial in providing information related to ship routing to the public. Baffinland will continue to use this service. Furthermore, it is Baffinland's intent to continue hiring Shipping Monitors based in Pond Inlet and to providing live viewing of vessel tracks through the Baffinland office in 2021. Baffinland Shipping Monitors will also continue to inform residents about shipping activities through the use of marine VHF radio, local public radio, and Facebook posts on the dedicated Baffinland Shipping Facebook group page. Information on project shipping activities will also continue to be shared with the MEWG and the MHTO through the sharing of MEWG Meeting Records and invitation for participation at MEWG meetings.

## Project Certificate Condition No. 128

Category	Marine Environment - Public Engagement
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure habitat compensation is acceptable to local communities.
Term or Condition	The Proponent shall consult with local communities as fish habitat off-setting options are being considered and demonstrate its incorporation of input received into the design of the Fish Habitat Off-Setting Plan required to offset the Harmful Alteration, Disruption or Destruction of Fish and Fish Habitat (HADD).
Relevant Baffinland Commitment	27, 28
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Fisheries and Oceans Canada, Mittimatalik Hunter and Trapper Organization, Pisiksik Working Group
Reference	N/A
Ref. Document Link	N/A

Baffinland has engaged and conducted comprehensive consultation on the Project as a whole with the five North Baffin communities (Arctic Bay, Clyde River, Sanirajak, Igloolik, and Pond Inlet) prior to, during, and following the environmental reviews of the Project by the NIRB. Specific to fisheries offsetting in the marine environment, Baffinland (with DFO participation) consulted with the community of Pond Inlet in regard to the Ore Dock proposed at Steensby Port and the habitat off-set design for the existing Ore dock and Freight dock at Milne Port for the Early Revenue Phase of the Project (ERP). Early engagement was initiated during the consultation process on the ERP when Baffinland met with members of the MHTO and other community members to discuss the design, offsetting measures, and proposed monitoring with respect to construction of the Ore Dock at Milne Port. Since then, consultation efforts have focused largely on offsetting habitat effectiveness monitoring associated with in-water marine infrastructure.

Baffinland was issued a Fisheries Authorization (Ref No. 14-HCAA-00525) from DFO in 2014 for construction of the Ore Dock at Milne Port. A fish habitat offsetting plan was included with Baffinland's application for an authorization under the *Fisheries Act*. This included fish habitat enhancement measures constructed around the Ore Dock.

Similarly, Baffinland was issued a Fisheries Authorization (Ref No. 18-HCAA-00160) on March 21, 2019 for construction of the Freight Dock at Milne Port. A separate offsetting plan for the Freight Dock was developed which included the addition of coarse rock substrates as offsetting materials around the perimeter of the Freight Dock.

With regards to future expansion plans such as the proposed Phase 2 proposal, Baffinland continues to explore potential offsetting options in both freshwater and marine environments to address potential losses in fish habitat associated with permanent habitat alteration or destruction of fish habitat, which includes community consultation activities in order to help refine candidate offset locations. For freshwater, offsetting may be required to offset proposed in-water infrastructure along the proposed North railway (water crossings, pond encroachment, and

stream diversions) and additional water crossings on Tote Road realignments and quarry access roads, in addition to waterbodies identified for water withdrawal. Exploration of potential marine offsetting options are aimed at offsetting in-water works associated with the proposed construction of second Ore Dock.

Various options are being considered for fish habitat offsetting in the freshwater environment including improving lake or stream fish rearing habitat. For marine habitat, enhancement and/or creation of habitat (e.g., rocky reefs) and complementary measures (e.g., financial contributions in-lieu of constructing habitat) are being explored.

Consultation activities related to offsetting in 2020 were delayed in part from logistical and operational restrictions associated with the COVID-19 Pandemic. Focus was geared towards desktop-based exercises and the collection of baseline data in order to gather data for consideration during future consultation efforts.

## **RESULTS**

A number of potential offsetting options were identified for the marine environment as part of Phase 2 conceptual offsetting planning (Golder, 2018f). Numerous potential freshwater offsetting options located in both lake (e.g., rearing habitat creation and/or improvements to existing) and stream (e.g., rearing habitat creation, removal of natural barriers, improvements to upstream passage) habitats were also identified and further investigated during summer field programs in 2019, and additional investigations continued into 2020.

The following field work was completed in 2020 to collect baseline data on potential freshwater and marine-based offsetting sites as follows:

### *Freshwater*

In 2020, six (6) offsetting locations along the Tote road were assessed to collect new information on juvenile arctic char and to evaluate potential habitat utilization by ninespine stickleback. Streams were sampled using electrofishing and fish habitat information was collected. An additional six (6) contingency offsetting locations were also sampled should the other sites be considered unsuitable for future offsetting measures. Data analysis remains ongoing.

### *Marine*

In 2020, a review of potential offsite offsetting locations was completed using a desktop-approach and a pre-screening process. Of the nine (9) sites initially identified prior to any collection of on-site data, a further evaluation against six (6) criteria was completed. Following this analysis, six (6) sites were considered suitable for the potential construction of rocky reefs in Milne Inlet and requiring on-site data collection to further validate their suitability. In 2020, baseline data was collected at three (3) of these sites, including a site near Tugaat River. Data collected from the site near Tugaat River is being further analysed for to support the development of a conceptual design for a proposed rocky reef offset site. The conceptual design is intended to provide an example of offsetting habitat that may be suitable to Milne Inlet and can be shared as part of future engagement efforts.

## **TRENDS**

Results from the six-years of post-construction monitoring of the Milne Port Ore Dock offsetting works have shown the offsetting habitat is effective in supporting biological activity, providing support for the addition of coarse substrates as an effective approach for successful offsetting.

Trends are not yet available for the Freight Dock offset habitat given that year 1 of post-construction monitoring occurred in 2020.

Over the long term, as existing datasets are expanded upon with results from recent offsetting monitoring programs implemented in the region, the suitability of constructing rocky reefs and/or addition of three-dimensional substrates as offset habitat capable of providing stable and functional fish habitat over time will be further validated.

#### **RECOMMENDATIONS / LESSONS LEARNED**

The last year of the 6-year Ore Dock offset monitoring was completed in 2020. Based on the results collected over the 6 years, the offset habitat remained stable; colonization of aquatic vegetation and benthic invertebrates was observed, with percent cover, species richness and abundances generally increasing over the monitoring period from 2015 to 2020, reflecting natural succession patterns. Fish were also shown to use the constructed offset habitat. The results of this monitoring help to further validate the suitability of substrate additions for fish habitat offset measures in the region.

Baffinland will continue to monitor the success of fish habitat offsetting measures associated with the construction of the recently constructed Freight Dock. Baffinland will also continue to provide the results of the annual monitoring program to DFO, the MEWG and other interested parties, as requested.

Baffinland remains committed to exploring potential offsetting options in both freshwater and marine environments to address potential losses in fish habitat associated with permanent habitat alteration or destruction of fish habitat associated with future permitting requirements, as needed. Although engagement activities were not possible in 2020 due to the COVID-19 Pandemic, Baffinland intends to move forward with engagement activities in 2021 in order to get feedback on the progress it has made for identifying suitable locations for the construction of future offset measures.



## 4.7 PERFORMANCE ON SOCIO-ECONOMIC CONDITIONS

### 4.7.1 Population Demographics (PC Conditions 129 through 134)

Six (6) PC conditions are listed under the heading of Population Demographics in the Project Certificate. Three (3) of these describe the NIRB's expectations with respect to working with the Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and establishing a Project-specific working group. Three PC conditions relate to mitigating the potential for demographic changes or monitoring and reporting of demographic change within the communities due to Project employment.

#### Inuit & Stakeholder Feedback

Key stakeholders that provide input related to the socio-economic monitoring program for the Project include the communities, the QIA, various departments of the GN, and CIRNAC. These agencies are active members of the Mary River Socio-economic Monitoring Working Group (SEMWG). While the potential for in-migration of non-Inuit into the North Baffin communities and out-migration of Inuit from the North Baffin were raised as concerns by the GN and by communities during the environmental assessment, it has not been raised as a concern in recent engagement activities in 2020.

#### Monitoring

Baffinland conducts monitoring of population demographics in the Local Study Area - the five (5) North Baffin communities (LSA) by reviewing government population statistics, tracking employee origin information, and tracking worker changes in address. Table 4.34 provides an evaluation of the Project's impacts on population demographics, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

#### Path Forward

Baffinland will continue to monitor this aspect of the socio-economic environment, and will discuss monitoring results with the SEMWG and QSEMC. Reporting on each PC condition follows.

**Table 4.34: Population Demographics Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Mine Employment	Migration of non-Inuit Project employees into the North Baffin LSA	Baffinland's 2020 Socio-economic Monitoring Report, which includes a review of population statistics, BCLO tracking of worker changes in home community, and results from the Employee Information Survey.	Effects may be occurring
	Out-migration from North Baffin	Cumulative Baffinland data since 2015 indicates a net of one non-Inuit employee/contractor is known to have in-migrated to the North Baffin LSA. This is not a significant effect. Cumulative Baffinland data since 2015 indicates a net negative migration (out-migration) of 22 Inuit workers from the North Baffin LSA, accounting for 0.4% of 2012 North Baffin LSA population.	

Component	Effects	Monitoring Program	Impact Evaluation
		This is significantly lower than the lower end of the out-migration estimate from the EIS. While a small number of Project workers have moved out of the North Baffin LSA, the effect has been smaller than predicted. It is also impossible to determine whether out-migration from the North Baffin LSA might have been any different if the Project was not there.	

## Project Certificate Condition No. 129

Category	Population Demographics - Qikiqtaaluk Socio-Economic Monitoring Committee
Responsible Parties	The Proponent, members of the QSEMC
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	Description of the general monitoring framework to be developed in consultation with the Qikiqtaaluk Socio-Economic Monitoring Committee.
Term or Condition	The Proponent is strongly encouraged to engage in the work of the Qikiqtaaluk Socio-Economic Monitoring Committee along with other agencies and affected communities, and it should endeavour to identify areas of mutual interest and priorities for inclusion into a collaborative monitoring framework that includes socio-economic priorities related to the Project, communities, and the North Baffin region as a whole.
Relevant Baffinland Commitment	41, 43, 45, 46
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (SEMR; Aglu and Stratos, 2021) 2020 QSEMC and SEMWG Meeting Records Draft Socio-Economic Monitoring Plan (Baffinland, 2019e).
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.3 and C.4 Appendix G

### METHODS

Baffinland continues to engage with the Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and the Mary River Socio Economic Monitoring Working Group (SEMWG), a sub-set of the QSEMC whose members include Baffinland, the Government of Nunavut, the Government of Canada, and the QIA. A Terms of Reference for the SEMWG (which identifies socio-economic monitoring priorities and objectives for the Project) has been developed and is provided in the Socio-Economic Monitoring Plan (Baffinland, 2019e). Baffinland has also incorporated feedback from SEMWG members while developing the Project's socio-economic monitoring program and continues to welcome feedback on the program from the SEMWG and QSEMC.

There was no meeting of the QSEMC in 2020 due to COVID-19. To maintain engagement with the community members of the QSEMC, Baffinland invited Mayors and community service providers from the North Baffin LSA Hamlets to participate in one-on-one discussions to provide updates on Mary River's existing operations, the results of the 2019 SEMR and to listen to community updates and issues of importance. Meetings were held with the Mayors of Igloolik and Pond Inlet in 2020 in place of the 2020 QSEMC meeting.

## RESULTS

Baffinland has a Socio-Economic Monitoring Plan in place and continues to engage with the QSEMC and SEMWG on the Project's monitoring program, which confirms compliance with this Term and Condition. Baffinland's Socio-Economic Monitoring Report assesses the socio-economic performance of the Project on an annual basis. Performance of the Project is assessed using socio-economic indicators for Valued Socio-Economic Components (VSECs) considered in the FEIS (Baffinland, 2012). The report has identified various positive effects of the Project and presents information that is consistent with several FEIS predictions. In other cases, monitoring data have revealed unclear, inconsistent, or otherwise negative trends (but not necessarily due to the Project). Long-term monitoring will be necessary to track Project outcomes more fully over time and may contribute to an improved understanding of observed trends and causality. Baffinland's compliance with various Project Certificate Terms and Conditions pertaining to socio-economic monitoring are also discussed throughout the report.

## TRENDS

Where appropriate, trends have been described for the indicators assessed in the Socio-Economic Monitoring Report. These trends demonstrate whether an indicator has exhibited change and describes the direction of that change. Trends are identified at various scales (North Baffin LSA, Iqaluit, the Qikiqtani Region, Nunavut or project-level). Additional information on these trends including pre-development average, 3-year average, last-year value, and the change from previous periods are outlined in the Executive Summary of the 2020 SEMR (Aglu and Stratos, 2021).

## RECOMMENDATIONS / LESSONS LEARNED

A number of changes to how information is presented in the socio-economic monitoring report were included in the 2020 report. These changes are informed by input received through community engagement, the Phase 2 Proposal hearings, and by the report authors experience and expertise in other northern and mining contexts. The report maintains clear alignment with the Mary River Environmental Impact Statement's predictions, Project Certificate's Terms and Conditions and Socio-Economic Monitoring Program. The SEMWG was engaged on these updates, which included re-organization of VSECs and indicators, additional data reporting around both normalized and absolute values and additional indicators around employment by skill level.

Going forward, successful socio-economic monitoring for the Project will require appropriate long-term data, the regular input of Project stakeholders, and a focus on continual improvement. Baffinland has also committed to using adaptive management as a tool to identify and make necessary improvements to the Project's socio-economic performance in the future.

### Project Certificate Condition No. 130

Category	Population Demographics - Project-specific monitoring
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	Recognizing that some Project-specific socio-economic monitoring initiatives may be best addressed in smaller more focused working groups, this is encouraged where possible.
Term or Condition	The Proponent should consider establishing and coordinating with smaller socio-economic working groups to meet Project specific monitoring requirements throughout the life of the Project.
Relevant Baffinland Commitment	41, 43, 46
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 QSEMC and SEMWG Meeting Records Draft Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.3 and C.4 Appendix G

#### METHODS

Baffinland continues to engage with the QSEMC and the SEMWG on the Project's socio-economic monitoring program. In addition, Baffinland regularly engages North Baffin community members through its community engagement program, and other committees that operate under provisions of the Inuit Impact and Benefit Agreement (IIBA), on various socio-economic topics.

#### RESULTS

Baffinland continues to engage the SEMWG, whose members include Baffinland, the Government of Nunavut, the Government of Canada, and the QIA. A Terms of Reference for the SEMWG (which identifies socio-economic monitoring priorities and objectives for the Project) has been developed and is provided in the Socio-Economic Monitoring Plan (Baffinland, 2019e). Baffinland has incorporated feedback from SEMWG members while developing the Project's socio-economic monitoring program and continues to welcome feedback on the program from the SEMWG. Baffinland's recent meetings with the North Baffin LSA Hamlets have been recorded in meeting notes presented in Appendix C of the Socio-Economic Monitoring Report.

#### TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to engage with the QSEMC, SEMWG and North Baffin LSA communities on the Project's monitoring program and will consider establishing smaller, focused socio-economic working groups to address specific community issues or Project challenges if deemed appropriate.

### Project Certificate Condition No. 131

Category	Population Demographics - Monitoring demographic changes
Responsible Parties	The Proponent, members of the QSEMC
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To monitor demographic changes affecting the North Baffin communities and the territory as a whole in order to understand changes and to evaluate the Proponent's predictions as related to population demographics.
Term or Condition	The Qikiqtaaluk Socio-Economic Monitoring Committee is encouraged to engage in the monitoring of demographic changes including the movement of people into and out of the North Baffin communities and the territory as a whole. This information may be used in conjunction with monitoring data obtained by the Proponent from recent hires and/or out-going employees in order to assess the potential effect the Project has on migration.
Relevant Baffinland Commitment	45
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.3 Appendix G

#### METHODS

Baffinland has provided demographic change information in the Socio-Economic Monitoring Report. This includes data on population estimates, known in-migrations of non-Inuit Project employees and contractors, known out-migrations of Inuit Project employees and contractors, percentage of Inuit vs. non-Inuit residents in the North Baffin Local Study Area (LSA), and Nunavut annual net migration. Baffinland also regularly administers an Inuit Employee Survey, which collects information related to employee changes of address, housing status, and migration intentions.

#### RESULTS

Demographic change indicator trends are provided in Table 4.35. Detailed results are presented in the Socio-Economic Monitoring Report.

#### TRENDS

Where appropriate, trends have been described for the indicators assessed in the Socio-Economic Monitoring Report.

**Table 4.35: 2020 Monitoring of Indicators of Demographic Change**

Indicator / Topic	Summary
Known in-migrations of non-Inuit Project employees and contractors	One non-Inuk employee migrated into the LSA in 2018, with no additional migrations in 2019 or 2020.
In-migration of non-Inuit to the North Baffin LSA	While LSA-level migration data is not available, the proportion of Inuit to non-Inuit in LSA communities has remained relatively similar to pre-development levels.
Known out-migrations of Inuit Project employees and contractors	Five Inuit Baffinland and contractor employees were known to have moved out of the North Baffin LSA in 2020.
Out-migration of Inuit from the North Baffin LSA	While LSA-level migration data is not available, the proportion of Inuit to non-Inuit in LSA communities has remained relatively similar to pre-development levels.
Population estimates	The average annual population growth rates over the post-development period for North Baffin LSA communities was 2.2%, Iqaluit 2%, and Nunavut 1.4%, higher than the Canadian average growth rate of 1.2%. The rate of growth does not appear to have been affected by the Project.
Nunavut net migration	Nunavut net migration was -88 people in 2019, continuing a negative trend over the past 5 years.
Employee and contractor changes of address, housing status, and migration intentions	Based on 2020 Inuit Employee Survey results, declared migration intentions for 2021 align with the past several years of movement, with nine respondents expressing an intention to move in the next year.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland continues to provide demographic change information in its Socio-Economic Monitoring Report. However, only limited government data are currently available for the indicators 'in-migration of non-Inuit to the North Baffin LSA' and 'out migration of Inuit from the North Baffin LSA'. For this reason, Baffinland continues to present data from various non-government sources (e.g. Inuit Employee Survey, Baffinland Community Liaison Officer (BCLO) survey) to help better understand this topic.



### Project Certificate Condition No. 132

Category	Population Demographics - Training programs
Responsible Parties	The Proponent, North Baffin Hamlets, Municipal Training Organization, Government of Nunavut
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To develop training programs in ways which contribute to limiting the potential for migration to occur as North Baffin residents seek training and employment opportunities in the larger centre of Iqaluit.
Term or Condition	The Proponent is encouraged to partner with other agencies such as Hamlet organizations in the North Baffin region, the Municipal Training Organization, and the Government of Nunavut in order to adapt pre-existing, or to develop new programs which encourage Inuit to continue living in their home communities while seeking ongoing and progressive training and development. Programs may include driver training programs offered within Hamlets, providing upgraded equipment to communities for use in municipal works, providing incentives for small businesses to remain operating out of their community of origin, or supplementing existing recreational facilities and programming in North Baffin communities.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 QSEMC and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e) Qikiqtani Skills and Training for Employment Partnership (Q-STEP) Project Advisory Committee (PAC) Quarterly Reports Baffinland IIBA Quarterly Reports
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.3 and C.4 Appendix G

#### METHODS

In 2020 Baffinland partnered with local and regional governmental agencies and educational institutions to support local communities and develop training programs for residents while limiting the potential for out migration. Baffinland's priority in training is to train people to work at the mining operation. Training provided can benefit local communities should an employee chose to change jobs and return to work in the community. The skill set learned at Baffinland is transferrable for life long benefit of the individual and their home communities.

In September 2019, the Government of Nunavut through Nunavut Arctic College announced that they will set up a mine training centre in Rankin Inlet. Baffinland has continued to engage with Nunavut Arctic College over the last year. Baffinland was selected to participate in an industry survey and feedback portal to provide information around

the types of training and certification required in trades and heavy equipment operation. Through the NWT/Nunavut Chamber of Mines education working group Baffinland participated in a presentation and review by Nunavut Arctic College on their plans for setup and implementation of the new training center. Baffinland was advised on Nunavut Arctic college's staffing plans and on their efforts to serve regional centers throughout Nunavut. More recently, Nunavut Arctic College has presented on training and implementation plans now that the training center is scheduled to be in operation.

Baffinland also serves as a partner with the NWT/Nunavut Chamber of Mines Mine Education working group. Baffinland attends a monthly meeting to discuss opportunities to engage with students and youth and share opportunities in mining including employment, scholarships, education and training. Different industry partners present to the larger working group monthly exploring unique and new approaches to many of the common challenges faced by the mining industry. There is an opportunity to network, ask questions, and share experiences through this venue. In addition to hearing about Nunavut Arctic College's mine training center, other presenters included Voisey's Bay (Indigenous relationships), Mining Matters (student engagement), and Origin (indigenous learning and training) amongst others. Baffinland will present on Inuit success, Q-STEP, and learning and training in 2021.

Baffinland has engaged with Mining Matters to explore a combination of in school structured training as well as public outreach in impacted communities. Programs for grade 7 students would focus on planet earth science and resource development. Programs for grade 9 students would focus on environmental chemistry including groundwater, water testing, and mine water. Programs for grade 11 students would focus on mineral resource development cycle and careers in mining. Applications for funding support will be submitted to NTI and other funders to support this initiative.

Baffinland has also engaged with Skills Canada Nunavut to explore ways that the company could support the Nunavut territorial competitions as well as the national competitions. Skills Canada Nunavut brings youth from across the territory who are interested in skilled trades together to compete and show what they have learned. Baffinland views this as an ideal opportunity to both engage with and support these youth encouraging them to pursue a career in skilled trades.

### **Q-STEP**

Baffinland and the Qikiqtani Inuit Association (QIA) as well as the government of Nunavut, Kakivak Association and the Government of Canada have partnered in the \$19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program, the objective of which is to provide Inuit with skills and qualifications to meet the employment needs of the Mary River Project as well as other employment opportunities in the region. Training under the Q-STEP program includes work readiness programs as well as targeted training programs directed at apprenticeships, skills development, and formal certification in heavy equipment operation.

The Qikiqtani Skills and Training for Employment Partnership has proven to be the most successful employment and training program currently offered at Baffinland. The Q-STEP Charter from Employment and Service Development Canada was scheduled to end on March 31st, 2021. Due to COVID-19, it has been extended with no additional funding until March 31st, 2022. The Q-STEP teams at Baffinland and QIA are seeking third party funding to ensure that this successful training program can continue into the future.

### ***Community Based Work Readiness Training***

Baffinland continues to offer the Community Based Work Readiness Training Program. The Community Based Work Readiness Training Program is a 40-hour training program facilitated in the communities and addresses the following areas: Self Awareness, An Introduction to Mining, Essential Skills for the Workplace, Money Management and Preparing for Fly-In, Fly-Out. For 2020 in line with the IIBA commitments the Work Readiness Program was delivered in all five of the North Baffin impacted communities as well as Iqaluit.

In March 2020, COVID-19 directly impacted Nunavut and Nunavummiut, all Nunavut based staff were demobilized in an effort to protect employees and communities. In 2020, Baffinland held 7 community based Work Ready Program sessions. There were a total of 54 graduates of this program during the year. Because of COVID-19 and travel restrictions delivery of the program was transitioned to an online distance format. Q-STEP teams both at Baffinland and QIA worked with Employment and Service Development Canada (ESDC) to secure 10 laptop computers and internet access to allow community based residents to participate in the training. The online distance format proved to be very successful and continued after in person training was able to resume.

### ***On-Site Work Readiness Training***

The on-site Work Readiness program offers participants the opportunity to complete 60 hours of job shadowing at the Mary River site. The participants rotate within 5 entry-level jobs identified by the Inuit Success Assurance department. Upon completion of the on-site Work Readiness each participant is given the opportunity to provide feedback on their experience and area of interest such that Baffinland can work to find a placement in a training program or an employment opportunity for the participant. In 2020 Baffinland had a total of 10 graduates of the on-site Work Readiness Training program. This was impacted by COVID-19 and the inability of Nunavummiut to travel to site under territorial travel restrictions.

### ***Apprenticeships and Other Opportunities***

Baffinland has identified apprenticeship opportunities in the following trades:

- Heavy Equipment Service Technician “Heavy Equipment Mechanic”
- Truck and Coach Service Technician “Heavy Truck/Duty Mechanic”
- Automotive Service Technician “Automotive Mechanic”
- Welder
- Machinist
- Millwright “Industrial Mechanic”
- Oil Heat Systems Technician “Oil Burner Mechanic”
- Housing Maintainer
- Electrician

A pre-trades training program is provided for interested Inuit participants. Upon completion of the pre-trades training program, individuals will write a Trades Entrance Exam that once successful, will allow them to register with Nunavut Apprenticeship and may become fulltime, permanent apprentices at Baffinland.

At the start of 2020, there were 16 Inuit apprentices (14 males and 2 females). One of the female apprentices is currently off on maternity leave.

At the end of 2020, there were 15 Inuit apprentices (13 males and 2 females). All current apprentices at Baffinland are eligible to attend technical training school for their specific trade and apprenticeship level in 2021. Baffinland is coordinating the training with the Nunavut Apprenticeship Department and schedule will be determined based on COVID-19 restrictions for 2021.

### ***Heavy Equipment Training***

In previous years, Baffinland offered Inuit opportunities to participate in the Heavy Equipment Operating Training delivered by the Operating Engineers Training Institute of Ontario (OETIO) in Morrisburg, Ontario in partnership with Q-STEP. However, due to COVID-19 restrictions, the Heavy Equipment Operating Training did not take place in 2020.

### ***Support for Local Businesses***

In addition to provisions respecting the participation of Inuit Firms in Project contracting opportunities as detailed in Article 6 of the Inuit Impact and Benefit Agreement (IIBA) and the Inuit Procurement and Contracting Strategy, Baffinland supports the development of local businesses through its annual contribution of \$250,000 through the IIBA's Business Capacity and Start Up Fund. The fund, which is administered by the QIA, is designed to assist existing Inuit Firms to develop capacity to participate in the bidding process and to encourage business start-ups in the communities.

In addition, Baffinland has worked and will continue to work with local businesses on an ongoing basis to create contracting opportunities in the communities.

### ***Support for Local Communities***

Baffinland also supports a number of community investment programs. Pursuant to Article 12 of the IIBA, Baffinland and QIA each contribute \$375,000 annually to the Ilagiiktunut Nunalinnullu Pivalliajutsait Kiinaujat fund. The fund, which is administered by QIA is designed to meet the following objectives:

- Creation of opportunities for community capacity building;
- The fair distribution of impacts and benefits between communities and across generations;
- Maintenance of consistency with community development objectives; and
- Promotion of mutual understanding and learning.

The Fund is intended to support a wide range of activities including participation in community projects, youth and Elder programs, hunter support activities, cultural learning and revitalization, social support programs for families and individuals and counseling and healing programs.

In addition, through its community sponsorship program, Baffinland supports a wide range of social, recreational and cultural activities in the communities.

## **RESULTS**

The types of training currently provided or proposed by Baffinland reveal the full scope of learning opportunities available at the Project, either provided directly by Baffinland, contractors, or jointly with a partner such as the QIA. In 2020, Inuit training hours totalled 14,384 hours which is 13.7% of the total training provided by Baffinland. Baffinland is also working to develop new training programs that would be offered both in the community and at the Mine site. Baffinland is also working with contractors to explore new skills development initiatives. Training

programs are expected to continue to evolve at the Project as the operation advances, employment increases, and feedback from Inuit employees is implemented.

In 2020 the Human Resources and Training Departments provided the following training:

- Apprenticeship Training
- Arial Work Platform Classroom
- Arial Work Platform Field Training
- Commercial Truck & Trailer Classroom
- Commercial Truck & Trailer Field Training
- Drill Classroom
- Drill Field Training
- Heavy Equipment Classroom
- Heavy Equipment Field Training
- Heavy Equipment Operator (HEO) Program Classroom & Field Training - OETIO
- HEO Program Job Shadowing
- Light Vehicle Driver Classroom
- Light Vehicle Driver Field Training
- Medium Duty Vehicle Classroom
- Medium Duty Vehicle Field Training
- MISC / Specialized Trainings
- Mobile & Stationary Crane Classroom
- Mobile & Stationary Crane Field Training
- Site Orientations & Baffinland Presentations
- Support Equipment Classroom
- Support Equipment Field Training
- Onsite Work Ready Program
- Workplace Health & Safety Classroom Training
- Workplace Health & Safety Field Training
- WSCC Certification
- Tuttarvik 101
- Community Based Work Ready Training

## TRENDS

On an annual basis, Baffinland has and continues to seek multiple avenues for offering in community training, education and employment opportunities to Inuit, and to further explore new partnerships with local Hamlets and training institutes and strengthen existing programs or partnerships, where these already exist.

Some of the initiatives explored included:

- In Community Pre-Trades Training
- Driver's License Training
- Financial Literacy and Jobs Search Training
- Portfolio Development

- Adult Basic Education
- Pathway to Adult Secondary School
- Postsecondary Training Opportunities

#### **RECOMMENDATIONS / LESSONS LEARNED**

The COVID-19 Pandemic caused travel and other restrictions in Nunavut and across the world. This impacted Nunavut based employees who were no longer able to travel to and work at site. Nunavut based employees remained at home in their respective communities. Recognizing this it was important for Baffinland to continue to communicate with and engage employees and community residents during this time. Baffinland did this by conducting monthly community town halls and transitioning to community based training. The benefit of community based training is primarily that employees remain at home with their families and loved ones. Without the added stress of having to travel or to be away from home employees and residents were better able to concentrate and be successful with their training. In addition, by running training in the communities this provided additional employment and contracting opportunities in each community. Hotels, restaurants, and local stores would all have benefitted from instructor travel as well as increased spending by participants if they received training bonuses.

During 2020 Baffinland committed to increase community training initiatives. This has been done so that training to staff and community members can continue under the COVID-19 travel restrictions that have taken place in the territory. The Work Ready Program was initially transitioned to an online delivery format with participants being provided a laptop and internet access to be able to participate in the program. Even when in-person training resumed Baffinland continued to offer the distance online format which was well received by participants.

Baffinland continued to work with its partners, such as Nunavut Arctic College, to offer ongoing training and development in the communities. Baffinland has explored numerous in community training programs with the college in 2020. These include: The Adult Basic Education Program, the Pathways to Adult Secondary School (PASS) Program, the Pre-Trades Program and Portfolio Development.

### Project Certificate Condition No. 133

Category	Population Demographics - Monitoring demographic changes
Responsible Parties	The Proponent, members of QSEMC, Government of Nunavut, Nunavut Housing Corporation
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	Training programs may be developed with the goal of limiting the potential for migration to occur as North Baffin residents may choose to seek employment and therefore move from smaller North Baffin communities to the larger centre of Iqaluit.
Term or Condition	The Proponent is encouraged to work with the Qikiqtaaluk Socio-Economic Monitoring Committee and in collaboration with the Government of Nunavut's Department of Health and Social Services, the Nunavut Housing Corporation and other relevant stakeholders, design and implement a voluntary survey to be completed by its employees on an annual basis in order to identify changes of address, housing status (i.e. public/social, privately owned/rented, government, etc.), and migration intentions while respecting confidentiality of all persons involved. The survey should be designed in collaboration with the Government of Nunavut's Department of Health and Social Services, the Nunavut Housing Corporation and other relevant stakeholders. Non-confidential results of the survey are to be reported to the Government of Nunavut and the NIRB.
Relevant Baffinland Commitment	43, 45
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix B Appendix C.3 Appendix G

#### METHODS

Baffinland regularly administers a voluntary Inuit Employee Survey, which collects information on employee changes of address, housing status, and migration intentions. Baffinland has discussed its surveys with the Government of Nunavut, SEMWG (which includes GN, QIA, and CIRNAC representatives) and QSEMC and will continue to engage on the Project's socio-economic monitoring program. Results from the Inuit Employee Survey are summarized, where relevant, in the Project's Socio-Economic Monitoring Reports.

## RESULTS

Site-based survey administration occurred at Mary River between September 7 to October 16, 2020 (Table 4.36). A six-week administration period was used in order to accommodate Inuit employee shift changes associated with a 28-day rotation implemented due to COVID-19 precautions. In-community survey administration generally occurred over a two-week period from September 8-22, 2020 and was led by a team of Baffinland Community Liaison Officers (BCLOs) and Northern Affairs staff. Both site and community-based survey locations were utilized in order to address challenges associated with accessing employees during the implementation of the COVID-19 Pandemic precautions. At the time of survey administration, all Nunavut-resident employees had been placed on paid administrative leave in their home communities. However, non-Nunavut resident employees and employees of contractors (both Inuit and non-Inuit) were still permitted to work at the Project via fly-in/fly-out rotations. Multiple survey locations were required to engage the largest number of Inuit Project employees possible. Various health and safety protocols were utilized by Baffinland during in-community survey administration to manage transmission risks associated with COVID-19 (e.g. use of local survey administrators only, physical distancing, mask wearing, hand washing and enhanced cleaning measures, and options for contactless survey pick up and drop-off).

**Table 4.36: Changes in Inuit Employee and Contractor Residence and Community (2020 Inuit Employee Survey Results)**

Type of Change	Number of Respondents	Percentage of Respondents
<b>All survey respondents (n=82)</b>		
Residence changed in the past 12 months, within existing community	10	12.2%
Residence changed in the past 12 months, moved to new community	4	4.9%
Residence did not change in the past 12 months	67	81.7%
Unknown	11	1.2%
<b>Total</b>	<b>82</b>	<b>100.0%</b>
<b>If you answered 'Yes, from one community to another community', which community did you move from? (n=4)</b>		
Clyde River	1	25%
I Don't know	1	25%
I'm originally from Hall Beach	1	25%
Quebec to Nunavut	1	25%
<b>Total</b>	<b>4</b>	<b>100.0%</b>

**Notes:**

Source: 2020 Inuit Employee Survey

Table 4.37 pertains to current Inuit employee and contractor housing status. Regarding homeownership (n=82), 43.9% of respondents said they have considered purchasing a home in their community, 48.8% had not considered purchasing a home in their community, 4.9% already owned their own home, and results were unknown for 2.4% of respondents.



**Table 4.37: Current Inuit Employee and Contractor Housing Status (2020 Inuit Employee Survey Results)**

Current Housing Status	Number of Respondents	Percentage of Respondents
<b>What type of housing do you currently live in? (n=82)</b>		
Government of Nunavut staff housing	2	2.4%
Other	6	7.3%
Privately owned - Owned by another individual	14	17.1%
Privately owned - Owned by you	5	6.1%
Public housing	45	54.9%
Renting from a private company	9	11.0%
Unknown	1	1.2%
<b>Total</b>	<b>82</b>	<b>100.0%</b>
<b>Have you ever considered purchasing a home in your community? (n=82)</b>		
I already own my own home	4	4.9%
No	40	48.8%
Unknown	2	2.4%
Yes	36	43.9%
<b>Total</b>	<b>82</b>	<b>100.0%</b>

**Notes:**

Source: 2020 Inuit Employee Survey.

Table 4.38 summarizes results pertaining to Inuit employee and contractor migration intentions (n=82).

**Table 4.38: Inuit Employee and Contractor Migration Intentions (2020 Inuit Employee Survey Results)**

Migration Intentions	Number of Respondents	Percentage of Respondents
<b>All survey respondents (n=82)</b>		
Plan to move residences in the next 12 months, within existing community	6	7.3%
Plan to move residences in the next 12 months, to a new community	4	4.9%
Do not plan to move residences in the next 12 months	66	80.5%
Unknown	6	7.3%
<b>Total</b>	<b>82</b>	<b>100.0%</b>
<b>If yes, which community are you planning to move to? (n=3)</b>		
Iqaluit	1	33.3%
Alberta or BC	1	33.3%
Unsure	1	33.3%
<b>Total</b>	<b>8</b>	<b>100.0%</b>

**Notes:**

Source: 2020 Inuit Employee Survey.

**TRENDS**

Like previous surveys, some respondents to the 2020 Inuit Employee Survey indicated they had moved to a different community in the past 12 months (4.9% in 2020, 3.6% in 2019, 9.9% in 2018, and 7.0% in 2017) or planned to move to a different community in the next 12 months (4.9% in 2020, 13.8% in 2019, 17.6% in 2018, and 16.3% in 2017). The proportion of employees living in public housing appears to be trending downwards (66.7% in 2017, 60.7% in 2018 and 54.9% in 2020). Due to a survey administration error in 2019, data on the type of housing respondents lived in were unable to be collected and compared to current survey results. Baffinland will continue to track employee changes of address, housing status, and migration intentions through an Inuit Employee Survey to see if future trends emerge.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to administer this survey on a regular basis. Baffinland will also continue to welcome feedback on the survey from SEMWG and QSEMC members.

In 2020, Baffinland successfully conducted both on site and in community survey administration (North Baffin LSA communities and Iqaluit). This was in direct response to comments received from the Government of Nunavut related to the 2019 Socio-Economic Monitoring Report. Baffinland will continue to look for ways to expand survey administration to ensure the survey aims to attract responses from the largest segment of the Inuit workforce at the Project.

### Project Certificate Condition No. 134

Category	Population Demographics - Employee origin
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	Project-specific information regarding employee origin is important to comparing predictions of labour availability and employment opportunities with actual levels of employment from various demographic segments over different geographic areas.
Term or Condition	<p>The Proponent shall include with its annual reporting to the NIRB a summation of employee origin information as follows:</p> <ol style="list-style-type: none"> <li>The number of Inuit and non-Inuit employees hired from each of the North Baffin communities, specifying the number from each</li> <li>The number of Inuit and non-Inuit employees hired from each of the Kitikmeot and Kivalliq regions, specifying the number from each</li> <li>The number of Inuit and non-Inuit employees hired from a southern location or other province/territory outside of Nunavut, specifying the locations and the number from each</li> <li>The number of non-Canadian foreign employees hired, specifying the locations and number from each foreign point of hire.</li> </ol>
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

#### METHODS

Data on the origin, number, and ethnicity of employees and contractors who worked on the Project are presented in the Socio Economic Monitoring Report, and summarized in the below Table 4.39. This information was obtained from internal Baffinland records.

#### RESULTS

**Table 4.39: Detailed Baffinland and Contractor Employment Full-Time Equivalents (FTEs) 2020**

Location	Baffinland			Contractor			All workers		
	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total
<b>LSA Communities</b>									
Arctic Bay	28	1	29	11	-	11	39	1	40
Clyde River	24	-	24	9	-	9	33	-	33

Location	Baffinland			Contractor			All workers		
	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total
Pond Inlet	24	-	24	8	-	8	33	-	33
Igloolik	12	-	12	6	-	6	18	-	18
Iqaluit	31	1	32	24	-	24	55	1	56
Sanirajak	18	-	18	10	-	10	29	-	29
<b>Other Nunavut Communities</b>									
Kimmirut	1	-	1	-	-	-	1	-	1
Cape Dorset	2	-	2	-	-	-	2	-	2
Rankin Inlet	1	-	1	-	-	-	1	-	1
Pangnirtung	2	-	2	0	-	0	2	-	2
Qikiqtarjuaq	-	-	-	1	-	1	1	-	1
<b>Other Provinces and Territories</b>									
Alberta	1	71	73	0	23	23	1	95	96
British Columbia	1	44	45	-	20	20	1	63	64
Manitoba	1	24	25	-	5	5	1	29	30
New Brunswick	2	57	60	-	9	9	2	66	68
Newfoundland & Labrador	0	174	175	-	70	70	0	244	244
Northwest Territories	-	1	1	-	-	-	-	1	1
Nova Scotia	1	146	147	0	8	8	1	155	156
Ontario	20	349	369	6	50	56	26	400	426
Prince Edward Island	-	10	10	-	-	-	-	10	10
Quebec	2	55	57	1	16	17	4	71	75
Saskatchewan	1	26	27	0	3	4	1	29	30
Yukon	-	1	1	-	-	-	-	1	1
<b>Other</b>									
International	-	1	1	-	-	-	-	1	1
Unknown	-	0	0	0	484	484	0	484	484
<b>Totals</b>	<b>173</b>	<b>962</b>	<b>1,135</b>	<b>77</b>	<b>689</b>	<b>765</b>	<b>250</b>	<b>1,651</b>	<b>2,171</b>

## TRENDS

There were 250 Inuit FTE) at the Project in 2020 (including direct and contractor employees), including 151 from North Baffin LSA communities and 55 from Iqaluit. This represents an increase of 86 Inuit FTEs (52%) since operations began in 2015. There was an initial drop in Inuit FTEs from 2014-2016, likely caused by a shift away from the large amount of lower-skilled labour used during construction. The number has generally increased, with the exception of the drop in 2020 which is due to the COVID-19 Pandemic, and the demobilization of contractor employees at the end of 2019. The decrease in Inuit employment in 2020 was due to fewer Inuit working for contractors due to the COVID-19 Pandemic and the decision taken to keep Nunavut residents off site in line with Government of Nunavut Public Health Orders. Within the LSA, the number of directly employed Inuit actually increased in 2020 by 26, while the number of Inuit contractor FTEs decreased by 69.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to provide information regarding employee origin in future Socio-Economic Monitoring Reports.

#### 4.7.2 Education and Training (PC Conditions 135 through 141)

Seven (7) PC conditions relate to education and training, mostly encouraging Baffinland to maximize education and training benefits to Nunavummiut in the local communities. This includes the development of recognizable and transferable skills that can be used outside of the mining industry. The NIRB required Baffinland to conduct a labour market analysis, which was updated for the Early Revenue Phase.

##### **Inuit & Stakeholder Feedback**

As noted in Section 4.7.1, the key stakeholders focused on the socio-economic environment include the communities, the QIA, various departments of the GN, and CIRNAC. There is an inherent relationship between the education and training initiatives and objectives implemented by Baffinland and the Government of Nunavut, which is responsible for delivering most education and training programs in Nunavut. Commitments for Baffinland to provide education and training opportunities are contained in the IIBA. The SEMWG and QSEMC also regularly discuss this element of the Project. Aside from employment (discussed in Section 4.7.3), Baffinland's stakeholders have viewed education and training opportunities as a key benefit of the Project (Appendix B).

##### **Monitoring**

Baffinland tracks and reports on the amount of training delivered each year (including the amount of training delivered to Inuit workers), government educational attainment statistics, and results from an Employee Information Survey. Table 4.40 provides an evaluation of the Project's impacts on education and training, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.40: Education and Training Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Life Skills	Training of workers and contractors, resulting in improved life skills amongst LSA residents. Training in 2020 is described in PC Condition No. 137. The elder-in-residence counsels Inuit workers as requested.	All Inuit training hours for Baffinland staff are tracked and reported quarterly and annually to the QIA. Baffinland reports on its training programs annually in its socio-economic monitoring report	Positive effects consistent with FEIS predictions
Education and Skills	Training programs as described above; incentives related to school attendance and success (i.e., laptop program, scholarships); opportunities to gain skills on the job	In 2020, Inuit training hours totalled 14,384 hours which is 13.7% of the total training provided by Baffinland.	Positive effects consistent with FEIS predictions

Positive effects with respect to life skills and to education and work skills have occurred as a result of the Project.

##### **Path Forward**

Baffinland will continue to implement and refine its training programs, in consultation with the SEMWG, QSEMC, and the Project's workforce. Reporting on each PC condition follows.

## Project Certificate Condition No. 135

Category	Education and Training - Employee work/study programs
Responsible Parties	The Proponent, Qikiqtani Inuit Association
Project Phase(s)	Construction and Operations
Objective	Recognizing the 12-hour work days inherent with work at the Project site, it is not clear how employees would successfully engage in a work/study program offered by the Proponent.
Term or Condition	The Proponent is encouraged to consider offering additional options for work/study programs available to Project employees (in addition to study programs at project sites that would be offered to employees when off-shift).
Relevant Baffinland Commitment	93
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group
Reference	2020 SEMWG Meeting Records
Ref. Document Link	Appendix C.3

### METHODS

Baffinland utilizes a learning management system (Cognibox) to track and record training activities for all employees. All of this training is available to Nunavummiut and is beneficial as they expand their skills and knowledge.

Additionally, Baffinland has developed a full suite of Leadership Training at site which is available interested Inuit employees and all supervisory and management employees, both Inuit and non-Inuit. The supervisory training will help Nunavummiut advance within their set careers.

Training for coaches is also available to Inuit employees who are interested in guiding and assisting other employees as they learn the skills of their role.

In 2020 through the Q-STEP Program, a three-day pilot program based on financial literacy, resume writing and interview skills was developed for delivery in the communities. This program was named Tuttarvik 101 and was aimed at training staff and members of the communities in these essential skills. During the later part of 2020 this program was launched and had 15 graduates. The program was reviewed after the initial rounds of delivery and it was decided that the contents of the program would be incorporated into the Community Based Work Ready Program moving forward in 2021.

#### **Online Training**

Online training is available through the learning management system (LMS) whereby employees can complete training prior to arriving at site. Baffinland jointly with QIA have discussed expanding access to this delivery of training. There is online training for employees through Cognibox, such as the Workplace Hazardous Materials Information System (WHMIS) 2015 and Zero Energy State Isolation Awareness (Lockout Tag-out – LOTO).

### **Q-STEP**

Baffinland and the Qikiqtani Inuit Association (QIA) as well as the government of Nunavut, Kakivak Association and the Government of Canada have partnered in the \$19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program, the objective of which is to provide Inuit with skills and qualifications to meet the employment needs of the Mary River Project as well as other employment opportunities in the region. Training under the Q-STEP program includes work readiness programs as well as targeted training programs directed at apprenticeships, skills development, and formal certification in heavy equipment operation.

The Qikiqtani Skills and Training for Employment Partnership has proven to be the most successful employment and training program currently offered at Baffinland. The Q-STEP Charter from Employment and Service Development Canada was scheduled to end on March 31st, 2021. Due to COVID-19, it has been extended with no additional funding until March 31st, 2022. The Q-STEP teams at Baffinland and QIA are seeking third party funding to ensure that this successful training program can continue into the future.

### **RESULTS**

Baffinland Human Resources personnel work with the Mary River Inuit Impact and Benefit Agreement (IIBA) and the Joint Employment Committee to discuss training opportunities at both the mine site and in communities. These discussions are of an ongoing and iterative nature and will continue to occur in 2021.

### **TRENDS**

In 2020 a clear and purposeful transition to more community based training was realized. This resulted in recognizable benefits for Inuit participants who could train in their own community while remaining at home with families and loved ones. Increasing community based training also resulted in a positive financial benefit to each community. Travelling instructors utilized local hotels and restaurants, and community participants who received a training bonus most often spent that money in the community. For some of the community based training, local community employment resulted. (Pre-trades training for 3 months with local instructors)

### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to examine programs offered in other jurisdictions, including those offered by other mining companies operating in similar conditions, to determine their potential suitability for offer at the Mary River Project.

Review and expansion of online learning will be examined in order to expand this delivery options for employees and community residents.



## Project Certificate Condition No. 136

Category	Education and Training - Transferable skills and training
Responsible Parties	The Proponent, Qikiqtani Inuit Association, Government of Nunavut, Municipal Training Organization
Project Phase(s)	Construction and Operations
Objective	Offering training which results in certifications that are valid for employment at more than one site or in different fields provides an investment in the long-term employability of Nunavummiut.
Term or Condition	The Proponent is encouraged to work with training organizations and/or government departments offering mine-related or other training in order to provide additional opportunities for employees to gain meaningful and transferable skills, credentials and certifications especially where such training of employees offered by the Proponent remains valid only at the Mary River Project sites.
Relevant Baffinland Commitment	92, 94
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group
Reference	2020 SEMWG Meeting Records
Ref. Document Link	Appendix C.3

### METHODS

Baffinland works in partnership with the Government of Nunavut, Department of Family Services to conduct an apprenticeship program. This allows Nunavummiut to train to become journeypersons in skilled trades. Prior to entering the apprenticeship program Baffinland offers eligible employees pre-trades training. The pre-trades training program introduces Nunavummiut to the trades, but more importantly is an upgrading program that allows them to prepare for the educational requirements of each trade.

Baffinland has identified apprenticeship opportunities in the following areas: Housing Maintainer, Electrician, Heavy Duty/Truck, Welder and Heavy Equipment Mechanic, Automotive Service Technician/Mechanic, Heavy Truck and Trailer Service Technician/Mechanic, Heat Systems Technician/Oil Burner Mechanic, Millwright, Parts Technician and Machinist.

In 2020 through the Q-STEP Program, a three-day pilot program based on financial literacy, resume writing and interview skills was developed for delivery in the communities. This program was named Tuttarvik 101 and was aimed at training staff and members of the communities in these essential skills. During the later part of 2020 this program was launched and had 15 graduates. The program was reviewed after the initial rounds of delivery and it was decided that the contents of the program would be incorporated into the Community Based Work Ready Program moving forward in 2021.

In 2020 Baffinland has partnered with Nunavut Arctic College to explore highlighting the availability of both the Adult Basic Education Program and the Pathway to Adult Secondary School Program. Baffinland will socialize both of these programs to employees and to the communities in an effort to encourage participation through 2021.

Baffinland has trained a number of Inuit employees in Mine Rescue. This training involves advanced first aid and Cardiopulmonary Resuscitation (CPR), ladder and fire tool training, pumper truck operations, self-contained breathing apparatus, rope and confined space rescue and basic and advanced firefighting techniques. Internal and external instructors have been engaged to ensure the highest standard is being achieved.

## RESULTS

In 2020 the Human Resources and Training Departments provided the following training:

- Apprenticeship Training
- Arial Work Platform Classroom
- Arial Work Platform Field Training
- Commercial Truck & Trailer Classroom
- Commercial Truck & Trailer Field Training
- Drill Classroom
- Drill Field Training
- Heavy Equipment Classroom
- Heavy Equipment Field Training
- Heavy Equipment Operator (HEO) Program Classroom & Field Training - Operating Engineers Training Institute of Ontario (OETIO)
- HEO Program Job Shadowing
- Light Vehicle Driver Classroom
- Light Vehicle Driver Field Training
- Medium Duty Vehicle Classroom
- Medium Duty Vehicle Field Training
- MISC / Specialized Trainings
- Mobile & Stationary Crane Classroom
- Mobile & Stationary Crane Field Training
- Site Orientations & Baffinland Presentations
- Support Equipment Classroom
- Support Equipment Field Training
- Onsite Work Ready Program
- Workplace Health & Safety Classroom Training
- Workplace Health & Safety Field Training
- WSCC Certification
- Tuttarvik 101
- Community Based Work Ready Training

## TRENDS

In 2020, Inuit training hours totalled 14,384 hours which is 13.7% of the total training provided by Baffinland.

## RECOMMENDATIONS / LESSONS LEARNED

In 2020, Adult Basic Education and Pathway to Adult Secondary School Programs have been explored with Nunavut Arctic College. Baffinland plans to socialize these programs further with both employees and community members.

Further training in the communities has been explored and will be rolled out in 2021. Other community based training initiatives that have been explored include driver's licensing training, in community pre-trades training, financial literacy and job search training and portfolio development.

### Project Certificate Condition No. 137

Category	Education and Training - Transferable skills and training
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	Offering training which results in certifications that are valid for employment at more than one site or in different fields provides an investment in the long-term employability of Nunavummiut.
Term or Condition	Prior to construction, the Proponent shall develop an easily referenced listing of formal certificates and licences that may be acquired via on-site training or training during employment at Mary River, such listing to indicate which of these certifications and licences would be transferable to a similar job site within Nunavut. This listing should be updated on an annual basis, and is to be provided to the NIRB upon completion and whenever it is revised.
Relevant Baffinland Commitment	92
Reporting Requirement	The initial listing should be provided to the NIRB at least 60 days prior to the start of construction, an annually thereafter or as may otherwise be required.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group
Reference	2020 SEMWG Meeting Records
Ref. Document Link	Appendix C.3

#### METHODS

There are a number of qualifications that employees can obtain which would aid them for their work and their personal lives. These include:

- First Aid & CPR Certification
- Mine Rescue and Fire Fighting Skills
- Forklift Certification
- Confined Space Certification
- Fall Arrest Certification
- WHMIS certification
- Apprenticeship Training
- Arial Work Platform Classroom
- Arial Work Platform Field Training
- Commercial Truck & Trailer Classroom
- Commercial Truck & Trailer Field Training
- Drill Classroom
- Drill Field Training
- Heavy Equipment Classroom
- Heavy Equipment Field Training

- HEO Program Classroom & Field Training - OETIO
- HEO Program Job Shadowing
- Light Vehicle Driver Classroom
- Light Vehicle Driver Field Training
- Medium Duty Vehicle Classroom
- Medium Duty Vehicle Field Training
- MISC / Specialized Trainings
- Mobile & Stationary Crane Classroom
- Mobile & Stationary Crane Field Training
- Workplace Health & Safety Classroom Training
- Workplace Health & Safety Field Training
- WSCC Certification
- Site Orientation

Baffinland delivers training that is job specific. The above listing, although not exhaustive, is subject to operational need. It is noteworthy that due to poor internet connectivity in some communities, employees who reside in the North Baffin Communities upon hire complete the full suite of training once they arrive on site for their first employment rotation.

## **RESULTS**

In 2020, Inuit training hours totalled 14,384 hours which is 13.7% of the total training provided by Baffinland. Baffinland is also working to develop new training programs that would be offered both in the community and at the Mine site. Baffinland is also working with contractors to explore new skills development initiatives. Training programs are expected to continue to evolve at the Project as the operation advances, employment increases, and feedback from Inuit employees is implemented.

## **TRENDS**

Baffinland continues to provide training and certification to employees as required. Offering programs such as pre-trades training which results in participants challenging the Trades Entrance Exam increases the number of Inuit pursuing certification. Future plans focus on new training programs and certifications that will allow more Inuit to become employed in meaningful and long-term careers at Baffinland.

## **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to monitor and evaluate training programs to ensure that training is effective and offers employees the opportunities to advance in their chosen careers and to develop transferable skills. New initiatives and programs are being considered to enhance the subject matter of training (i.e. Mental Health and First Aid Programs, Inuktitut as a Second Language) as well as enhance the support that is offered by Baffinland Management to Project employees.

Baffinland continues to work with contractors to ensure Inuit content in the form of training opportunities and to explore new skills development initiatives. Training programs are expected to continue to evolve at the Project as the operation advances, employment increases, and feedback from Inuit employees is considered.

In 2020 Baffinland created the Inuit Career Mobility Strategy which provides a clear roadmap for new employees joining Baffinland as well as employees seeking advancement or a change in career. Part of the Inuit Career Mobility Strategy requires a career path interview with every Inuit employee. The career path interview explores where the employee is now in their career, what they might be interested in doing in the future, and what Baffinland can do to support and assist Inuit employees in advancing at Baffinland. After the career path interview is conducted the employee will work with Human Resources and their department to create a career development plan which will map out everything required so that the employee can successfully advance at Baffinland. Once completed the career development plan is reviewed and signed off by the department, Human Resources, and the employee signifying that all parties are in full agreement. Once in place the employee will be supported so that they can undertake training and development as required to grow their career. Follow-ups and review will be scheduled every six months minimally.

## Project Certificate Condition No. 138

Category	Education and Training - Inuit employee training
Responsible Parties	The Proponent, Qikiqtani Inuit Association (QIA)
Project Phase(s)	Construction
Objective	Working together with the QIA to prepare effective training programs developed specifically for Inuit will assist in employee preparedness and may improve employee retention.
Term or Condition	The Proponent is encouraged to work with the QIA to ensure the timely development of effective Inuit training and work-ready programs.
Relevant Baffinland Commitment	92
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group
Reference	2020 SEMWG Meeting Records
Ref. Document Link	Appendix C.3

### METHODS

Baffinland and the QIA as well as the government of Nunavut, Kakivak Association and the Government of Canada have partnered in the \$19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program, the objective of which is to provide Inuit with skills and qualifications to meet the employment needs of the Mary River Project as well as other employment opportunities in the region. Training under the Q-STEP program includes work readiness programs as well as targeted training programs directed at apprenticeships, skills development, and formal certification in heavy equipment operation.

Baffinland continued working in collaboration with QIA, to identify candidates for training opportunities and for Inuit to gain skills and competencies to secure employment with Baffinland. This program is designed to prepare Inuit for employment both at the Project and in the community and to gain employment skills for future employment in the region through a number of training-to-employment initiatives.

### RESULTS

#### **Q-STEP**

The Qikiqtani Skills and Training for Employment Partnership has proven to be the most successful employment and training program currently offered at Baffinland. The Q-STEP Charter from Employment and Service Development Canada was scheduled to end on March 31st, 2021. Due to COVID-19, it has been extended with no additional funding until March 31st, 2022. The Q-STEP teams at Baffinland and QIA are seeking third party funding to ensure that this successful training program can continue into the future.

#### ***Community Based Work Readiness***

Baffinland continues to offer the Community Based Work Readiness Training Program. The Community Based Work Readiness Training Program is a 40-hour training program facilitated in the communities and addresses the following

areas: Self Awareness, An Introduction to Mining, Essential Skills for the Workplace, Money Management and Preparing for Fly-In, Fly-Out. For 2020 in line with the IIBA commitments the Work Readiness Program was delivered in all five of the North Baffin impacted communities as well as Iqaluit.

In March 2020, the COVID-19 Pandemic directly impacted Nunavut and Nunavummiut, and all Nunavut based staff were demobilized in an effort to protect employees and communities. In 2020, Baffinland held 7 community based Work Ready Program sessions. There were a total of 54 graduates of this program during the year. Because of COVID 19 and travel restrictions delivery of the program was transitioned to an online distance format. Q-STEP teams both at Baffinland and QIA worked with Employment and Service Development Canada (ESDC) to secure 10 laptop computers and internet access to allow community based residents to participate in the training. The online distance format proved to be very successful and continued after in person training was able to resume.

### ***On-Site Work Readiness Training***

The on-site Work Readiness program offers participants the opportunity to complete 60 hours of job shadowing at the Mary River site. The participants rotate within 5 entry-level jobs identified by the Inuit Success Assurance department. Upon completion of the on-site Work Readiness each participant is given the opportunity to provide feedback on their experience and area of interest such that Baffinland can work to find a placement in a training program or an employment opportunity for the participant. In 2020 Baffinland had a total of 10 graduates of the on-site Work Readiness Training program. This was impacted by COVID-19 and the inability of Nunavummiut to travel to site under territorial travel restrictions.

### ***Apprenticeships and Other Opportunities***

Apprenticeship opportunities in skilled trades are open to Inuit each year in the following trades:

- Heavy Equipment Service Technician “Heavy Equipment Mechanic”
- Truck and Coach Service Technician “Heavy Truck/Duty Mechanic”
- Automotive Service Technician “Automotive Mechanic”
- Welder
- Machinist
- Millwright “Industrial Mechanic”
- Oil Heat Systems Technician “Oil Burner Mechanic”
- Housing Maintainer
- Electrician

Baffinland and QIA accept expressions of interest in the apprenticeship program from Inuit and conduct interviews, testing and selection for participants to join a Pre-Trades Training Program which qualifies successful participants to apply to enter the apprenticeship program. The career path for apprenticeship training is as follows:

1. Expression of Interest
2. Testing of Prior Learning and Academic Aptitude
3. Pre-Screen Interview and Discussion for Pre-Trades Program
4. Participation in a Three Month Pre-Trades Training Program
5. Writing Trades Entrance Exam



6. Formal Interview
7. Selection & Offer
8. Job Shadowing in area of apprenticeship to understand the business and role
9. Indentured as Apprentice, completion of Year 1, 2, 3 and 4 Apprenticeship Training as required followed by completion of technical training sessions delivered at a post-secondary institution. Number of required sessions corresponds to the general minimum length apprenticeship in terms of years.
10. For roles such as Housing Maintainer which have a 3-year apprenticeship, successful completion of the 3<sup>rd</sup> year/technical training session would see the apprentice certified as a journeyperson.
11. For other roles completion of Year 4 apprenticeship training, followed by session 4 training, and session 4 exams are required.
12. On successful completion of session 4, apprentices can be certified as journeypersons.

At the end of 2020, there were 15 Inuit apprentices (13 males and 2 females), as summarized in Table 4.41. All current apprentices at Baffinland shall be attending technical training school for their specific trade and apprenticeship level in 2021. Baffinland is coordinating the training with the Nunavut Apprenticeship Department.

**Table 4.41: Apprentices at Baffinland in 2020**

Number of Apprentices	Level of Training	Occupation
5	Year 1 Apprentice	Heavy Equipment Service Technician "Heavy Equipment Mechanic"
0	Year 1 Apprentice	Truck and Coach Service Technician "Heavy Truck/Duty Mechanic"
1	Year 1 Apprentice	Automotive Service Technician "Automotive Mechanic"
2	Year 1 Apprentice	Welder
1	Year 1 Apprentice	Machinist
1	Year 1 Apprentice	Millwright "Industrial Mechanic"
0	Year 1 Apprentice	Oil Heat Systems Technician "Oil Burner Mechanic"
3	Year 1 Apprentice	Housing Maintainer
3	2 X Year 1 Apprentice 1 X Year 3 Apprentice	Electrician

### Heavy Equipment Training

In previous years, Baffinland offered Inuit opportunities to participate in the Heavy Equipment Operating Training delivered by the OETIO in Morrisburg, Ontario in partnership with Q-STEP. However, due to COVID-19 restrictions, the Heavy Equipment Operating Training did not take place in 2020. Baffinland and QIA are planning meetings at the OETIO in Morrisburg prior to June 15th, 2021. This meeting will review all previous training conducted, training plans,

and successes. Future training requirements and changes to existing training in order to meet the operational needs of Baffinland will be discussed.

### **TRENDS**

Due to COVID-19 travel restrictions, the apprenticeship program has been altered to have pre-trades training offered in the communities. This model allows for potential participants to study and write the Trades Entrance Exam in their community before beginning the interview process and beginning indentured as an apprentice at site. This change was made due to travel restrictions and the desire to continue in community training for qualified Inuit candidates.

The Community Based Work Ready Program has also been adapted with the inclusion of an online distance format to deal with COVID-19 travel restrictions. Baffinland plans to continue transitioning towards community based training where possible during the global pandemic.

In 2020 a clear and purposeful transition to more community based training was realized. This resulted in recognizable benefits for Inuit participants who could train in their own community while remaining at home with families and loved ones. Increasing community based training also resulted in a positive financial benefit to each community. Travelling instructors utilized local hotels and restaurants, and community participants who received a training bonus most often spent that money in the community. For some of the community based training, local community employment resulted. (Pre-trades training for 3 months with local instructors)

### **RECOMMENDATIONS / LESSONS LEARNED**

The COVID-19 Pandemic caused travel and other restrictions in Nunavut and across the world. This impacted Nunavut based employees who were no longer able to travel to and work at site. Nunavut based employees remained at home in their respective communities. Recognizing this it was important for Baffinland to continue to communicate with and engage employees and community residents during this time. Baffinland did this by conducting monthly community town halls and transitioning to community based training. The benefit of community based training is primarily that employees remain at home with their families and loved ones. Without the added stress of having to travel or to be away from home employees and residents were better able to concentrate and be successful with their training. In addition, by running training in the communities this provided additional employment and contracting opportunities in each community. Hotels, restaurants, and local stores would all have benefitted from instructor travel as well as increased spending by participants if they received training bonuses.

During 2020 Baffinland committed to increase community training initiatives. This has been done so that training to staff and community members can continue under the COVID-19 travel restrictions that have taken place in the territory. The Work Ready Program was initially transitioned to an online delivery format with participants being provided a laptop and internet access to be able to participate in the program. Even when in-person training resumed Baffinland continued to offer the distance online format which was well received by participants.

Baffinland continued to work with its partners, such as Nunavut Arctic College, to offer ongoing training and development in the communities. Baffinland has explored numerous in community training programs with the college in 2020. These include: The Adult Basic Education Program, the Pathways to Adult Secondary School (PASS) Program, the Pre-Trades Program and Portfolio Development.

## Project Certificate Condition No. 139

Category	Education and Training - Hiring southern Canadians and foreign employees
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	With the unknown availability of labour from the North Baffin region and Nunavut as a whole to provide employment to the Project, the need to employ southern Canadians or foreign workers may implicate the Proponent's on-site language, cross-cultural awareness, and other programming. Having information available regarding the sourcing of labour for the Project is important to ensuring the Proponent and others are prepared for any influx of southern or foreign employees.
Term or Condition	Prior to commencing construction, the Proponent is requested to undertake and provide the results of a detailed labour market analysis which provides quantitative predictions of the number of employees that may reasonably need to be sourced from southern Canada and from foreign markets, identifying where applicable, the country of origin for the foreign labour. Within 90 days of the issuance of the Project Certificate, the Proponent is required to submit an updated Labour Market Analysis which considers requirements of the ERP as well as hiring points within Nunavut and outside of the North Baffin region and RSA.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Mary River Socio-Economic Monitoring Working Group
Reference	Qikiqtani Labour Market Analysis (FHW Consulting, 2014a)
Ref. Document Link	NIRB Registry Document No. 291437

### METHODS

Baffinland completed and presented a labour market analysis in the 2014 Annual Report to the NIRB to satisfy this condition.

In 2019, Mining Industry Human Resources Council (MIHR) was engaged to conduct a Qikiqtani Labour Market Analysis in the region, for both Baffinland and QIA. The Labour Market Analysis is intended to estimate and assess the availability of Inuit labour for Baffinland operations in the Qikiqtani region of Nunavut and to help identify the factors that may influence that availability.

There are challenges in recruiting Inuit effectively given the Qikiqtani labour supply. Limited numbers of semi-skilled and skilled qualified workers currently seeking work are available. Because of this limited availability of labour from the North Baffin region, and Nunavut as a whole, Baffinland is required to employ southern Canadian workers at site to ensure production continues.

When employing a workforce with significant southern Canadian representation it is important to ensure on site language, cross cultural awareness, and other programming is available. Taking steps to ensure these are in place will increase communication and good working relations.

Baffinland ensures priority hiring is available for Inuit within the 5 impacted communities as well as the Qikiqtani region. All Inuit employees who express interest are contacted, and their qualifications and skills are assessed against any open roles. Inuit who are qualified for roles are interviewed and if successful are offered career positions at Baffinland.

In late 2020 MiHR was engaged again by both Baffinland and QIA to build a Skills Equivalency Assessment Template (SEAT). This assessment template would assess Inuit skills and knowledge acquired through traditional skills and training as opposed to southern education and training. The SEAT is based on a holistic complete review of Inuit Traditional Knowledge and Skills and allows Baffinland to include this as part of the recruitment and selection process.

## RESULTS

The Qikiqtani Labour Market Analysis report is organized around 2 key sections:

- **Section 1:** The Labour Market Analysis (LMA) examines the labour market conditions in the Qikiqtani region of Nunavut, from both a labour demand and labour supply perspective; and the Skills and Capacities Assessment (SCA) profiles the skills and capacities of the labour force, including a look at how people distribute by skill level among Qikiqtani's labour supply;
- **Section 2:** Inuit Labour Force Barriers Analysis (ILBA) explores barriers to full employment for Inuit and identify potential strategies to support/improve the ability of Inuit people to attain and maintain employment at Baffinland operations.

At its core, the Qikiqtani Labour Market Analysis (QLMA) aims to understand and inform expectations of labour supply in the Qikiqtani region, such that project partners can develop strategies to maximize the potential of their community members. As well, the QLMA covers labour demand factors that may tighten the labour market for different occupations and categories of skill level.

This report provides an analytical framework that is simple to understand and reproduce and can lead to informed decisions about Baffinland's Inuit Employment Goals (IEGs) and targets as set out in the Inuit Impact Benefit Agreement.

This study also develops a SCA for Qikiqtani. The SCA will profile the skills and capacities of the labour force, including a look at how people distribute by skill level and how specific skills are utilized among the labour supply. Understanding the skill profile of the labour force can help identify where particular skill gaps in a region may exist and ultimately point to potential opportunities to better align the skills of the labour force with those in demand.

## TRENDS

With the first Qikiqtani Labour Market Analysis now complete in February 2020, Baffinland and QIA have this as a critical resource when examining labour supply and supports. Going forward a new labour market analysis will be completed triennially in the year prior to Minimum Inuit Employment Goals for the Project being updated.

Initial work completed to review a holistic Inuit approach to training and development will result in the creation and future use of an Inuit SEAT. Through MiHR, Baffinland, QIA, research and understanding this will be the first Inuit SEAT utilized in mining. The SEAT will highlight knowledge and skills gained through traditional Inuit Qaujimajatuqangit (IQ), Inuit teaching and learning, and traditional activities. These skills will be measured as equivalent to southern Canadian traditional learning where appropriate.

## **RECOMMENDATIONS / LESSONS LEARNED**

There are challenges in attracting workers in the Qikiqtani's unique and complex labour market. The main attractors to working full-time are financial and personal motivations such as supporting family members or purchasing equipment that will help with hunting such as snowmobiles, boats and ATVs as well as rifles and ammunition. However, these attractors are challenged by factors such as earnings-based rent increases and the family impacts of a rotational work schedule. Findings from the Qikiqtani Labour Market Analysis indicate that there is limited detailed understanding of what mining work involves and what employment opportunities there may be.

Many of the barriers to Inuit employment stem from weak social infrastructure, notably lack of access to affordable child care, housing shortages, limited educational (elementary, secondary and post-secondary) levels and work-related training opportunities, social assistance dependency through rent rated to income, lack of equitable health services to address complex mental health and addiction issues, and barriers to obtaining a driver's licence (often a requirement for employment).

Skills gaps and cultural norms concerning career advancement can create barriers, suggesting that Inuit employees may need more encouragement to apply for advancement, particularly for supervisory positions and above. The timeframes and steps required to advance from an entry-level position upward can also pose challenges.

Recognizing the importance of ensuring that language and cross cultural awareness is provided to the total workforce, Baffinland has ensured this is addressed. 100% of employees who arrive at the Baffinland site are required to complete an extensive site orientation on their first day at site. One hour of this orientation provides cultural awareness training, provided to all employees on their first day of work.

### ***Inuit Cultural Engagement Workshop***

This workshop was initially delivered in 2019 to the senior management team and at site. In late 2019 Baffinland used Legacy Training and Development to deliver an Inuit Cultural Engagement (ICE) Train the Trainer program to five new Inuit employees from the Inuit Success Assurance team with the intention of them becoming the trainers to deliver this workshop. In 2020, the Inuit Success Assurance Team continued to review and update the Inuit Cultural Engagement Workshop, and by using shared experience and knowledge they continually work on improving the workshop to the benefit of all employees.

### ***Country Kitchens***

Country kitchens are available in three separate areas of the site. These kitchens allow both Inuit and non-Inuit employees to gather for cultural activities such as bannock making, and also to enjoy country food. Each country kitchen is equipped with a freezer to store country food that is brought to the site by employees.

### ***Baffinland on-site Cultural Workshops***

Each quarter at the Mary River mine site and Milne Port site, Baffinland organizes cultural workshops for both Inuit and non-Inuit employees to participate in. In 2020 Baffinland held a variety of workshops, including; purse making, Inuktitut classes, country food cooking and spring parka making. Access to an area to sew, as well as material and supplies is available at all times.

### ***Inuit Societal Days***

Nunavut Day celebrates the official division of Nunavut from the Northwest Territories and the official recognition of Nunavut as an independent territory. In 2020, Baffinland celebrated the signing of the Nunavut Land Claims

Agreement on July 9<sup>th</sup>. Due to the COVID-19 Pandemic the celebrations were limited to socially distanced activities such as draws and bingo. There was also a promotion of Inuit films for all staff. Country food was served to employees in the staff cafeterias.

On November 7<sup>th</sup> Baffinland celebrated International Inuit day on site. Due to the COVID-19 Pandemic restrictions activities were limited. There was a special Inuit cultural presentation delivered between 9am and 12pm by the Inuit Success Team in the main cafeteria of the Mary River site.

### ***Cultural Advisors On Site***

Formally known as “Elders”, the role of Cultural Advisors is to act as Inuit career and cultural advisors and to provide guidance and assistance to all employees on issues involving Inuit culture. Cultural Advisors also develop, identify, encourage and facilitate cross-cultural activities on site. On-Site Cultural Advisors provide the following support:

- Personal counselling for Inuit;
- Work-related counselling for Inuit;
- Cultural advisement to Inuit and Non-Inuit;
- On-site interpretation/translation services (both written and verbal translation/ interpretation) as required by site personnel;
- Assistance to Baffinland’s Human Resources department with administrative and onboarding activities related to Inuit employees;
- Assistance with training facilitation required for Inuit employees; and
- Advise the Baffinland on-site Social Committee on the organization of on-site cross-cultural activities.

### Project Certificate Condition No. 140

Category	Education and Training - Survey of Nunavummiut employees
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	Monitoring the number of employees who leave previous employment in their home communities or who leave some type of formal education in pursuit of employment with the Project is important to evaluate predictions made and the potential impacts to North Baffin communities and education rates.
Term or Condition	The Proponent is encouraged to survey Nunavummiut employees as they are hired and specifically note the level of education obtained and whether the incoming employee resigned from a previous job placement or educational institution in order to take up employment with the Project.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G.16

#### METHODS

Baffinland regularly administers a voluntary Inuit Employee Survey, which collects information on employee level of education obtained and whether the employee resigned from a previous job placement or educational institution in order to take up employment with the Project. Baffinland has discussed its surveys with the Government of Nunavut, SEMWG (which includes GN, QIA, and CIRNAC representatives) and QSEMC and will continue to engage both groups on the Project's socio-economic monitoring program. The most recent survey was administered by Baffinland in January/February 2020. Results from the Inuit Employee Survey are provided, where relevant, in the Project's Socio-Economic Monitoring Reports.

#### RESULTS

A total of 82 surveys were completed by Inuit employees and contractors. Table 4.42 summarizes results on the highest level of education obtained by survey respondents ( $n=82$ ).

**Table 4.42: Education Status (2020 Inuit Employee Survey Results)**

Highest Level of Education	Number of Respondents	Percentage of Respondents
<b>What is the highest education level you have obtained? (n=82)</b>		
Apprenticeship or trades certificate or diploma	7	8.5%
College, or other non-university certificate or diploma	14	17.1%
High school diploma or equivalent	23	28.0%
Less than high school	34	41.5%
University certificate or diploma	2	2.4%
Unknown	2	2.4%
<b>Total</b>	<b>82</b>	<b>100.0%</b>
<b>If Baffinland or other agencies were to offer additional educational or training programs for mine employees, what kind of programs would you be interested in? (Select all that apply) (n=82)</b>		
Financial management	30	36.6%
Literacy and numeracy	8	9.8%
Traditional skills	21	25.6%
Training to prepare for a different job at the mine	47	57.3%
Other	21	25.6%

**Notes:**

Source: 2020 Inuit Employee Survey.

Table 4.43 summarizes results on the employment status of survey respondents prior to Project employment (n=82).

**Table 4.43: Employment Status Prior to Project Employment (2020 Inuit Employee Survey Results)**

Pre-Employment Status	Number of Respondents	Percentage of Respondents
<b>Did you resign from a previous job in order to take up employment with the Mary River Project? (n=71)</b>		
Yes	19	23.2%
No	63	76.8%
<b>Total</b>	<b>82</b>	<b>100.0%</b>
<b>If yes, what was your previous employment status? (n=19)</b>		
Casual	2	10.5%
Full-time	13	68.4%
Part-time	3	15.8%
Unknown	1	5.3%
<b>Total</b>	<b>19</b>	<b>100.0%</b>

**Notes:**

Source: 2020 Inuit Employee Survey.

Table 4.44 summarizes results on the education status of survey respondents prior to Project employment (n=82).



**Table 4.44: Education Status Prior to Project Employment (2020 Inuit Employee Survey Results)**

Pre-Employment Status	Number of Respondents	Percentage of Respondents
<b>Were you enrolled in an academic or vocational program at the time of your hire at the Mary River Project? (n=82)</b>		
Yes	6	7.3%
No	70	85.4%
Unknown	6	7.3%
<b>Total</b>	<b>82</b>	<b>100.0%</b>
<b>If yes, did you suspend or discontinue your education because you were hired to work at the Mary River Project? (n=6)</b>		
Yes	1	16.7%
No	5	83.3%
<b>Total</b>	<b>6</b>	<b>100.0%</b>

**Notes:**

Source: 2020 Inuit Employee Survey.

**TRENDS**

Like previous surveys, the individuals who completed Baffinland's Inuit Employee Survey in 2020 had varied educational and pre-employment backgrounds. 41.5% had less than a high school education, 28.0% had a high school diploma or equivalent, and 10.9% had higher than a high school diploma or equivalent. By comparison, data from the 2016 Census indicate the proportion of the North Baffin LSA's population (aged 25 to 64 years) with no certificate, diploma or degree was 50.8%; with a secondary school diploma or equivalency certificate was 14.4%; and with a postsecondary certificate, diploma, or degree was 36.0%. Likewise, the proportion of Nunavut's population (aged 25 to 64 years) with no certificate, diploma or degree was 40.9%; with a secondary school diploma or equivalency certificate was 14.6%; and with a postsecondary certificate, diploma, or degree was 44.4% (Statistics Canada, 2017).

Inuit working at Baffinland generally did not quit their schooling for the job, with only one respondent reporting leaving an academic program in 2020. Past years have had similar results. In 2017, 2018 and 2019, 0%, 3% and 0% of survey respondents report suspending their education as a result of being hired to work at the Project. Baffinland will continue to track employee education and pre-employment status through an Inuit Employee Survey to see if additional trends emerge.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to administer this survey on a regular basis. Baffinland will also continue to welcome feedback on the survey from the Government of Nunavut, SEMWG and QSEMC members.

## Project Certificate Condition No. 141

Category	Education and Training - Training of Inuit
Responsible Parties	The Proponent, Qikiqtani Inuit Association
Project Phase(s)	Construction
Objective	To ensure that effective training is available in a timely manner.
Term or Condition	The Proponent is encouraged to work with the Qikiqtani Inuit Association prior to construction in order to prioritize the provision of training of Inuit to serve as employees in monitoring or other such capacities.
Relevant Baffinland Commitment	92
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association (QIA)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G.16

### METHODS

Baffinland continues to work collaboratively with the QIA to promote Inuit training, education, and employment initiatives, consistent with provisions of the Inuit Impact and Benefit Agreement (IIBA, 2018). This work occurs through IIBA committees such as:

- Joint Executive Committee; and
- Employment and Contracting Committees.

Inuit training and employment initiatives addressed through the IIBA include:

- Inuit Human Resources Strategy;
- Apprenticeship Program (not mentioned specifically in the IIBA, but apprenticeship training is identified as a potential program);
- Morrisburg Heavy Equipment Operator training program (not mentioned specifically in the IIBA, but HEO training is identified as a potential program);
- Work Ready Program;
- Summer Student Employment;
- Inuit Internship Program;
- Achievement Awards and Scholarships; and
- Baffinland Inuit Training Centre.

Furthermore, Baffinland and the QIA are partners in the \$19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) program, which has been designed to provide Inuit with skills and qualifications to meet the employment needs of the Mary River Project as well as other employment opportunities in the region. Q-STEP is an initiative consisting of both work readiness measures as well as targeted training programs directed at

apprenticeships, skills development, supervisor training, and formal certification in heavy equipment operation. The program will be implemented through the joint efforts of Baffinland and QIA.

#### **RESULTS**

Detailed information on training programs is provided in the 2020 SEMR (Aglu and Stratos, 2021).

#### **TRENDS**

Detailed information on training programs is provided in the 2020 SEMR (Aglu and Stratos, 2021).

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland recognizes the need to institute training programs at early stages to ensure Inuit are equipped with the necessary skills to take advantage of employment opportunities at the Mary River Project. The Mary River IIBA and Inuit Human Resources Strategy outline several initiatives Baffinland is undertaking to advance Inuit training and employment. The success of Inuit training and employment initiatives will continue to be tracked through Baffinland's Socio-Economic Monitoring Reports and IIBA Implementation Reports provided to QIA.

In 2020, Baffinland was able to successfully implement some distance learning programs in response to the COVID-19 Pandemic. Further, the Company was able to mobilize Nunavut-based members of the Inuit Success Team to successfully deliver in-person training in communities. Detailed information on training programs is provided in the SEMR.

Should the Phase 2 Proposal be approved, Baffinland is committed to the development of an updated Inuit Training Program that covers the period between Phase 2 construction and the first three years of operations. This plan will provide updates on programs that will be offered and how Baffinland intends to maximize Inuit engagement with the Project.

### 4.7.3 Livelihood & Employment (PC Conditions 142 through 147)

The Project provides direct and indirect employment opportunities to residents of the five (5) North Baffin communities and other Nunavummiut.

Six (6) PC conditions relate to potential impacts of the Project on livelihood and employment. The conditions identify actions that Baffinland and other parties (the GN, QIA and the Nunavut Housing Corporation) should undertake to remove barriers to employment of Inuit, including those barriers faced by Nunavummiut with limited or no previous wage employment experience; women; those living in social housing (the majority of Nunavummiut); and unilingual candidates.

The IIBA outlines the commitments Baffinland has made to ensuring the North Baffin communities benefit from employment opportunities of the Project. Baffinland and QIA also establish annual Minimum Inuit Employment Goals (MIEGs) to set a target for Inuit employment and to outline the actions that need to be taken to meet it.

Baffinland and QIA initiated the development of an Inuit Human Resources Strategy (IHRS) in 2016. The IHRS was finalized with QIA in 2017. In 2019, Baffinland developed the Inuit Success Assurance team. This team ensures Inuit Success at Baffinland by directly interacting with all Inuit working at Baffinland. The team encourages Inuit to access available training opportunities as well as ensure Baffinland continues to develop and retain our Inuit employees.

#### **Inuit & Stakeholder Feedback**

Discussions around livelihood and Project-related employment opportunities continue to be a key focus of the comments provided by community members and other stakeholders during public meetings. The SEMWG and QSEMC also regularly discuss this element of the Project (Appendices C.3 and C.4).

#### **Monitoring**

Baffinland tracks and reports on Inuit employment levels reached each year. This information is presented in quarterly and annual IIBA reports to the QIA, and annually in the socio-economic monitoring report. Furthermore, Baffinland has provided information on potential barriers to employment for women in the 2020 Socio-Economic Monitoring Report for the Mary River Project. This includes indicator data on hours worked by female employees and contractors, and information on childcare availability and costs. Table 4.45 provides an evaluation of the Project's impacts on employment, relative to predictions presented in the FEIS.

In 2020, the Project continued to generate substantial wage employment for LSA residents. The generation of 304,998 employment hours for North Baffin LSA Inuit is greater than the FEIS prediction of 235,000 hours, while the 110,830 hours in Iqaluit is slightly less than the 112,000 hours predicted in the FEIS. Combined, the 415,828 hours for the LSA is significantly greater than the predicted 335,000 hours.

#### **Path Forward**

Baffinland continues to refine its Inuit human resources programs and remains committed to meeting Inuit employment targets. The new Baffinland Apprenticeship Program, the development of a labour pool of multi-skilled Inuit Heavy Equipment Operators, implementation of the Q-STEP training program (in conjunction with QIA and Governments) and other actions to meet the MIEG should also assist with increasing employment in the North Baffin communities. Baffinland will continue to monitor Inuit employment levels at the Project for future trends. Reporting on each PC condition follows.

**Table 4.45: Livelihood and Employment Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Wage Employment	Employment of LSA residents	In 2020, the Project continued to generate substantial wage employment for LSA residents. The generation of 304,998 employment hours for North Baffin LSA Inuit is greater than the EIS prediction of 235,000 hours, while the 110,830 hours in Iqaluit is slightly less than the 112,000 hours predicted in the EIS. Combined, the 415,828 hours for the LSA is significantly greater than the predicted 335,000 hours.	Positive effects consistent with FEIS predictions
	Creation of indirect jobs within the LSA	Spending on Inuit businesses is an indicator of potential indirect employment: Since Project development, a total of \$1.3 billion worth of contracts have been committed to Inuit Firms. \$91 million in contracts was committed to Inuit Firms in 2020.  Furthermore, the Project generated 3,830,834 hours of labour in 2020, much greater than the predicted amount.	Positive effects consistent with FEIS predictions
Job Progression and Career Advancement	Expanded employment and career development options	In 2020, Baffinland continued providing training and skills development opportunities to Inuit. This included 44,135 hours of training for Inuit in dozens of training programs. Sixteen (16) Inuit apprentices were also employed by Baffinland and eight (8) participants in the Inuit internship program.  A total of over 150,000 hours of training have been provided to Inuit since Project development. Five Inuit were promoted in 2020, a decline from eight promotions in 2019, likely due to Nunavut resident workers being on standby during the pandemic.	Positive effects consistent with FEIS predictions

## Project Certificate Condition No. 142

Category	Livelihood and Employment - Employee Cohesion
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To promote cohesion between employees on site, and between employees and their families.
Term or Condition	The Proponent is encouraged to address the potential direct and indirect effects that may result from Project employees' on-site use of various Inuktitut dialects as well as other spoken languages, specifically paying attention to the potential alienation of some employees that may occur as a result of language or other cultural barriers.
Relevant Baffinland Commitment	105
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association (QIA)
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland's Inuktitut in the Workplace Policy outlines the Company's position respecting support for the use of Inuktitut at all Project sites in Nunavut and ensures that a lack of proficiency in English will not be a barrier to Inuit employment, subject to considerations of health and safety. At the end of 2019, Baffinland's Inuktitut in the Workplace Policy was revised with QIA as part of the work completed by the IIBA Employment Committee. This policy was formally rolled out in 2020 at Project sites. Article 11.4 of the IIBA also specifically addresses the topic of Inuktitut in the workplace.

Although the working language at the Project is English, the Company supports the principle of increased use of Inuktitut in the workplace over the lifetime of the Project. Baffinland is looking to further reduce barriers associated with language through increased use of bilingual signs and documents, and the use of graphics and symbols where possible. To aid in recruitment efforts, an Inuktitut language portal was added to the Baffinland job search database in 2017. This portal allows job seekers to read job descriptions in Inuktitut. In addition to this, Inuit are able to apply/send in resumes in both English and/or Inuktitut. In 2020, Baffinland has included Inuktitut speaking trainers for the Work Ready Program offered in North Baffin LSA communities. Baffinland also has an individual who will be able to support apprentices in Inuktitut as required. Baffinland continues to look for opportunities to translate training materials where possible, and hired a full time translator in 2020 and looking to add additional translators in 2021 and beyond.

In any instance where language is a barrier for any employee, Baffinland is committed to using best efforts to provide translation in the dialect required to ensure that every employee is able to fully understand materials and documents. Baffinland is proactive in addressing any potential language or cultural barriers. This is evident through the various activities which increase the use and awareness of Inuktitut and Inuit culture at site. These activities include;

- Inuit Cultural Engagement Workshops provided to all employees at the project which share Inuit History, Customs and Traditions.
- Updated mandatory Cultural Awareness Employee Orientation Program currently under development which will provide an awareness and understanding to all Baffinland employees.

Annual Workplace Conditions Survey which is administered by QIA and Baffinland jointly. This survey provides an opportunity for employees to report back on workplace conditions.

Pursuant to the IIBA, Baffinland provides Inuit employees with access to professional career counselling and professional counselling for personal issues on an as-needed basis. Services are available from Inuktitut speaking counsellors.

**RESULTS**

Not applicable.

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Not applicable.

### Project Certificate Condition No. 143

Category	Livelihood and Employment - Employee family contact
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To enable and foster connection and contact between employees and family members.
Term or Condition	The Proponent is encouraged to consider the use of both existing and innovative technologies (e.g. community radio station call-in shows, cell phones, video-conferencing, Skype, etc.) as a way to ensure Project employees are able to keep in contact with family and friends and to ward off the potential for feelings of homesickness and distance to impact on employee retention and family stability.
Relevant Baffinland Commitment	N/A
Reporting Requirement	As needed
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

Internet and telephone access is available free of charge to employees in the accommodations rooms at site, and in some common areas. Bandwidth and utilization levels may limit the use of some applications.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.



## Project Certificate Condition No. 144

Category	Livelihood and Employment - Requirements for employment
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To ensure that the prerequisites and requirements for employment are clear and well known in work readiness programs.
Term or Condition	The Proponent is encouraged to make requirements for employment clear in its work-readiness and other public information programs and documentation, including but not limited to: education levels, criminal records checks, policies relating to drug and alcohol use and testing, and language abilities.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland Community Liaison Officers (BCLOs) communicate these requirements to individuals who drop off their resumes to Baffinland. Job postings also identify many of these requirements. Employment requirements are made clear to potential employees during pre-screening for Work Ready training. They are also reviewed during pre-screening for new hiring. These requirements (background check, criminal record check and medical) are included in the employment agreement that new employees receive and sign.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland is continuously seeking ways to increase Inuit employment in the Project and to provide relevant and meaningful training opportunities for local community members.

## Project Certificate Condition No. 145

Category	Livelihood and Employment - Barriers to employment for women
Responsible Parties	The Proponent, Government of Nunavut, members of QSEMC
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To monitor and understand the existence of barriers to employment for women specifically relating to childcare availability and costs.
Term or Condition	The Proponent is encouraged to work with the Government of Nunavut and the Qikiqtaaluk Socio-Economic Monitoring Committee to monitor the barriers to employment for women, specifically with respect to childcare availability and costs.
Relevant Baffinland Commitment	43, 45
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix B Appendix C.3 Appendix G.16

### METHODS

Baffinland has provided information on potential barriers to employment for women in the Socio-Economic Monitoring Report. This includes indicator data on hours worked by female employees and contractors, and some information on childcare availability and costs. Furthermore, specific reference is made in the Mary River Project IIBA to Inuit women's access to employment (Article 7.17) and affirmative steps for attracting female employees (Article 11.5; which acknowledges Inuit women entering non-traditional occupations can face barriers related to skill levels and discrimination). Actions identified in Article 11.5 include:

- The Company shall develop an affirmative action plan that sets out measurable goals and procedures to monitor compliance with government employment equity legislation and any harassment policies.
- The Company and a designated Inuit organization shall develop and locate training programs developed specifically to attract women who may want to work at the Project.
- The Company and a designated Inuit organization shall develop and implement gender sensitivity training programs.
- The Company shall provide for appropriate accommodations and facilities for female Inuit employees.

## RESULTS

Table 4.46 presents the hours (and percentage of hours) worked by women and men on the Project in 2020. 435,416 hours (or 11.4% of total hours worked on the Project) were worked by women, which is 10,937 hours more than documented for 2019. As a percentage of the workforce, Inuit women represented 28.5% of the Inuit workforce (which is consistent with the proportion in 2019), and non-Inuit women represented 8.8% of the non-Inuit workforce (up from 7% in 2019). However, the percentage of hours worked by Inuit women compared to Inuit men on the Project (approximately 28.5% of this total) was much higher than non-Inuit women compared to non-Inuit men (approximately 9.5% of this total) in 2020.

**Table 4.46: Hours Worked by Project Employees and Contractors by Ethnicity and Gender (2020)**

	Hours Worked	FTE	% of 2020 Total
<b>Inuit</b>			
Male	359,447	178	9.4%
Female	143,911	71	3.8%
<b>Non-Inuit</b>			
Male	3,035,971	1,506	79.3%
Female	291,505	145	7.6%
<b>All Ethnicities</b>			
Male	3,395,418	1,684	88.6%
Female	435,416	216	11.4%
<b>Total</b>	<b>3,830,834</b>	<b>1,900</b>	<b>100%</b>

Appropriate community-level indicator data are currently unavailable for the topic of childcare availability and costs. As such, this topic continues to be tracked through the GN-Baffinland MoU, QSEMC process, community engagement conducted for the Project and through the Inuit employee survey (results are reported on in the Socio-Economic Monitoring Report). Employment levels can be influenced by many factors, including the existence of barriers faced by certain demographic groups. Inadequate access to childcare in the Local Study Area (LSA) may be creating some barriers to increased employment of women at the Project. However, the new employment opportunities being created for women in the LSA because of the Project should be acknowledged. Baffinland has also developed, or has committed to developing, several measures that encourage Inuit female employment and retention at the Project. Goals and priorities in this area were finalized with the QIA in the IHRS and through renegotiation of the IIBA in 2018. The success of IIBA and IHRS initiatives will continue to be tracked by Baffinland.

Baffinland completed the Arnait Action Plan in 2019. This plan has identified potential areas that can be addressed over the long term to increase the number of Inuit women working at the project. Baffinland will also continue to strive for the inclusion of Inuit women in its annual training programs.

Through the Inuit Certainty Agreement, Baffinland has committed to the investment of CAD \$15 million towards the construction of childcare facilities in North Baffin LSA communities as well as the provision of a Nunavut resident Baffinland Inuit employee early childcare subsidy.

**TRENDS**

There were 71 female Inuit FTEs in the workforce in 2020 (Baffinland and contractor employees), down from 80 in 2019. While the absolute numbers were down, female Inuit increased as a percentage of Inuit workers (by 1% to 29%), and as a percentage of all workers (slightly, from 3.7 to 3.8%).

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland continues to provide information related to potential barriers to employment for women through its Socio-Economic Monitoring Reports. However, appropriate community-level indicator data are currently unavailable for the topic of childcare availability and costs. As such, this topic continues to be tracked through the GN-Baffinland MoU, QSEMC process and community engagement conducted for the Project.

Baffinland engages with the GN on employment topics through the SEMWG and QSEMC as well as the Memorandum of Understanding signed in 2019. Baffinland remains open to discussing these issues with the GN further as part of its engagement with these groups. Baffinland also remains open to discussing how improved monitoring data may be obtained.

### Project Certificate Condition No. 146

Category	Livelihood and Employment - Availability of childcare for Project Employees
Responsible Parties	Government of Nunavut and Qikiqtani Inuit Association
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To lessen the barriers to employment as relating to the availability of childcare.
Term or Condition	The Government of Nunavut and the Qikiqtani Inuit Association are strongly encouraged to investigate the possibility for Project revenue streams to support initiatives or programs, which offset or subsidize childcare for Project employees.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	N/A
Ref. Document Link	N/A

#### METHODS

This PC Condition is not directed at Baffinland. See PC Condition No. 145 for Baffinland's work with the SEMWG in this area.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

### Project Certificate Condition No. 147

Category	Livelihood and Employment - Affordability of housing
Responsible Parties	The Proponent, Government of Nunavut and Nunavut Housing Corporation
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To lessen the barriers to maintaining employment as relating to the availability and costs of housing.
Term or Condition	The Proponent is encouraged to work with the Government of Nunavut and the Nunavut Housing Corporation to investigate options and incentives which might enable and provide incentive for employees living in social housing to maintain employment as well as to negotiate for and obtain manageable rental rates.
Relevant Baffinland Commitment	43
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Government of Nunavut (Nunavut Housing Corporation; Community and Government Services; Economic Development and Transportation); Mary River Socio-Economic Monitoring Working Group (SEMWG); Qikiqtani Socio-economic Monitoring Committee (QSEMC)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G.16

#### METHODS

Baffinland discusses housing related issues with the SEMC and SEMWG, of which the Government of Nunavut (including Nunavut Housing Corporation) are active participants. There was no QSEMC meeting in 2020 due to COVID-19. Baffinland continued to engage the Government of Nunavut and Nunavut Housing Corporation (NHC) in 2020 related to social housing and Project employees. Early on during the COVID-19 Pandemic, Baffinland was in contact with the Policy & Strategic Planning division of NHC to ensure housing supports were provided to Project employees negatively impacted by COVID-19. The NHC was very helpful in ensuring that additional information and resources were available in the North Baffin LSA communities to assist Project employees affected by the pandemic. These supports included changes to rent payments alongside changes to wages associated with the decision to demobilize Nunavut resident employees from site on standby wages in response to public health advice.

#### RESULTS

Not applicable

#### TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Housing in Nunavut is the responsibility of the Government of Nunavut and the NHC. Baffinland will continue to participate with these parties on related housing issue discussions and as requested and can advocate for more work-friendly social housing policies for its workers. Baffinland and the GN signed a Memorandum of Understanding in 2019 to work on issues of mutual concern. Baffinland would welcome discussions on housing related issues through this forum.

#### 4.7.4 Economic Development, Self-Reliance, and, Contracting and Business Opportunities (PC Conditions No. 148 through 152)

Five (5) PC conditions relate to the potential impacts of the Project on economic development and self-reliance, and contracting and business opportunities. The objectives of the conditions are to: encourage Baffinland to investigate what measures the Proponent could take to encourage home ownership; promote the contracting of Inuit firms by contracting with smaller work packages; undertake collaborative monitoring with regional agencies to evaluate the Project's interactions with harvesting and food security; outline measures to minimize impacts on park users; and to complete an assessment of the risk presented by temporary mine closure on local employment and economic development.

##### **Inuit & Stakeholder Feedback**

With respect to economic development, local communities, the QIA, the GN, and the federal government are all key stakeholders. As with employment, Inuit and these stakeholders are interested to see the Project deliver and induce economic development in the region. Conversely, concerns were expressed regarding the potential negative effects or challenges associated with temporary or early closure of the Project. Commitments and contracting guidelines are contained in the IIBA to encourage contracting of Inuit firms.

##### **Monitoring**

Baffinland tracks and reports on the amount spent on contracting with Inuit firms each year and on LSA payroll amounts. Baffinland has also presented information on Project harvesting interactions and food security, household income and food security, and land user - Project interactions in the 2020 Socio-Economic Monitoring Report. Table 4.47 provides an evaluation of the Project's impacts on economic development and self-reliance, and contracting and business opportunities based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

Positive effects with respect to aspects of the economy in the North Baffin communities have accrued as a result of Project employment.

##### **Path Forward**

Baffinland and QIA signed an amended IIBA in 2018. Both continue to work collaboratively to improve Inuit business opportunities at the Mary River Project. Baffinland will continue to monitor and report on Project-related economic-development effects in future years. Reporting on each PC condition follows.

**Table 4.47: Economic Development Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Land	Mine operation and ongoing construction activities causing increased industrial utilization of land, may affect harvesting and travel, or result in changes to how people engage in the land-based economy	Effects are difficult to monitor and assess. In 2020, a total of 332 land use visitor person-days were recorded at Project sites, a 63% reduction from 2019. The decrease is attributed to the impacts of COVID-19 restrictions and the closure of Project	N/A



Component	Effects	Monitoring Program	Impact Evaluation
		facilities to Nunavut residents in respect of Public Health Measures.	
People	Employment, training and contracting resulting in increased human capacity and well-being; opportunities for youth, improved education and training; and increased wealth and well-being	Baffinland's 2020 Socio-economic Monitoring Report presents 2020 training, employment, income and contracting statistics all well as investments in school-based initiatives and company donations. Taken together, this data indicates the Project has had a positive effect on skills and opportunities in the LSA.	Positive effects consistent with FEIS predictions
Community Economy	Employment of North Baffin residents resulting in an improved ability to achieve strategic community development objectives; increased wealth in community; increased local business opportunities	Employment monitoring and results are described in Section 4.7.3. Since Project development, a total of \$1.3 billion worth of contracts have been committed to Inuit Firms. \$91 million in contracts was committed to Inuit Firms in 2020. Furthermore, Project employee payroll expenditures (in Canadian dollars) totaled \$20.864 million in 2020.	Positive effects consistent with FEIS predictions
Territorial Economy	Employment of Nunavut residents causing growth in the territorial economy. Expanded economic activity (Gross Domestic Product; GDP) Increased diversity of territorial economy.	Impacts to the territorial economy consist of employment (Section 4.7.3) and contracting within Nunavut (see above), as well as corporate and payroll taxes, mineral royalties (once they begin), and IIBA payments.	Positive effects consistent with FEIS predictions

## Project Certificate Condition No. 148

Category	Economic Development and Self-Reliance, and Contracting and Business Opportunities – Food security
Responsible Parties	The Proponent, Members of the QSEMC
Project Phase(s)	Construction and Operations
Objective	To improve understanding of the interactions between the Project and Inuit harvesting and how this relates to food security for residents of the North Baffin.
Term or Condition	The Proponent is encouraged to undertake collaborative monitoring in conjunction with the Qikiqtaaluk Socio-Economic Monitoring Committee’s monitoring program which addresses Project harvesting interactions and food security and which includes broad indicators of dietary habits.
Relevant Baffinland Commitment	45
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix B Appendix C.3 Appendix G.16

### METHODS

Baffinland has provided some information on Project harvesting interactions and food security in the Socio-Economic Monitoring Report.

### RESULTS

Appropriate community-level indicator data are currently unavailable for this topic. As such, this topic continues to be tracked through the QSEMC process, community engagement conducted for the Project, and related information (results are reported on in the Socio-Economic Monitoring Report). Some territorial (but not community-scale) government data are available on harvesting and food security in Nunavut and are presented in the Socio-Economic Monitoring Report. Data related to this topic are also presented in the report and include: Proportion of tax filers with employment income, median employment income, percentage of population receiving social assistance, number of recorded land use visitor person-days at Project sites, and number of Wildlife Compensation Fund claims.

Harvesting and consumption of country food remains a valued and important part of the Inuit culture and diet. Monitoring data presented in the Socio-Economic Monitoring Report suggest Inuit land use activities coexist to some degree with the Project, as local land users have continued to access Project sites since construction. Inuit employee

harvesting is also permitted at the Project (subject to certain restrictions) although Baffinland's January 2019 Inuit Employee Survey indicates only minimal harvesting is currently being conducted.

Stakeholder concerns expressed about Project effects on harvesting and wildlife are acknowledged. Concerns have also been expressed elsewhere about declining rates of country food consumption and the lack of food security in Nunavut, generally. Various mitigation measures have been established by Baffinland to address effects on Inuit travel, camps, and harvesting. For example, Baffinland has contributed \$750,000 to a Wildlife Compensation Fund (administered by the QIA under the terms of the IIBA) to address the potential for wildlife-related impacts from the Project. Monitoring data indicate this Fund has been accessed by local Inuit. Baffinland has also established a Harvesters Enabling Program in Pond Inlet through the IIBA, whereby Baffinland will contribute \$400,000 per year for 10 years for a gas program to enhance travel for Inuit in the area.

There are positive indications the Project makes contributions to improved household income and food security in the Local Study Area (LSA). This has occurred by providing LSA residents with meaningful employment opportunities and through related contributions and initiatives. Employment income facilitates the purchase of food and other family goods, while also providing a means to participate in harvesting if desired. Baffinland also contributes to various community wellbeing initiatives directly (e.g. through the IIBA's Ilagiiktunut Nunalinnullu Pivalliajutsait Kiinaujat (INPK) Fund, school lunch program, seasonal country food exchange program, community food bank donations) and indirectly (e.g. through the QIA Legacy Fund and QIA Benefits Fund), which may assist individuals not directly benefiting from Project employment.

The Nunavut Food Security Coalition (2014) has outlined four components of food security (i.e. availability, accessibility, quality, and use) and factors affecting each component. Baffinland has acknowledged it can play a role in each of these food security components. However, the Nunavut Food Security Coalition (2014) also highlights food security components "are influenced by many complex factors" and notes "this critical and complex issue is larger than the mandate of any one organization. A collaborative approach is essential." Baffinland continues to make contributions to the components of food security through initiatives commensurate with its role as a regional mineral developer; Baffinland's role in each of the four food security components identified by the Nunavut Food Security Coalition (2014) is described in the Socio-Economic Monitoring Report.

## TRENDS

Baffinland acknowledges Inuit and stakeholder concerns have been raised on this topic. However, relevant mitigation is in place (e.g. Wildlife Compensation Fund, Harvesters Enabling Program) and Baffinland continues to make contributions to the components of food security through initiatives commensurate with its role as a regional mineral developer. In addition, potential effects on wildlife resources continue to be tracked through Baffinland's environmental monitoring programs and the TEWG/MEWG processes. Relevant sections of Baffinland's Annual Report to the NIRB should be consulted for monitoring results and information specific to these topics.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to monitor the topic of Project harvesting interactions and food security in its Socio-Economic Monitoring Report. However, appropriate community-level indicator data are currently unavailable for this topic. As such, this topic continues to be tracked through the QSEMC process, community engagement conducted for the Project, and related information. Baffinland is open to discussing with the SEMWG and QSEMC how improved monitoring data may be obtained.

Baffinland has committed to provide the necessary funding and support to QIA to conduct a Pond Inlet Country Food Baseline Study. This work will be Inuit-led. Baffinland looks forward to continued discussions regarding this work. Should Phase 2 proceed Baffinland will work with QIA and the NIRB to address alternative next steps to ensure existing PC Conditions continue to be met.

## Project Certificate Condition No. 149

Category	Economic Development and Self-Reliance, and Contracting and Business Opportunities – Impacts of temporary closure
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To further the understanding of how a temporary closure may impact on the well-being of the residents and businesses of the North Baffin region.
Term or Condition	Prior to the commencement of operations, the Proponent is required to undertake an analysis of the risk of temporary mine closure, giving consideration to how communities in the North Baffin region may be affected by temporary and permanent closure of the mine, including economic, social and cultural effects and taking into consideration the potential drop in employment between the construction and operations phases of the Project.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Potential Effects of a Mine Closure (FHW Consulting, 2014b)
Ref. Document Link	N/A

### METHODS

The report '*Potential Effects of a Mine Closure*' (FHW Consulting, 2014b) was completed in 2014 and submitted to the NIRB.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

When the Project is approaching closure, Baffinland will work with government and community stakeholders to implement programs to support employee transition. Many Baffinland employees will be able to demonstrate a meaningful work record and a variety of on-the-job and formal training experiences, which may assist them in their transition to new endeavours.

Baffinland is working with the QIA to develop a Mine Closure Working Group that will include members from local communities and will address biophysical and socio-economic issues related to temporary and permanent site closure.

## Project Certificate Condition No. 150

Category	Economic Development and Self-Reliance, and Contracting and Business Opportunities – Impacts to visitors of Sirmilik National Park
Responsible Parties	The Proponent, Parks Canada
Project Phase(s)	Construction and Operations
Objective	To limit potential of Project impacts upon visitors, researchers and/or beneficiary users of the Sirmilik National Park.
Term or Condition	<p>The Proponent will ensure the following:</p> <ol style="list-style-type: none"> <li>The Proponent will maintain, where possible, a minimum flying altitude of 2,000 feet over the park, except for approaches to land, take-off or for safety reasons</li> <li>The Proponent will ensure that certification of noise compliance is current, where compliance is applicable</li> <li>For the purpose of briefing Park visitors, the Proponent will provide Parks Canada (1) prior to commencing the shipping season, with planned daily shipping schedules, and (2) annually, with air traffic information, and (3) to provide updates when significant variations from these are expected</li> <li>The Proponent is strongly encouraged to provide due consideration to wilderness experience during its operations in the open water season, especially during the month of August which is typically a time of high use by sea kayakers.</li> </ol>
Relevant Baffinland Commitment	34
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Parks Canada, Environment Climate Change Canada, Qikiqtani Inuit Association, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board, Parks Canada
Reference	<p>Environmental Protection Plan (Baffinland, 2021d)</p> <p>Draft 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021)</p> <p>2020 Marine Mammal Aerial Survey (Golder, 2021d)</p> <p>2020 MEWG Meeting Records</p>
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

### METHODS

Pilots are made aware of the minimum flying altitude in the region and is included in aviation contracts. It is also captured generally through the Environmental Protection Plan (Baffinland, 2021d) where subject to safety requirements, aircraft will maintain a cruising altitude of at least 650 m (equivalent to > 2,000 feet) above ground level minimum during point to point travel when in areas likely to have migratory birds (see Section 4.6.9). Helicopter flight height compliance is monitored annually and is reported on in the Terrestrial Environment Annual Monitoring Report (EDI, 2021). Flight paths were also tracked during the implementation of marine mammal aerial surveys completed in July and August, 2020 (Golder, 2021d).

Previously in 2014, Baffinland worked directly with Parks Canada to develop a brochure on kayaking safely around large ships. The brochure was published in French, English and Inuktitut and installed in the Pond Inlet Parks office.

Baffinland continues to contract exactEarth®, a global vessel monitoring and tracking service based on AIS (Automatic Identification System) data from polar orbiting satellites to track and report on vessel movements. The vessel tracking information is available on Baffinland's website to allow communities to check on vessel coordinates, which direction the vessel is moving, and its destination.

## **RESULTS**

No helicopter flights over Sirmilik Park occurred in 2020 (EDI, 2021). All other aircraft transiting to and from monitoring areas near Sirmilik Park took into consideration recommendations to maintain flight elevations that are at least 2,000 feet over the park, consistent with overall environmental management measures captured through the Environmental Protection Plan (Baffinland, 2021d). Otherwise, marine mammal aerial surveys were completed by aircraft transiting over water in proximity to Sirmilik Park (Golder, 2021d).

Parks Canada continues to be advised of shipping activity through publicly accessible information posted in Pond Inlet, social media (through Facebook), local public radio announcements and marine VHF radio, and through MEWG updates.

## **TRENDS**

Not applicable.

## **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to make all pilots aware of the cruising altitude of at least 650 m above ground level minimum, consistent with the minimum flying altitude.

Baffinland remains open to discussion with Parks Canada if updates to the brochure or other additional information is requested.

Baffinland has found the use of exactEarth® to be beneficial in providing information related to ship routing to the public. Baffinland will continue to use this service. Furthermore, it is Baffinland's intent to continue providing live viewing of vessel tracks through the Shipping Monitors based out of the Pond Inlet Office in 2021.

Baffinland will continue to provide information about its shipping season through MEWG correspondence and/or relevant MEWG meetings.

## Project Certificate Condition No. 151

Category	Economic Development and Self-Reliance, and Contracting and Business Opportunities - Access to housing
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operations
Objective	To investigate ways that economic development and self-reliance may improve access to housing by employees.
Term or Condition	The Proponent is encouraged to investigate measures and programs designed to assist Project employees with homeownership or access to affordable housing options.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	N/A
Ref. Document Link	N/A

### METHODS

Access to affordable housing in Nunavut is the responsibility of the Government of Nunavut and the Nunavut Housing Corporation (NHC). However, with the introduction of paid employment at the Project, some Nunavut-based employees may be introduced to banking activities and programs, including savings and investment accounts and possible access to mortgages and similar opportunities, all of which may help employees with eventual home ownership.

Baffinland continued to engage the Government of Nunavut and Nunavut Housing Corporation (NHC) in 2020 related to social housing and Project employees. Early on during the COVID-19 Pandemic, Baffinland was in contact with the Policy & Strategic Planning division of NHC to ensure housing supports were provided to Project employees negatively impacted by COVID-19. The NHC was very helpful in ensuring that additional information and resources were available in the North Baffin LSA communities to assist Project employees affected by the pandemic. These supports included changes to rent payments alongside changes to wages associated with the decision to demobilize Nunavut resident employees from site on standby wages in response to public health advice

Baffinland also regularly administers an Inuit Employee Survey, which collects data on employee housing status and other topics. Survey results are presented in the Socio-Economic Monitoring Report.

### RESULTS

Currently, there is not a clear and direct relationship between Project employment and any measures or programs undertaken by Baffinland or others and home ownership. However, Project employment should eventually act to increase the purchasing power of local residents and decrease the number of individuals receiving income support. This is expected to occur primarily through increases in local wealth generated by Project-related employment and other economic opportunities. While the manner in which Project employees spend their incomes will ultimately be



a personal choice, access to adequate housing (including private ownership) may be a goal for some individuals. Incomes generated by the Project may help individuals accomplish this goal should they wish.

Baffinland provides financial literacy training at both Project locations (i.e. Mary River and Milne Port). Two representatives of the Nunavut Literacy Council were on site for a week in January 2020 for the first of three site visits to complete a workplace literacy needs study. Representatives met with key departmental management and created an advisory committee. A second visit was planned for March, but was postponed due to COVID-19. The visit will be rescheduled and the assessment will continue as planned. Baffinland will continue to offer financial literacy training to its employees, on an as-needed basis.

Baffinland and the GN signed a Memorandum of Understanding in 2019 to work on issues of mutual concern. Baffinland would welcome discussions on housing related issues through this forum.

The First Nations Bank of Canada (FNBC) established a branch in Pond Inlet in 2014. The FNBC also has a branch in Iqaluit, and one in Baker Lake. Though FNBC has established these branches independent of any action by Baffinland, it is likely that the establishment of the Pond Inlet branch was induced at least partly by the Project, in the same way that the branch in Baker Lake was likely induced at least partly by the Meadowbank Mine.

Furthermore, the NHC continues to make investments in new housing units across the territory and has several existing programs, which support improved access to housing for Nunavut residents. These programs include recent changes made to the Public Housing Rent Scale (in 2014) to reduce disincentives to work and encourage savings (e.g. by assessing only the incomes of the two primary tenants rather than non-primary tenants, placing limits on rent increases due to income increases every year until the rent assessed total is eventually reached). The NHC also offers home purchase assistance programs (e.g. the Nunavut Down payment Assistance Program; Tenant to Owner Program) and home renovation and repair programs to Nunavut residents (NHC, 2016). Together, these programs and investments are expected to lead to improved housing circumstances for individuals, help reduce overcrowding, and address public housing deficits in the territory.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Not applicable.

## Project Certificate Condition No. 152

Category	Economic Development and Self-Reliance, and Contracting and Business Opportunities – IIBA contract requirements
Responsible Parties	Qikiqtani Inuit Association
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To improve ability of small businesses to access Project contract and sub-contract opportunities.
Term or Condition	The Qikiqtani Inuit Association is encouraged to provide the Board and the Qikiqtaaluk Socio-Economic Monitoring Committee with information regarding the effectiveness of any provisions within the Inuit Impact and Benefit Agreement which may require that larger contracts be broken down into smaller size in order that they are reasonably managed by smaller businesses in the North Baffin region, while respecting any confidential or privileged information.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	Qikiqtani Inuit Association, Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	N/A
Ref. Document Link	N/A

### METHODS

This condition is not assigned to Baffinland however the Company can confirm that it continued implementing provisions of the IIBA to support increased access to Inuit firms for contracting opportunities at the Mary River Project. This includes contracting procedures designed to maximize opportunities for Inuit Firm participation in smaller and larger contracts. Implementation is regularly monitored by the IIBA Contracting Committee, and Baffinland provided quarterly reports to QIA on the number and value of contracts awarded to Inuit Firms.

Baffinland contributed \$275,000 to a Business Capacity and Start Up Fund in 2020 which was a continuation of previous years' contributions. The fund, which is administered by QIA, is intended to develop business capacity and enhance the ability of Inuit Firms to participate in the Project bidding process through the provision of advice and assistance related to start-up capital and financing, management development, ongoing business management, financial management, contracts and procurement or human resources management. Baffinland also participates in both the Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and the Mary River Socio-Economic Monitoring Working Group (SEMWG). These Working Groups provide a discussion forum and information sharing hub that supports impacted communities and interested stakeholders to take part in monitoring efforts to Project-specific economic monitoring.

Further Inuit Firm business development efforts will be informed by the Inuit Firm Survey, which was developed in 2019 and released to all Inuit Firms registered with Nunavut Tunngavik Incorporated (NTI). The survey allows Inuit Firms to identify areas in which they require the most business development support, thereby directing Baffinland

and QIA efforts, as well informing the utilization of the Business Capacity and Start-Up Fund. The survey remains open to all Inuit Firms.

#### **RESULTS**

The total value of contracts awarded to Inuit Firms was \$91 million in 2020. This is a decrease from 2019 (from \$289 million) but represents an increase as a percentage of total contracting from 38% in 2019 to 44% in 2020. This includes twenty-eight (28) contracts with Inuit-owned businesses and joint ventures, all of which were based in either the North Baffin communities or Iqaluit. Since Project development, a total of approximately \$1.3 billion worth of contracts have been awarded to Inuit-owned businesses and joint ventures.

#### **TRENDS**

Not applicable.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland continues to work with the QIA through the Contracting Committee and the Joint Executive Committees to maximize Project-related benefits to Inuit Firms.

#### 4.7.5 Human Health & Wellbeing (PC Conditions 153 through 157)

Five (5) PC conditions relate to the potential impacts of the Project on human health and well-being. These conditions focus on the implementation of measures to support Inuit employed by the Project, including: the provision of employee assistance programs, addressing potential cultural conflicts at site, the provision of services or programs to benefit families in potentially affected communities to mitigate the impact of employees' absence from home, and monitoring of potential indirect effects of the Project on human health and well-being. Commitments to the provision of employee assistance and counselling are contained in the IIBA

##### **Inuit & Stakeholder Feedback**

As noted in Section 4.7.1, the key stakeholders focused on the socio-economic environment include the communities, the QIA, various departments of the GN, and the federal government. There is an inherent relationship between the Project and the Government of Nunavut for managing socio-economic effects from the Project as the GN is responsible for delivering most health and social services programs in Nunavut. Key concerns expressed by stakeholders relate to the effects of fly-in/fly-out employment on workers and their families. These concerns were raised during the environmental assessment, and also in recent consultation (Appendix B). The SEMWG and QSEMC also regularly discuss this element of the Project (Appendix C.3 and C.4).

##### **Monitoring**

Baffinland tracks and reports on several indicators of human health and well-being. This includes reporting on the number of instances that illegal substances or alcohol are identified during security searches at the Project sites, and occupational health and safety statistics. Baffinland has also presented information on the prevalence of substance abuse, gambling issues, family violence, marital problems, rates of sexually transmitted infections and other communicable diseases, rates of teenage pregnancy, high school completion rates, proportion of tax filers with employment income and median employment income, percentage of population receiving social assistance, and other topics (e.g. crime rates) in the 2020 socio-economic monitoring report. Table 4.48 provides an evaluation of the Project's impacts on human health and well-being, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

Changes in human health and well-being are often more apparent over a longer term, and attributing cause can be challenging. As Project construction only began in 2013, there is a minimal amount of post-Project data currently available. Human health and well-being can also be influenced by many different socio-economic factors, including those which are external to the Project. Direct correlations between the Project and human health and well-being will only come to light with the analysis of additional annual data. However, there is currently no indication the FEIS predictions are not being met and it is expected that the Project is improving the health and well-being of some individuals and families in the LSA who participate in the Project. There were no significant injuries and no fatalities at the Project sites in 2020.

##### **Path Forward**

Baffinland will continue to deliver and refine its training and employee assistance programs, and monitor indicators of human health and well-being, in consultation with the SEMWG, the QSEMC, and the Project's workforce. Reporting on each PC condition follows.

**Table 4.48: Human Health and Well-being Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Substance Abuse	Increased substance abuse due to the transportation of substances through Project sites	Security searches of employees arriving and departing site and site searches with drug dog and trained staff. In 2020, 20 drug and alcohol related contraband infractions occurred at Project sites amongst employees and contractors. This was a reduction from 2018 and 2019. While all contraband infractions are of concern and taken seriously by Baffinland, the 20 infractions that occurred in 2020 represent only a small number of individuals from the Project workforce. All individuals who do not comply with Baffinland's no drugs/no alcohol policy are immediately removed from site and disciplinary action (up to and including termination) is commenced. Baffinland also notifies the RCMP, where appropriate, of search results. Impaired driving violations have increased in the North Baffin LSA during the post-development period. However, the trend is not significantly different than the trend in all of Nunavut when comparing the different periods.	Relevant monitoring activities for human health and well-being are longer term and conclusions will be drawn in future years
	Increased substance abuse because Project employment makes substances more affordable		
	The Company's focus on health and safety, and employee assistance and counselling programs will increase awareness of employees, reducing substance abuse		
Increased Well-being and Community Social Stability	Project employment resulting in increased well-being of children, and increased community social stability	There are positive indications the Project is contributing to the enhanced well-being of children, by providing LSA residents (and parents) with opportunities to obtain meaningful employment and incomes. These opportunities can help reduce the various family stresses and uncertainties associated with un- and under-employment. Baffinland has also implemented an Employee and Family Assistance Program for workers and their family members who may require family-related or other forms of personal assistance. There are also positive indications the Project continues to improve household income and food security in the LSA. This has occurred through contributions to community wellness initiatives and by providing LSA residents with meaningful employment opportunities. Increased employment income facilitates the purchase of store-bought food and other family goods, while also providing an improved means to participate in harvesting. As Project construction only began in 2013, there is a minimal amount of post-Project data currently available. Correlations between the Project the various indicators being tracked (e.g. youth crime, employment income, social assistance rates), if any, will only come to light with the analysis of additional annual data.	Relevant monitoring activities for human health and well-being are longer term and conclusions will be drawn in future years

## Project Certificate Condition No. 153

Category	Human Health and Well-Being - Employee and family health and well-being
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Closure and Post-Closure Monitoring
Objective	To provide adequate medical services on site, including those that contribute to the mental health and well-being of all employees.
Term or Condition	The Proponent is encouraged to employ a mental health professional to provide counselling to Inuit and non-Inuit employees in order to positively contribute toward employee health and well-being.
Relevant Baffinland Commitment	96
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G.16

### METHODS

Baffinland’s benefit plan includes an Employee and Family Assistance Program (EFAP), which offers all permanent employees and their dependents professional short-term counselling on an as-needed basis. In addition, on-site Inuit Cultural Advisors are available for the Project’s Inuit employees to meet with, and Baffinland provides all employees with regular access to an on-site Project physician assistant.

A Community Counsellor Program has been established by Baffinland in the North Baffin LSA communities. In 2020, Baffinland provided funding for the Ilisaqsvik Society to hire community councillors in Igloolik, Clyde River and Sanirajak, with efforts ongoing to hire individuals in Arctic Bay and Pond Inlet. It is expected that after training offered by the society in late 2020, councillors in Pond Inlet and Arctic bay will be hired. Since the start of the program in June 2019, well over 100 interventions have happened, providing counselling support to individuals and their families. This partnership has allowed Ilisaqsvik to increase the availability of culturally and linguistically relevant counselling services in Nunavut and also to increase the number of trained Inuit counsellors who are able to provide counselling services in Inuktitut. With the restrictions from COVID-19, the Ilisaqsvik Society adjusted their programming to include virtual services as well as in-community services as public health advice allowed.

### RESULTS

EFAP usage has been relatively consistent since 2017 at approximately 5 accesses per 100 employees. Nearly 60% of the 49 counseling cases in 2020 were classified as “psychological” support, with other issues including marital, work, addiction and trauma. The Project continues to provide all workers with regular access to a physician’s assistant, with whom they can confidentially address health-related issues (including those unrelated to the workplace).

**TRENDS**

The number of visits per Inuit employee does not show a significant trend outside of a predictable drop in 2020 with most Inuit employees off site due to COVID-19.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland has received informal positive feedback about the presence of Inuit Cultural Advisors (previously called on-site Elders) on site to work with and mentor Baffinland employees. Baffinland will maintain the employment of Inuit Cultural Advisors on site, per IIBA Article 11.8. Baffinland has also received direct positive feedback on the deployment of the Community Counsellors Program and would like to take this opportunity to thank the Ilisaqsivik Society for their ongoing work and effort to support this program. Baffinland will also continue to explore other options and opportunities to provide support to its Inuit employees, their families and communities.

### Project Certificate Condition No. 154

Category	Human Health and Well-being - Indirect impacts to health and well-being
Responsible Parties	The Proponent, Government of Nunavut, members of the QSEMC
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To understand the indirect impacts of the Project upon health and well-being.
Term or Condition	The Proponent shall work with the Government of Nunavut and the Qikiqtaaluk Socio-Economic Monitoring Committee to monitor potential indirect effects of the Project, including indicators such as the prevalence of substance abuse, gambling issues, family violence, marital problems, rates of sexually transmitted infections and other communicable diseases, rates of teenage pregnancy, high school completion rates, and others as deemed appropriate.
Relevant Baffinland Commitment	43, 45
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix B Appendix C.3 Appendix G.16

#### METHODS

Baffinland has provided information on potential indirect effects of the Project in the Socio-Economic Monitoring Report. This includes information (where available) on the prevalence of substance abuse, gambling issues, family violence, marital problems, rates of sexually transmitted infections and other communicable diseases, rates of teenage pregnancy, high school completion rates, and other topics (e.g. crime rates).

#### RESULTS

See 'Trends' below for summarized results. Detailed results are presented in the Socio-Economic Monitoring Report.

#### TRENDS

2016 was the most recent year data on the percentage of health centre visits related to infectious diseases were available. Compared to pre-development period averages, there has been a slight increasing trend in health centre visits related to infectious diseases in the North Baffin LSA (from 2.6% to 2.7%) and decreasing trends in Iqaluit (from 2.0% to 1.0%) and Nunavut (from 4.8% to 3.1%) in the post-development period. Detailed results are presented in the Socio Economic Monitoring Report.



**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland continues to provide information on potential indirect effects of the Project through its Socio-Economic Monitoring Reports and complies with this Term and Condition. In instances where appropriate community-level indicator data are currently unavailable (e.g. for the topics of prevalence of gambling issues, prevalence of family violence, prevalence of marital problems, and rates of teenage pregnancy), these topics continue to be tracked through the QSEMC process and community engagement conducted for the Project.

Baffinland is working to increase its engagement of Community Services Providers (i.e. educators, RCMP, Health Care providers) in an effort to better understand these potential indirect effects and to discuss ways in which the Company can partner with Inuit Associations, and Governments to come up with solutions to them.

Further, Baffinland is investigating the establishment of alcohol and narcotics anonymous programs at Site as an additional support to employees.

Baffinland is also open to discussing with the SEMWG and QSEMC how improved monitoring data may be obtained.

## Project Certificate Condition No. 155

Category	Human Health and Well-being - Employee cohesion
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To encourage the on-site cohesion of employees through cultural-awareness and social programs.
Term or Condition	The Proponent is strongly encouraged to provide the NIRB with an updated report on its development of mitigation measures and plans to deal with potential cultural conflicts which may occur at site as these may become needed.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be provided at least 60 days prior to the commencement of any construction activities.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland is committed to promoting employee cohesion through cultural awareness and social programs. In 2020, Baffinland continued to provide cultural recognition programs such as cultural awareness, promotion of Inuktitut in the workplace and Inuit Cultural Advisors to support Inuit employees. All of the cultural awareness and promotion activities on site benefit all employees and help to bridge the gap between different cultures to foster an inclusive and culturally safe work environment.

Nunavut Day celebrates the official division of Nunavut from the Northwest Territories and the official recognition of Nunavut as an independent territory. In 2020, Baffinland celebrated the signing of the Nunavut Land Claims Agreement on July 9<sup>th</sup>. Due to the COVID-19 Pandemic the celebrations were limited to socially distanced activities such as draws and bingo. There was also a promotion of Inuit films for all staff. Country food was served to employees in the staff cafeterias.

On November 7<sup>th</sup> Baffinland celebrated International Inuit day on site. Due to the COVID-19 Pandemic restrictions activities were limited. There was special Inuit cultural presentation delivered between 9am and 12pm by the Inuit Success Team in the main cafeteria of the Mary River site.

Consistent with the provisions of the IIBA, Baffinland has also instituted measures to reduce and address potential cultural conflicts at site, including:

- Mandatory cultural awareness training provided to all new employees and contractors as part of site orientation;
- Offering the Inuit Cultural Engagement (ICE) Workshop to all Baffinland employees and contractors.
- Providing culturally appropriate working conditions, including the use of Inuktitut in the workplace;
- Maintaining up to four (4) on-site Inuit Cultural Advisors to provide counselling services and support;

- Maintaining up to four (4) on-site Human Resources Advisor - Inuit Relations;
- Maintaining two (2) Inuit Success Assurance Facilitators;
- Maintaining one (1) Inuit Engagement Coordinator;
- Maintaining one (1) IIBA Employment and Training Specialist;
- Continuing access to the country food kitchen provided for the consumption and sharing of traditional country food and activities; and
- Ongoing translation of signage and policies on site to ensure effective communications to and for the safety of all employees.

Baffinland is committed to continuing to deliver the Inuit Cultural Engagement Workshop to all employees at site. This workshop exposes non-Inuit to the cultures and traditions of the Inuit and provides for a much greater level of understanding.

The Inuit Success Assurance team continues to work with all employees, Inuit and Non-Inuit to increase engagement and improve communications. This team has been actively involved with reaching out to Inuit employees, discussing concerns, and assisting them to speak with their supervisors or managers. 100% of employees who arrive at the Baffinland site are required to complete an extensive site orientation on their first day at site. One hour of this orientation provides cultural awareness training, provided to all employees on their first day of work.

Baffinland makes the Employee Family Assistance Program available to all employees who may wish to talk to someone or to get help dealing with any concerns. This is available in both English and Inuktitut.

## **RESULTS**

The Inuit Success Assurance Team continues to review and update the Inuit Cultural Engagement Workshop, and by using shared experience and knowledge they have significantly improved this program. The Inuit Success Assurance Team delivers the Inuit Cultural Engagement Workshop to all employees at site.

In addition to quarterly Cultural Activities, which in 2020 included events such as purse making, spring parka making etc., the Cultural Advisors at site often do smaller events such as bannock making or sewing with both Inuit and Non-Inuit together, which helps to build understanding and bridge cultural differences between Inuit and non-Inuit employees.

In 2020 Baffinland created the Inuit Career Mobility Strategy which provides a clear roadmap for new employees joining Baffinland as well as employees seeking advancement or a change in career. Part of the Inuit Career Mobility Strategy requires a career path interview with every Inuit employee. The career path interview explores where the employee is now in their career, what they might be interested in doing in the future, and what Baffinland can do to support and assist Inuit employees in advancing at Baffinland. After the career path interview is conducted the employee will work with Human Resources and their department to create a career development plan which will map out everything required so that the employee can successfully advance at Baffinland. Once completed the career development plan is reviewed and signed off by the department, Human Resources, and the employee signifying that all parties are in full agreement. Once in place the employee will be supported so that they can undertake training and development as required to grow their career. Follow-ups and review will be scheduled every six months minimally.

**TRENDS**

Baffinland continues to deliver cultural workshops and activities at site which are available to all employees. The Inuit Success Assurance Team continues to engage with site management and employees and offers ongoing cultural training and supports.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland is committed to supporting Inuit employees at site and continuing to build cultural awareness and understanding amongst the entire Baffinland team. A number of initiatives are planned for 2021 to increase cultural awareness and reduce misunderstandings including:

- Measures to promote the use of Inuktitut (ongoing efforts to translate signs / manuals – will continue in 2021, also incorporating Inuktitut translation and support in training.);
- Providing language lessons on site for interested employees;
- Continued review and enhancement of cross-cultural training programs and on-boarding orientation programs; and
- Delivery of presentations (on-site and at corporate head office) relating to Inuit culture and the IIBA.

## Project Certificate Condition No. 156

Category	Human Health and Well-Being - Support Initiatives
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To assist with fostering well-being within point-of-hire communities.
Term or Condition	The Proponent is encouraged to assist with the provision and/or support of recreation programs and opportunities within the potentially affected communities in order to mitigate potential impacts of employees' absences from home and community life
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	N/A
Ref. Document Link	N/A

### METHODS

An Ilagiktunut Nunalinnullu Pivalliajutsait Kiinaujat Fund (the Fund) has been established under Article 12 of the IIBA (Support for Communities). The objectives of the fund include:

- Creation of opportunities for community capacity building;
- The fair distribution of impacts and benefits between communities and across generations;
- Maintenance of consistency with community development objectives; and
- Promotion of mutual understanding and learning.

The Fund is intended to support a wide range of activities including participation in community projects, youth and Elder programs, hunter support activities, cultural learning and revitalization, social support programs for families and individuals and counseling and healing programs. Baffinland and QIA each contributed \$375,000 annually to the fund which is administered by QIA from 2013 to 2020. Through successful IIBA renegotiations in 2018, the Company and QIA further agreed that commencing in 2019, maximum annual matching contributions to the Fund by the Company will be increased but shall not exceed \$550,000 annually.

As a responsible corporate citizen, Baffinland is committed to assisting the North Baffin Communities with sponsorship requests. Baffinland has prioritized donations and sponsorships and grouped them into five general categories that best align with Baffinland's corporate vision and objectives.

- Health and Safety;
- Education;
- Arts, Sports and Culture;
- Community Engagement; and
- Mining Events/Mining Education.

Baffinland aims to support initiatives, events, and programs that fall within one or more of these areas. Additionally, Baffinland has provided nearly half a million dollars' worth of goods and in-kind donations including masks, cleaning supplies, food relief, and other donations directly to communities and community members during COVID-19.

Pursuant to IIBA Article 11.6, Baffinland provides employees with access to professional career and personal counselling on an as-needed basis. Baffinland offers five types of counselling and support services:

- Employee and Family Assistance Program (EFAP);
- Site Cultural Advisors;
- Human Resource Advisor- Inuit Relations;
- On-Site physician's assistants;
- Community Counsellors Program.

The intent of the Community Counsellors Program is to offer support to the five impacted communities (Arctic Bay, Clyde River, Sanirajak, Igloolik and Pond Inlet). The Community Counsellor Program will provide in-person counselling and support for all individuals living in all Point of Hire communities. Counsellors are trained professionals with expertise and experience in addressing trauma and related mental health care issues and concerns in a culturally appropriate way. Baffinland and the Qikiqtani Inuit Association (QIA) have been working closely with the Ilisaqsvik Society to design and support this Community Counselor Program.

The Arnaik Action Plan identifies barriers to employment for women, and then develops methods of reducing or eliminating those barriers. Two separate focus groups were conducted in preparation for the plan. The first was conducted in Arctic Bay with a group who did not currently work at Baffinland. The second focus group was conducted at the Mary River site and involved a group of current employees. After the focus groups, Baffinland brought together a group of government, and non-government organizations along with a facilitator to conduct an Arnaik Action Plan Round Table working group. At that time, all identified barriers from the two previous focus groups were explored, and potential solutions were discussed. Following this, a report was produced by the facilitator and all participants of the Round Table Working Group helped to prepare a three year Arnaik Action Plan.

The Arnaik Action Plan is planned for three years with each year having a specific focus:

- Year 1 (2020-2021)            Recruitment Barriers
- Year 2 (2021-2022)            Retention barriers
- Year 3 (2022-2023)            Advancement Barriers

While year 1 was interrupted by the COVID-19 Pandemic, Baffinland made efforts to address and reduce or resolve each of the barriers that were identified. Because Nunavut based Inuit employees were not at site for most of 2020 two planned site based advisory committees (one on each rotation) were not formed. These advisory committees would meet on a regular basis and review progress on barriers as well as make recommendations on reducing or eliminating other barriers. Upon return to work in 2021, setting up these two advisory committees will be a high priority.

Actions related to the Arnaik Action Plan are reported to the Baffinland and QIA Employment Committee on a regular basis and form part of the quarterly report to the Joint Executive Committee.

## RESULTS

Baffinland realized great success with the Cultural Awareness activities that were undertaken. These activities helped to build cultural awareness and also brought the entire team together to participate in celebrations. For our Inuit employees these societal day celebrations show that Baffinland recognizes their importance and wants to help in celebrating these important dates. For Non-Inuit team members, having the opportunity to participate in celebrations of Inuit Societal Days, builds their awareness and understanding of their fellow team members, and a greater understanding and respect for Nunavut.

Baffinland is proud to be able to support numerous community projects and activities. Providing support to these types of events and activities gives Baffinland a greater sense of being involved in each of our North Baffin Communities. Supporting youth activities, and community social well being activities is something that Baffinland is both honoured and glad to be able to be a part of.

Baffinland continues to review our various health and well being initiatives and activities to ensure they are meeting the needs of our employees and their families. Continuing training and development strengthens all of these resources, and provides a greater opportunity to meet the needs of our employees and their families as well as the communities.

Awareness of barriers for both our employees and potential employees, and having a plan to help reduce or eliminate some of these barriers is an effective way of ensuring a ready, able and willing labour force. The greater our ability to reduce or eliminate barriers, the larger number of available employees from the communities will be available to work with Baffinland. This will be a great benefit to both our communities, our employees, and Baffinland.

## TRENDS

Baffinland has made it a priority to create an inclusive and supportive work environment for all employees. We have engaged in supporting the communities in years past and will continue these efforts in 2021. Baffinland understands the importance of incorporating cultural activities and support for employees that are away from home. In-community councillors are made available to both Inuit and non-Inuit employees. Baffinland has launched new initiatives such as the Arnait Action Plan in an effort to reduce recruitment and retention barriers for female Inuit. The efforts to mitigate the effects of employees being away from their home will continue as Baffinland further evaluates programs to learn which areas are having the greatest impact on employee satisfaction at site.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland continues to plan and implement cross cultural awareness activities for all employees. In addition, Baffinland will continue to develop and implement continued support and training for key staff who can in turn greatly impact the satisfaction of our employees with their employment, and their employer. Building a greater understanding of our communities will help to ensure we understand the needs, and are available to help with support and guidance where possible. Implementation of the Arnait Action Plan will have a lasting impact for both our current and future workforce, and Baffinland is committed to being successful with this endeavour.

## Project Certificate Condition No. 157

Category	Human Health and Well-Being - Counseling and treatment programs
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To make available, necessary treatment and counseling services for employee and family well-being.
Term or Condition	The Proponent should consider providing counseling and access to treatment programs for substance and gambling addictions as well as which address domestic, parenting, and marital issues that affect employees and/or their families.
Relevant Baffinland Commitment	96
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G.16

### METHODS

Baffinland's benefit plan includes an Employee and Family Assistance Program (EFAP), which offers all permanent employees and their dependents professional short-term counselling on an as-needed basis. In addition, on-site Inuit Cultural Advisors are available for the Project's Inuit employees to meet with, and Baffinland provides all employees with regular access to an on-site Project site physician's assistant. Furthermore, Section 11.7 of the IIBA commits Baffinland to the development and operation of a Community Counsellors Program in the communities of Arctic Bay, Clyde River, Sanirajak, Igloolik, and Pond Inlet.

### RESULTS

Use of the EFAP has been relatively consistent since 2017 at approximately 5 accesses per 100 employees. Nearly 60% of the 49 counseling cases in 2020 were classified as "psychological" support, with other issues including marital, work, addiction and trauma. The Project continues to provide all workers with regular access to a physician's assistant, with whom they can confidentially address health-related issues (including those unrelated to the workplace). A Community Counsellor Program has been established by Baffinland in the North Baffin LSA communities. In 2019, Baffinland provided funding for the Iliasaqivik Society to hire community councillors in Igloolik, Clyde River and Sanirajak, with efforts ongoing to hire individuals in Arctic Bay and Pond Inlet. It is expected that after training offered by the society in late 2020, councillors in Pond Inlet and Arctic bay will be hired. Since the start of the program in June 2019, well over 100 interventions have happened, providing counselling support to individuals and their families. This partnership has allowed Iliasaqivik to increase the availability of culturally and linguistically relevant counselling services in Nunavut and also to increase the number of trained Inuit counsellors who are able to provide counselling services in Inuktitut. With the restrictions from COVID-19, the Iliasaqivik Society



adjusted their programming to include virtual services as well as in-community services as public health advice allowed.

### **TRENDS**

A summary of monitoring results and trends is provided in Figure 35 in the SEMR. Detailed results are presented in the Socio-Economic Monitoring Report.

### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to provide employee access to the EFAP, on-site Cultural Advisors, and a Project-site physician assistant, and is committed to the development and operation of a Community Counsellors Program. Baffinland also encourages its employees and stakeholders to provide feedback on how its various programs and initiatives can be improved in the future. For example, Baffinland's Workplace Conditions Review process (required under the IIBA) has previously reviewed aspects of the counselling and support services available to Project employees.

Baffinland is working to increase its engagement of Community Services Providers (i.e. educators, RCMP, Health Care providers) in an effort to better understand these potential indirect effects and to discuss ways in which the Company can partner with Inuit Associations, and Governments to come up with solutions to them.

Further, Baffinland is investigating the establishment of alcohol and narcotics anonymous programs at Site as an additional support to employees.

#### 4.7.6 Community Infrastructure and Public Services (PC Conditions 158 through 161)

Four (4) PC conditions relate to the potential impacts of the Project on community infrastructure and public services. All four conditions name the GN as the responsible party for implementation of these conditions. NIRB encourages Baffinland to work with the GN to address public service issues, particularly those that may be adversely affected by the Project.

##### Inuit & Stakeholder Feedback

Key stakeholders focused on community infrastructure and public services include community members, Hamlet administrations, the QIA, the GN, and CIRNAC. The GN is the primary stakeholder, since it is responsible for the delivery of many public services. Hamlets expressed concern that skilled workers may leave their workforce to work for the Project, resulting in a skills gap, at least temporarily. Some Project employees and contractors have left positions in their communities to pursue employment at the Project. However, the Mary River Experience – The First Three Years report (BDSI, 2016) describes a lack of full-time hamlet work in many communities and the important role the Project plays in filling this gap. Potential opportunities for the community to realize new community infrastructure as a result of the Project continue to be expressed.

##### Monitoring

Baffinland has conducted Employee Information Surveys in 2017, 2018, 2019 and 2020. Results are provided in the annual socio-economic monitoring reports. Baffinland also reports on indicators pertaining to competition for skilled workers, labour force capacity, pressures on existing health and social services provided by the GN that may be impacted by Project related in-migration of employees, and on Project-related pressures on community infrastructure. Table 4.49 provides an evaluation of the Project's impacts on community infrastructure and public services, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.49: Community Infrastructure and Public Services Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Recruitment and Retention of Hamlet Employees	Competition for skilled workers may lead to temporary effects on municipal services	Inuit Employee Survey results continue to indicate the Project may be having some negative effect by increasing the competition for workers in local communities. Results from the 2020 Inuit Employee Survey show that 23% of Inuit workers left a previous job to join Baffinland. Out of the 16 responses that listed the previous employer, four were Hamlets. This effect will continue to be monitored to determine if the project has a sustained negative effect on Hamlet staff retention. Direct engagement with Hamlet governments could support monitoring of this effect. Currently no data is collected on whether and how Hamlets are benefitting from any labour force capacity created by the project. Reasons	Effect within FEIS predictions
Education and Skills	Long term improvement in labour force capacity		Long-term effect may be realized over time

Component	Effects	Monitoring Program	Impact Evaluation
		<p>Inuit employees cited for resigning in 2020 included family reasons, and accepting positions closer to home. Therefore, it is anticipated that community-based employers, such as Hamlet governments, will continue to have opportunities to hire former Project employees.</p> <p>Further, Baffinland does not offer conditional training. Individuals that receive training from Baffinland are free to use the skills gained from training to seek employment from an employer of their choosing.</p>	

It is also expected that ongoing training and experience generated by the Project, in addition to regular employee turnover, will continue to increase the pool of skilled workers in the local labour force and negate any short-term, negative Project effects. Effects to community infrastructure and public services as a result of Project employment are consistent with FEIS predictions. An overall improvement in the capacity of the local labour force will occur and become apparent with time.

#### Path Forward

Baffinland will continue to monitor this aspect of the socio-economic environment, and will discuss monitoring results with the SEMWG. Reporting on each PC condition follows.

## Project Certificate Condition No. 158

Category	Community Infrastructure and Public Services – Impacts to health services
Responsible Parties	The Proponent, Government of Nunavut
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To monitor indirect Project impacts to health and social services provided by the Government of Nunavut.
Term or Condition	The Proponent is encouraged to work with the Government of Nunavut and other parties as deemed relevant in order to develop a Human Health Working Group which addresses and establishes monitoring functions relating to pressures upon existing services and costs to the health and social services provided by the Government of Nunavut as such may be impacted by Project-related in-migration of employees, to both the North Baffin region in general, and to the City of Iqaluit in particular.
Relevant Baffinland Commitment	43
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.3 Appendix G

### METHODS

Baffinland continues to engage the QSEMC and SEMWG on its socio-economic monitoring program; the Government of Nunavut (GN) actively participates in both these groups. Baffinland also signed an updated Memorandum of Understanding (MoU) with the GN Department of Health in 2017 regarding site health services and medevac procedures. More specifically, this MoU describes the health care staff and services Baffinland will provide on-site, including procedures Baffinland will follow during medevac situations, for pre-employment medical examinations, and for the reporting and management of communicable diseases, amongst other topics. The MOU also describes how Baffinland will pay for and/or reimburse the GN Department of Health for costs associated with the medical transportation of employees and for conducting pre-employment medical exams.

Baffinland has provided information on potential socio-economic effects of the Project in its Socio-Economic Monitoring Report. This includes indicator data related to pressures on existing health and social services provided by the GN that may be impacted by Project-related in-migration of employees (e.g. percentage of the population receiving social assistance, percent of health centre visits related to infectious diseases, total and per capita number of health centre visits, number of visits to Project site physician assistant).

## RESULTS

Summary results and trends in socio-economic monitoring data are presented in Table 4.50. Detailed results are presented in the Socio-Economic Monitoring Report.

In-migration of workers is one way the Project could negatively affect health and social service provision in the LSA. Company monitoring data suggest North Baffin Local Study Area (LSA) in-migration is not occurring in any significant manner (see Sections 3.1.2 and 3.1.3 of the Socio-Economic Monitoring Report). Company monitoring data for Iqaluit are more limited, but a net of +1 individuals are known to have moved from the North Baffin LSA into Iqaluit since 2015 (data obtained from annual BCLO survey discussed in Section 3.1.2 of the Socio-Economic Monitoring Report). More generally, Section 3.1.5 of the Socio-Economic Monitoring Report indicates an average of 85 Inuit and two (2) non-Inuit employees/contractors with known origins lived in Iqaluit in 2019. Appropriate government-sourced migration data for the LSA are otherwise unavailable. However, the Project may also be contributing positively to LSA health service provision, by providing employees with regular access to an on-site Project physician assistant and by providing various counselling and support services (e.g. EFAP, on-site Cultural Advisors, commitment to establish a Community Counsellor Program).

**Table 4.50: Selected Human Health and Well-Being Indicators and Trends in 2020**

Indicator / Topic	Summary and Trends
Percentage of population receiving social assistance	The portion of the population receiving social assistance in the North Baffin LSA has largely stayed the same during the post-development period.
Percent of health centre visits related to infectious diseases	Compared to pre-development period averages, there has been a slight increasing trend in health centre visits related to infectious diseases in the North Baffin LSA (from 2.6% to 2.7%) and decreasing trends in Iqaluit (from 2.0% to 1.0%) and Nunavut (from 4.8% to 3.1%) in the post-development period.
Number of health centre visits (total) Number of health centre visits (per capita)	It is doubtful that the Project has had a significant effect on the number of clinic visits in the North Baffin LSA communities. While clinic visits increased in the pre-development and post-development periods, they also increased in Iqaluit.
Number of visits to Project physician assistant	The Project continues to provide all workers with regular access to a physician's assistant, with whom they can confidentially address health-related issues (including those unrelated to the workplace)

## TRENDS

Trends are presented in Table 4.50.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to provide information related to pressures on existing health and social services provided by the GN that may be impacted by Project-related in-migration of employees. Baffinland will also continue to engage the Government of Nunavut, SEMWG and QSEMC on its socio-economic monitoring program.

## Project Certificate Condition No. 159

Category	Community Infrastructure and Public Services – Impacts to infrastructure
Responsible Parties	The Proponent, Government of Nunavut
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To monitor Project-related impacts to infrastructure within the Local Study Area communities.
Term or Condition	The Proponent is encouraged to work with the Government of Nunavut to develop an effects monitoring program that captures increased Project-related pressures to community infrastructure in the Local Study Area communities, and to airport infrastructure in all point-of-hire communities and in Iqaluit.
Relevant Baffinland Commitment	43
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.3 Appendix G

### METHODS

Baffinland continues to engage the Government of Nunavut, QSEMC and the SEMWG on its socio-economic monitoring program and the Government of Nunavut (GN) actively participates in both these groups. Baffinland also provides information on potential socio economic effects of the Project in the Socio-Economic Monitoring Report. This includes indicator data related to increased Project-related pressures to community and airport infrastructure in the Local Study Area (LSA) communities (i.e. Arctic Bay, Clyde River, Sanirajak, Igloolik, Pond Inlet, and Iqaluit).

### RESULTS

To support the movement of workers, freight, and other materials to and from the Project, Baffinland uses community airport infrastructure in the LSA. This is due to the remote location of the Project and lack of viable alternative transportation methods (aside from seasonal marine re-supply).

Baffinland's utilization of community infrastructure, particularly airports, dropped significantly in 2020. In 2020, there were 421 Project aircraft movements at LSA community airports, down from 2,253 in 2019. This includes fixed-wing aircraft (e.g. passenger, cargo, and 'combi' type) and rotary-wing aircraft (e.g. helicopters used for site activities). Travel restrictions resulting from public health orders associated with the COVID-19 Pandemic was a key contributing factor that limited Baffinland's utilization of community infrastructure in 2020, particularly airports.

Project-related aircraft movements add some incremental pressure on LSA community airport facilities. However, LSA community airports regularly accommodate various non-Project passenger, cargo, and other aircraft, and project-related aircraft movements at LSA community airports in 2018 represented a small portion (8.4%) of this total.

#### **TRENDS**

Trends are presented in the 'Results' section above.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to provide information related to increased Project-related pressures to community infrastructure in the LSA communities, and to airport infrastructure in all point-of-hire communities and in Iqaluit, in the Socio-Economic Monitoring Report. Baffinland will also continue to engage the Government of Nunavut, SEMWG and QSEMC on the Project's socio-economic monitoring program.

## Project Certificate Condition No. 160

Category	Community Infrastructure and Public Services – Distribution of benefits
Responsible Parties	Qikiqtani Inuit Association, Government of Nunavut
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure the distribution of benefits is done in a way that off-sets Project-related impacts to infrastructure or services.
Term or Condition	The Government of Nunavut and the Qikiqtani Inuit Association are encouraged to cooperate to ensure in a broad sense, that Project benefits are distributed across impacted communities and across various demographic groups within these communities in a manner that best offsets any Project-related impacts to infrastructure or services.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association (QIA) and Government of Nunavut (GN)
Reference	The Mary River Project Inuit Impact and Benefit Agreement Between Qikiqtani Inuit Association and Baffinland Iron Mines Corporation (QIA and Baffinland, 2018) 2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

While Baffinland cannot influence how the QIA and GN cooperate with one another, the Proponent regularly engages with both organizations to help ensure Project benefits are distributed appropriately and Project-related impacts are addressed.

Baffinland produces an annual Socio-Economic Monitoring Report and regularly engages the QSEMC and SEMWG to discuss socio-economic impacts and benefits of the Project. GN and QIA representatives are members of both the QSEMC and SEMWG. Furthermore, Baffinland regularly communicates with the QIA on various matters related to the Mary River Project Inuit Impact and Benefit Agreement (IIBA; QIA and Baffinland, 2018).

### RESULTS

The Mary River Project employed 1,900 full-time equivalents (FTEs), who worked 3,803,834 million hours in 2020. This is 259 fewer FTEs than in 2019 largely due to the contractor employee demobilization that occurred in Q4 of 2019. The Project had 250 Inuit FTEs in 2020, representing 13% of the total workforce. The number of Inuit FTEs dropped by 38 in 2020, while proportion of the workforce remained stable at approximately (13%). 151 of the Inuit FTEs are based in the North Baffin LSA, with another 55 in Iqaluit.

In addition, \$20,864,472 million in wages were paid to Baffinland and contractor Inuit employees in 2020, up slightly from 2019. This despite COVID-19 Pandemic public health restrictions that required Baffinland to send Nunavut-based employees home in March 2020. The total value of contracts awarded to Inuit Firms was \$91 million in 2020.



This is a decrease from 2019 (from \$289 million), but represents an increase as a percentage of total contracting from 38% in 2019 to 44% in 2020.

Various programs under the IIBA also continue to operate, such as the Ilagiiktunut Nunalinnullu Pivalliajutsait Kiinaujat (INPK) Fund (which provides up to \$1.1 million/year for community wellness-focused projects in the North Baffin) and the Business Capacity and Start-Up Fund (which provides up to \$275,000/year to Inuit Firms to assist with locating start-up capital and financing, management development, ongoing business management, financial management, contracts and procurement, and human resources management). Several other Project-related initiatives are also addressed directly in the IIBA.

#### **TRENDS**

See 'Results' above.

#### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to engage the QIA and GN, where appropriate, to help ensure that Project benefits are distributed across impacted communities and across various demographic groups within these communities, and to help offset any Project-related impacts to infrastructure or services in the communities. Baffinland and the GN signed a Memorandum of Understanding in 2019 to address areas of mutual interest.

### Project Certificate Condition No. 161

Category	Community Infrastructure and Public Services – Policing
Responsible Parties	Government of Nunavut, Royal Canadian Mounted Police
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure the territorial government and its policing service are adequately prepared to handle any Project-related increases to the need for service and associated impacts.
Term or Condition	The Government of Nunavut should be prepared for any potential increased need for policing, and ensure that the Royal Canadian Mounted Police is prepared to handle ongoing Project-related demographic changes and subsequent crime prevention that may be needed as a result of the development, operation, and closure of the Project.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Government of Nunavut (GN)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C Appendix G

#### METHODS

Baffinland regularly engages the GN on the Project's socio-economic monitoring program. For example, Baffinland produces an annual Socio-Economic Monitoring Report (which includes demographic and crime-related information) and regularly engages the QSEMC and SEMWG to discuss socio-economic impacts and benefits of the Project. GN representatives are active members of both the QSEMC and the SEMWG. Information obtained by the GN during these meetings and through review of Baffinland's annual Socio-Economic Monitoring Reports may be used to prepare for any potential increased need for policing and crime prevention activities.

The Company has also directly engaged local RCMP detachments in the North Baffin communities to discuss socio-economic impacts and benefits of the Project.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland continues to cooperate with the GN regarding Project-related socio-economic monitoring (including monitoring of demographic and crime-related information). Baffinland will continue to engage the GN through the QSEMC and SEMWG, moving forward. Baffinland will also continue to engage directly with the RCMP on an as-needed basis.

#### 4.7.7 Culture, Resources & Land Use (PC Conditions 162 through 166)

Five (5) PC conditions relate to the potential impacts of the Project on culture, resources and land use. The conditions request Baffinland notify communities regarding Project activities and particularly shipping and that Baffinland engage communities in monitoring programs and the establishment of mitigation measures to ensure that both consider traditional activities.

##### **Inuit & Stakeholder Feedback**

Key stakeholders focused on culture, resources and land use include the communities, the QIA, the GN Department of Culture and Heritage, and the Inuit Heritage Trust. The latter two organizations are responsible for the management of cultural heritage including archaeological sites. The potential for the Project to affect current land uses and the availability of wildlife resources were key concerns of the communities and the QIA. The GN departments expressed concern regarding the potential for adverse effects to archaeological sites and ensuring proper planning and procedures took place. Concerns regarding potential impacts to resources and land use continue to be a theme of community engagement (Appendix B).

##### **Monitoring**

Baffinland conducts annual monitoring and when required mitigation work under an Archaeological Permit issued by the GN. Baffinland also monitors the number of land use visitor person-days at Project sites, and the number of Wildlife Compensation Fund claims recorded annually. Table 4.51 provides an evaluation of the Project's impacts on culture, resources and land use, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.51: Culture, Resources and Land Use Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Archaeological Sites	Unauthorized removal of artifacts from known archaeological sites	Worker site orientation training includes rules regarding archaeological sites, with dismissal a consequence of offence. Baffinland's consulting archaeologist visits sites most years. Sites are successfully mitigated or protected, as applicable.	Effects did not occur
	Disturbance to archaeological sites due to ground disturbance activities without mitigation		
	Potential for chance finds		
Inuit Harvesting of Wildlife	Mine operations affecting the harvesting of caribou, marine mammals and fish	Land user visits to the Mine Site and Milne Port were recorded. The QIA reported that 10 claims were paid from the Wildlife Compensation Fund in 2020, totaling \$25,575.	Effect within FEIS predictions
Travel and Camps	Potential for reduced safety travelling around Eclipse Sound and Pond Inlet and through	Site observations suggest Inuit land use coexists with the Project's activities. In 2020, a total of 332 land	Effect within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
	Milne Port. Emissions and noise disruption during travel and/or camping	use visitor person-days were recorded at Project sites, a 63% reduction from 2019. The decrease is attributed to the impacts of COVID-19 restrictions and the closure of Project facilities to Nunavut residents in respect of Public Health Measures	
	Sensory disturbance and safety along Milne Inlet Tote Road	Fewer hunters using cabins due to the limited Total Allowable Harvest (TAH) of 250 set for caribou on Baffin Island.	Effect within FEIS predictions
	Detour around Mine Site		
	HTO cabin closure	HTO cabin at the Mine Site was relocated, and the Milne Port cabin was relocated and reconstructed in consultation with the MHTO.	Effect within FEIS predictions

Meaningful effects to culture, resources and land use as a result of the Project have not occurred, based on monitoring and site observations. In fact, monitoring data suggests Inuit land use and harvesting coexists with the Project to some degree.

Baffinland acknowledges the potential for future wildlife-related impacts from the Project and has contributed \$750,000.00 to a Wildlife Compensation Fund (administered by the QIA under the terms of the IIBA) to address this issue.

Baffinland worked closely with the MHTO to relocate and renovate an MHTO Cabin near the Mary River Mine Site as well as the construction of a new MHTO Cabin at Milne Port. We would like to thank all MHTO members who worked with Baffinland on these initiatives. Baffinland will continue to provide maintenance services to the MHTO Cabins in the Project Area when requested by the MHTO.

#### Path Forward

Baffinland will continue to monitor this aspect of the socio-economic environment, and will discuss monitoring results with the MRSMWG and QSEMC. Reporting on each PC condition follows.

## Project Certificate Condition No. 162

Category	Culture, Resources and Land Use - Public consultation
Responsible Parties	The Proponent, Elders and community members of the North Baffin communities
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure the ongoing and consistent involvement of Elders and community members in developing and revising monitoring and mitigation plans.
Term or Condition	The Proponent should make all reasonable efforts to engage Elders and community members of the North Baffin communities in order to have community level input into its monitoring programs and mitigative measures, to ensure that these programs and measures have been informed by traditional activities, cultural resources, and land use as such may be implicated or impacted by ongoing Project activities.
Relevant Baffinland Commitment	97
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association (QIA), North Baffin Communities
Reference	2020 MEWG Meeting Records
Ref. Document Link	Appendix C.1

### METHODS

Baffinland is committed to engaging and conducting comprehensive consultation on various Project-related aspects on an ongoing basis, with particularly focus on Pond Inlet and the other four North Baffin communities (Arctic Bay, Clyde River, Sanirajak, and Igloolik). While engagement efforts in 2020 (though limited due to COVID-19 Pandemic) and years prior to 2020 were highly focused on the sharing of information and seeking feedback on the Phase 2 Proposal, a wide range of topics were discussed applicable to both current and proposed future operations. Baffinland recognize that the potential to engage with Elders and community members was reduced in 2020 due to travel and other operational restrictions related to the COVID-19 Pandemic.

Typically, Baffinland aims to meet with various community groups on a regular basis to discuss aspects of the Project and ongoing issues, concerns or recommendations these Community representatives may have. The MHTO is also a participating member of the Terrestrial and Marine Environment Working Group (TEWG and MEWG) meetings, where annual monitoring program design and results are discussed. The MHTO participated in the in-person meeting held on February 25 and 26, 2020 in Ottawa and a MHTO representative attended teleconference sessions on June 24 and 25, 2020. During this meeting, Baffinland shared its plans on its anticipated shipping schedule, mitigation and management measures, and a high-level summary of the communications protocol to be implemented during the 2020 shipping season. In addition, Baffinland hosted a pre-shipping season meeting in Pond Inlet with representatives (including Elders) from the Hamlet, MHTO, and QIA over two separate half-days, July 8 and 15, 2020.

Baffinland typically strives to maintain ongoing participation of community members including Elders from North Baffin Communities, particularly Pond Inlet, in the marine monitoring programs, though it is recognized that the opportunities to do so in 2020 were limited due to the COVID-19 Pandemic. This includes training and employment

opportunities in marine vessel safety and field data collection techniques such as marine wildlife observations (marine mammals and seabirds), and physical and biological sampling (e.g., collection of water, sediment, benthos and fish samples). In 2020, Golder on behalf of Baffinland completed some monitoring with Inuit participation; one (1) individual from Pond Inlet supported the Marine Environmental Effects Monitoring/Aquatic Invasive Species programs.

## **RESULTS**

Community members and other stakeholders continue to provide valuable input that guide the development of monitoring programs and mitigation measures as, needed. For example, specific changes were made to the shipping lane near Bruce Head in direct response to feedback received during the 2019 End of Shipping Season meeting held in January 2020 (refer also to Summary Sheet for PC Condition No. 164 for additional details). In addition, no acoustic sounders remained underwater from 2020-2021, unlike the previous year, which was in direct response that no units be left to overwinter. Baffinland further explored the potential for using an encrusting agent to minimize dust releases from the ore piles at Milne Port based on ongoing concerns of red dust being observed on snow by land users traveling through Milne Port (see February 2020 working group minutes). The use of a new product was trialed in winter 2020 and further measures continue to be explored.

A list of meetings held with the public (including with elders) and with community groups in 2020 are listed in Table 2.1.

## **TRENDS**

Not applicable.

## **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to provide the results of the key monitoring programs of interest to the communities. Baffinland will continue to seek formal feedback from the MHTO through their involvement as a Member of both the Marine Environment and Terrestrial Environment Working Groups, through NIRB-led meetings such as the annual Marine Monitoring and Marine Mitigation Workshop, Baffinland-led annual Pre-Shipping and End of Shipping Season meetings, etc.

Baffinland intends to continue training and employing Inuit participants in marine monitoring programs once COVID-19 related restrictions are lifted. Additional Inuit participation in the terrestrial environment monitoring programs is also planned for all future monitoring efforts.

## Project Certificate Condition No. 163

Category	Culture, Resources and Land Use - Public consultation
Responsible Parties	The Proponent, North Baffin communities
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To involve communities in the development and evolution of management and monitoring plans.
Term or Condition	The Proponent shall continue to engage and consult with the communities of the North Baffin region in order to ensure that Nunavummiut are kept informed about the Project activities, and more importantly, in order that the Proponent's management and monitoring plans continue to evolve in an informed manner.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	North Baffin Communities
Reference	2020 Community Meeting Records
Ref. Document Link	Appendix B

### METHODS

Baffinland is committed to meaningful engagement with individuals and organizations potentially affected by the Project, including the five (5) North Baffin Communities (Arctic Bay, Clyde River, Sanirajak, Igloolik and Pond Inlet). In support of the Company's focus on continuous improvement and the engagement objectives defined for the Project (Section 2.2), Baffinland implements a variety of engagement mechanisms that are intended to ensure that a broad and comprehensive approach to the identification of interested parties and that the creation of enhanced opportunities for dialogue and input are executed.

There was no QSEMC meeting in 2020 due to COVID-19. To maintain engagement with the community members of the QSEMC, Baffinland invited Mayors and community service providers from the North Baffin LSA Hamlets to participate in one-on-one discussions to provide updates on Mary River's existing operations, the results of the 2019 SEMR and to listen to community updates and issues of importance.

As North Baffin Community representatives, the Company also actively engages Hamlet Mayors and Councillors, as well as Hunter and Trapper Organization (HTO) Board Members. These organizations have a direct interest in Project activities and have provided valuable feedback to the company which has aided in more successful Project planning.

### RESULTS

Not applicable.

### TRENDS

Not applicable.



**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to implement a proactive approach to engagement, while respecting public health advice related to COVID-19, with various stakeholders, through meetings, workshops, surveys and dissemination of information and reports. This will ensure that the communities, QIA, regulators and the public are informed in a timely and culturally sensitive manner of the Project's progress and the potential environmental and social impacts of ongoing operations.

## Project Certificate Condition No. 164

Category	Socio-Economic Impacts – Shipping notification
Responsible Parties	The Proponent, Elders and community members of the North Baffin communities
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	In order to inform members of North Baffin communities of planned Project shipping transits such that community members’ planned travel routing may be adjusted to avoid interaction with Project ships and/or ship tracks.
Term or Condition	The Proponent is required to provide notification to communities regarding scheduled ship transits throughout the regional study area including Eclipse Sound and Milne Inlet, real-time data regarding ships in transit and any changes to the proposed shipping schedule to the MEWG and agencies within Pond Inlet on a weekly basis during open water shipping, and to the RSA communities on a monthly basis.
Relevant Baffinland Commitment	30, 34
Reporting Requirement	The information required shall be provided on a monthly basis at a minimum or more often as the Proponent determines necessary and is to be provided to the Proponent’s community liaison officers and those of the Qikiqtani Inuit Association as well as the Hunters and Trappers Organizations and Hamlet organizations of the North Baffin communities, Coral Harbour, and the NIRB’s Monitoring Officer. Where deviations from the proposed schedule or routing are required, this information shall be provided as soon as possible.
Status of PC Condition	Steensby – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG) and Mittimatalik Hunter and Trappers Organization (MHTO)
Reference	Northern Shipping Corridor Anchorage Locations (Baffinland, 2020o) Marine Shipping and Vessel Management Report (Baffinland, 2020p) Baffinland Website
Ref. Document Link	<a href="https://www.baffinland.com/operation/shipping-and-monitoring/">https://www.baffinland.com/operation/shipping-and-monitoring/</a>

### METHODS

Baffinland continues to partner with exactEarth®, a global vessel monitoring and tracking service based on AIS (Automatic Identification System) data from polar orbiting satellites to track and report on vessel movements. The vessel tracking information is available on Baffinland’s website to allow communities to check on vessel coordinates, which direction the vessel is moving, and its destination. Baffinland also installed an AIS tracker system in Baffinland’s Shipping Monitor office located on the second floor of the MHTO building on a dedicated laptop and wall-mounted monitor so that live viewing may be made possible for those that may not have access to a computer and internet. In a non-COVID-19 Pandemic scenario, live continuous monitoring of vessels active in the Northern Shipping Route is made available to any visitors during Baffinland’s regular office hours (8am to 5pm).

As first initiated in 2019, Baffinland continued with its implementation of the Pond Inlet “guardian program” (Shipping Monitors) in 2020, which consisted of employing a minimum of two (2) full-time Shipping Monitors from

the community of Pond Inlet to actively track daily Project vessel movements in the RSA in real-time, and in relation to reported marine mammal sightings (as shared by the community and the monitoring teams). Shipping Monitors track any feedback they receive over the shipping season and answer questions as needed, and act as a direct liaison between the community of Pond Inlet, hunters and Baffinland's headquarters, including the Shipping and Sustainable Development departments).

## RESULTS

Baffinland continues to make vessel routing accessible to the public via the Baffinland website. Baffinland also continues to maintain an AIS tracker system in Baffinland's Shipping Monitor office located in the second floor of the MHTO building on a dedicated laptop and wall mounted monitor (see Photo 27 in Appendix D). This set-up provides live continuous monitoring of vessels active in the Northern Shipping Route for all those that drop by the Baffinland office during its regular office hours (8am to 5pm). In 2020, due to the COVID-19 Pandemic, public access was limited to the Baffinland Shipping Monitor's office, however as public health restrictions allow this access will be restored in future.

Ongoing consultation with the MHTO and representatives of the Hamlet of Pond Inlet in 2020 (i.e., following the End of 2019 End of Shipping Season and 2020 Pre-Shipping Season meetings) and years prior, resulted in Baffinland committing to new vessel traffic management practices and/or monitoring approaches noting that these are in addition to all other changes implemented from prior years (e.g., 9 knot vessel travel speeds, limiting transits based on ice conditions, etc.):

- Baffinland made a slight deviation to its shipping route centreline near Bruce Head by displacing the route closer to the western shoreline of Poirier Island (see Figure 6.1 in Baffinland, 2020p);
- Baffinland did not leave any acoustic equipment over winter between 2020 and 2021 in response to MHTO's preference to not leave sounders on the seabed.
- Continuation of the implementation of the Pond Inlet "guardian program" (Shipping Monitors) which consisted of employing a minimum of two full-time Shipping Monitors from the community of Pond Inlet to actively track daily Project vessel movements in the RSA in real-time, and in relation to reported marine mammal aggregations (as shared by the community and the monitoring teams). Baffinland created a dedicated "Baffinland Shipping" Facebook Group page and posted regularly on shipping updates.
- In addition to the regular communications about daily shipping activity via marine VHF radio, local radio and Facebook, Baffinland initiated the weekly sharing via email to the MHTO and Hamlet of Pond Inlet an anticipated 10-day rolling schedule of upcoming Baffinland vessel activity in the Regional Study Area; and
- Enhanced vigilance of the boundaries of the shipping lane by the establishment of additional notifications related to shipping lane deviations and vessel follows-up, as well as further improving response time to correct vessel movement or speed in the event of non-adherence to vessel management protocols. Continued use of a real-time AIS-based alert system immediately informed the Port Authority and Baffinland's Shipping department of a non-compliance event, such as a speed exceedance in the RSA, so that the issue could be quickly resolved.

## TRENDS

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland has found the use of exactEarth® to be beneficial in providing information related to ship routing to the public. Baffinland will continue its use of this service. Baffinland will continue to communicate changes to the proposed shipping schedule to the Marine Environment Working Group where the Mittimatalik Hunters and Trappers Organization is a member, and will notify should any additional deviations be made to the Northern Shipping Route based on feedback obtained by the MHTO. Furthermore, Baffinland will continue to hire Shipping Monitors based out of Baffinland's office in Pond Inlet in order to maintain communications in the community of Pond Inlet on the presence of vessels along the Northern Shipping Route over the duration of the shipping season and to provide a direct liaison with the community of Pond Inlet, including the MHTO.

## Project Certificate Condition No. 165

Category	Socio-Economic Impacts - Emergency shelters
Responsible Parties	The Proponent, Elders and community members of the North Baffin communities
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	In order to provide for human safety precautions in the event of adverse weather or other emergency situations along segments of linear transportation infrastructure.
Term or Condition	The Proponent is strongly encouraged to provide buildings along the rail line and Milne Inlet Tote Road for emergency shelter purposes, and shall make these available for all employees and any land users travelling through the Project area. In the event that these buildings cannot, for safety or other reasons be open to the public, the Proponent is encouraged to set up another form of emergency shelters (e.g. seacans outfitted for survival purposes) every 1 kilometre along the rail line and Milne Inlet Tote Road. These shelters must be placed along Tote Road and rail routing prior to operation of either piece of infrastructure, and must be maintained for the duration of project activities, including the closure phase.
Relevant Baffinland Commitment	14
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Rail Corridor – Not Active Milne Inlet Tote Road – Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Water Board, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board
Reference	Emergency Response Plan (Baffinland, 2020f) Roads Management Plan (Baffinland, 2020c)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland has constructed four (4) refuge stations at KM 33, 40, 60 and 69 along the Tote Road. Each station is heated and outfitted with beds and bedding, water, an Automatic External Defibrillator (AED), food and a digital radio that provides direct contact with Baffinland security or dispatch. In addition to the four (4) refuge stations, there are eleven (11) heated seacans located at communication towers along the Tote Road, equipped with a fire extinguisher and first aid kits. The communication tower seacans are intended for emergency and temporary use only and do not house radios, food or water.

Baffinland has a trained emergency response team at both ends of the Tote Road with emergency vehicles to rapidly respond to any concerns. The emergency response team also has access to snowmobiles, and a side by side that is capable of moving through snowdrifts and effecting a rescue as required. Baffinland continued to expand rescue capabilities in 2019-20 with the purchase of a Sno-Cat® for long distance remote rescue requirements. The Tote Road Travel Procedure is publicly available and outlines the emergency response procedure.

Ensuring the health and safety of local hunters on-site is of utmost importance to Baffinland. In the summer months, local hunters have been advised to report to security and request a transport for their equipment and personnel. In

the winter, they are to check in with security and are given instructions on where to safely travel around both sites. To prevent potential transfer of the COVID-19 virus to Nunavummiut, all visits to Project facilities by non-project staff were temporary halted during 2020. As a result of the temporary closure, all camps and accommodations were closed to non-Project staff, however, the HTO Cabins remained available for use by hunters/visitors.

To eliminate any potential contact with site personnel while COVID-19 restrictions are in place, a non-contact Visitor Communication Center was established at each work site (Mary River and Milne Inlet), eliminating the necessity for visitors and Baffinland employees to interact closely. The Visitor Communication Center includes a radio with a dedicated channel for hunters/visitors to contact Security directly. Requests for food and other goods were dropped off at the Visitor Communication Centers at a predetermined drop off time.

In 2020, additional equipment for hunter/visitor transportation between Milne Port and the Mine Site was purchased to increase capabilities at site. During COVID-19, dedicated vehicles have been pre-determined for hunter/visitor transport purposes and are sanitized before and after use. Only personnel who have tested negative to both an initial and subsequent 5-day COVID-19 test provide hunter/visitor transport. A dedicated bus was utilized for transporting visitors across the Tote Road. A roll-off trailer was utilized to transport all terrain vehicles on the Tote Road.

Daily public communications via radio occurred at the onset of the COVID-19 Pandemic in Pond Inlet to notify personnel of the temporary closure at site and protocols in place. The BCLO monitored social media and advised Nunavummiut of the COVID-19 protocols in place at the Project. Baffinland also placed COVID-19 signage at the HTO hunting cabins. Hunter and visitor supply requests continued to be accommodated in 2020 based upon supplies available on site.

In 2020, Baffinland participated in a Search and Rescue (SAR) response and ATV retrieval of a damaged ATV where two individuals were stranded. Individuals were rescued and ATV retrieved with support from Pond Inlet SAR.

The Steensby rail line project has been deferred at this time.

## **RESULTS**

A total of 316 individuals stopped and checked in at the Project site in 2020 to hunt near the Project area or for other reasons such as resting, stopping for food, or having snowmobiles serviced. Baffinland accommodated all individuals, providing support when required for breakdowns and maintenance issues.

This was a significant decrease from 2019, in which 936 individuals checked in at the Project, and was mostly likely due to the ongoing COVID-19 Pandemic. The number of individuals which checked in at the Project in 2020 was comparable to 2018 in which 354 individuals were recorded, and an increase from 2017 in which only 154 individuals were recorded as having visited the Project. No project related safety related incidents occurred in 2020 for visiting hunters and all emergency shelters were available for use.

## **TRENDS**

Emergency shelters continue to be available for use and no project related health and safety incidents with hunters and visitors occurred in 2020.

**RECOMMENDATIONS / LESSONS LEARNED**

PC Condition No. 165 was originally developed for the development of the southern railway to Steensby Inlet. For the Emergency Response Plan (ERP), use of the Tote Road means that there are multiple types of vehicles readily available to access a person in need of assistance. Therefore, construction of emergency shelters along every 1 Km of the Tote Road is not warranted at this time. Construction of emergency shelters along the railway to Steensby Port will be considered when this phase of the Project becomes active. Baffinland commits that buildings placed along the rail line for signal and switch requirements will also be intended for use as emergency shelters for Railway personnel and visitors.

## Project Certificate Condition No. 166

Category	Socio-Economic Impacts - Public Consultation
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To ensure members of the public are able to access shipping information on an as-required basis in order to inform potential users of the scheduled Project activities, which could require deviations to land users' schedules or routing.
Term or Condition	The Proponent should ensure through its consultation efforts and public awareness campaigns that the public have access to shipping operations personnel for transits into and out of both Steensby Inlet port and Milne Inlet port either via telephone or internet contact, in order that any questions regarding ice conditions or ship movements that could assist ice users in preparing for travel may be answered by Project staff in a timely fashion.
Relevant Baffinland Commitment	30
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Hunter and Visitor Site Access Procedure (Baffinland, 2020q)
Ref. Document Link	<a href="https://www.baffinland.com/operation/shipping-and-monitoring/">https://www.baffinland.com/operation/shipping-and-monitoring/</a>

### METHODS

Baffinland has developed a Hunter and Visitor Site Access Procedure (Baffinland, 2020q) for visitors wanting to access the Project area, made available to local communities. All policies related to visitor's access to the Project Area are developed with rights of Nunavut Land Claims Agreement (NLCA) beneficiaries and conditions of the IIBA in mind.

Ensuring the health and safety of local hunters on-site is of utmost importance to Baffinland. Accordingly, specific protocols were established in response to the COVID-19 Pandemic to minimize the potential risk of transmission.

Prior to the COVID-19 Pandemic, in the summer months, local hunters have been advised to report to security and request a transport for their equipment and personnel. In the winter, they are to check in with security and are given instructions on where to safely travel around both sites. In 2018 Baffinland hosted a site visit with Pond Inlet hamlet and HTO representatives and worked with the MHTO to improve hunter and visitor access on site, further defining Project site visitor communication protocols and improving snowmobile crossings on the tote road and incorporating them into snow management practices. Snowmobile crossing signs were erected for the safety of all. In 2019, Baffinland continued to work with the MHTO and QIA to improve the traditional hunter and visitor passage on the Project site with several improvements including establishing a new snowmobile access route to the Sallivik accommodations complex, ongoing trail maintenance, and new cabin construction and maintenance.



Baffinland continues to implement a communications protocol with the community of Pond Inlet. Information regarding the communications protocol was shared during meetings with the MHTO during the pre-shipping season meeting in July 2020, as well as during the June 25, 2020 MEWG meeting. Baffinland also made available a Shipping and Marine Monitoring Program Fact Sheet, which contained relevant Baffinland staff contact information should community members have any concerns throughout the season.

## **RESULTS**

The public have access to shipping operations personnel via telephone (corporate direct land-line and cell-based, and local cell phone number), and internet contact via a dedicated shipping email address (shipping@baffinland.com) that is monitored by Baffinland staff including Shipping Monitors and Manager - Environmental, Social, and Governance, in addition to having in-person access to Pond Inlet-based Shipping monitors during daily office hours from a dedicated Baffinland office. For additional information on the role of Shipping Monitors, refer to summary sheet for PC Condition No. 102.

## **TRENDS**

Not applicable.

## **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to promote the use of the Hunter and Visitor Site Access Procedure, though in consideration of most recent GN public health guidance available related to the COVID-19 Pandemic, and the ship transit web tracking service available on the Baffinland website. Shipping and Marine Monitoring Fact sheets and large maps showing the Northern Shipping Route will continue to be posted throughout Pond Inlet, and will include staff contact information should community members have any concerns throughout the shipping season.

The communications protocol proved to be an effective method for addressing ongoing community concerns related to shipping throughout the season. Baffinland will continue to make community members aware of the protocol and implement this in 2021. This includes the continuation of a minimum hiring of two full-time Shipping Monitors to act as the liaison between community members, hunters and Baffinland and tracking of comments and concerns over the shipping season, using a variety of communication methods.

#### 4.7.8 Benefits, Royalties and Taxation (PC Condition 167)

One PC condition relates to the potential impacts of the Project on benefits, royalties and taxation: that Baffinland negotiate a Development Partnership Agreement with the GN. The GN, however, no longer negotiates such agreements.

##### Inuit & Stakeholder Feedback

Key stakeholders focused on the benefits, royalties and taxation include the following:

- QIA - Receives IIBA benefits, as well as rent payment for the lease of Inuit Owned Land (IOL), royalties on aggregate from IOL, and tipping fees for waste deposited on IOL;
- NTI - recipient of mineral royalties first payable to the Government of Canada, since Inuit hold sub-surface rights to Deposit No. 1 covered by a grandfathered federal mining lease;
- GN - Recipient of territorial taxes (corporate, property and payroll taxes);
- Qikiqtani Inuit - Beneficiaries of benefits and royalties that accrue to the QIA, as well as a portion of mineral royalties paid to NTI and then dispensed to the QIA and other regional Inuit organizations; and
- Other Nunavummiut - Beneficiaries of mineral royalties' payable to NTI.

Communities continue to express a desire to maximize benefits of the Project (Appendix B).

##### Monitoring

Baffinland tracks payments made as benefits, royalties and taxes, and this information is presented in annual monitoring reports. Table 4.52 provides an evaluation of the Project's impacts on benefits, royalties and taxes, based on monitoring activities completed in 2020, relative to predictions presented in the FEIS and FEIS Addendum.

**Table 4.52: Benefits, Royalties and Taxation Impact Evaluation**

Component	Effects	Monitoring Program	Impact Evaluation
Benefits and Royalty Payments to Inuit Organizations	Increased revenues that can be dispensed to Inuit beneficiaries	Monitoring is not required.	Within FEIS predictions
Territorial Own-source Revenues	Increased taxes and revenues; Payments of payroll and corporate taxes to territorial government	The Project's effect on revenues flowing to the territorial government is largely established by the value of its payroll as well as the assessment of corporate tax payments by Baffinland. In 2020, Baffinland paid a total of approximately \$15 million in taxes to the Government of Nunavut: \$9.5 million in employee payroll tax and \$5.5 million in fuel tax. This represents a slight decrease from 2019 and is largely attributed to the decrease in Project activity that occurred throughout 2020.	Within FEIS predictions

Significant positive benefits have been realized by the stakeholders listed above, as a result of benefits, royalties and taxes paid by the Project in 2020.

**Path Forward**

Baffinland will continue to meet its commitments with respect to benefits, royalties and taxes. Reporting on PC Condition No. 167 follows.

## Project Certificate Condition No. 167

Category	Benefits, Royalty and Taxation – Partnership Agreements
Responsible Parties	The Proponent, Government of Nunavut
Project Phase(s)	Construction
Objective	The Proponent and the Government of Nunavut develop a formalized partnership agreement.
Term or Condition	The Proponent and the Government of Nunavut are strongly encouraged to, as soon as practical following the issuance of the Project Certificate, enter into discussions to negotiate a Development Partnership Agreement.
Relevant Baffinland Commitment	43
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

### METHODS

Baffinland issued an invitation letter to the Government of Nunavut (GN) in September 2013 regarding the negotiation of a Development Partnership Agreement (DPA). However, a DPA between the GN and Baffinland has not yet been formalized. It has come to Baffinland’s attention the DPA program for new mines is currently on hold, while the GN’s Department of Economic Development and Transportation and Department of Finance work to develop a replacement (Gregoire, 2016). For added context, the GN website contains a DPA Policy that is noted to have expired on March 31, 2016.

Baffinland and the GN signed a Memorandum of Understanding 2019. This MoU reflects the shared GN-Baffinland belief that, “Nunavummiut should benefit from resource development within the territory of Nunavut and that, therefore, maximizing their capacity to engage in such development is important”. Through this MoU, GN and Baffinland identified 4 priority areas for continued collaboration, “Barriers to Employment, Education and Training, Community Wellness, and Infrastructure and Transportation.” The GN and Baffinland continue to engage frequently on many aspects of the Mary River Project to continue collaboration that supports responsible resource development.

### RESULTS

Not applicable.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to engage with the GN on this topic once a current policy has been issued by the GN.

#### 4.7.9 Governance & Leadership (PC Conditions 168 through 169)

Two (2) PC conditions relate to the potential impacts of the Project on governance and leadership, both of which relate to the collection of socio-economic data and annual reporting to NIRB.

##### **Inuit & Stakeholder Feedback**

Members of the SEMWG include Baffinland, the QIA, the GN, and CIRNAC. Each organization has an interest and a role in improving socio-economic conditions within the Qikiqtani Region and Nunavut as a whole. Baffinland has actively engaged the group over the past several years. In 2015 and early 2016, Baffinland revised its socio-economic monitoring program based on feedback from this group. Baffinland is also actively involved in the Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and regularly participates in its meetings. There was no QSEMC meeting in 2020 due to COVID-19. To maintain engagement with the community members of the QSEMC, Baffinland invited Mayors and community service providers from the North Baffin LSA Hamlets to participate in one-on-one discussions to provide updates on Mary River's existing operations, the results of the 2019 SEMR and to listen to community updates and issues of importance.

##### **Monitoring**

Baffinland completes a socio-economic monitoring report annually, which presents monitoring results for aspects of the socio-economic environment that interacts with the Project. No negative regional or cumulative economic effects associated with the Project were identified in 2020. As such, no mitigation measures have been proposed to manage negative effects. The socio-economic monitoring program has been developed in consultation with the SEMWG, and monitoring results are also reviewed by this group and QSEMC annually.

A number of changes to the socio-economic monitoring report were made in the 2020 reporting year, including some modification to indicators, organization of the report and presentation of the executive summary table. These changes were informed by input received through community engagement, the recent Mary River Phase 2 hearings, and by the report authors' experience and expertise in other northern and mining contexts. Changes included reporting on additional normalized indicators, the addition of several new indicators and re-ordering VSECs with the goal of more clarity. Baffinland consulted with the Mary River SEMWG prior to implementing these changes.

The COVID-19 Pandemic has also had a major impact on the Mary River Project, with Baffinland implementing various measures to ensure a safe workplace and to protect Nunavut communities. Most notably, the decision was made to return Nunavummiut employees to their home communities in mid-March 2020 in accordance with Government of Nunavut recommendations. While these employees continue to receive standby pay, certain benefits of employment, such as training, skills development and advancement are likely to be negatively impacted.

##### **Path Forward**

Baffinland will continue to undertake the collection of socio-economic monitoring data in consultation with the SEMWG and QSEMC, and report this monitoring data annually through its Socio-Economic Monitoring Report. Reporting on each PC condition follows.

### Project Certificate Condition No. 168

Category	Governance and Leadership - Monitoring program
Responsible Parties	The Proponent, members of the QSEMC
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	Outline variables that are relevant to the Project and which should be adopted by the QSEMC's monitoring program.
Term or Condition	The specific socioeconomic variables as set out in Section 8 of the Board's Report, including data regarding population movement into and out of the North Baffin Communities and Nunavut as a whole, barriers to employment for women, project harvesting interactions and food security, and indirect Project effects such as substance abuse, gambling, rates of domestic violence, and education rates that are relevant to the Project, be included in the monitoring program adopted by the Qikiqtani Socio-Economic Monitoring Committee.
Relevant Baffinland Commitment	45
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Reference	2019 Socio-Economic Monitoring Report (Aglu and Stratos, 2020) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019e)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

#### METHODS

Socio-economic data collection and analysis methods are described in the Socio-Economic Monitoring Plan (Baffinland, 2019e) and annual Socio-Economic Monitoring Report. Government data are collected from the Nunavut Bureau of Statistics and Statistics Canada. Change of address information is collected by Baffinland's Community Liaison Officers and through voluntary employee surveys. Other Project-specific information is also presented by Baffinland, as appropriate.

#### RESULTS

Summary results and trends for relevant socio-economic monitoring data are presented in Table 4.53. Detailed results are presented in the annual Socio-Economic Monitoring Report, including additional information where appropriate community-level indicator data are currently unavailable (e.g. for the topics of childcare availability and costs, Project harvesting interactions and food security, prevalence of gambling issues, prevalence of family violence).

**Table 4.53: 2020 Monitoring Results and Trends for Selected Socio-Economic Indicators**

Indicator / Topic	Summary and Trend
Known in-migrations of non-Inuit Project employees and contractors	One non-Inuk employee migrated into the LSA in 2018, with no additional migrations in 2019 or 2020.
In-migration of non-Inuit to the North Baffin LSA	While LSA-level migration data is not available, the proportion of Inuit to non-Inuit in LSA communities has remained relatively similar to pre-development levels.
Known out-migrations of Inuit Project employees and contractors	Five Inuit Baffinland and contractor employees were known to have moved out of the North Baffin LSA in 2020.
Out-migration of Inuit from the North Baffin LSA	While LSA-level migration data is not available, the proportion of Inuit to non-Inuit in LSA communities has remained relatively similar to pre-development levels.
Nunavut annual net migration	Nunavut net migration was -88 people in 2019, continuing a negative trend over the past 5 years.
Employee and contractor changes of address, housing status, and migration intentions	Based on 2020 Inuit Employee Survey results, declared migration intentions for 2021 align with the past several years of movement, with nine respondents expressing an intention to move in the next year.
Project female employment	The project had 216 female FTEs in 2020, representing 11% of the total workforce, an increase in both number and proportion from 2019.
Childcare availability and costs	Comments on the lack of childcare in LSA communities have been made previously by Project stakeholders and can be found in previous SEMRs. This topic continues to be tracked through the QSEMC process and community engagement conducted for the Project.
Project harvesting interactions and food security	Topic will continue to be tracked through the QSEMC process, community engagement conducted for the Project, and related information.
Number of drug and alcohol related contraband infractions at Project sites	Twenty drug and alcohol-related contraband infractions occurred at Project sites among Baffinland and contractor employees in 2020, a slight decrease from 2019 (24).
Number of impaired driving violations	Impaired driving violations have increased in the North Baffin LSA during the post-development period. However, the trend is not significantly different than the trend in all of Nunavut when comparing the different periods.
Number of drug violations	Both Iqaluit and Nunavut have seen rapid decreases in drug violations during the post-development period, while North Baffin LSA has only seen a slight decrease, with an uptick in 2018, the latest year for which data is available.
Prevalence of gambling issues	These topics continue to be tracked through the QSEMC process and community engagement conducted for the Project.
Prevalence of family violence	
Number of secondary school graduates	Graduation rates steadily declined in the Qikiqtani region from 2009 to 2014 but have risen quickly since then. School attendance rates in the North Baffin LSA region have not changed considerably over time or compared to the rest of Qikiqtani. Many factors affect school attendance and graduation rates, and the data does not suggest a significant effect of the Project.
Secondary school graduation rate	

**TRENDS**

Trends in the monitoring data are presented in the 'Results' section above with additional detail in the socio-economic monitoring report.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland continues to provide information on socio-economic effects of the Project through its Socio-Economic Monitoring Report. In instances where appropriate community-level indicator data are currently unavailable (e.g. for the topics of childcare availability and costs, Project harvesting interactions and food security, prevalence of gambling issues, prevalence of family violence), these topics continue to be tracked through the QSEMC process and community engagement conducted for the Project. Baffinland is open to discussing with the SEMWG and QSEMC how improved monitoring data may be obtained.



## Project Certificate Condition No. 169

Category	Governance and Leadership – Monitoring economic effects
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To maintain transparency inform communities in relation to economic benefits associated with the Project.
Term or Condition	The Proponent provide an annual monitoring summary to the NIRB on the monitoring data related to the regional and cumulative economic effects (positive and negative) associated with the Project and any proposed mitigation measures being considered necessary to mitigate the negative effects identified.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (SEMWG)
Reference	2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021) 2020 Community Engagement and SEMWG Meeting Records
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.3 Appendix G

### METHODS

Baffinland has provided a summary of monitoring data related to regional and cumulative economic effects associated with the Project in its annual 2020 Socio-Economic Monitoring Report (Aglu and Stratos, 2021).

### RESULTS

The Project continues to make positive contributions to Nunavut's economy. 250 Inuit FTEs were employed by the Project in 2020, earning a combined total of \$20,864,472. A total of \$91 million was committed to Inuit Firms in 2020. Since Project development, a total of \$1.3 billion dollars has been committed to Inuit Firms.

Mining remains an important contributor to the Nunavut economy. Nunavut's real gross domestic product (GDP) for all industries in 2019 (the latest year for which data is available) was \$3,156 million. Of this amount, 'metal ore mining' was responsible for contributing \$874 million (or 28%). Mining may also make economic contributions to supporting industries such as 'construction' (\$585 million contribution to the Nunavut economy in 2019), 'transportation and warehousing' (\$72 million contribution to the Nunavut economy in 2019), and 'accommodation and food services' (\$32 million contribution to the Nunavut economy in 2019), among others.

### TRENDS

The Project continues to provide positive regional and cumulative economic effects.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland continues to provide information on regional and cumulative economic effects of the Project through its Socio Economic Monitoring Report. No negative regional or cumulative socio-economic effects directly associated with the Project were identified in 2020.

#### 4.8 PERFORMANCE ON OTHER CONDITIONS

##### 4.8.1 Accidents & Malfunctions (PC Conditions 170 through 177)

Eight (8) PC conditions relate to accidents and malfunctions. Two (2) of these conditions relate to the TEMMP, four (4) relate to spill response planning, one (1) relates to implementing adaptive management measures for hunter safety around ice tracks (not applicable to Northern Shipping Route), and one (1) relates to the use of foreign flagged vessels. Baffinland's updates to these PC conditions are provided in the pages that follow.

## Project Certificate Condition No. 170

Category	Accidents and Malfunctions - Terrestrial Wildlife Management and Monitoring Plan
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	Updates to plan in order to better understand the potential for, and to minimize possible caribou-railway interactions.
Term or Condition	The Proponent shall include in an updated Terrestrial Wildlife Management and Monitoring Plan, plans for increased caribou monitoring efforts including weekly winter track surveying and summer and fall surveys undertaken on foot twice per month.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Responsible Party	Baffinland
Status of PC Condition	Steensby – Not Active
Status of Compliance	Not Applicable
Stakeholder Review	Terrestrial Environment Working Group (TEWG), Nunavut Impact Review Board
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

No Railway has been constructed to date, and as a result there is no potential for caribou-railway interactions to exist. Snow track surveys and snowbank height monitoring are conducted in the winter to assess wildlife (specifically caribou) interaction with the Tote Road. Detailed survey methods are described in the TEMMP and the 2020 Draft Terrestrial Environment Annual Monitoring Report (Sections 8.1 and 8.2; EDI, 2021), which has been released to the Working Group for review and comment. Snow track surveys generally occur in early winter and late spring; they are dependent on light availability and snow conditions, so they are somewhat unpredictable in frequency. Snowbank height monitoring occurs once per month during winter. The TEMMP includes a plan to increase the frequency of these surveys when caribou populations increase to a level that supports robust statistical analysis.

### RESULTS

Snowbank height monitoring was increased from a frequency of once per month, to twice per month in 2020 following multiple incidental caribou observations along the Tote Road in January. Snowbank height compliance with the 1 m threshold remained high (96%) in 2020.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Project Certificate Condition No. 170 refers to better understanding and minimizing caribou interactions with the Railway. The Railway for the Steensby Port phase of the Project has not been built, and therefore these monitoring activities have not been triggered. This will be re-evaluated once plans resume for Railway construction and

operation. Although traffic has increased along the Tote Road, caribou density is still too low and observations too infrequent to warrant sustained increased survey frequency. As there were no additional caribou observations from the Tote Road after January 2020, snowbank height monitoring returned to the once-monthly schedule for the 2021 winter season.

## Project Certificate Condition No. 171

Category	Accidents and Malfunctions - Terrestrial Wildlife Management and Monitoring Plan
Responsible Parties	The Proponent
Project Phase(s)	Pre-Construction
Objective	Updates to plan in order to minimize potential for caribou-railway interactions.
Term or Condition	The Proponent shall include within its updated Terrestrial Wildlife Management and Monitoring Plan, a commitment to establish deterrents along the railway and Tote Road embankments at any areas where it is determined that caribou are utilizing the embankments or transportation corridors to facilitate movement and where such movement presents a likelihood of caribou mortality to occur.
Relevant Baffinland Commitments	N/A
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Responsible Party	Baffinland
Status of PC Condition	Milne Inlet Tote Road – Active Steensby Railway – Not Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix G

### METHODS

No Railway has been constructed to date, and as a result there is no potential for caribou-railway interactions to exist. Areas along the Tote Road that may be used for caribou movement were identified in the FEIS Terrestrial Wildlife Baseline Report (EDI, 2012). Successive Height of Land surveys and driver observations have continued to provide information on potential areas of use by caribou along the Tote Road.

Section 3.3.3 and 3.3.4 of the Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) outline specific mitigation and management measures concerning caribou movement and mitigating mortalities. Snowbank heights along the Tote Road are limited to 1 m in height to allow for caribou movement across the length of the road corridor. Any identified trail crossings will be identified and reviewed with QIA-identified Elders and hunters, such that any adjustments to the embankments facilitate the desired wildlife movement. Refer to the TEMMP for further discussion on management measures and adaptive management.

### RESULTS

A total of eleven (11) caribou from seven (7) groups were reported from incidental observations in 2020. Most of the caribou were observed in exploration areas southeast of the Project in summer. Four (4) separate observations of a single caribou were recorded from the Tote Road in January. The observed caribou was confirmed to have crossed the Tote Road in three (3) of these four (4) instances, suggesting that the road did not act as a barrier to movement. No caribou were identified during the Height of Land surveys. Caribou have not been observed directly

in the PDA during Height of Land surveys between 2014 and 2020. Caribou abundance surveys conducted in 2014 and 2018 by the Government of Nunavut also reported low abundance throughout Baffin Island.

**TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

To date, the implementation of deterrents along the Tote Road has not been required given the relatively low abundance of caribou. Existing mitigation and monitoring as outlined in the TEMMP is considered adequate to meet the terms of the Project Certificate condition.

### Project Certificate Condition No. 172

Category	Accidents and Malfunctions – Overwintered fuel vessel
Responsible Parties	The Proponent
Project Phase(s)	Construction
Objective	To provide evidence that vessel to be used is fit and insured for proposed use.
Term or Condition	The Proponent is encouraged to provide the Government of Nunavut with evidence that the vessel that it intends to use for the overwintering of fuel has been designed and certified for use under the conditions which it is expected to operate, and that it be required to provide copies of the vessel owners' insurance policies.
Relevant Baffinland Commitment	8
Reporting Requirement	The required information is to be provided to the Government of Nunavut as soon as possible, and at a minimum, at least 60 days prior to the commencement of any construction related shipping.
Status of PC Condition	Not Active
Status	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

Not applicable in 2020, Baffinland did not require the overwintering of fuel via vessel in 2020.

#### RESULTS

None.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

If overwintering of fuel is required, Baffinland will provide the Government of Nunavut with the requested information.



## Project Certificate Condition No. 173

Category	Accidents and Malfunctions - Use of best practices
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Closure
Objective	To provide additional spill contingency measures for spills in marine areas.
Term or Condition	The Proponent shall employ best practices and meet all regulatory requirements during all ship-to-shore and other marine-based fuel transfer events.
Relevant Baffinland Commitment	9
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment and Climate Change Canada, Qikiqtani Inuit Association, Nunavut Water Board, Indigenous and Northern Affairs Canada, Nunavut Impact Review Board.
Reference	Spill Contingency Plan (Baffinland, 2021i) Oil Pollution Emergency Plan – Milne Inlet (OPEP; Baffinland, 2020i) Oil Pollution Prevention Plan – Milne Inlet (OPPP; Baffinland, 2020j) Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) Spill at Sea Response Plan (SSRP; Baffinland, 2015b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Baffinland maintains a Transport Canada approved Oil Pollution Emergency Plan (OPEP) for ship to shore fuel transfers at Milne Port, which is currently a Class 2 Oil Handling Facility. The OPEP was updated in May 2020. Training of Baffinland staff on the Milne Inlet OPEP was conducted by a qualified marine spill response contractor (Navenco Marine) between July 11 to 13 and July 17 to 19, 2020. Baffinland is committed to undertaking fuel transfer from vessels under good weather conditions. Baffinland also maintains a Transport Canada approved Oil Pollution Prevention Plan (OPPP) for Milne Port (Baffinland, 2020j), which is specifically designed to prevent the discharge of oil during bulk fuel transfers at Milne Port.

Baffinland also maintains the Spill at Sea Response Plan (SSRP) that outlines procedures for dealing with the unlikely event of a spill during ship-to-ship fuel transfers. Each vessel under contract to Baffinland also maintains its own Shipboard Oil Pollution Emergency Plan (SOPEP), which outlines the vessel's protocol for dealing with a spill event, and includes an inventory of spill response equipment onboard the vessel.

### RESULTS

OPEP training occurred in 2020. A mock spill exercise was performed to ensure spill readiness. Baffinland has invited communities of the North Baffin Region to participate and observe training in the past, however due to the ongoing COVID-19 Pandemic, visits to Project facilities by non-project staff were put on hold until further notice to eliminate any potential close interactions between employees and visitors of the mine. Required equipment for a Class 2 Oil Handling Facility was met. No spills occurred during fuel transfers.

**TRENDS**

As in previous years, Transportation Canada's Guidelines for Baffinland's Class 2 (previously Class 1) Oil Handling Facility were adhered to.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to conduct routine training exercises and strategically place resources and equipment on site for spill response during ship-to-shore fuel transfer events.

## Project Certificate Condition No. 174

Category	Accidents and Malfunctions - Community level spill response
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Closure
Objective	To improve community ability to assist in spill response
Term or Condition	The Proponent and the Canadian Coast Guard are required to provide spill response equipment and annual training to Nunavut communities along the shipping route to potentially improve response times in the event of a spill.
Relevant Baffinland Commitment	108,110
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment Climate Change Canada (ECCC), Qikiqtani Inuit Association (QIA), Nunavut Water Board (NWB), Indigenous and Northern Affairs Canada, Nunavut Impact Review Board (NIRB).
Reference	Oil Pollution Emergency Plan – Milne Inlet (OPEP; Baffinland, 2020i) Oil Pollution Prevention Plan – Milne Inlet (Baffinland, 2020j) Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) Spill at Sea Response Plan (Baffinland, 2015b)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

In a January 29, 2015 letter from the Canadian Coast Guard (CCG) to NIRB, the CCG noted that the provision of spill response equipment and training to communities was the responsibility of CCG.

Training of Baffinland staff on the Milne Inlet OPEP was conducted by a qualified marine spill response contractor between July 11 to 13 and July 17 to 19, 2020. This ensured that Baffinland is ready to respond to potential spills along the shipping route within the Inlet. Oil Spill Response Ltd. has continued to be retained to respond to significant spills that occur. Baffinland continued to improve marine spill response ability at the Port in 2019, procuring a spare outboard engine for the rescue boat and additional anchor kits, anchor buoys and other materials. Baffinland is committed to ensuring that adequate resources are allocated to the development and deployment of emergency and spill response capabilities within the Project.

### RESULTS

OPEP training occurred in 2020. A mock spill exercise was performed to ensure spill readiness. Baffinland has invited communities of the North Baffin Region to participate and observe training in the past, however due to the ongoing COVID-19 Pandemic, visits to Project facilities by non-project staff were put on hold until further notice to eliminate any potential close interactions between employees and visitors of the mine. Required equipment for a Class 2 Oil Handling Facility was met. No spills occurred during fuel transfers.

**TRENDS**

Baffinland is committed, during operations, to conducting regular and annual spill response exercises and training in known and effective techniques for responding to spills.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to conduct routine training exercises and strategically place resources and equipment on site for spill response during ship-to-shore fuel transfer events.

### Project Certificate Condition No. 175

Category	Accidents and Malfunctions – Ship track markers in ice cover
Responsible Parties	The Proponent, Qikiqtani Inuit Association, Hunters and Trappers Organizations of the North Baffin region and Coral Harbour
Project Phase(s)	Construction, Operations, Closure and Post-Closure Monitoring
Objective	To ensure that measures taken to mark the shipping track(s) during periods of ice cover are effective in advising ice-based travelers, and that, where necessary, revisions to this practice can be made to ensure public safety.
Term or Condition	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.
Relevant Baffinland Commitment	34, 57
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Steensby Port – Not Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

Not applicable in 2020. There is no winter shipping associated with the current phase of the Project. Furthermore, action on this PC Condition is deferred until the Steensby Port is developed and transits through ice are scheduled.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

## Project Certificate Condition No. 176

Category	Accidents and Malfunctions - Revised spill modeling
Responsible Parties	The Proponent
Project Phase(s)	Pre-Construction, Construction Operations, Closure
Objective	To improve community ability to assist in spill response.
Term or Condition	The Proponent is required to revise its spill planning to include additional trajectory modeling for areas of Hudson Strait, such as Mill Island, where walrus concentrate, as well as for mid-Hudson Strait during winter conditions as well as for the northern shipping route, including Milne Inlet, Eclipse Sound and Pond Inlet.
Relevant Baffinland Commitment	N/A
Reporting Requirement	The updated modeling shall be provided to the NIRB, Fisheries and Oceans Canada, and Environment Canada for review at least 3 months prior shipment of bulk fuel to Steensby Inlet or Milne Inlet.
Status of PC Condition	Steensby Port – Not Active Milne Port – Active
Status of Compliance	In Compliance
Stakeholder Review	Transport Canada, Canadian Coast Guard, Fisheries and Oceans Canada, Environment and Climate Change Canada
Reference	Milne Inlet Spill Modelling Report Fuel Spill Modelling: Northern Shipping Route Open Water Season - Milne Inlet, Eclipse Sound, Pond Inlet (AMEC Foster Wheeler, 2015) Emergency Response Plan (Baffinland, 2020f) Oil Pollution Emergency Plan – Milne Inlet (Baffinland, 2020i) Oil Pollution Prevention Plan – Milne Inlet (Baffinland, 2020j) Shipping and Marine Wildlife Management Plan (Baffinland, 2020k) Spill at Sea Response Plan (Baffinland, 2015b) Spill Contingency Plan (Baffinland, 2021h) Diesel Environmental Emergency (E2) Plan – Mine Site (Baffinland, 2020r). Diesel Environmental Emergency (E2) Plan - Milne Port (Baffinland, 2020l). Exploration Spill Contingency Plan (Baffinland, 2014d)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

### METHODS

Not applicable to Steensby Port and the Southern Shipping Route in 2020. Revised oil spill modelling was conducted for shipping from Milne Port in 2015 that satisfies this condition. Leading up to this modelling, a fuel spill preparedness workshop was held in April 2014 with Transport Canada and the Canadian Coast Guard. This workshop established the following credible spill scenarios for modelling:

- For arctic diesel - two (2) compartments of a double-hull, multi-compartment fuel tanker, which amounts to 4,000 m<sup>3</sup> (4 ML). The expected maximum size of the fuel tanker is 15 <L.
- For Intermediate Fuel Oil (IFO) - half of the IFO fuel remaining in the ship when sailing into Milne Inlet which amounts to 2,000 m<sup>3</sup> (2 ML) of IFO.

The spill assessment considered the open-water season, and the month of September was selected as representative in terms of meteorological and oceanographic conditions. Five potential spill locations along the shipping route were selected considering community recommendations.

Two (2) scenarios were modelled at each of the five (5) locations using the software OST, which computes spill probability distributions to indicate geographical regions (e.g., Pond Inlet, Eclipse Sound, Navy Board Inlet and Milne Inlet) which might be affected as a result of a spill, how frequently and how soon.

In addition, ten (10) (two fuel types by five locations) simulations were run with a September 'P50' wind condition defined as the average wind speed conditions and the associated most frequent wind direction. Finally, a sensitivity run considering a full fuel tanker loss of 15 mL arctic diesel cargo at a location in Eclipse Sound was also prepared. For these scenarios, RPS ASA's OILMAP (RPS, 2014) was used to provide additional estimation of spill weathering and fate. This includes slick characteristics, estimate of fuel concentrations in the surface layer, amounts evaporated and that have reached shore, and remaining amounts of fuel, and fuel and water (mousse) volume. The spill modelling completed in this study assumes no intervention, response or containment and that the slick is assumed to freely discharge (during a very short duration) from the damaged vessel.

The OILMAP oil spill model and response system introduced above was used to provide additional estimates of spilled fuel fate, in particular, slick characteristics and weathering. OILMAP calculates the evaporation, dispersion and remaining percentage for a given spill scenario where the user defines a fuel product type, weather conditions, properties of the receiving water, and the amount of fuel released.

The fate or weathering processes considered were evaporation, the conversion of liquid fuel into gaseous component, and natural dispersion, the breakup of a fuel slick into small droplets that are mixed into the sea by wave action. These are two important weathering processes that typically occur over the first five days following a spill and act to remove fuel from the sea surface. Fuel will also be brought to shore depending on the prevailing currents and winds at the time as well as the type and amount of fuel, and type of shoreline. Consideration of the amounts lost due to these processes yields an estimate of the remaining amount of fuel on the surface at any time. These are the key fates modeled and tracked by OILMAP. No containment or recovery of spilled fuel was assumed in the simulations.

## **RESULTS**

The modelling results from the 2015 report were presented in a series of figures showing expected spill trajectories after one (1) day and five (5) days. The spill model informed the development of Baffinland's Spill at Sea Response Plan.

The spill modelling results highlight the importance of spill prevention and the Spill at Sea Response Plan preparedness to minimize any adverse effects in the unlikely event of a fuel release of any size during vessel traffic into Milne Inlet.

## **TRENDS**

Not applicable.

**RECOMMENDATIONS / LESSONS LEARNED**

Management plans, including the Spill at Sea Response Plan (Baffinland, 2015b) and the Emergency Response Plan (Baffinland, 2020f) are being updated as part of the Phase 2 Proposal regulatory process to incorporate the updated fuel spill dispersion modelling that was completed in support of the Phase 2 Proposal. Operational practices and mitigation measures have been implemented as a proactive measure until decision on the Phase 2 Proposal is received.



### Project Certificate Condition No. 177

Category	Accidents and Malfunctions - Foreign flagged vessels
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Closure and Post-Closure Monitoring
Objective	To ensure foreign flagged ships operating in Canadian waters are held to the same standard as domestic ships with regard to emergency response planning.
Term or Condition	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.
Relevant Baffinland Commitment	13, 37
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Condition	Milne Port - Active
Status of Compliance	In Compliance
Stakeholder Review	Transport Canada
Reference	N/A
Ref. Document Link	N/A

#### METHODS

Ship owners / operators are responsible for enrolling their foreign flagged vessel with the appropriate program. Baffinland incorporates this requirement into contract terms and conditions with all vessels contracted directly by Baffinland.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

#### 4.8.2 Alternatives Analysis (PC Condition 178 through 184)

Ten (10) PC conditions relate to alternatives analysis. Four (4) of these conditions relate to shipping activities, two (2) relate to the membership of the MEWG, one (1) relates volumes of ore to be hauled on the Tote Road, one (1) relates to the implementation of mitigation measures in the marine environment, and two (2) relate to the assessment of Baffinland's performance against commitments and terms and conditions of the Project Certificate. Of note, PC condition No. 179 (a), (b) and (c) relate to Baffinland's production increase proposal to allow for shipment of 6 Mtpa of ore through Milne Inlet. Baffinland's updates to these PC conditions are provided in the pages that follow.

### Project Certificate Condition No. 178

Category	Alternatives Analysis - Mill Island shipping route consideration
Responsible Parties	The Proponent, Qikiqtani Inuit Association, Nunavut Impact Review Board, Marine Environment Working Group
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance
Objective	To prevent disturbance to walrus and walrus habitat on the northern shore of Mill Island.
Term or Condition	Subject to safety considerations and the potential for conditions, as determined by the crew of transiting vessels, to result in route deviations, the Proponent shall require 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.
Relevant Baffinland Commitment	N/A
Reporting Requirement	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 monitors. The Proponent shall summarize all incidences of deviations from the nominal shipping route as presented in the FEIS to the NIRB annually, with corresponding discussion regarding justification for deviations and any observed environmental impacts.
Status of PC Condition	Steensby – Not Active Milne Port - Active
Status of Compliance	Not Applicable
Stakeholder Review	N/A
Reference	N/A
Ref. Document Link	N/A

#### METHODS

Not Applicable in 2020. Shipping iron ore through Steensby Inlet is not active and has yet to be part of the Project's operations.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

### Project Certificate Condition No. 179

Category	Operational Variability
Responsible Parties	The Proponent
Project Phase(s)	Operations
Objective	To apply the precautionary principle in respect of potential effects on marine wildlife and marine habitat from changes to shipping frequency that may result from a significant increase in mine production for an extended period of time.
Term or Condition	Baffinland shall not exceed 20 ore carrier transits to Steensby Port per month during the open water season and 242 transits per year in total.
Relevant Baffinland Commitment	4
Reporting Requirement	To be developed following approval by the Minister.
Status of PC Condition	Steensby Port – Not Active
Status	Not Applicable
Stakeholder Review	N/A
Reference	NA
Ref. Document Link	N/A

#### METHODS

Not Applicable in 2020. Shipping iron ore through Steensby Inlet is not active and has yet to be part of the Project’s operations.

#### RESULTS

Not applicable.

#### TRENDS

Not applicable.

#### RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

### Project Certificate Condition No. 179 (a)

Category	Operational Variability/Flexibility
Responsible Parties	The Proponent
Project Phase(s)	Operations
Objective	To ensure that there are appropriate limits on the Milne Inlet marine shipping component in order to limit and manage likely project effects, while balancing the need for operational flexibility.
Revised Term or Condition	Until December 31, 2021, the total volume of ore shipped via Milne Inlet may exceed 4.2 million tonnes per year, but must not exceed 6.0 million tonnes in any calendar year. After December 31, 2021 the maximum total volume of ore shipped via Milne Inlet in a calendar year returns to 4.2 million tonnes per year, unless this condition has been further modified under s. 112 of <i>Nunavut Planning and Project Assessment Act</i> , S.C. 2013, c. 14, s.2.
Relevant Baffinland Commitment	4
Reporting Requirement	For each year after the Proponent commences shipping ore via Milne Inlet under the Early Revenue Phase Proposal, the Proponent shall include in the Annual Report to the NIRB, a summary of the total amount of ore shipped via Milne Inlet for the previous calendar year.
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	2020 QIA & NWB Annual Report for Operations (Baffinland, 2021a)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

#### METHODS

The total volume of ore shipped via Milne Inlet is tracked annually by Baffinland.

#### RESULTS

Baffinland shipped a total of 5.46 million tonnes of iron ore during the 2020 shipping season, as outlined in Table 4.54.

#### TRENDS

The total volume of ore shipped via Milne Inlet in 2017 was 4.05 Mt, 5.094 Mt in 2018, and 5.86 Mt in 2019. The volume of ore shipped increased between 2015 and 2019, and subsequently decreased slightly in 2020 to 5.46 Mt (see Figure 1.2).

Baffinland continues to operate within the existing allowance for shipping limits outlined in PC Condition No. 179(a).

**Table 4.54: Monthly and Annual Quantities of Ore Shipped by the Project in 2020**

Month	Lump Shipped (WMT <sup>1</sup> )		BHL <sup>2</sup> Shipped (WMT)		Fines Shipped (WMT)		Total Shipped (WMT)	
	Milne Inlet	Steensby Inlet	Milne Inlet	Steensby Inlet	Milne Inlet	Steensby Inlet	Milne Inlet	Steensby Inlet
January	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-
July	72,529	-	0	-	649,058	-	721,587	-
August	584,349	-	308,513	-	1,162,618	-	2,055,480	-
September	374,495	-	536,477	-	1,092,195	-	2,003,167	-
October	92,607	-	170,848	-	413,338	-	676,793	-
November	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-
<b>Sub-Total</b>	<b>1,123,980</b>	<b>0</b>		<b>0</b>		<b>0</b>	<b>5,457,027</b>	<b>0</b>
<b>Total</b>	<b>1,123,980</b>		<b>1,015,838</b>		<b>3,317,209</b>		<b>5,457,027</b>	

**Notes:**
<sup>1</sup>WMT = Wet Metric Tonnes.

<sup>2</sup>BHL = Baffinland Hematite Lump.

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to track ore volumes shipped on a yearly basis.

The Phase 2 application proposes to increase the volume of ore transported to Milne Port to 12 Mtpa by rail, and to cease the transport of ore via truck along the Milne Inlet Tote Road. Baffinland will continue to work through the regulatory process to obtain approval for this expansion.

### Project Certificate Condition No. 179 (b)

Category	Operational Variability/Flexibility
Responsible Parties	The Proponent
Project Phase(s)	Operations
Objective	To ensure that there are appropriate limits on the Milne Inlet Tote Road land transportation component in order to limit and manage likely project effects, while balancing the need for operation flexibility.
Revised Term or Condition	Until December 31, 2021, the total volume of ore transported by truck on the Milne Inlet Tote Road may not exceed 4.2 million tonnes per year, but must not exceed 6.0 million tonnes in any calendar year. After December 31, 2021, the maximum total volume of ore transported by truck on the Milne Inlet Tote Road in a calendar year returns to 4.2 million tonnes per year, unless this condition has been further modified under s. 112 of the <i>Nunavut Planning and Project Assessment Act</i> , S.C. 2013, c. 14, s. 2.
Reporting Requirement	For each year after the Proponent commences shipping ore via Milne Inlet under the Early Revenue Phase Proposal, the Proponent shall include in the Annual Report to the NIRB, a summary of the total amount of ore shipped via Milne Inlet for the previous calendar year.
Relevant Baffinland Commitment	4
Status of PC Condition	Milne Port
Status of Compliance	Non Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	2019 QIA & NWB Annual Report for Operations (Baffinland, 2020s)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a>

#### METHODS

The total volume of ore transported by truck on the Milne Inlet Tote Road is tracked annually by Baffinland.

#### RESULTS

In 2020 a total of 6.04 Mt of iron ore was transported by truck on the Milne Inlet Tote Road, as outlined in Table 4.55.

**Table 4.55: Monthly and Annual Quantities of Ore Generated and Transported Via the Tote Road in 2020**

Month	Quantity of Ore Transported by Truck (Wet Metric Tonnes)
January	402,842
February	467,119
March	488,301
April	478,619
May	405,713
June	462,278
July	542,692
August	524,541
September	597,978

Month	Quantity of Ore Transported by Truck (Wet Metric Tonnes)
October	590,035
November	561,568
December	520,765
<b>Total</b>	<b>6,042,451</b>

This is the first year Baffinland has met the 6 Mt limit for wet metric tonnes since the Project Certificate was amended in 2018. The cause for the overage in 2020 was largely due to a greater number of operating days than what was forecasted for at the end of the year. It is difficult to predict production, especially in the early winter months, as weather (high winds, snow) tends to influence haulage capability quite frequently. Based on the weather forecast in early December of 2020, it was anticipated that there would be a number of delays in haulage and we would be unlikely to reach the 6 Mt mark. Near the end of the year the weather forecast improved which allowed for more operational days. As a matter of practice Baffinland does not implement full stops on the operation if they can be avoided. Full stops create the potential for equipment freeze ups and failures and safety risks for the personnel that are then required to do the maintenance. The steps taken when it was recognized we might be approaching the permit limit in the final days of December, include but are not limited to:

- Reducing payload per truck;
- Slowing down movement by reducing speeds on the tote road; and
- Performing opportunistic maintenance on the haul trucks which, in effect, reduces the number of trucks in circulation without necessarily shutting them down for prolonged periods.

Despite the efforts listed above to slow production and remain under the 6 Mt transportation limit, due to the customary 3-5 day delay in receiving final production numbers as aerial drone surveys are conducted to reconcile truck scale data, the overage was not confirmed until the month had ended. Ultimately, there was a reported exceedance of 42,451 tonnes, or 0.71% of the approved limit.

## TRENDS

From 2017 to 2020, the amount of ore transported by truck on the Milne Inlet Tote road has increased from 4.54 to 6.04 Mt.

## RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to track ore volumes transported by truck on the Milne Inlet Tote Road, however, given the volumes in question and the inherent limitations of production accounting systems, which in the case of Mary River is subject to error inducing factors including truck scale accuracy, variable bulk density of different ore types and sinking of stockpile bases (on permafrost), it is not advisable to report to the tonne and in the future we will report to the closest 10,000<sup>th</sup> tonne in a given period. In support of this position, the following rationale is provided:

1. Reporting to the tonne implies our production accounting system is accurate to 0.000017%. No bulk material handling system in the world has that level of accuracy. As such, it is uncommon in the industry to report bulk commodity volumes down to the last tonne especially on an annual basis for large operations.



2. Taking into account all of the inherent errors in production accounting systems, and Baffinland's specifically, it is not unreasonable to expect an accuracy of +/-2% to +/-3%. This equates to an error band of +/- 120kT to 180kT at a 6.0Mtpa operating level.
3. Aerial surveys used to reconcile truck scale data carry a certain degree of inherent error as it assumes bulk densities to determine tonnage. Bulk density varies by ore type and over the course of a month it is common to transition multiple times through different ore types, which complicates the determination of the overall bulk density, which requires us to use averages and historical values.
4. Truck scales are susceptible to temperature fluctuations which, given our operating context, is another source of error. Combining truck scales with the aerial surveys allows us to "average out" the error, but it does not eliminate the error.

To avoid future exceedences of ore volumes transported by truck, Baffinland will continue to monitor the forecast of our haulage operation and in times where we are at a higher probability of meeting or exceeding our permitted limits, as was the case in 2020, we will take actions to slow production while preserving the operation and health and safety of employees.

### Project Certificate Condition No. 179 (c)

Category	Operational Variability/Flexibility
Responsible Parties	The Proponent
Project Phase(s)	Operations
Objective	To ensure commitments made by the Proponent with respect to the 2018 production increase and delivery of benefits to Inuit are adhered to, and can be determined through a body of evidence.
Revised Term or Condition	The Proponent shall be required to resource and support a third party to conduct bi-annual performance audits of commitments made by the Proponent in relation to both the IIBA and every Proponent commitment and every terms or condition of the Project Certificate relating to environmental management of the Tote Road component or environmental management related to shipping. The Proponent shall file Performance Audit Reports with the NIRB on or before March 31 and September 30 of each calendar year.
Relevant Baffinland Commitment	N/A
Reporting Requirement	On a bi-annual basis, the Proponent shall file a Performance Audit Report with the NIRB on or before March 31 and September 30 of each calendar year. This report shall include the findings of the third-party auditor, and Baffinland's commitment to addressing findings of the auditor. This term and condition will remain in force for the duration of the Mary River Project, unless it is modified under the <i>Nunavut Planning and Project Assessment Act</i> .
Status of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	N/A
Reference	Specified Auditing Procedures on the Commitments Audit Protocol report to the Nunavut Impact Review Board For the period ending June 30, 2020 (BDO, 2020) Specified Auditing Procedures on the Commitments Audit Protocol report to the Nunavut Impact Review Board For the period ending December 31, 2020 (BDO, 2021)
Ref. Document Link	NIRB Public Registry

#### METHODS

Since 2018, Baffinland has retained a consultant to complete an audit that would meet the specific objectives of the terms and conditions of Project Certificate Condition No. 179 (c). Prior to its implementation, the audit template was shared with the Qikiqtani Inuit Association (QIA) to confirm the scope prior. A contract was established with BDO Canada LLP (BDO) to conduct two (2) audits in 2020 in relation to both the IIBA, project Commitments, and the Terms and Conditions of the Project Certificate relating to the operation of the Tote Road and shipping activities.

#### RESULTS

The first Performance Audit Report was submitted to the NIRB in September 2020, for the period between January 1, 2020 and June 30, 2020 (BDO, 2020). For the IIBA section of the audit report, Baffinland had an 93% completion rate. For the PC No. 005 Terms and Conditions section, Baffinland had a 95% completion rate.

The second Performance Audit Report was filed to the NIRB on March 26, 2021, covering the period between June 30, 2020 up to December 31, 2020 (BDO, 2021). For the IIBA section of the audit report, Baffinland had an 93% completion rate. For the PC No. 005 Terms and Conditions section, Baffinland had a 95% completion rate.

**TRENDS**

In 2020, Baffinland maintained its completion rate of 95%, and continued to improve upon its completion rate for the IIBA section of the audit report (change from 86% in first half of 2019, to 93% for 2020).

**RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to execute the bi-annual audits required under Project Certificate Condition No. 179(c) in 2021.

## Project Certificate Condition No. 180

Category	Transboundary Effects - Makivik Corporation involvement in the Marine Environment Working Group (MEWG)
Responsible Parties	The Proponent, members of the Marine Environment Working Group
Project Phase(s)	Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To enable Makivik Corporation and Nunavik communities near shipping lanes to remain informed and involved in those shipping activities which could affect the marine environment and marine mammals.
Term or Condition	The Marine Environment Working Group established for this Project shall invite a representative from Makivik Corporation to be a member of the Group.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval by the Minister.
Status of PC Condition	Steensby - Not Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2020 MEWG Meeting Records
Ref. Document Link	Appendix C.1

### METHODS

Makivik is a member of the MEWG established in 2013. Meeting Records of working group meetings are distributed to all parties. If a representative of Makivik is unable to attend a meeting, they are informed of Project plans through the sharing of meeting presentation slides [Inuktitut and English] and meeting minutes (draft and final versions [Inuktitut and English]) via email.

### RESULTS

Makivik was sent MEWG meeting presentation slides and meeting minutes for all scheduled meetings, in addition to other technical information (e.g., latest drafts of annual monitoring reports) in 2020.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to update Makivik on Project activities through the MEWG meetings and distribution of technical documentation.

## Project Certificate Condition No. 181

Category	Transboundary Effects - Marine Environment Working Group (MEWG) reporting
Responsible Parties	The Proponent, members of Marine Environment Working Group
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To enable Makivik Corporation and Nunavik communities near shipping lanes to remain informed and involved in those shipping activities which could affect the marine environment and marine mammals.
Term or Condition	Regardless of whether Makivik Corporation participates as a member of the Marine Environment Working Group, the Marine Environment Working Group will provide Makivik Corporation with regular updates regarding the activities of the Marine Environment Working Group throughout the Project life cycle.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval by the Minister.
Status of PC Condition	Steensby - Not Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2020 MEWG Meeting Records
Ref. Document Link	Appendix C.1

### METHODS

Makivik is a member of the MEWG established in 2013. Meeting Records of the MEWG meetings are distributed to all parties. If a representative of Makivik is unable to attend a meeting, they are informed of Project plans through the sharing of meeting presentation slides [Inuktitut and English] and meeting records (draft and final versions [Inuktitut and English]) via email.

### RESULTS

Makivik received MEWG meeting presentation slides for all scheduled meetings, meeting records and other technical information (e.g., latest drafts of annual monitoring reports as available) in 2020.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to update Makivik on Project activities through the MEWG meetings and distribution of technical documentation via email.

## Project Certificate Condition No. 182

Category	Transboundary Effects - Reporting to Marine Environment Working Group (MEWG)
Responsible Parties	The Proponent, Makivik Corporation
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To enable Makivik Corporation and Nunavik communities near shipping lanes to remain informed and involved in those shipping activities which could affect the marine environment and marine mammals.
Term or Condition	Baffinland shall make available to Makivik Corporation any ship route deviation reports provided to the NIRB in accordance with the terms and conditions set out in Section 4.12.4 of the Final Hearing Report.
Relevant Baffinland Commitment	N/A
Reporting Requirement	To be developed following approval by the Minister.
Status of PC Condition	Steensby – Not Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	N/A
Ref. Document Link	<a href="https://www.baffinland.com/operation/shipping-and-monitoring/">https://www.baffinland.com/operation/shipping-and-monitoring/</a>

### METHODS

This condition is focused on shipping through the shared waters of Hudson Strait from Steensby Port. The Project has not utilized the southern shipping route to transport ore to date. However, vessel transit information for all vessels (non-Baffinland and Baffinland-procured vessels) with Automatic Identification System (AIS) tracking data and travelling within the RSA along the active Northern Shipping Route is publicly available on a 24-hour basis on the Baffinland website over the entire shipping season. Accordingly, online tracking is available prior to start of shipping and remains until after shipping has ended (typically set to provide data from July to October, inclusively). Baffinland will provide ship route deviation reports to Makivik when required.

### RESULTS

There were no changes to the ship route in 2020 that would be relevant to the Southern Shipping Route since the portion of the Project is not active. Baffinland did share through sharing of MEWG meeting slide decks and minutes that a slight deviation of the Northern Shipping Route was made near Bruce Head.

### TRENDS

Not applicable.

### RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to make ship route information publicly available through its online website and will provide Makivik with any ship route deviation reports when relevant to the Southern Shipping Route when the Steensby portion becomes active.

### Project Certificate Condition No. 183

Category	Project monitoring of impacts to marine mammals
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To address concerns associated with the potential for impacts to marine mammals, and compliance and enforcement of terms and conditions in Project Certificate No. 005 relating to ship-based observer programs, noise exposure assessment, and the identification of other mitigation measures that have the potential to further reduce potential impacts to marine mammals.
Term or Condition	The Proponent shall collaborate with the Marine Environment Working Group (MEWG) to develop impact avoidance or mitigation strategies for the protection of the marine environment, and shall implement these strategies. The Proponent shall implement any direction from the Department of Fisheries and Oceans (DFO), issued in furtherance of their mandate, for any avoidance or mitigation measures, including cessation of any activity, for the protection of the marine environment. The Proponent shall, every six months, provide to DFO a tracking table of (i) collective recommendation of the other members of the working group, and (ii) any directions from DFO. For each, the table must show the Proponent's means of implementation. Where any direction or recommendations are not fully implemented, the Proponent shall include the rationale.
Relevant Baffinland Commitment	N/A
Reporting Requirement	Results of the observer program shall be provided in the Annual Report to the Board. Further, Baffinland shall report all data it generates from the implementation of monitoring of marine impacts it is required to implement pursuant to the Terms and Conditions of the Project Certificate. In relation to the specific reporting associated with the Extension Request to the Production Increase Proposal, Baffinland shall provide the tracking table referenced above to Fisheries and Oceans Canada and the other members of the Marine Environment Working Group within six months following the NIRB's issuance of Amendment 003 to the Project Certificate and shall provide subsequent updates to the table every 6 months thereafter.
Status of PC Condition	Milne Port – Active
Status of Compliance	In Compliance.
Stakeholder Review	Marine Environment Working Group (MEWG), Department of Fisheries and Oceans (DFO)
Reference	Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port (Fednav, 2020a) Standing Instructions and General Information for Masters of Vessels Sailing to Milne Inlet Port (Fednav, 2020b) 2019 Marine Mammal Aerial Survey Report (Golder, 2020i) 2020 MEWG Meeting Records Is vessel hull fouling an invasion threat to the Great Lakes? (Sylvester and Macoriaac, 2010)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1

## METHODS

Baffinland has regularly consulted with the MEWG, DFO and Inuit stakeholders when developing or enhancing impact avoidance and mitigation strategies for the protection of the marine environment.

The MEWG provides a valuable forum for ongoing Project communication and reporting between Baffinland and other interested parties. The MEWG also serves as an advisory group to provide recommendations on appropriate management approaches and actions related to the Project.

Any new or modified/enhanced mitigation measures related to shipping or port operations are documented in the annually revised Standing Instructions to Masters (SITM; Fednav 2020a; 2020b). These documents are distributed to all Project Vessel owners / operators prior to the start of the shipping season. These documents provide specific reporting and navigational guidance to Vessel Masters calling to Milne Port, and is applicable to ore carriers, freight vessels, fuel tankers and Project support vessels (i.e., icebreaker, tugs) during their travel in the RSA and Baffin Bay.

## RESULTS

Baffinland and the MEWG held meetings on February 25, 2020, June 25, 2020 and December 9, 2020. The February meeting was held in-person in Ottawa and the other two meetings were in teleconference format due to the COVID-19 Pandemic public health restrictions.

New and enhanced mitigation measures incorporated by Baffinland in 2019 were maintained in 2020 in response to recommendations and feedback provided by the MEWG, DFO, and Inuit stakeholders, including the following:

- During the early shoulder season, restrictions were set on the maximum number of Project vessel transits allowed in the RSA within a 24-h period based on daily ice conditions along the Northern Shipping Route.
- During the early shoulder season, a 40-km vessel buffer zone (i.e., vessel set-back area) was implemented at the entrance of the RSA that extended 40 km to the east of the Nunavut Settlement Boundary.
- Collection of permanent video recordings onboard the icebreaker to record ice conditions during all icebreaker/escort transits in the RSA during both shoulder seasons.
- An ice analyst was deployed on the icebreaker on all transits undertaken in the RSA during the early and late shipping shoulder seasons.
- Continued use of a real-time AIS-based alert system that immediately informed the Port Authority and Baffinland's shipping department of any non-compliance events (e.g. speed exceedances in the RSA).
- Community consultation prior to start of icebreaker escort and shipping operations.
- Maximum of three ships transiting at a time in the RSA or anchored at Ragged Island.

In addition, the shipping route was slightly modified to deviate as close as safely allowable to Poirier Island, and as far as safely allowable from the Bruce Head point in Milne Inlet. This additional mitigation was a direct result of consultation with the MHTO during the end of shipping meeting in Pond Inlet 2019. It was implemented during the 2020 shipping season and will be continue to be implemented in future shipping seasons.

Modifications incorporated into Baffinland's 2020 monitoring programs in response to recommendations and feedback provided by the MEWG, DFO, and Inuit stakeholders included the following:

### **MEEMP and NIS/AIS Program:**

- Addition of water quality monitoring stations at the discharge location of MP-06, consistent with the study design for discharge location MP-05.



- Water sampling timing was altered to ensure collection of water samples during at least one active discharge event at each of the discharge locations.
- Increased the sampling effort for benthic infauna and sediment study components (from 8-10 to 15 sampling stations per transect) to increase power of detection, informed by power analysis.
- Benthic infauna and sediment sampling methodology and equipment was standardized across all stations to ensure consistency and comparability of results.
- Due to the belt transects being moved, twisted, and obscured following a short deployment period, the belt transects were replaced with ten steel quadrats that should be more robust under the local conditions.
- Following limitations in species identification in ROV footage on the belt transects, a dive team trained in the identification of marine biota were used in addition to ROV for survey of the quadrats.
- Adoption of hoop/fyke nets as a new method in the fish sampling program to compensate for low catch in Fukui traps, following successful trial of the method in 2019. Fukui trapping continued in 2020 to meet commitments of continuing to sample at old locations for minimum of three years to facilitate comparison of old and new methods / results.
- Modifications of methodology in Fukui traps and hoop nets included setting the traps in deeper locations recommended by Inuit field personnel to target demersal species and improve capture efficiency.
- Tried bottom trawling in the fish sampling program to test the efficacy of capturing large bodied demersal fish species not typically caught in previous surveys (e.g. Arctic cod).
- Continued collection of species added in 2019 (sculpin and shellfish) in addition to char for tissue/body burden analysis.
- Reviewed ship hull monitoring methodology with ROV operator prior to surveying to ensure methodology was aligned with the stratified survey design used in Sylvester and Macoriaac (2010).
- Performed ship hull monitoring on two ships at anchorage to avoid limitations with hull visibility and accessibility when ships are moored at the Ore Dock, increasing the total area and survey time for each ship.
- Deployment of nine sets of settlement baskets and plates along the Freight Dock, as well as ten sets of settlement plates in other locations around Milne Port to increase monitoring of recruitment of encrusting biota.
- Targeted sampling at locations where potential NIS/AIS taxa had been observed previously included the collection of additional samples to be preserved for DNA analysis at the Canadian Centre for DNA Barcoding at the University of Guelph. Additional incidentally collected specimens were also selectively preserved for barcoding and taxonomic confirmation.

#### **Marine Mammal Monitoring Programs:**

- Continuation of the Pond Inlet Guardian Program (shipping monitors) which consisted of employing shipping monitors from the community of Pond Inlet to actively track daily Project vessel movements in the RSA in real-time, and in relation to reported marine mammal aggregations (as shared by the community and the monitoring teams).
- Aerial surveys included systematic surveying of the fjords during all of the surveys, as proposed by the QIA during the review of the 2019 Marine Mammal Aerial Survey Program Final Report (Golder, 2020i).
- Enhancement of the UAV/drone study component to the Bruce Head Shore-based Monitoring Program to better evaluate observer detection performance and to assess behavioral changes of narwhal in relation to

shipping events under a different behavioral context (e.g. resting/milling, socializing) than what is typically observed in the Behavioral Study Area (BSA; travelling) through focal follow surveys.

- For Bruce Head shore-based monitoring program, modified daily survey effort to maximize observations collected during ship transit events, thereby increasing sample size of exposure events.

In response to Board Recommendation No. 3, Baffinland supplied the NIRB with a table summarizing feedback provided by the MEWG since 2018 and how Baffinland has considered and implemented that feedback.

Additionally, Baffinland notes that DFO has not provided any directions to Baffinland with respect to Term and Conditions No. 183 and DFO identified on March 22, 2021 in response to MHTO written questions for the Phase 2 Public Hearing that “to date, there has not been a situation, within DFO’s mandate, that provided sufficient evidence that there would be imminent negative impacts to the marine environment such that it required a direction”.

### **TRENDS**

The MEWG has successfully provided valued input into the Baffinland annual marine monitoring programs.

### **RECOMMENDATIONS / LESSONS LEARNED**

Baffinland will continue to work with the MEWG to review and guide marine monitoring programs for the Project on an annual basis and develop mitigation measures or action plans as and when needed.

Baffinland, with support from DFO and other members of the MEWG has put a strong emphasis on continuing existing programs and developing more diverse community-based monitoring programs.

### Project Certificate Condition No. 184

Category	Project monitoring of impacts to marine mammals
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To address concerns associated with the potential for impacts to marine mammals, and compliance and enforcement of terms and conditions in Project Certificate No. 005 relating to ship-based observer programs, noise exposure assessments, and the identification of other mitigation methods that have the potential to further reduce potential impacts to marine mammals.
Term or Condition	The Proponent shall collaborate with the Marine Environment Working Group to review the status of compliance with, and implementation of, all of the Terms and Conditions in Project Certificate No. 005 related to marine environmental protection.
Relevant Baffinland Commitment	N/A
Reporting Requirement	Results of the observer program shall be provided in the Annual Report to the Board. Further, Baffinland shall report annually all data it generates from the implementation of monitoring of marine impacts it is required to implement pursuant to the Terms and Conditions of the Project Certificate.
dStatus of PC Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG), Department of Fisheries and Oceans (DFO)
Reference	Marine Environmental Effects Monitoring Plan. (Baffinland, 2016c) 2019 Marine Mammal Aerial Survey Report (Golder, 2020i) Is vessel hull fouling an invasion threat to the Great Lakes? (Sylvester and Maclsaac, 2010)
Ref. Document Link	<a href="https://www.baffinland.com/media-centre/document-portal/">https://www.baffinland.com/media-centre/document-portal/</a> Appendix C.1 Appendix G

#### METHODS

Refer to PC Condition No. 77 and 183.

#### RESULTS

Refer to summary for PC Condition No. 77 and 183.

#### TRENDS

Refer to summary for PC Condition No. 77 and 183.

#### RECOMMENDATIONS / LESSONS LEARNED

Refer to summary for PC Condition No. 77 and 183.

## 5 NIRB CORRESPONDENCE

Throughout 2020, formal correspondence and exchange of information regarding current operations took place between Baffinland and NIRB, and included the following:

- Meetings and Workshops
  - Baffinland participated in the NIRB-facilitated Marine Monitoring and Marine Mitigation Workshop held in Pond Inlet on August 25, 2020. NIRB released a summary report on November 25, 2020 and provided some key recommendations (NIRB, 2020b). Baffinland responded to NIRB Recommendations No. 1 (Ballast Water Exchange and Invasive Species) and 3 (Dust) on December 23, 2020 (Baffinland, 2020t), and Recommendation No. 2 (Population and health status of fish and marine mammals) on January 23, 2020 (Golder, 2021g).
  - NIRB is an Observer Organization for the MEWG and TEWG which meets annually either in-person (one in-person in February 2020 or via teleconference (two teleconference meetings were held in June and December 2020). All meeting records and presentation slides presented during these meetings are distributed to the NIRB, in addition to copies of draft monitoring programs as they are completed for inclusion in the Annual Report to the NIRB.
- Site Visits and Inspections
  - NIRB conducted one in-person site visit on February 11-13, 2020. A follow-up report was prepared by the NIRB and released on May 12, 2020 (NIRB, 2021c). Baffinland provided to NIRB a 2020 dustfall summer update as requested by NIRB following their February 2020 site visit on August 21, 2020 (Baffinland, 2020u).
  - Due to operational constraints and travel restrictions related to the COVID-19 Pandemic, NIRB completed its summer 2020 site visit through a desktop-based review. On September 3, 2020, NIRB provided Baffinland a checklist of photos they needed from Baffinland to complete their review. Various photos were taken of Mine Site, Tote Road, Milne Port, Bruce Head, and Steensby Port infrastructure and were shared with the NIRB for their review. A follow-up report was prepared by the NIRB and released on November 24, 2020 (NIRB, 2020d).
- Annual Reporting
  - Baffinland received reviewer comments on the 2019 Annual Report to the Nunavut Impact Review Board on August 5, 2020 (NIRB, 2020e). Comments from the MHTO to Baffinland were issued to the NIRB on September 10, 2020 (MHTO, 2020).
  - Baffinland provided responses to reviewer comments received on the 2019 Annual Report to the Nunavut Impact Review Board on September 4, 2020 (excluding MHTO comments due to later submission; Baffinland, 2020v) and on October 13, 2020 (response to MHTO comments; Baffinland, 2020w).
  - The NIRB's 2019-2020 Annual Monitoring Report for the Mary River Project (NIRB, 2020f) and Board's Recommendations (NIRB, 2020g) was issued to Baffinland on December 23, 2020. Baffinland provided responses to Board recommendations and on areas requiring further study or changes to the monitoring program on March 5, 2021 (Baffinland, 2021j).

The following sections further summarize engagement and correspondence with NIRB throughout 2020.

## 5.1 NIRB SITE VISITS AND INSPECTIONS

The objective of the NIRB's site visits to the Mary River and Milne Port sites is to determine whether, and to what extent, the land or resource use in question is being carried out within the predetermined Terms and Conditions as set out in the amended Project Certificate issued for the Mary River Project, in accordance with Section 12.7.2(b) of the *Nunavut Agreement*. As described by NIRB, the observations resulting from the site visits shall, wherever possible, be incorporated into the measurement of the relevant effects of the Project, provide the information necessary for agencies to enforce terms and conditions of land or resource use approvals, and will be further used to assess the accuracy of the predictions contained in the project impact statements in accordance with Section 12.7.2 of the *Nunavut Agreement*, and s. 135 (3) of the *NuPPAA* (NIRB, 2019b).

Only one in-person site inspection was possible at both the Mary River Mine Site and Milne Port, due to operational constraints, public health measures and travel restrictions related to the COVID-19 Pandemic. Accordingly, NIRB staff were only able to complete the Winter Site visit (February 11 to 13, 2020). A desktop-review was completed by the NIRB as an alternative to the in-person Summer Site visit based on photos shared with the NIRB.

Upon completion of the Winter 2020 site visit, NIRB Monitoring Officers met with Baffinland staff to discuss observations noted during the site visit. This meeting allowed for Baffinland Operations staff to directly engage with NIRB, and for NIRB to provide an overview of their findings, including specific areas of the Project where improvement could be made, or where adjustments to environmental mitigation measures could be implemented. Baffinland's senior management team was present for these meetings, such that any concerns identified could be addressed and corrected with the appropriate department in a timely and effective manner.

It was noted by NIRB staff following the winter 2020 site visit, that based on the on-site observations *"the NIRB Monitoring Officers note that the site appeared to be well managed and maintained with adequate environmental protection measures and procedures in place"* (NIRB, 2020c, 2020d). Several improvements were also noted by NIRB staff across the Project area during the winter visit including:

- the Waste Rock Storage Facility by addition of the water treatment plant and the increased depth of the sedimentation ponds;
- Organization and waste storage and segregation in the incinerator buildings;
- The completed fence and gate around the landfill cell in use;
- Installation of an access gate to the hazardous waste storage area; and
- The clean-up and removal of synthetic liners from the landfarm.

NIRB staff also identified some minor issues related to dust emissions which required follow-up actions from Baffinland. During the visit, NIRB Monitoring Officers observed an increased amount of dust being emitted at the crusher facility. Baffinland had removed several hoods from the conveyor system for maintenance purposes which resulted in increased dust generation from the crusher. In addition, during the inspection of Milne Port dust could also be seen on the sea ice in Milne Inlet. As part of the visit, Baffinland had committed to providing an update to the NIRB on actions taken to reduce dust at the crusher and Milne Port. Baffinland's response to the findings (Baffinland, 2020u) included details, where applicable, on progress made to date and future plans to address concerns of dust emissions at the crusher plant (reinstallation of hoods), along the Tote Road (expanded application of dust suppressant, DustStop) and at Milne Port stockpiles (pilot application of a crusting agent, DusTreat).

Following NIRB's completion of the desktop-based 2020 summer update review, Monitoring Officers concluded that Baffinland appears to be compliant with the majority of terms and conditions contained within PC No. 005.

Consistent with conclusions made following the Winter 2020 site visit, NIRB reiterated *“that Baffinland appears to have a well managed and well maintained site with adequate environmental measures in place where necessary”*.

A summary of the conclusions from these site visits, in addition to general performance related to the PC No. 005 is also provided in the 2019-2020 NIRB Annual Monitoring Report (NIRB, 2020f) and the Board Recommendations report (NIRB, 2020g), further described below.

## 5.2 COMMENTS ON THE 2019 ANNUAL REPORT TO THE NIRB

Baffinland submitted its 2019 Annual Monitoring Report (the 2019 Annual Report; Baffinland, 2020n) to the NIRB on May 15, 2020. The NIRB conducted a preliminary completeness check on the submission and requested additional information from Baffinland (NIRB, 2020h). Baffinland provided responses to the NIRB on June 5, 2020 (Baffinland, 2020x).

Following receipt of responses to NIRB’s additional information requests, the NIRB subsequently sent a notification to its Mary River Distribution List on June 11, 2020 indicating that the report was now accessible on NIRB’s online public registry and requested comments from all interested parties with respect to their jurisdiction and/or area of expertise by July 27, 2020.

The NIRB provided Baffinland with regulatory agency and other stakeholder comments to its 2019 Annual Report on August 5, 2020, based on responses received on or before July 27, 2020 from the QIA, GN, CIRNAC, ECCC, DFO, Parks Canada, Transport Canada, Oceans North, and delayed submissions by the WWF on July 31, 2020 and MHTO on September 10, 2020. NIRB requested that Baffinland provide a response to reviewer comments to the NIRB by September 4, 2020. As part of this request, NIRB requested that Baffinland provide additional information regarding its ground water chemistry results.

In Baffinland’s response to the NIRB regarding comments received on the 2019 Annual Report, Baffinland provided itemized responses to 153 comments received, where applicable, from QIA (87), GN (6), CIRNAC (10), ECCC (12), DFO (8), Parks Canada (8), TC (4; did not require responses from Baffinland), WWF (6) and ON (16) in the Company’s letter to NIRB on September 4, 2020 (Baffinland, 2020v), and to the MHTO (7) on October 13, 2020 (Baffinland, 2020w). A summary of comments and Baffinland’s responses is provided in NIRB, 2020f and 2020g. A summary of the main comments by reviewing agency is provided in Table 5.1

**Table 5.1: Summary of Reviewer Comments on 2019 Performance and Compliance**

Agency	Summary of 2019 Comments on Regulatory Performance and Compliance
Qikiqtani Inuit Association (QIA)	Noted the survey methods for caribou monitoring are inadequate to determine if the Project is having an effect.
	Noted the inability to identify hull biofouling species requires improvement in order to better detect invasive species.
	Stated Efficacy concerns with the Marine Environment and Terrestrial Environment Working Groups.
	Monitoring, reporting and feedback from working groups gives the impression of a “checkbox” exercise.
	Format of groups lacks sufficient time to provide input into monitoring program design and implementation prior to the release of the 2019 Annual Report.

Agency	Summary of 2019 Comments on Regulatory Performance and Compliance
	<p>Expressed concern regarding the recurring issues with perched and obstructed culverts and the need to take a proactive approach to prevent culvert damage.</p> <p>Requested improvements to the Core Receiving Environment Monitoring Program (CREMP) involving water sediment and water quality monitoring and aquatic biota monitoring in Mine Site lakes and streams.</p> <p>Noted improvements in the Marine Environmental Effects Monitoring Program such as the addition of the Northeast sampling transects and increases in the number of sampling sites.</p> <p>Requests that Baffinland provided information regarding the need and value in collecting data on sea ice trends as this is critical to Inuit use of the ice.</p> <p>Noted a need to collect baseline data to further understand the impacts the Project is having on the robustness of the Pond Inlet food system and access to country food.</p>
Mittimatalik Hunters and Trappers Organization (MHTO)	<p>Is concerned regarding the inadequacy of the current caribou monitoring and the need to expand their surveying efforts as well as meet with the MTHO to discuss this.</p> <p>Requested clarification regarding the current dust monitoring program, why some programs have been on hold and how others should be modified due to exceedances of predicted dust fall thresholds.</p> <p>Requested an update on the potentially invasive species that was found in Milne Inlet in the 2019 sampling as well as an update to the program to include “biota” in its ballast water sampling.</p> <p>Has concerns regarding the current marine mammal monitoring program and the lack of assessment around icebreaking during the shoulder season.</p> <p>Requested immediate development and implementation of a comprehensive seal monitoring program.</p> <p>Requested that DFO confirm whether T&amp;C 183 provides a sufficient mechanism for ensuring the protection of marine mammals and environment in consideration of Baffinland’s current icebreaking activities.</p>
Government of Nunavut (GN)	<p>Noted concern regarding the consistency of data presented from the 2019 Inuit Employee Survey</p> <p>Requested that the Inuit Employee Survey be expanded to include Inuit residing outside of the local study area (Iqaluit and non-Nunavut communities).</p>
Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)	<p>Noted ineffective dust management, monitoring and potential effects on water courses, marine shoreline, and vegetation.</p> <p>Requested testing for acidity/ alkalinity, sulphate, iron, manganese, nickel and nitrate concentrations in vegetation and soil base metal site tests.</p> <p>Requested a summary table in future NIRB Annual Reports identifying exceedances of daily water withdrawal limits.</p> <p>Recommended expansion of groundwater monitoring program to include wells near the Waste Rock Stockpile area, borrow pits and quarries and the rationale for not including these sites in current monitoring.</p> <p>Acknowledged Baffinland’s improvements at the Waste Rock Area but also noted several concerns regarding the current management of effluent and areas for improvement.</p> <p>Noted concerns regarding potential future quarry and borrow-source pits along the Tote Road for the development of rail-link. CIRNAC recommended confirmation of the origin of elevated aluminum, mercury, and copper concentrations in Shake Flask Extraction test as</p>

Agency	Summary of 2019 Comments on Regulatory Performance and Compliance
	<p>well as an update to the Closure and Reclamation plan to include potentially acid generating rock sources.</p> <p>Requested an overview of the long-term plan to address permafrost degradation in the borrow pits, a description of closure and reclamation activities and revisits to reclamation/restoration areas with reference to target conditions of these areas.</p> <p>Recommended a more detailed analysis of unauthorized discharges and spills including the quantity spilled, causes and corrective actions taken or planned.</p> <p>Requested more information on the frequency of landfill inspections.</p>
Environment and Climate Change Canada (ECCC)	<p>Requested that the Proponent present the groundwater data collected graphically in order to clarify differences in up and down-gradient concentrations and highlight temporal trends.</p> <p>Noted concerns that the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines presented in Table 2.2 have not been updated for zinc or manganese and requests these to be updated in future years.</p> <p>Recommended that the Proponent consistently apply the 3 milligrams of nitrogen per litre nitrate (mg-N/L) guidelines of the CCME Water Quality Guidelines to ensure appropriate comparisons and make possible notes of exceedances clear.</p> <p>Has concerns regarding sudden increases in nitrate and sulphate at Mary River Tributary F. ECCC notes that these increases do not exceed CCME Water Quality Guidelines but that the sudden increase compared to previous data may indicate mine influence.</p> <p>Required a more thorough review of flight log data to determine if pilots' justification is a sufficient explanation for flight height restrictions being broken and acknowledged that the Proponents committed to a further analysis of this data during the Terrestrial Environment Working Group (TEWG) meeting in June 2020.</p> <p>Recommended that if an altitude of 1,100 m through the Snow Goose area during moulting season cannot be maintained, pilots should re-route around the area while maintaining the 1,500 m horizontal buffer.</p>
Fisheries and Oceans Canada (DFO)	<p>Is concerned regarding the breaking of non-landfast ice in the Regional Study Area and the current lack of both approval and assessment for this under the current Project Certificate.</p> <p>Expressed concerns regarding the Shipbased Observer Program in that it only occurs during the shoulder seasons and not the height of the shipping season.</p> <p>Is concerned that the current comment/response format is not a timely mechanism for resolution of and incorporation of outstanding issues.</p>
Parks Canada (PCa)	<p>Outlined the submission timelines for draft monitoring programs and the publication of the annual report resulting the NIRB's Monitoring Report not containing incorporation of MEWG/TEWG member comments.</p> <p>Requested the location of Table 1.2 regarding the icebreaking assessment and daily ice charts that were used to characterize ice conditions for the current 2019 Annual Report.</p> <p>Further noted that Baffinland should work with the MEWG to resolve issues to the Working Group comment forms describing how those issues have been resolved through consensus and how those comments have been incorporated into the final reports and the ongoing monitoring programs.</p>
World Wildlife Fund (WWF)	<p>Requested an update to Baffinland's Draft Climate Change Strategy and how it intends to reduce emissions along with specific commitments and timeline targets.</p> <p>Requested that Baffinland clarify what impacts the Project may have on the climate and provide a suggested approach for how to measure those impacts.</p>



Agency	Summary of 2019 Comments on Regulatory Performance and Compliance
	<p>WWF would like Baffinland to clarify the thresholds for when emissions would be determined to impact the climate.</p> <p>Regarding PC Condition No. 78, requested that Baffinland provide the data for 2019 and 2020 ice conditions for the Northern Shipping Route.</p> <p>Requested that Baffinland clarify which monitoring programs classify narwhal behavioural response, which of those programs are occurring in the shoulder seasons and which of those programs occur along the entire RSA shipping route.</p> <p>Required clarification regarding Baffinland's narwhal monitoring programs and their ability to detect calving and nursing behaviours in order to have a greater understanding of these activities within the RSA.</p>
Oceans North (ON)	<p>Noted disagreement with the use of icebreakers through both the winter and shoulder seasons of shipping and requests that NIRB provide a summary of where icebreaking was discussed in the northern shipping corridor.</p> <p>More clarity is needed around the number and type of vessels and their associated noise levels.</p> <p>Expressed concerns regarding the monitoring timelines and the limitations the current timeline has on the ability for each year results to feed into subsequent years monitoring programs, specifically with respect to incorporation of MEWG comments.</p> <p>Noted concerns regarding the need for further detail and discussion around the Early Warning Indicators amongst MEWG members prior to the establishment of those indicators and associated thresholds.</p>

### 5.3 NIRB'S ANNUAL MONITORING REPORT AND BOARD RECOMMENDATIONS

On December 23, 2020 the NIRB issued its 2019-2020 Annual Monitoring Report (the Monitoring Report) for Baffinland Iron Mines Corporation's Mary River Project and the Board's Recommendation (NIRB, 2020g) which included comments subsequent to NIRB's Winter 2020 Site Visit and Summer Update via a desktop review. NIRB motioned to issue five (5) additional recommendations to Baffinland as part of the Monitoring Report based on five (5) key topic areas as follows:

1. Dust, pursuant to PC Condition Nos. 10, 46;
2. Fish Passage, pursuant to PC Condition No. 47;
3. Working Group and Adaptive Management Strategy, pursuant to PC Condition Nos. 49, 77;
4. Groundwater Management, pursuant to PC Condition Nos. 17, 20, 23; and
5. Updated Ice Information and Assessment of Activities; pursuant to PC Condition No. 78, 100.

In addition to these formal recommendations, NIRB also identified 11 areas requiring further study or changes to the monitoring program as follows:

1. Emissions of Dioxins and Furans from Waste Incineration, pursuant to PC Condition No. 12;
2. Adaptive Strategies for Dust, pursuant to PC Condition No. 21;
3. Fish Sampling, pursuant to PC Condition No. 48(a);

4. Effluent Discharge and Exceedances, pursuant to PC Condition Nos. 24, 26;
5. Blasting and Explosives Residue Monitoring, pursuant to PC Condition No. 20;
6. Caribou Monitoring, pursuant to PC Condition Nos. 51, 53, 54, 57, 58;
7. Helicopter Flights, pursuant to PC Condition Nos. 59, 71;
8. Ship Hull Biofouling, pursuant to PC Condition No. 91;
9. Marine Sediment Contamination, pursuant to PC Condition No. 76;
10. Early Warning Indicators; pursuant to PC Condition Nos. 110, 111, 112; and
11. Marine Environment Working Group; pursuant to PC Condition No. 184.

Baffinland's responses to the NIRB Board's recommendations provided on March 5, 2020, including further updates requested by NIRB for inclusion in the 2020 Annual Report, can be found in Appendix E.

#### **NIRB Considerations on Baffinland's Overall Performance**

As part of NIRB's 2019-2020 Annual Monitoring Report and review of compliance status for the various terms and conditions (NIRB, 2020g), there were a number of PC Conditions that were highlighted specifically as needing additional efforts by Baffinland in order to achieve full compliance in the future. These include PC Condition No. 17, 20, 23, 47, 49, 77, 78, 100 and 184, noting that most were considered "In Compliance" by Baffinland, save for PC Condition No. 17 (In Progress). Baffinland also notes that PC Condition No. 49 and 77, although indicated as not reaching full compliance, were deemed "In Compliance" by both the NIRB and Baffinland in 2019 and 2020.

There were also a number of other PC conditions for which NIRB did not agree with Baffinland's self-assessment status. Specifically, a number of PC conditions (e.g., 1, 83, 105 to 109, 111) were indicated as being "In Progress" by NIRB, but were considered "In Compliance" by Baffinland. In these cases, Baffinland seeks greater clarity from NIRB on its assessment methodology and associated considerations when assigning a status, including for those conditions for which there was previously mutual agreement on compliance status. Discussions with NIRB staff in 2019 and 2020 confirmed that NIRB methodologies for assessing status of compliance for all Proponents had diverged from prior years, however no formal guidance or methodology has been provided to date to better clarify the revised methodology NIRB utilizes to assess compliance status with PC Terms and Conditions. Baffinland will continue to complete its self-assessment using the approach described in Section 4.1 until such time that additional guidance is provided by the NIRB on its assessment methodology.

As a whole, Baffinland remains committed to improving compliance status, which includes prioritizing a reduction in the number and extent of non-compliances and accidents.

## 6 MANAGEMENT PLAN UPDATES

Table 6.1 provides an extensive list of all the Management Plans for the Project.

**Table 6.1: Current List Environmental Monitoring and Management Plans**

Document Number	Plan Name	Current Revision Date
BAF-PH1-300-P16-0002	Snow Management Plan	Mar-21
BAF-PH1-830-P16-0001	Surface Water Sampling Program - Quality Assurance and Quality Control Plan	Mar-21
BAF-PH1-830-P16-0002	Air Quality and Noise Abatement Management Plan	Apr-21
BAF-PH1-830-P16-0004	Borrow Pit and Quarry Management Plan	Mar-14
BAF-PH1-830-P16-0006	Cultural Heritage Resource Protection Plan	Mar-16
BAF-PH1-830-P16-0008	Environmental Protection Plan	Apr-21
BAF-PH1-830-P16-0010	Fresh Water Supply, Sewage and Wastewater Management Plan	Mar-21
BAF-PH1-830-P16-0011	Hazardous Materials and Hazardous Waste Management Plan	Mar-17
BAF-PH1-830-P16-0012	Interim Closure and Reclamation Plan	Oct-18
BAF-PH1-830-P16-0013	Oil Pollution Emergency Plan - Milne Inlet (OPEP)	May-20
BAF-PH1-830-P16-0017	Q1 Quarry Management Plan	May-19
BAF-PH1-830-P16-0023	Roads Management Plan	Feb-20
BAF-PH1-830-P16-0024	Shipping and Marine Wildlife Management Plan	July-20
BAF-PH1-830-P16-0025	Stakeholder Engagement Plan	Mar-16
BAF-PH1-830-P16-0026	Surface Water and Aquatic Ecosystems Management Plan	Mar-21
BAF-PH1-830-P16-0027	Terrestrial Environmental Management and Monitoring Plan	Mar-16
BAF-PH1-830-P16-0028	Waste Management Plan	Mar-20
BAF-PH1-830-P16-0029	Phase 1 Waste Rock Management Plan	June-20
BAF-PH1-830-P16-0030	Borrow Source Management Plan – Kilometre 2	Oct-14
BAF-PH1-830-P16-0031	Life of Mine Waste Rock Management Plan	Apr-14
BAF-PH1-830-P16-0032	Borrow Source Management Plan - Kilometre 97	Oct-14
BAF-PH1-830-P16-0035	Borrow Source Management Plan - Kilometre 104	Mar-14
BAF-PH1-830-P16-0036	Spill Contingency Plan	Feb-21
BAF-PH1-830-P16-0037	Exploration Spill Contingency Plan	Jan-21
BAF-PH1-830-P16-0038	Exploration Closure and Reclamation Plan	Jan-21
BAF-PH1-830-P16-0039	Aquatic Effects Monitoring Plan	Oct-15
BAF-PH1-830-P16-0040	QMR2 Quarry Management Plan	Jul-17
BAF-PH1-830-P16-0041	Polar Bear Safety Plan	Mar-16
BAF-PH1-830-P16-0042	Spill at Sea Response Plan	Aug-15
BAF-PH1-830-P16-0046	Marine Environmental Effects Monitoring Plan	Mar-16
BAF-PH1-830-P16-0047	MDMER Emergency Response Plan	Feb-19

Document Number	Plan Name	Current Revision Date
BAF-PH1-830-P16-0050	Ballast Water Management Plan	Mar-19
BAF-PH1-830-P16-0056	Diesel Environmental Emergency (E2) Plan - Milne Port	Feb-20
BAF-PH1-830-P16-0057	Diesel Environmental Emergency (E2) Plan – Mine Site	Feb-20
BAF-PH1-830-P16-0058	Oil Pollution Prevention Plan - Milne Inlet (OPEP)	May-20
BAF-PH1-840-P16-0002	Emergency Response Plan	Dec-20
H349000-3000-07-245-0001	Q7 Quarry Management Plan	Oct-13
H349000-3000-07-245-0002	Q11 Quarry Management Plan	Oct-13
H349000-3000-07-245-0003	Q19 Quarry Management Plan	Oct-13
H349000-4200-07-245-0001	D1Q1 Quarry Management Plan	Oct-13
H349000-4200-07-245-0002	D1Q2 Quarry Management Plan	Oct-13

A copy of Baffinland's Environmental Management Plans are available on the document web portal:  
<https://www.baffinland.com/media-centre/document-portal/>.

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